Book of Abstracts 2025

32nd International Student Congress Of (bio-)Medical Sciences

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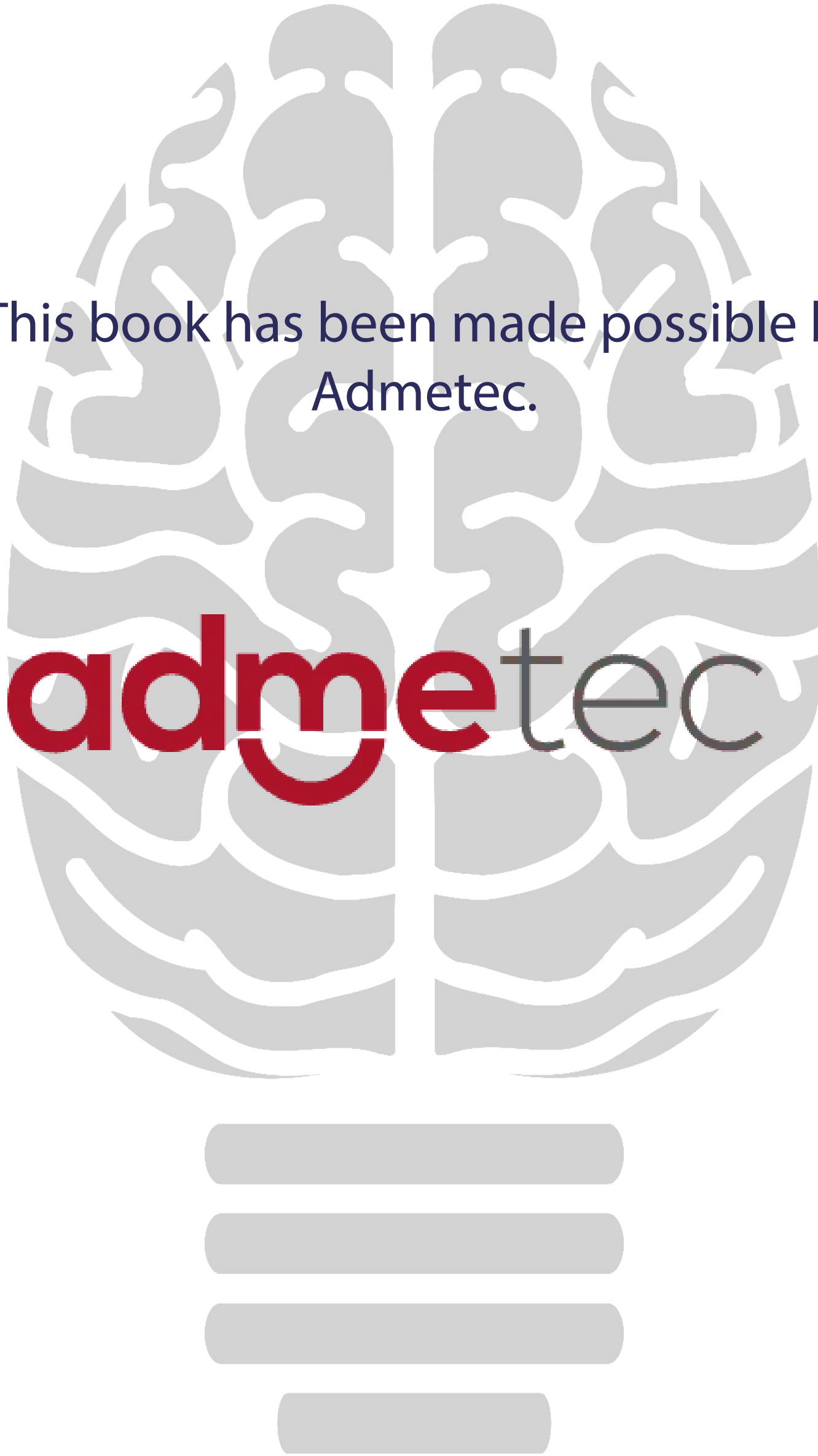

Preface

Bauke Oostheim
Prof. Wiro Niessen, PhD

ISCOMS 2025 | SCIENCE BEYOND BORDERS

Bauke Oostheim

president ISCOMS 2025

Dear participants,

With great pleasure, I would like to welcome you to the 32nd edition of the International Student Congress Of (bio)Medical Sciences (ISCOMS)!

Before we dive in, I want to say one thing to you: enjoy. Enjoy the scientific program that ISCOMS has to offer, enjoy meeting many other like-minded students, and enjoy all the social activities this week where you can get to know each other, and hopefully create lasting and meaningful friendships.

On behalf of the entire Organising Committee of ISCOMS 2025, we are incredibly proud to present this year's programme to you. I'm very proud of all the hard work of the entire Organising Committee of ISCOMS 2025.

The theme of ISCOMS 2025 is 'Harmonious Healthcare', addressing global challenges related to the environment, climate change, conflict, and healthcare. We aim to approach these issues with optimism, working together to find solutions.

Each day features its own theme: 'Scientific Development: From Bench to Bedside', 'Next-Gen Technologies', 'Personalised Medicine', and 'Global Health, Equity and Justice'. These themes are reflected in our keynote lectures, day chairs, and at the Fountain Patio.

On Monday, the 2nd of June, we kick off with the Pre-course: a day of masterclasses and inspiring ISCOMS Medical Talks to sharpen your research skills.

Throughout the congress, we welcome various world-renowned award-winning keynote speakers, including Professor Peter Hegemann PhD, Professor Hans Clevers MD, PhD, Professor Svetlana Mojsov PhD, Professor David Huang MD, PhD and Professor Awa Marie Coll-Seck MD, PhD.

This year, we're proud to introduce something new to your ISCOMS experience: our very own ISCOMS Podcast! For the first time at such a professional level in our 32-year history, we're bringing the voices, stories, and science of inspiring people to life, in a format you can take with you: on your way home, during a walk, or even before or after a congress day. Be sure to listen to our podcast on Spotify when you get the chance!

After the congress, an international group of around thirty young and talented (bio)medical students will start with the ISCOMS Research Fellowships, in which they will join a two-week research internship at one of the Research Institutes of the UMCG.

I am proud that we are acting according to our slogan; 'Science Beyond Borders', and that we are able to bring students from all over the world together to provide them with the opportunity to present their research on an international platform, acquire knowledge by attending the programme, and expand their network by interacting with other participants from across the globe.

On behalf of the entire Organising Committee, I wish you all an inspiring experience and I hope you will enjoy ISCOMS 2025 as much as we enjoyed organising it!

Bauke Oostheim

Prof. Wiro Niessen, PhD

Dean/Member of the Board of Directors
University Medical Center Groningen

Dear participants of the ISCOMS 2025 conference,

I would like to bid you a warm welcome to the International Student Congress Of bio(Medical) Sciences 2025. Any time of the year the city of Groningen is special, but the time when spring turns into summer is special: the days are long, the city is lively, and there is ISCOMS, definitely one of my favourite weeks in the academic year in Groningen. ISCOMS is a conference that we at University Medical Center Groningen (UMCG) and the University of Groningen are immensely proud of. Fully organised by students for students, ISCOMS is one of the largest student conferences in the world and a truly unique event.

This year's theme of ISCOMS is Harmonious Healthcare. This reflects the broad perspective the ISCOMS organisation has towards health and healthcare. This greatly aligns with the mission and vision of UMCG, where the aim is to create the future of Health. More healthy years for citizens in our region, e.g. through prevention, by providing accessible, high-quality care, and by educating the next generation of health professionals. But also, more healthy years to people all over the world, by translating scientific discoveries and novel technologies into meaningful innovations.

At ISCOMS 2025 the future of medicine (that is: you!) will reflect on the urgent realities of our world. Next to be exposed to exciting developments in science and healthcare, I hope this theme will challenge us to think beyond traditional clinical settings, realising that health is not created in hospitals alone. It is shaped by our environment, our policies, our shared global experiences. In a world facing unprecedented pressures, from climate change and environmental, to political and social unrest and geopolitical conflicts, healthcare must evolve. Harmonious healthcare calls for innovation to shape systems that are not only clinically efficient but also socially, environmentally and globally responsible.

I really think ISCOMS is a place where such big issues can be addressed, by young people with an open mind to science, innovation, health and society. ISCOMS is a truly international meeting, and it thus brings many perspectives. It is such an honour to be able to welcome people from so many different places in Groningen, representatives of over 70 countries have already registered when I write this in the beginning of May. Diversity and inclusion are important values for UMCG and the University of Groningen, and I am sure this diversity will increase the quality of the discussions and interactions at ISCOMS.

ISCOMS 2025 will also focus on the collaboration between the 'Global North' and the 'Global South'. Achieving harmonious healthcare will benefit greatly from mutual learning and partnership across borders. It means respecting different health systems, while acknowledging structural imbalances, and building solutions that are locally relevant yet globally informed.

I invite you to take full advantage of the exciting programme of ISCOMS 2025. There can be such joy in learning new things, in getting inspired by the passion of professionals. In addition, I hope you will have an excellent time in Groningen. Conferences like these are also a place to meet people, to exchange ideas, to challenge each other how to create the best future for medicine, and, to have a good time. I myself met many people in my early career during conferences, and some of them have become dear friends. Who have all taken on different kind of roles in different settings, and different places in the world, and whose experiences continue to shape my own view on health, science, innovation and the responsibility we have towards the future of health and healthcare.

Wiro

Organising Committee

Executive Board
Advisory Board
Junior Advisory

ISCOMS 2025 | SCIENCE BEYOND BORDERS

Executive Board

The ISCOMS Executive Board 2025 is composed of nine (bio)medical students from the University of Groningen, working in close collaboration with 25 organisation members to deliver the best possible experience at ISCOMS 2025. Their mission is to offer students the chance to present their research on an international stage, gain insights through a diverse scientific programme, and broaden their network by engaging with fellow participants.

Since the formation of the Executive Board in May 2024, the board members have grown into their respective roles and responsibilities. Through biweekly meetings, they ensured that all of their tasks were carried out diligently and that communication remained clear and consistent. Beyond their professional cooperation, the board also developed meaningful friendships. It is remarkable how individuals with such varied personalities complemented one another and provided support whenever it was needed.

Over the course of this challenging yet rewarding year, every member has gained valuable experience and takes great pride in what has been achieved. The Executive Board extends heartfelt thanks to the entire Organising Committee for their dedication in bringing ISCOMS 2025 to life. They also express their appreciation to the advisory board, junior advisors, and everyone who offered their support throughout the year.

It is with great pleasure that the Executive Board welcomes all participants to the 32nd edition of the International Student Congress of (bio)Medical Sciences and wishes everyone an inspiring and memorable experience.

Bauke Oostheim	President
Philip de Knijf	Secretary
Loek de Esch	Treasurer
Eline Vrouenraets	Scientific Programme
David Krijger	Sponsors & Fundraising
Lexander Kouwenhoven	International Contacts
Lois van Loenen	Hosting & Logistics
Vera Stroosma	Media & Branding
Julia Pijnenburg	Research & Development

Advisory Board

As ISCOMS is organised each year by a new team of students, the Advisory Board plays an essential role in ensuring the continuity of the congress. With many years of experience in supporting ISCOMS, the advisors offer valuable expertise, insights, and professional networks that greatly benefit the Organising Committee. The Advisory Board consists of three senior staff members from the University Medical Center Groningen (UMCG).

Prof. Paul de Vos, PhD
Full professor of immune-endocrinology at the University of Groningen
Advisor since 2009

Prof. Matijs van Meurs, MD, PhD
Intensivist at the UMCG
Advisor since 2016

Robert A. Pol, MD, PhD
Vascular and transplant surgeon at the UMCG
Advisor since 2018

We would like to thank Paul, Matijs and Robert for their continuous support, advice and enthusiastic participation. We greatly appreciated and enjoyed our teamwork.

Organising Committee

President, Secretary, Treasurer
Scientific Programme
Sponsors & Fundraising
International Contacts
Hosting & Logistics
Media & Branding
Research & Development

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President, Secretary, Treasurer

The president, secretary, and treasurer are responsible for overseeing the Organising Committee, as head of the Executive Board.

The main task of the president, **Bauke Oostheim**, is to lead the Executive Board. She is responsible for ensuring the smooth organisation of the 32nd edition of ISCOMS, before and during the congress. Additionally, she is tasked with finding suitable day chairs and jury members.

The secretary, **Philip de Knijff,** is the contact person for the organisation. Throughout the year he will work closely with the president. Besides he is responsible for managing all registrations, online and during the congress. He will manage the registration desk and is happy to welcome all the participants.

The treasurer, **Loek de Esch**, is responsible for all budgetary aspects of the congress. As treasurer, he is in charge of the incoming and outgoing funds and he manages the budget estimate for the congress. He is happy to assist participants with any questions they may have about payments or fees.

Furthermore, the president, secretary and treasurer will take care of the statistics of our congress, to improve ISCOMS for the coming years. They are looking forward to meeting everyone at ISCOMS 2025!

Philip de Knijf, Bauke Oostheim, Loek de Esch

Scientific Programme

The Scientific Programme committee consists of six young and enthusiastic (bio)medical students. It is their responsibility to organise the scientific part of ISCOMS 2025. They are in charge of the keynote lectures, workshops, pre-course, interactive operation, patient lecture and the ISCOMS Research Fellowships (IRF). Their aim is to make the scientific programme of ISCOMS engaging and diverse. Besides, they also supervise the abstract selection and ensure that students can present their research in a plenary, oral or poster session.

During the pre-course, participants have the chance to improve their research skills in a track of two masterclasses and attend interesting ISCOMS Medical talks. Additionally, the Graduate School of Medical Sciences will tell all about the research possibilities in Groningen at 'Your Future at the UMCG'.

Divided across three congress days, five internationally well-established researchers will present their knowledge and experiences in keynote lectures. There are also a lot of exciting workshops, ranging from hands-on activities to patient demonstrations and interactive workshops about societal issues. Additionally, an interactive operation will be presented. So even if you are not very familiar with research yet, participants can visit the lectures, participate actively in hands-on workshops and gain new scientific skills.

For students who are interested in doing research in Groningen in the University Medical Center Groningen, the Scientific Programme committee organises the two-week ISCOMS Research Fellowships. These internships will take place directly after the congress, offering you the chance to connect with researchers at the UMCG.

The Scientific Programme committee is convinced that ISCOMS is the perfect opportunity for students and young researchers from all around the world to present their recent work, meet fellow scientists and get enthusiastic about doing research. They enjoy creating a challenging and diverse scientific programme for ISCOMS 2025 and they are looking forward to meeting you all!

Eline Vrouenraets
Vieve Staal
Dana Rosloot
Cas Reuling
Fien Zwaan
Teun de Bok

Sponsors & Fundraising

ISCOMS cannot take place without its financial funding. The Sponsors & Fundraising Committee is responsible for securing the financial resources necessary to organise this international event. This involves establishing and maintaining contact with a wide range of companies and funds.

The committee is made up of six enthusiastic and dedicated students who have worked hard to ensure the financial success of the congress. A strong and positive collaboration between ISCOMS and its partners is key to making the event a success.

As one of the largest student congresses in the world focused on (bio)medical sciences, ISCOMS offers outstanding sponsorship opportunities. The congress attracts hundreds of national and international students, as well as scientists, professors, researchers, and medical specialists from the UMCG. This diverse and professional audience makes ISCOMS an appealing platform for potential sponsors.

Sponsoring ISCOMS provides companies with a valuable opportunity to increase brand awareness and establish new connections. Our aim is to create partnerships that offer mutual benefits. Sponsors can showcase their organisation through logo placement (e.g. on our website), promotional stands, or by hosting engaging workshops. If you are passionate about supporting biomedical research and would like to connect with a broad audience of ambitious (bio)medical students, we invite you to explore the possibilities on our website. Should you have any questions, please don't hesitate to get in touch, we would be more than happy to provide you with all the information you need.

David Krijger
Noortje Zwarts
Sophie Goswami
Pepijn Boudri
Stephan Scheurwater
Floor Wassenberg

International contacts

The International Contacts committee manages the global outreach for ISCOMS. The International Contacts committee is dedicated to promoting the congress worldwide and providing essential support to international participants preparing for ISCOMS 2025. This includes assisting with registration and resolving any difficulties you might face.

The International Contacts committee actively promotes ISCOMS through email, calls, and distributing promotional materials globally. The committee is greatly supported in this effort by our dedicated ISCOMS Ambassadors; past participants inspired by their own experience. Interested in joining our global ISCOMS network? To learn more about the ISCOMS Ambassador role and how to get involved for ISCOMS 2026, go to page: 19

The International Contacts committee is your point of contact for various aspects of participation:
Questions: International Contacts answers any questions participants might have about abstract submission, registration, travel, etc., and provides general information about ISCOMS.
Visa support: the committee works closely with embassies to assist students in their visa application for the Netherlands.
Financial aid: they manage the ISCOMS Travel Grants for students needing financial assistance to attend.

Are you interested in helping us promote ISCOMS in your region? We are always seeking new global contacts. Please reach out to the International Contacts committee! For assistance with visas, travel grants, ambassador information, promotional partnerships, or any other inquiries, please email the International Contacts committee at: iscoms@umcg.nl

The International Contacts committee would like to thank everyone who helped in promoting ISCOMS 2025!

Lexander Kouwenhoven
Nika van der Marel
Tom Karelse
Charlotte Dortland
Roos Minkema
Jeroen Liefers

Hosting & Logistics

The Hosting and Logistics committee is responsible for the hosting of participants, organising the social programme and the logistics during the congress.

When the participants of ISCOMS come to Groningen, they need a place to stay. Next to providing discounts on various hotels and hostels in the city, the Hosting & Logistics committee can usually offer an affordable and fun alternative with the ISCOMS Housing Hub. Participants will sleep in a typical Dutch student house or with a host family. . Besides being more affordable than a hotel, this accommodation offers participants the opportunity to socialise with local residents of Groningen and gain insight into their daily lives.

Next to the scientific programme, ISCOMS offers a broad social programme for the participants to connect and have fun with each other. The Hosting & Logistics committee organises a welcoming night on Sunday, salsa workshop on Monday and the Formal Dinner on Tuesday. On Wednesday the 'recreational evening' takes place, on which various activities are held. Thursday, after the closing ceremony we celebrate the World Wide ISCOMS Night: a night on which everybody dresses up in a typical outfit of their country and comes together to celebrate the amazing week they had. On Friday, during the Post Congress Tour, ISCOMS will visit another Dutch city for a day filled with activities and relaxation.

At last, the Hosting and Logistics committee is responsible for managing all logistical aspects of the congress. Together with the Scientific Programme committee, they provide the overall programme and the plan of action: a comprehensive guide detailing every aspect of the congress.

This years' Hosting & Logistics committee is looking forward to seeing you at ISCOMS 2025!

Lois van Loenen
Noor van den Boom
Ilse Hughtenburg
Mees van Ginneke

Media & Branding

The Media & Branding Committee is responsible for shaping the visual identity and public image of ISCOMS. This committee ensures that everything associated with the congress, from posters and flyers to merchandise and social media, reflects a cohesive, professional, and recognisable brand.

Throughout the year, the committee designs all of the promotional and printed materials for ISCOMS 2025. These include posters, flyers, banners, booklets, and congress signage, as well as the merchandise worn by the organisation and sold to participants. Many of these materials are distributed internationally by the International Contacts Committee, and play an important role in global outreach.

One of the committee's most significant projects is the Book of Abstracts. This comprehensive publication features all abstracts presented at the congress, along with practical information and acknowledgements. It is distributed to all participants and serves as a lasting reflection of ISCOMS' scientific and organisational quality.

The Media & Branding Committee is also responsible for ISCOMS' online presence, maintaining and designing content for platforms such as Instagram, Facebook, LinkedIn, and TikTok. The committee develops a consistent social media strategy, creates engaging posts, and interacts with the ISCOMS community throughout the year.

Another highlight is the production of the official promo video and trailer, which visually introduces ISCOMS to new audiences and builds excitement in the run-up to the event.
The Media & Branding Committee works closely with all other committees to ensure every visual element , aligns with the ISCOMS brand. This collaboration helps maintain the congress's professional standard and makes ISCOMS instantly recognisable both locally and internationally.

For questions about social media, design, branding, or promotional partnerships, please contact the committee at: iscoms@umcg.nl
The Media & Branding Committee is excited to bring the visual side of ISCOMS 2025 to life and looks forward to welcoming you to the congress in June!

Vera Stroosma
Felien Suermondt
Tom WInters
Daan Kievit
Emma Boerebach

Research & Development

The Research & Development committee focuses on innovating and improving each edition of ISCOMS. By evaluating and brainstorming, the committee identifies what can and should be changed, ensuring that valuable insights, ideas, and feedback are considered to maintain ISCOMS's progressive nature.

Sustainability is an essential concept at ISCOMS. The Research & Development committee works to minimise our environmental footprint and promote sustainable practices throughout the conference. The committee is also responsible for the website and the ISCOMS app. Each year, they update and improve the layout, while ensuring participants receive the right information and latest updates.

In addition, the Organising Committee supports a charity each year. For ISCOMS 2025, over €10,000 has already been raised for 'Vrienden Beatrix Kinderziekenhuis', supporting the care and well-being of children with severe health conditions at the UMCG's Children's Hospital. The Research & Development committee organises the fundraising activities.

Lastly, the committee maintains partnerships with other student-led organisations to promote the international exchange of biomedical knowledge. By sharing ideas and supporting each other's initiatives, ISCOMS fosters academic growth, global connection, and a shared commitment to advancing science and healthcare.

Julia Pijnenburg
Floris van den Broek
Eva Kools
Milou Zielhuis

Ambassadors

Our Ambassadors begin as enthusiastic participants or presenters at ISCOMS. Inspired by their positive experience, they apply to represent the congress internationally. These selected individuals play a crucial role in promoting ISCOMS globally. Each ambassador serves for one year, selected after the previous congress to build excitement for the upcoming one. Ambassadors who demonstrate exceptional dedication may be reselected to continue their valuable work.

Starting their first promotions in October, our Ambassadors actively spread the word about ISCOMS. They share official content on social media and distribute posters, flyers, and stickers within their home countries. Many go further, by organising local meetings or by giving presentations to share their own ISCOMS experiences. Through these efforts, our network of enthusiastic students and researchers effectively conveys the unique excitement of ISCOMS across the globe. We maintain close contact with our Ambassadors who, this year, represent over 32 countries worldwide. Discover our current Ambassadors on our website, and read stories like this one:

“I was privileged to attend ISCOMS in 2022 for the first time and I learned so much through the keynote lectures, oral and poster presentations, laboratory tours, and many other educational and recreational activities. ISCOMS is a great platform for students to present their research, and learn from fellow students and researchers from all over the world on different types of research they are conducting in their respective fields.”

Alice Chimwemwe Mnyanga, student at the Kamuzu University of Health Sciences and research assistant at Malawi Liverpool Welcome Trust

Do you have questions about the ISCOMS experience, student life in Groningen, or are you in need of travel tips? Our Ambassadors are happy to share their firsthand insights. Feel free to reach out to them for advice! You can find their profiles on our website: **https://iscoms.com/university-ambassadors/** for official visa application procedures or complex registration issues, please contact the International Contacts committee directly at iscoms@umcg.nl.

Abdulmalek Alhithlool

Saudi Arabia

Adanna Emenikeonu

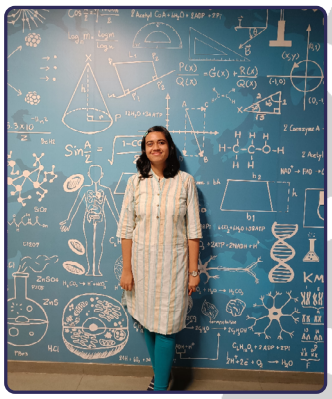
Nigeria

Ahmed Abdulwahed

Yemen

Ahmed Alsoufi

Libya



Aitijhya Kar

India

Ameer Hamza

Pakistan

Ana Maria Valencia Camacho

Colombia

Aynaz Mohammadi

Iran

Catherine Rejoice Nyirenda

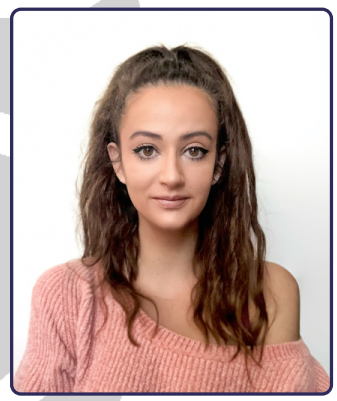
Malawi

Christabel Aloy-Amadi

Serbia

Christian Urrea

Colombia



Denise Taner

Bulgaria

Dev Patel

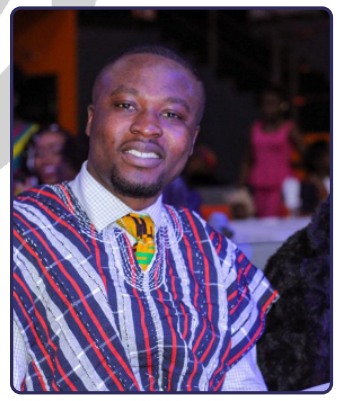
India

Dorene Susan Jacob

Bulgaria

Dorota Szydlowska

Poalnd

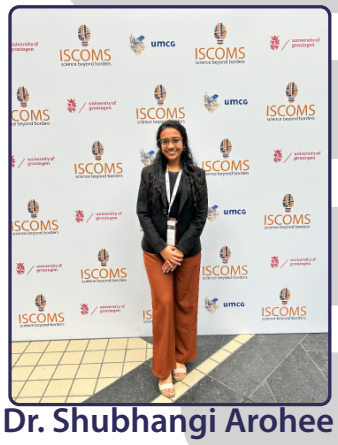


Dr. Colins Boamah

Tanzania

Dr. Jayesh Watane

India



Dr. Shubhangi Arohee

India

Elene Lipartia

Georgia

Evelyn Gómez Garfias

Mexico

Glory Esther Kaunda

Malawi

Karolina Jalowiecka

Poland

Hammad Jamshaid

Kyrgyzstan

Hosein Kouchaki

Iran

Krishin Yerabolu

United States

Ksenija Femić

Serbia

Levon Kharatyan

Armenia

Lia Medina Montalvo

Mexico

Maksym Horiachok

Lithuania

Mario Francisco Arreola Rent-

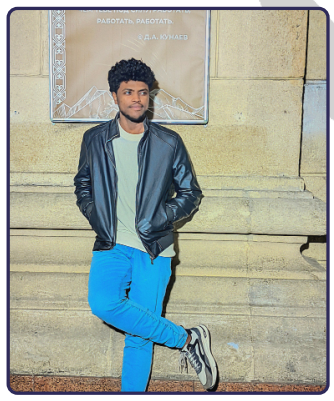
Mexico

Maximilian Greiner

Germany

Mohammad Mohamadi

China



Mohammed Anwar Abdelgader

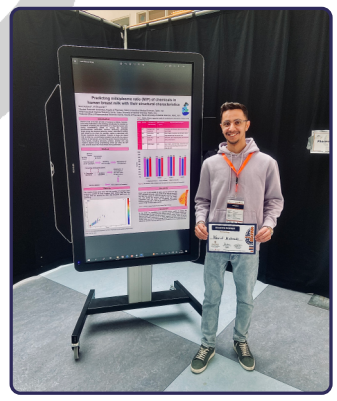
Sudan

Muhammad Umais

Pakistan

Namuun Batsaikhan

Mongolia



Navid Kaboudi

Iran

Niloufar Hazrati

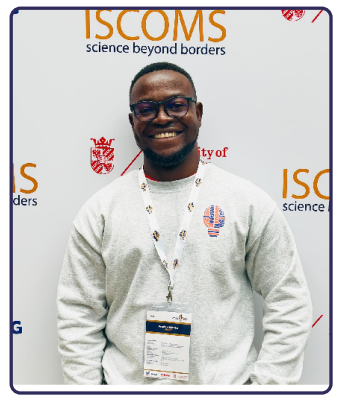
Iran

Nishany a/p Kasturiy

Malaysia

Perminder Singh

India



Precious Innocent Mastala

United States

Francois Mataboro

Congo-Kinshasa

Rizana Riyaz

United Arab Emirates

Saharnaz Sazegarnejad

Iran

Sajjad Mohammed Al Haddad

Saudi Arabia

Samin Davoody

Iran

Shafali Khanom

Bulgaria

Shrinivas Jiragal

Azerbaijan

Sinem Göç

Mexico

Taha Nagib

Libya

Tina Gabriel

Germany

Tina Luo

China

Vaidehi Vinay Kale

India

Vaneesha Lyanage

Sri Lanka

Yousif Albadri

Iraq

Yasir Alsagoor

Saudia Arabia

Yimeng Zhang

China

How can I become an ISCOMS Ambassador?

Inspired after attending ISCOMS 2025? If your experience motivates you to share the excitement with future participants, consider applying to become an ambassador for ISCOMS 2026! As an ambassador, you'll play a vital role in our global promotion. Keep an eye on our website and social media channels for application details following ISCOMS 2025, or go to https://iscoms.com/become-an-ambassador/ for more information!

Partners

IFMSA-NL

The International Federation of Medical Students Associations of the Netherlands (IFMSA-NL) is an organisation for Dutch medical students, represented at each of the eight medical faculties, with 900 active members. Its mission is to provide future physicians with a comprehensive introduction to global health issues. Through its programmes, IFMSA-NL aims to develop culturally aware medical students who are dedicated to addressing the transnational inequalities impacting global health.
IFMSA-NL is a part of the global IFMSA network. IFMSA is one of the world's oldest and largest student-run organisations, recognised by the World Health Organization (WHO) as an official international forum for medical students. With over 75 years of history, IFMSA connects over 1.5 million medical students from 133 national organisations across 123 countries worldwide.

AMSA

Asian Medical Students' Association (AMSA) International is a peak representative organisation for medical students from across Asia, the Asia-Pacific and beyond. AMSA was officially founded in Manila, Philippines in 1985, and from this day it has been an active student-led, non-profit, non-political organisation. AMSA has the focus of uniting Asian medical students under the key virtues of knowledge, action, and friendship. Currently, AMSA encompasses over 30 member countries and more than 25.000 active medical students around the globe. AMSA holds two medical student conferences yearly, for students from across the world to learn from each other, teach their fellow peers and develop lasting friendships.

EMSA

The European Medical Students Association (EMSA) is a non-profit, non-governmental organisation representing medical students from across Europe. Founded 1990 in Brussels and currently uniting 96 medical faculties in 24 different European countries. EMSA seeks to improve the health and quality of care of European citizens, by providing a platform for high-level advocacy, projects, training, workshops and international meetings. Its activities gather around Medical Education, Medical Ethics and Human Rights, Health Policy, Public Health, Medical Science and European Integration and Culture. EMSA is recognised by the European Parliament, the European Commission, the Council of Europe and the World Health Organisation's Regional Office for Europe.
Their main objectives are to connect European medical students to promote European integration and a sense of European identity, to represent their voice and promote the highest standards in European medical education, science and ethics.

Partners

EPSA

EPSA is an umbrella organisation of European pharmaceutical students' associations, representing more than 100,000 students in 36 European countries and 44 member associations. EPSA has a permanent office in Brussels and conducts its activities through regular congresses, soft skills, training events, publications, campaigns, exchange programmes and collaboration with professional organisations.
The vision of the association is to represent, reach and engage every single pharmaceutical student in Europe to collaborate on the development of the future of pharmacy and healthcare together. The mission of EMSA is to actively engage at student and professional level, bringing pharmacy, knowledge and students together while promoting personal development.

European MD/PHD Association

The European MD/PhD Association (EMPA) is a non-profit organisation that brings together healthcare students and graduates with an interest in science from across Europe. Its primary goal is to create a network connecting MD/PhD candidates from all European countries. EMPA organises various scientific events, including webinars and its annual conference, which is held in a different European city each year. This annual conference gathers MD/PhD candidates from across Europe to share knowledge and foster collaboration. In addition, EMPA collects information and advises policymakers on improving MD/PhD programmes, raises funding to support European translational research projects, and promotes the mobility of MD/PhD candidates throughout Europe.

TAMSA

The Tanzania Medical Student Association (TAMSA) is the foremost national organisation for medical students in Tanzania. TAMSA unites medical students from 14 medical schools across the nation.
TAMSA prepares and practically equips medical students in identifying, addressing, and solving major community health challenges through scientific and technological approaches such as research, policy formation, and participation in national and international conferences and paper presentations across various disciplines.
TAMSA has been actively partnering with national and international organisations to improve healthcare services in Tanzania and across Africa, while amplifying the voices of over 18,000 medical students from Tanzania on a global stage.

Partners

AIMS Meeting

The Annual International Medical Students (AIMS) Meeting is an international medical congress hosted at the Faculty of Medicine of the University of Lisbon, Portugal, entirely held by students every year in April. With renowned national and international speakers, a variety of practical workshops, and four competitions (Research, Scientific, Clinical, and Start-Up), participants can enjoy four days of lectures and hands-on learning. Besides this enriching learning experience, they also provide an outstanding social and cultural program for their participants to get to know the beloved city of Lisbon. In addition, they are available to facilitate the accommodation of foreign students.

YES Meeting

The Young European Scientist (YES) Meeting is an annual international student conference held at the Faculty of Medicine of the University of Porto, Portugal. After many successful editions, the event remains focused on its key objectives: promoting junior research in the biomedical field, providing students with a platform to share their experiences, and bridging the gap between world-renowned researchers and the next generation of scientists.

The YES Meeting features an outstanding scientific programme, with the presence of leading experts in biomedical fields such as Neurosciences, Oncology, Molecular Biology, Physiology, Immunology, Internal Medicine, and Surgery. Participants can enhance their skills through a wide range of workshops and enjoy the vibrant city of Porto through various social activities. They invite you to join the 20th YES Meeting, which will take place from 18th to 21st September 2025.

ICHAMS

The International Conference for Healthcare and Medical Students (ICHAMS) is Ireland's first student-led conference, founded at the Royal College of Surgeons in Ireland (RCSI) in 2010. This annual international conference is organised each February by a group of full-time students from various healthcare fields at RCSI in Dublin, Ireland.

ICHAMS welcomes undergraduate students from all healthcare disciplines, including physiotherapy, pharmacy, and medicine. Students looking to enhance their research and presentation skills, network with like-minded peers and professionals, and learn from world leaders through small group workshops or keynote lectures will find ICHAMS to be an inspiring environment. Students without research to present are also welcome to attend as passive participants and will have full access to the three-day conference.

Partners

ICOCIMS

The International student Congress on Clinical Innovation and Medical Sciences (ICOCIMS) is an international biomedical student conference taking place in Italy, fostering scientific dissemination, career development, and networking opportunities among students from diverse geographical and academic backgrounds. ICOCIMS invites undergraduate, graduate, and doctoral students, as well as recent graduates, from all fields of biomedical science.
The third edition will take place in the charming city of Parma in November 2025. The program will include lectures by distinguished professors, a variety of practical workshops, and career development panels. These activities will complement the oral presentations and poster sessions, offering students the opportunity to showcase their research. Beyond the academic program, the event will offer social activities to foster networking and cultural experiences, including exploring the beautiful city and its delicious cuisine.

MEDICS

The Medical International Conference for Students (MEDICS) is the main event organised by the Scientific Organisation of Medical Students (SOMS). Their mission is to bring together science enthusiasts worldwide, offering exceptional opportunities to share research, broaden horizons, and connect with like-minded people. Since its first edition in 2016, MEDICS has hosted conferences, workshops, scientific competitions, and social events, all organised by ambitious medical students.
MEDICS 2025 took place in Bucharest, Romania, in early April, focusing on networking and how effective communication drives innovation. Their purpose is to unite the greatest minds of our generation with those who want to follow in their footsteps.

ICMS

ICMS, the International Congress of Medical Sciences is an international event, organised by the Association of Medical Students in Bulgaria, Sofia (AMSB-Sofia). Taking place each year in May, the congress provides students and young doctors from around the world with the opportunity to present their research through poster and oral sessions in pre-clinical studies, therapy, surgery, and public health. ICMS aims to inspire innovation and promote academic excellence through a remarkable programme of hands-on workshops and keynote lectures by world-renowned scientists and doctors.
ronment. Students without research to present are also welcome to attend as passive participants and will have full access to the three-day conference.

Organisation

Junior Scietific Masterclass
Graduate School of Medi-
cal Sciences
Research Institute

ISCOMS 2025 | SCIENCE BEYOND BORDERS

Junior Scientific Masterclass

Junior Scientific Masterclass Programme

Jenke Gorter PhD, Junior Scientific Masterclass Programme Coordinator

About the Junior Scientific Masterclass (JSM) Programme

The Junior Scientific Masterclass (JSM) Programme organised by the Faculty of Medical Sciences at the University of Groningen and University Medical Centre Groningen (UMCG) offers a unique opportunity for students enrolled in the bachelor's degree in medicine and dentistry to enhance their scientific training. Through the JSM Programme, students explore the integration of scientific research and clinical care, engage in hands-on research projects under the supervision of established (physician) scientists, deepen and develop their scientific knowledge and research skills, and gain the opportunity to tailor education and training to their individual interests and career goals, including preparation for the (D)MD/ PhD trajectory.

Bridging the Gap: Training for Innovation in Healthcare

Physician-scientists play a crucial role in bridging research and clinical practice, both in translating research outcomes into advances in patient care as well as reverse-translating patient outcomes to understand their mechanistic basis. To address the shortage of physician-scientists in the northern Netherlands, the JSM programme was launched in 1999 to help motivated students develop research skills and ambitions, aiming to embed talented physician-scientists in the region. Beginning in 2001, the (D) MD/PhD programme has given talented students the opportunity to pursue a PhD in parallel with their medical studies. Beginning in 2012, the Mandema stipend was initiated to enable new physician-scientists, (D)MD/PhDs, to combine their medical specialist training with research and establish their own lines of research. These initiatives have together trained numerous physician-scientists who now work successfully in the UMCG and surrounding hospitals.

Getting Involved in the JSM Programme

The JSM Programme offers a wide range of courses, research opportunities, and networking and mentoring activities to support the development of scientific knowledge and skills. The full list of courses is available in Ocasys. Students interested in joining the JSM Programme can find more information on the website or by email. (Clinician) scientists who wish to become (more) involved are also encouraged to get in touch or visit the University Medical Center intranet.

Ocasys: **https://ocasys.rug.nl/current/catalog/programme/JSM1**

Website**:** **https://www.rug.nl/umcg/education/geneeskunde/junior-scientific-masterclass/**

Email**:** **j.s.masterclass@umcg.nl**

Intranet: **https://intranet.umcg.nl/c/portal/login?redirect=%2Fjunior-scientific-masterclass&refererPlid=38980&p_l_id=2**

Graduate School of Medical Sciences

Graduate School of Medical Sciences (GSMS)

The Graduate School of Medical Sciences (GSMS) is the largest Graduate School of the University of Groningen. The GSMS is responsible for the selective masters and PhD education programmes within the University Medical Centre Groningen (UMCG). Research within the UMCG ranges from fundamental to patient-oriented (clinical) research. The programmes cover a wide range of research fields and are intended for students with a background in areas including biology, biochemistry, biomedicine, healthy ageing, healthcare, medicine, pharmacy, psychology and human movement sciences.

PhD programmes

The Graduate School of Medical Sciences (GSMS) offers different opportunities to prospective PhD students. Support ranges from locating potential supervisors to tailor-made advice in line with the funding structures you may have access to. Please consult the website to learn more about the available PhD opportunities: **rug.nl/gsms**

Why pursue a PhD at the GSMS?

The GSMS works with people from all over the world. All of the postgraduate programmes are taught in English and almost half of the doctoral students are international! The students are encouraged to complete parts of their programme in partner universities abroad and to build connections across national and cultural borders.
In addition, GSMS provides a personalised programme. Their PhD students follow courses and do research in small groups where personal interaction with their supervisor is an important part of their PhD trajectory. As a result, the students design their research and their programme to meet their own personal interests.

The University of Groningen is a top 100 University: our researchers come from all over the world and conduct groundbreaking research in an international environment. Research within the GSMS ranges from fundamental to patient-oriented (clinical) research. The GSMS has organised all its research into five research institutes, each of which has developed research programmes around specific aims and objectives.

Master programmes

The Graduate School of Medical Sciences administrates two master programmes:

1. **MScClinical and Psychosocial Epidemiology ;** Clinical and Psychosocial Epidemiology (CPE) is a selective two-year research master's programme that focuses on the prevention, development, and treatment of both physical and mental conditions through a challenging and high-quality interdisciplinary curriculum, including biological, psychological, and social perspectives. CPE students learn how to contribute to better solutions by applying innovative research designs and statistical techniques while utilising state-of-the-art facilities. Students are situated within the UMCG, and have the opportunity to work with unique data resources. The master's programme includes two tracks: Lifecourse Health Development and Health Systems and Prevention.
   - ***Track - Lifecourse Health Development***; In this track, the focus lies on unraveling how chronic diseases and mental health issues develop and progress over time through the application of a life-course perspective. Understanding the processes leading to changes in health and wellbeing and improving prevention and treatment strategies are key aspects of this track. While collaborating with renowned researchers and clinicians, students learn how a person's age, lifestyle, stage of illness or stressful life events affects these processes.
   - ***Track - Health Systems and Prevention***; In this track the focus is on the applying of a health systems approach to design population-based prevention programmes and evaluate the impact of health systems on population health, well-being and healthcare costs. Through this track, students acquire practical experience during an internship, allowing them to put research into practice to make a measurable impact on society.

More information: **rug.nl/cpe**

2. MSc Molecular Medicine and Innovative Treatment

The MSc Molecular Medicine and Innovative Treatment (MMIT) is a two-year selective programme designed to educate motivated students through a challenging and high-quality multidisciplinary curriculum. Whether students aspire to work in or outside academia, they will be prepared for a successful career in (bio)medical and pharmaceutical sciences. Right from the start, students will learn to become a critical evaluator of current research, develop their own ideas, and define the kind of researcher they want to become.

MMIT offers a rare advantage by integrating fundamental, translational and clinical research. It covers a wide range of exciting topics in molecular and translational medical research such as immunology and infectious diseases, drug innovation and development, neurobiology and neurodegenerative diseases, cancer biology and immune therapy, cardiovascular diseases, and bioinformatic and system medicine.

More information: **rug.nl/mmit**

Why choose a master's programme at the GSMS?

- Become part of a close-knit international cohort
- Engage in a stimulating and supportive research environment
- Receive ongoing individual guidance throughout the academic journey to support the achievement of personal learning objectives.
- Benefit from high quality teaching by renowned researchers
- Receive support for both personal and professional growth
- Have the opportunity to undertake research internships

Students who are interested in (applying for) one of these programmes, can consult the official webpages for more information:
For CPE: **www.rug.nl.cpe**
For MMIT: **www.rug.nl/mmit**

Research Institutes

Health in Context

Research Institute for Prediction, Prevention, and Care
Director: Tineke Oldehinkel

The mission of the Health in Context Research Institute is to promote public health and clinical care by facilitating high-quality research aimed at understanding and predicting health trajectories, preventing the onset, relapse or negative consequences of disorders and improving the treatment and care of patients. A large part of their research focuses on contextual factors associated with health-related outcomes, including interventions. Together they envision shaping healthy futures for citizens, clients and patients. The Health in Context Research Institute covers fifteen research programs, which can be described by three research themes.

Clinical, cognitive, perceptual, and translational neuroscience
This research aims to better understand how the brain is involved in mental, cognitive, perceptual, and motor abilities, and to develop more effective treatments for current and future patients.

Individual, social, and environmental risk and resilience
This research theme focuses on how risk and resilience factors within individuals and in their social and physical environments influence the onset, course and consequences of disorders.

Movement, education, treatment, and care
This theme focuses on how we can provide the best possible treatment and care. It involves, among other things, promoting lifestyle management, evidence-based training of health professionals, and treatments that are cost-effective and optimally geared to patients' needs.

MoHAD

Research Institute for Mechanisms of Health, Ageing and Disease (MoHAD)
Director: Marco Demaria

The mission of MoHAD is to foster knowledge and promote collaboration among fundamental, translational and clinical researchers to understand and target disease mechanisms. With a deeper understanding of the mechanisms that regulate health and pathology, they strive to develop innovative therapeutic applications for multiple morbidities and for extension of healthy longevity.

Themes:
- Oncology (Theme lead – Marcel van Vugt)
- Cardiovascular and Renal Disease and Treatment (Theme lead – Udo Mulder)
- Development and Ageing (Theme lead – Ellen Nollen)

Precision:
Personalised medicine research institute Groningen (PRECISION)
Director: Debbie van Baarle

Precision is the personalised medicine research institute Groningen.
The mission of Precision is to foster innovative research in the development of diagnostic and therapeutic strategies aimed at advancing personalised care. To achieve this, they aim to create an open, inspiring, translational environment to facilitate multidisciplinary scientific excellence towards novel personalised treatments with scientific, economic and/or societal impact. Researchers from UMCG and Groningen Research Institute of Pharmacy (GRIP) actively participate within this institute.

1. ***The research within Precision is embedded in three themes:***
Innovative technologies for diagnostics, treatment and transplantation
Theme lead – Bart Cornelissen
Within this theme, novel medical technologies will be developed to identify and monitor disease, improve treatment specificity, and enhance survival after transplantation.

2. ***Drug development and therapeutic strategies***
Theme leads – Patrick van Rijn, Anna Salvati (GRIP).
The aim is to improve drug therapies through the discovery of novel drug targets, development of new small molecule and biological drug entities and therapeutic strategies, improved drug delivery, and evaluation of drug use in real-world settings, from preclinical research to clinical application.

3. Microbes, inflammation and immunity
Theme lead – Jill Moser
The focus will be on conditions in which homeostasis is disturbed by pathogens or imbalances in host and inflammatory pathways in order to advance immunomodulatory therapies and vaccine development.

European Research Institute for the Biology of Ageing (ERIBA)

At ERIBA, research is strongly connected with education and training of the future generation of Biology-of-Ageing researchers. ERIBA aims to be 'the place to be' for the best students by offering comprehensive training in some of the top Biology-of-Ageing laboratories in the world. They have developed a cutting-edge graduate curriculum in ageing biology, where students will be exposed to a wide variety of model systems and approaches. The extensive training experience of ERIBA'a international faculty, gained at leading research institutes worldwide, ensures an optimal educational and research environment. ERIBA is part of the University Medical Center Groningen and is also located there.

Undergraduate students

ERIBA welcomes applications from undergraduate (pre-BSc and MSc) students who wish to pursue an internship in one of the ERIBA labs. Students are typically enrolled in biomedical, chemical, pharmaceutical, medical or bioinformatic programmes at their home University or University of Applied Sciences ('Hogeschool'). Prospective students are invited to explore the different research teams on the ERIBA website and to specify their motivation for selecting a particular lab in their application. While some short-term internships may be available, we prefer rotations that last for five months or longer.

PhD students

ERIBA offers an exciting environment to pursue a PhD degree in the Biology of Ageing. They aim to train PhD students to become independent, creative, multi-skilled scientists. While students primarily focus on their own research projects, they also benefit from complementary research activities in neighbouring labs. A wide variety of courses, all taught in English, are available to help PhD students acquire additional skills. A PhD degree from one of the ERIBA labs provides excellent preparation for the next stage of an academic or corporate career. PhD students in ERIBA are enrolled in the Graduate School of Medical Sciences and will defend their thesis at the University of Groningen. PhD projects at ERIBA typically last four years.

Postdoctoral fellow

ERIBA is always looking for outstanding postdoctoral candidates with strong training in molecular or cell biology who are eager to address key scientific questions in ageing research. They encourage postdoctoral candidates to directly contact one of the ERIBA's Principal Investigators to explore job opportunities.

For more information, please visit https: **www.eriba.umcg.nl**

Email: SecretariaatEriba@umcg.nl

Congress

Programme 2025
Day Chairs
Jury chair + members
Awards
Theme: Harmonious Healthcare

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Programme ISCOMS 2025

Monday 2nd of June - Pre-course

Scientific Devlopment: From Bench to Bedside

08:15-09:00	Registration
09:00-09:30	Day opening
09:30-11:00	Masterclass I
11:00-11:45	Break
11:45-13:15	Science Elective
13:15-14:15	Lunch
14:15-15:45	Masterclass II
16:00-17:00	Speed keynote lectures
17:00-17:30	Your Future at the UMCG
17:30-17:45	Day closing
19:00-23:00	Social programme

Tuesday 3rd of June - Congress day 1

Next-Gen Technologies

07:45-08:30	Registration
08:30-09:00	Opening ceremony
09:00-10:00	Keynote lecture: Prof. Peter Hegemann, PhD
10:00-11:15	Poster session I
11:15-12:00	Break- Meet the Expert: Prof. Peter Hegemann, PhD
12:00-13:15	Workshop I
13:05-14:20	Lunch-Career and Internship Fair
14:20-15:45	Oral session I
16:00-17:00	Keynote lecture: Hans Clevers, MD, PhD
17:00-17:30	Closing ceremony
19:30-23:30	Formal Dinner

Wednesday 4thh of June - Congres day 2

Personalised Medicine

08:30-09:00	Registration
09:00-09:15	Opening ceremony
09:15-10:15	Keynote lecture: Prof. Svetlana Mojsov, PhD
10:15-11:30	Poster session II
11:30-12:00	Break- Meet the Expert: Prof. Svetlana Mojsov, PhD
12:00-13:15	Workshop II
13:05-14:15	Lunch-Research & Academic Fair
14:15-15:30	Operation
15:30-15:45	Break
15:45-16:45	Plenary Session
16:45-17:45	Keynote Lecture: David Huang, MD, PhD
17:45-18:00	Closing ceremony
19:00-22:30	Recreational Evening

Thursday 5th of June - Congress day 3

Global Health, Equity and Justice

08:30-09:00	Registration
09:00-09:15	Opening ceremony
09:15-10:15	Keynote lecture: Prof. Awa Marie Coll-Seck, MD, PhD
10:15-11:30	Plenary session II
11:15-11:45	Break- Meet the Expert: Prof. Awa Marie Coll-Seck, MD, PhD
11:45-13:00	Workshop III
13:00-14:00	Lunch
14:00-15:30	Oral session II
15:30-16:00	Break
16:00-17:00	Patient Lecture
17:00-17:45	Award & Closing ceremony
19:00-02:00	World Wide ISCOMS Night

Day chairs

Monday the 2nd of June

Prof. Irene H. Heijink, PhD

Full Professor Cellular and Molecular Lung Pathology, Department of Pathology and Medical Biology, UMCG

Professor Heijink is a cell/molecular biologist recognised for her extensive experience in mucosal immunology and patient-specific culture models for respiratory disease. She was trained at the University of Groningen as Medical Biologist and received her PhD degree on T cell dysregulation in asthma in 2004 at the Faculty of Medical Sciences. As a postdoc, she continued her line of research on the interaction between epithelial cells and T cells, other cell types and environmental exposures in various lung diseases, including COPD. After a post-doctoral study on epithelial cell biology at the St. Micheal's Hospital in Toronto, she moved back to the University Medical Centre Groningen (UMCG) within the translational and multidisciplinary research Institute of Asthma and COPD (GRIAC), where she entered a Talent Track. Since 2013, she is heading the Experimental Pulmonology and Inflammation Research (EXPIRE) lab at the departments of Pathology & Medical Biology and Pulmonary Diseases (UMCG). Since 2023, she is a full professor. She is currently programme leader of GRIAC and Head of the European Respiratory Society (ERS) Assembly Basic and Translational Sciences. She leads various research consortia supported by funding of e.g. the Dutch Lung Foundation-Health~Holland, ZonMW-Open and NWO Perspective programmes, and is co-founder of the large national consortium P4O2 – precision medicine for more oxygen.

The research of Professor Heijink and her team focuses on the role of the respiratory epithelium in the pathogenesis of lung diseases, using advanced in vitro models, including organoids and lab-on-chip. The main goal is to translate the findings into the clinic and to develop a novel strategy to halt or even reverse the damaged mucosal barrier in the lungs and stimulate epithelial barrier regeneration.

Tuesday the 3rd of June
Prof. Wiro Niessen, PhD

Wiro Niessen is Dean of the Faculty of Medical Sciences, University of Groningen, and board member of University Medical Center Groningen since February 2023. He is also a professor in AI in medical imaging and health. He has a background in physics and medical imaging, obtaining his MSc and PhD at Utrecht University. Part of this MSc/PhD trajectory was carried out at the University of Wisconsin, Madison, and Yale University, respectively. He previously worked at Erasmus MC, University Medical Center Rotterdam, and Delft University of Technology, leading a large research group on biomedical image analysis.

His research interests are in the development, validation and responsible implementation of AI in health. In this domain, he has primarily worked in the field of medical imaging, imaging genetics and computer-aided interventions. He supervised more than 60 PhD students in these fields. In 2023, he was named most influential researcher in Radiology in Europe by AuntMinnie. Wiro Niessen is fellow and, from 2016-2019 was president of the MICCAI Society, the premier international society in medical image computing and computer-assisted interventions.

From 2020-2023, Wiro Niessen was CTO and board member of Health-RI, an initiative which aims to develop a national health data infrastructure for reuse of data for research and innovation; Health RI received a 69 MEuro Innovation grant from the Dutch government in 2021. In 2015 he received the Simon Stevin award, the largest prize in Applied Sciences in the Netherlands. In 2005 he was elected to the Dutch Young Academy and in 2017 he was elected to the Royal Netherlands Academy of Arts and Sciences. In 2023 he was elected to the Netherlands Academy of Engineering.

In 2012 Wiro Niessen founded Quantib, an AI company in medical imaging, where he acted as scientific lead until 2022. Quantib currently employs about 50, and has multiple FDA approved products in MR brain image analysis, and MR prostate image analysis. In January 2022 Quantib was acquired by Rad Net, the largest provider of outpatient radiological imaging services in the US.

Wednesday 4th of June
Prof. Hjalmar Bouma, MD, PhD, EuCP

Consultant Internal Medicine, specialised in Acute Medicine and Pharmacology

Hjalmar Bouma is a physician-researcher with a strong dedication to improving the lives of acutely ill patients through research. He received his MD and PhD with honors and specialised in internist-acute medicine, with additional training in experimental and clinical pharmacology and immunology. During his PhD research, conducted in collaboration with Heidelberg University (Germany), the National Institutes of Health (Bethesda, USA), the University of Wisconsin (USA), and the University of Aberdeen (Scotland), he focused on the effects of metabolic stress induced by acute illness on the immune system, with relevance to acute kidney injury (AKI) and studied protective mechanisms of hibernating animals. His training provides him with extensive knowledge to successfully translate fundamental findings on the molecular mechanisms of disease into drug development.

His current work consists of caring for acutely ill patients at the Emergency Department (ED), including the coordination of the flow of patients at the ED to maintain acute care capacity. He is the course director of the Clinical Pharmacology training program. He also leads a translational research line dedicated to improving outcomes for patients with sepsis by improving recognition of early sepsis and developing personalised medicine. To learn from individual differences in early sepsis, clinical data, and biomaterials from thousands of acutely ill patients per year are collected by the Acute lines data-biobank that facilitates the identification of (risk) markers predictive of response to therapy. Biomarkers associated with clinical outcomes in patients are further dissected in pre-clinical models to identify novel therapeutic targets. He is fascinated by hibernation: specific adaptations render the animals resistant to metabolic stress, which can serve as a blueprint for developing new therapies and has already resulted in a patented drug for sepsis. His research group is a dynamic blend of (technical) clinicians and experts in data and life sciences. He is a board member of the Dutch Sepsis Foundation (SepsisNet) and associate editor of Frontiers in Nephrology.

Reflecting on his journey, Prof. Bouma shares what continues to inspire his passion for science and collaboration:

“Throughout my career, I have been intrigued by the molecular aspects of life and exploring the mechanisms that underlie human disease by fundamental and translational research. Already during my study in Medicine, I became involved in scientific research. Brainstorming about biomedical challenges with smart, dedicated, and creative people from different backgrounds is something that gives me a lot of energy. ISCOMS has contributed to my career at its early stage by allowing me to interact with peers and provide a lot of inspiration for my research!”

Thursday the 5th of June
Marco Versluis, MD PhD & Prof. Ymkje Stienstra, MD PhD

Prof. Ymkje Stienstra, MD PhD

Professor Stienstra (she/her), affiliated with the Liverpool School of Tropical Medicine, UK, and the University Medical Centre Groningen, is an internist/infectious diseases consultant and clinical epidemiologist with over 20 years of experience in clinical and public health research. Her research focuses on Neglected Tropical Diseases (NTDs), which affect more than one billion people globally. Her current research includes a randomised clinical trial investigating the efficacy of the promising new drug Telacebec for the treatment of Buruli ulcer and leprosy in Ghana, Benin, Côte d'Ivoire, and Ethiopia.
Snakebite envenoming, the most lethal yet only recently recognised NTD, predominantly impacts rural populations in low- and middle-income countries. Professor Stienstra co-leads the African Snakebite Alliance in collaboration with scientists from Kenya, Eswatini, Rwanda, Malawi, and Ghana. This Alliance studies the burden of snakebite envenoming in communities, identifies hotspots through geospatial modelling, and examines long-term consequences. Additionally, she is involved in research developing interventions to prevent and manage snakebite envenoming.

Marco Versluis, MD PhD

Marco Versluis is a gynaecologist, teacher and researcher in medical education with a passion for healthcare and health equity. His focus is on interprofessional education (IPE) as a means to address the Human Resource Crisis (HRC) that is threatening health equity, locally and worldwide. By evidence informed implementation of IPE we can better prepare healthcare workers for future, interprofessional practice. Conversely, by investigating implementation of IPE we can gain a better understanding of IPE.
In addition to implementation of IPE, his research aims to unravel how IPE can bridge differences in interprofessional culture by equipping students with the skills and attitudes to overcome the power differences that obstruct patient care and job satisfaction of professionals. The research mainly uses qualitative approaches. Marco Versluis is leading the research group on IPE within LEARN, the Lifelong Learning, Education and Assessment Research Network in the UMCG.

Jury members

Jury Chair
Prof. Marc van Dijk, MD, PhD
Professor and chair of the department of Neurosurgery at the UMCG

WProf. J. Marc C. van Dijk MD PhD is professor and chair of the department of Neurosurgery at the University Medical Center Groningen. His main surgical specialties are Neurovascular Surgery, Skull Base Surgery and Neuromodulation. Marc started his neurosurgical training in Leiden. After graduation, he was selected to do a prestigious clinical and research fellowship in Toronto, Canada. As such, he had the opportunity to work closely with world-leading neurovascular specialists Pierre Lasjaunias, Karel Ter Brugge and Chris Wallace. During his Toronto experience, Marc was intrigued by dural AV-fistulas, a rare and peculiar neurovascular disorder, and published several hallmark papers that ultimately resulted in a PhD-thesis. Back in the Netherlands, Marc was appointed clinical director in the Leiden University Medical Center. Despite this demanding position, he managed to obtain an additional master's degree (MSc) in neurovascular diseases at the Université de Paris-Sud.

In 2006, Marc was invited to join the neurosurgical staff in the University Medical Center Groningen. This appointment offered him a unique opportunity to expand his teaching experience on a European level through the EANS platform, and to learn the fine arts of neuromodulation. Because of his multifaceted academic profile, Marc was offered a talent-track position that resulted in the appointment as a university professor with focus on surgery of the aging brain. In addition to its close connection with the University of Groningen's 'Healthy Ageing' motto, the focus on the ageing brain offers a unique opportunity to combine the strengths of multiple academic disciplines, moving beyond traditional monodisciplinary research.

Prof Barbara Horvath, MD, PhD

Dermatologist and the chair of the department of Dermatology at the University Medical Center Groningen

Prof. Barbara Horváth MD PhD is a dermatologist and the Chair of the department of Dermatology at the University Medical Center Groningen (UMCG) since 2019. She is also the head of the Center of Expertise for Blistering Diseases, a nationally (NFU) and internationally (ERN-SKIN) recognised center of excellence within the Netherlands.

Prof. Horváth completed her medical training at Semmelweis University in Budapest, Hungary, where she also pursued her PhD in the department of Genetics, Cell- and Immunobiology. In 2008, she joined the UMCG as a staff member in the department of Dermatology. Between 2012 and 2021, she led the national residency training programme in dermatology in the Netherlands.
Her primary areas of expertise and research focus on autoimmune blistering diseases (AIBDs), with a particular emphasis on the pathomechanisms and emerging therapies for pemphigus and pemphigoid disorders. In addition, she conducts clinical, epidemiological, and translational research on hidradenitis suppurativa (HS).

Prof. Horváth is an active member of the European Academy of Dermatology and Venereology (EADV) task forces on Autoimmune Blistering Diseases. Furthermore, she also serves on the board of the European Reference Network on rare diseases.

In the academic publishing realm, Prof. Horváth is an associate editor of the British Journal of Dermatology and has contributed extensively to the field through numerous peer-reviewed articles and book chapters. She is also the editor of the textbook Autoimmune Bullous Disease.

Pepijn van der Aa, MD, BSc Denistry
PhD Candidate | Department of Oral and Maxillofacial Surgery

Pepijn van der Aa earned his medical degree from the University Medical Center Groningen (UMCG) in 2021 and is currently pursuing a PhD within the department of Oral and Maxillofacial Surgery. Alongside his research, he is undertaking a fast-track Dentistry program as part of his preparation for the Oral and Maxillofacial Surgery residency at the University of Groningen.

His doctoral research focuses on identifying clinical and biological subgroups of patients with oral squamous cell carcinoma (OSCC). With a particular interest in prognostic biomarkers, he collaborates closely with specialists from the department of Pathology and Medical Biology to gain deeper insights into patient outcomes. By integrating clinical expertise with molecular research, his team strives to develop personalised treatment and follow-up strategies for OSCC patients.
Pepijn's work showcases dedication to enhancing molecular knowledge of OSCC, thereby bridging the gap between research and clinical practice.

Based on his own experience, Pepijn emphasises the value of sharing ideas and connecting with fellow researchers early on:
"As a former ISCOMS board member (2018), I experienced firsthand how sharing (bio)medical knowledge and connecting with peers worldwide can be transformative. This conference proved that science can kickstart anyone's career by collaborating with motivated people. So, I encourage all participants to engage, exchange ideas and inspire your fellow students."

Prof. Claudine Lamoth, PhD

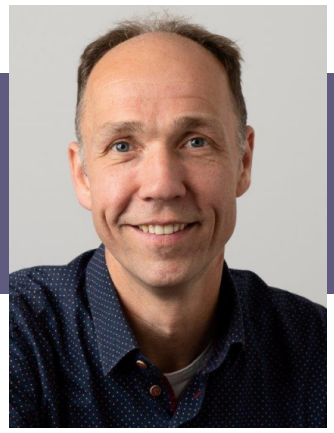
Professor of Movement Analysis and Smart Technology in Aging at the Department of Human Movement Sciences of the UMCG

Professor Dr. C.J.C. (Claudine) Lamoth is Professor of Movement Analysis and Smart Technology in Aging at the Department of Human Movement Sciences of the UMCG. She studied movement sciences at VU University, Amsterdam and earned her doctorate in 2004 for her research on walking with low back pain. Her research applied methods from dynamical systems theory—coordination dynamics—to quantify coherent and variable patterns in kinematic and electromyographic signals that reflect movement coordination and its stable and adaptive features. She employed methods from nonlinear dynamics and pattern recognition techniques to extract relevant features from whole-body movement recordings, revealing the interactions between factors causing movement decline in people with various pathologies and in the aging population.

Since 2008, Professor Lamoth has been employed at the UMCG's Department of Human Movement Sciences. Her research focuses on understanding gait, postural control, and physical activity in age- and lifestyle-related diseases. Lamoth's interdisciplinary approach combines dynamical systems theory, biomechanics, behavioral sciences, and data sciences. She collaborates with medical departments, biomedical technology experts, data scientists, industry partners, and artists on projects aimed at preventing health decline, achieving more healthy years, and maintaining quality of life for aging citizens and patients through personalized interventions and early risk detection. Her work features innovative wearable sensor technology to capture movement, physiological, and behavioral data over extended periods, along with AI/data science methods. This research involves co-developing, testing, and validating sensing and monitoring technology and algorithms that assess, remotely monitor, and provide personalized services to individuals in their natural home environment.

Prof Jan-Luuk Hillebrants, PhD

Professor of Experimental Vascular Pathology within the Department of Pathology & Medical Biology at the UMCG



Professor Dr. J.L. (Jan-Luuk) Hillebrands is a biomedical scientist and professor of Experimental Vascular Pathology at the University Medical Center Groningen (UMCG). He began his academic journey studying Biomedical Sciences at the University of Groningen, where he earned his PhD cum laude in 2001. His doctoral research focused on understanding the pathogenetic mechanisms behind transplant vasculopathy, a condition affecting blood vessels in transplanted organs. After completing his PhD, Professor Hillebrands continued his research at the University of Massachusetts Medical School in the USA. There, he investigated regulatory T-cell subsets in autoimmune diabetes, gaining valuable insights into immune regulation in autoimmunity.

Currently, Professor Hillebrands' research is dedicated to exploring cardiovascular diseases, particularly atherosclerosis and vascular calcification, within the context of chronic kidney disease. He is also intrigued by the mechanisms of chronic tissue remodeling following kidney transplantation and in improving donor kidney quality to enhance transplantation outcomes. His expertise encompasses tissue remodeling processes, with a focus on the phenotypic modulation of vascular smooth muscle cells and endothelial cell biology. He utilises various experimental approaches, such as in vitro cell models, ex vivo organ perfusion models, and in vivo models, to advance translational research.

Beyond his research, Professor Hillebrands is passionate about education. He teaches basic histology in the medical curriculum at the University of Groningen and has developed innovative e-learning modules featuring virtual microscopy for histology classes. He has co-edited the Dutch histology textbook 'Functionele histologie' and is actively involved in mentoring young researchers and PhD students.

Professor Hillebrands' work aims to unravel the complexities of vascular and kidney disease, with the goal of identifying novel therapeutic targets and offering hope for preventive treatments.

Julia Bakker BSc

Fifth-year medical student at the University of Groningen

Julia Bakker is a fifth-year medical student at the University of Groningen, currently completing her clinical internships at the Isala Hospital in Zwolle. ISCOMS sparked her enthusiasm for research, which she is excited to share as she will pursue a PhD at the Department of Internal Medicine alongside her medical degree.

As president of ISCOMS 2023, she is honoured to be part of the jury for the 32nd edition this year. ISCOMS has always been a place where scientific curiosity and ambition come together. But it is more than just science: it offers an environment where students from all over the world connect, share experiences, and have fun together. These international friendships and shared moments are what make ISCOMS truly unforgettable.

Over the years, ISCOMS has grown into one of the leading student congresses in biomedical sciences. Julia is proud to see how the organising committee has once again put together a fantastic programme.

She is convinced that students can make a real impact in science by connecting with each other and exchanging ideas. ISCOMS provides the perfect platform for this. It is her hope that this congress will inspire, challenge, and encourage students to further explore their scientific passions!

EmProf. Cees Th. Smit Sibinga, MD ,PhD
Expert Advisor World Health Organisation

EmProf. Cees Th. Smit Sibinga is a clinical haematologist and specialist of transfusion medicine. He is a special professor of International Development of Transfusion Medicine at the University of Groningen. He has been involved in the development of transfusion medicine, quality systems and management for developing economies since 1980 through his work with the World Health Organization (WHO). At the WHO, he served as the regional coordinator of the Global Quality Management Project for the European region. For 25 years he has served as the Managing Director of Sanquin Division Blood Bank North Netherlands in Groningen. From 1993 until 2005 the Blood Bank incorporated the WHO Collaborating Center for Blood Transfusion and the WFH International Hemophilia Training Center in Groningen.

EmProf. Cees Th. Smit Sibinga is the founder of the Dutch Blood Bank Inspection and the Accreditation Program and the Hemovigilance system. Besides, he is the founder of the Academic Institute for International Development of Transfusion Medicine at the UMCG. This institute used to provide a post-academic Master's in Management of Transfusion Medicine, which is now part of the Master's programme of the University of Groningen Graduate School of Medical Sciences. EmProf. Smit Sibinga is still deeply involved in transfusion medicine and related health sciences research focused on developing countries. He serves the WHO Eastern Mediterranean Region as a Lead Technical Adviser in their Strategic Framework for Blood Safety and Availability 2016-2025 and its priority interventions.

Awards

Plenary Awards: First, Second, and Third prize: €1250, €750, €250

Students who are selected to present their research during the plenary sessions of ISCOMS have a chance of winning one of the three plenary awards. The first prize consists of €1250, the second prize consists of €750, and the third prize consists of €250.This money can be used to visit a biomedical congress. The winners will be selected by the official jury of ISCOMS 2025, consisting of renowned (bio)medical scientists and (bio)medical students from the University Medical Centre Groningen (UMCG).

Plenary Award: Audience Award: €150

The winner of this award will be determined by the audience attending the plenary sessions. The plenary presenter most appreciated by the audience will receive a cheque of €150 to use towards attending a (bio) medical congress of their choice.

Plenary Award: First Year Crew Award: €150

The winner of this award will be determined by the ISCOMS First Year Crew. This team consists of 12 enthusiastic first year (bio)medical students who assist the Organising Committee during the congress. The plenary presenter most appreciated by the First Year Crew will receive a cheque of €150 to attend a (bio)medical congress of their choice.

Best Oral Abstract Award: €150

The best oral abstracts in the fields of clinical sciences, basic sciences, and community health will be recognized with an abstract award. The winners will be selected by the official jury of ISCOMS 2025, consisting of renowned (bio)medical scientists and (bio)medical students from the University Medical Center Groningen (UMCG). The jury will select one winner per category, resulting in three awardees. Each winner will receive a cheque of €150 to use towards attending a (bio)medical congress of your choice.

World Health Award: One-year subscription to EMHJ

To stimulate and acknowledge students conducting research on global health issues and to appreciate their contributions to global health, the WHO-supported World Health Award has been established. This award is granted to a presenter either from a developing country or whose research focuses on issues affecting developing countries. This prize will be awarded by Em. Prof. Cees Th, Smit Sibinga MD, PhD, FRCP Edin, FRCPath, member of the WHO Expert Committee, Groningen. The winner will receive a one-year online subscription to the Eastern Mediterranean Health Journal (EMHJ).

Awards

Sustainability Award: €150

To honour and celebrate participants who exemplify outstanding efforts in sustainable travel, ISCOMS presents the Sustainability Award. The participant who shows the greatest effort will receive a cheque of €150. The winner will be selected by the Research & Development Committee of ISCOMS 2025.

Session Winners: Official certificate

In each poster and oral session, the best presentation will be selected. The session winner is determined by the session chair, a (bio)medical expert from the University Medical Center Groningen with expertise in the session's research field. All session winners will receive an official certificate.

All awards, except for the session winner certificates, will be awarded during the Award & Closing Ceremony of ISCOMS 2025 on Thursday, the 5th of June 2025, from 17:00 to 17:45.

Theme: Harmonious Healthcare

Harmonious Healthcare

The theme for ISCOMS 2025 is 'Harmonious Healthcare', addressing the global challenges related to the environment, climate change, conflict, and healthcare.

We will focus on the collaboration between the 'Global North' and the 'Global South'.

These concepts refer to the diverse socio-economic landscapes of our world. In the developing countries of the Global South, there is a young and dynamic population with great potential for innovative ideas. Meanwhile, the Global North has advanced technological knowledge, but its population is ageing. Our core question is: how can these two worlds strengthen each other in a harmonious and beneficial way? We aim to approach these complex global issues with optimism to find solutions together.

Harmonious Healthcare represents the alignment of various topics aimed at bringing together diverse backgrounds and talents.

Congress

Keynote lectures
Interactive Operation
Workshops
ISCOMS corporate member meeting

ISCOMS 2025 | SCIENCE BEYOND BORDERS

Keynotes

Prof. Hans Clevers MD PhD

Professor Hans Clevers earned his Master's degree in Biology in 1982 and completed his MD and PhD at the University of Utrecht in 1984 and 1985, respectively. After postdoctoral research at the Dana-Farber Cancer Institute in Boston, he returned to the Netherlands in 1989 as an Assistant Professor in the Department of Clinical Immunology at the University of Utrecht. In 2002, he was appointed Head Director of the Hubrecht Institute, where he led a research group as Principal Investigator. His groundbreaking discovery of LGR5 as a key marker for Wnt-dependent adult stem cells paved the way for the development of organoid technology, enabling the growth of mini-organs in vitro. This groundbreaking innovation has transformed fields such as disease modelling, drug discovery, and personalised medicine. In 2015, he became Director Research of the Princess Maxima Center for Paediatric Oncology.

Currently, Professor Clevers is a Professor of Molecular Genetics at the University of Utrecht and serves as Head of Pharma Research and Early Development at Roche Basel. He is also a member of the Royal Netherlands Academy of Arts and Sciences and the Royal Society.

Throughout his career, he has been honoured with numerous prestigious awards, including the 2001 Spinoza Award, the 2004 Louis-Jeantet Prize for Medicine, the 2012 Heineken Prize for Medicine, the 2013 Breakthrough Prize in Life Sciences, the 2016 Körber European Science Prize, the 2019 the Citation Laureate, and the 2021 Pezcoller Foundation-AACR International Award. His innovative work continues to redefine the landscape of personalised medicine and disease research, impacting global healthcare profoundly.

Keynotes

Prof. Peter Hegemann PhD

Professor Peter Hegemann earned his Bachelor's and Master's degrees in Chemistry from the University of Münster and Ludwig-Maximilian-University of Munich in 1980. He completed his PhD at the Max Planck Institute of Biochemistry in 1984, focusing on halorhodopsin, a light-sensitive ion pump protein. Following postdoctoral research at Syracuse University in 1986, he joined an independent research group at the Max Planck Institute of Biochemistry. In 1993, he became Professor of Biochemistry at the University of Regensburg, where he made the groundbreaking discovery of channelrhodopsins – light-sensitive proteins that revolutionised neuroscience and laid the foundation for the field of optogenetics. In 2005, he joined Humboldt University of Berlin as a Professor of Experimental Biophysics and was named Hertie Professor for Biophysics in 2016.

Professor Hegemann's research focuses on the structure and function of light-activated proteins and their applications in neuroscience and medicine. His pioneering contributions to the development of optogenetics, a transformative technology that uses light to control neuronal activity, have had a profound impact on science and medicine.

For his exceptional work, Professor Hegemann has been honoured with numerous prestigious awards, including the 2020 Shaw Prize in Life Science and Medicine, the 2021 Lasker Award for Basic Science, and the 2022 Louisa Gross Horwitz Prize. As a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the German National Academy of Sciences Leopoldina, his discoveries continue to revolutionise the understanding and treatment of neurological disorders, shaping the future of biomedical science.

Keynotes

Prof. Svetlana Mojsov PhD

Professor Svetlana Mojsov earned her degree in Physical Chemistry from the University of Belgrade in 1971 and completed her PhD at the Rockefeller University in 1978 under the mentorship of Nobel laureate Bruce Merrifield, focusing on peptide synthesis. In 1983, she joined the Endocrine Unit of Massachusetts General Hospital as an Assistant in Biochemistry and Instructor in Medicine at Harvard Medical School, where she also served as the inaugural director of the Howard Hughes Peptide Core Facility. During this time, she conducted groundbreaking independent research, discovering that GLP-1(7-37) functions as an incretin with therapeutic potential for Type 2 diabetes. This discovery laid the foundation for GLP-1(7-37) based therapies, leading to the development of widely used medications such as liraglutide (Victoza) and semaglutide (Ozempic) for diabetes and obesity treatment.

In 1990, Professor Mojsov returned to Rockefeller University as an Assistant Professor and continued her pioneering work on GLP-1 biology. Her remarkable contributions were recognized in 2002 with her promotion to Research Associate Professor.

Professor Mojsov's impressive achievements have been honoured with numerous prestigious awards, including the 2023 VinFuture Prize, the 2024 Pearl Meister Greengard Award, the 2024 Tang Foundation Prize, the 2024 Princess of Asturias Prize, and the 2024 Lasker-DeBakey Clinical Medical Research Award. Her innovative work has transformed the treatment of metabolic diseases, impacting millions of patients worldwide.

Keynotes

Prof. David Huang MD PhD

Professor David Huang earned his Bachelor's and Master's degrees in Electrical Engineering from the Massachusetts Institute of Technology (MIT) in 1985 and his MD and PhD from the joint Harvard-MIT Health Sciences and Technology Program in 1993. He completed his residency in Ophthalmology at the Doheny Eye Institute and a fellowship in Cornea at Emory University. Co-inventor of Optical Coherence Tomography (OCT) in 1991, Professor Huang transformed medical imaging with this transformative technology now used in over 40 million procedures annually worldwide. Beyond his academic achievements, he co-founded Gobiquity, creator of the GoCheck Kids app, which has screened over 5 million preschoolers for amblyopia risk factors.

Currently, he serves as Director of Research of Casey Eye Institute, holds the Wold Family Endowed Chair in Ophthalmic Imaging, and is a Professor of Ophthalmology and Biomedical Engineering at Oregon Health & Science University, where he leads the Center for Ophthalmic Optics and Lasers. He is also a practicing ophthalmologist specialising in cornea and refractive surgery.

Professor Huang's contributions have earned him numerous honours, including the 2012 Champalimaud Vision Award, the 2013 Jonas Friedenwald Award, the 2017 Russ Prize, the 2023 Lasker-DeBakey Clinical Medical Research Award, and the 2023 National Medal of Technology and Innovation. He is a distinguished member of the National Academy of Engineering, National Academy of Medicine, and a fellow of the National Academy of Inventors and the American Ophthalmological Society. Through his innovative work, Professor Huang continues to advance ophthalmology, enhancing diagnostic tools and improving patient care worldwide.

Keynotes

Prof. Awa Marie Coll-Seck MD PhD

Professor Awa Marie Coll-Seck is a highly respected physician, infectious disease specialist, and global health leader who has made significant contributions to public health policy and disease control. After earning her medical degree from Cheikh Anta Diop University in Dakar, she specialised in infectious and tropical diseases, with a focus on bacteriology and virology. She began her international career at UNAIDS in Geneva, where she led policy, strategy, and research initiatives to combat the HIV/AIDS epidemic.

She later served two terms as Senegal's Minister of Health and Prevention (2001–2003, 2012–2017), implementing major health reforms, expanding vaccination programmes, and improving maternal and child healthcare. Between these terms, she was appointed Executive Director of the Roll Back Malaria Partnership (RBM), where she led global efforts to reduce malaria mortality and mobilised international funding for disease prevention. She has also held leadership roles at the World Health Assembly, the West African Health Organization, and the Global Fund to Fight AIDS, Tuberculosis, and Malaria, influencing policies on infectious disease control, healthcare financing, and health system strengthening.

For her contributions to global health, Professor Coll-Seck has received numerous awards, including the Chevalier de l'Ordre du Mérite de la République Française. She is a member of the National Academy of Medicine (France) and the African Academy of Sciences. Currently, as President of the Forum Galien Africa, she continues to shape global health initiatives, advocating for medical innovation, stronger healthcare systems, and improved access to care, particularly in Africa.

Workshop: Lab on a chip

Department: Research Institute of Pharmacy; Pharmaceutical Analysis group

Supervisors: Drs. Ing. Patty Mulder & Frederique Alleblas BSc & Prof. Sabeth Verpoorte PhD

Over the past few decades, lab-on-a-chip technologies have made significant inroads into laboratories, focusing on the development of rapid chemical and bioanalytical analyses using minimal sample volumes. Micro- and nanotechnologies are employed to construct interconnected microchannel networks in planar substrates, forming microfluidic devices that replace conventional chemical vessels, such as beakers and columns. These devices enable ultra-small-volume (from µL to nL) liquid handling. Small handheld analysers are one result of this innovation, suitable for medical diagnostics, agriculture, environmental studies, and other applications.

In the last fifteen years, lab-on-a-chip technologies have also found increasing application in cell biology, where microenvironments can be engineered to mimic in vivo conditions. These advancements enable the creation of tissue constructs or even actual tissue samples in physiological configurations using specialised lab-on-a-chip systems, known as 'organ-on-a-chip' or 'human-on-a-chip' systems. These systems allow for improved study of in vivo processes in vitro and provide insights into drug toxicity and complex inter-organ regulatory pathways.

This workshop will provide participants with a glimpse into how laboratories actively contribute to the development of lab-on-a-chip systems for sensing, analytical chemistry, cell culture, and analysis. Participants will witness the fabrication of these devices, learn the fundamentals of microfluidics, and engage in discussions about potential medical applications of lab-on-a-chip technologies with researchers.

Workshop: Basic Life Support: Heroes Are Not Born, They Are Trained

Department: Wenckebach Institute for Education and Training

Supervisor: Monique Timmer, Instructor ERC / NRR CPR-Instructor

This active, hands-on workshop enables participants to practise and perfect resuscitation skills, including the use of an AED, in small groups (3–4 people). The emphasis is on learning by doing: participants actively perform cardiopulmonary resuscitation (CPR) and receive real-time feedback on the quality of their compressions, focusing on depth, speed, and consistency. Observers evaluate the resuscitation process, identifying strengths and areas for improvement in a collaborative and reflective environment.

Participants also gain insights into leadership roles in resuscitation teams and effective team coaching—key skills for medical professionals. Practical application focuses on CPR guidelines, including pushing hard (5–6 cm), pushing fast (100–120 compressions per minute), and minimising interruptions.

For further information, participants are encouraged to visit the European Resuscitation Council (ERC) website: www.erc.edu and an international campaign for CPR awareness: life-saver.org.uk.

Workkshop: Dental Implants In The Aesthetic Zone

Department: Oral Maxillofacial Surgery, UMCG Prosthetic Dentistry, UMCG

Supervisor: Charlotte Jensen DMD PhD & Gerdien Telleman DMD PhD

Losing teeth in the aesthetic zone can significantly impact a person's quality of life. Dental implants restored with ceramic crowns offer a reliable solution, with survival rates ranging from 96.1% to 98.9% after 7.5 years of function. While professionals consider it a sensitive method, patient satisfaction is generally high.

This workshop includes a lecture on dental implant possibilities, treatment steps, and aesthetic outcomes. The second part is a hands-on session, where participants practise placing a dental implant in a model, simulating the surgical procedure. The workshop is supported by Nobel Biocare Netherlands.

Workshop: Pharmacists In Personalised Medicine: A Key To Better Care?

Department: Pharmacotherapy, Epidemiology and Economics, University of Groningen, Netherlands

Supervisor: Prof. Katja Taxis PhD & Claudia Dantuma-Wering

The aim of the workshop is to explore the role of the (community) pharmacist in providing pharmaceutical care to patients focusing on personalised medicine. The workshop begins with a lecture highlighting the potential of pharmacists to improve personalised medicine using examples from Dutch pharmacy practice, such as pharmacogenetic testing. Participants visit simulated community pharmacies operated by pharmacy master's students at the University of Groningen to observe how they manage personalised medicine. The workshop concludes with a plenary discussion on the future of personalised medicine, with a focus on interprofessional collaboration. Students from various backgrounds are encouraged to participate.

Workshop: Hands-on Workshop Suturing

Department: Research Support Facility – Central Animal Facility

Supervisors: Annemieke van Oosten PhD & Michel Weij Eng & Daryll Eichhorn Eng

In recent years, surgical techniques have become increasingly sophisticated, necessitating training and education. This workshop focuses on teaching students the correct handling of surgical instruments and proper suturing techniques, providing an opportunity to practise the fine art of suturing. Participants gain practical experience while developing precision and dexterity critical to surgical procedures.

During this workshop, Admetec will provide a brief introduction to their ergonomic loupes, which participants will then be able to use throughout the session. This will allow them to practise and/or learn suturing techniques while maintaining proper posture.

Workshop: An Introduction In Treating Life-threatening Situations In The IC

Department: Department of Critical Care, UMCG

Supervisors: Edward Buitenwerf MD PhD, Ethel Metz MD

Implementation of interdisciplinary teams in the ICU to provide care in often life-threatening situations, focused attention on the relevance of leadership behaviour. Effective, coordinated, and safe patient care challenge even the most experienced ICU teams daily. Leadership behaviour can be described as the process of guiding others to recognise and align with what needs to be done and how to achieve it, while also supporting both individual and collective efforts to reach common goals.

Simulation training is useful for teaching team-based crisis management skills and is now considered essential in developing and maintaining competencies for ICU workers.

In our high fidelity Simulation Center, participants of the workshop will become familiar with some stepwise elements of the treatment, such as resuscitation and airway management of critically ill patients. The non-technical skills such as leadership, communication, and cooperation are also emphasised. The experiences may contribute to the development of knowledge and skills in decision-making and teamwork during the treatment of critically ill patients.

Workshop: 3D-Lab Groningen

Department: 3D-lab / Orthopedic Surgery / Trauma Surgery

Supervisors:

- Tuesday: Joep Kraeima, Anne Meesters, Reinier ten Brink, Nick Assink (Technical Physicians and 3D Specialists), Danique Smelt (Technical Physician Student)
- Wednesday: Anne Meesters, Sander Tabernée Heijtmeijer, Nick Assink (Technical Physicians and 3D Specialists), Mirka Buist (Design Specialist), Danique Smelt (Technical Physician Student)
- Thursday: Peter Pijpker, Sander Tabernée Heijtmeijer, Fleur van der Kaaij (Technical Physicians and 3D Specialists), Suzanne van Wees (Design Specialist), Danique Smelt (Technical Physician Student)

At the UMCG, 3D virtual surgical planning technology is frequently used across multiple disciplines. This technology ensures safer, faster, and more accurate surgical procedures. The Technical Physicians at the 3D-Lab plan complex cases daily, transferring virtual surgical plans to the operating theatre with precision through the use of 3D-printed, patient-specific instrumentation and implants.

One notable application is 3D-guided, patient-specific corrective limb osteotomy. These surgeries address bone deformities in three dimensions. With 3D planning and printing, the anatomy can be visualised in 3D, and the osteotomy can be precisely planned using CT scans. Patient-specific instruments guide the cutting and repositioning processes, enabling more predictable outcomes.
This workshop includes two parts:

1. Learning the basics of virtual surgical planning, where participants virtually plan a corrective limb osteotomy.
2. Hands-on simulated surgery using sawbones to practise with patient-specific 3D-printed instruments.

Participants can also experience 3D virtual surgical planning through augmented reality glasses (HoloLens).

Workshop: Anatomy in 3D - Innovative Educational Practices with Enatom

Department: Anatomy & Medical Physiology UMCG - Enatoms

Supervisors: Eric Sietsma MSc, Anne Marijke Kosta MSc

In this workshop, you will be introduced to Enatom, a revolutionary web-based application that brings the human body to life in unprecedented detail. Enatom offers high-resolution 3D models of real human bodies, scanned in various dissection rooms and visualized using point cloud technology. These models are accessible directly in any browser, allowing for an intuitive and interactive exploration of anatomical structures.

Additionally, Enatom supports Virtual Reality (VR) and Extended Reality (XR), enabling immersive experiences that elevate anatomy education to a new level. Participants will explore how this technology enhances spatial understanding, supports remote learning, and transforms traditional anatomy instruction into an engaging, high-impact experience.

Workshop: Inside The Psychotic Experience

Department: Psychiatry, UMCG

Supervisor: Frank van Es MD

Psychosis is a psychiatric term describing a mental state often characterised by a loss of contact with reality. Patients experiencing psychosis may report hallucinations (perceiving things that are not present) or delusional beliefs (false interpretations of reality). The combination of these symptoms often results in significant disruptions in perception, thinking, emotions, and behaviour. Severe episodes may also manifest as unusual or bizarre behaviour, difficulties with social interactions, and impairments in daily life activities. As a result, patients with psychosis may find themselves in hostile environments and are in need of empathetic care and medical expertise.
This workshop offered participants the opportunity to engage with both a psychiatrist and a patient who had experienced psychosis, allowing for open discussions and deeper understanding of this complex condition. Topics included addressing patients' needs, reducing stigma, and promoting health and social recovery.

Workshop: Gut Anastomosis

Department: General Surgery, UMCG

Supervisor: Berber van den Hengel MD MBA & Leonie Jonker MD PhD

Bowel resections are common in abdominal surgery, and creating an anastomosis (connecting two ends of the bowel) is a standard procedure. This workshop covers the different types of anastomoses and suturing techniques, along with their associated challenges.

The programme includes a hands-on session where students practise creating intestinal anastomoses, gaining an understanding of the techniques and common pitfalls. By the end of the workshop, participants will have enhanced their practical knowledge and skills in this critical area of surgery.

Workshop: Dissection of the Human Brain

Department: Anatomy & Medical Physiology, Biomedical Sciences of Cells & Systems, UMCG

Supervisors: Janniko Georgiadis PhD & Tim valk PhD

Dissection of the human body in general and of the brain in particular is an underexposed part of the average medical curriculum. In this context, the workshop 'Dissection of the human brain' will address this omission. The workshop will be organised in the dissection room of the Anatomy Department of the University Medical Centre Groningen (UMCG) and is especially intended for students with a special interest in the brain.

The workshop will start with the inspection of the external parts of the human brain. The morphology of meninges, blood vessels, and neocortical areas were central topics. Subsequently, transversal and horizontal sections of fixated human brains were used to inspect the inner parts of the brain. Attention was paid to the three-dimensional location of the cortical, extrapyramidal, and limbic structures. At the end of the workshop, students had gained a better insight into the structure and function of the human brain.

Workshop: Surgical Anatomy Of The Heart And Invasive Treatment Of Atrial Fibrillation

Department: Cardiothoracic Surgery and Cardiology, UMCG

Supervisors: Yuri Blaauw MD PhD & Wobbe Bouma MD PhD

Atrial fibrillation is a growing global health issue linked to significant morbidity and mortality. This workshop focuses on the basic anatomy of the heart and its role in the aetiology and pathophysiology of atrial fibrillation. A clear understanding of cardiac anatomy is essential to comprehend the various invasive treatment options available.

Participants will learn about the advantages and disadvantages of these treatment modalities and gain insights into the underlying mechanisms of atrial fibrillation and its management.

Workshop: Surgical Anatomy Of The Heart And Surgical Treatment Of End-stage Heart Failure: LVAD

Department: Cardiothoracic Surgery and Cardiology, UMCG

Supervisors: Michiel Kuijpers MD PhD & Wobbe Bouma MD PhD

Heart failure is a growing global concern. Historically, heart transplantation was the only effective treatment for end-stage heart failure. However, the implantation of a left ventricular assist device (LVAD) has become a viable alternative.

This workshop covers the problem of end-stage heart failure, relevant cardiac anatomy, and various LVAD options (emergency implantation and destination therapy). Participants will also observe the implantation technique for an LVAD used in destination therapy, gaining a thorough understanding of the challenges and benefits of this innovative treatment.

Workshop: Children's Fracture Management; Casting on your own

Department: Children's Orthopaedics

Supervisors: Mareille Kruse-Bolwijn & Derk Jan Hogewerf

Did you know that immobilisation of injured limbs dates back as early as 1600 BC? From self-setting embalming bandages used by the Egyptians to wax and resin used by Hippocrates, casting materials have greatly evolved over the centuries. Nowadays synthetic casts are more often used, but the plaster of Paris developed by Dutch military surgeon Anthonius Mathijsen in 1852 has not yet gone out of fashion.

In this hands-on workshop, the instructors will elaborate on the different casting materials, their advantages and disadvantages. Furthermore, you will learn about the biomechanical aspects of fracture reduction and stabilisation. Additionally, you will be able to practice basic techniques as you apply a cast on your fellow students. We look forward to welcoming you in the plaster room!

Workshop: State of the Art Radiotherapy: Is It a Game-Changer in Fighting Cancer?

Department: Radiotherapy

Supervisors: Christian Hammer MD

Radiotherapy is one of the pillars of the treatment of oncology patients, next to surgery and systemic therapy. In the Netherlands, this specialty is developing very fast, resulting in the introduction of new indications for treatment with state-of-the-art techniques to optimally treat cancer with minimal side effects.

One of the most important innovations is proton therapy. The University Medical Centre Groningen (UMCG) was the first institute that started this new technique in the Netherlands, back in 2018.

Proton therapy is a relatively new method to treat patients with radiation, as protons have special characteristics to inflict DNA damage without further passing through the body, as photons do.

This makes it possible to inflict less damage to the healthy organs surrounding the tumor.

The workshop entails an interactive presentation where input from the audience will be sought in several clinical urological cases in which new techniques were applied and provided basic insights into the treatment principles of cancer.

Workshop: Stick or Prick?

Department: Biomedical Sciences, Section Anatomy and Medical Physiology

Supervisors: Rob Bakels PhD

Using surface electrodes ("stick") we will show the relation between electromyogram (EMG) and force for the first dorsal interosseus (FDI), a small intrinsic hand muscle, in volunteers from the audience. Next, we will determine the conduction velocity in their ulnar nerve, and finally, we will determine reaction time in response to an audible tone and an LED flash, respectively. What components contribute to reaction time? Why use EMG?

After the surface electrodes, we will switch to a needle electrode ("prick"). This technique will allow us to show the activity of individual motor units in the FDI as force is varied. Hopefully, we will be able to demonstrate the "size principle," which states that as force increases, motor units are activated from weaker to stronger ones. The supervisor will perform the needle EMG on himself and thus allow the workshop participants a view of real-time motoneuron activity in his spinal cord.

During the workshop, the participants are invited to participate in a quiz, using an online platform.

Workshop: The Future of Mobility: Functional Electrical Stimulation for Spinal Cord Injury

Department: Rehabilitation Science

Supervisors: PULSE Racing Team VIII

- Tuesday: Peter van Burk, Elien Watson, Renske de Boer
- Wednesday: Peter van Egdom, Isaac Debono, Renske de Boer

Functional Electrical Stimulation (FES) is revolutionising rehabilitation for individuals with spinal cord injuries (SCI), enabling them to cycle using their own paralysed leg muscles. This groundbreaking technology enhances mobility, muscle strength, blood flow, cardiorespiratory fitness, and mental well-being, offering a holistic approach to recovery. FES exemplifies ISCOMS' core themes: as 'Next-gen Technology, it leverages advanced bioengineering to convert electrical impulses into muscle movement, reshaping rehabilitation possibilities. As a tool for 'Personalised Medicine,' PULSE Racing tailors FES cycling to individual needs by adjusting stimulation patterns and training schemes. On a global scale, it promotes 'Global Health, Equity, and Justice' by making this innovative form of rehabilitation known to people worldwide, fostering greater equity in healthcare for those with SCI.

PULSE Racing, based at Vrije Universiteit Amsterdam (VU), keeps developing FES technology and improving its accessibility for people with SCI. The team has earned recognition for their work in rehabilitation and para-sports, securing top honors at Lyon Cyber Days and second place at the 2024 Cybathlon.

Why Join the PULSE Racing Workshop?

- Inspiring Presentation: Discover how FES technology is changing the landscape of SCI rehabilitation.

- Live Demonstration: Watch an athlete use FES to activate their paralyzed muscles and cycle in real time.
- Interactive Experience: Experience FES firsthand by trying electrical stimulation and feeling how it activates muscles.

- ·Connect with Innovators: Meet the PULSE Racing team and athletes, and learn about their perspective on FES as a groundbreaking healthcare innovation.

Already want to learn more about us? Take a glimpse at the PULSE Racing team and its innovations through our LinkedIn (PULSERacingVU) or instagram (pulse.racingnl)!

Join us to explore the future of rehabilitation, where technology, personalized care, and global equity converge to create a more harmonious future for healthcare.

Workshop: The Miracle of Giving Birth

Department: Clinical Training Center, UMCG

Supervisors: Marco Versluis MD PhD & Dennis Beekhuis MD

General childbirth, also known as labour, is a unique event showing the miracle and power of nature. Although it is a physiological event of itself, childbirth is one of the most fascinating aspects of medicine, which mostly deals with pathophysiological processes.

Childbirth is the culmination of the gestation and pregnancy period with the expulsion of one or more newborn babies from a women's uterus into a completely different environment. At that moment, being disconnected from the mother's circulation after cutting the umbilical cord, the newborn faces a very serious and complicated adaptation of their own circulation to the onset of their own respiratory system.

The process of a normal vaginal human childbirth is categorised into four stages. Stage 1: The onset of birth is initiated by a metabolic change in the infant which causes the release of the hormones needed for uterine contractions. Stage 2: The process of shortening and dilation of the uterine cervix is caused by uterine contractions. This process facilitates the head of the infant to enter the birth canal. Followed by Stage 3: The continuation of uterine contractions with the help of the mother's pressing, pushing the baby through the birth canal into the baby's new world,and finally Stage 4: The delivery of the placenta. The expulsion of the placenta mostly starts spontaneously approximately twenty minutes after the occlusion and the cutting of the umbilical cord.

During this workshop more details will be given on monitoring labour, pain control, and problems that may happen before and during delivery including the therapeutic possibilities if these problems occur. You are also given the opportunity to deliver a baby using a mannequin, simulating the real situation.

Workshop: Tiny Machine Learning for Interactive Serious Games in Rehabilitation

Department: Rehabilitation and biomedical engineering

Supervisors: Elisabeth Wilhelm PhD & Xueyi Wang & Luis Felipe Garcia Arias MSc & Catalina Barcaru

Over the last decades serious gaming has become increasingly more popular in physiotherapy and rehabilitation. To support each individual in the most efficient way many of these games now rely on machine learning based analysis of real-time data. Within this workshop participants will have the opportunity to experience serious games that motivate patients to do their physiotherapy exercises. Furthermore, participants will learn about how tiny machine learning can be used to create machine learning based control algorithms for serious games. Finally they will get the opportunity to train their own personal machine learning based game control algorithm.

Workshop: Fracture Management In Trauma

Supervisors: George Volckmann

This hands-on workshop delves into the treatment of fractures, exploring biomechanical aspects of different fixation methods. Participants will practise applying implants to various fracture types, including those of the proximal femur, tibia, and proximal humerus, using medical drills, saws, and surgical kits.

The workshop provides valuable insights into fracture management and helps participants understand the practical application of surgical tools and techniques in trauma cases.

Workshop: Fix a Mandibular Fracture Yourself

Department: Oral and Maxillofacial Surgery, UMCG

Supervisors: Prof. Ruud Bos DMD PhD & Baucke van Minnen MD & Maarten Heuvels

The treatment of mandibular fractures has evolved greatly over the past 50 years. Biomechanical principles that have been developed in laboratory models are applied to clinical practice in order to allow for immediate mobilization and rehabilitation of the injured part. The goal of this workshop is to give insight into the widely accepted treatment modality for mandibular fractures: internal fixation using mini plates and screws. After a short introduction to the principles of mandibular fracture treatment, the participants will perform an osteosynthesis of mandibular fractures in a polyurethane mandible with mini plates and screws.

Workshop: Transgender debate

Department: Genderteam UMCG

Supervisors: Anke Schuringa

Transgender people experience a mismatch between their gender identity or gender expression and their assigned sex. 'Transgender' is an umbrella term: in addition to including trans men and trans women (whose binary gender identity is the opposite of their assigned sex), it may also include genderqueer people, whose identities are not exclusively masculine or feminine, for example: bigender, pangender, genderfluid, or agender).

Since the late '70s the University Medical Center Groningen (UMCG) in the Netherlands has offered a treatment programme for transgender people, according to the professional standards of the World Professional Association of Transgender Health (WPATH). Once patients have been diagnosed with gender dysphoria by the psychiatrist, the 'real-life phase' starts. This includes living according to their gender identity and starting cross-sex hormone therapy. When the 'real-life phase' has been successfully completed, , one can apply for sex reassignment surgery. After these operations, lifelong continuation of cross-sex hormone therapy is needed to maintain the secondary sex characteristics of the desired gender.

What does the transition contain and cause physically, mentally, and socially and how can we guide the patients in this process? During this workshop, participants will be able to ask questions to a member of the UMCG Gender team and a transgender patient.

Workshop: Plastic Surgery: How do tissue expanders work?

Department: Plastic Surgery, University Medical Center Groningen

Supervisors: Vera van Aalst MD & Edwin de Vrij MD PhD

Plastic surgeons perform a variety of different reconstructive and esthetic procedures. These vary from basic wound care to extensive reconstructions after tissue loss or removal due to trauma or disease, like cancer. Plastic surgeons at University Medical Center Groningen (UMCG), collaborate with many different medical specialists. Considering the high incidence of breast cancer, (more than 1 in 8 women will have breast cancer in their lifetime) a large part of our practice focuses on breast reconstruction after cancer removal. The surgeons perform these reconstructions using a patients' own tissue, or implants. Tissue expanders are often used to expand skin and other soft tissues to create a pocket in which to place a permanent implant or to obtain more tissue to cover a defect.

The main goal of this workshop is to familiarise participants with different treatment options available for breast reconstruction. Specifically, they learn how to use tissue expanders for use in breast reconstruction.

Workshop: Train Your Own Image Recognition Model

Department: DASH

Supervisors: Dorien Neijzen, Kai Yu Ma

How can we teach an AI model to recognize medical images? In this workshop, we will start with a brief introduction to the fast-developing field of AI in healthcare. Then, you will have the opportunity to train your own AI model for image recognition. In a simple way, you will experience how this model is trained and how input (your training data) influences the output.

Through a demonstration, you will explore how different characteristics of your training data can impact the AI's performance. We will also discuss both the opportunities and challenges of using AI in clinical settings. What are the benefits of using AI for image recognition? Where can things go wrong, and to what extent do we need human oversight?

If you bring your own laptop, you can try it out yourself! If you already have some image data that can be used for classification, feel free to bring it and experience the (im)possibilities of using a simplistic AI model. No laptop? No problem! You can follow along with our demonstration.

Workshop: Gene Editing Essentials: the CRISPR-Cas9 toolbox

Department: Genetics

Supervisors: Kai Yu Ma PhD & Willemien Heerema-van Zwol

Join us to unravel the complexities of gene-editing! Tailored for students with little to no background in gene-editing, this hands-on workshop demystifies the molecular mechanisms behind this groundbreaking technology. You will gain a foundational understanding of how gene-editing works, exploring its potential and limitations in a medical context. We'll address burning questions, such as the current state of gene-editing in health care, offering insights into what's currently possible and what remains science fiction.

Workshop: Crash Course Suturing: Master the Basics in 60 Minutes

Department: Transplantation surgery

Supervisors: Robert Pol MD PhD, Floris Kroezen MSc, Rijan Berends MSc

Looking to boost your suture skills in no time? This practical crash course in suturing is perfect for students who want to rapidly build hands-on experience and develop their skills. The workshop starts with a short, interactive theory session covering the basics of wound closure, sterile technique, and instrument handling. After, it is time to get hands-on: you will practise real suturing techniques on porcine trotters, a realistic and tactile way to simulate human tissue. By the end of the session, you will have improved your technique and built steady hand skills, giving you a solid head start before entering the clinical setting.

Pre-Course:
ISCOMS Medical Talks

Title: "Pumping kidneys as a solution for everything – We thought it should be warm, but how about going below zero?"

Cyril Moers MD PhD

Ex vivo kidney perfusion has been around for decades, but it really took off approximately 10 years ago, when we found out that pumping a donor kidney at 0-10 degrees Celsius actually leads to better post-transplant outcomes compared to static cold storage. Since then, much research has been directed at increasing perfusion temperature to 37 degrees Celsius, thus allowing more metabolism and perhaps also a genuine "test drive" of the organ prior to transplantation, to better assess its viability, and provide a platform for biological interventions to resuscitate and repair the organ. However, lately, a small group of seemingly crazy surgeon-scientists have proposed to start pumping donor kidneys at sub-zero temperatures. "Just because we can", is what they said. But could it also have an advantage? You'll find out in this IMED-talk!

Cyril Moers MD PhD is a transplant surgeon and associate professor in the UMCG. His research covers a whole spectrum of clinical and pre-clinical studies in kidney transplantation, focusing on interventions before or during organ preservation to better conserve organ quality and to quantify the impact that donor characteristics have on post-transplant outcome. He authored several key publications on this topic, two of which appeared in "The New England Journal of Medicine". His line of research now focuses on pre-transplant organ resuscitation and evaluation, for which he has been awarded various national and international research grants.

ISCOMS Medical Talks

Title: "Education and training as gamechanger for futureproof healthcare"
Prof. Marieke Schuurmans PhD RN

Healthcare worldwide faces multiple interconnected challenges. Rising healthcare costs, epidemiological challenges and growing health inequality are putting pressure on healthcare systems, organisations, and professionals. These challenges force us to rethink the organisation and provision of healthcare. As the World Health Organisation (WHO) already mentioned a long time ago, most systems are slow to adapt to the changing needs of the population. In adapting the system, population health, patient experience and costs are still the main focus combined with the growing concern regarding clinician wellbeing, equity and environmental sustainability.

Given the urgency of problems, change needs to speed up to create new, yet unknown, health care practices as an answer to the challenges. Question is what this means for current health care professionals and, moreover, for future healthcare professionals. We educate our students with today's knowledge in yesterday's practice for tomorrow's care.

In her lecture Prof. Schuurmans will discuss the challenges, the developments and the meaning of these for current and future healthcare professionals. She will emphasise on the need for clinical leadership and the role of professionals as change agents.

Prof. Marieke Schuurmans is vice dean of Education and Training at the University Medical Center Groningen. She is responsible for the academic programs for medicine, dentistry, sport- and movement sciences, as well as for the post initial training programs for physicians and nurses. Trained as a healthcare scientist and nurse she has a longstanding career in health care, she was member of the Dutch Healthcare Council, Chief Healthcare Organization of the Dutch Healthcare Authority and member of numerous advisory boards regarding the future of healthcare.

ISCOMS Medical Talks

Title: "Engagement for Change"

Prof. Marco Antonio de Carvalho Filho MD PhD

Are you tired of feeling like you're merely surviving your medical or biomedical studies—jumping from one exam to the next? Do you often hear nostalgic voices romanticising the "good old days," when students were open to making "real" sacrifices? These frustrations point to a deeper need for change in how we conceptualise and deliver education—particularly when students are left in a passive state rather than encouraged to enact their autonomy.

In this lecture, Prof. de Carvalho Filho will explore the urgent call to transform the culture of health professions education. He will challenge outdated thinking, highlight the pitfalls of "nostalgic" or "weaponised" professionalism, and reveal how hidden curricula can limit both learners and educators. Drawing on the influential work of Paulo Freire and Dutch scholar Gert Biesta, he will show how redefining the core purpose of education can empower students to become genuine change agents. He will also discuss the risks of emotional detachment and why it takes real courage to challenge entrenched norms. Join us to discover a fresh vision for education—one that not only tackles the frustrations many students face today, but also cultivates the structures necessary for authentic engagement. This approach paves the way for learners to exercise greater autonomy and equips all of us to meet tomorrow's rapidly evolving healthcare challenges head-on.

Prof. Marco Antonio de Carvalho Filho spent over 20 years working as an internal medicine specialist and clinical teacher across wards, ICUs, and emergency departments. Over time, his passion for innovative learning methodologies led him to focus on medical education research, drawing inspiration from Critical Pedagogy and the Theatre of the Oppressed. He now dedicates his career to designing and implementing pioneering approaches in online learning, simulation, and assessment. Marco's research centers on professional identity development, clinical reasoning, and the role of the arts in health professions education. He is also active in faculty development, helping educators foster learner-centered communities of practice.

ISCOMS Medical Talks

Title: "Eat or be eaten: AI-supported Radiology"
Prof. Derya Yakar MD PhD

AI is rapidly transforming the field of radiology, offering unprecedented opportunities to enhance precision and efficiency in healthcare. By developing and implementing advanced AI algorithms, radiologists can significantly improve diagnostic accuracy, particularly in the detection and monitoring of abdominal diseases such as liver conditions, pancreatic cancer, and prostate cancer. AI-driven innovations, like K-space undersampling techniques, enable faster MRI scans, making imaging more accessible and patient-friendly. Additionally, AI can streamline workflows, eliminate redundancies, and reduce waste, contributing to more sustainable and efficient practices.

With these advancements, however, come critical responsibilities. Ensuring that AI systems are transparent, trustworthy, and equitable is essential. This involves integrating patient perspectives, addressing ethical and legal implications, and fostering fairness in the deployment of these technologies.

Radiologists must take the lead in shaping the future of their profession by embracing curiosity, innovation, and collaboration. If the field hesitates to define its own path, others will step in to do so. The time to act is now—will radiologists "eat" by driving progress, or be "eaten" by external forces shaping their future?

Derya Yakar is the Chair of the Department of Radiology at the UMCG. She completed her PhD in prostate MRI and radiology residency at Radboudumc, followed by an ESOR (European School of Radiology) fellowship at MSKCC (Memorial Sloan Kettering Cancer Center) in New York. Specialised in abdominal and AI-supported radiology, Dr. Yakar has secured grants from esteemed organisations such as Health Holland, NWO, and the Hanarth Fund. She serves on the scientific advisory boards of the ICAI (Innovation Center for AI) Lab, the ELSA (Ethical, Legal and Societal Aspects) Lab AI Health Equity, the EIBIR (European Institute for Biomedical Imaging Research), and the Hanarth Fund. Her work focuses on advancing diagnostic accuracy, automating workflows, and fostering equitable healthcare. Additionally, she is dedicated to education, leadership development, and promoting gender equity in academia through mentorship and sponsorship initiatives.

ISCOMS Medical Talks

Title: "UMCG vision on AI: Bending the curve in healthcare innovation"
Bart Scheerder MBA

The UMCG is at the forefront of harnessing artificial intelligence (AI) to address some of the most pressing challenges in healthcare, including unhealthy life years, persistent health inequalities, and workforce pressures. As a leader in the EU-accredited Active & Healthy Ageing region, UMCG integrates AI across its core tasks (research, education, care, and innovation) to shape a sustainable future of health.

Generative AI, embedded securely within UMCG's systems, exemplifies how technology can transform healthcare. We identify different value streams of AI: for discovery, efficiency, precision, and augmentation. From summarising patient records to streamlining administrative processes and augmenting clinical decision-making, AI tools have demonstrated significant improvements in efficiency and accuracy. However, with these advancements comes the responsibility to address equity concerns, ensuring that AI reduces, rather than exacerbates, existing disparities in care. This is not only true for the world at large, but also in our region, the Northern Netherlands. UMCG is committed to using AI as a force for equitable health outcomes.

We envision a healthcare system where technology supports healthier ageing, enables healthcare workers to focus on high-value care, and reduces the sector's environmental footprint. This transformative vision not only sustains the quality of care but also ensures that innovation serves all, leaving no patient or professional behind.

Bart Scheerder MBA is affiliated with the UMCG Innovation Center and the Data Science Center in Health (DASH), where he focuses on driving AI healthcare innovation. He has a background in clinical research at an academic contract research organization affiliated with the UMCG, working across Europe in various therapeutic areas and various sponsors. Bart also serves as president of the Dutch Clinical Research Foundation.

Currently, he works as an AI Strategy Lead and is dedicated to advancing AI innovation to shape the future of healthcare. He is responsible for developing the overarching AI strategy for the organization, ensuring that artificial intelligence and data-driven solutions are seamlessly integrated into research, clinical practice, and healthcare delivery. His work focuses on bridging UMCG's pioneering research with external innovations, fostering public-private partnerships that drive sustainable, technology-enabled healthcare solutions.

A key challenge he addresses is the looming healthcare workforce shortage, leveraging AI to alleviate administrative burdens and enhance efficiency in clinical practice. Through initiatives such as #NoMoreTyping (#NooitMeerTikken), he supports the implementation of AI-driven tools that streamline documentation, enabling healthcare professionals to focus on patient care. His strategic vision aims to position UMCG at the forefront of AI-driven transformation, ensuring that technology enhances both operational efficiency and patient outcomes.

Masterclasses

Title "An abstract: A Gateway to get your attention"
Prof. Harm Kampinga PhD

The abstract of a scientific paper or grant is the gateway to being noted and read. If you do not roll out the red carpet, people will pass by! A good abstract should not only present the essential and sound features of your research and radiate its high quality, but also should advertise why your findings are relevant and how they are relevant.

In this masterclass, we will have an interactive discussion about the DOs and DONTs in writing a convincing scientific abstract.

Title: "Preparing an oral presentation"
Prof. Anton Scheurink PhD
Prof. Jocelien Olivier PhD

This masterclass will provide strategies for preparing interesting and engaging presentations. The essence of an effective presentation is engaging the audience, capturing their interest by posing an intriguing question, spelling out a methodology for addressing that question, and then answering it. A successful presentation provides the audience with cues and information in an orderly structure, allowing them to form expectations on what they would hear and when they would hear it. Tips for doing so, along with tips on what not to do, are supplied. The presenter engages participants in a highly interactive format by crafting storylines and structures from the material that they provided. The focus of this masterclass will be on oral presentations, but at the end, some dos and don'ts on poster presentations will also be given.

Title: "Do I see myself as a PhD student?"
Salome Scholtens PhD

You are all biomedical students with an affinity for research, but have you considered doing a PhD? This may be a tough decision. Maybe you already made up your mind and you are aiming for a PhD, but it could very well be that you struggle to decide because other career choices are luring as well. Perhaps you are hesitant, because of the many stories you heard about how stressful it is to be a PhD student. Or you simply don't know what a PhD trajectory really entails and therefore you find it difficult to decide on whether to go for it or not. During this masterclass, students will take time to think about a possible future as a PhD student. We will guide them through some exercises to help you in finding out whether a PhD is something for you.

Masterclasses

Title: "Writing a Good Introduction for Your Research Article"
Prof. Ton Lisman PhD
Sjoukje van der Werf MSc

The introduction is an essential part of your research article. It is the first thing that readers will see, and it needs to be engaging, informative, solid and well-written. In this workshop, we will discuss key elements of an effective introduction, share tips & tricks and address questions and challenges including:

- When do you start writing the introduction?
- How do you start?
- How to summarise the literature (and make sure you do not miss anything)?
- How do you motivate the relevance of your specific research question in the introduction?
- Academic writing: structure and storytelling.

Title: "And now for the discussion – what should I write?"
Prof. Janette Burgess PhD

You have completed your experimental protocols, analysed the data and interpreted the results and written them down. Now you need to describe your findings in the context of the literature – how hard can that be? Well actually writing the discussion is often the hardest component of the manuscript to craft. What should you include and what not? How do you deal with conflicting data? How much can you speculate about the implications of your findings?

This interactive workshop aims to give you tools to help with crafting a compelling discussion that frames your new knowledge in the context of the state of the art in your field.

Title: "Be aware of the Statistics"
Inge Reininga MD

In 90 minutes, an overview of statistical techniques will be given. Together with the participants several questions will be answered including:

- What is the link between probability theory and statistics?
- Why is it important to use descriptive statistics?
- What is a statistical test? Why should we abandon null-hypothesis significance testing (NHST)?
- How to interpret effect sizes, confidence intervals and meta-analytic thinking?

The emphasis will not be on formulas and mathematics, but on understanding the logic behind the statistical tools to avoid biased conclusions. Prior to this masterclass participants will be asked to do a small homework assignment, so they are prepared for the masterclass.

Masterclasses

Title: "From telling to selling – make your research efforts fundable"
Prof. Ingrid Molema MD PhD

Most of you will not have engaged in writing a grant proposal yet, but one day you may face this fun, but also challenging task. This masterclass will take you through the career steps in academia, with a focus on the early stages that you are in. How do you develop your own research ideas? Once you know what you want to do next, how do you make your own CV stand out? And furthermore, how do you convince the panel that will evaluate your proposal, that your research is both urgent and worth investing in?

This masterclass will provide a concise overview of these steps. Whether you are just starting your journey in biomedical research or already considering your next career move, this masterclass will serve as a valuable starting point. This masterclass will take you through these steps, in a nutshell, and can be used as a starter by those of you who just entered biomedical research as well as by those who are already thinking about the next career step.

Title: "Networking in scientific research and going abroad"
Marit Westerterp PhD

How can I make the most of my scientific career and gain international experience, visibility, and orientation? What can I learn from going abroad for an internship or as part of my PhD research? And which grants are available for this purpose? This and more will be discussed during this masterclass with Marit Westerterp, PhD, Associate Professor at the UMCG, who has previously performed research at Roche in Basel, Switzerland, and at Columbia University in New York, USA, and Benedek Halmos, MD PhD student.

Title: "Unlocking funding: A masterclass grant writing"
Prof. Folkert Kuipers PhD

In 90 minutes, an overview of statistical techniques will be given. Together with the participants several questions will be answered including:

- What is the link between probability theory and statistics?
- Why is it important to use descriptive statistics?
- What is a statistical test? Why should we abandon null-hypothesis significance testing (NHST)?
- How to interpret effect sizes, confidence intervals and meta-analytic thinking?

The emphasis will not be on formulas and mathematics, but on understanding the logic behind the statistical tools to avoid biased conclusions. Prior to this masterclass participants will be asked to do a small homework assignment, so they are prepared for the masterclass.

Science Elective

Debate: "Stress: From bench to daily life"

Moderator: Els Maeckelberghe PhD
Panel members: Malin Meyer and Felix Reichelt (PhD-candidates)

Stress: A key factor in modern health Stress is a pervasive issue in modern life, affecting nearly all aspects of daily living. Most individuals encounter some level of stress on a regular basis. However, when stress becomes frequent and persists at high levels over time, it can contribute to significant health challenges, including mental health disorders like depression, anxiety, and burnout, as well as cardiometabolic conditions such as cardiovascular disease, diabetes, and obesity. According to the World Health Organization, these stress-related conditions represent one of the largest contributors to global disease burden, posing a serious threat to individual well-being and economic productivity. Addressing the impact of stress is essential to improving public health outcomes and overall population well-being. Innovating Stress Research:from lab to real life Stress in Action is an initiative aimed at advancing our understanding of stress by utilising cutting-edge technology and big data analytics to study stress in real-world settings rather than confined laboratory environments. The program fosters interdisciplinary collaboration to:
Examine how stress responses emerge from the dynamic interaction between individual factors and environmental context over time.
Develop accurate, real-time methods to measure stress in individuals during their daily activities.
Investigate how beneficial stress-response mechanisms can shift into harmful effects, leading to mental and cardiometabolic health issues.
These insights are meant to create innovative tools for monitoring and interventions that help manage daily stress and reduce its health consequences. (To learn more, visit Stress in Action)
In this debate, we will address the ethical, conceptual and collaborative challenges faced in this project.

More about the participants:
https://stress-in-action.nl/malin-meyer/
https://stress-in-action.nl/felix-reichelt/
https://stress-in-action.nl/els-maeckelberghe/

Science Elective

Patient Lecture: "A patient with Toxic shock syndrome and multi-organ failure"

Annemieke Oude Lansink-Hartgring MD PhD

Sepsis is a severe immune response of the body to a pathogen, which can cause an infection. In most cases, infections resolve on their own – someone may feel unwell for a while but eventually recovers, even without treatment. However, in some cases, an infection can turn into sepsis. The most severe form, known as septic shock, causes a significant drop in blood pressure, reducing the flow of oxygen-rich blood to tissues and organs. This can lead to serious damage. As a life-threatening condition, sepsis requires urgent treatment to minimise the risk of death or permanent organ damage.

Two years ago, a 36-year-old woman with viral symptoms developed pneumonia and rapidly deteriorated, requiring admission to the ICU. This patient lecture will follow her journey through severe illness, the development of multi-organ failure, the intensive supportive treatment she received at the ICU, and her road to recovery afterwards.

For most people, everyday activities like brushing their teeth or combing their hair require no thought. However, ICU-acquired weakness after septic shock, combined with delirium, left Doortje dependent on assistance for a long time.

Now the patient and her partner are highly motivated to educate the public on the early warning signs of sepsis. Through this lecture, she also hopes to raise awareness among medical students about the long-term effects of septic shock on her daily life.

Science Elective

Sustainability in Healthcare: "Sustainable innovation, striving for green healthcare is the future pathway"

Luise Bödeker
Lukas Radema

Healthcare is one of the most pollutive sectors, with an environmental footprint even larger than that of the aviation industry. At the same time, its direct impact on overall population health remains relatively limited. This imbalance raises a critical question: how can we ensure that healthcare fulfills its mission of promoting health while reducing its harm to the planet?

The future holds promising innovations and transformative changes aimed at making our medical system more sustainable. From greener hospital operations to eco-friendly medical practices, a shift towards environmentally responsible healthcare is already underway. The Netherlands, and particularly the UMCG, is at the forefront of these efforts, leading the way in implementing sustainable healthcare solutions.

In this lecture, Schelto Kruijff, surgical oncologist and Chief Green officer at the UMCG, will explore why sustainability in healthcare is essential and how the sector can adopt greener practices. Join this session to discover how we can transform healthcare into a force for both human and planetary well-being.

Podcast

Eduard Verhagen: End-of-Life Care in Newborns

Kicking off the ISCOMS Podcast, we're excited to have Eduard Verhagen join us! He's a professor in paediatrics and an advocate for making sure children get the most compassionate palliative care possible. Working as a paediatrician at the UMCG, prof. Verhagen played an important part in creating the Groningen Protocol.
This episode, prof. Verhagen tells us about his career journey, breaks down what the Groningen Protocol is all about, and talks about the impact it has had in medical ethics, and in his own life. He also shares his enthusiasm about his IMED-talk at ISCOMS 2024.

Yara Wingelaar-Jagt: Aviation Health in the Military

In this second episode of the ISCOMS Podcast: an interview with Yara Wingelaar-Jagt. As Head of Aerospace Medicine and part of the Center for Man in Aviation of the Royal Netherlands Air Force, she works on crucial aspects of aviation health.
In this episode, Yara explains her career trajectory, provides details about her deployment to Mali, and outlines her PhD research. She'll also cover key challenges and progress within aerospace medicine and how this affects pilots and aircrew.

In this episode, Frederieke discusses her humanitarian career, the challenges of delivering healthcare in difficult settings, and the pursuit of global health equity. Listen in for a direct perspective on humanitarian action.

Podcast

Marc Bonten: A New Pandemic, are we prepared?

On the third episode of the ISCOMS Podcast, we speak with Marc Bonten, Professor of Clinical Epidemiology of Infectious Diseases at the University Medical Center Utrecht. An expert in infectious disease management, he was a member of the Netherlands' Outbreak Management Team (OMT) during the COVID-19 pandemic.
Listen as Marc Bonten discusses his career, his work with the OMT, and key topics in infection prevention and global health policy. This episode offers a straightforward look at managing infectious diseases and addressing public health challenges.

Frederieke van Dongen: Personal Stories as a Humanitarian Affairs Manager in the Middle East

This last episode: Frederieke van Dongen, Humanitarian Affairs Manager at Doctors Without Borders (MSF) and PhD in Social Psychology. With field experience in crisis zones, including the Middle East, she focuses on improving medical access in these demanding environments.

In this episode, Frederieke discusses her humanitarian career, the challenges of delivering healthcare in difficult settings, and the pursuit of global health equity. Listen in for a direct perspective on humanitarian action.

History of ISCOMS

HISTORY OF

ISCOMS

THE BIRTH OF ISCOMS

From scepticism to inspiration

1993

Prof. Theo de Vries, driven by a belief in student potential, initiates the idea of a congress organised by and for medical students. Inspired by a similar event in Tenerife, two eager students, Kees Poelstra and Eric Maarsingh, are appointed to lead the experiment.

The founding team travelled to Tenerife to observe a mini-conference and returned to Groningen to build SCG from scratch.

"STUDENTS KNOW VERY LITTLE, CAN DO PRETTY MUCH NOTHING AND LACK ANY DRIVE OR INITIATIVE" - OPINON OF A MEDICAL TEACHER

ISCOMS was made to prove these accusations wrong

Program and Abstract Book
First Student Congress 1994
(in Dutch; 53 pages)
Onderzoek – Re-search
Eerste Studenten Congres
Geneeskunde = First Student
Congress in Medicine

Board and Committees of the First Student Congress 1994
From left to right.
First row (board): Prof. Theo de Vries, Prof. Eric Maarsingh, Prof. Kees Poelstra, Gerjan Navis.
Second row: Rinze Wolf, Marie-Claire de Wit, Manuela de Klaver, Anneke Meppelink, René de Jong.
Third row: Nadja Kos, Carlinde de Ruiter, Henriëtte Westerlaan, Marlies Reinders.
Fourth row: Carel Geerdink, Anita Zandstra, Hanneke Goudsmit, Bert-Jan Egberink.

1994

The first **Student Congress of Medicine** (SCG) is held with 450+ students in Groningen. It features 15 oral and 15 poster presentations and is fully student-organised with support from the faculty.

HISTORY OF

ISCOMS

BUILDING THE BLUEPRINT

From experiment to recurring congress

1996

SCG is formalised as a faculty taskforce, ensuring its continuity.

Voting technology is used to make sessions interactive years before clickers became common.

Tweede Studenten Congres Geneeskunde

Onderzoek: zelf doen

1997

Introduction of **masterclasses** to help students start with research, with topics such as "Research abroad" and "Combining research and studies". Very much like the masterclasses at the Pre-Course ISCOMS 2025.

1998

For the first time, SCG goes national.

1999

Workshops are introduced, focusing on practical skills like clinical reasoning.

2000

Keynote on the Human Genome Project. Voting keypads are used for the first time to engage the audience. Revolutionary at the time.

"RESEARCH ABROAD: IS IT SOMETHING FOR ME?" – 1997 MASTERCLASS TOPIC

HISTORY OF

ISCOMS

FROM LOCAL TO GLOBAL

Going international, establishing academic value

2002

Launch of the MD/PhD programme at the University of Groningen. SCG becomes a platform to support these dual-role students.

"THIS MARKED THE BEGINNING OF ISCOMS AS AN INTERNATIONAL PLATFORM."- RODERICK WOUTER

2003

SCG becomes an international event. The name changes from SCG to ISCOMS, **International Student Congress of Medical Sciences**. English becomes the official language.

Two fellowship participants from ISCOMS 2005 later started a PhD programmes at the UMCG.

2004

The first **Post-Congress Tour** is organised. A full two-day programme is launched.

2005

ISCOMS Research Fellowships (IRF) are introduced, allowing international students to do research in Groningen.

2006

Dentistry is included in the programme. ISCOMS launches a new independent website and formalises board grants.

HISTORY OF

ISCOMS

PROFESSIONALISATION & PRESTIGE

Nobel laureates, expanded formats, digital transformation

2007

Inclusion of biomedical students. Three-day social programme starts.

2009

Two Nobel Laureates present at the congress.

2010

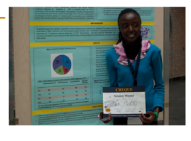
New logo and slogan introduced. Theme: Healthy Ageing.

2011

Pre-course and **debate sessions** are introduced. ISCOMS launches its own mobile app.

2012

The **Feedback system** is introduced after abstract selection to help students develop academically . ISCOMS gains national attention via a national TV show.



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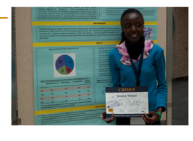

HISTORY OF

ISCOMS

RESILIENCE & FUTURE VISION

Theme: Innovation under pressure, digital transformation, future health

2020

ISCOMS was digital for the first time due to COVID-19 pandemic.

In 2021, participants could attend virtual poster sessions inside a digital world, including avatars and interaction rooms.

2021

Due to the ongoing pandemic, ISCOMS was held digitally once again, featuring virtual poster sessions and immersive VR worlds.

"DESPITE THE COVID PANDEMIC, WE PUSHED INNOVATION FURTHER."

2022

It was uncertain whether ISCOMS could go ahead. First hybrid edition.

2023

Founders return for the 30th anniversary. Keynotes include Prof. Robert Langer and Prof. Mayrbitt Kuypers, MD, PhD

2024

Daythemes like AI and Planetary Health introduced. "Meet the Expert" launched.

For the whole story visit our website!

Social Programme

Sunday 1st of June 2025

City tour through Groningen and the welcoming night with drinks and a pub quiz at News Café.

Monday 2nd of June 2025

A buffet and salsa workshop at one of the many pubs in Groningen: News Café.

Tuesday 3rd of June 2025

Formal dinner at one of the most prestigious places of Groningen, the Prinsenhof.

Wednesday 4th of June 2025

Enjoy a buffet followed by a relaxing boat tour, an exciting game of lasergaming or a fun round of bowling!

Thursday 5th of June 2025

World Wide ISCOMS Night with a buffet at Huize Maas. Please, do not forget to bring your traditional clothes and music!

Friday 6th of June 2025

Post Congress Tour to Amsterdam:
A city walk through our beautiful capital and a visit to the Amsterdam city zoo: Artis!

Plenary sessions

Presenters

Maria Mirkin
Johanna Gloria Kristano
Marta Amari
Si Han
Siyu Zhou
Layla Ahmad Fayoumi
Ziyad Aldhiaf
Ali Rezvanimer

Dynamic Changes in Cardiac Innate Immune Cell Populations During LPS-Induced Systemic Inflammation

Maria Mirkin
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Co-authors: Ms. Katrin Straburger, Ms. Giulia Trimaglio, Mr. Peter Mirtschink

Introduction

Endotoxin-induced cardiomyopathy is a complex pathological condition driven by systemic inflammation caused by endotoxins, such as lipopolysaccharides (LPS), typically associated with gram-negative bacterial infections. This condition results in impaired cardiac function and poses significant challenges for patient outcomes in septic shock. While the interplay among bone marrow-derived macrophages (BMDM), tissue-resident macrophages, cardiomyocytes, and neutrophils has been extensively studied in myocardial infarction, the cellular mechanisms underlying endotoxin-induced cardiomyopathy remain poorly understood. Elucidating these mechanisms is essential for developing novel intervention strategies to mitigate endotoxin-induced cardiac dysfunction

Materials & Methods

LPS (5mg/kg body weight) or phosphate-buffered saline (PBS) was administered intraperitoneally into B57/Bl6 J. After removal the left ventricle was digested and neutrophils, monocytes , BMDMs and tissue resident macrophage populations were isolated and quantified (in % relative to live, CD45+ cells, presented as Mean SEM) by flow cytometry 6h, 24h and 48h post PBS or LPS-injection. Statistical significance was assessed using the Kruskal-Wallis test followed by Dunns post-hoc-test for multiple-comparisons.

Results

Neutrophils increased from 0.49% in PBS-treated mice to around 3.00% ($p<0.05$) at 6h post LPS- treatment and remained high throughout the 48h time point. Monocytes gradually increased up to 3.2 fold at 48h post LPS treatment compared to PBS-control mice (0.36% vs. 1.17%). Surprisingly, the percentage of total macrophages remained constant in LPS- treated mice. Whereas the CCR2-, MHCII+ subfraction of tissue resident macrophages was almost completely diminished at 48h post LPS-injection, the fraction of CCR2-, MHCII- macrophages, which are known to support the resolution of inflammation, increased during the same period by 2.5 fold (82.9% vs. 33.9% in PBS-treated mice, $p<0.01$). Regarding BMDM, the CCR2+, MHCII+ subfraction strongly decreased overtime (0.24% at 48h post LPS injections vs. 12.8% in PBS-treated mice, $p<0.01$), whereas CCR2+MHCII- macrophages increased (0.46% 48h post LPS injection vs. 1.34% in control treated mice, $p<0.05$).

Conclusion

During LPS-induced systemic inflammation cardiac innate immune cell populations undergo dynamic changes, with significant recruitment of neutrophils and monocytes. Shifts in macrophage subpopulations, including the depletion of CCR2-, MHCII+ tissue-resident macrophages and an increase in resolution-supportive CCR2-, MHCII- macrophages will be further characterized by functional and multi-omic-based analyses.

STIM1 as a Potential Universal Treatment Target for Chimeric Antigen Receptor-T Cell Therapy Across Surfaceome Meta-Analysis of Three Bone Sarcoma Subtypes

Johanna Gloria Kristanto
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Indonesia International Institute for Life Sciences
Co-authors: Ms. Michelle Angelica Subrata, Mr. Mitchell Judah Kusumohardjo, Mr. Nathaniel Emmanuel Muliana

Introduction

Bone sarcomas are a group of aggressive tumours with poor prognosis, highlighting the urgent need for novel therapies. An emerging therapy, chimeric antigen receptor (CAR) T cells, which refers to engineered T cells with synthetic receptors to target tumour-specific antigens, has been shown to improve prognoses up to 80% in haematological malignancies. Nonetheless, its application toward solid tumours, specifically bone sarcoma, remains a significant challenge due to its tumour heterogeneity, variability in antigen expression, and the high cost and time associated with developing personalized targets. Therefore, this study aims to identify a universal target for CAR-T therapy in Ewing sarcoma, chordoma, and osteosarcoma by performing a meta-analysis of surface protein datasets (surfaceome).

Materials & Methods

A total of 9,748, 258, and 6,088 surfaceome datasets from Ewing sarcoma, chordoma, and osteosarcoma of both cell lines and patient samples were systematically obtained from Google Scholar and assessed using R programming. The data were processed to obtain mean values and Log2FC values and two-way ANOVA was used to determine the significance of upregulation or downregulation in comparison to mesenchymal stem cells (MSCs), by which results were visualized with volcano plots.

Results

Meta-analysis of the three bone sarcoma surfaceomes identified 22 shared surface proteins linked to cancer progression. Further analysis shows the potential protein biomarker with highly upregulated and consistent Log2FC values across bone sarcoma subtypes is STIM1, accounting for a Log2FC mean value SD of 5.98 1.30 with each Log2FC value of 6.99, 4.51, and 6.44 for Ewing sarcoma, chordoma, and osteosarcoma, respectively. The corresponding results were shown to be significantly upregulated with a p-value of 0.015. STIM1, a transmembrane protein, is known to dysregulate the apoptotic and autophagy pathways that initiate and drive tumor progression, with it being upregulated in sarcomas while having minimal to no presence in MSC control.

Conclusion

Our meta-analysis identified STIM1 as a potential universal biomarker for CAR-T cell therapy in bone sarcomas. For further studies, functional validation, normal tissue expression analysis, and preclinical studies are needed to confirm its clinical applicability.

Effect of anti-IL-17 and anti-IL-23 monoclonal antibodies on gut microbiota in patients with psoriasis: a single centre observational study

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Co-authors: Ms. Chiara Maria Teresa Boggio, Dr. Edoardo Cammarata, Dr. Marta Mellai, Dr. Federica Veronese, Prof./ Dr. Paola Savoia

Introduction

The gut-skin axis (GSA) is crucial for understanding the pathogenesis of inflammatory skin diseases such as psoriasis, which is characterized by specific dysbiotic signatures of both the gut and skin microbiota. Gut dysbiosis may alter skin homeostasis through the GSA and immune signalling networks, involving IL-23 and IL-17 cytokines. Targeting these pro-inflammatory pathways could be one of the therapeutic alternatives for psoriasis, and anti-IL-23 or anti-IL-17 monoclonal antibodies (mAbs) are indeed effective systemic treatments for moderate to severe psoriasis.This study aims to i) evaluate the gut microbiota and its variation in psoriasis patients before, during, and after systemic anti-IL-23 or anti-IL-17 therapy; ii) assess clinical outcomes such as Psoriasis Area Severity Index (PASI), Dermatology Life Quality Index (DLQI), and Investigators Global Assessment (IGA) at the baseline and during the follow-up visits.

Materials & Methods

Stool samples were collected from a cohort of informed consent naive psoriatic patients (n = 43) at baseline (T0), after 16 (T16) and 52 (T52) weeks of treatment with anti-IL-23 or anti IL-17 mAbs. Microbial DNA was isolated (QIAmp PowerFecal Pro DNA Kit). Gut microbiota composition was analysed using 16S rDNA sequencing of the V3-V4-V6 hypervariable regions, processed with MicrobAT software and the Ribosomal Project Database (RDP) database, and assessed with MicrobiomeAnalyst for alpha- and beta-diversity. Clinical endpoints were statistically analysed as well.

Results

Preliminary data confirm an altered Bacillota (formerly Firmicutes)/Bacteroidetes [B(F)/B] ratio at T0, which indicates intestinal dysbiosis. Both the treatments not only improve the condition, but also shift the B(F)/B ratio, increasing species within the Bacteroidetes phylum and enhancing microbiota biodiversity. Besides microbiota changes, both the treatments improve PASI, IGA, and DLQI scores compared to the baseline.

Conclusion

These results demonstrate a progressive increment in gut biodiversity and a normalization of the ratio of B(F)/B in both the patient groups. This pilot study underscores the potential role of biologics in the GSA homeostasis, as the restoration of gut microbiota may support clinical outcomes in psoriasis treatment. Moreover, multicentric studies and gut microbiota analysis on a larger scale could pave the way to better comprehend the relationship between psoriasis and microbiome and lead to personalized, microbiota-targeted therapeutic strategies.

Two-Sample Mendelian Randomization Study to explore the Causal Associations between Type 2 Diabetes and Glycaemic Traits with Alzheimers Disease and Vascular Dementia

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Co-authors: Dr. Elnaz Naderi, Prof. Geert Jan Biessels

Introduction
Type 2 diabetes (T2D) and associated glycemic traits such as hemoglobin A1c (HbA1c), fasting glucose have been linked to cognitive decline. However, the findings from observational studies are often confounded by lifestyle and comorbid factors. This study investigated the potential causal links between T2D and glycemic traits with dementia outcomes (all-cause dementia, Alzheimers disease (AD), vascular dementia), and markers of AD and vascular pathologies, including CSF amyloid beta 1-42, phosphorylated Tau (p-tau), total Tau, and white matter hyperintensity volume. In addition, we used clinical diagnosed lacunar and non-lacunar ischemic stroke as indices of cerebrovascular injury.

Materials & Methods
We employed two-sample Mendelian Randomization (MR) approaches to explore the independent and combined effects of T2D and related glycemic traits on dementia outcomes and pathology markers. Summary-level data from published GWASs were analysed using the inverse-variance weighted method within the multivariable MR framework, with MR Egger and weighted median applied as a sensitivity analysis.

Results
All instrumental variants passed validation tests. Genetically predicted T2D was associated with ischemic stroke (OR 1.14, 95% CI 1.111.17) and lacunar stroke (OR 1.15, 95% CI 1.091.22), which remained robust in both sensitivity analysis and multivariable MR analysis. T2D also showed a suggestive but weaker association with p-tau levels (OR 1.02, 95% CI 1.001.03). However, there was no significant causal link between T2D and dementia, including all cause dementia (OR 1.05, 95% CI 1.01.11), AD (OR 1.03, 95% CI 0.991.08) and vascular dementia (OR 1.01, 95% CI 0.891.15).HbA1c was significantly linked to AD (OR 1.39, 95% CI 1.031.66). Fasting glucose (OR 1.23, 95% CI 1.031.47) and fasting insulin (OR 1.46, 95% CI 1.052.02) also showed associations with ischemic stroke; 2-hour glucose was significantly associated with lacunar stroke (OR 1.24, 95% CI 1.011.52).

Conclusion
While glycemic traits show a suggestive causal link to dementia, including AD, our study does not provide strong evidence for a direct causal relationship between T2D and dementia. However, our findings suggest a causal link between T2D and ischemic and lacunar stroke, highlighting the impact of metabolic dysfunction on vascular health.

Association between sleep quality in adolescence and dysmenorrhea severity in young adulthood: A prospective cohort study

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Co-authors: Ms. Saloni Shrees, Dr. Emmy van den Boogaard, Dr. Martijn Finken, Dr. Tanja Vrijkotte

Introduction
Dysmenorrhea, the most common gynecological issue among women of reproductive age, significantly affects physical well-being, mental health, and overall quality of life. Sleep management has emerged as a promising strategy, as poor sleep quality is associated with increased inflammation and may exacerbate dysmenorrhea. However, existing research is predominantly cross-sectional, leaving the direction of causality unclear. This study aims to prospectively investigate the association between adolescent sleep quality and subsequent dysmenorrhea severity in their young adulthood and to investigate the moderating function of initial dysmenorrhea status.

Materials & Methods
We used data from 614 girls who were followed up by the Amsterdam Born Children and their Development (ABCD) study. Sleep quality and its components were assessed by the Pittsburgh Sleep Quality Index (PSQI) at ages 15 to 16. Dysmenorrhea severity was assessed by the modified Menstrual Disorder of Teenagers (MDOT) questionnaire. Multivariate logistic regression models were conducted to examine the association between overall sleep quality and its components and dysmenorrhea severity, while controlling for demographic, reproductive and lifestyle factors. The moderation function of initial dysmenorrhea status was assessed by adding interaction term with sleep quality into models.

Results
Among the total sample, 77.7% (n=477) girls suffered from moderate/severe dysmenorrhea at ages 19 to 20. At baseline, approximately 45.5% (n=261) of all girls reported poor sleep quality at ages 15 to 16, of whom 84.3% (n=220) of them subsequently developed moderate/severe dysmenorrhea. The results from regression analyses showed that poor sleep quality (OR: 1.21, 95%CI: 1.11-1.32), longer sleep latency (OR: 1.31, 95%CI: 1.02-1.67), and lower sleep efficiency (OR: 2.15, 95%CI: 1.29-3.60) were significantly associated with subsequent risk of severe dysmenorrhea. The associations were not moderated by initial dysmenorrhea status.

Conclusion
Poorer overall sleep quality during adolescence, especially longer sleep latency and lower sleep efficiency, were strongly and independently associated with subsequent dysmenorrhea severity in young adulthood.

In-Silico and In-Vitro Approaches for Optimizing Treatment in Pediatric Pulmonary Artery Stenosis

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Istanbul Medipol University
Co-authors: Mr MHD Homam Al Haj Ali, Dr Ender Odemis, Dr Sercin OZKOK

Introduction

Pulmonary artery stenosis, a condition that obstructs blood flow, especially in infants, requires precise analysis for effective clinical intervention. Computational fluid dynamics simulations are increasingly used for hemodynamic studies, however its accuracy remains uncertain without precise experimental validation. The main aim of this study is to validate CFD results using experimental data obtained from a Vivitro Pulse Duplicator System focusing on pre- and post-operation conditions for patients with stenosis who received a stent.

Materials & Methods

Experimental Procedure:Patient-specific DICOM data from CT scans were acquired to initiate the modeling process. Three-dimensional patient models, representing both pre- and post-operative states, were segmented from the CT scans and further processed using CAD software to create hollowed and meshed structures. Resin-based 3D printing techniques were then employed to fabricate physical models of the patients anatomy. Simulated experimentation was conducted by running blood-analog solutions through a Vivitro Pulse Duplicator System under controlled conditions. Hemodynamic data were subsequently collected using Vivitro software and post-processed with MATLAB to extract meaningful insights and validate the results. Computational Procedure:Physiological boundary conditions were applied to ensure realistic simulation environments for the study. Patient-specific models were carefully meshed using advanced CFD tools to achieve high accuracy and computational efficiency. The flow and pressure distributions were then simulated, allowing for detailed hemodynamic analysis. Finally, pre- and post-stent CFD results were quantitatively compared with experimental measurements to assess consistency and reliability, demonstrating the robustness of the simulation framework.

Results

Velocity profiles in regions of critical stenosis, showed pronounced flow acceleration and a transition to irregular flow patterns , aligning closely with experimental observations. Streamline analyses revealed coherent deviations in flow trajectories downstream of the stenosis, indicating the onset of localized flow instabilities. These findings highlight the intricate interaction between geometric constraints and flow dynamics in stenotic conditions. The computed flow gradients show exceptional consistency with experimental data, with deviations constrained to less than 5%.

Conclusion

This unique in silico analysis and in vitro vallidation approach allows clinicians and surgeons to perform different repairs on patient-specific 3D in vitro models and to optimize the treatment of the pulmonary artery stenosis.

Clinical Efficacy of Platelet-Rich Plasma in Treating Patellofemoral Chondromalacia: Assessing Long-Term Pain Relief and Functional Outcomes in a 1-Year Follow-Up Local Study

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Introduction
Patellofemoral chondromalacia is a common degenerative knee condition characterized by anterior knee pain and functional limitations. Platelet-rich plasma (PRP) therapy has gained attention for its potential to alleviate symptoms and enhance functional outcomes through its regenerative and anti-inflammatory properties. This study aimed to evaluate the efficacy of PRP injections in managing pain and improving functionality in patients with patellofemoral chondromalacia over a one-year follow-up period.

Materials & Methods
A retrospective cohort study was conducted at Almoosa Specialist Hospital, Al-Ahsa, Saudi Arabia, including 103 patients aged 18 years or older diagnosed with patellofemoral chondromalacia confirmed by clinical examination and imaging. Patients received PRP injections and were followed up for 12 months. Data were extracted from electronic medical records, including demographics, duration of symptoms, Outerbridge grade, and changes in pain and functional scores measured by the Visual Analog Scale (VAS) and Anterior Knee Pain Scale (AKPS). Statistical analysis was performed using IBM SPSS version 26.

Results
The mean age of the patients was 32.86 years (SD = 9.54), with 77.7% being male. Significant improvements were observed in both VAS and AKPS scores. The mean VAS score decreased from 6.42 (SD = 2.52) before treatment to 0.50 (SD = 0.78) at the one-year follow-up (mean difference = -5.91, 95% CI: -6.34, -5.49; $P < 0.001$). The mean AKPS score increased from 81.17 (SD = 11.71) to 96.03 (SD = 5.46) (mean difference = 14.93, 95% CI: 13.18, 16.67; $P < 0.001$). No changes were observed in the Outerbridge grade. Age was significantly associated with greater improvements in VAS and AKPS scores, with older patients showing the most pronounced benefits.

Conclusion
PRP injections demonstrated significant efficacy in reducing pain and improving knee functionality in patients with patellofemoral chondromalacia after 12 months. While the treatment effectively managed symptoms, no structural changes in cartilage were noted. PRP appears to be a safe and effective option for symptom relief in this patient population, but further research is needed to explore its long-term regenerative effects and comparative effectiveness against other therapies.

Toll-like receptor 7 is involved focal and generalized epilepsy: Expression analysis of epilepsy patients and in silico inhibitor design

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Azad Medical University, Tehran Branch, Tehran, Iran.
Co-authors: Dr. Kiarash Saleki

Introduction

Epileptic seizures are associated with reduced quality of life and increased morbidity. However, the precise molecular mechanism of seizures remains undefined. Toll-like receptors are innate immune receptors which could mount a cytokine response and direct adaptive immune signaling. TLR7 is reportedly activated during epilepsy linked to tuberous sclerosis complex. We aimed to assess TLR7 expression in focal and generalized epilepsy and explore potential effects associated with molecular interactions of antiepileptic pharmacotherapy on TLR7.

Materials & Methods

48 epilepsy patients (focal/generalized, n=24 per group) and 24 controls were enrolled and their clinical record including current treatments, type of epilepsy, Quality of life by QoLIE-31, and time of seizures following blood sampling. Furthermore, EEG/MRI and blood parameters including CBC diff and Iron study were collected. Collected blood samples were used to isolate PBMCs. Total RNA was then extracted and reverse-transcribed to cDNA for expression analysis by RT-PCR. Docking and dynamic simulations by GROningen MAchine for Chemical Simulations (GROMACS) were utilized to identify ligand-TLR7 interactions to draw conclusions on the TLR7 inhibitory role of anti-epileptic drugs. Moreover, regression and association analyses between TLR7 expression, inflammatory markers, and clinical seizure parameters were conducted.

Results

TLR7 expression was significantly upregulated in generalized epilepsy patients compared to controls ($p < 0.05$) but not in focal epilepsy patients when compared to controls ($p > 0.05$). Moreover, docking antiepileptic drugs at the GMP binding site of TLR7 showed moderate to strong binding suggesting potential competitive inhibitory effects. Regression analysis suggested TLR7 expression could robustly predict next seizure. Highest docking scores were calculated for phenytoin-4.947, Phenobarbital-4.338, Ezogabine-4.254, Lamotrigine-4.249, Primidone-4.220, and Stiripentol-3.984, scoring lower than GMP-TLR7 interactions. Molecular dynamics analysis of antiepileptics-TLR7 revealed sustained binding position for phenytoin/phenobarbital molecules. Also, short-range energy interactions as well as MM-GBSA analyses showed stable binding. TLR7 was not associated with QoLIE-31 questionnaire which evaluates quality of life in epileptic patients.

Conclusion

The present clinical investigation suggests TLR7 may be dysregulated in specific subtypes of epilepsy suggesting it could serve as a biomarker for seizure prediction. TLR7 dynamics could be influenced by specific antiepileptics. Additional research with large-scale longitudinal sampleing is warranted.

Oral Sessions I

Oncology

Presenters

Carolina Palacios-Montoya
Giulio Ruggierie
Theresa Wallner
Fatemeh Darvishnia
Mariana Caldeira

Muscle atrophy in lung cancer cachexia: towards a living, single-fiber approach

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University of Antioquia
Co-authors: Mr. Andres F Milan, Dr Marco A Giraldo, Dr Geysson J Fernandez, Dr Robson F Carvalho, Dr Juan C Calderon

Introduction

Cancer is a major public health challenge because of its high prevalence, morbidity, mortality, and health-care costs. Among its systemic complications, cancer-induced cachexia (CC) is particularly debilitating, further hindering cancer treatments and predicting poor prognosis (WHO, 2019; Fearon et al. 2011; Lim et al. 2020). Despite this, the CC pathophysiology remains poorly understood at the muscle cellular level. Here, we develop a single-muscle fiber murine model with potential to address CC cellular mechanisms.

Materials & Methods

One million Lewis Lung Carcinoma (LLC1, ATCC-CRL: 1642) cells (passage 4) were injected into Tumor-Bearing (TB) C57BL/6 adult mice (3 males, 3 females). Controls (2 males, 2 females) received phosphate buffered saline. Body weight, temperature, thigh and calf circumferences, and tumor diameter were repeatedly measured. After 241.8 days, mice (10.350.25 weeks old) were sacrificed. Tumors, liver, heart, spleen, fat depots (retroperitoneal, visceral, epididymal), and muscles (Flexor Digitorum Brevis (FDB), Peroneus Longus (PL), Extensor Digitorum Longus (EDL), Plantaris, Soleus) were dissected and weighed. Muscles were dissociated in collagenase type II; only isolated, well-contracting fibers were imaged and morphometric analyses were performed using ImageJ.

Results

Control animals gained 2.390.54 g but TB mice lost 1.151.6 g (p=0.006). Thigh and calf circumferences tended to decrease, but spleens were significantly heavier in TB mice (162.677.16 mg) compared to controls (57.3510.01 mg; p=0.037). The greatest difference in fat tissue was observed in the visceral depot (mg): control 329.85117.19, TB 233.62105.70, though not significant (p=0.318). Regarding muscle tissue weight, the greatest change was observed in the EDL (mg): control 9.531.45, TB 8.071.24 (p=0.190). The FDB, EDL and PL fibers of TB mice showed a 20.810.5% (p=0.01) lower diameter (n=199) than the control ones (n=111). The Soleus fibers remained unaffected (p=0.521)

Conclusion

The decreases in weights and circumferences, as well as the splenomegaly, confirm the development of inflammation and CC in the TB mice. This study offers the first evidence of muscle atrophy at the single-fiber level in a CC murine model, paving the way for future detailed physiological, biophysical, molecular and mathematical studies of living single skeletal muscle fibers in the context of CC (CODI 2021-40170; FUA-001-2024/2025-0072).

Usefulness of molecular clustering in predicting survival in individuals with solid tumors

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Co-authors:

Introduction

In a landmark decision in the 2010s, the scientific community recognised that molecular clustering of lower-grade gliomas provides better prognostic predictions than traditional histology. Since then, significant efforts have been dedicated to multi-omics molecular profiling of tumours to emphasise their potential predictive value for clinical purposes. The study aims to explore whether the 16 genes CCND2, PTBP1, CIC, ATRX, PIK3CA, MYC, IDH1, TP53, CDKN2A, NOTCH1, FUBP1, TERT, PTEN, IDH2, NF1 and MDM4, previously identified by The Cancer Genome Atlas (TCGA) Network as discriminant alterations in lower-grade gliomas (2015), may influence survival outcomes in other solid tumours.

Materials & Methods

We analysed data from the TCGA regarding 9980 patients, endeavouring 140 solid tumours, and examined the expression level (EL) of the 16 genes. For each gene, median EL was used as cut-off to divide patients into 2 groups: EL higher (>) vs. lower (<) than its median value. Survival rates with Hazard Ratio (HR) and 99% confidence intervals (CI) were calculated (HR>1.0 = higher survival). All the analyses were conducted in R (v4.3.2), using the packages survival, ggplot2, and gprofiler2.

Results

By combining statistically significant HRs, we identified several clusters of gene expression level ($p<0.001$), associated with higher survival depending on whether each gene was higher or lower than its median value. For CCND2<, CIC<, CDKN2A< and TERT<, hepatocellular carcinoma had an HR of 2.03 (99%CI 1.39-2.96); for CCND2< and TERT>, kidney renal papillary cell carcinoma showed an HR of 2.96 (99%CI 1.56-5.64); for PIK3CA>, TERT<, PTEN>, IDH2< and MDM4<, lung squamous cell carcinoma revealed an HR of 2.77 (99%CI 1.83-4.21); for CIC< and PIK3CA>, pancreatic adenocarcinoma evidenced an HR of 2.31 (99%CI 1.32-4.04); for CCND2< and PTEN>, thyroid classical papillary carcinoma had an HR of 4.76 (99%CI 1.71-13.3).

Conclusion

These results highlight significant differences in survival rates based on molecular level alterations of some genes. The recognised clusters of associations may enhance risk stratification to identify tumours with worse prognosis. Our findings underscore the potential utility of the analysed gene EL as a biomarker to help in predicting prognosis. Further research is needed to enlarge molecular clustering to other genes to implement personalised survival prediction.

Radiosensitisation in two different prostate cancer cell lines: The role of epigenetic modulation with alpha, beta, and X-ray Irradiation

Theresa Wallner
Germany
TU Dresden
Co-authors: Dr Roswitha Runge, Prof. Jorg Kotzerke

Introduction

Current therapeutic applications in nuclear medicine largely involve the use of beta and alpha emitters. Various combinatorial approaches play an important role in improving the therapeutic outcome. One promising strategy involves the addition of epigenetically modifying agents to increase the efficacy of radionuclide treatments. This study examines the cytotoxic effects of combining the histone deacetylase inhibitor (HDACi) Suberoylanilide hydroxamic acid (SAHA) with alpha irradiation (Ac-225), beta irradiation (Lu-177) or X-ray irradiation in two prostate cancer cell lines, PC3 and Du-145.

Materials & Methods

PC3 and Du-145 cell lines were pre-incubated with 2.5 M of SAHA for 24 hours. Each cell line was then irradiated with either Ac-225 (doses ranging from 0.1 2 Gy), Lu-177, (0.5 10 Gy), or X-ray irradiation (1 10 Gy). Cell survival was assessed using a clonogenic survival assay, while apoptosis and necrosis were quantified through PI & Annexin V staining as well as Western Blots.

Results

For PC3 cells, the combined treatment of 2.5 M of SAHA and irradiation did not significantly alter cell survival compared to irradiation alone. Du-145 cells treated with 2.5 M of SAHA showed decreased survival rates across all three irradiation types, with the most profound effects following X-ray irradiation. Cells irradiated with 5 Gy showed a survival fraction of 65% without and 5.4% with SAHA. At 10 Gy, cells showed a survival fraction of 53% without and 0.04% with SAHA. Interestingly, the PI & Annexin V assay showed no significant correlation between SAHA and early apoptosis induction. However, preliminary Western Blot data suggest that SAHA regulates the Bax and Bcl-2 apoptotic pathways in a cell line-specific manner.

Conclusion

Du-145 cells demonstrated a clear sensitivity to SAHA, highlighting the drugs radiosensitising effect. Thus, epigenetic modulation with SAHA could be a more efficient treatment option for patients with poor response to radionuclide therapy. Further studies are required to better understand SAHAs complex role in radiosensitisation, especially across different cell lines and radiation modalities.

Evaluation of spontaneous immunity against placental, stem cell and tumoral proteomes in breast cancer patients

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Introduction
Breast cancer is the most common cancer among women worldwide. Several screening methods, including mammography and MRI, have been developed for breast cancer detection. However, each of these methods has drawbacks, such as limited effectiveness, or low sensitivity and specificity, which hinder their widespread use. An innovative approach involves examining autoantibody profiles against antigenic changes in cancer patients. Given the significant phenotypic and functional similarities among placental, stem, and tumor cells, this study aims to investigate the reactivity of serum antibodies in breast cancer patients against antigens from placental cells, umbilical cord-derived mesenchymal stem cells, menstrual blood-derived mesenchymal stem cells, and breast cancer cell lines.

Materials & Methods
Serum samples were first collected from breast cancer patients, who were then categorized into four groups: Luminal A, Luminal B, HER2+, and triple-negative. Cell samples were prepared from placental cells, umbilical cord-derived and menstrual blood-derived mesenchymal stem cells, and tumor cells. Lysates were created for each cell type, and protein concentrations were measured using the BCA method. Next, the reactivity of serum antibodies in each patient group, compared to those in normal individuals, was assessed against each cell lysate using an indirect ELISA method. The correlation between serum reactivity and the clinical and pathological status of the patients was then evaluated.

Results
Among the 91 patients enrolled, 52 were classified as Luminal A, 13 as Luminal B, 10 as HER2+, and 16 as triple-negative. Serum reactivity varied among these groups, with increased reactivity observed against placental proteome and umbilical cord-derived mesenchymal stem cell lysates in all groups compared to normal individuals. Correlation analysis revealed a direct association between serum reactivity and both tumor size and histological grade, particularly with respect to placental proteome antigens. However, no significant correlation was observed between serum reactivity and metastasis in any group.

Conclusion
This study indicates that breast cancer patients exhibit significantly higher levels of antibodies against placental antigens compared to normal individuals. Furthermore, serum reactivity was directly correlated with tumor size and histological grade. These findings may open new avenues for future clinical research focused on screening and monitoring the status of breast cancer patients.

Comparative analysis of follicular cell- derived thyroid carcinoma: assessing the impact of high-grade features in an advanced disease cohort

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Introduction

In the latest 5th WHOs Classification of Tumors of Endocrine Organs [1], a new term was created to identify those cases, at the time of pathological evaluation, which have a worse prognosis within differentiated follicular cell-derived thyroid carcinomas (DFCDTC): Differentiated High Grade Thyroid Carcinoma (DHGTC). In our work, we aimed to evaluate its frequency and clinicopathological features within a series of advanced follicular cell-derived thyroid carcinoma (AdvTC).

Materials & Methods

We gathered several clinicopathological characteristics from a retrospective cohort of 138 patients with AdvTC submitted to total thyroidectomy, followed by therapy with radioactive iodine (131I). We reclassified them according to 5th WHOs criteria; compared DHGTC to non-high grade differentiated follicular cell-derived thyroid carcinomas (non-HGDTC), and DHGTC to Poorly Differentiated Thyroid Carcinoma (PDTC). We also performed survival analysis for disease-specific survival (DSS).

Results

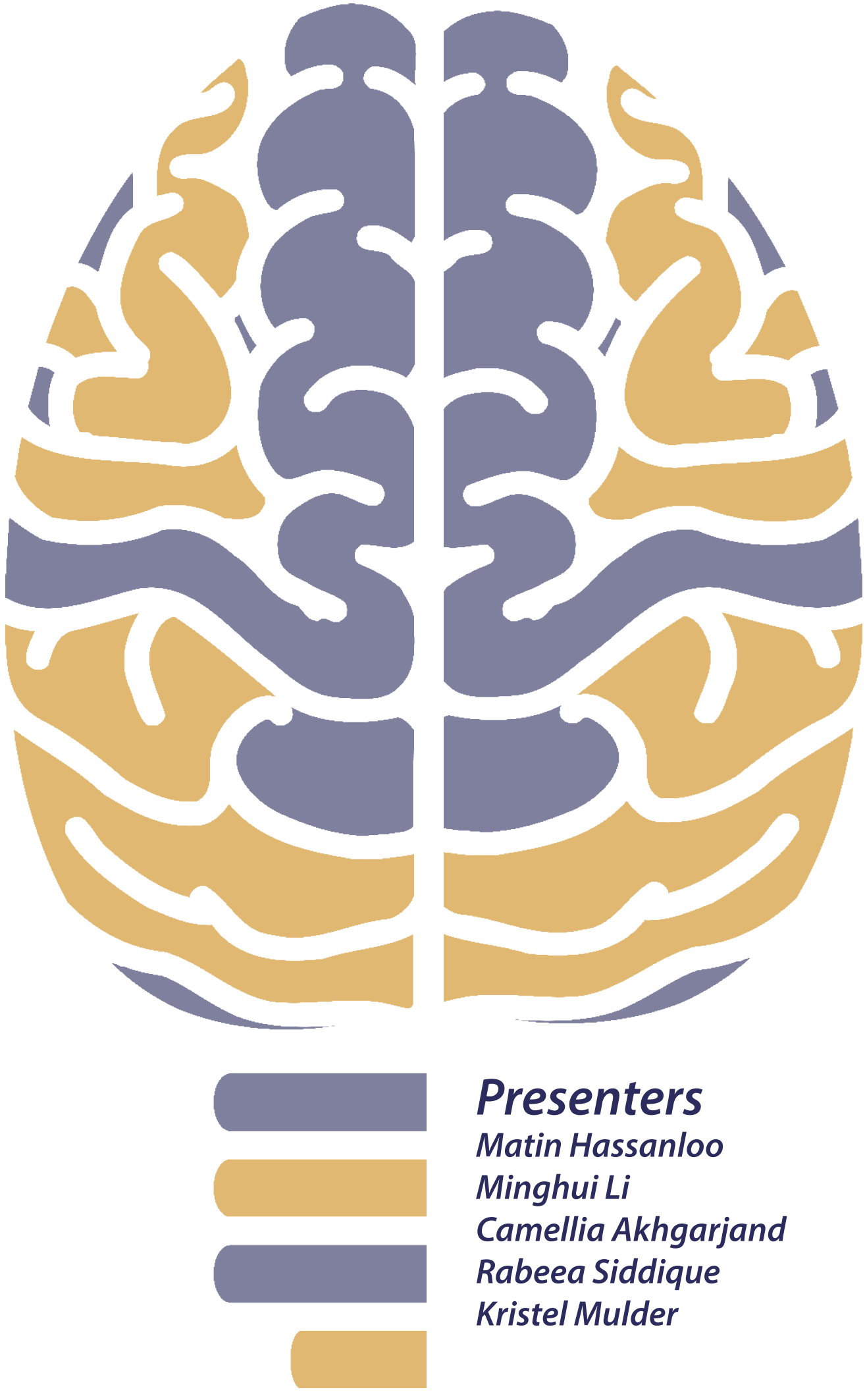
We found that DHGTCs prevalence is higher in AdvTC than what is described in studies without prior clinical selection. In comparison to non-HGDTC, DHGTC cases were significantly associated to several adverse clinicopathological features: age ranges of 18 and 55 years old; presence of distant metastasis; lung metastasis; synchronous metastasis; higher median tumor size and in the range of >2 cm; tall-cell subtype of PTC; higher median mitotic index and in the range of 5/2 mm2; tumor necrosis; angioinvasion; high AJCC 8th edition pT stage (pT3/T4) and submission to additional therapies, including tyrosine kinase inhibitors (TKI). PDTC, in comparison to DHGTC, displayed higher tumor size, a lower mitotic count and more frequent necrosis. Independent prognostic factors for worse DSS, in the whole series, were higher age (55 vs <55 years old) [p=0,005, HR=19,625, 95% CI (2,479-155,372)], coherent with AJCCs new cutoff value for risk stratification, and male sex [p=0,029, HR=7,441, 95% CI (1,231-44,965)], coherent with the knowledge that male patients have more aggressive disease at presentation. DHGTC cases show worse clinical outcomes compared to non-HGDTC cases, namely more cases with persistence of disease at the end of follow-up.

Conclusion

Our results support the usefulness of subgrouping DHGTC tumors, as proposed in the 5th WHO classification, since they more frequently display aggressive features and poor outcomes.

Oral Session I

Neurology



Presenters

Matin Hassanloo
Minghui Li
Camellia Akhgarjand
Rabeea Siddique
Kristel Mulder

Molecular Vibrations and Neural Activity: Investigating Their Role in Odor Discrimination.

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Introduction

Olfactory perception is a sophisticated process involving complex neural and molecular interactions. Despite advancements in understanding receptor-odorant interactions, the role of molecular vibrations in odor discrimination remains largely unexplored. Traditional models focus heavily on molecular shape and binding, often neglecting how vibrational energy of odorant molecules might influence neural encoding and perception. This study integrates molecular spectroscopy, electrophysiological data, and artificial intelligence to investigate the contribution of molecular vibrations to olfactory discrimination, with potential applications in diagnostics, sensory technologies, and environmental monitoring.

Materials & Methods

Neural activity was recorded from mitral and tufted cells in the olfactory bulbs, anterior olfactory nucleus, and piriform cortex of C57BL/6 mice using multi-channel electrodes. Mice were exposed to 21 odorants characterized by vibrational spectra obtained via infrared and Raman spectroscopy. Two datasets were constructed: (1) a neural dataset capturing baseline activity (0.5 seconds) and odor response activity (0.5 seconds) and (2) a molecular dataset detailing bond assignments, wavenumbers, and vibrational frequencies. This approach enables exploration of molecular contributions to neural encoding and supports potential virtual odor reconstruction by combining molecular bonds.

Results

Initial analysis using Random Forest and Logistic Regression achieved a classification accuracy of 55% when analyzing each 0.5-second odor exposure individually. By aggregating data from multiple exposures within a trial (10 repetitions of 0.5 seconds), accuracy improved to 77%, demonstrating the value of incorporating repeated neural responses. To build on these results, a refined dataset is being developed with expanded chemical and neural features. This updated dataset will address current limitations and enable a more comprehensive evaluation of the hypothesized relationship between molecular vibrations and neural activity.

Conclusion

Preliminary findings suggest that integrating neural and molecular datasets provides valuable insights into odor processing mechanisms. Refining these datasets and validating the hypothesized link between molecular vibrations and neural activity remain key next steps. This research aims to enable the development of AI-based systems for accurate odor classification, which could lead to advancements in diagnostics and environmental monitoring. By modeling odor signals for electronic transmission, this study also opens doors to innovative sensory communication technologies.

Revealing the neurotoxicity of brominated flame retardants based on human neural organoids

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Introduction

Healthy neurodevelopment is essential for the correct functioning of the nervous system development. The developing nervous system is susceptible to exposure to environmental chemicals. Polybrominated diphenyl ethers (PBDEs), a group of brominated flame retardants, have been reported to disrupt animal neurodevelopment and induce neural dysfunction. However, the potentially adverse effects of PBDEs on the human nervous system remain unclear due to the lack of realistic in vitro models. This study aims to use human neural organoid models, including brain and retinal organoids to reveal the potential toxicity of PBDEs to human early neural development.

Materials & Methods

Human embryonic stem cell-derived brain and retinal organoids were generated and exposed to 2.5 mg/L (low-level) and 12.5 mg/L (high-level) PBDEs during the organoid induction process (from Day6 to Day32), respectively. Microscopy, immunostaining, and RNA-sequencing were applied to evaluate the neurotoxic effects of PBDEs.

Results

Brain and retinal organoid models were successfully established and can mimic human early neurodevelopment. Exposure to PBDEs disrupted the growth and development of the brain and retinal organoids in dose- and time-dependent manners, as evidenced by abnormal morphologies, such as the decreased area of organoids. The thickness and area of the ventricular zone/subventricular zone of brain organoids and the thickness, area, and ratio of neural retinal epithelium in retinal organoids were also reduced after exposure to PDBEs. Moreover, compared with controls, reduced cell proliferation, induced apoptosis, and disrupted cell differentiation were found in PBDE-exposed neural organoids. Transcriptome data proved that the common neurotoxicity of PBDEs to the human brain and retinal organoids was closely related to the anatomical structure morphogenesis, neuron migration, axon development, axonogenesis, and axon guidance.

Conclusion

Exposure to PBDEs showed similar neurotoxicity to the human brain and retinal organoids. PBDEs could exert neurotoxic effects through common mechanisms, including disruption of anatomical structure morphogenesis, neuron migration, axon development, axonogenesis, and axon guidance. This study suggests that exposure to PBDEs at the early stage could pose threats to human early neural development.

The Role of Vitamin D in Alzheimer's Disease: A Critical Link in Neurodegenerative Pathology

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Introduction

Emerging evidence suggests that vitamin D, a neurosteroid with anti-inflammatory and neuroprotective properties, may play a significant role in the pathogenesis of Alzheimers disease (AD). This study investigates the association between serum vitamin D levels and cognitive function in patients with AD, aiming to explore whether vitamin D supplementation can modulate disease progression.

Materials & Methods

We conducted a cross-sectional study including 150 participants aged 6085 years, comprising 75 AD patients (diagnosed via clinical and neuroimaging criteria) and 75 cognitively healthy controls. Serum 25-hydroxyvitamin D [25(OH)D] levels were measured using chemiluminescent immunoassay. Cognitive function was assessed using the Mini-Mental State Examination (MMSE). In a subset of AD patients (n = 40), the effects of 12-week vitamin D supplementation (2,000 IU/day) on cognitive outcomes were evaluated.

Results

Mean serum 25(OH)D levels were significantly lower in AD patients (15.8 4.2 ng/mL) compared to controls (27.6 6.1 ng/mL, *p* < 0.001). A positive correlation was observed between serum vitamin D levels and MMSE scores in the AD group (r = 0.43, *p* < 0.01). After 12 weeks of supplementation, MMSE scores improved by 2.1 0.5 points in the intervention group compared to no significant change in the control group (*p* < 0.05).

Conclusion

Our findings highlight a potential link between vitamin D deficiency and cognitive decline in AD. Vitamin D supplementation may offer a promising therapeutic avenue to mitigate disease progression. Further longitudinal studies are warranted to confirm these findings.

Clock gene deficiency exacerbates post-Intracerebral hemorrhage (ICH) induced brain injury via inflammatory pathways in mice

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Introduction

Spontaneous intracerebral hemorrhage (ICH) remains the only stroke subtype without a scientifically proven treatment. Primary injury in ICH is related to the mass effect from the initial hematoma, hydrocephalus, and elevated intracranial pressure. Secondary injury in ICH is the result of activation of oxidative stress, neuroinflammatory, and blood-related toxicity pathways. Accumulating data has shown that circadian rhythm plays a crucial role in strokes onset, however, its underlying role in the neurodegenerative progress of ICH is not fully explored yet.

Materials & Methods

Clock gene knock-out ICH induced mouse model, neurobehavioral tests, western blot, Real-time qPCR, multimodal MRI (T2 RARE), Positron Emission Tomography (PET), RNA sequencing, confocal and fluorescence Microscopy.

Results

Results indicated that ICH decreased sleep bout number during daytime and increased the length of sleep bout during nighttime compared to the control group. ICH mice exhibited increase in period (longer free period) under light conditions (LL), unlike the control group, ICH mice failed to show dysrhythmia, suggesting that ICH may disrupt normal circadian rhythms. Further, Sham, wild type (WT)-ICH, and Clock gene knock-out (Clock-/-) ICH were compared. Overall, neurobehavioral scores, MRI scans, and H&E staining results have shown that the Clock-/- ICH group presented severe neurobehavioral, pathophysiological, and neurodegenerative changes as compared WT-ICH and sham group. The expression levels of MMP-9; vWF and MMP9 positive cells increased in the Clock-/- ICH group. The expression levels of tight junction proteins decreased in the Clock -/- ICH group, whereas pro-apoptotic proteins (Bax, Cleaved Caspase-3), and the number of TUNEL-positive cells increased, while the expression levels of anti-apoptotic protein Bcl-2 and NeuN positive cells decreased. The expression of inflammatory proteins (NF-k, iNOS, TLR4, and IL-6), positive immune cells increased in Clock-/- ICH group. Lastly, oxidative markers expression increased in the Clock-/- ICH group compared to WT-ICH and sham group.

Conclusion

The clock gene deficiency (Clock -/-) aggravates the pathophysiology of ICH-induced brain injury and increases neurological severity by increasing the expression levels of neuroinflammatory markers, apoptosis of neuronal cells, the permeability of BBB, oxidative stress damage and immune related responses. These results suggest that Clock -/- affects the progression and recovery processes associated with ICH-induced secondary brain injury.

Battling glioblastoma therapy resistance: increased spatial and temporal calcium activity after radiotherapy or surgical lesion

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Introduction

Glioblastoma is the most prevalent primary brain tumour worldwide, yet it remains incurable. Due to its infiltrative character and high resistance against therapies, it is extremely aggressive and responsible for high mortality and morbidity rates. Despite intensive therapy, glioblastoma recurrence is inevitable. Recently, therapy resistance in glioblastoma has been linked to tumour microtubes (TMs), which are ultra-long neurite-like membrane protrusions that extend between glioblastoma cells. Since calcium oscillations propagate intercellularly through TMs and enable glioblastoma cell communication, this research investigated calcium activity after application of standard of care treatments in an in vitro neuronal-glioblastoma organoid model, to better understand the mechanisms underlying glioblastoma therapy resistance.

Materials & Methods

To investigate calcium activity after standard of care therapy, an in vitro neuronal-glioblastoma organoid model was developed. Simplified brain organoids were co-cultured with a patient derived glioblastoma cell line, which was priorly transfected with a fluorescent marker for calcium. The model was exposed to radiotherapy (2x2 Gy), chemotherapy (200 M temozolomide every two days) and laser inflicted damage (model for surgical lesion). Brain organoids were analysed before and on several timepoints after exposure to therapy by fluorescent confocal microscopy, visualizing calcium activity spatially and over time. Calcium activity data was subsequently analysed with python.

Results

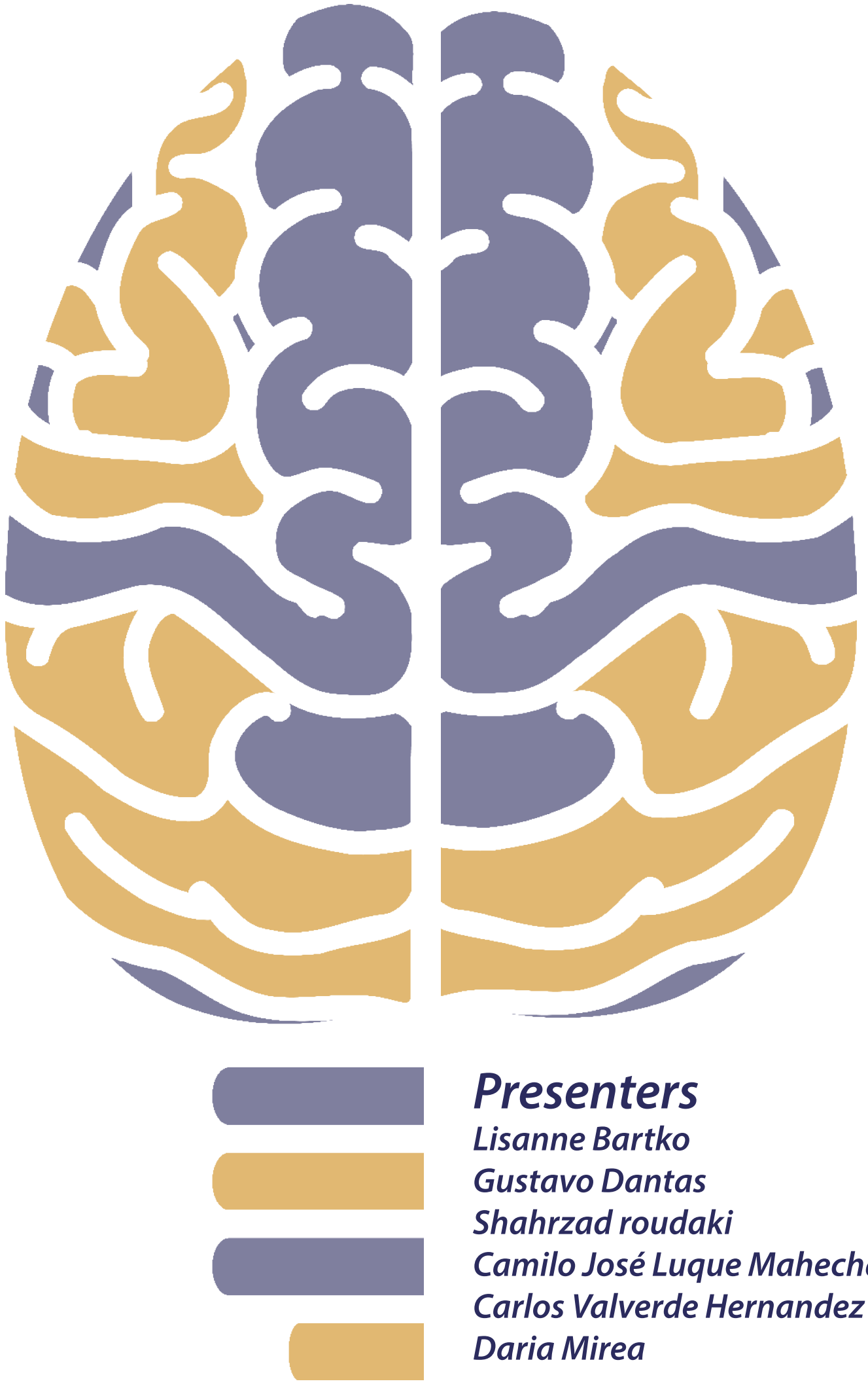
Analysis of calcium activity data showed temporary increased calcium oscillation frequency in response to radiotherapy, with normalization over time. Additionally, when assessing the number of rhythmically calcium oscillating cells, the same pattern of immediate increase of active cells after radiotherapy, with normalization over time, was found. Furthermore, increased spatial and temporal calcium activity was observed after laser inflicted damage (model for surgical lesion).

Conclusion

These findings strengthen the hypothesis of increased calcium activity playing a role in glioblastoma therapy resistance. Therefore, investigating this mechanism further holds the potential to give rise to a new, valuable opportunity to develop glioblastoma therapies.

Oral Session I

Immunology



Presenters

Lisanne Bartko
Gustavo Dantas
Shahrzad roudaki
Camilo José Luque Mahecha
Carlos Valverde Hernandez
Daria Mirea

Metabolic Profiling of Type I Interferonopathies to Develop Targeted Decision-Making Tools

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Co-authors: Prof. Dr. med Min-Ae Lee-Kirsch, Prof. Dr. med Peter Mirtschink

Introduction

Type I interferonopathies are a group of rare genetic disorders characterized by chronic overactivation of the type 1 interferon signaling pathway due to impaired nucleic acid metabolism or sensing, leading to persistent inflammation and tissue damage leading to increased morbidity and mortality early in live.This project aims to improve our understanding of the link between chronic activation of type I interferon signaling in patients with interferonopathies and its impact on cellular metabolism, laying the foundation for advancing precision medicine through the development of innovative treatment strategies and advanced diagnostic tools.

Materials & Methods

In a cross-sectional study plasma samples from patients with different subtypes of Aicardi-Goutieres syndrome (AGS) and age- and sex-matched healthy individuals were analyzed using liquid chromatography coupled with mass spectrometry (LC-MS/MS) to quantify metabolites across various metabolic pathways. The resulting data were analyzed using MetaboAnalyst 6.0, performing principal component analysis (PCA) and orthogonal partial least squares-discriminant analysis (oPLS-DA) to explore metabolic differences between groups. The biomarker analysis tool was employed to calculate the area under the curve (AUC) of receiver operating characteristic (ROC) curves for individual metabolites and metabolite ratios, aiming to identify potential biomarkers distinguishing AGS from healthy individuals. Additionally, random forest analyses were applied to construct predictive models capable of accurately classifying metabolomic profiles into healthy and AGS groups.

Results

Distinct metabolic profiles were observed for each AGS subtype, with key metabolites such as spermin (polyamine-pathway), cis-aconitate (citric acid cycle, xanthurenic acid, kynurenine, (both kynurenine pathway) and citrulline (urea cycle) among the top-regulated biomarkers. ROC curve analysis demonstrated strong diagnostic performance, with metabolites such as the citrulline/spermin ratio (AUC: 0.94) or xanthurenic acid (AUC: 0.92) showing high predictive accuracy for identifying patients with AGS Type 7.

Conclusion

The preliminary results emphasize subtype-specific and shared metabolic alterations, offering potential biomarkers for AGS diagnosis and classification. Moreover, these results will be compared with findings from primary fibroblasts to identify potential correlations. Through these planned experiments, we aim to identify new biomarkers and potential therapeutic targets, ultimately striving to improve patients' quality of life and clinical outcomes.

Patients with Post Acute COVID Syndrome present lower interleukin receptor gene expression

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Introduction

Post-COVID syndrome (PASC) is defined as the presence of persistent or new symptoms, such as fatigue, anxiety, and insomnia that cannot be defined by another diagnosis. Diabetes mellitus (DM) increases the risk of PASC due to heightened inflammation and metabolic dysregulation. This study aimed to evaluate the gene expression in post-COVID patients with and without DM, to verify the impact of Diabetes in PASC manifestations.

Materials & Methods

This study, funded by Hccom VIDA, approved by the HCFMUSP Ethics Committee (approval numbers: 4.270.242, 4.502.334, 4.524.031, 4.302.745, and 4.391.560). Ninety COVID-19 patients, previously hospitalized during the first wave (MarchJune 2020), were divided into Control, PASC, and PASCDM groups, with 15 males and 15 females per group. Follow-up assessments occurred 5 to 12 months post-discharge. Blood samples were collected to analyze RNA and gene expression of IL1R1, IL6R, CXCR2, and VEGF. Exclusion criteria included chronic infections, degenerative, or autoimmune diseases, and inability to answer questionnaires. Statistical analyses used ANOVA and Kruskal-Wallis tests ($p < 0.05$).

Results

During hospitalization, patients in the PASCDM group present more prolonged requirement for mechanical ventilation ($p = 0,0042$) compared to Control. In the follow-up assessment, patients with PASC and DM exhibited significantly higher leukocyte ($p < 0.0001$) and lymphocyte count ($p = 0.0056$) compared to Controls. IL1R1 and IL6R gene expression was significantly downregulated in PASC ($p = 0.0052$ and $p = 0.0427$), while CXCR2 and VEGF values showed no significant differences. Self-reported symptoms like fatigue (Control = 7%; PASC = 83%; PASCDM = 57%) and insomnia (Control = 17%; PASC = 57%; PASCDM = 40%) were prevalent in the PASC and PASCDM groups with $p < 0,0001$ and $p = 0,0058$, respectively.

Conclusion

Patients in the PASCDM group exhibited higher leukocyte and lymphocyte counts, despite no significant differences in regulatory protein gene expression. In contrast, PASC patients showed reduced cytokine receptor expression (IL1R1 and IL6R), suggesting a dysfunctional inflammatory response. This pro-inflammatory status in diabetic patients may counterbalance the downregulation observed in PASC without DM, as supported by Hotamisligil et al. (2006), who highlighted chronic low-grade inflammation in diabetes, underscoring its role in modulating post-COVID immune responses.

Advancing Systemic Lupus Erythematosus Care Machine Learning for Precision Subtype Classification

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Co-authors:

Introduction

Systemic Lupus Erythematosus (SLE) is a complex autoimmune disease characterized by diverse and often overlapping symptoms, making accurate subtype classification a significant challenge for clinicians. This study introduces a novel machine learning framework that combines the strengths of Bidirectional Long Short-Term Memory (Bi-LSTM) networks and Gradient Boosted Decision Trees (GBDT) to enhance the precision of SLE subtype classification. By integrating unstructured patient narratives with structured clinical data, our approach aims to deliver personalized and adaptive therapeutic strategies, ultimately improving patient outcomes and advancing equitable healthcare delivery.

Materials & Methods

A comprehensive dataset of over 1,200 anonymized patient records, spanning a decade of clinical evaluations, serological assessments, and medication histories, was curated from two institutions. The Bi-LSTM model was employed to extract complex patterns from unstructured patient narratives, while GBDT provided a robust analytical layer for structured data. Critical GBDT hyperparameters, including learning rates (0.050.20) and tree counts (100500), were fine-tuned using cross-validation to optimize model performance. The dataset was partitioned into an 80% training and 20% validation split to ensure generalizability. Model efficacy was evaluated using precision, recall, F1 score, and AUC-ROC metrics.

Results

The integrated Bi-LSTM and GBDT model achieved exceptional performance, with an overall precision of 95.3%, specificity of 93.2%, and sensitivity of 94.8%. Notably, the model demonstrated a 92% accuracy in identifying challenging SLE manifestations such as lupus nephritis, significantly outperforming traditional diagnostic methods, which typically achieve 6575% accuracy. These results highlight the models ability to discern subtle subtype distinctions, offering a transformative tool for SLE diagnosis and treatment planning.

Conclusion

This study represents a paradigm shift in SLE subtype classification, leveraging machine learning to address the complexities and uncertainties inherent in traditional diagnostic approaches. By enhancing diagnostic accuracy, our framework empowers clinicians to deliver personalized care, improving patient outcomes and reducing healthcare disparities. Future work will focus on external validation with broader datasets to further refine and generalize the model, ensuring its applicability across diverse patient populations. This research underscores the potential of machine learning to revolutionize autoimmune disease management, paving the way for more equitable and patient-centered healthcare solutions.

Assessment of the role of Vitamin D in mayaro virus replication and modulation of inflammatory response in Macrophages.

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Co-authors:

Introduction

Mayaro virus (MAYV), an emerging arbovirus in Latin America, causes significant morbidity due to prolonged arthralgia and inflammation. Its pathogenesis remains poorly understood, with macrophages identified as central to its immunopathogenic effects. Current treatments are limited to symptom management, underscoring the need for novel therapeutic strategies. Vitamin D, known for its immunomodulatory and antiviral properties, has demonstrated efficacy against several viral infections. This study investigates the antiviral and immunomodulatory effects of vitamin D3 in human macrophages infected with MAYV.

Materials & Methods

An in vitro experimental study was conducted using macrophages derived from monocytes of healthy donors (n=4). Macrophages were differentiated in the presence of vitamin D3 at concentrations of 0.1 nM and 1 nM and subsequently infected with MAYV. Viral replication was quantified via plaque assays, while cytokine production (TNF-, IL-6, IL-8, IL-10,CCL2, CCL5) was measured using ELISA. The expression of immunoregulatory genes (EPSTI1, VDR, LL37, and SOCS1) was assessed through RT-qPCR. Statistical analyses were performed using GraphPad Prism, with significance set at $p<0.05$.

Results

Vitamin D3 significantly reduced viral replication, with 1 nM achieving an 82% inhibition at the peak of infection (24 h post-infection). Pro-inflammatory cytokines, including IL-6 and IL-8, were notably decreased, particularly with 0.1 nM treatment at early time points. Conversely, IL-10 production increased significantly with 1 nM vitamin D3 at 6 h post-infection, highlighting its immunoregulatory potential. Gene expression analysis revealed no significant changes in EPSTI1, VDR, LL37, or SOCS1, suggesting alternative mechanisms for vitamin Ds effects.

Conclusion

Vitamin D3 demonstrates a dual role in reducing MAYV replication and modulating inflammation in infected macrophages. These findings position vitamin D as a promising candidate for mitigating MAYV-induced pathogenesis, particularly inflammation-associated tissue damage. Further studies are warranted to elucidate its mechanisms and therapeutic potential in arboviral infections.

Switching Antibody Gears: How CRISPR Discovery of BRWD3 Shapes Personalized Vaccine Design

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Introduction

Successful immunization after vaccination requires precise antibody development and regulation. Class switch recombination (CSR) enables B cells to tailor antibody isotypes, a process essential for adaptive immunity and personalised medicine. Based on a genome-wide CRISPR-Cas9 screen and preliminary associations with B cell leukemias, we hypothesised that BRWD3 is a negative regulator of IgA CSR, acting through chromatin modulation and suppression of AID expression.

Materials & Methods

CRISPR-Cas9 was used to delete Brwd3 in the CH12 murine B cell line. Single-cell clones were validated by Sanger sequencing and mismatch cleavage assays. CSR to IgA was quantified via flow cytometry following stimulation with CD40/IL-4/TGF- (CIT) or individual cytokines. Activation-induced cytidine deaminase (AID) and Lysine-demethylase 5c (KDM5c) protein levels were analysed by Western blotting. Statistical significance was determined using two-way ANOVA and Students t-tests (< 0.05).

Results

Efficient Brwd3 deletion was confirmed in bulk (52.7% editing) and three homozygous clones. IgA class switching was significantly elevated in knockout cells: unstimulated knockout cells showed 78.0% IgA+ versus 7.6% in wild type (p = 2.98 105), and CIT-stimulated cells reached 90.7% IgA+ versus 29.4% (p = 1.08 107). TGF- alone also induced significantly higher switching (89.2% vs. 14.2%, p = 1.44 104). A two-way ANOVA confirmed significant effects of genotype (p < 2.2 1016) and stimulation (p = 1.45 108). In single-cell analysis, two of three knockout clones displayed >99% IgA+ cells without stimulation, suggesting constitutive CSR. The Western blots revealed that AID was detected in unstimulated knockout clones but absent in wild types. KDM5c levels trended lower in knockouts, though antibody specificity limited interpretation.

Conclusion

BRWD3 is a novel suppressor of IgA CSR. Its deletion induces spontaneous and cytokine-enhanced class switching, likely via epigenetic regulation of AID, master player in antibody development. These findings identify BRWD3 as a potential target for personalised modulation of antibody responses, with implications for immunotherapy and disease prevention. Future studies should explore BRWD3s mechanism in vivo and its engineering for improved immunization. If this interaction is confirmed in vivo, BRWD3 will be conceived as a central regulator of the antibody development process.

An exploratory study on the role of platelets in the pathophysiology of Giant Cell Arteritis

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Co-authors:

Introduction

Giant cell arteritis (GCA) is an immune-mediated vasculitis affecting medium- and large-size arteries in patients over 50. GCA can cause severe complications, including permanent blindness and stroke due to arterial inflammation and remodelling, leading to stenosis or occlusion. Despite advancements in understanding its cellular and immunological mechanisms, the exact cause and pathogenesis of GCA remain unclear. Platelet counts are often elevated in GCA, but their role in inflammation and vessel wall remodeling remains unexplored, and the utility of anti-platelet therapy in GCA is still debated. The aim of this study is to explore the role of platelets in the pathophysiology of GCA.

Materials & Methods

The study will include 30 patients from the long-standing GPS cohort at the Dept. of Rheumatology and Clinical Immunology at the University Medical Centre Groningen, with biobanked arterial tissue and comprehensive clinical data. Platelet abundance will be assessed using immunohistochemistry, and the relationship with inflammatory markers and tissue remodeling will be explored through cross-sectional and longitudinal analyses. Statistical analyses will include non-parametric tests, with statistical significance set at $p < 0.05$.

Results

Platelet levels were elevated in the adventitia of the temporal artery in the GCA group compared to healthy controls. So far, only 18 biopsies (9 for each group) were assessed using the Mann-Whitney U test. In the adventitia, platelet infiltration was higher in patients (median 38.76, IQR 0.9570.80) compared to controls (median 9.78, IQR 2.8820.88; p=0,0315). No significant differences in platelet abundance were detected in the intima (p=0.1903) or media (p=0.3865) layers.

Conclusion

These findings suggest that, in GCA patients, platelet aggregation in the temporal artery is predominantly located in the adventitia layer, supporting the idea that outer vessel wall immune activation precedes the luminal involvement. Moreover, the lack of significance for the intima and medial layers may be due to the limited sample size, which will be augmented to 30 patients for each group later in the study. Overall, the results obtained as yet emphasize the possibility of using antiplatelet therapy not only in high-risk groups, but also in the overall GCA patient population.

Oral Session I

Biochemistry & Microbiology

Presenters

Lizi Mokvanidze
Othman Jamal Allail
Ana Shekiladze
Naheed Mojgani
Sina Jafari
Paulina Maldonado Macías
Xanthia Woltjer

Comparative validation of low-density lipoprotein cholesterol estimation formulas in a diverse population

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Co-authors: Ms Nino Gagua

Introduction

Cardiovascular diseases are the leading cause of death worldwide, claiming 17.9 million lives annually. Low-density lipoprotein cholesterol (LDL-C) is a key marker for assessing cardiovascular disease risk, its accurate estimation is essential. Direct measurement methods of LDL-C are precise, although expensive and impractical for routine use, particularly in low- and middle-income countries. Various estimation formulas, such as Friedewald, de Cordova, and others, have been developed, although their accuracy can vary across different populations. This study aims to evaluate the reliability of several LDL-C estimation formulas compared to direct measurement and identify the most suitable formulas for a cohort of adolescents.

Materials & Methods

A retrospective analysis was conducted on data from 500 adolescents with complete lipid profiles collected in 2019 and 2021. Participants were categorized into subgroups based on triglyceride (TG) levels, HDL cholesterol (HDL-C), total cholesterol (TC), and age. LDL-C levels were calculated using eight formulas- Friedewald, de Cordova, Vujovic, Chen, Anandraja, Hattori, Ahmadi, Puavillai- and compared to directly measured values. The study was approved by the Bioethics International Committee of the Petre Shotadze Tbilisi Medical Academy and adhered to the Helsinki Declaration.

Results

The study revealed variability in the accuracy of LDL-C estimation formulas. The Friedewald and Chen formulas demonstrated slight underestimations (mean difference: -1,322) and were generally close to direct measurements. The de Cordova formula provided the most accurate estimates across a broader range of TG values, indicating its adaptability to lipid profiles variations. The Hattori formula showed a lower mean underestimation of -0,318 mg/dl, reflecting good accuracy. However, the Vujovic, Anandraja, and Puavillai formulas exhibited higher underestimations ranging from -6,621 to -9,926 mg/dl. The Ahmadi formula displayed significant inaccuracy, with a mean difference of -90,613, making it less suitable for this population.

Conclusion

While formulas like Friedewald and de Cordova are reliable and cost-effective for general use, others such as Ahmadi may not be appropriate for all populations. The selection of an estimation formula should account for population-specific characteristics and clinical or research needs. Further studies are recommended to validate these findings in more diverse populations and clinical settings.

A novel anisaldehyde-based dispersive liquidliquid microextraction method with UPLCMS/MS for simultaneous determination of endocrine-disrupting compounds in food products

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Introduction

Bisphenol A (BPA) and parabens are synthetic compounds, (BPA) extensively used in producing epoxy resins and polycarbonate plastics, is commonly found in food cans, beverage bottles, cosmetic packaging, and other consumer goods. Parabens are among the most widely used preservatives in food products. As an endocrine disruptor, BPA interferes with hormonal receptors, potentially causing reproductive, nervous, metabolic, and immune system disorders, as well as developmental problems in offspring. The primary route of exposure is through the consumption of food and beverages in contact with BPA-containing materials. To address the need for effective monitoring, a rapid, green, and efficient method was developed for the simultaneous determination of selected parabens and bisphenols in food products.

Materials & Methods

This method utilized anisaldehyde-based deep eutectic solvent dispersive liquidliquid microextraction (DES-DLLME) coupled with UPLCMS/MS analysis. A natural deep eutectic solvent, synthesized from anisaldehyde and decanoic acid in a 3:1 molar ratio, served as the extraction medium. Key parameters, including solvent volume, vortex duration, centrifugation time, sample volume, and pH, were optimized to ensure high sensitivity and efficiency.

Results

The method demonstrated excellent performance, achieving determination coefficients (R2) of 0.9990, limits of detection between 0.0005 and 0.02 g/L, and extraction recoveries ranging from 97.8% to 100.2%, with relative standard deviations below 6.8%. The optimized method was applied to 80 food products, such as soft drinks, energy drinks, sauces, and juices collected from the Saudi market. Results showed methylparaben as the most frequently detected paraben (51.25%), followed by ethylparaben (35%) and propylparaben (11.25%). Butylparaben was less prevalent (8.75%), while benzylparaben was not detected. Among the bisphenols, BPA was the most common, found in 73.75% of samples with a maximum concentration of 26.6 g/L, followed by bisphenol S (31.25%) and bisphenol F (26.25%).

Conclusion

This innovative approach enables fast, precise, sustainable analysis of endocrine-disrupting chemicals, marking a significant advancement in green analytical methods for food safety.

Rapid detection of Staphylococcus aureus and Escherichia coli using golden nanoparticles

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Introduction

An antibiotic resistance remains a major challenge in modern medicine, partly due to delays in diagnosing bacterial infection. This study investigates the potential of unmodified gold nanoparticles as a rapid, and affordable diagnostic tool for detecting Staphylococcus aureus and Escherichia coli within 24 hours. The approach leverages the nanoparticles sensitivity to bacterial presence, which indices visible color changes under acidic conditions

Materials & Methods

To test this approach, 900L solutions with varying concentrations of Staphylococcus aureus and Escherichia coli were prepared in distilled water and incubated for 24 hours. Afterward, 450L of 20 nm gold nanoparticles (nanoComposix) and 150L HCl were added to create an acidic environment, facilitating interactions between the nanoparticles and bacterial metabolites. Color changes were observed visually under consistent lighting conditions and matched to a Munsell color chart for documentation. For example, high concentrations of Staphylococcus aureus and Escherichia coli resulted in HEX color #747080, while lower concentrations showed HEX color #938292. Control samples without bacteria retained the original raspberry color (HEX #6a2939) of the nanoparticles. After capturing images of the results, a color detector was used to identify the specific HEX codes. All experiments were repeated three times to confirm reproducibility.

Results

Clear color differences were observed, correlating with bacterial concentrations. For Staphylococcus aureus, high concentrations (1:10) produced darker shades (HEX color #747080), while lower concentrations (1:1,000,000) yielded lighter ones (HEX color #938292). Similar results were obtained for Escherichia coli. Repeated trials confirmed the consistency of these observations, suggesting that this method is reliable for detecting bacterial presence based on visible color changes.

Conclusion

The study shows that unmodified gold nanoparticles can serve as a rapid and straightforward diagnostic tool for detecting Staphylococcus aureus and Escherichia coli within 24 hours, using minimal laboratory infrastructure. While the sensitivity to bacterial presence is promising, specificity remains a challenge. Future work should explore modifications to the nanoparticles to enhance their selectivity for different bacterial strains, making the method more robust for clinical applications.

Synergistic Antibacterial Effects of Probiotic bacteria and Propolis Extracts against Helicobacter pylori in challenged Wistar rat models

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Introduction
H.pylorus is a significant contributor to a range of gastrointestinal conditions, with conventional treatment methods primarily relying on antibiotics. Nevertheless, the rise of antibiotic-resistant strains has necessitated the exploration of alternative therapeutic approaches. The present study aimed to determine invitro antibacterial potential of probiotic bacteria (Lacticaseibacilus rhamnosus and Limosilactobacillus reuteri) and propolis extracts against H. pylori. Furthermore, to analyze the impact of either probiotics or propolis extracts or their combinations on body weight index and histopathological changes in H. pylori infected animal models

Materials & Methods
This study evaluated the inhibitory effects of probiotic bacteria and four different propolis extracts on the growth of H. pylori during invitro studies. While, during invivo analysis the effects of combination of probiotics (109 CFU/ml) and different concentrations of propolis extracts in H.pylori infected Wistar rat models was evaluated. Fifty-four male Wistar rats (200-250 g) infected by H. pylori suspension (108 CFU/mL) were orally administered propolis or probiotics (109 CFU/ml) for 21 days via gavage. The effects of different treatments on body weight and histopathological changes in the gastric tissue samples were assessed and results statistically analyzed.

Results
The findings showed that oral administrations of propolis and probiotic, either separately or in combination, can lead to significant increase in body weight and amelioration of histopathological changes in the gastric tissue samples of infected animals. The results of this study underscore the possible therapeutic advantages of these treatments in addressing H. pylori-induced gastropathy.

Conclusion
Additional research is necessary to clarify the mechanisms involved and to refine dosage and treatment protocols for optimal effectiveness. Furthermore, exploring the potential for developing beneficial food products utilizing probiotics, postbiotics, and propolis to alleviate digestive issues caused by pathogenic bacteria, specifically H. pylori, is recommended. In conclusions, this study reinforces the increasing body of evidence indicating the possible therapeutic advantages of propolis and probiotics in the treatment of gastric damage associated with H. pylori. It explores the feasibility of developing beneficial food products that incorporate probiotics, postbiotics, and propolis to alleviate digestive issues caused by gastrointestinal pathogens

Evaluation of relation between vitamin D levels and gingivitis in children with type 1 diabetes

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Introduction
Vitamin D is the only vitamin that acts as a hormone in the body and has an anti-inflammatory role, increasing immunity and eliminating inflammatory responses are among its features. In addition, the lack of this vitamin disrupts the synthesis and secretion of insulin in humans. Therefore, the present study was conducted with the aim of investigating the relationship between vitamin D level and gingivitis in children with type I diabetes.

Materials & Methods
In this cross-sectional study, 148 children with typel diabetes aged between 6-12 years were enrolled. Age, gender, serum calcium(mg/dl) and 25-hydroxyvitamin D(ng/ml) levels were recorded by reviewing the patient's medical Records. Participants were matched based on age and gender. Additionally, all individuals who had another systemic disease, taken vitamin D supplements or antibiotics in the past three weeks, and had undergone dental treatment in the past six months were excluded from the study. Gingival status was evaluated using Silness and Loe plaque index and modified gingival index by Luben et al. Data were analyzed using Mann-Whitney, Kruskal-Wallis and Spearman's correlation coefficient tests at a significance level of 0.05 in SPSS software version 24.

Results
A total of 74 patients with gingivitis (GG) and 74 patients without gingivitis (control group [CG]) were included in the study, 77(52.02%) girls (38CG, 39GG) and 71(47.98%) boys (36CG, 35GG). The mean age of the participants was 8.781.88 years. There was no statistically significant difference in the distribution of gender and age between the two groups($P>0.05$). The mean vitamin D level in the GG was 20.72(12.77) significantly lower than that of the CG [29.57(10.72),$P<0.001$]. In the CG, the adequate vitamin D level was found in 41.9%, while in the GG it was 25.7%. The mean calcium level in the GG was 8.58(0.47) and CG [9.12(0.47)]. There was a positive and significant relationship between the level vitamin D and calcium both GG and CG($r=0.862$,$P<0.05$; $r=0.789$,$P<0.05$, respectively).

Conclusion
The mean of vitamin D in GG was significantly lower than CG, therefore, examining the level of vitamin D and vitamin supplementation in case of deficiency, in order to improve and control this disease in diabetic patients with gingivitis is suggested.

Cardioprotective effect of L-Theanine on mitochondrial function and dynamics in a rat model of isoproterenol-induced cardiac injury

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Introduction

Isoproterenol (ISO), a -adrenergic agonist, is widely used as a model of experimental cardiac injury due to its ability to induce oxidative stress, mitochondrial dysfunction and fragmentation, as well as the loss of the ability to repair or remove defective mitochondria. In contrast, L-Theanine, an amino acid derived from Camellia sinensis, possesses antioxidant properties that could protect mitochondria. This study aimed to evaluate the protective effects of L-Theanine on mitochondrial function and dynamics in ISO-induced cardiac injury in rats.

Materials & Methods

Male Wistar rats were orally pretreated with 500 mg/kg/day of L-theanine for 14 days. On day 14, 150 mg/kg of ISO or saline was administered subcutaneously. Two days later, the rats were sacrificed, and their hearts were removed for analysis of infarct size and oxidative stress markers. Polarographic analysis was used to estimate oxygen consumption in isolated mitochondria. Levels of proteins involved in mitochondrial dynamics were explored by immunoblotting in cardiac homogenates.

Results

L-Theanine pretreatment not only reduced infarct size by 42% (95%CI 20-60%), but also prevented oxidative stress by decreasing lipid peroxidation by 61% (95%CI 30-46%) and restoring the activities of the antioxidant enzymes superoxide dismutase by 35% (95%CI 26-43%) and catalase by 75% (95%CI 51-99%), compared with rats treated with ISO alone. L-Theanine maintained basal respiration and enhanced ADP-stimulated respiration. Consequently, L-Theanine increased the respiratory control index from 2.1 to 6.4 (95%CI 5.4-7.4) and the phosphorylation efficiency from 1.0 to 2.3 (95%CI 2.2-2.4). Finally, the levels of the mitochondrial fusion proteins mitofusin 2 and optic atrophy protein 1, as well as the mitochondrial fission proteins dynamin-related protein 1 and fission 1 showed no significant differences between the ISO- and L-Theanine-treated groups.

Conclusion

L-Theanine pre-treatment attenuates cardiac injury by reducing oxidative stress and improving mitochondrial function, without altering mitochondrial dynamics. Thus, L-Theanine could be a promising candidate for the development of new therapies that counteract the harmful effects of cardiotoxic agents.

Preliminary Safety Analysis of Imatinib through Assessment of Metabolic and Toxicity Mechanisms in Precision-Cut Placental Slices and Placental Cell Line Models

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Co-authors: Miss Claudia Westerhof

Introduction

Assessing drug safety during pregnancy is challenging due to the exclusion of pregnant women from clinical trials. Therefore the impact of drugs on the fetus is understudied. The placenta, a vital organ in drug metabolism, expresses enzymes such as Cytochrome P450 3A4 (CYP3A4) and transporters like P-glycoprotein (P-gp), influencing fetal drug exposure. Pregnant women diagnosed with Chronic Myeloid Leukemia (CML) may be prescribed imatinib, a tyrosine kinase inhibitor. Imatinibs effects on placental drug metabolism and toxicology can be investigated using placental models. This study uses placental models to assess imatinibs safety during pregnancy by examining its metabolic activity and toxicity in the placenta.

Materials & Methods

Full term placentas (UMCG healthy adult donors) were used for precision-cut placental slices and exposed to increasing concentrations of Imatinib (0.5, 1.0, 5.0, 10, 50.0 M). Cell viability was assessed using PrestoBlue and ATP quantification assays. Imatinib-induced cytotoxicity was assessed in BeWo B30 cells exposed to increasing imatinib concentrations (0.1-1000 M) using a Crystal Violet cell viability assay. Baseline functional assays were performed using ketoconazole and verapamil at varying concentrations to determine the subtoxic concentration in BeWo B30 cells.

Results

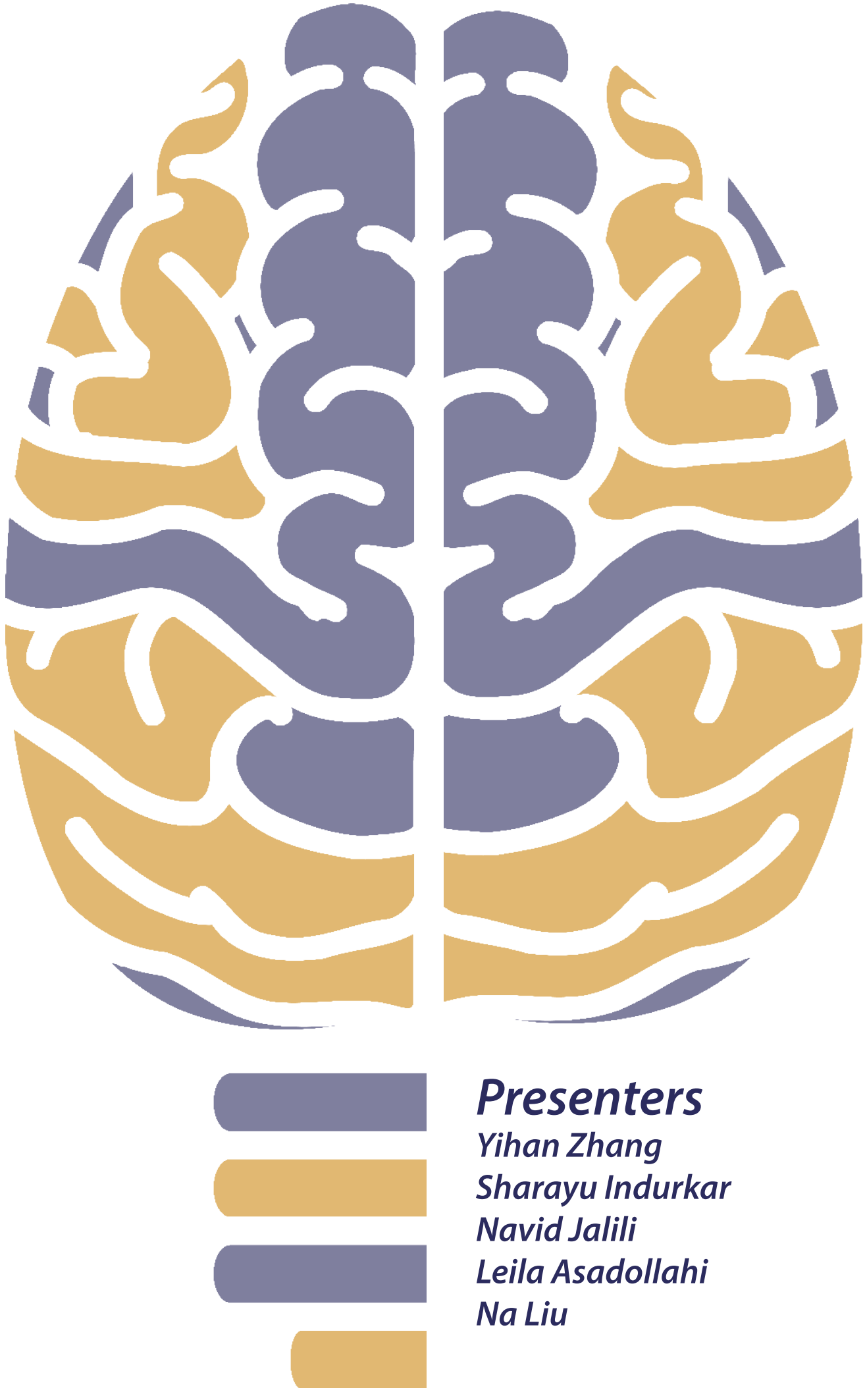
Preliminary PrestoBlue assay data indicate a reduction in maternal and fetal placental tissue viability at 50 M Imatinib. ATP quantification (normalized to protein levels) decreased most between 1050 M (72%) in maternal tissue, suggesting a strong dose-dependent effect, while fetal ATP levels remained relatively stable across concentrations. Cytotoxicity assays in BeWo B30 cells showed a dose-dependent reduction in cell number between 101000 M imatinib. Baseline assays identified 10 M ketoconazole and verapamil as subtoxic concentrations for future co-exposure studies with imatinib in BeWo B30 cells.

Conclusion

This ongoing study highlights the importance of placental models in understanding drug metabolism and toxicity during pregnancy. Preliminary results from BeWo cells and placental slices indicate potential cytotoxic effects of imatinib at higher concentrations. However, further research is needed due to model and donor variability, and to increase statistical power. Ongoing experiments assess CYP3A4 and P-gp activity to study pathways underlying imatinibs mechanism of action. Ultimately, these results are important to understand imatinib use during pregnancy and strategies to reduce fetal exposure.

Oral Session I

Dermatology



Presenters

Yihan Zhang
Sharayu Indurkar
Navid Jalili
Leila Asadollahi
Na Liu

Triple Therapy with Triamcinolone Acetonide, Hyaluronidase, and Fractional CO2 Laser for Refractory Keloids: A Randomized Controlled Trial

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Introduction
Current treatments for keloids often yield suboptimal outcomes and high recurrence rates. Intractable scars account for approximately 40% of all cases. Dual therapy (DT), comprising triamcinolone acetonide (TA) and fractional CO2 laser (FCL), is widely used but has limitations, including insufficient efficacy for deep scars and the need for repeated sessions. Hyaluronidase, known for enhancing drug diffusion and reducing scar proliferation, shows promise in improving treatment efficacy. This study evaluates the efficacy and safety of a triple therapy (TA, hyaluronidase, and FCL, TT), for managing complex keloids.

Materials & Methods
This single-center, randomized, prospective clinical trial with evaluator blinding was performed on patients suffering complex scars. Participants were randomly assigned to either a TT group or a DT group. Treatments occurred every 4 weeks until scar height reached 1 mm. Effectiveness was evaluated at 4 weeks post-treatment using VSS, PSAS, GAIS, Doppler ultrasound improvement rates, and adverse event profiles.

Results
A total of 60 patients were enrolled, with 30 in the experimental group and 30 in the control group. Baseline characteristics had no significant differences ($P > 0.05$). The experimental group demonstrated significantly greater improvements in scar thickness, VSS, PSAS, and GAIS scores compared to the control group. After the first treatment, the reduction rate of scar thickness was significantly higher in the experimental group (30.08%, $P = 0.028$). The experimental group also required fewer sessions to reduce scar thickness to half its original size (2.77 vs. 3.57 treatments, $P = 0.046$). At the 4 weeks post-treatment follow-up, no significant differences in VSS, PSAS, or GAIS scores were observed between groups ($P > 0.05$). The experimental group showed a lower incidence of local reactions, and no significant hypersensitivity or side effects related to hyaluronidase were reported.

Conclusion
The TT demonstrated superior efficacy in treating complex keloids in early phase, significantly reducing thickness, improving appearance, and decreasing treatment sessions compared to traditional DT. The TT also showed a favorable safety profile. Further research is warranted to evaluate long-term outcomes.

Exploring the role of Sodium in the causation of Atopic Dermatitis A Case-control study

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Introduction

Atopic dermatitis (AD), a cutaneous pathology, is regarded as an inflammatory disease impacting negatively on well-being. Although environmental and lifestyle variables influence it, little is known about the function that particular exposures play in the causation of AD. Studies indicate, cutaneous involvement in regulating total body sodium, challenging conventional models of sodium homeostasis that only include the kidney and blood pressure. The hypothesis suggests that skin sodium may promote immunological dysregulation by upregulating proinflammatory markers, triggering AD. Considering the exciting novelty of this correlation, if proven, it shall curb the abysmal prognosis of AD.

Materials & Methods

A case-control study was conducted, with a sample size of 50 with age and gender matched controls over 6 months. AD was diagnosed using the Hannifin and Rajka criteria, severity was assessed using the SCORAD criteria. INTERSALT equation was applied for both groups to determine 24-hour mean sodium excretion, using the spot urine sodium and urine creatinine values. Statistical analysis was done using Spss V. 29. The Independent samples T-test, Fischers exact test, and dose-response analysis were done to evaluate the significance of the results.

Results

The analysis comprised 100 participants. The mean 24-hour urine sodium excretion was 4.7 g/day in the case, and 3.3 g/day in the control group. Fishers Exact Test showed an association between 24-hour mean sodium excretion and active AD, (p=0.03), indicating a significant relationship between the variables. Multivariable logistic regression revealed that a 1.0 g increase in estimated 24-hour urine sodium excretion was associated with increased odds of AD (adjusted odds ratio [AOR], 1.11; 95% CI, 1.07-1.14). The dose-response relationship was analyzed using linear regression, revealing a significant positive correlation between Sodium levels and severity of AD (= 0.25, $p < 0.05$).

Conclusion

Dietary sodium intake, approximated by 24-hour urinary sodium excretion, was associated with active AD and increased severity, which represents an interesting avenue for future research in decoding its heterogeneity. Our study opens the potential for other studies on the restriction of dietary sodium intake as an intervention for AD that would be cost-effective and low-risk.

Synergistic effects of photobiomodulation and curcumin gel on diabetic foot ulcer healing: a randomized controlled trial

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Co-authors:

Introduction

Diabetic foot ulcers (DFUs) are a debilitating complication of diabetes, often resistant to conventional treatments and associated with high amputation rates. Photobiomodulation (PBM) has shown promise in enhancing wound healing, but its combination with bioactive agents like curcumin remains underexplored. This study investigates the synergistic effects of PBM and topical curcumin gel on wound healing in DFUs.

Materials & Methods

A randomized, double-blind, controlled trial was conducted with 120 participants with Wagner grade 2 or 3 DFUs. Participants were randomized into four groups: (1) PBM+curcumin gel, (2) PBM+placebo gel, (3) curcumin gel alone, and (4) standard care. PBM was administered using an 808 nm infrared laser (fluence: 4 J/cm2, power density: 50 mW/cm2) three times weekly for 12 weeks. Curcumin gel (2% w/w) was applied daily. Primary outcomes included ulcer size reduction (cm2), healing rate (mm2/day), and time to complete wound closure (days). Secondary outcomes assessed pain levels using the Visual Analog Scale (VAS) and quality of life (QoL) using the Diabetic Foot Ulcer Scale (DFS).

Results

The PBM+curcumin group demonstrated a mean reduction in ulcer size of 5.2 cm2 by week 8, significantly greater than the PBM+placebo (3.8 cm2), curcumin alone (3.0 cm2), and control groups (1.5 cm2)($p<0.001$). The healing rate was highest in the PBM+curcumin group (4.2 mm2/day), compared to 3.0, 2.5, and 1.8 mm2/day in the other groups ($p<0.05$). Complete wound closure was achieved in a median time of 42 days in the PBM+curcumin group, compared to 56, 60, and 70 days in the other groups ($p<0.001$). Pain scores (VAS) decreased by a mean of 3.5 points in the PBM+curcumin group, compared to 2.0, 1.5, and 0.8 points in the other groups ($p<0.05$). QoL scores (DFS) improved by a mean of 12.5 points in the combined treatment group, compared to 7.0, 6.5, and 4.0 points in the other groups ($p<0.05$).

Conclusion

Combining photobiomodulation and topical curcumin gel significantly enhances wound healing, reduces pain, and improves quality of life in patients with diabetic foot ulcers. This novel, non-invasive approach offers a promising therapeutic strategy for chronic wound management.

Rice Stem Cells as a Novel Promising Active Ingredient with Anti-Proliferative Effects for Potential Skin Cancer Prevention and Whitening Activity

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Introduction
Rice (Oryza sativa) is recognized for its antioxidant, anti-inflammatory, and skin-whitening properties, making it a beneficial plant in dermatological applications. Despite its promising attributes, the potential of rice callus extracts for skin cancer prevention and hyperpigmentation treatment remains underexplored. This study aims to investigate the efficacy of rice callus as a natural source of active ingredients to inhibit the proliferation of melanoma cells (B16F10) and to assess its skin-whitening effects.

Materials & Methods
The plant hormone 2,4-D was applied at concentrations of 1 g/mL and 1.5 g/mL to induce rice callus formation. Following callus formation, extracts were prepared using both aqueous and ethanolic solvents at a concentration of 1 mg/mL for subsequent characterization. The total phenolic and flavonoid content, antioxidant activity, proteins, and carbohydrates in the extracts were measured to determine the optimal hormone concentration. The anti-melanocyte activity was assessed through cytotoxicity measurements using B16F10 cells, and IC50 values were calculated. Statistical analyses were performed using two-way ANOVA and independent t-tests with Tukeys honest significant difference test for multiple comparisons in GraphPad Prism version 9.0.2 (San Diego, CA, USA). A p-value less than 0.05 was considered statistically significant. Additionally, data obtained from flow cytometry were analyzed using FlowJo software (V10.5.3, Treestar Inc., San Carlos, CA, USA).

Results
The ethanolic extract exhibited greater cytotoxicity in the study, resulting in an IC50 of 566.3 g/mL, while the aqueous extract showed an IC50 of 1327 g/mL. Additionally, skin-whitening tests demonstrated that the aqueous extract achieved an impressive 85% inhibition of melanin biosynthesis at a concentration of 3200 g/mL, significantly outperforming both the ethanolic extract (68%) and the commonly used whitening agent, arbutin (50%). These results indicate that rice callus extract possesses significant anti-melanoma and skin-whitening properties.

Conclusion
Our findings suggest that rice callus extract is a promising natural ingredient for developing effective products for skin cancer prevention and skin whitening. This research contributes to understanding rice as a valuable resource in cosmeceutical formulations, highlighting its potential benefits in dermatological health.

Synergistic immunomodulation and angiogenesis-mediated remodeling of the wound healing microenvironment in infectious wounds using hydrogel/nanofiber composite patches

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Introduction

Chronic wounds, due to prolonged non-healing, provide a micro-environment for harmful microorganisms to thrive, increasing the risk of infection. Infection, in turn, further impedes the wound healing process, creating a vicious cycle. These wounds exhibit a deteriorated microenvironment characterized by reduced extracellular matrix, impaired angiogenesis, persistent bacterial infection, and excessive reactive oxygen species production. To prevent wound deterioration and avoid systemic diseases, we aimed to develop a multifunctional bilayer wound dressing (MBWD) specifically for infected wound repair.

Materials & Methods

The inner layer (DMOG@PCL/ASC) consists of a polycaprolactone (PCL)/fish collagen (ASC) nanofibers decorated with coaxial microparticles containing dimethoxyacylglycine (DMOG) was prepared by electrospinning and spraying techniques. The outer layer is a glycidyl methacrylate-modified carboxymethyl chitosan hydrogel loaded with cerium oxide nanozymes (M-CMCS/CeO2). Experimental data were presented as mean standard deviation, and significance between groups was determined using one-way ANOVA.

Results

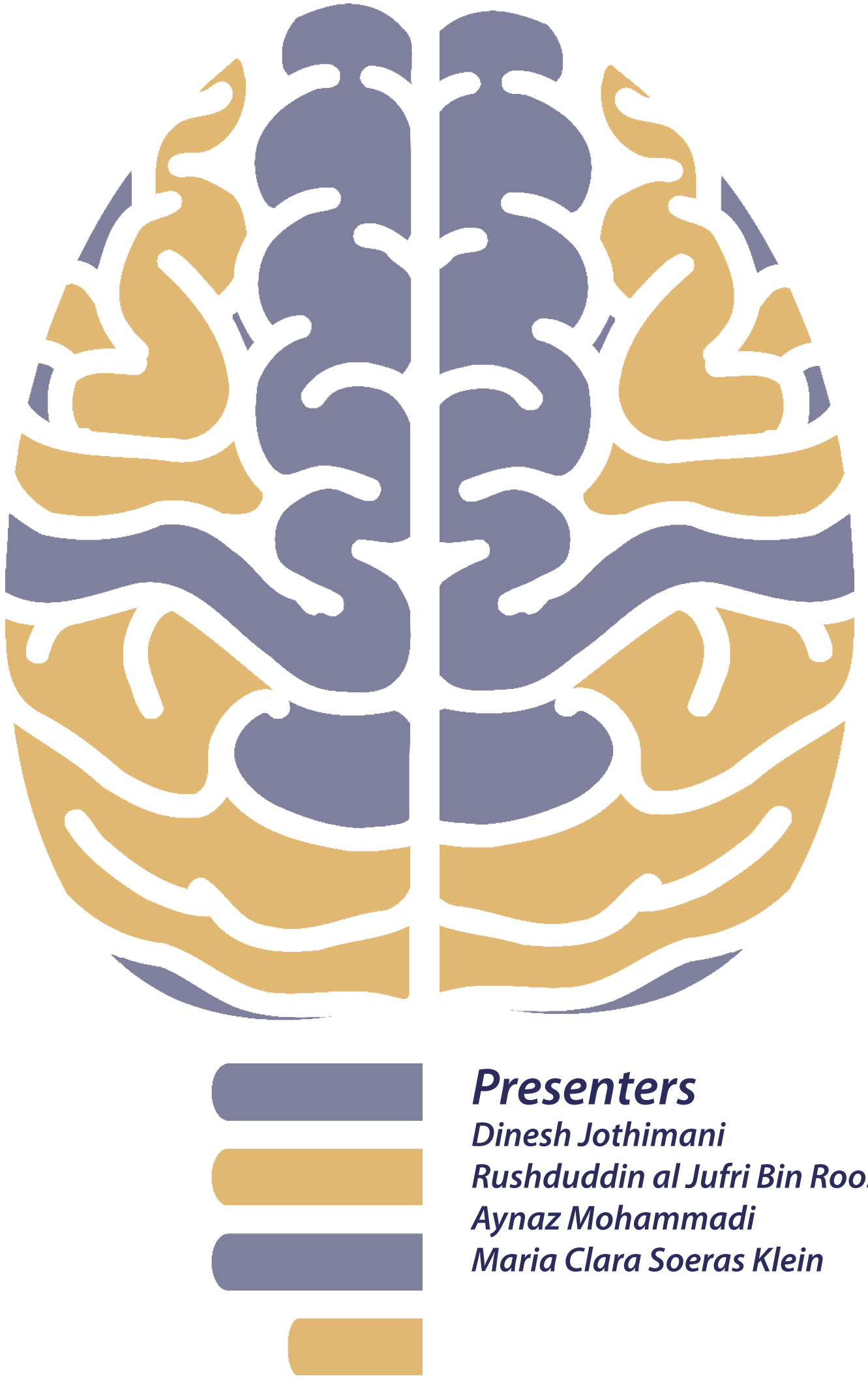
The cell viability experiment of L929 and HUVECs, MBWD group had good compatibility. The cell migration of L929 and HUVECs, after 24 hours, the healing rate of MBWD group was 41.1% and 83.65%, respectively. Notably, the number of bacterial colonies was significantly reduced in the MBWD group, and the inhibition efficiencies were more than 95% for E. coli and 85% for S. aureus. The MBWD group significantly promoted the development of the vasculature, manifested by HUVECs vascularization results. Additionally, we found that the MBWD group upregulated the expression of HIF-1 and VEGF (angiogenesis-related proteins), exhibiting robust angiogenic capabilities. The relevant findings suggested that the active components in MBWD may exhibit significant anti-inflammatory effects, effectively promoting the expression of anti-inflammatory factors. Platelet adhesion and hemostasis abilities of MBWD group were more significant. In infected wounds in rats, the MBWD group significantly accelerated the wound healing process compared with other groups. Due to word limitations, the above is a narrative of some of the results.

Conclusion

To address the clinical challenges of infected skin wounds, a novel MBWD scaffold was successfully developed in this study. MBWD scaffold achieved the precise regulation of ROS levels and promoted the comprehensive repair of wounds. MBWD scaffold has a huge market potential in the field of wound repair dressings.

Oral Session I

Gastrointestinal Medicine



Presenters

Dinesh Jothimani
Rushduddin al Jufri Bin Roosli
Aynaz Mohammadi
Maria Clara Soeras Klein

The role of serum melatonin in cirrhotic patients with hepatic encephalopathy

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Co-authors: Ms Evangeline Simon, Dr Vignesh Kumar Paranthaman, Dr Viknesh Prabhu Anbalagan, Dr Abraham Sam Rajan Paul Martin, Dr Mohamed Rela

Introduction

Hepatic Encephalopathy (HE), a serious complication in liver cirrhosis, is strongly associated with morbidity and mortality. Melatonin, a neuroprotective hormone secreted by pineal gland and enterochromaffin cells of gastrointestinal tract, has been involved in sleep-cycle in normal people. This may be disrupted in cirrhotic patients. We aimed to evaluate the role of serum melatonin in cirrhotic patients with hepatic encephalopathy

Materials & Methods

A prospective observational study was conducted in hospitalized patients with liver cirrhosis after meeting inclusion and exclusion criteria. Morning (0800 hour) melatonin levels were measured in patients categorized into three groups based on their progression of HE, according to West Haven criteria (WHC), as group 1 (no HE), group 2 (WHC grade | & II) and group 3 (WHC grade III & IV). Four healthy volunteers underwent melatonin level for standardization.

Results

52 patients with mean age (years) 55.5 $ 12 (range, 18- 78) including 9 (17.3%) women underwent study. The mean melatonin (pg/mL) levels between healthy volunteers and liver cirrhosis patients: 23.88 (95% Confidence Interval, CI 10.21- 37.53) and 190 (95% CI 159.79 - 220.55). Amongst liver cirrhotic patients, in group 1 (n=11), group 2, (n=27), group 3 (n=14) melatonin was 45.62 (CI 37.26 - 53.98), 214 (CI 173.77 - 254.26) and 280.89 (CI 252.87 - 309.08, p<0.001) respectively. The correlation coefficient (r) between melatonin and grades of HE is 0.797 (p <0.001). A melatonin of 3 85 pg/ml was associated with HE with 86.96%, 100%, and 90.16%; sensitivity, specificity, and accuracy respectively, with the area under receiver operating curve (AUROC) 0.94 (p <0.001).

Conclusion

Morning melatonin levels are significantly higher in HE patients with liver cirrhosis - highest level measured in most severe HE grades. A level of 3 85 pg/ml was associated with HE, and 3 248.95 pg/ml with severe HE in cirrhosis. Prospective larger studies are required to validate the role of melatonin as a prognostic marker.

Combined Nephroprotective Effects of Terminalia chebula and Annona muricata in a Zebrafish Model of Nephrotoxicity

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Introduction

Terminalia chebula (TC) and Annona muricata (AM) are medicinal plants known for their nephroprotective properties. Although both plants have shown promising individual benefits, their combined effects on kidney protection remain underexplored. This study investigates the synergistic nephroprotective effects of TC and AM extracts in a zebrafish model of gentamicin-induced nephrotoxicity.

Materials & Methods

High-performance liquid chromatography (HPLC) was used to analyze the phytochemical composition of TCAM extracts. Seventy-two zebrafish (Danio rerio) were divided into six groups: Group 1 (Control), Group 2 (Gentamicin-induced nephrotoxicity), Group 3 (TCAM extract), and Groups 4, 5, and 6 (gentamicin and TCAM extracts at doses of 50, 100, and 200 mg/kg, respectively). Histopathological examination of kidney tissues was conducted to assess renal damage. Gene expression analysis of kidney injury molecule-1 (KIM-1) was performed using gel electrophoresis.

Results

HPLC analysis of the TCAM extract revealed the presence of bioactive compounds such as quercetin, corilagin, gallic acid, chebulagic acid, and ellagic acid, which are known for their anti-inflammatory and nephroprotective effects. Histopathological analysis showed no significant kidney damage in the control and TCAM-only groups, while significant renal injury was observed in the gentamicin group. Treatment with TCAM extracts at doses of 50, 100, and 200 mg/kg resulted in a reduction of tubular necrosis and considerable improvement in kidney tissue, indicating the protective effects of TCAM. Additionally, gene expression analysis revealed a significant reduction in KIM-1 levels in the TCAM-treated groups, further supporting the nephroprotective effects.

Conclusion

This study demonstrates the synergistic nephroprotective effects of Terminalia chebula and Annona muricata extracts in alleviating kidney damage induced by gentamicin in zebrafish. The presence of bioactive compounds and their ability to reduce renal injury markers highlight their potential as therapeutic agents for nephrotoxicity. Further studies are needed to explore the mechanisms of action and evaluate their clinical applicability.

Platelet-to-lymphocyte ratio as a predictor of acute kidney injury in sepsis patients: a prospective study

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Introduction
Sepsis is a leading cause of Acute Kidney Injury (AKI), contributing to high morbidity and mortality in critically ill patients. While the Neutrophil-to-Lymphocyte Ratio (NLR) has been widely studied, the Platelet-to-Lymphocyte Ratio (PLR) remains underexplored as a biomarker for AKI in sepsis. PLR reflects both inflammatory and thrombotic pathways, which are central to sepsis-induced AKI pathophysiology. This study investigates the predictive value of PLR for AKI in sepsis patients, comparing it to NLR and other inflammatory markers.

Materials & Methods
A multi-center prospective observational study enrolled 150 adult sepsis patients (Sepsis-3 criteria) admitted to the intensive care units (ICU). Patients with chronic kidney disease, hematologic disorders, or recent surgery were excluded. PLR and NLR were calculated from admission blood counts and monitored daily for five days. AKI was diagnosed using Kidney Disease: Improving Global Outcomes (KDIGO) criteria. Statistical analyses included multivariate logistic regression (adjusting for age, comorbidities, and medications), receiver operating characteristic (ROC) curve analysis to determine optimal PLR and NLR cutoffs, and are under the curve (AUC) comparison to assess predictive accuracy.

Results
Of 150 patients, 64 (42.7%) developed AKI. Patients with PLR>180 at admission had a higher AKI incidence (68.8% vs. 31.2%, $p<0.01$). The optimal PLR cutoff was 185 (sensitivity 76.5%, specificity 79.8%). PLR outperformed NLR (AUC: 0.84 vs. 0.72, $p<0.01$) and other biomarkers (C-reactive protein, procalcitonin). In multivariate analysis, PLR was independently associated with AKI (OR=3.89, 95% confidence interval (CI): 2.12-7.14). Elevated PLR also correlated with higher renal replacement therapy rates (27.3% vs. 13.6%, $p<0.01$) and longer ICU stays (median 9 vs. 5 days, $p=0.02$).

Conclusion
Elevated PLR at admission is a strong, independent predictor of AKI in sepsis patients, outperforming NLR and other biomarkers. PLRs dual reflection of inflammation and thrombosis makes it a valuable tool for early AKI detection. These findings suggest that PLR could be integrated into clinical practice to improve risk stratification and guide timely interventions, potentially reducing morbidity and mortality in sepsis patients. Further studies are needed to validate these results in diverse populations and settings.

White and Brown adipose grafts: a novel approach to correct reproductive, metabolic, and renal deficits in BTBRob/ob mice

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Introduction

Diabetes mellitus (DM) is a systemic disease associated with glucose, lipids, and insulin metabolism disturbances. The metabolic changes peculiar to type 2 diabetes mellitus (DM2) are risk factors for Diabetic Kidney Disease (DKD). The transplantation of brown and white adipose tissues (BAT and WAT) is a promising therapeutic approach to reverse DKD. BAT, a thermogenic tissue, secretes regulatory molecules responsible for long-term euglycemia. WAT produces leptin, which mediates energy homeostasis and glucose metabolism. The BTBRob/ob mice model is a robust representation of DKD2: they are knockout for leptin and develop DM2 and obesity-related complications. Fat transplantation from BTBR wild-type and heterozygotes mice (BTBRob+/?) to BTBRob/ob yielded the reversion of DM2, restoration of leptin levels, and improvement in proteinuria. WAT from donors also restored fertility in BTBRob/ob females. This presents the transplantation as a strategy to increase the BTBRob/ob mice pool in the animal facility, reinforcing the 3Rs principle in animal use (reduction, replacement, and refinement). Further comprehension of this technique may benefit the treatment of DKD and contribute to its clinical translation.

Materials & Methods

Inguinal WAT and interscapular BAT from female and male BTBRob+/? mice of any age were collected after isoflurane-induced euthanasia. A syringe-needle homogenized version of the accumulated fat was injected in female and male isoflurane-sedated BTBRob/ob mice. Immunohistochemistry and Hematoxylin and Eosin staining were performed to evaluate kidney, pancreas, and ovary samples. Two-way ANOVA was used to analyze weight gain and glycemia. The Kruskall-Wallis test was applied to analyze leptin plasmatic concentration, albuminuria, and pancreatic islets area.

Results

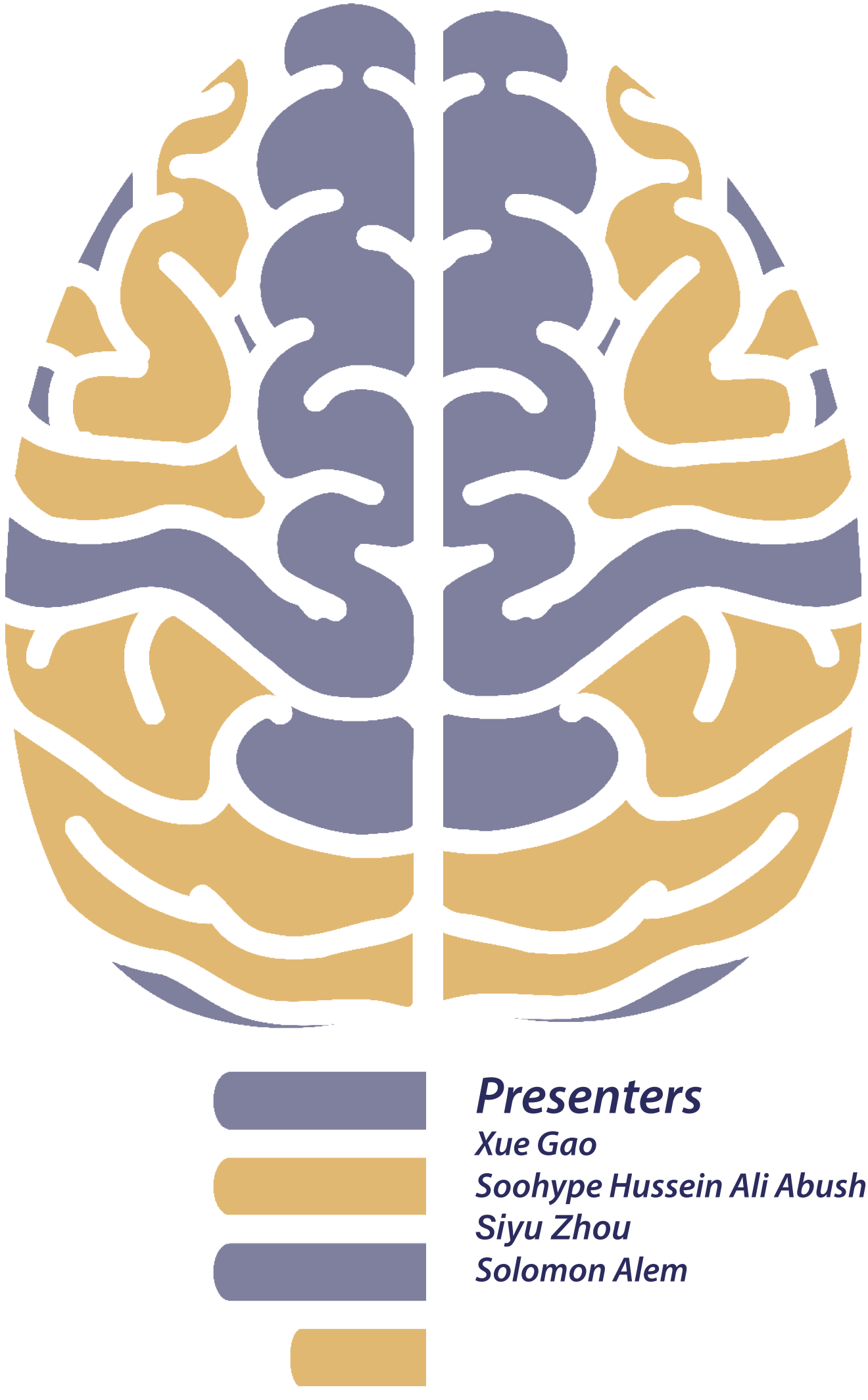
The fat transplantation reduced weight gain in recipient females ($p<0,0001$) but not in males ($p=0,6577$). The procedure reduced the glycemia of the BTBRob/ob male animals ($p=0,0045$). An increase in leptin plasmatic concentration was detected in all recipients ($p=0,0072$). There was a decrease in pancreatic islets area in the transplanted mice ($p=0,0087$). The results of the intervention in kidney morphology are still being analyzed.

Conclusion

Despite primary, the results of this study show the considerable potential of the WAT and BAT transplantation as a strategy to reduce the systemic complications associated with DM2 and obesity, risk factors for the development of Diabetic Kidney Disease.

Oral Session I

Public Health



Presenters

Xue Gao
Soohype Hussein Ali Abushaina
Siyu Zhou
Solomon Alem

Disposable face mask-derived microplastics disrupted neurodevelopment based on human neural organoids

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Co-authors: Prof. Bochu Wang

Introduction

Massively using face masks during and after the COVID-19 pandemic has raised global concerns about environmental issues. Microplastics released from face masks pose great threats to ecosystems and human health. However, the potentially hazardous effects of face mask-derived microplastics (FMMs) on humans remain poorly understood due to the lack of available in vitro models. This study used advanced human neural organoid models to reveal the potential toxicity of FMMs to human early neural development.

Materials & Methods

FMMs were extracted from the leachates of disposable face masks, identified by Fourier Transform Infrared Spectroscopy and Scanning Transmission Electron Microscopy, and harvested for exposure experiments. Human embryonic stem cell-derived neural organoids were generated and exposed to 0.1 mg/L FMMs for 21 days. Immunostaining, Scanning and Transmission Electron Microscopy, and RNA-sequencing were applied to reveal the neurotoxic effects of FMMs.

Results

FMMs were successfully extracted from disposable face masks and found to be internalized by neural organoids after exposure. Exposure to FMMs disrupted the growth and development of organoids in dose- and time-dependent manners, as evidenced by abnormal morphologies, including the decreased area of organoids and the thickness, area, and ratio of neuroepithelial structures. FMM exposure reduced cell proliferation, induced apoptosis, and disrupted neural differentiation. Moreover, exposure to FMMs was found to cause the disarrangement of neuroepithelium. Transcriptome data showed that the neurotoxicity of FMMs was closely related to neurogenesis, anatomical structure morphogenesis, and axon guidance in neural organoids.

Conclusion

FMM exposure disrupted the growth and development of human neural organoids, suggesting that exposure to FMMs could pose threats to human early neural development.

Adapting Healthcare Practices to Climate Change: Insights from Physicians in Challenging Settings

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Introduction
One year after the devastating Derna floods, the need to understand the far-reaching implications of climate change on the healthcare system has become increasingly urgent. This study aims to assess the effects of climate change and environmental obstacles on healthcare professionals in Libya, showcasing their experiences, readiness, and practices, and assessing their awareness regarding proper ways of handling environmental challenges.

Materials & Methods
Our cross-sectional study was conducted involving 47 medical doctors in different specialties. Data collection involved a structured questionnaire seizing demographic details, workplace settings, training, and challenges faced in pertaining to climate change impacts. Environmental awareness was assessed through questions evaluating participants' knowledge of climate-related health risks, resource usage habits, and attitudes toward eco-friendly practices. Descriptive and correlation analyses were used to evaluate the data.

Results
Participants were predominantly male (75%), with an average age of 30.83 years (SD = 6.82). Overall, 42% worked in resource-limited settings, and only 8% had received training in handling natural disasters. A quarter of participants faced difficulties providing care during extreme floods, with 78% encountering respiratory and pollution-related illnesses. Nearly half (47%) worked in hospitals ill-equipped to address climate-related challenges, and 27% reported reduced service coverage during peak summer health episodes due to institutional obstacles. Environmental awareness was low, with only 22% mindful of resource usage and 36% using eco-friendly transportation. However, 61% expressed interest in reducing waste and taking environmental action. A moderate positive correlation ($r = 0.46$, $p < 0.01$) was observed between environmental training and environmentally beneficial practices.

Conclusion
The study highlights the challenges Libyan healthcare professionals face due to climate change, which may compromise patient care quality. While awareness and willingness to act are evident, gaps in training and institutional preparedness persist. Addressing these gaps through targeted training, improved resource allocation, and sustainable practices is essential to strengthen healthcare resilience and ensure high-quality care amid climate change impacts.

Associations Between Cardio-Metabolic Profiles in Pregnancy and Risk of Primary Dysmenorrhea in Female Offspring at Age 15-16: The ABCD Study

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Introduction

Primary dysmenorrhea (PD), characterized by pain during menstruation and concomitantly negative social effects, is affecting the majority of reproductive age women. As several metabolic aspects are contributing to the presence of PD, we aim to evaluate whether the foetal programming hypothesis, related to intrauterine conditions affecting offsprings reproductive health later in life, could be applicable. To evaluate in which extent the maternally individual and clustered cardiometabolic components during pregnancy are associated with dysmenorrhea in female offspring at age 15-16 years, and if these associations were mediated by the offsprings menarche age.

Materials & Methods

Data were obtained from a prospective birth cohort, the Amsterdam Born Children and their Development (ABCD) study. Mothers with menstruating female offspring were included (n=982). PD was defined as adolescent females experiencing menstrual abdominal and/or back pain leading to analgetic use. Metabolic profiles during pregnancy period, including measurements of pre-pregnancy body mass index (pre-pBMI), glucose levels, systolic/diastolic blood pressure, triglycerides, and Apolipoprotein A1 at 12th week of gestation. Multivariable logistic regression was performed to analyze these variables individually, as well as clustered.

Results

The prevalence of PD in ABCD cohort was 49.2%. The risk of dysmenorrhea is higher in offspring having mothers with higher pre-pBMI (OR: 1.15, 95%CI: 1.01-1.30). This association was partially mediated by earlier age at menarche.

Conclusion

We found that maternal distinctive cardiometabolic component has been associated with the presence of PD in their offspring, at the age of 15-16 years. This association is (partly) mediated by an early age at menarche. In order to understand PD better, our observations suggest, that we need to take into account the early life (prebirth) courses.

Effectiveness and Acceptability of Implementing Group Antenatal Care at Health Posts in Ethiopia: A Pre-and-Posttest Cluster Randomized Controlled Trial

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Introduction
Access to quality antenatal care (ANC) is crucial for reducing maternal mortality. Despite the WHO recommendation of eight ANC visits, many African countries, including Ethiopia, struggle to achieve even the minimum standard of four visits. Group ANC (G-ANC) is an alternative service delivery model that gathers 812 pregnant women with similar gestational ages for medical assessments, knowledge sharing, and social support throughout pregnancy. This study assesses the effectiveness of G-ANC in improving ANC coverage and promoting facility-based deliveries at health posts, the lowest tier of Ethiopia's primary healthcare system. Additionally, it explores the acceptability of G-ANC among women and their spouses.

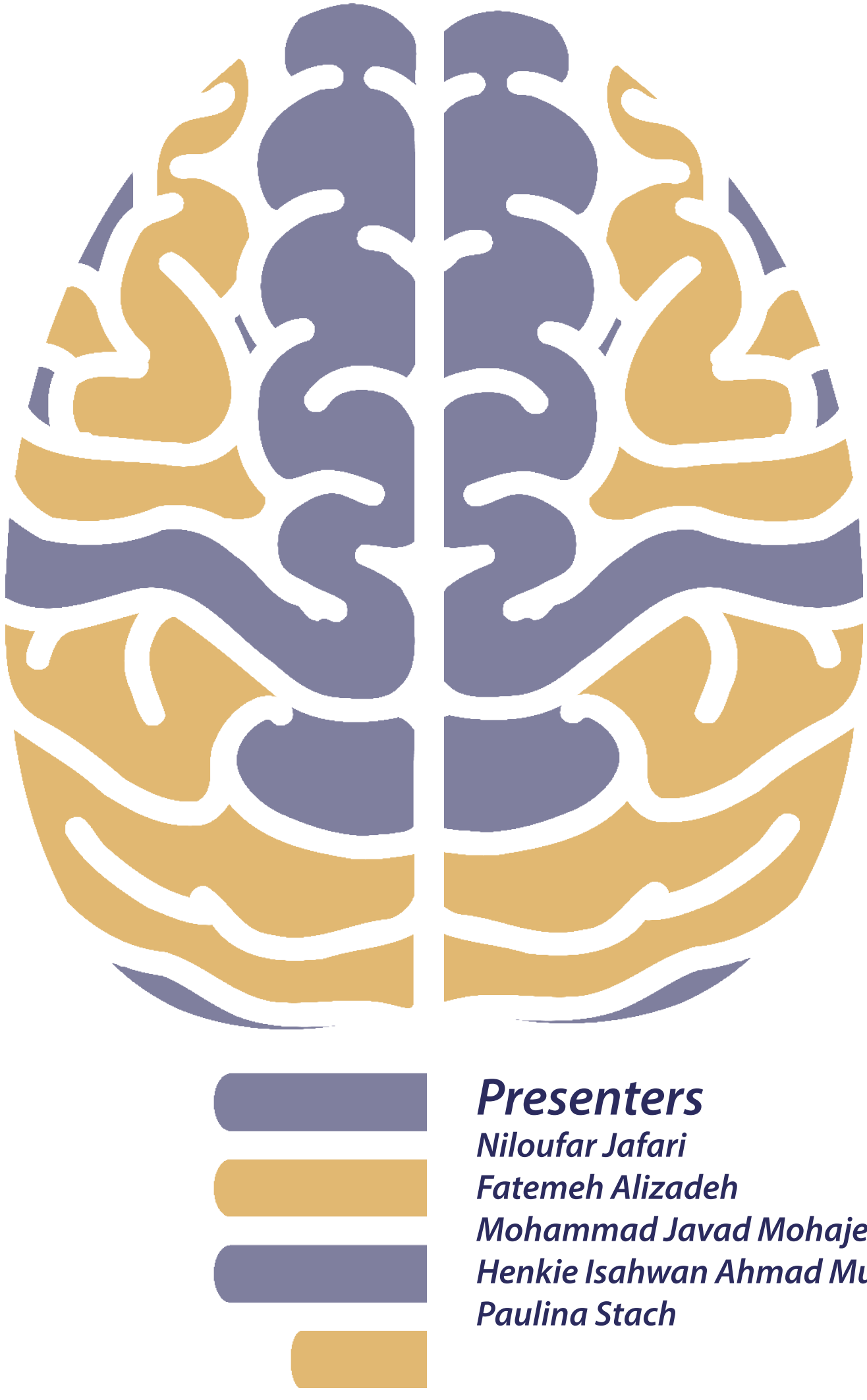
Materials & Methods
A pre- and post-cluster randomized trial with a mixed-methods approach was conducted in Amhara Region, Ethiopia, from 2021 to 2023. The trial involved 540 women: 180 in the intervention cluster and 360 in the control clusters. Comparative analysis between the intervention and control clusters was conducted for primary outcomes, including four or more ANC visits and facility delivery, and secondary quality outcomes such as comprehensive ANC received, positive experience with ANC services, and self-efficacy. Generalized estimating equations were employed to account for within-cluster data correlation and generate odds ratios with 95% confidence intervals. Thirty-three in-depth interviews with women and their male partners were conducted and thematically analyzed to further explain effectiveness and acceptability of G-ANC.

Results
Implementation of G-ANC at the health post level significantly increased coverage of four or more ANC visits (adjusted odds ratio [AOR]=6.6; 95% confidence interval [CI]: 3.4, 12.8; p<0.001) and the proportion of facility deliveries (AOR=2.1, 95% CI: 1.3, 3.3; p=0.002). G-ANC showed positive associations with the provision of comprehensive coverage of nine key components of ANC services, positive experience with ANC services, and self-efficacy. Qualitative findings indicated high acceptability and increased participation among women and male partners due to enhanced learning and perceived benefits.

Conclusion
G-ANC significantly improved ANC coverage and facility delivery compared to individual ANC. Its acceptability among women and their spouses further supports potential advantages to providing G-ANC at health post level.

Oral Session I

Pharmacology



Presenters

Niloufar Jafari
Fatemeh Alizadeh
Mohammad Javad Mohajer Javan
Henkie Isahwan Ahmad Mulyadi Lai
Paulina Stach

Enhancing the Anticancer Effects of Rosmarinic Acid in PC3 and LNCaP Prostate Cancer Cells using Titanium Oxide and Selenium-doped Graphene Oxide Nanoparticles

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Introduction

Prostate cancer remains a significant health concern due to its high mortality rate, emphasizing the need for innovative therapeutic approaches. This study aims to explore the potential anticancer effects of a drug nanocomplex containing rosmarinic acid in the treatment of prostate cancer, aiming to contribute to the development of safer and more effective treatment options for cancer patients.

Materials & Methods

To investigate the effects of rosmarinic acid@Se-TiO2-GO, PC3, LNCaP, and normal (HFF-1) cell lines were treated with varying concentrations of the nanocomplex. Cell viability was assessed using the Resazurin test, while levels of reactive oxygen species (ROS), gene expression (Bcl-2 and Bax), and total antioxidant capacity were measured in both cancerous and normal cells.

Results

The Se-TiO2-GO nanoparticles demonstrated high entrapment efficiency and loading capacity for rosmarinic acid. Treatment with rosmarinic acid@Se-TiO2-GO resulted in decreased cell viability and increased apoptosis in PC3 and LNCaP cells, while showing no inhibitory effects on the normal cell line (HFF-1) at concentrations toxic to cancer cells. Additionally, a dose-dependent increase in ROS levels, a decrease in total antioxidant capacity, elevated Bax gene expression, and reduced Bcl-2 expression were observed in the cancer cells following treatment with the nanocomplex.

Conclusion

The cytotoxic effects of rosmarinic acid@Se-TiO2-GO nanoparticles on prostate cancer cells appear to be mediated through the generation of oxidative stress and induction of apoptosis. The unique formulation of these nanoparticles holds promise for future prostate cancer treatment strategies.

Targeted delivery of epirubicin to cancer cells utilizing copper sulfide nanoparticles functionalized with polyarginine and 5TR1 aptamer

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Introduction

Low efficacy and life-threatening side effects pose significant challenges in treating cancer with current chemotherapeutic agents. These issues arise from the drugs' inability to differentiate between cancerous and healthy cells, leading to nonspecific drug delivery. In this study, we developed a novel drug delivery system based on copper sulfide nanoparticles (CuSNPs) loaded with epirubicin (Epi) coated by polyarginine and 5TR1 aptamer (CEPA) in order to deliver Epi to cancer cells specifically.

Materials & Methods

The loading efficiency of CEPA and its in vitro cumulative drug release at pH 7.4 and 5.6 were determined by measuring Epi fluorescence intensity. MTT assay was applied to compare the in vitro cytotoxicity of the Epi and CEPA in C26 and MCF-7 (mucin+) and CHO (non-target, mucin) cell lines. Cellular internalization was assessed by flow cytometry and fluorescence imaging methods. In vivo studies in the C26 tumor-bearing BALB/c mice model were carried out by monitoring tumor volume, mouse weight, and mortality rate for 26 days. Tissue distribution of Epi was studied at 6 and 24 hours after a single intravenous administration of CEPA and free Epi.

Results

CEPA complex showed the maximum loading efficiency (100%) due to its hollow center and porous surface. Epi cumulative release from CEPA in the environment with similar acidity to the tumor site (pH=5.6) was remarkably higher than in physiological pH (pH=7.4). The results showed that CEPA significantly increased the cellular uptake of Epi and also increased its in vitro toxicity in cancerous cell lines compared to healthy ones. In vivo studies revealed that after a single intravenous injection of agents into C26 tumor-bearing BALB/c mice, in the group receiving CEPA, tumor growth inhibition was significantly higher than in the group receiving free Epi and the control group. Ex vivo Epi fluorescence imaging in the CEPA group compared to the Epi group showed more significant drug accumulation in the tumor and less accumulation in vital organs.

Conclusion

The CEPA complex was demonstrated to possess superior efficacy and fewer side effects than Epi alone. Therefore, the designed drug delivery system has a great potential to provide a new and efficient approach to cancer treatment.

Therapeutic Potential of Nanoliposomal Encapsulated Phenolics of Salvia leriifolia: Induction of Apoptotic and Inflammatory Pathways in Colorectal Cancer Mice

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Introduction
Globally, colorectal cancer is among the most common causes of cancer-related deaths, compounded by various challenges, including chemotherapy resistance and severe side effects, that necessitate alternative treatments. The present study investigates a possible role for the phenolic-rich fractions from *Salvia leriifolia* Benth encapsulated within nanosized liposomes (PRF-NLs) in colon cancers, with particular regard to enhancing bioavailability and thereby improving the therapeutic efficacy.

Materials & Methods
Phenolic compounds were then extracted from *Salvia leriifolia Benth* and encapsulated in nanoliposomes to improve stability and efficacy. The physicochemical properties of the nanoliposomes were studied using dynamic light scattering (DLS), zeta potential measurement, and field-emission scanning electron microscopy (FESEM). Animal experiment conducted on 24 male BALB/c mice with colorectal cancer: They were divided into three groups, controls (untreated), PRFs at 100 mg/kg/day, and PRF-NLs at the same dosage. Colon tissue was analyzed by cellular and molecular techniques after 28 days of treatment.

Results
The PRF-NLs consisted of small agglomerated, well-dispersed nanoparticles/colloidal systems of average size near 172.9 nm and a surface charge of 49.2 mV. Salicylic acid and naringin have been characterized as the primary phenolic compounds in the preparation, presumably, responsible for anticancer effects. Treatment with PRF-NLs significantly improved the quality of live in terms of increasing the body weight and food intake and reducing the levels of liver enzymes and lipid peroxidation. An increase in the expression of apoptogenic genes (Caspase-3, Bax) and downregulation of the anti-apoptotic and inflammatory signals (Bcl2, iNOS) suggested enhanced apoptosis and reduced inflammation compared to untreated controls.

Conclusion
Nanoliposome-encapsulated phenolic-rich fractions should provide an exciting and novel phytochemical way to treat colorectal cancer. Because of their apoptotic capacity, modulation of inflammation, and enhancement of physiological health, PRF-NLs merit further investigation in drug discovery relating to anticancer therapies.

Sustained Ocular Protection Against Retina Degeneration with Quercetin-Infused Nanotechnology

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Co-authors:

Introduction

Age-Related Macular Degeneration (AMD) is a major cause of vision loss globally, particularly in individuals over 50. Oxidative stress, a key driver of AMD, leads to damage of retinal pigment epithelial (RPE) cells and photoreceptors, resulting in progressive visual decline. Quercetin, a flavonoid with strong antioxidant and anti-inflammatory properties, shows potential in mitigating these effects. However, its poor solubility and low bioavailability limit its clinical application. This study introduces a novel delivery system using gold yarnball nanoparticles (GYs) to encapsulate Quercetin, aiming to enhance its therapeutic efficacy for AMD.

Materials & Methods

Gold yarnball nanoparticles (GYs), characterised by a large surface area and cavity texture, were used to encapsulate Quercetin (QC@GY), achieving high loading efficiency and controlled release. In vitro experiments were conducted using human RPE cells exposed to sodium iodate (NaIO3) to simulate oxidative stress. In vivo studies employed AMD models to evaluate the formulations effects on retinal structure, cell survival, and visual function. Key assessments included biocompatibility, anti-apoptotic activity, and electroretinography (ERG) responses.

Results

QC@GY achieved a Quercetin loading efficiency exceeding 40% and demonstrated sustained release. The formulation exhibited excellent biocompatibility and significantly reduced oxidative stress in RPE cells. In AMD models, QC@GY preserved retinal integrity, prevented photoreceptor apoptosis, and maintained ERG functionality. Additionally, it inhibited the formation of drusen-like deposits and reduced neuroinflammation. The slow-release mechanism extended therapeutic effects, reducing administration frequency and improving patient compliance.

Conclusion

The QC@GY delivery system offers a novel approach for AMD treatment, addressing key limitations of traditional antioxidants. Its enhanced bioavailability, sustained release, and demonstrated efficacy in reducing oxidative damage and inflammation make it a promising candidate for clinical application. Further studies are warranted to validate these findings and explore its broader potential in retinal therapy.

The effect of hypothermia on fentanyl plasma concentration and pharmacokinetics after intravenous administration- rodent model.

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Introduction

Fentanyl, a widely used synthetic opioid, is essential in the management of critically ill patients, serving as both an anesthetic and a potent analgesic. Despite its long-standing use since the 1970s, further research is needed to understand its pharmacokinetics, particularly under pathological conditions such as hypothermia. Hypothermia, often observed in trauma and surgical patients, can alter drug metabolism and elimination. This study aims to investigate the effects of moderate and severe hypothermia on fentanyls serum concentration and pharmacokinetic parameters compared to normothermic controls.

Materials & Methods

The male Wistar rats were randomly assigned to three groups: a control group, in which animals were maintained at normothermia (37C), and two experimental groups exposed to different levels of hypothermia. In the moderate hypothermia (MH) group, the core body temperature was lowered to 30C, while in the severe hypothermia (SH) group, it was reduced to 27C. Before the onset of hypothermia, the animals were anesthetized, and vascular catheters were inserted into the jugular vein and femoral artery. Fentanyl (10 g/kg) was administered intravenously over five minutes. Blood samples were collected at eight time points via the femoral catheter, and serum concentrations of fentanyl were measured using LC-MS. Pharmacokinetic analysis was performed using WinNonlin software, and statistical analysis was conducted to compare the groups.

Results

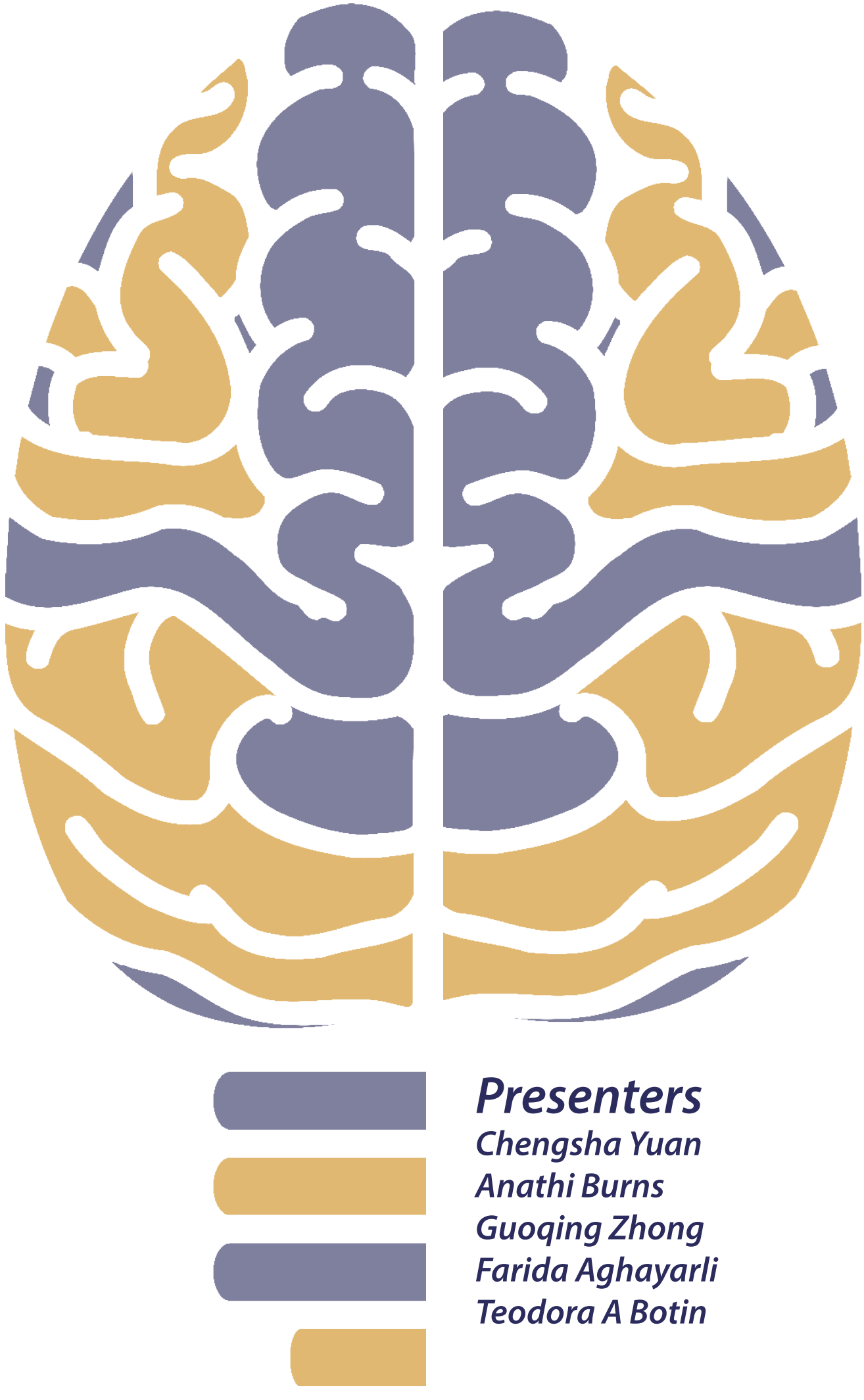
Maximum serum fentanyl concentrations were significantly higher in the MH group compared to controls and nearly doubled in the SH group ($p<0.01$). The area under the curve (AUC) was significantly elevated in SH group compared to controls (329531.9 vs 163022.9; $p<0.01$). The volume of distribution (Vd) was reduced in both MH (1.18 vs 1.72; $p<0.05$) and SH groups (0.87 vs 1.72; $p<0.01$). Clearance (CL) was also diminished: SH group (1.88 vs 3.37; $p<0.01$) and MH group (2.99 vs 3.37; $p<0.05$).

Conclusion

Hypothermia significantly affects fentanyls pharmacokinetics. Elevated AUC in the SH group suggests increased drug exposure, while reduced CL and Vd indicate slower elimination and altered tissue distribution. These findings highlight the importance of considering hypothermias severity when dosing opioids in clinical settings. They provide a foundation for further research, which could lead to improved fentanyl dosing strategies, enhancing the effectiveness and safety of opioid use in the future.

Oral Session II

Oncology II



Presenters

Chengsha Yuan
Anathi Burns
Guoqing Zhong
Farida Aghayarli
Teodora A Botin

L-methionine promotes CD8+ T cells killing hepatocellular carcinoma by inhibiting NR1I2/PCSK9 signaling

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Co-authors: Dr. Changpeng Hu

Introduction

Liver cancer has consistently high incidence and mortality rates among malignant tumors. PCSK9, a target for hypercholesterolemia therapy, has recently been identified as an inhibitor of anti-tumor immunity, and targeting PCSK9 effectively inhibits tumor progression. However, small molecule inhibitors are lacking due to its flat protein structure. We aimed to discover small molecule inhibitors that inhibit PCSK9 transcription, providing new solutions for the treatment of liver cancer patients.

Materials & Methods

PCSK9 transcription inhibitor screening was conducted using a PCSK9 promoter-driven td-Tomato plasmid. Quantitative real-time PCR and immunoblotting were employed to assess the effect of L-methionine on PCSK9 expression in HCC cell lines. Co-culture experiments were performed to evaluate the impact of methionine on T cell-mediated killing of liver cancer cells. RNA sequencing, CUT&Tag, gene editing, and luciferase reporter assays were utilized to identify the transcription factor regulating PCSK9. Additionally, liver cancer transplant and spontaneous liver cancer mouse models were used to evaluate the anti-cancer efficacy of L-methionine.

Results

Our study identified L-methionine, an essential amino acid, as a transcriptional inhibitor of PCSK9. The optimal dose of L-methionine to inhibit PCSK9 expression and enhance CD8+ T cell-mediated killing of liver cancer cells in vitro is 50 M. Furthermore, intraperitoneal injection of 5 mg/kg/day of L-methionine significantly inhibited tumor growth in both liver cancer transplant and spontaneous liver cancer mouse models. Mechanistically, we identified NR1I2 as a key transcription factor for PCSK9, whose inhibition by L-methionine occurs through binding to the TGCAC region in the PCSK9 promoter.

Conclusion

This work demonstrates that L-methionine promotes CD8+ T cell-mediated killing of hepatocellular carcinoma by inhibiting NR1I2/PCSK9 signaling. Our study introduces a novel and convenient approach to inhibit PCSK9 and provides a theoretical basis for the rational supplementation of methionine in liver cancer patients.

Gene transcription profiling of 7,12-Dimethybenzanthracene (DMBA)-induced mammary carcinogenesis: role thereof maternal methyl donor nutrients.

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Introduction

Breast cancer is the leading cause of cancer death among women worldwide. Recent evidence suggests that maternal nutrition during pregnancy significantly influences the health and disease risk of offspring, including cancer susceptibility. This effect has been attributed to epigenetic modifications, particularly DNA methylation. Interestingly, previous studies have shown that adequate intake of maternal micronutrients such as folate, choline, methionine, and vitamin B12 can lower the susceptibility of offspring developing breast cancer. However, these studies lack the underlying mechanisms. Therefore, the study aimed to assess the role of maternal methyl donor nutrients on gene transcription in breast cancer.

Materials & Methods

Pregnant Sprague-Dawley rats were fed either the control (AIN-93G) or a diet supplemented with micronutrients (including vitamin B12, folic acid, methionine, and choline) during gestation and lactation. At weaning, female offspring were selected from each group and fed the control diet until study termination. The control offspring were further divided into two groups. At 57 days of age, mammary cancer was chemically induced in one group of control offspring and in methyl donor offspring using DMBA. At study termination, tumor, and normal mammary (from the non-neoplastic control offspring) tissues were collected and stored according for assays. The differentially expressed genes in the tissues of the three offspring groups were identified using RNA sequencing (RNAseq).

Results

In this study involving 18 samples, 46729 transcripts were expressed in at least one sample. We identified 4191 differentially expressed genes (DEGs) among the three groups. Using Recursive Feature Elimination (RFE), only 10 DEGs, namely Tpst1, Gsc, Akr7a3, Trmt9b, Pik3c2g, Myl4, Acaca, Piezo1, AABR07059232.1, and H6pd were significantly differentially expressed among the groups. Kyoto Encyclopedia of Genes and Genome (KEGG) analysis revealed that DEGs were mainly enriched in the phosphatidylinositol signaling pathway, cardiac muscle contraction, metabolism of xenobiotic by cytochrome P450, fatty acid biosynthesis, and pentose phosphate pathway.

Conclusion

Among the identified genes, Acaca and Pik3c2g have been linked to cancer, including breast cancer, indicating their potential role in cancer-related pathways. However, further validation is required to confirm their roles and underlying mechanisms.

Beyond the Scalpel: The Role of EGFR Mutation in Predicting Transfusion Needs During lung cancer-derived Spinal Metastasis Surgery

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Co-authors: Mr. Yonghan Chen

Introduction

Spinal metastasis occurs in 30%-36% of lung cancer patients, leading to pain, decreased spinal stability, and neurological deficits. Surgery can effectively alleviate symptoms. However, surgery for patients with lung cancer spinal metastasis (LCSM) carries risks such as massive bleeding, shock, etc. Therefore, it is essential for clinicians to accurately assess the risk factors for intraoperative blood loss (IOBL), RBC transfusion volume, and RBC transfusion requirement preoperatively and to manage fluids effectively in the perioperative period.

Materials & Methods

This retrospective study included 163 patients who underwent limited resection surgery for LCSM at Guangdong Provincial People's Hospital from January 1, 2017, to August 30, 2024. Estimated IOBL, intraoperative RBC transfusion volume, and RBC transfusion requirement were assessed in relation to demographics, surgical details, preoperative systemic treatment for tumors, and preoperative laboratory data. Multivariable linear regression analysis was used to evaluate factors influencing IOBL and RBC transfusion volume, while multivariable binary logistic regression was applied to assess factors affecting RBC transfusion requirement.

Results

The average blood loss among patients was 765 890 ml, with an average transfusion volume of 4.9 2.9 units. The average blood loss for transfused patients was 1151.7 ml, compared to 300.9 ml for non-transfused patients. Multivariable analysis identified significant factors associated with IOBL as surgical method C (thoracolumbar-sacral vertebral body cavity cement filling with laminectomy and internal fixation), level of lamina decompression, EGFR mutation, and preoperative INR. Important factors associated with intraoperative RBC transfusion volume included surgical method C, level of instrumentation, level of lamina decompression, duration of surgery, EGFR mutation, and preoperative hemoglobin level. Factors influencing RBC transfusion requirement included level of instrumentation and the umber of spinal metastases3.

Conclusion

The findings revealed a strong correlation between increased surgical invasiveness and IOBL, RBC transfusion volume, and RBC transfusion requirement. Additionally, we were the first to identify EGFR mutation as a significant predictor of increased blood loss and RBC transfusion volume during LCSM surgery. These results are valuable for guiding clinicians in preoperative planning and more effectively managing blood loss and transfusion intraoperatively.

Prognostic Role of Androgen Receptor Expression in Breast Cancer: Insights from an Azerbaijani Cohort

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Introduction

Breast cancer is the most frequently diagnosed malignancy in women globally and a leading cause of cancer-related mortality. Neoadjuvant chemotherapy (NACT) plays a crucial role in managing locally advanced breast cancer by reducing tumor burden and facilitating breast-conserving surgery. Pathologic complete response (pCR), often assessed using the Miller-Payne grading system, is a critical prognostic marker for long-term outcomes. Recent research highlights androgen receptor (AR) expression as a potential biomarker influencing therapeutic response, particularly in hormone receptor-positive subtypes. This study explores AR's prognostic value in breast cancer patients from Azerbaijan, aiming to provide localized insights.

Materials & Methods

150 Azerbaijani patients with stage II and III breast cancer who received NACT treatment between 2015 and 2022 were included in this retrospective analysis. Hospital records were used to gather information on outcomes, pCR rates, AR expression, age, and subtype distribution. The subtypes of tumours were categorised as TNBC, HER2+, Luminal A, and Luminal B. Using immunohistochemistry, AR expression was identified and classified according to staining intensity. SPSS 29.0 was used to conduct statistical analyses, such as survival analysis and chi-square, with significance set at $p<0.05$.

Results

In 16.77% of Luminal A, 38.07% of Luminal B, 8.39% of HER2+, and 11.61% of TNBC patients, AR positive was found. Lower pCR rates were seen in AR-positive Luminal A tumours, which was associated with chemoresistance mediated by the PI3K/Akt/mTOR pathways. Compared to AR-negative cases (27.2%), AR-positive cases in TNBC showed noticeably lower pCR rates (12.5%). AR-positive HER2+ tumours showed worse overall results and lower pCR rates. These results are consistent with other research showing AR's predictive potential across subtypes and its role in treatment resistance.

Conclusion

This study highlights the prognostic significance of AR expression in breast cancer, particularly its association with reduced pCR rates and poor outcomes in Luminal A and TNBC subtypes. Treatment results for AR-positive tumours may be improved by AR-targeted treatments, particularly in cases where the tumours are chemoresistant. These findings add significantly to the global understanding of AR's function in breast cancer, as this is the first study to assess AR expression in an Azerbaijani population. To confirm these findings and investigate AR-targeted treatment approaches, larger, multi-center trials are necessary for future study.

Diagnostic accuracy of rapid on-site evaluation of touch imprint cytology during virtual bronchoscopy navigation

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Introduction

Virtual bronchoscopy navigation (VBN) is an emerging tool for the diagnosis of pulmonary nodules, with studies showing that VBN has a good overall diagnostic accuracy. The yield, however, is greatly impaired in lesions <2 cm. Rapid on-site evaluation of touch imprint cytology (TIC-ROSE) of biopsies taken during VBN allows immediate assessment of this cytological material using a quick staining of the smears. Obtained information can potentially help clinicians to optimize the VBN procedure and reduce the number of repeated biopsies. The aim of this retrospective analysis is to evaluate the diagnostic accuracy of TIC-ROSE during VBN in the University Medical Center Groningen.

Materials & Methods

The current analysis is based on a single center, prospective, observational cohort study NAVIGATOR of patients undergoing a VBN procedure to assess a pulmonary nodule (ClinicalTrials.gov identifier NCT05383105). Clinical data of all procedures performed with TIC-ROSE since January 2025 were analyzed. Outcome categories of the TIC-ROSE and final cytology are: benign, malignant, atypical cells (abnormal, but not conclusive enough for a diagnosis), and other (no result available). Histology findings were categorized in benign, malignant and other diagnosis. The degree of concordance was assessed by comparing the TIC-ROSE result obtained during the procedure with the final cytology and histopathological results both obtained after the procedure. For comparison of results, the categories malignant and atypical cells were bound to one category (malignant).

Results

22 patients (64% male) were included in this analysis. In more than half of the population, a primary lung cancer diagnosis was expected, and otherwise metastasis, infection or benign diagnosis were anticipated. Per case an average of 2 TIC-ROSE specimens were prepared and an average of 12 biopsies were collected. The final diagnosis by histology showed malignancy in 54.5% of cases, benign sample in 40% and other in 4.5% (ALK-positive histiocytosis). As for TIC-ROSE results were 45.5% benign, 31.8% malignant, 22.7% atypical and 4.5% other. In most cases (77.3%) results between TIC-ROSE, final cytology and final histology were concordant.

Conclusion

TIC-ROSE showed adequate concordance with final cytology and final histological assessment, making it an easy and effective technique that might aid doctors in optimizing the VBN procedure.

Oral Session II

Neurology II

Presenters

Fatemeh Taghvaei
Kianoush Gholami
Seyed Mostafa Fazel Hoseini
Zhongke Wang
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Detecting of MS lesions in MRI brain images by novel Artificial Intelligence techniques

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Introduction

Multiple sclerosis (MS) is an autoimmune disorder where the immune system targets nerve axons and damages the myelin sheath, leading to the development of white spots known as plaques on the nerves. Early diagnosis and accurate measurement of plaque size play a crucial role in managing the disease. Traditional manual segmentation techniques are not only time-consuming but also prone to inconsistency.This study aims to automate lesion detection using Artificial Intelligence (AI), specifically by applying a practical method based on Support Vector Machine (SVM) classification.

Materials & Methods

This study utilized a dataset of 210 MRI brain scans collected from Atieh Hospital in Tehran, Iran, featuring both individuals with multiple sclerosis (MS) and healthy participants. A supervised learning method with Support Vector Machines (SVM) was implemented for lesion segmentation. The SVM model was trained using manual annotations on 70% of the data, while the remaining 30% was reserved for testing. Various features distinguishing MS lesions from healthy brain tissuesuch as intensity, texture, and shapewere extracted. Post-processing methods were applied to refine lesion maps, and performance was evaluated using standard metrics like sensitivity, specificity, accuracy, and the Dice coefficient.

Results

The AI-driven MS lesion detection system showed outstanding diagnostic capabilities, with sensitivity, specificity, and overall accuracy of 92.4%, 94.7%, and 93.6%, respectively. The Dice coefficient, which measures the precision of lesion segmentation, was an impressive 0.88, highlighting the system's strong performance in accurately localizing lesions. Additionally, the SVM classifier demonstrated excellent discrimination, successfully distinguishing MS lesions from healthy brain tissue.

Conclusion

Our AI-powered system for detecting MS lesions has shown exceptional diagnostic effectiveness, achieving high sensitivity, specificity, accuracy, and an impressive Dice coefficient, highlighting its accuracy in localizing lesions. The incorporation of cutting-edge AI methods in medical imaging offers a promising path forward, aiming to improve the precision and speed of multiple sclerosis diagnosis, which can lead to better patient care.

Safety Profile of Urolithin A and B In an Alzheimers Disease Rat Model: Pathohistological Assessment of Vital Organs

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Introduction

Urolithins, metabolites derived from ellagitannins, have demonstrated neuroprotective effects and potential therapeutic applications, particularly in Alzheimers Disease (AD). In the first phase of our research, Urolithin A (Uro A) and Urolithin B (Uro B) exhibited remarkable neuroprotective effects on the cortex, hippocampus, and cerebellum, as demonstrated by histological and biochemical analyses, as well as improvements in behavioral assessments. Building upon these promising results, in the second phase of our study, we assess the safety profile of intraperitoneal (IP) administration of Uro A and Uro B through histological examination of vital organs to support their clinical translation.

Materials & Methods

In the present study, the Wistar rats were randomly divided into 7 distinct groups (Control, Sham, AD, Uro A 10 and 20, Uro B 10 and 20). Alzheimers disease was induced via a stereotaxic injection of Streptozotocin (STZ) into the lateral ventricles to create a reliable AD model. After a two-week treatment period, histopathological analyses of the liver, kidneys, pancreas, and testis tissues were performed using Hematoxylin and Eosin (H&E) staining to evaluate potential toxicological effects of Uro A and B.

Results

Histological analysis using H&E staining showed no noticeable pathological changes in these critical organs. This confirms that Uro A and B are well-tolerated and do not induce harmful impact on the administered doses. The liver exhibited normal hepatic lobular architecture with intact hepatocytes, and kidney sections displayed preserved glomerular and tubular morphology without signs of inflammation or damage. The pancreas indicated normal acinar structures and well-preserved islets of Langerhans. Moreover, the testis maintained intact seminiferous tubules with no evidence of lesions.

Conclusion

In conclusion, Uro A and B effectively mitigate neurodegeneration and maintain organ health, suggesting their potential as promising therapeutic compounds for AD. These findings warrant further investigation into their long-term efficacy and safety in clinical settings.

Integrated Clinical-Radiomic-Network model for identifying hippocampal sclerosis and predicting surgical outcomes in mesial temporal lobe epilepsy: A 10-year Multi-Center Study

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Introduction

Hippocampal sclerosis (HS) is the most common pathology associated with drug-resistant in mesial temporal lobe epilepsy (mTLE), and early anterior temporal lobectomy (ATL) is superior to prolonged medical therapy in mTLE. Preoperative identification of HS facilitates early diagnosis and surgical intervention for mTLE. We aimed to precisely identify the HS and predict the surgical outcomes in patients with mTLE based on artificial intelligence (AI) algorithms and 18F-FDG PET images.

Materials & Methods

This study was conducted from January 2013 to May 2023. Integrated preoperative Clinical-Radiomic-Network (CRN) features of hippocampus in mTLE patients from six comprehensive epilepsy centers were extracted from the 18F-FDG PET images and selected using LASSO regression. Twelve individual machine learning (ML) models and the ensemble ML model named Super-learner (SL) were developed based on the selected CRN features. The receiver operating characteristic (ROC) curve analysis was used to determine the effectiveness of ML and SL models.

Results

342 mTLE patients and 97 healthy controls from our epilepsy centers were included in the training set. Three clinical features (seizure frequency, volume, mean standardized uptake value [SUV]), four radiomics features (square-root glszm GrayLevelNonUniformity, wavelet-HLL first-order Energy, square-root glszm SmallAreaHighGrayLevelEmphasis, original glszm SizeZoneNonUniformity) and two brain network features (degree centrality, nodal efficiency) were selected to develop the model. The SL model demonstrated the best stability and superior performance (area under the curve [AUC]: 0.95, accuracy [Acc]: 0.92) in identifying the HS compared to all ML models. Further, the SL model exhibited good performance in predicting the surgical outcomes (1-year: AUC=0.93, Acc=0.91; 3-year: AUC=0.95, Acc=0.93; 5-year: AUC=0.96, Acc=0.92) of patients underwent ATL. 419 mTLE patients and 203 healthy controls from other five epilepsy centers were enrolled as the test set, and the SL model also perform well. Finally, we launched an online tool based on the SL model, allowing clinicians to quickly identify HS and predict surgical outcomes of mTLE.

Conclusion

The SL model developed based on the CRN features provides a clinically practical method for predicting the HS and surgical outcomes of mTLE patients, which offers support for the preoperative evaluation of clinicians.

Beyond Movement: The Role of AdipoRon in Modulating Neuropsychiatric and Cognitive Impairments in Parkinson's Disease

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Introduction

Parkinson's disease (PD) is a complex neurodegenerative disorder characterized by both motor and non-motor symptoms. While motor symptoms are the hallmark of PD, non-motor symptoms, including depression, anxiety, and cognitive impairment, significantly impact patients' quality of life and often precede motor manifestations. This study investigated the effects of intranasal AdipoRon (Ad), an adiponectin receptor agonist, on both neuropsychiatric and cognitive symptoms in a 6-hydroxydopamine (6-OHDA)-induced rat model of PD

Materials & Methods

A hemiparkinsonian rat model was created by unilateral injection of 6-OHDA into the medial forebrain bundle. One week post-injection, rats were randomly assigned to treatment groups receiving either intranasal Ad (0.1, 1, or 10 g), levodopa (10 mg/kg orally), or vehicle for 21 consecutive days. For evaluation of anxiety-like behaviors, the open field test and elevated plus maze, and for depressive-like behaviors, sucrose splash test and forced swimming test were performed. Cognitive function, specifically recognition and spatial memory, was examined through the novel object recognition test and Barnes maze test, respectively. Unlike conventional treatments such as levodopa, which primarily target motor symptoms

Results

Ad (1 and 10 g) demonstrated significant efficacy in ameliorating both neuropsychiatric and cognitive deficits. These behavioral improvements were accompanied by decreased expression of neuroinflammatory markers, including NLRP3, caspase 1, and IL-1, and increased expression of Sirt-1 in the prefrontal cortex. Moreover, Ad significantly reduced oxidative stress markers, increased total antioxidant capacity, and elevated levels of antioxidant enzymes, including superoxide dismutase (SOD) and glutathione peroxidase (GPx) in the hippocampus. Furthermore, Ad increased the expression of brain-derived neurotrophic factor (BDNF) and postsynaptic density protein 95 (PSD-95), suggesting enhanced synaptic plasticity.these findings suggest that intranasal Ad ameliorates both neuropsychiatric and cognitive symptoms in PD through multiple mechanisms, including anti-inflammatory effects, activation of AMPK/Sirt-1 signaling, reduction of oxidative stress, and promotion of synaptic plasticity.

Conclusion

In conclusion, this study provides compelling evidence for the therapeutic potential of intranasal Ad in managing non-motor PD symptoms

Choline transporters are required for oligodendrocyte differentiation and myelin sheath formation in postnatal brains

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Introduction

Insufficient oligodendrocyte (OL) myelination has been demonstrated as a factor causing neurodysfunctions in postnatal and adult brains. In principle, upon the onset of differentiation, each oligodendrocyte precursor cell (OPC) must produce more than a 3000-fold membrane to form myelin sheaths within hours. However, the mechanisms underlying the cell membrane synthesis remain largely unknown. Choline is an essential nutrient for lipid metabolism, which is required for cell membrane synthesis and extension. Choline transporters (ChTs) are responsible for choline uptake from extracellular environments.

Materials & Methods

We analysed the scRNA-seq dataset from mouse brain samples at P10 obtained from our recent report (accession number: GSE262996), and the snRNA-seq dataset from mouse brain samples at 2 months obtained from Ximerakis and colleagues (accession number: GSE129788). We quantitatively analyzed mOL and myelin markers by immunofluorescence staining using OPC conditioned knockout mice (The Jackson Laboratory). We tested animal behavior using behavioral analysis software (Shanghai XinRuan Information Technology). Data were analyzed using GraphPad Prism 8.02.

Results

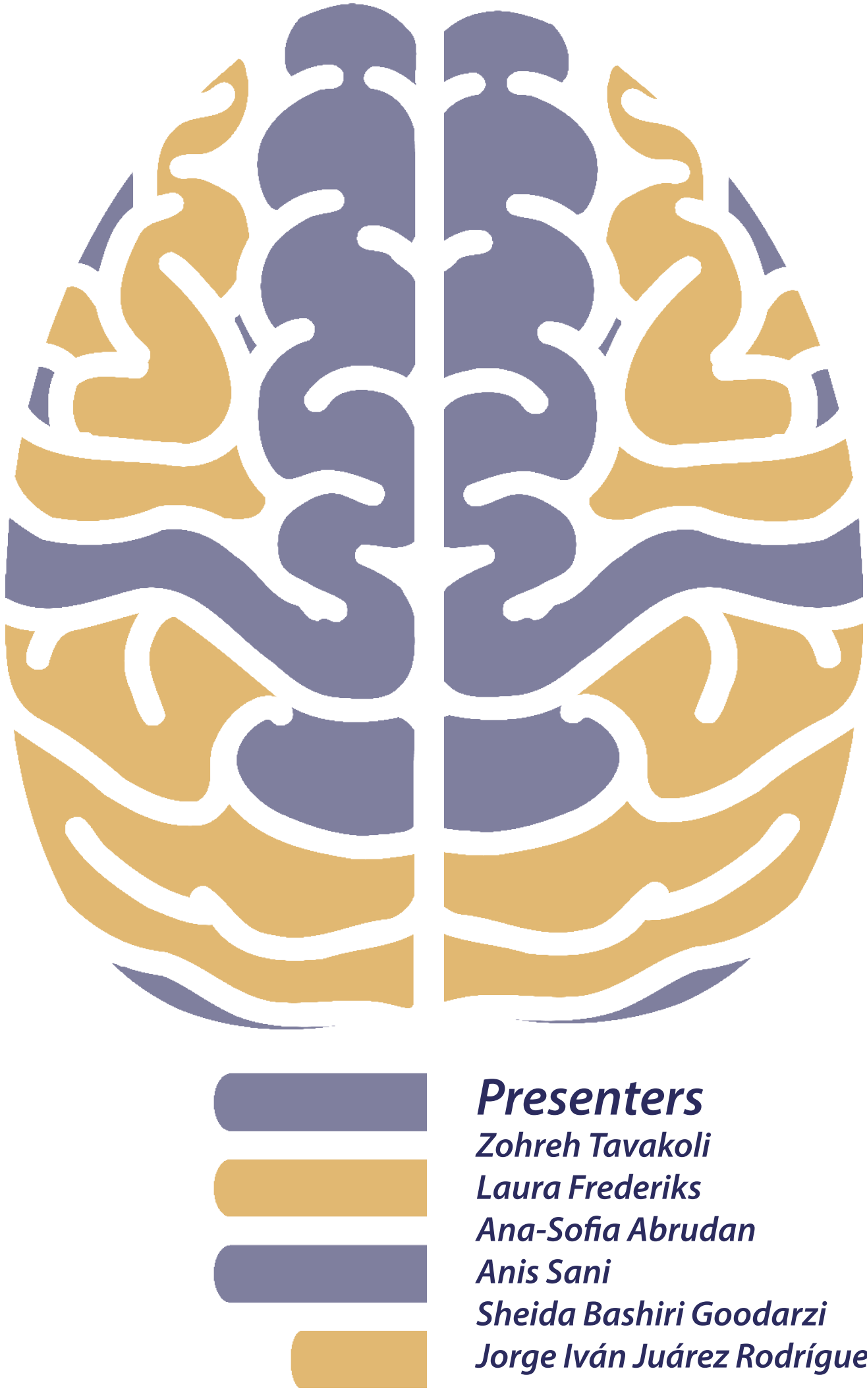
Here, we reported that SLC44A1 and SLC44A5 are the major ChTs specifically expressed in oligodendrocyte lineage cells by single-cell sequencing and analysis. We hypothesized that these ChTs are required for OPC differentiation and myelination. As expected, conditional knockout (cKO) of SLC44A1 or SLC44A5 in OPC inhibited oligodendrocyte (OL) differentiation and myelination in neonatal mice. Further, hypomyelination persists into adulthood in the SLC44A1 cKO but not SLC44A5 cKO brains, which is probably due to vanishing SLC44A5 expression in adult OPCs. Of note, tracing and calculating newly-formed myelin sheaths revealed that the total length of myelin sheaths produced by individual OL was significantly decreased upon SLC44A1 deletion in adult brains. These findings indicate that OL differentiation and myelin sheath formation necessite choline uptake. Consequently, the SLC44A1 conditional knockout mice performed poorly in the cognition test with anxiety-like behaviors in adulthood compared to the littermate controls.

Conclusion

These findings together revealed that choline transport is required for oligodendrocyte myelination and white matter integrity in postnatal brains, implying SLC44A1 and SLC44A5 as potential targets for pro-myelination strategies.

Oral Session II

Gynaecology & Obstetrics



Presenters

Zohreh Tavakoli
Laura Frederiks
Ana-Sofia Abrudan
Anis Sani
Sheida Bashiri Goodarzi
Jorge Iván Juárez Rodríguez

Decoding preeclampsia: how sodium levels reflect disease severity and pregnancy outcomes

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Introduction

Preeclampsia, a hypertensive disorder of pregnancy, is associated with significant maternal and neonatal morbidity. Sodium dysregulation may contribute to its pathophysiology through mechanisms involving vascular resistance, endothelial dysfunction, and the renin-angiotensin-aldosterone system (RAAS). However, the role of serum sodium levels in preeclampsia severity and outcomes remains unclear. This study investigates the association between serum sodium levels, preeclampsia severity, and maternal/neonatal outcomes.

Materials & Methods

A cross-sectional study was conducted involving 300 pregnant women diagnosed with preeclampsia. Serum sodium levels were measured at diagnosis and analyzed as a continuous variable. Preeclampsia severity was classified as mild or severe based on the American College of Obstetricians and Gynecologists (ACOG) criteria. Maternal outcomes included eclampsia and HELLP syndrome, while neonatal outcomes included birth weight, preterm delivery, and Apgar scores. Fluid balance, renal function, and diuretic use were recorded and adjusted for in the analysis. Multivariable linear and logistic regression models were used to assess associations.

Results

The study included 300 participants with a mean age of 28.55.2 years, mean BMI of 29.34.8 kg/m2, and 45% nulliparous. Of these, 197 (65.7%) had mild preeclampsia, and 103 (34.3%) had severe preeclampsia. Lower serum sodium levels were significantly associated with increased preeclampsia severity, with a 17% higher odds per 1 mmol/L decrease (adjusted odds ratio (aOR): 1.17; 95% confidence interval (CI): 1.071.29; $p < 0.001$). Similarly, lower sodium levels were associated with adverse maternal outcomes (aOR: 1.13; 95% CI: 1.031.24; $p = 0.008$) and neonatal outcomes, including lower birth weight (-40 g per 1 mmol/L decrease; 95% CI: -52 to -28; $p < 0.001$) and higher odds of preterm delivery (aOR: 1.15; 95% CI: 1.051.26; $p = 0.003$).

Conclusion

Lower serum sodium levels are independently associated with increased preeclampsia severity and adverse maternal/neonatal outcomes, even after adjusting for key confounders. While dietary sodium intake did not influence serum sodium levels, these findings highlight sodium dysregulation as a potential contributor to preeclampsia pathophysiology. Future studies should explore whether sodium monitoring could aid in risk stratification and investigate mechanistic pathways such as RAAS activation and endothelial dysfunction to guide targeted interventions in high-risk pregnancies.

Exploring Pelvic Floor Symptoms indicating the prevalence of Increased Pelvic Floor Muscle tone in women aged 18-25.

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Introduction
Increased pelvic floor muscle tone (IPFMt) is the definition of an elevated resting tone in the pelvic floor muscles in people without a neurological condition. It is associated with somatic symptoms, in different domains, such as sexual dysfunction, lower urinary tract symptoms, defecation problems, pelvic pain, pelvic organ prolapse, and a reduced quality of life. There is no existing data on the prevalence of IPFMt in adolescent women. This study aims to determine the prevalence of IPFMt in this group, with a validated questionnaire on pelvic floor symptoms.

Materials & Methods
This cross-sectional study included Dutch women aged between 18 and 25 years, who had no history of gynecological, urological, gastrointestinal conditions or pregnancy. Participants were recruited through social media and completed the questionnaire "Amsterdam Hyperactive Pelvic Floor Scale for Women (AHPFS-W)" online. The AHPFS-W distinguishes six different domains of symptoms (max score 30). Evaluation was based on clinical cut-off AHPFS-W scores: no IPFMt (6.00-10.99), mild IPFMt (11.00-12.99), and moderate to severe IPFMt (13.00-30.00).

Results
A total of 1,121 eligible women participated in this study, of whom 485 (43.3%) had no indication of IPFMt, and 299 (26.7%) respectively 337 (30.1%) had a mild indication or moderate to severe indication of IPFMt. The highest AHPFS-W score was achieved in the "Irritable Bowel Symptoms" domain.

Conclusion
Among Dutch women aged 18 to 25 years, one third reported moderate to severe complaints on the questionnaire, indicating IPFMt. These findings suggest a high prevalence of symptoms that might be associated with IPFMt among adolescent women, thus stressing the need for awareness and further research to IPFMt in this age group.

Placental pathology is associated with lower quality Fidgety Movements in preterm infants.

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Introduction
Preterm infants are at risk for neurodevelopmental disabilities later in life, like motor delays and cerebral palsy(CP). The placenta plays a critical role throughout pregnancy, particularly in preterm birth. Our aim is to explore the relation between placental lesions and accurate predictors of neurodevelopmental outcomes in preterm infants.

Materials & Methods
Preterm infants(<30 weeks and/or birthweight <1000g) were included with histopathological examination (according to Amsterdam criteria) of the placentas. We predicted the risk for future possible neurodevelopmental impairment using Prechtl's General Movement Assessment to evaluate fidgety movements(FM) at 3 months post-term. We also calculated the Motor Optimality Score-Revised(MOS-R).

Results
In total 78 infants were included. The gestational age(GA) ranged from 24.1-32.6 weeks and birth weight was between 550-1950 grams. The presence of AIUI(ascending intrauterine infection)was significantly associated with absent FMs (p=0.034). Both the presence of fetal and maternal vascular malperfusion(FVM and MVM) were associated with a MOS-R<23[p= 0.015, p=0.045].

Conclusion
AIUI is associated with a higher risk of absent FMs and therefore an increased risk for CP. FVM and MVM are significantly associated with MOS-R<23, which is predictive of an elevated risk for adverse neurodevelopmental(non-CP) outcomes. This finding supports the hypothesis that impaired neurodevelopment in preterm infants already starts before birth.

Evaluation of mechanical and non-mechanical methods of cervix ripening in women with PROM: A randomized clinical trial

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Introduction
Premature rupture of membranes (PROM) occurs in 8% of pregnancies. In the absence of spontaneous labor, induction of labor is considered an appropriate strategy for term pregnant women with PROM. There are several approaches for pre-induction cervical ripening, including mechanical methods, such as Foley catheterization, and non-mechanical methods, such as oral misoprostol. The purpose of this study was to evaluate and compare the effects of oral misoprostol and Foley catheterization in pregnant women with PROM 34w who underwent induction of labor.

Materials & Methods
A randomized clinical trial was performed. Inclusion criteria were nullipar and multipar pregnant women 34 weeks of gestational age (GA), singleton pregnancies with cephalic presentation with confirmed amniotic fluid leakage for more than 60 minutes. A total of 104 participants were randomly allocated into two groups, one receiving sublingual misoprostol (miso) and the other receiving transcervical Foley catheter (FC) for cervical ripening. The primary outcome was time from intervention to delivery, and the secondary outcomes included delivery method, maternal and neonatal results (chorioamnionitis, Apgar score, neonatal sepsis and asphyxia), and arterial blood gas (ABG) analysis of the umbilical cord.

Results
The mean time from induction to delivery (11.6 1.98 for FC vs. 10.16 2.35 hours for miso, P=0.007) and the median duration of cervical ripening (4.5 (0.0-6.0) for FC vs. 4.0 (1.5-6.0) hours for miso, P=0.04) was longer in the FC group. There was no statistically significant difference in the cesarean delivery rate between the two groups (29.6% for FC vs 38.5% for miso, P=0.2). There were no cases of chorioamnionitis or asphyxia in the two groups. There was no significant difference between the two groups in terms of umbilical cord pH, and the first and fifth minute Apgar scores (P=0.1, P=0.4, and P=0.1); nevertheless, these values were higher in the FC group. There were no statistically significant differences among additional secondary outcomes.

Conclusion
Cervical ripening in PROM cases with FC is associated with longer duration of ripening and time from induction to delivery compared to ripening with misoprostol. The cesarean delivery rate and the maternal and neonatal infection rates were not different between these methods.

Effect of Vaginal Progesterone On Uterine, Middle Cerebral, And Umbilical Artery Doppler Findings in Preeclampsia

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Introduction
Preeclampsia is the new onset of hypertension and proteinuria with or without severe features. Decrease in the progesterone may be one of the causes of preeclampsia. In this study, we aimed to investigate the effects of vaginal progesterone on findings of uterine, middle cerebral, and umbilical artery Doppler in patients with preeclampsia.

Materials & Methods
In this single-blinded randomized clinical trial with parallel groups and a sample size of 80 participants in two groups, trial group received 200 mg of progesterone in the form of a suppository every day for a week, while the control group received placebo. We compared Doppler ultrasound of the uterine, middle cerebral, and umbilical artery after one week of the intervention.

Results
Both groups had similar baseline characteristics. uterine artery systolic/diastolic (S/D) ratio and Left uterine artery pulsatility index (PI) decreased significantly (both P-value = 0.001), and middle cerebral artery PI, peak systolic velocity (PSV) value, and S/D significantly increased after taking progesterone compared to before the intervention (all P-value = 0.001) . There was a non-significant decrease in S/D of the umbilical artery in the progesterone group (P-value = 0.2) but the PI of the umbilical artery was significantly increased. (P-value = 0.009).

Conclusion
Based on our findings, vaginal progesterone improved maternal and neonatal outcomes of pregnant women with preeclampsia and the function of uterine, middle cerebral, and umbilical artery.

Evaluation of the antiplatelet effect of the aminoestrogen Dieoctad as a potential hormone replacement agent.

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Introduction

Thrombosis is one of the leading causes of death in the world; it is estimated that 1 in 4 people worldwide die from this process. It is defined as forming a blood clot that loses its physiological characteristics to repair the endothelium and generates a partial or complete blockage of a blood vessel in the venous or arterial territory. The most susceptible people have risk factors such as advanced age, orthopedic surgeries, cancer, and treatment with oral contraceptives. Some causes are related to disorders related to the deficiency of physiological anticoagulant proteins. In the search for therapeutic alternatives, synthetic amino estrogens such as Dieoctad were developed to affect different pharmacological targets, exhibit estrogenic effects, and reduce platelet activity. The objective of the work was to evaluate the antiplatelet capacity of Dieoctad in an in vitro model.

Materials & Methods

The compound Dieoctad was isolated and characterized at the UNAM Chemistry Institute. Dieoctad's antiplatelet activity was evaluated using an optical lumiagregometer at 37 C and 1200 rpm. Platelets from donors from the blood bank of Instituto Nacional de Cardiologia Ignacio Chavez (INC) were used (NOM-253-SSA1-2012), and platelet aggregation was induced with 10 M ADP, 10 M epinephrine, and 2 g/mL collagen according to the Bohrn technique. A dose-response curve was performed (5.0, 50, and 500 M). The institutional ethics committee approved the protocol with registration 24-1466. The data were analyzed in the GraphPad Prism v8.0 program, considering statistical significance $P<0.05$.

Results

We observed that Dieoctad at a concentration of 500 M inhibits platelet aggregation at a mean percentage of 66% (95%CI 63.7-68.7) with the ADP agonist compared to the control, by 60% (95%CI 56.78-63.22) with the Epinephrine agonist, and by 50% (95%CI 41.7-58.3) with the Collagen agonist ($P<0.05$).

Conclusion

Dieoctad has an antiplatelet effect compared with control. This effect highlights and gives a possible advantage to its use as an estrogen with a lower risk of thrombosis, which would be helpful as an alternative in hormone replacement therapy.

Oral Session II

Cardiology

Presenters

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Shima Mohammadi
Hacer Erva Evirgen
Sudhir Rajbhandari
Andres Clarke
Dayu Sun

Meta AI-Driven Prediction and Decision Support System for Heart Failure for Comprehensive Clinical Insights

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Introduction

Heart failure remains a leading cause of morbidity and mortality, necessitating early detection, precise risk stratification, and individualized management strategies. Traditional diagnostic pathways rely heavily on echocardiography for assessing left ventricular ejection fraction (EF) and structural abnormalities. However, access to timely imaging is often limited, delaying treatment decisions. This study presents a multimodal deep learning model integrating electrocardiography (ECG), chest X-ray (CXR), and clinical data to predict clinical and echocardiography-related outcomes. By utilizing multiple specialized models and aggregating their outputs within an AI-driven interface, this system provides a real-time decision support tool for clinicians.

Materials & Methods

A retrospective dataset comprising hospitalized heart failure patients is being used to develop and validate multiple deep learning models tailored to different prediction tasks. The primary models were trained to predict EF and categorize patients into heart failure with reduced EF, mid-range, and preserved EF. Additional models predicted specific echocardiographic abnormalities such as diastolic dysfunction, valvular disease, and wall motion abnormalities. Patient outcome predictions included in-hospital mortality, ICU admission, readmission risk, and the need for advanced heart failure therapies. Treatment recommendations were generated based on guideline-directed medical therapy eligibility, volume status, and hemodynamic stability.

Results

The preliminary AI model demonstrated high predictive performance across multiple tasks. EF prediction from multimodal data achieved a C-index of 0.85 compared to echocardiography-based EF assessments. Echocardiographic abnormality classification showed an accuracy of 88%, with specific findings such as diastolic dysfunction and valvular disease identified with high sensitivity and specificity. Outcome prediction models yielded an area under the receiver operating characteristic curve (AUROC) of 0.85 for in-hospital mortality, 0.86 for ICU admission, and 0.87 for 30-day readmission risk. Treatment recommendation models aligned with expert clinician decisions in 89% of cases. The AI systems interactive interface enabled real-time decision support, with predictions accessible through structured commands, allowing clinicians to retrieve individualized insights or comprehensive reports based on specific clinical needs.

Conclusion

This study demonstrates the feasibility and efficacy of a multimodal AI-driven decision support system for heart failure management, integrating diverse clinical data sources to provide real-time insights into EF, structural cardiac abnormalities, patient risk stratification, and optimal treatment strategies.

Preliminary Insights into the Relationship Between MAC-2 Binding Protein and Coronary Calcium Score in Cardiovascular Risk Assessment

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Introduction

Cardiovascular Diseases (CVD) remain the leading cause of global mortality. Accurate and early identification of susceptible individuals is crucial in reducing the burden of CVD. The coronary calcium score (CCS), obtained through computed tomography imaging, acts as an established indicator of subclinical atherosclerosis. Concurrently, MAC-2 Binding Protein (Mac-2BP) has garnered attention as a biomarker associated with inflammation and fibrosis, playing critical roles in cardiovascular disease progression. This study demonstrates the relationship between Mac-2BP and CCS to explore the potential of integrating these markers into cardiovascular risk assessment.

Materials & Methods

A total of 140 patients are to be enrolled in this cross-sectional cohort study. To date, 78 participants (35 males, 43 females) without coronary artery disease (CAD) or diabetes have been included. Serum Mac-2BP levels were measured using enzyme-linked immunosorbent assay (ELISA), and CCS was determined through non-contrast computed tomography. Age, sex, smoking history, and elevated LDL levels were accounted for in the analysis as confounding variables. The association between Mac-2BP and CCS was assessed using multivariate regression analysis and Pearson correlation.

Results

Preliminary data indicate a positive correlation between Mac-2BP levels and CCS, suggesting an association between systemic inflammation and coronary artery calcification. Mac-2BP levels were considerably higher in patients with higher CCS values than in those with minimal calcification. After adjusting for confounding variables, Mac-2BP levels remained an independent predictor of CCS ($p < 0.05$).

Conclusion

MAC-2 Binding Protein holds promise as an additional biomarker to enhance the coronary calcium score in assessing cardiovascular risk. Although CCS represents structural components of atherosclerosis, Mac-2BP provides insight into the inflammatory and fibrotic mechanisms underlying disease progression. These initial results highlight the potential clinical importance of incorporating Mac-2BP into risk assessment models to guide early interventions and tailored treatment approaches. To validate these results and investigate the potential therapeutic benefits of targeting Mac-2BP, longitudinal studies with more subjects are required.

Involvement of Glycogen Synthase Kinase-3 and Oxidation Status in the Loss of Cardioprotection by Postconditioning in Chronic Diabetic Male Rats

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Introduction

Diabetes mellitus as a main risk-factor of ischemic heart disease may interfere with postconditioning'scardioprotective effects. This study aimed to investigate the involvement of glycogen synthase kinase-3 (GSK-3) and oxidation status in chronic diabetes-induced loss of cardioprotective effect of ischemic-postconditioning (IPostC) in Wistar rats.

Materials & Methods

After 8 weeks of induction of diabetes by streptozotocin (50mg/kg), hearts of control and diabetic rats were isolated and mounted on a constant-pressure Langendorff system. All hearts were subjected to 30min regional ischemia followed by 60min reperfusion (by occluding and re-opening of left anterior descending coronary artery, respectively). IPostC was applied immediately at the onset of reperfusion. At the end of reperfusion, the infarct size of myocardium was measured via computerized planimetry. Myocardial contents of malondealdehyde and glutathione as indices of oxidative status were assayed spectrophotometrically and the total and phosphorylated forms of myocardial GSK-3 were quantified through western blotting.

Results

IPostC reduced the infarct size of control hearts from 412.9% to 281.9% ($P<0.05$), whereas it could not induce significant changes in infarct size of diabetic animals (351.8% vs. 393.1%). IPostC-induced reduction in malondealdehyde and elevation in glutathione contents were significant only in control not in diabetic hearts. The total forms of GSK-3 were similar in all groups; however, the phosphorylation of GSK-3 (at Ser9) by IPostC was greater in control hearts than diabetics ($P<0.01$).

Conclusion

The failure of cardioprotection by IPostC in diabetic hearts may be attributed to the loss of phosphorylation of GSK-3 and thereby increase in oxidative stress in diabetic states.

Predictive Value of IL-6, NT-proBNP, and TNF- in All-Cause Mortality and Relation To Platelet Function in High-Risk Population

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Introduction

IL-6, NT-proBNP, and TNF- are liquid biomarker that are elevated in individuals with type 2 diabetes mellitus (T2DM), especially those with cardiovascular complications. These biomarkers reflect increased heart stress due to hyperglycemia, inflammation, and hypertension, making them valuable for assessing cardiovascular risk and mortality. The aim of study was to determine the ability of IL-6, NT-proBNP, and TNF- to predict all-cause mortality and their association with platelet function among T2DM patients.

Materials & Methods

Three hundred-three T2DM patients were enrolled in the study. Among the patients included, 34 (11.2 %) patients died within a median observation time of 5.9 years. Serum IL-6, NT-proBNP, and TNF- concentrations were assessed by ELISA immunoassay and compared between the patients who survived and those who died. Platelet functions were determined via VerifyNow platelet testing, 515 was taken as a 4th quartile cut-off to specify the patients with hyper vs normal platelet activity.

Results

Receiver operating characteristic (ROC) curve analysis showed IL-6, NT-proBNP, and TNF- as mortality predictions (AUC: 0.653, p= 0.004; AUC: 0.688, p<0.001; AUC:0.657, p=0.003 respectively). Combining all biomarkers yielded a higher AUC than the value of each individual biomarker (AUC: 0.697, p=0.0002). Adjusted Cox-regression analysis was used for prediction of all-cause mortality. After including all blood-biomarkers into one multivariate Cox regression model, combined value predicted the future occurrence of long-term all-cause mortality as the most significant (HR= 4.10, 95% CI: 1.9-8.8; p= 0.0003). Besides, patients with hyper platelet activity had significantly higher TNF- concentration compared to patients with normal platelet activity (p= 0.019). We utilized SHAP analysis to uncover how laboratory features contribute to predictions, confirming IL-6 as the top regulator of high mortality risk. Interaction and enrichment analyses identified 34 shared targets for IL-6, TNF, and NPPB, linking them to cardiovascular diseases (CVD) and pathways such as cytokine signaling, vitamin B12 metabolism, and heart-specific processes like dilated cardiomyopathy.

Conclusion

Combining different biomarkers of processes underlying cardiovascular pathophysiology might be beneficial for early diagnosis of all-cause mortality and IL-6, NT-proBNP, and TNF- combination is a strong and independent predictor of long-term all-cause mortality among patients presenting with T2DM. Moreover, TNF- presents significant interactions with platelet function in patients with stable diabetes.

The World's First Absorbable Occluder for the Transcatheter Treatment of Congenital PFO Closure in Growing Children and Adolescents

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Introduction

Absorbable occluders for transcatheter treatment of congenital PFO is new and unexploited, compared to metallic occluders. This study aims to signify results of analyses between absorbable and conventional metallic occluders for transcatheter treatment of congenital PFO closures in growing children and adolescents. Heres the world's first case of congenital PFO in human treated with absorbable occluder.

Materials & Methods

The world's first absorbable occluder for the transcatheter treatment of congenital PFO closure was performed in 15-year-old male patient on 25th October 2023 in our hospital. As of 15th January 2025, 6 (six) patients have received such treatment. 12 growing children and adolescents were enrolled in the study (n = 12), 6 patients in control group were treated with metallic occluders for PFO closures while other 6 patients in observational group were treated with absorbable occluders for PFO closures. Their ages ranged from 8 to 20 years (median = 14 years). Data from both groups were carefully analyzed.

Results

Preoperative data like gender, age, BMI, diagnosis of PFO, comorbidities, and 2D echocardiogram had no significant differences between the two groups (P>0.05).Total operation time length, total intraoperative blood loss, total pre and postoperative mechanical ventilation time length, total postoperative intensive care unit (ICU) stay, total hospital stay, amount of analgesic drugs administered during surgery, amount of analgesic drugs administered in postoperative ICU, and amount of analgesic drugs required after discharged from hospital also had no significant differences between the two groups (P>0.05).Intraoperative assessment, overall health and cardiac functions assessment at 1 week, 3 months, 6 months and 9 months also had no significant differences between the two groups (P>0.05).Operation cost was lower in control group than observational group (p<0.01).Intraoperative and postoperative blood transfusion, and postoperative drainage werent needed. There werent postoperative complications, and redo surgery in both groups (P>0.05).Absorbable occluders assimilate and get absorbed into tissues without detectable traces in 1 (one) year, devoid of significant harmful effects to heart and body.

Conclusion

Absorbable occluders used for transcatheter treatment of congenital PFO closures in growing children and adolescents have similar results compared to metallic occluders but with the absorbable advantage.

Melatonin as a reactive treatment for post-operative delirium in patients in the cardiac ICU: a retrospective cohort study

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Introduction
ICU delirium is a significant problem in post-operative cardiothoracic patients, contributing to prolonged ICU and hospital stays and increased mortality. Current pharmacological treatments, such as benzodiazepines and antipsychotics, have notable adverse effects, leading to interest in safer alternatives. A systematic review has shown melatonins effectiveness as a prophylactic agent for delirium in surgical and ICU patients. This study aims to assess the use of melatonin as a reactive therapeutic agent in post-operative delirium in cardiac ICU patients.

Materials & Methods
This retrospective cohort study analysed data from 127 patients diagnosed with delirium, confirmed through a positive CAM-ICU score. Patients were divided into two groups: one that received melatonin (n=57) as part of their delirium management and another that did not (n=70). The primary outcome was delirium regression, measured by a negative CAM-ICU score during the ICU stay. Secondary outcomes included ICU length of stay, hospital length of stay, and duration of mechanical ventilation. Statistical analyses included the Mann-Whitney U test for continuous variables, the Chi-square test for categorical variables, and binomial regression analysis to determine predictors of delirium regression.

Results
Delirium regression was slightly lower in the non-melatonin group (23/57, 32.9%) compared to the melatonin group (24/70, 42.1%), though this difference was not statistically significant (p=0.356). Binomial regression revealed an odds ratio of 0.845 (95% CI: 0.329-2.172, p=0.727) for melatonins effect on delirium regression. Statistically significant predictors of delirium regression included ICU length of stay (1.126, 95% CI: 1.041-1.219, p=0.003) and mechanical ventilation (0.897, 95% CI: 0.833-0.965, p=0.004).

Conclusion
Melatonin showed a loose association with delirium regression but did not demonstrate significant effectiveness as a reactive treatment for post-operative delirium in cardiothoracic ICU patients. Larger studies with more controlled environments are needed to better assess its potential as a treatment for ICU delirium.

Matrix viscoelasticity controls differentiation of human blood vessel organoids into arterioles and promotes neovascularization in myocardial infarction

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Introduction

Stem cell-derived human blood vessel organoids (hBVOs) are embedded in extracellular matrices to stimulate vessel sprouting. Although vascular organoids in 3D collagen I-Matrigel gels are currently available, they are primarily capillaries composed of endothelial cells, pericytes, and mesenchymal stem-like cells, which necessitate mature arteriole differentiation for neovascularization.

Materials & Methods

The dynamic hydrogel (D-hydrogel) was formed by assembling acryloyl -cyclodextrin (Ac--CD) with the aromatic residues of gelatin via host-guest interactions. The covalently crosslinked methacryloyl gelatin non-dynamic hydrogel (ND-hydrogel) with a similar stiffness was used as a control. Human induced pluripotent stem cells were aggregated into embryonic bodies and induced into hBVOs. During the vessel sprouting stage, hBVOs were encapsulated in ND- or D-hydrogels to investigate the bioeffect of matrix viscoelasticity in regulating vascular development. The morphology, lumen diameters and angiogenesis levels of hBVOs were examined by immunofluorescence. The cellular composition, developmental trajectory and underlying mechanisms were investigated by single cell RNA sequencing. Furthermore, the differentiation of hBVOs was tested in vivo by co-injecting with ND- or D-hydrogel into myocardial infarction rat models.

Results

The vascular organoids within the dynamic hydrogel demonstrated enhanced angiogenesis, larger lumen diameters and differentiation into arterioles containing smooth muscle cells. The dynamic hydrogel mechanical microenvironment promoted vascular patterning and arteriolar differentiation by elevating Notch receptor 3 signaling in mesenchymal stem cells and downregulating platelet-derived growth factor B expression in endothelial cells. Transplantation of vascular organoids in vivo, along with the dynamic hydrogel, led to the reassembly of arterioles and restoration of cardiac function in infarcted hearts.

Conclusion

These findings indicate that the viscoelastic properties of the matrix play a crucial role in controlling vascular organization and differentiation processes, suggesting an exciting potential for its application in regenerative medicine.

Oral Session II

Geriatrics

Presenters

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Carlos Alberto Fermín-Martínez
Hersyananda Ramdhani Mahira Arifin
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Genome-wide association study identifies genetic variants associated with epigenetic age acceleration in the Lifelines cohort study

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Introduction

Epigenetic age acceleration (EAA) refers to the phenomenon where an individual's DNA methylation-estimated biological age exceeds their chronological age. Research has shown that EAA is associated with various chronic diseases, including cardiovascular diseases, cancer, respiratory diseases, and increased mortality. However, genetic determinants underlying EAA are not yet fully characterized. Therefore, we aim to investigate genetic variants associated with EAA estimated by different DNA methylation-based epigenetic clocks, including recently developed versions.

Materials & Methods

This study utilized DNA methylation and genotype data from 1553 adults enrolled in the Lifelines cohort study, who were non-randomly selected based on smoking and chronic obstructive pulmonary disease (COPD) status for DNA methylation measurement. Biological age was derived using six DNA methylation-based epigenetic clocks from three generations: Horvath, Hannum, SkinHorvath, PhenoAge, GrimAge, and DunedinPACE. EAA was calculated by regressing biological age on chronological age and taking the residuals, which represent the discrepancy between biological and chronological age. Genome-wide association studies (GWAS) of EAA were conducted, by fitting a linear regression model, adjusted for sex, smoking status, COPD status height, body mass index, income, educational attainment and the first ten principal components. Genome-wide significant (P<5x10-8) single nucleotide polymorphisms (SNP) were mapped and annotated.

Results

A total of 67 significant SNPs were associated with the Horvath epigenetic clock, all located on chromosome 6 (top hit: rs1800460, =2.35, P=4.09 x 10-10). These SNPs were mapped to the genes TPMT, KIF13A-NHLRC1, and KDM1B. For the SkinHorvath clock, one significant SNP was identified (rs2736100, =0.59, P=4.17 108), located on chromosome 5 and mapped to the TERT gene. No significant associations were observed for Hannum, PhenoAge, GrimAge or DunedinPACE derived EAA.

Conclusion

This study revealed significant genetic associations with EAA for the Horvath and SkinHorvath clocks. No overlapping SNPs were observed between these clocks, suggesting that these measures may capture distinct biological processes or pathways underlying epigenetic aging.

STUDY OF PLATELET FUNCTION PHENOTYPES IN FRAIL OLDER WOMEN

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Introduction

During aging, several physiological systems are altered, with emerging frailty representing a significant cardiovascular disease risk factor. Among the scales to determine frailty are the Fried Phenotype and Frailty Trail Scale (FTS), but it is also important to know the platelet reactivity profile and to evaluate the presence of procoagulant platelets and circulating microvesicles.The aim of this work is to determine the platelet reactivity profile, procoagulant platelets and circulating microvesicles in frail and non-frail older people.

Materials & Methods

A blood sample with anticoagulant sodium citrate 3.2% of 50 older women was taken and centrifuged for obtain platelet rich plasma (PRP) and platelet poor plasma (PPP) for flow cytometry analysis. PRP was used for analysis of the exposure of phosphatidylserine (PS), intracellular calcium levels and platelet reactivity in microplate evaluating P-Selectin expression and fibrinogen binding in response to 3 platelet agonists (ADP, CRP and TRAP-6). PPP was used for analysis of circulating microvesicles (cMVs).

Results

In the studied population, the average age was 73.46 years and 66% of women had abdominal obesity. The percentage of non-frail according to FTS-5 (cut-off 25 points) was 74% versus 26% of frail and no significant differences were found in levels of PS and calcium, while in platelet reactivity significant differences were found in the specificity for fibrinogen and for P-selectin activated by CRP and ADP respectively (p-values 0.0477 and 0.0431). When the cut-off score was 7 points, there were 26% of non-frail and 74% of frail people, and significant differences were found in the levels of PS and calcium (p-values 0.0004 and 0.0145 respectively), along with the fibrinogen capacity stimulated by ADP, CRP and TRAP-6 (p-values 0.0003, 0.0003 and 0.0002 respectively). Higher levels of cMVs were observed in the older women with cut-off 7 points.

Conclusion

Cut-off score 7 points for FTS-5 could represent a novel tool for evaluate the behavior of platelets in older people, which present a platelet reactivity profile more altered, procoagulant platelets and higher levels of cMVs than cut-off <7 points, which could constitute a cardiovascular risk factor.

Validation of Anthropometric Aging (AnthropoAge) for Predicting Age-Related Outcomes and Characterizing Biological Aging Across Diverse Populations

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Introduction

Aging is a complex process marked by progressive deterioration of body systems, leading to disease, disability, and death. Chronological age (CA) often fails to capture the heterogeneity of this process. Biological age (BA) metrics better reflect changes in biological systems but remain underutilized due to their complexity. To address this, we developed AnthropoAge, an anthropometry-based BA metric. We aim to validate AnthropoAge to comprehensively study age-related outcomes across diverse settings and populations.

Materials & Methods

AnthropoAge was developed using U.S. National Health and Nutrition Examination Survey (NHANES) data to predict 10-year all-cause mortality with parametric Gompertz models. Its simplified version includes CA, body mass index, waist-to-height ratio, sex, and race/ethnicity. We derived AnthropoAgeAccel as a proxy of age acceleration by obtaining the residuals of a linear regression of CA onto AnthropoAge. We evaluated AnthropoAge using harmonized data from the Gateway to Global Aging (G2A), including longitudinal aging studies from U.S., England, Mexico, Costa Rica, and China. Mortality predictive performance was assessed using Cox models and decision curve analysis, while associations of age acceleration (AnthropoAgeAccel) with functional decline (difficulty in activities of daily living) and self-reported age-related diseases were evaluated with generalized estimating equation Poisson models. All-cause mortality analyses were replicated with Mexico City Prospective Study (MCPS) data, and the Coyoacan cohort was used to explore its relationship with frailty (index and phenotype) in older adults.

Results

AnthropoAge outperformed CA for mortality prediction in NHANES (n=18,794) and most G2A studies (n=55,628, c-statistic 0.772 vs. 0.760) except in Mexico (n=4,018, likely due to sample size), however, it performed better in MCPS (n=154,800) and surpassed other anthropometry-based markers after CA adjustment, with superior net benefit for identifying high risk subjects in decision curve analysis. Longitudinal AnthropoAgeAccel assessments were linked to higher rates of new-onset functional decline, diabetes, hypertension, cancer, arthritis, pulmonary, and cardiovascular disease. In the Coyoacan cohort, AnthropoAgeAccel strongly correlated with frailty and predicted transitions to pre-frail and frail stages over three years.

Conclusion

AnthropoAge is a robust and reproducible BA metric strongly associated with age-related outcomes. Its implementation could facilitate modeling aging trends in different populations to better characterize the heterogeneity of this phenomenon.

ALGUM: Sugar-Free Chewing Gum to Stimulate Saliva in Elderly with Xerostomia Made from Red Algae (Rhodophyta sp.)

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Introduction

The elderly experience many physical changes, especially reduced salivary secretion or xerostomia. One of the efforts to maintain salivary secretion in the elderly is to chew sugar-free gum. However, currently circulating gum that still contains sugar and has a composition that is not suitable for the elderly. Meanwhile, red algae (Rhodophyta sp.) is a marine flora that has health benefits and is rarely known in public. Therefore, we aimed to formulate sugar-free chewing gum from red algae as an innovation of sugar-free chewing gum made from red algae that is suitable for the elderly and can increase salivary secretion.

Materials & Methods

Sugar-free chewing gum is made by mixing cooked beeswax then adding xylitol and red algae extract. The formulation of sugar-free chewing gum depends on the volume of red algae extract (50 ml, 60 ml, and 70 ml). The research sample of 40 elderly people at the Sumbersari Health Center, Jember, East Java, which was divided into 2 groups; the group chewing 2 chewing-gums each and the control group chewing apples. Subjects were instructed to spit into the saliva pot for 10 minutes in intervals of every 1 minute. Measurement of saliva volume using a volume pipette. Data were analyzed using the unpaired t-test statistical test.

Results

The study showed a significant increase in salivary volume when chewing sugar-free gum from red algae compared to the control ($p<0.05$). In the red algae gum group there was an increase in salivary volume of 1.872 ml compared to the control.

Conclusion

Red algae-based sugar-free gum has the potential to increase salivary secretion in the elderly with xerostomia.

Complete blood count (CBC) inflammatory ratios as prognostic predictors in elderly acute ischemic stroke

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Introduction

Acute ischemic stroke (AIS) is a leading cause of long-term disability among elderly patients. Identifying reliable biomarkers to predict functional outcomes is critical for optimizing treatment strategies and improving patient care. The neutrophil-to-lymphocyte ratio (NLR) and lymphocyte-to-monocyte ratio (LMR), as markers of systemic inflammation, have shown potential prognostic value in various conditions. However, their utility in elderly AIS patients remains underexplored. This study aimed to evaluate the prognostic significance of NLR and LMR in predicting unfavorable outcomes in elderly AIS patients.

Materials & Methods

We conducted a retrospective cohort study involving 318 elderly AIS patients admitted to a tertiary care center. Baseline demographic, clinical, and laboratory data were collected at admission. NLR and LMR were calculated from complete blood count results. The primary outcome was functional status at three months, categorized as favorable (modified Rankin Scale [mRS]<3) or unfavorable (mRS3). Multivariate logistic regression models were used to assess associations. Predictive performance was evaluated using receiver operating characteristic (ROC) curve analysis, with area under the curve (AUC) values reported.

Results

Of the 318 patients, 58.5% experienced unfavorable outcomes (mRS3) at three months. The mean NLR was significantly higher in patients with unfavorable outcomes compared to those with favorable outcomes (4.51.8 vs. 3.11.3, p<0.001). The mean LMR was significantly lower in patients with unfavorable outcomes (2.90.6 vs. 3.80.8, p<0.001). Multivariate logistic regression revealed that elevated NLR was associated with a 42% increase in the odds of an unfavorable outcome (adjusted odds ratio [aOR] 1.42; 95%CI: 1.181.70; p<0.001), while lower LMR reduced the odds by 22% (aOR 0.78; 95%CI: 0.650.93; p=0.007). ROC curve analysis demonstrated that NLR alone had a predictive AUC of 0.79, while LMR alone yielded an AUC of 0.74. Combining NLR and LMR improved predictive accuracy to an AUC of 0.82, demonstrating excellent discrimination between favorable and unfavorable outcomes.

Conclusion

NLR and LMR are valuable independent predictors of unfavorable outcomes in elderly AIS patients. Their combination enhances predictive accuracy, offering a simple, cost-effective tool for early risk stratification. These findings support the integration of inflammatory biomarkers into routine AIS management and highlight the need for further studies exploring anti-inflammatory interventions.

Uncovering the Cerebral Blood Flow Patterns Corresponding to Amyloid-beta Accumulations in Patients with Mild Cognitive Impairment Using Arterial Spin Labeling

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Introduction

Mild Cognitive Impairment (MCI) is often an early occurrence in Alzheimers disease (AD) spectrum. MCI consequences can be characterized by alterations in cerebral perfusion and pathological impact of amyloid-beta (A). Our objective was to explore the correlation between A1-42 levels in cerebrospinal fluid (CSF) and cerebral blood flow (CBF) changes in MCI patients across diverse brain regions using novel Arterial Spin Labeling (ASL) technique.

Materials & Methods

This study was done using data obtained from the Alzheimer's Disease Neuroimaging Initiative (ADNI) database. Patients diagnosed with early MCI (EMCI), and late MCI (LMCI) were enrolled. CSF A1-42 levels of each patient were measured using tandem mass spectrometry analysis and mean CBF was extracted using pulsed ASL.

Results

The study included a total of 134 subjects, consisting of 82 EMCI, and 52 LMCI individuals. In the EMCI subjects, A1-42 level exhibited a significant positive correlation with CBF in four regions, particularly in the corpus callosum. On the other hand, among the LMCI subjects, this correlation was observed in thirteen regions with a significant metrics in the occipital, parietal, and temporal regions. Additionally, after conducting multiple regression models, age and A levels was identified as a predictor of mean CBF in certain brain regions.

Conclusion

A and CBF alterations can influence each other to manifest cognitive deficits mainly in the occipital, temporal, parietal, and limbic regions of brain and age can be recognized as an influential factor on Amyloid-CBF correlation. Unraveling this interrelation is crucial for conducting more effective approaches in the future studies.

Prolonged preservation of livers donated after circulatory death using dual hypothermic oxygenated machine perfusion.

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Introduction

Liver transplantation with grafts donated after circulatory death (DCD) increases the risk of early graft failure due to ischemia-reperfusion (IR) injury-related complications. A 2-hour period of dual hypothermic oxygenated machine perfusion (DHOPE) has been shown to reduce IR injury-related complications, especially non-anastomotic biliary strictures (NAS). While prolonged DHOPE may safely extend the preservation time for brain-death donor livers, its safety in DCD livers remains unclear. This study evaluates the safety and outcomes of prolonged DHOPE in DCD liver transplantation.

Materials & Methods

Between June 2022 and August 2024, 22 DCD livers underwent prolonged DHOPE (4 hours), with a median follow-up of 8 months post-transplant. A 1:1 time-matched control DCD group underwent DHOPE <4 hours. Outcomes included the 7-day peak value of alanine-aminotransferase (ALT;U/l), international normalized ratio (INR), and total bilirubin (Mmol/L), as well as graft loss due to primary non function (PNF) or early hepatic artery thrombosis (HAT) within 2 months. Death-censored graft survival and NAS incidence were assessed at 6 months. Data are presented as medians and ranges.

Results

Median total preservation time was 12.0 hours (9.0-23.9) in the prolonged group and 8.8 hours (5.7-10.7) in the control group ($p<0.001$). No technical issues occurred during perfusion, and all livers were transplanted. Peak ALT, INR, and bilirubin values were comparable between groups: ALT 1525 U/L (440-3997) vs. 962 U/L (335-4059), $p=0.132$), INR (2.2 (1.6 4.3) vs. 2.4 (1.3-4.7), $p=0.37$), and bilirubin (108 umol/L (23-282) vs. 71 umol/L (9-421), $p=0.37$).Death-censored graft survival was not significantly different between groups (86% vs. 100%, $p=0.23$), although in the prolonged group, three patients required re-transplantation due to one case of PNF (5%) and two after HAT (9%). Symptomatic NAS occurred in one patient in the prolonged group (5%) and in none of the control group ($p=1.00$).

Conclusion

Prolonged DHOPE in DCD livers did not result in a significant increase in graft-related complications, including PNF, HAT and NAS. While graft survival has to be monitored in longer follow-up, it now appears to be safe to extend DCD liver graft preservation. This approach can optimize transplant logistics and facilitate daytime surgeries for high-risk DCD liver recipients.

Oral Session II

Psychiatry

Presenters

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Gebrhud Berihu Haile
Yashar Nasrollahpoor
Alireza Motamedi
Mohammad Mohammadi
Jan Hoffmann

Associations between oral health and mental health symptoms: evidence from a community-based study

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Introduction
Depression and anxiety are among the most prevalent mental health conditions, with significant consequences for individual well-being and public health systems. Poor oral health has been identified as a potential contributor to these conditions due to its psychosocial and physiological impacts. This study aims to investigate the association between oral health-related quality of life (OHRQoL) and the presence of depressive and anxiety symptoms in a community-based sample of adults.

Materials & Methods
This cross-sectional study included 400 adults aged 1865, recruited through stratified random sampling. Data collection involved structured questionnaires assessing OHRQoL using the Oral Health Impact Profile-14 (OHIP-14), depressive symptoms using the Patient Health Questionnaire-9 (PHQ-9; cutoff 10), and anxiety symptoms using the Generalized Anxiety Disorder-7 (GAD-7; cutoff 10). Clinical oral examinations evaluated dental caries, periodontal health, and tooth loss. Logistic regression models assessed the association between poor OHRQoL and the presence of depressive or anxiety symptoms, adjusting for sociodemographic and lifestyle confounders.

Results
Poor OHRQoL was reported by 26.0% (n=104) of participants, with the most affected domains being psychological discomfort (29.5%) and social disability (28.0%). The prevalence of moderate-to-severe depressive symptoms was 28.5% (n=114), and moderate-to-severe anxiety symptoms were observed in 24.0% (n=96). Participants with poor OHRQoL had significantly higher odds of depressive symptoms (OR = 1.85; 95% CI: 1.422.28; p<0.001) and anxiety symptoms (OR = 1.53; 95% CI: 1.171.90; p<0.001). Among OHIP-14 domains, psychological discomfort (OR = 2.13; 95% CI: 1.253.00; p<0.001) and social disability (OR = 1.96; 95% CI: 1.472.45; p<0.001) exhibited the strongest associations with depressive symptoms. Severe periodontal disease was independently associated with both depressive (OR = 1.51; 95% CI: 1.211.81; p=0.002) and anxiety symptoms (OR = 1.38; 95% CI: 1.091.67; p=0.003).

Conclusion
Poor OHRQoL, particularly in the domains of psychological discomfort and social disability, is strongly associated with depressive and anxiety symptoms. These findings highlight the importance of addressing oral health as part of a holistic mental health care strategy. Future research should explore longitudinal relationships and the impact of oral health interventions on mental health outcomes.

Effect of Cognitive Behavioral Therapy on Depression, Anxiety, and QOL among Common Pulmonary Disease Patients: A Systematic Review and Meta-Analysis.

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Introduction
Depression and anxiety are common psychological conditions with significant public health implications among tuberculosis (TB) and chronic obstructive pulmonary disease (COPD) patients. Cognitive behavioral therapy (CBT) is a form of psychological treatment which involves efforts to change behavioral and thinking patterns for depression, and anxiety disorders among different patients. Despite this finding, there is a lack of review evidence on the effectiveness of CBT among common pulmonary diseases (TB and COPD) patients. So this review and meta-analysis aimed to examine the effectiveness of CBT among TB and COPD patients.

Materials & Methods
Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria were employed in the execution of this systematic review and meta-analysis. We have used PubMed/Medline, Science Direct, Webs of Science, Scopus, Cochrane Library, Google Scholar as part of our search strategy between 2004 and 2024. Two authors were individually screened and retrieved articles based on the inclusion and exclusion criteria, assessed the quality of study and risk of bias. RevMan version 5.4 software was used for meta-analysis.

Results
In this meta-analysis a total of 11 randomized control trial studies were included with a total 2166 TB and COPD patients. A meta-analysis shows there was a significant improvement in depression (ES=-0.41; 95%CI:-0.62, -0.19, anxiety (ES=-0.56; 95%CI:-0.99, -0.14), and quality of life (ES=-0.84; 95%CI:-1.62, -0.05). CBT was also effective for improving dyspnea, fatigue and emotional functioning among TB and COPD patients. Subgroup analysis indicated a difference in effectiveness of CBT across, frequency of sessions, duration of intervention, mode of delivery, intervention provider, measurement tool and types of group. There were no indication of publication bias, Egger's test (depression, P=0.215; anxiety, P=0.180; quality of life, P= 0.471) and funnel plot was symmetric distribution for all outcomes.

Conclusion
This systematic review and meta-analysis demonstrated that cognitive behavioral therapy was an effective treatment options for reducing depression and anxiety symptoms, and improving quality of life and treatment adherence among common pulmonary diseases (TB and COPD) patients. So for clinical practice, CBT should be considered as supplementary therapy with usual treatment for TB and COPD patients, in pulmonary rehabilitation and TB outpatient clinics.

Mental health outcomes in adolescents: the role of screen time and lifestyle factors

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Introduction
The increasing prevalence of screen time (ST) among adolescents has raised concerns about its potential impact on mental health. This study explores the relationship between ST and symptoms of stress, anxiety, and depression in a sample of adolescents, with a focus on moderating factors such as sleep and physical activity.

Materials & Methods
This cross-sectional study included 400 adolescents aged 1218 years recruited from schools. Participants completed a structured questionnaire assessing daily ST, physical activity, and sleep duration. Mental health outcomes, including stress, anxiety, and depression, were measured using the DASS-21 questionnaire. ST was categorized as <2 hours/day, 24 hours/day, 46 hours/day, and >6 hours/day. Multivariate logistic regression and linear models were applied, controlling for confounders such as socioeconomic status, gender, and sleep.

Results
Of the participants, 55% were female, with a mean age of 15.21.4 years. High ST (>6 hours/day) was reported by 48% of participants. Symptoms of stress, anxiety, and depression were significantly more prevalent in the >6 hours/day group (53%, 45%, and 40%, respectively) compared to the <2 hours/day group (30%, 25%, and 22%, respectively). In the 24 hours/day ST group, no significant differences were observed in the prevalence of stress (OR: 1.2, 95%CI: 0.81.7), anxiety (OR: 1.1, 95%CI: 0.81.6), or depression (OR: 1.0, 95%CI: 0.71.5) compared to the <2 hours/day group. However, those in the 46 hours/day group had significantly higher odds of experiencing stress (OR: 1.8, 95%CI: 1.32.7), anxiety (OR: 1.6, 95%CI: 1.12.4), and depression (OR: 1.5, 95%CI: 1.02.2) compared to the <2 hours/day group. The >6 hours/day group exhibited the strongest associations: stress (OR: 2.5, 95%CI: 1.73.7), anxiety (OR: 2.2, 95%CI: 1.53.3), and depression (OR: 2.0, 95%CI: 1.42.9).

Conclusion
The results suggest a clear gradient, with the highest ST (>6 hours/day) being the most strongly associated with adverse mental health outcomes. Physical inactivity also appeared to exacerbate the associations, although it was less pronounced than the sleep factor. These findings underscore the urgent need for interventions targeting ST reduction and promoting balanced lifestyle habits to protect adolescent mental health.

Comparing Machine Learning Models to Assess the Relationship Between Diffusion Tensor Imaging Parameters and Brain White Matter Integrity in Psychotic Disorders

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Co-authors:

Introduction

White matter integrity, critical for cognitive function, is disrupted in psychotic disorders such as non-affective (e.g., schizophrenia) and affective psychosis (e.g., bipolar disorder). Diffusion Tensor Imaging (DTI) quantifies microstructural changes through metrics like Fractional Anisotropy (FA), Mean Diffusivity (MD), Axial Diffusivity (AD), and Radial Diffusivity (RD). While these parameters reflect axonal organization and myelination, their tract-specific associations with psychotic phenotypes remain unclear. This study leverages machine learning (ML), deep learning (DL), and ensemble approaches to evaluate DTI-based predictors of psychosis subtypes, integrating demographic variables like age, sex, and race.

Materials & Methods

Six ML modelsRandom Forest, Neural Networks (NN), Support Vector Machines (SVM), K-Nearest Neighbors (KNN), Naive Bayes, and Decision Treeswere trained on DTI and clinical data to classify psychosis subtypes. Feature selection optimized inputs, while performance metrics (accuracy, F1-score, precision, recall) evaluated efficacy. An ensemble voting approach aggregated predictions from individual models, prioritizing majority consensus to boost robustness.

Results

Random Forest achieved the highest individual accuracy (85%), followed by Neural Networks (83%). SVM and KNN showed moderate performance (7275%), while Decision Trees and Naive Bayes lagged (70%). Key predictors included FA, RD, and fw_MD, with tract-specific exclusions (e.g., Ansa_Lenticularis_L) showing negligible impact. The ensemble approach surpassed all standalone models, achieving 88% accuracy by harmonizing diverse classifier strengths.

Conclusion

Ensemble learning demonstrated superior predictive power in linking DTI parameters to psychotic phenotypes, outperforming individual models. While Random Forest and Neural Networks excelled independently, the ensembles integration of multiple classifiers enhanced stability and accuracy. This underscores the potential of ML-driven DTI analysis for early psychosis detection and personalized interventions, emphasizing tract-specific white matter integrity as a biomarker. Future studies should validate these findings in larger cohorts and explore dynamic brain connectivity patterns in psychosis progression.

Molecular analysis on single nucleotide polymorphism (SNP) C677T on the MTHFR gene as an indicator of ADHD

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD) has become one of the most common neurodevelopmental disorders. ADHD is comorbid with other conditions such as anxiety and depression. The overlap of symptoms in comorbidities and inconsistent testing among clinicians has led to underdiagnosis and misdiagnosis of ADHD. Of adults, 20 to 30% report ADHD-like symptoms during screening tests, and nearly 90% of these are false positives. Additionally, 20% of children are reported as being misdiagnosed with ADHD. The methylenetetrahydrofolate reductase (MTHFR) gene is a key regulatory enzyme with a major role in the folate and homocysteine metabolism which has been linked to several neurological disorders. Genetic variants of MTHFR result in decreased enzyme activity, leading to alterations in homocysteine levels, impaired absorption of folate acid.

Materials & Methods

DNA samples were collected from 60 participants via cheek swabs and saliva collection. Samples were stored at -20oC until analysis was performed. Participants also completed self-report questionnaires including the Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist, the Generalized Anxiety Disorder 7-item (GAD-7) Symptom Checklist, and a questionnaire developed in our laboratory to gain information on formal diagnoses, behaviors related to ADHD and anxiety, and demographic information. Participants were grouped into those with behaviors of ADHD and anxiety, and those without associated behaviors. DNA from both groups was amplified using loop-mediated isothermal amplification (LAMP) for colorimetric visualization of the wild-type and the mutated gene. Data were analyzed using Chi-Square analyses.

Results

Preliminary results suggest a positive correlation between the MTHFR SNP and behaviors indicative of ADHD and anxiety (N=5). The MTHFR wild-type is positively correlated with participants who present with no behaviors of ADHD and anxiety (N=5). As we are still analyzing data, we predict the current observed trend to continue. Full results will be presented at the conference.

Conclusion

This study utilizes quantitative data to develop an unbiased biological measure to assist clinicians in the diagnosis of ADHD and anxiety. A secondary aim of this study is to bolster support for treating individuals that have the SNP with a formulated folic acid supplement that can be metabolized properly, which has been demonstrated to reduce symptoms in individuals with ADHD.

Sexual function and its predictors in people with multiple sclerosis and neuromyelitis optica spectrum disorder: a case-control study

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Introduction
Sexual dysfunction is a prevalent yet underrecognized comorbidity in individuals with multiple sclerosis (MS) and neuromyelitis optica spectrum disorder (NMOSD), significantly impacting quality of life. While sexual dysfunction in MS is well-documented, limited research exists on NMOSD, a related neuroinflammatory disorder. This study evaluated sexual function (SF) in men and women with MS and NMOSD compared to healthy controls (HCs) and identified associated predictors, including demographic, clinical, and psychological factors.

Materials & Methods
This case-control study was conducted from February 2023 to January 2024 at an MS clinic. Participants included 114 individuals with MS, 88 with NMOSD, and 86 age-matched HCs. Data on demographics, disease duration, neurological disability (Expanded Disability Status Scale, EDSS), anxiety (Beck Anxiety Inventory), and depression (Beck Depression Inventory-II) were collected. SF was assessed using the Female Sexual Function Index for women and the International Index of Erectile Function for men. Multivariate linear regression analysis was used to identify independent predictors of SF, adjusting for confounders.

Results
SF scores were significantly lower in both men and women with MS and NMOSD compared to HCs ($p<0.001$). In men with MS, predictors of worse SF included lower partner education (B=-2.7, 95% confidence interval (CI): -4.3, -1.0; p=0.003), higher anxiety (B=-0.6, 95%CI: -0.9, -0.2; p=0.003), and greater depression (B=-0.3, 95%CI: -0.6, -0.03; p=0.026). In men with NMOSD, higher EDSS (B=-5.7, 95%CI: -9.6, -1.7; p=0.007) and anxiety (B=-1, 95%CI: -1.6, -0.4; p=0.002) predicted poorer SF. Among women with MS, significant predictors of worse SF included higher EDSS (B=-1.2, 95%CI: -2.1, -0.2; p=0.016) and greater depression (B=-0.2, 95%CI: -0.3, -0.1; p=0.001). In women with NMOSD, higher EDSS (B=-1.4, 95%CI: -2.4, -0.5; p=0.005) and depression (B=-0.1, 95%CI: -0.2, -0.02; p=0.019) were significant predictors of poorer SF.

Conclusion
Men and women with MS and NMOSD experience significantly worse SF than HCs, with distinct predictors identified in each group. A multidisciplinary approach integrating neurological and psychological care is critical. Interventions targeting modifiable risk factors, such as anxiety and depression, may improve SF outcomes. Future longitudinal studies should explore causal relationships and evaluate targeted therapies to enhance sexual health and quality of life.

Oral Session II

Orthopaedics & Pain Management

Presenters

Hossein Parsa Yekta
Yunhao Wang
Navid Jalili
Ziyad Aldhiaf
Laura Zavala Rucio

The role of quadriceps muscle activation patterns in patellofemoral pain syndrome (PFPS): a cross-sectional electromyography (EMG) study

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Introduction
Patellofemoral pain syndrome (PFPS) is a prevalent cause of anterior knee pain, often attributed to quadriceps muscle dysfunction. While previous studies have focused on muscle thickness and strength, the role of muscle activation patterns remains understudied. This study aims to compare quadriceps muscle activation patterns between PFPS patients and healthy controls using surface electromyography (EMG) during functional tasks.

Materials & Methods
A cross-sectional study was conducted at a tertiary orthopedic center. Fifty PFPS patients (mean age: 28.45.2 years) and 50 healthy controls (mean age: 27.84.9 years) were recruited. Inclusion criteria for PFPS patients included anterior knee pain for 3 months, positive patellar compression test, and pain during stair descent. Exclusion criteria included prior knee surgery, osteoarthritis, or other systemic conditions. Surface EMG was used to measure muscle activation of the vastus medialis obliquus (VMO), vastus lateralis (VL), rectus femoris (RF), and vastus intermedius (VI) during three functional tasks: stair descent, single-leg squat, and isometric knee extension. EMG signals were normalized to maximal voluntary isometric contraction (MVIC). Between-group comparisons were made using independent t-tests, and effect sizes were calculated using Cohens d.

Results
PFPS patients demonstrated significantly delayed VMO activation compared to healthy controls during stair descent (mean difference: 34.2 ms, 95% confidence interval (CI): 28.539.9 ms, $p<0.001$) and single-leg squat (mean difference: 28.7 ms, 95% CI: 22.435.0 ms, $p=0.002$). The VMO/VL activation ratio was significantly lower in PFPS patients during all tasks (stair descent: 0.720.12 vs. 0.890.15, $p<0.01$; single-leg squat: 0.680.10 vs. 0.850.13, $p<0.01$; isometric knee extension: 0.700.11 vs. 0.870.14, $p<0.01$), indicating a relative underactivation of the VMO. No significant differences were observed in RF or VI activation patterns ($p>0.05$). Effect sizes for VMO activation delay and VMO/VL ratio were large (Cohens $d>0.8$), suggesting clinically meaningful differences.

Conclusion
This study highlights altered quadriceps activation in PFPS, particularly delayed VMO activation and a reduced VMO/VL ratio, suggesting neuromuscular dysfunction rather than just weakness. Rehabilitation should focus on neuromuscular retraining to optimize VMO activation and quadriceps coordination. Future studies should explore targeted interventions such as EMG biofeedback, sensorimotor retraining, and taping to improve functional outcomes.

Risk Factors for Cardiac Complications Following Primary Total Knee Arthroplasty: A National Database Analysis

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Introduction

Total knee arthroplasty (TKA) is performed over 700,000 times annually in the U.S. for advanced knee osteoarthritis, yet it is associated with significant cardiovascular complications that can elevate morbidity and mortality rates. This study utilizes the National Inpatient Sample (NIS) database to investigate the relationship between patient characteristics and the incidence of major cardiac events following TKA, with the goal of enhancing risk stratification and informing clinical decision-making.

Materials & Methods

A retrospective cohort study was conducted using the NIS database from 2010 to 2019, focusing on patients who underwent primary TKA. Patients with pre-existing cardiac conditions or prior knee surgeries were excluded to rule out confounding factors. Cardiac events were identified through ICD-9 and ICD-10 codes, and multivariate logistic regression was employed to assess the association between patient demographics, hospital characteristics, comorbidities, and cardiac complications.

Results

Of 1,283,093 patients included in the analysis, 2.78% (n = 35,723) experienced cardiac complications. Advanced age, male sex, and Black race were significant risk factors. Comorbidities such as chronic pulmonary disease (OR = 1.82, 95% CI = 1.75-1.88), hypertension (OR = 2.03, 95% CI = 1.96-2.10), and renal failure (OR = 2.55, 95% CI = 2.48-2.63) were strongly associated with cardiac complications. Larger hospital size, teaching hospital status, and non-elective admissions were also linked to increased risks. Postoperative complications such as pneumonia, deep vein thrombosis, and arrhythmias further elevated the likelihood of cardiac complications.

Conclusion

Cardiac complications after TKA are influenced by both patient-specific factors, such as age, gender, race, and comorbidities, and hospital-related factors, including hospital size and teaching status. Our findings highlight the importance of comprehensive preoperative assessment and vigilant perioperative management, particularly for high-risk patients. Future studies should focus on interventions that mitigate the risks following primary TKA and improve patient outcomes.

Comparative analysis of ultrasound-guided versus landmark-based regional anesthesia in adult patients: a cross-sectional study

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Introduction

Ultrasound-guided regional anesthesia (UGRA) has gained widespread adoption due to its potential to improve accuracy and reduce complications compared to traditional landmark-based techniques. However, real-world data comparing the two methods in diverse clinical settings remain limited. This cross-sectional study aims to compare the success rates, procedural characteristics, complication rates, and patient satisfaction between UGRA and landmark-based regional anesthesia in adult patients undergoing elective surgeries.

Materials & Methods

A cross-sectional study was conducted at a large academic medical center over six months. Consecutive adult patients (aged 1865 years) receiving peripheral nerve blocks for elective upper or lower limb surgeries were included. Patients were divided into two groups based on the technique used: UGRA (n=120) and landmark-based (n=120). Data on block success rates (defined as complete sensory and motor blockade without supplemental analgesia), procedural time, number of needle passes, and complications (vascular puncture, nerve injury, local anesthetic systemic toxicity [LAST]) were collected. Patient satisfaction was measured using a validated 10-point Likert scale (1= very dissatisfied, 10= very satisfied), administered 24 hours post-procedure. Statistical analysis was performed using chi-square tests for categorical variables and independent t-tests for continuous variables.

Results

The UGRA group had a significantly higher block success rate compared to the landmark-based group (92.5% vs. 75.8%, p<0.01). Procedural time was shorter in the UGRA group (meanstandard deviation (SD): 9.32.4 minutes vs. 14.73.8 minutes, p<0.01), and fewer needle passes were required (1.50.6 vs. 3.21.1, p<0.01). Complications were less frequent in the UGRA group, with no cases of vascular puncture or nerve injury, compared to four cases of vascular puncture and two cases of nerve injury in the landmark-based group (p=0.02). No cases of LAST were reported in either group. Patient satisfaction scores were significantly higher in the UGRA group (8.91.2 vs. 6.71.8, p<0.01).

Conclusion

UGRA is associated with higher success rates, shorter procedural times, fewer needle passes, lower complication rates, and greater patient satisfaction compared to landmark-based techniques in adult patients undergoing elective surgeries. These findings support the use of UGRA as the preferred method for regional anesthesia in clinical practice, particularly in settings where resources and expertise are available.

Hamstring or Patellar Tendon? A Retrospective Local Study on Graft Effectiveness in ACL Reconstruction

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Introduction

The Anterior Cruciate ligament (ACL) which is located in the knee is the most commonly injured ligament. ACL rupture is a devastating injury that can lead to recurrent instability, chronic pain, and degenerative changes in the knee. ACL disruption is one of the most frequent sports injuries among active young individuals representing around 50% of all knee ligament injuries. Around 250,000 ACL injuries are recorded annually in the United States. Arthroscopic reconstruction is the standard approach, but the most favorable graft selection remains controversial: Bone-Patellar Tendon-Bone (BTB) or Hamstring Tendon (HT) grafts. Our aim of this study is to evaluate the impact of BTB and HT grafts on knee functionality, clinical symptoms, and patient satisfaction.

Materials & Methods

This retrospective study analyzed data from 90 patients who underwent ACL reconstruction in 2023 at a single center in Saudi Arabia. The inclusion criteria encompassed patients aged 18 years or older who had undergone primary unilateral or bilateral ACL reconstruction. The cohort was stratified into two groups based on graft type: (BTB, n = 42) and (HT, n = 48). Functional outcomes were evaluated by using (SAS Score). Statistical analyses, including regression models, were employed to investigate the associations between graft type and functional outcomes.

Results

Patients who underwent ACL reconstruction using hamstring tendon (HT) grafts demonstrated significantly higher knee functionality scores compared to those with bone-patellar tendon-bone (BTB) grafts. Notably, 95.8% of patients in the HT group achieved full functionality during sports activities, compared to 69.0% in the BTB group (p=0.002). However, the HT graft procedure was associated with higher reported scores for postoperative pain, grinding sensations, and stiffness.

Conclusion

Hamstring grafts demonstrated superior knee functionality and patient satisfaction compared to BTB grafts, with a higher proportion achieving full functionality. However, these procedures were associated with increased pain, stiffness, and grinding, reflecting trade-offs in post-operative symptoms. The study's single-center, retrospective design and short follow-up period may limit the generalizability of findings and fail to capture long-term outcomes or complications. Future research should focus on multi-center, prospective studies with extended follow-up and include other graft types to provide a more comprehensive understanding of ACL reconstruction techniques.

Prediction of Patient Morphology in Proximal Humerus Fractures Using Statistical Shape Modelling

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Introduction

Proximal humerus fractures (PHFs) account for approximately 6% of all adult fractures, predominantly affecting elderly individuals with osteoporosis or osteopenia. While conservative management is generally favored, more complex fracture patterns frequently necessitate surgical intervention. However, current surgical planning heavily depends on the surgeon's expertise and involves labor-intensive, time-consuming protocols. For optimal pre-operative planning, determining the premorbid anatomy of the fractured bone is crucial. The current gold standard uses the mirrored contralateral side, but this ignores arm-to-arm differences and bilateral fractures. To overcome these difficulties, a statistical shape model (SSM) is proposed to capture predominant three-dimensional (3D) bone shape variations and ultimately reconstruct the premorbid shape of a fractured humerus.

Materials & Methods

An SSM of the humerus was created from 136 triangular-3D meshes that were extracted from computerized tomography (CT) scans. The procedure was accomplished with the use of Scalismo open-source library, a specialized tool for model-based image analysis. The resulting SSM was then deployed and tested for its accuracy in predicting native proximal humerus morphology in 10 different meshes of fractured humeri at the surgical neck. The reconstructions were compared with their corresponding premorbid shape.

Results

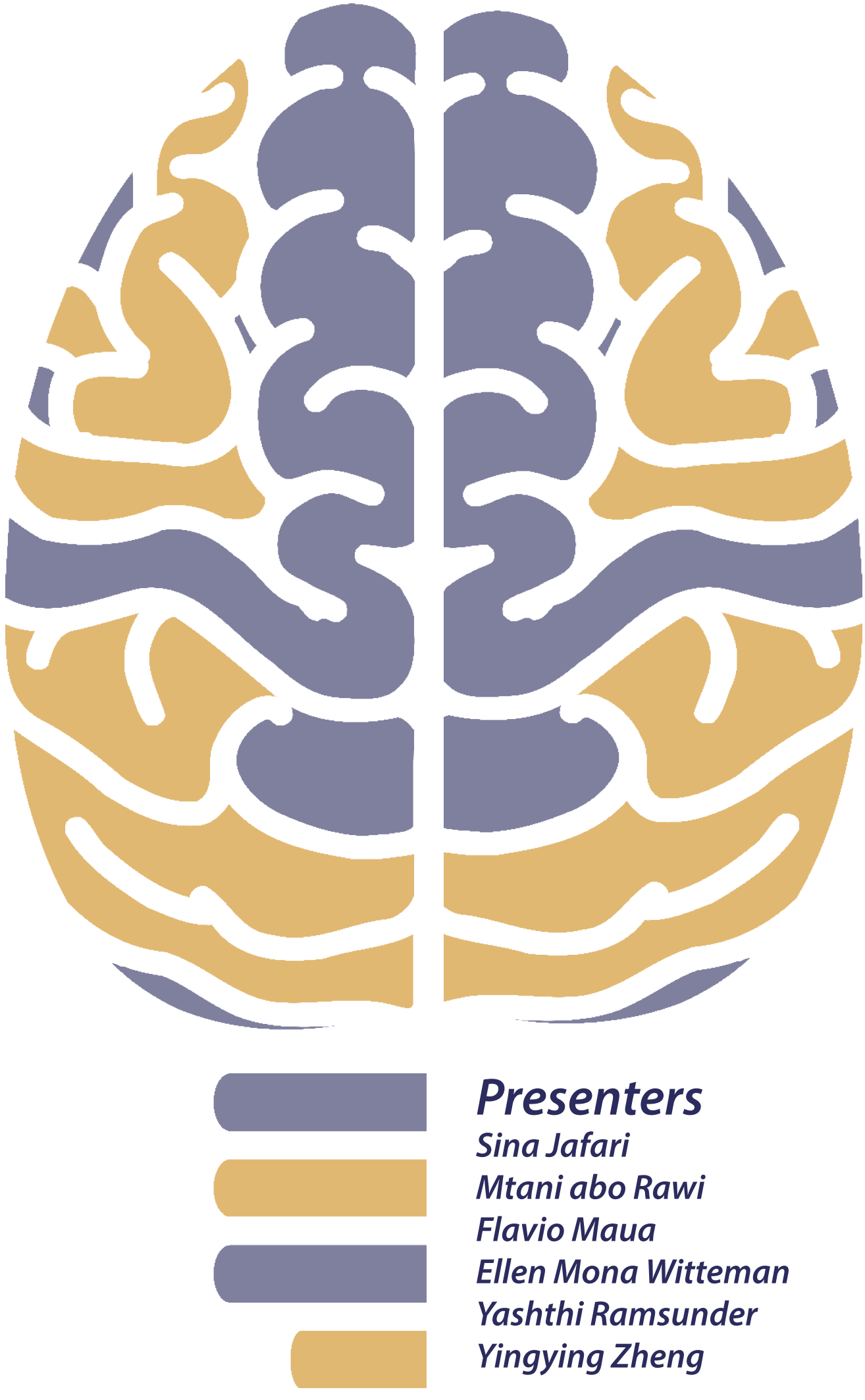
The SSM was assessed by its generalization, compactness, and specificity capacities. From the obtained results, the model captured 95% of the data variability within the training dataset through 5 shape modes of variations (MoVs). Accordingly, a reconstruction error of 0,57 mm for the training meshes was achieved with 17 MoVs. Through visual inspection, it was identified the different anatomical features captured by each MoV. Specifically, mode 1 portrayed humeral dimensions, mode 2 captured bowing and thickness, mode 3 showed rotation, and modes 4 and 5 enhanced the features from the second mode. Initial predictive accuracies for the reconstruction of humerus morphology in the 10 testing patients reported a mean average error of 1.524 0.349 mm and a dice score of 0.871 0.035 mm.

Conclusion

The generated SSM of the humerus can capture the full 3D anatomical variability presented by the input dataset. It has the potential to predict the native proximal humerus morphology after fracture. Hence, it holds significant promise for application in the pre-operative planning of more complex patterns of ruptures at the surgical neck.

Oral Session II

Paediatrics & Reproductive Health



Presenters

Sina Jafari
Mtani abo Rawi
Flavio Maua
Ellen Mona Witteman
Yashthi Ramsunder
Yingying Zheng

Evaluation of relation between vitamin D levels and gingivitis in children with type 1 diabetes

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Introduction

Vitamin D is the only vitamin that acts as a hormone in the body and has an anti-inflammatory role, increasing immunity and eliminating inflammatory responses are among its features. In addition, the lack of this vitamin disrupts the synthesis and secretion of insulin in humans. Therefore, the present study was conducted with the aim of investigating the relationship between vitamin D level and gingivitis in children with type I diabetes.

Materials & Methods

In this cross-sectional study, 148 children with typel diabetes aged between 6-12 years were enrolled. Age, gender, serum calcium(mg/dl) and 25-hydroxyvitamin D(ng/ml) levels were recorded by reviewing the patient's medical Records. Participants were matched based on age and gender. Additionally, all individuals who had another systemic disease, taken vitamin D supplements or antibiotics in the past three weeks, and had undergone dental treatment in the past six months were excluded from the study. Gingival status was evaluated using Silness and Loe plaque index and modified gingival index by Luben et al. Data were analyzed using Mann-Whitney, Kruskal-Wallis and Spearman's correlation coefficient tests at a significance level of 0.05 in SPSS software version 24.

Results

A total of 74 patients with gingivitis (GG) and 74 patients without gingivitis (control group [CG]) were included in the study, 77(52.02%) girls (38CG, 39GG) and 71(47.98%) boys (36CG, 35GG). The mean age of the participants was 8.781.88 years. There was no statistically significant difference in the distribution of gender and age between the two groups($P>0.05$). The mean vitamin D level in the GG was 20.72(12.77) significantly lower than that of the CG [29.57(10.72),$P<0.001$]. In the CG, the adequate vitamin D level was found in 41.9%, while in the GG it was 25.7%. The mean calcium level in the GG was 8.58(0.47) and CG [9.12(0.47)]. There was a positive and significant relationship between the level vitamin D and calcium both GG and CG($r=0.862$,$P<0.05$; $r=0.789$,$P<0.05$, respectively).

Conclusion

The mean of vitamin D in GG was significantly lower than CG, therefore, examining the level of vitamin D and vitamin supplementation in case of deficiency, in order to improve and control this disease in diabetic patients with gingivitis is suggested.

Unlocking the Mystery: How Gut Microbiota Influences Paediatric Brain Development and Disorders

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Introduction

Imagine if treating a childs neurological condition didnt start with the brain but with their gut. Research is showing us just how connected these two parts of the body are. For kids with autism spectrum disorder (ASD) or epilepsy, this connection might offer something life-changing. This study looks at gut microbiota transplants (GMT) to see if balancing gut bacteria can make a real difference for these kids and their families.

Materials & Methods

Fifty kids, ages 3 to 12, participated. They had either autism or epilepsy that hadnt improved much with traditional treatments. Each child received a transplant of gut bacteria from carefully chosen, healthy donors. Over a year, we checked in with the families every month. We tracked things like communication skills, social behaviors, seizure frequency, and overall health. Stool samples helped us understand what was changing in their gut.

Results

The results were beyond what we expected. Many kids with autism became more engagedmaking eye contact, using more words, and showing less repetitive behavior. For kids with epilepsy, seizures became less frequent and less severe. The gut bacteria in these children became much healthier and more diverse after the treatment. Families noticed real improvements in everyday life, and no serious side effects were reported.

Conclusion

This research shows us a whole new way of thinking about treating neurological disorders in kids. By focusing on the gut, were seeing changes that go far beyond what traditional treatments can offer. Its a hopeful step forward for kids and their families, and it opens the door to even more possibilities in the future.

Goal-directed therapy with continuous SvcO2 monitoring in pediatric cardiac surgery: the PediaSat single-center randomized trial

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Introduction

Low cardiac output syndrome (LCOS) remains a significant perioperative challenge in pediatric cardiac surgery. This study evaluated whether a hemodynamic protocol optimizing continuous central venous oxygen saturation (SvcO2) via the PediaSat catheter reduces postoperative complications in pediatric patients undergoing congenital heart surgery.

Materials & Methods

Conducted at the Instituto do Coracao in Sao Paulo, this randomized clinical trial compared a group receiving SvcO2-based goal-directed therapy via PediaSat (intervention) against conventional care (control). The main objective was assessing 24-hour lactate clearance post-surgery, with secondary outcomes including vasoactive-inotropic score (VIS), mechanical ventilation (MV) duration, vasopressor use, and ICU/hospital stay lengths.

Results

From July 13, 2014, to March 17, 2016, 391 patients were evaluated for eligibility. After applying inclusion and exclusion criteria, 65 patients were included and randomized33 to the control group and 32 to the PediaSat group. There were no losses to follow-up in either group. Lactate clearance did not significantly differ between the intervention and control groups. However, the PediaSat group showed significantly shorter mechanical ventilation times, reduced vasopressor use, and shorter ICU stays. No significant differences were observed in hospital stay length or incidence of postoperative complications between the group.

Conclusion

While optimizing SvcO2 did not affect overall lactate clearance, it was associated with shorter MV duration, decreased vasopressor need, and shorter ICU stays in pediatric cardiac surgery patients. These findings highlight the potential benefits of continuous SvcO2 monitoring in postoperative care.

MAGOH deficient murine oocytes fail in ovary and oocyte development

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Co-authors:

Introduction

Impairments in the maintenance of primordial follicles or in follicle development can contribute to primary ovarian insufficiency (POI), resulting in premature infertility. MAGOH is a protein of the exon junction complex (EJC) which plays a central role in mRNA regulation. Recent data show mRNA- and tissue- specific functions of MAGOH. Growing oocytes produce, process and store a large quantity of specific mRNAs, which are essential to allow the cells to progress through meiosis and early embryogenesis. However, the function of MAGOH in mammalian germ cells remains to be elucidated. We hypothesise that MAGOH plays an important role in mRNA regulation during oocyte development.

Materials & Methods

A Magoh conditional knockout (cKO) mouse strain was crossed with the oocyte specific Cre-drivers Gdf9-iCre (primordial follicles) or Zp3-Cre (primary follicles). Ovaries and oocytes from Cre-negative and Cre-positive mice were collected at different time points of oocyte development and compared regarding ovary area (4.5-5.5 days postpartum (dpp); 12.5-14.5 dpp; 19.5-23.5 dpp; 7-12 weeks) and germinal vesicle (GV) oocyte number (7-12 weeks). Immunofluorescence staining of cKO (Gdf9-iCre) and Cre-negative ovary cryosections using oocyte-specific anti NOBOX-antibody and DAPI was performed at 4.5 dpp, 9.5 dpp and 12.5 dpp.

Results

The cKO of Magoh by Gdf9-iCre results in a complete loss of mature GV-oocytes. The ovary area showed a significant reduction among all analysed age classes starting at 4.5 dpp. Significantly smaller ovaries were also observed after the depletion of Magoh by Zp3-Cre. However, the ovary size decrease was observed later, starting at 19.5 dpp. A very small number of mature GV oocytes were isolated from the Zp3-Cre cKO mice, and preliminary data suggest that these cannot undergo meiotic maturation. Cryosection analysis of Magoh cKO Gdf9-iCre ovaries revealed a significant loss of oocytes and a reduction of growing oocytes at 9.5 dpp and 12.5 dpp.

Conclusion

Depletion of Magoh in female germ cells has severe consequences for oocyte maintenance, growth and development. Our data therefore suggest a strong link between MAGOH-mediated mRNA regulation and oocyte survival and fertility. To test this in-depth, we will perform mRNA transcriptomics in future experiments.

The antipsychotic drug Olanzapine negatively impacts male fertility parameters alone and in combination with a high-sugar diet

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Introduction
Olanzapine is a routinely prescribed antipsychotic; however, its effect on male fertility parameters has not been well elucidated. Long-term treatment with Olanzapine has been demonstrated to precipitate an increase in appetite and rapid weight gain leading to obesity. Obesity is a well-documented cause of male infertility. We aimed to investigate whether Olanzapine-treated dysfunction differs from diet-induced dysfunction and if this impacts male fertility parameters as well as determine if the combined effects of the drug and diet impact these parameters.

Materials & Methods
The study utilized male Wistar rats (n=48) with diet and drug interventions lasting 12 weeks. There were 4 groups: control group that received a standard rodent chow (MCC), a high-sugar diet group (MSC), Olanzapine with control chow group (MCO), and Olanzapine with a high-sugar diet group (MSO). Olanzapine was administered at 1.5 milligrams/kilogram body weight to the rats once daily. Analysis of sperm parameters was carried out via Computer-Aided Sperm analysis, Sperm Class Analyser software, and Graphpad prism.

Results
There was a decrease in total motility (P = 0.0445) and kinematic parameters such as Curvilinear Velocity (P = 0.002), Average Path Velocity (VAP) (P = 0.0035), Straight Line Velocity (P = 0.0211) and Amplitude of lateral head displacement (ALH) (P =0.0018) between the MCC and MSO groups. Average Path Velocity decreased between the MCC and MCO groups (P = 0.0447). ALH decreased between the MSO and MSC groups (P = 0.00251). Compared to the control group, normal sperm morphology decreased between the MCO (P=0.0154), MSO (P=0.0043), and MSC (P=0.0001) groups, additionally there was an increase in sperm head defects in the MCO (P=0.0271), MSO (P=0.0160) and MSC (P=0.0001) groups.

Conclusion
Olanzapine combined with a high-sugar diet had a more detrimental effect on total sperm motility and kinematic parameters in comparison to Olanzapine treatment alone. Olanzapine treatment alone negatively affected Average Path Velocity, which may hinder the hyperactivation of sperm, disrupting sperm-oocyte fusion and possibly contributing to the development of idiopathic infertility. All treatment groups negatively affected sperm morphology in comparison to the control group, demonstrating that both Olanzapine and a high-sugar diet are harmful both alone and in combination to sperm morphology.

Children who have recovered from COVID-19 exhibit metabolic changes one year later

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Introduction

SARS-CoV-2 causes inflammation in various organs and systems. Metabolomic studies of pediatric patients during the acute phase of COVID-19 infection have shown significant changes in metabolic pathways. However, there is limited knowledge about the long-term impact on pediatric patients. Metabolomic analysis can expand the understanding of viral pathological mechanisms, enabling the detection of biomarkers and guiding diagnosis and the development of new therapies. Here, we aimed to perform an untargeted metabolomic comparison of pediatric patients who had recovered from COVID-19 one year after infection with pediatric patients who were not infected.

Materials & Methods

Peripheral blood was collected from children up to 12 years of age to obtain plasma. Untargeted metabolomic analysis was performed on children 11 to 15 months after COVID-19 diagnosis (n = 22) and compared with a control group (n = 26), consisting of age- and sex-matched children who tested negative for SARS-CoV-2 infection. The metabolomic analysis was carried out using liquid chromatography coupled with high-resolution mass spectrometry. Data analysis was conducted using MetaboAnalyst 6.0, and statistical analyses were performed using GraphPad Prism 8 software. Demographic, clinical, anthropometric, and laboratory data were analyzed using the Mann-Whitney test or the t-test for continuous variables, depending on the normality of the distribution, and Fishers exact test for categorical variables. A p-value < 0.05 was considered significant.

Results

We detected 192 possible metabolites with differential expression in children who had recovered from COVID-19 compared to the control group. These included metabolites linked to fatty acid metabolism, such as carnitine and decanoylcarnitine; amino acid metabolism, including tryptophan and glutamic acid; glycerophospholipids, such as lysophosphatidylcholine (LPC 18:2, LPC 18:1) and lysophosphatidylethanolamine (LPE 18:2); and markers of intestinal, kidney, and liver disorders, including indoxyl sulfate, phenol sulfate, and taurochenodeoxycholic acid.

Conclusion

COVID-19 induces metabolic changes in children that persist even one year after recovery. The findings indicate mitochondrial damage and suggest an increased risk of developing diabetes, heart disease, and intestinal disorders. Regular outpatient follow-ups are highly recommended to monitor, diagnose, and address potential chronic conditions at an early stage.

Poster session I

Oncology I

Presenters

Lia Medina Montalvo
Panji Wang
Teodor Vancea
Isabel Corado Ramis
Yu-Qiu Wu
Mostafa Eslamimahmoudabadi
Fatemeh Alizadeh

Boolean network modeling: The first step toward a new understanding of breast cancer heterogeneity

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Introduction

Intratumoral heterogeneity, driven by phenotypic plasticity, contributes to disease progression and therapy failures. However, a thorough understanding of its underlying mechanisms is still lacking. Breast cancer exemplifies this with its histological and molecular diversity, and estrogen receptor-positive (ER+), progesterone receptor-positive (PR+), and HER2- luminal A subtypes, such as the MCF7 cell line, are no exceptions. While single-cell RNA sequencing (scRNA-seq) and three-dimensional multicellular tumor spheroids (MCTS) represent initial approaches to understanding heterogeneity, integrating these tools with computational strategies offers new paths to uncover the regulatory groundwork of tumor behavior. Transcriptional regulatory networks (TRNs), when modeled via Boolean frameworks, provide a dynamic platform for studying gene interactions, identifying attractors (stable cellular states corresponding to distinct phenotypes), and simulating cellular transitions. This study represents the first step in constructing such a framework for ER+ breast cancer to advance precision medicine and improve therapeutic strategies.

Materials & Methods

Regulatory elements relevant to the MCF7 cell line were identified through an extensive review of NCBI literature. Interactions were strictly curated based on evidence quality (ranging from robust experimental validation to hypotheses), and evaluated for type and significance, such as feedback loops, activation, co-activation, and inhibition. Logical operators (AND, OR, NOT) were used to translate regulatory connections into Boolean functions to simulate binary gene expression dynamics. The final TRN was visualized using Cytoscape (v3.10.3) with a hierarchical layout.

Results

The TRN consists of 54 nodes and 81 interactions, representing the regulatory landscape of ER+, PR+, and HER2- breast cancer. Boolean equations simulate the evolution of binary states to attractors, enabling the observation of how perturbations, such as gene overexpression or silencing, influence heterogeneity. While simulation and attractor analyses are ongoing, the network provides a foundation for elucidating the regulatory mechanisms underlying breast cancer plasticity.

Conclusion

This study highlights the potential of integrating experimental data, TRN reconstruction, and Boolean modeling to understand intratumoral heterogeneity. Our rigorously curated Boolean model offers an accessible, cost-effective approach to perfect experimental design, dive deeper into tumor biology, and advance precision oncology while supporting a sustainable and inclusive healthcare future.

FOXA1 promotes estrogen receptor positive breast cancer progression by upregulating CPT1A and inducing fatty acid oxidation in a lipid-rich microenvironment

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Introduction

Recent researches have highlighted the significant impact of tumor microenvironment on the progression of estrogen receptor positive breast cancer (ER+ BC). Forkhead Box A1 (FOXA1), a key transcription factor in estrogen receptor signaling, plays a crucial role in lipid metabolism. However, there is a limited body of research examining the relationship between FOXA1 and lipid metabolism specifically in ER+ BC. This study explores how a lipid-rich microenvironment influences FOXA1 expression and function in ER+ BC.

Materials & Methods

Bioinformatics analyses were conducted to evaluate the FOXA1 expression profile and its correlation with lipid metabolism in ER+ BC. Cells were cultured in media containing palmitic acid (PA) and lipocyte conditional medium (LCM). Wound healing, MTS, and colony formation assays were employed to assess the migration and proliferation of ER+ BC. FOXA1 knockdown and overexpression in ER+ BC cells were achieved through lentiviral transduction. Nile Red staining was performed to visualize lipid droplet formation. Metabolic activity was measured using the Seahorse XFe24 Analyzer and by quantifying ATP levels. Western blot analysis was utilized to detect lipid metabolism-related proteins influenced by FOXA1.

Results

Bioinformatics analyses indicated that FOXA1 was overexpressed and positively linked to lipid metabolism in ER+ BC. MTS and colony formation assays demonstrated that incubation with PA and LCM significantly enhanced proliferation of ER+ BC cells compared to the control medium, while this effect was partially reversed by FOXA1 knockdown. Wound healing assays showed that the migration of ER+ BC cells induced by PA and LCM depended on FOXA1 expression. Nile Red staining revealed that FOXA1 knockdown induced lipid droplet accumulation, accompanied by a decrease in oxygen consumption rate (OCR) and ATP levels. Finally, Western blot indicated that PA and LCM increased FOXA1 and CPT1A expression, while FOXA1 knockdown inhibited CPT1A expression.

Conclusion

FOXA1 utilizes fatty acids to promote the proliferation and migration of ER+ BC cells by upregulating CPT1A and inducing fatty acid oxidation in a lipid-rich microenvironment, positioning it as a promising therapeutic target.

The role of circulating inflammatory biomarkers in predicting panitumumab-based therapy outcomes for metastatic colorectal cancer

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Introduction

Lately, both neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) have been indicated in several malignancies as potentially promising prognostic biomarkers. This study aims to evaluate the prognostic value of NLR and PLR in patients with metastatic colorectal cancer (mCRC) treated with Panitumumab-based regiments. Positive findings would help clinicians predict treatment outcomes and guide therapeutic decisions more effectively.

Materials & Methods

We conducted a retrospective cohort study involving mCRC patients who received first line therapy with FOLFOX/FOLFIRI (5-fluorouracil + leucovorin + oxaliplatin/irinotecan) + Panitumumab between 2015-2024 at the Oncology Institute of Cluj-Napoca, Romania. The inclusion criteria consisted of: KRAS wild-type status, left-sided colorectal cancer and availability of computed tomography (CT) response assessment within three months from the start of treatment. The exclusion criteria consisted of active viral or bacterial infections. NLR and PLR values were calculated one day prior to treatment initiation. Treatment response was evaluated according to the RECIST 1.1 criteria and was then dichotomized into: responder (complete or partial response and stable disease) and non-responder (progressive disease). ROC curve analysis was performed to determine the cut-off values of NLR and PLR that would optimally predict the response to treatment. Fisher's Exact and Chi-squared tests were performed to evaluate the differences between groups.

Results

The median age of the 44 patients that were analysed was 60 years, 52% of them were male and 48% female. ROC curve analysis identified cut-off values of 3.06 with 75% Sensitivity (Se) and 87.5% Specificity (Sp) for NLR and 135.76 with 75% Se and 55% Sp for PLR. The areas under the curve (AUC) were 0.78 and 0.66 for NLR and PLR respectively. The patients with NLR<3.06 had statistically significant higher response rates compared to those with elevated values (p=0.001, one-tailed Fisher's Exact), while no statistically significant difference was observed in the patients with PLR<135.76 (p=0.098, Chi-squared).

Conclusion

Our findings mark the potential of NLR and PLR as prognostic biomarkers in mCRC patients treated with Panitumumab-based regiments. As these biomarkers are cost-effective and widely available, incorporating them into standard clinical practice could streamline the tailoring of therapeutic decisions. However, considering the retrospective nature of the study and its limited cohort size, further research is necessary.

Using BEHAV3D to map the behaviour of T cells and the heterogenous response of patient-derived tumor organoids to bispecific antibody treatment.

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Introduction

T cell bispecific antibodies (TCBs) facilitate tumor killing by bringing T cells into close contact with tumor cells. However, heterogeneity in response remains a major challenge. This requires appropriate technology platforms and pre-clinical models to elucidate their efficacy across patients. We therefore aimed to study the heterogeneous sensitivity and resistance profile of patient-derived tumor organoids and the diversity of T cell behaviour in addition to killing capacity upon treatment with TCBs. To study this, we employ a novel multi-omics platform, BEHAV3D, based on live confocal microscopy and transcriptomics.

Materials & Methods

We conducted multispectral live 3D imaging of patient-derived breast cancer organoids co-cultured with healthy donor T cells in the presence of TCB. The BEHAV3D platform was then applied to track the death kinetics of the cancer organoids, alongside tracking of the T cells to classify their behaviour based on their migration and dynamic interactions with organoids.

Results

Initial screenings revealed different overall sensitivities of the various tumor organoid lines to TCB treatment. This confirmed the occurrence of inter-patient heterogeneity, with the frequency of super engager T cells, showing prolonged organoid engagement, correlating with therapeutic response. Intra-patient heterogeneity was also observed with individual organoids within a patients co-culture resisting TCB treatment, whereas others showed sensitivity to the treatment. Sub-culturing of these organoid lines allowed us to profile the most and least sensitive clones from each patient, which will be used for transcriptomic analysis to investigate the underlying molecular mechanisms of resistance.

Conclusion

Live microscopy and the BEHAV3D pipeline combined with clonal organoid technology are valuable tools for unravelling tumor biology and heterogenous tumor responses to immunotherapies such as TCBs. In the future this work will help to inform which subset of patients are most likely to benefit from specific TCB therapies, as well as aid the design combination partners to combat TCB treatment resistance.

Newcastle disease virus enhances the cytotoxic effects of 5-FU and Alters the expression pattern of microRNAs in human colorectal adenocarcinoma cell line

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Introduction
Colorectal cancer (CRC) is a prevalent form of malignancy that is often linked to a poor prognosis, primarily because it is usually diagnosed at an advanced stage. 5-Fluorouracil (5-FU) is a commonly used chemotherapeutic agent for treating various cancers, sometimes in combination with other chemotherapies. Virotherapy shows great potential as an effective tool in combating cancer due to its high level of safety and ability to specifically target cancer cells. The Newcastle disease virus (NDV) has been found to possess a remarkable safety profile, making it a promising candidate for medical applications. Notably, this virus exhibits a unique ability to specifically target tumor cells, which presents an exciting opportunity for its potential use in combination with chemotherapeutic agents like 5-FU. This study aims to evaluate the cytotoxic effects of NDV in combination with 5-FU on HT-29 cells, as well as the impact of this approach on the expression patterns of specific microRNAs.

Materials & Methods
In this study, we performed experiments to investigate the hypothesis on the HT-29 human colorectal adenocarcinoma cell line. We employed the non-virulent LaSota strain of NDV together with 5-FU to assess the cytotoxicity effects and determine the expression levels of miR-133a-3p, miR-574-3p, and miR-27a-3p in the study groups.

Results
Our study findings indicate that the use of combination therapy, in comparison to administering 5-FU and NDV alone, can result in more potent cytotoxic effects on colorectal cancer cells. This therapeutic approach also resulted in a significant upregulation of miR-133a-3p and miR-574-3p expression, as well as a considerable downregulation of miR-27a-3p expression in cancer cells.

Conclusion
The remarkable effect of NDV and 5-FU on HT-29 CRC cells in vitro is impressive. This combinational therapy also regulates cancer cell miRNA expression, improving therapeutic efficacy. This suggests that this therapeutic approach could be a promising CRC combination therapy.

Enhancing Chemotherapy Efficiency: Employing CuS Nanoparticles Functionalized with AS1411 Aptamer and Chitosan for Targeted Doxorubicin Delivery to Cancer Cells

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Introduction

A novel targeted nanostructure complex was developed as an alternative to traditional breast cancer treatments. Copper sulfide nanoparticles (CuS NPs) were utilized to deliver doxorubicin (Dox), a chemotherapy agent. Chitosan (CS), a biodegradable and biocompatible polymer, coated the Dox-loaded CuS NPs to regulate drug release. The AS1411 aptamer was conjugated with CS-Dox-CuS NPs to specifically target breast cancer cells (MCF-7 and 4T1), enhancing the formulation's precision and therapeutic efficacy.

Materials & Methods

The APT-CS-Dox-CuS NPs were synthesized by loading Dox into CuS NPs, coating with CS, and conjugating with AS1411. Flow cytometry, MTT assays, fluorescence imaging, and in vivo antitumor efficacy tests were conducted to evaluate the formulation. Drug release was assessed under acidic conditions mimicking the tumor microenvironment (pH 5.6) and physiological conditions (pH 7.4).

Results

The CuS nanoparticles exhibited high Dox loading capacity and nearly 100% entrapment efficiency due to their hollow core and porous surface. Drug release studies demonstrated a marked increase in Dox release at acidic tumor-like conditions (pH 5.6) compared to physiological pH (7.4). The targeted APT-CS-Dox-CuS nanoparticles significantly enhanced cytotoxicity in breast cancer cells, including 4T1 (p 0.0001) and MCF-7 (p 0.01), compared to non-targeted CHO cells. In vivo studies revealed that the targeted formulation exhibited superior tumor growth inhibition compared to free Dox in tumor-bearing mice (p 0.05), highlighting its enhanced therapeutic efficacy.

Conclusion

The targeted APT-CS-Dox-CuS nanoparticle system demonstrated improved effectiveness and specificity in delivering Dox to breast cancer cells, significantly enhancing cytotoxicity while minimizing harm to non-targeted cells. The findings underscore the potential of this sophisticated drug delivery system as a promising alternative to conventional breast cancer therapies, offering enhanced precision and reduced side effects.

Poster session I

Biomaterials

Presenters

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Jeanette Liliana Pineda Vázquez
Bahareh Farasati Far
Fatemeh Mehraban
Mahdie Zare
Mahdi Tavangar Ranjbar
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Evaluation of Effects of Platelet-Rich Plasma (PRP) On Knee Joint Cartilage Defects in Rabbits

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Introduction

The regeneration of tissue in osteochondral defects within the knee poses a significant challenge for orthopaedic surgeons and researchers. Platelet rich plasma (PRP) promotes chondrocyte proliferation and increases proteoglycan and collagen II content, leading to improved quality and quantity of repaired cartilage tissue. Despite its widespread application across different medical specialties, there remains a scarcity of robust evidence supporting its effectiveness thus we evaluated beneficial effects of using PRP on knee joint cartilage defects in rabbits.

Materials & Methods

16 adult male New Zealand white rabbits were divided in to two groups. The right knee joints were opened with a lateral par patellar approach. Patella was dislocated laterally and thesurface of the femoropatellar groove was exposed. A full thickness cylindrical cartilagedefect (5 mm in diameter.mm depth) was created by a stainless steel punch. SELPHYL system kit that we used prepares PRP rapidly and safely. Finally PRFM (Platelet rich fibrin matrix) injected in to the defect.

Results

Macroscopic evaluation was showed that the average score in 2,3.6months after operation were 2/6.3,3/5 for PRP and 2,2,3 for control groups(respectively). Histopathology revealed that average score in 2,3,6 months afteroperation were 13/6,16,17 for PRP groups and 10,7/6,10/5 for control groups(respectively). cartilage defect on surface of knee in PRP groups especially after 6months approximately completely repaired. Statistical analysis showed that the average of the total microscopic criteria in the third month between the treatment and control groups had a significant difference ($p=0.04$), but there was no significant difference in the sixth month ($p=0.12$).

Conclusion

This research showed that rabbits with experimental defect in patellar groove of distal end of femur in PRP groups had an significant improvement in all scores($p<0.05$). cost-Benefit analysis of PRP treatments will be necessary to determine economic efficiency and justify future research and use of PRPin MSK injuries.

Development and Characterization of an Insulin Nanocarrier System Based on Levan Nanoparticles as a Potential Therapy for Chronic Wound

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Introduction

Chronic wounds are a health problem due to increased risk factors such as diabetes, venous insufficiency, and arterial hypertension. For this reason, it is essential to develop new and specific local therapies that promote tissue regeneration and accelerate the healing process in a highly proteolytic environment with an exacerbated inflammatory response. In this work, levan nanoparticles (LNPs) were enzymatically produced, characterized, and assayed to promote cell proliferation. Also, insulin was loaded in levan nanoparticles to develop a nanosystem delivery that enhances their proliferation cell properties. The objective of this research is to create an innovative targeted therapy for the treatment of chronic wounds utilizing levan nanoparticles.

Materials & Methods

LNPs were enzymatically produced using recombinant levansucrase SacB H243L from Bacillus subtilis and LevS N70 Tn38 from Leuconostoc mesenteroides B512F. LNPs purification was performed by solvent precipitation and posteriorly dried by lyophilization. Proliferation cell assays were performed using Raw-Blue macrophages and HaCaT keratinocytes in a standard, hyperglycemic, and proinflammatory environment.

Results

LNPs has a spherical morphology, an average size of 71.02 0.44 nm, a PDI of 0.044 0.01, and a potential of -1.78 0.22. Proliferation assays have shown that LNPs has anti-inflammatory properties by containing NF-kB induction in macrophages. LNPs shows an effect on macrophage proliferation in a standard, hyperglycemic, and proinflammatory environment. A monolayer keratinocyte scratcher model shows that LNPs promotes incision closure but does not show significant cell migration. Finally, an insulin entrapping system was developed during the enzymatic synthesis of levan, forming a levan-insulin glycoconjugate (LNPs-Ins) in a single production step. The entrapping efficiency of this system was 83.37%, and the loading capacity was 280.57 2.88 g of trapped protein per mg of LNPs-Ins.

Conclusion

Levan nanoparticles produced enzymatically are spherical, highly monodisperse, and display a near-neutral charge. These LNPs exhibited anti-inflammatory properties and promoted the proliferation of macrophages and keratinocytes under standard, proinflammatory, and hyperglycemic conditions, indicating their potential for tissue regeneration. Additionally, insulin was effectively entrapping within the LNPs, leading to the development of a nanocarrier system that may serve as a promising therapy for chronic wounds.

Healing Full-thickness Wounds in Rats using Chitosan-based hydrogel grafted by alantoin and loaded with the Iris germanica rhizome extract

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Introduction

Managing full-thickness wounds continues to be a challenging issue in health-care systems and is a factor in increased costs. Some of these usual dressings do not contains major bioactive components that are needed for wound healing process. Chitosan based hydrogels have been studied for their use due to their non-toxic and biodegradable nature. This work sought to survey and assess a chitosan hydrogel containing allantoin and incorporating Iris germanica rhizome extract for the healing of wounds in rats.

Materials & Methods

The chitosan hydrogel was synthesized through the grafting of allantoin onto chitosan and blending with Iris germanica rhizome extract. SEM showed that this film had a porous and homogeneous nanostructure. According to rheological studies the hydrogel was evaluated for its mechanical properties and elasticity appropriate for wound dressings. The ability of the nanocomposite to promote wound healing was analyzed on rat model through histological analysis and immunohistochemistry to review the formation of epidermal layer, deposition of collagen and TGF- expression in vivo.

Results

The chitosan-allantoin-Iris germanica hydrogel reached a 85.34 3.21% of wound closure at day 14 (P = 0.032), and was significantly higher than the control groups. Histological examination also demonstrated that epidermal proliferation was in an orderly manner and IHC examination, TGF- positivity was 33.45% 5.67% (P = 0.018) and staining for collagen was 29.72% 4.89% (P = 0.022). Bioactive dealing in the hydrogel boosted the speed of wound healing and tissue remodelling. The chitosan-allantoin Iris germanica hydrogel was found to have considerable effectiveness in promoting full epidermal thickness wound healing through more proper epidermal reconstruction; increase collagen synthesis in the wound area; and activate TGF- expression for effective wound healing.Chitosan-based hydrogels have gained attention for their biocompatibility and biodegradability. This study aimed to synthesize and evaluate a chitosan hydrogel modified with allantoin and enriched with Iris germanica rhizome extract for enhanced wound healing in a rat model.

Conclusion

The chitosan-allantoin-Iris germanica hydrogel demonstrated significant potential in full-thickness wound healing by enhancing epidermal reconstruction, collagen synthesis, and TGF- expression. These findings demonstrated its potential as an advanced wound dressing material to open up potential future clinical uses.

Green-Synthesized Zinc/Zinc Oxide Nanoparticle-Loaded Poloxamer Hydrogel: A Novel Thermo-responsive Dressing for Burn Wound Healing

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Introduction

Burn wounds cause around 180,000 deaths each year due to their complex healing process. Zn/ZnO NPs possess promising solutions, showing strong antibacterial properties against MDR pathogens and reducing inflammation by inhibiting iNOS. This study aimed to develop a hydrogel based on Poloxamer and Zn/ZnO NPs as a novel dressing for burn wounds.

Materials & Methods

ZnO-NPs were green-synthesized using Origanum Majorana extract as a reducing and capping agent, with NaOH added dropwise to Zinc Acetate Dihydrate solution. Nanoparticles were characterized utilizing XRD, SEM, and TEM analyses. The nanoparticles were incorporated into a poloxamer-based hydrogel containing 25% W/V of P470 and P188. Biocompatibility was evaluated using MTT assay on human dermal fibroblasts. Antimicrobial efficacy was assessed against common burn wound pathogens, including P. aeruginosa and S. aureus through zone of inhibition and minimum bactericidal concentration tests. Wound healing potential was investigated using in vitro scratch assays on keratinocyte monolayers. In vivo studies were conducted using a rat burn model to assess wound healing efficacy.

Results

TEM analysis revealed nanoparticle sizes ranging from 20-50 nm. MTT assays demonstrated over 85% cell viability, indicating excellent biocompatibility of the formulation. Antimicrobial studies showed significant inhibition zones (15-20 mm) against tested pathogens. The scratch assay revealed enhanced cell migration with 75% wound closure at 24 hours compared to 45% in controls. In vivo studies demonstrated faster wound closure rates and decreased inflammatory markers compared to control groups. Histological analysis indicated increased collagen deposition alongside reduced inflammatory infiltrates within the treated wounds. The hydrogel maintained optimal moisture levels and demonstrated successful thermal gelation at physiological temperature.

Conclusion

These findings revealed that ZnO nanoparticle-loaded Poloxamer hydrogel represents a promising method for burn wound care. The formulation demonstrates complex advantages including effective antimicrobial activity, inflammation control, and optimal moisture maintenance. Poloxamer's thermoreversible properties ensure optimal wound contact through sol-gel transition at body temperature, making it ideal for wound dressings. The comprehensive evaluation through in vitro and in vivo studies supports its potential clinical application in burn wound management.

Chondrogenesis by Grape Seed Extract and Zingiber Officinale Extract using Adipose Derived-Stem Cells and Fibrin Scaffold

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Introduction
Cartilage diseases, including osteoarthritis, lack a definitive cure. Mesenchymal stem cells and tissue engineering are emerging strategies. We investigated the effects of substances Ginger and Grape seed Extract (GSE) on cartilage production.

Materials & Methods
Adipose tissue from three patients was processed to isolate stem cells, which were cultured and embedded in fibrin scaffolds. The constructs were divided into five groups: control (no growth factors), growth factor Ginger, growth factor GSE, combination of Ginger and GSE, and TGF-. These constructs were incubated in chondrogenic medium with medium changes every three days. After 14 days, cell viability was assessed using Trypan blue staining, and cartilage-specific gene expression (collagen II, aggrecan, SOX9, collagen X) was analyzed by RT-PCR.

Results
Cell viability was highest in the control group, significantly surpassing all other groups ($p < 0.0001$). Group Ginger exhibited higher viability than TGF- ($p = 0.0109$), GSE ($p < 0.0001$), and Combination ($p = 0.0007$). GSE had the lowest viability, and the combination group showed no significant advantage over GSE alone ($p = 0.3361$). TGF- notably increased collagen type II expression compared to all groups ($p < 0.0001$), while Ginger, GSE, and Combination groups showed non-significant increases compared to Control. Aggrecan expression was highest in TGF- ($p < 0.0001$), and Combination group significantly exceeded control group ($p = 0.0010$), but not Ginger or GSE. The Combination group significantly enhanced SOX9 expression compared to control, Ginger, and GSE ($p < 0.0001$), though it was not significant compared to TGF- ($p = 0.9923$). GSE showed higher SOX9 expression than Ginger ($p = 0.0328$), with both exceeding control group. Collagen type X expression, indicating hypertrophy, was significantly lower in Ginger, GSE, and Combination groups compared to TGF- ($p < 0.0001$), with no significant differences between Ginger, GSE, and Combination ($p > 0.05$).

Conclusion
Substances Ginger and GSE synergistically promoted the expression of chondrogenic genes, particularly SOX9, while limiting collagen type X expression, indicating reduced hypertrophy. The TGF- group, while showing superior chondrogenesis, was associated with higher hypertrophic marker expression. This highlights the potential of Ginger and GSE in cartilage tissue engineering.

The effect of Rhus coriaria aqueous extract on collagen production in fibroblast cells

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Introduction

Wound management is a big challenge in the world, and chronic wounds increasingly affect the number of elderly patients and their quality of life. Studies have shown that the aqueous extract of sumac fruit improves the wound healing process and also increases the contraction of the wound as a result of the activity of fibroblasts. Therefore, the aim of the this study is to investigate the effect of sumac fruit aqueous extract on the amount of collagen synthesis by fibroblast cells.

Materials & Methods

This study uses an in vitro pharmacological approach to evaluate the effect of Rhus coriaria sumac fruit aqueous extract on collagen production by fibroblast cells, using cell culture techniques, MTT assay for cell viability, and Real time PCR methods to investigate collagen gene expression. HSF-PI-16 fibroblast cells were cultured in 96-well plates in DMEM culture medium enriched with 10% FBS. Aqueous sumac extract with concentrations of 40, 80, 120, 160 g/ml was substituted for the culture medium and the cells were incubated for 24 and 48 hours under the same conditions. Antioxidant activity was also evaluated using DPPH and ABTS methods. In order to investigate the expression of COL1A1 gene, cells were first cultured in 6 plates and after treatment with different concentrations of water extract of sumac fruit and ascorbic acid were considered as positive control.

Results

Our findings confirmed that normal fibroblast cultures show almost 100% viability and confirm the absence of oxidative stress under standard cell growth conditions. When exposed to concentrations of 40 and 80, COL1A1 gene expression was increased, and when exposed to 120 and 160, COL1A1 gene expression was decreased. The dose-dependent response and the highest efficiency observed at concentrations of 120 and 160 g/ml, the potential of the extract as a therapeutic agent in It emphasizes the management of oxidative stress in fibroblast cells.

Conclusion

Rhus coriaria fruit aqueous extracts show significant antioxidant effects along with the ability Inhibition of oxidative damage caused by toxicity in human fibroblasts. Further in vivo research is necessary to translate these findings towards exploitation for the therapeutic management of diseases characterized by oxidative stress.

Rapid Relief for Migraines: Development and Evaluation of Electrospun Rizatriptan-PVA Fast-Dissolving Films

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Introduction

Migraine is a chronic neurological disease affecting nearly 14% of the global population, characterized by moderate to severe pain and sudden attacks. Rapid treatment is essential, especially since many patients experience nausea and vomiting, making it difficult to take medication. This study aimed to develop and evaluate an oral fast-dissolving film of rizatriptan for quick relief.

Materials & Methods

An electrospinning method was used to create a fast-dissolving film using polyvinyl alcohol (PVA), a water-soluble polymer, to form electrospun nanofibers of rizatriptan. Variable factors such as drug and polymer concentration and applied voltage were determined through preliminary studies. Design-Expert software was employed to establish 15 initial formulations based on the Box-Behnken model. Drug and polymer solutions were prepared and electrospun at different voltages. The nanofibers were evaluated using SEM for diameter and uniformity, and tests for wetting and disintegration time, drug content, and mechanical strength were conducted. Optimal formulation was identified using Design-Expert software and further analyzed for drug release, DSC, FTIR, and XRD to assess drug-polymer interactions and release rates.

Results

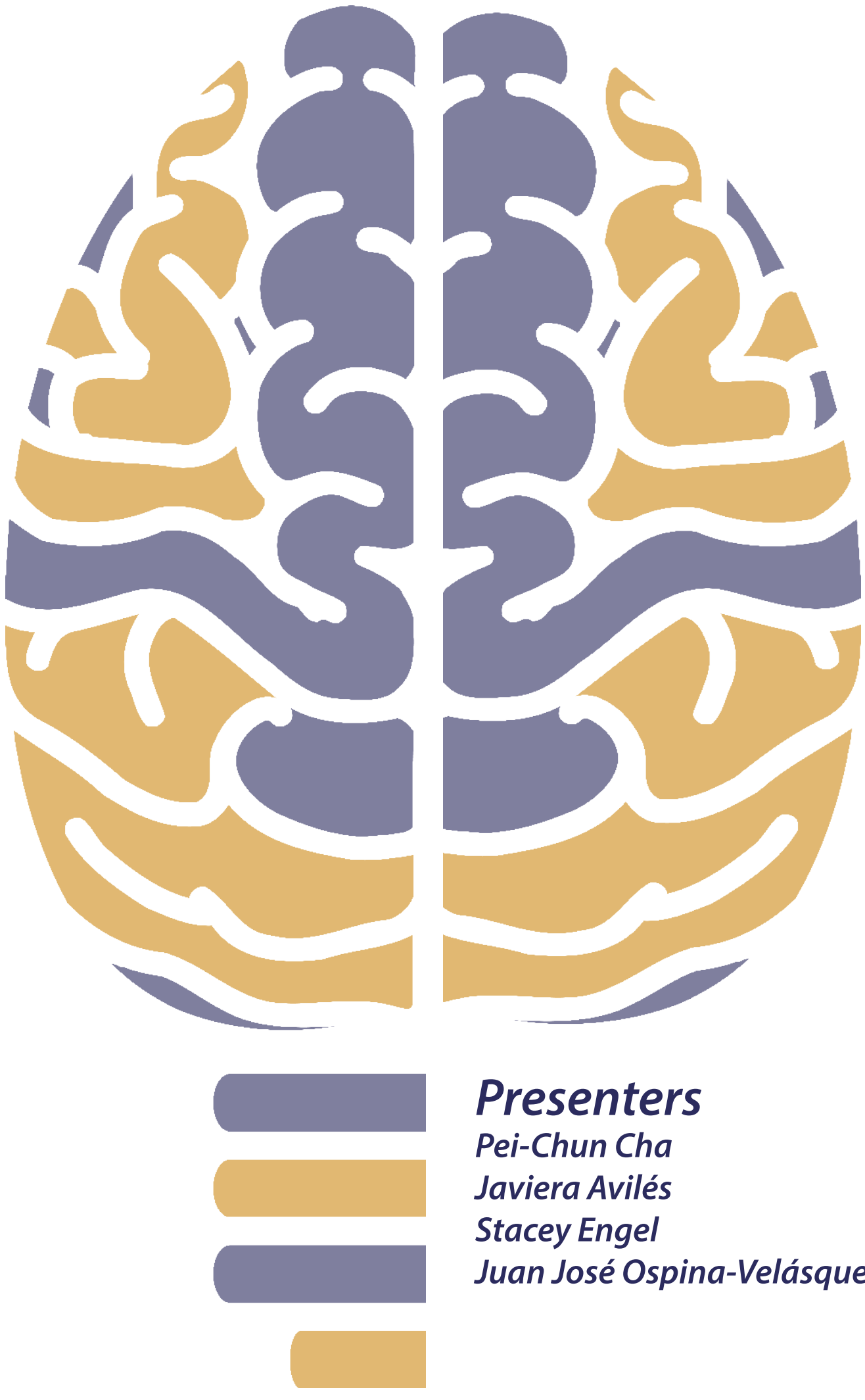
SEM analysis showed uniform nanofibers without beads, with fiber diameter increasing with higher polymer concentration and voltage. Films exhibited short wetting and disintegration times due to high porosity, which increased with polymer concentration. Higher polymer concentration and voltage reduced flexibility, Youngs modulus, and yield stress. The optimal formulation contained 6% PVA and 19% rizatriptan, prepared at 16 kV. This formulation disintegrated within 30 seconds and had over 90% drug content. Mechanical tests indicated good flexibility and strength. DSC and XRD studies showed a transition from crystalline to amorphous form during electrospinning, while FTIR analysis suggested hydrogen bonding between drug and polymer. The drug release was rapid, with over 80% released within 2 minutes, attributed to high fiber porosity, increased surface area, and the hydrophilic nature of PVA.

Conclusion

The optimized nanofiber formulation demonstrated suitable characteristics for rapid relief in acute migraine attacks, offering ease of administration and fast drug release.

Poster session I

Genetics I



Presenters

Pei-Chun Cha
Javiera Avilés
Stacey Engel
Juan José Ospina-Velásquez

Single-Cell RNA Sequencing Reveals Alternative Pathways in Influenza-Infected Lung Tissue

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Introduction

Influenza remains a significant global health challenge, causing annual seasonal epidemics and occasional pandemics that result in substantial morbidity and mortality. Some studies showed that influenza-infected lung tissues had significant cellular heterogeneity. However, the mechanisms of these variations are unclear. In this study, we aimed to identifying alterations in cellular composition, detecting differentially expressed genes (DEGs) across distinct cell populations, and uncovering the molecular pathways associated with these DEGs.

Materials & Methods

Single-cell RNA sequencing (scRNA-seq) were conducted on lung tissue from mice, with mixed genders (one male and one female) in each sample: control and influenza A infection. The two scRNA-seq libraries were obtained using 10X Genomics Chromium Single Cell ARC-v1 chemistry. Downstream analyses were performed using the Seurat pipeline. Dimensional reduction and clustering methods were employed to explore cellular composition changes, and Uniform Manifold Approximation and Projection (UMAP) plots were generated to visualize these alterations. Differentially expressed genes (DEGs) were identified to uncover molecular changes associated with influenza A infection. To further interpret the biological implications of the DEGs, pathway enrichment and network analyses were conducted using MetaCore.

Results

Our analysis revealed a substantial increase in immune cell populations within the infected lung, accompanied by 2,003 differentially expressed genes (DEGs), including 1,648 upregulated and 355 downregulated genes. Pathway enrichment analysis highlighted the activation of immune-related pathways in response to infection. Notably, we identified distinct clusters and roles of Natural Killer (NK) cells and CD4+ T cells in the influenza-infected sample. NK cells exhibited interactions with epithelial cells, while CD4+ T cells were associated with neuronal pathway modulation.

Conclusion

This study advanced our understanding of the lungs immune landscape during influenza infection. The identification of key immune pathways and potential novel interactions with other physiological systems provides a foundation for future research. By exploring these avenues, we can better comprehend the complexities of the immune response in respiratory infections and pave the way for innovative therapeutic strategies.

EEFSEC Deficiency: A Novel Selenopathy with Early-Onset Neurodegeneration

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Introduction

Selenoproteins are critical for numerous biological processes, including antioxidant defense and cellular homeostasis. Their biosynthesis relies on the eukaryotic elongation factor specific to selenocysteine (EEFSEC). Biallelic variants in EEFSEC have been linked to a novel autosomal recessive disorder characterized by early-onset neurodegeneration, global developmental delay, spasticity, seizures, and progressive cerebellar atrophy. This study investigates the genetic, functional, and clinical aspects of EEFSEC deficiency to provide insights into its pathophysiology and potential therapeutic targets.

Materials & Methods

Exome and genome sequencing were conducted in nine affected individuals from eight unrelated families. Functional studies assessed selenoprotein biosynthesis using patient-derived fibroblasts and in vitro luciferase reporter assays. A Drosophila RNAi model targeting eEFSEC was employed to evaluate motor and synaptic defects, and neuroimaging data were analyzed to characterize cerebellar involvement.

Results

Six pathogenic EEFSEC variants were identified. Affected individuals exhibited progressive motor dysfunction, spasticity, and cerebellar atrophy, with phenotypic variability ranging from moderate developmental delay to severe neurodegeneration. In vitro studies demonstrated reduced selenoprotein synthesis in patient fibroblasts. The Drosophila model revealed synaptic defects and progressive motor impairment, correlating with decreased eEFSEC activity.

Conclusion

This study identifies EEFSEC deficiency as a novel inborn error of selenocysteine metabolism associated with early-onset neurodegeneration. It highlights the crucial role of selenoproteins in neuronal function and suggests potential therapeutic opportunities targeting oxidative stress and ferroptosis pathways.

Evaluating human-specific RNA enrichment kits on non-model organisms, specifically African elephant (Loxodonta africana), for transcriptome sequencing.

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Introduction

Recent advances in transcriptomic approaches have facilitated the identification of immune mechanisms involved in various diseases. However, there are few studies on the immune responses of non-model species, such as African elephants (Loxodonta africana). To explore the transcriptomic profile of African elephants, this study evaluated the utility of human-specific RNA enrichment kits for transcriptome sequencing of elephant samples.

Materials & Methods

Total RNA was extracted from whole blood samples obtained from four free-ranging African elephants in Kruger National Park, South Africa, using the Paxgene Blood RNA Kit. As part of RNA enrichment, globin- and ribosomal transcripts were removed using the human-specific GLOBINclear and NEBNext rRNA Depletion kits, respectively. The enriched RNA was subjected to library preparation and paired-end sequencing on the MGI DNBSEQ-400 platform using a read length of 100 bp. The resulting RNA sequencing (RNA-seq) data was trimmed to remove low quality bases and mapped to the reference genome using standard bioinformatic tools. The presence of globin and ribosomal transcripts was evaluated and compared to that obtained from total RNA sequenced without any enrichment strategy.

Results

Following bioinformatic processing, an average of 177.67 million paired-end reads were retained with Phred quality scores ranging from Q34 to Q38 across all samples. Depletion of ribomosal RNA (rRNA) significantly reduced the proportion of rRNA reads from 57.5 73.1% in unprocessed samples to 3.5% in the enriched samples. There was no significant effect on the percentage of globin reads in the enriched compared to the unprocessed samples. Notably, genome alignment metrics improved substantially after RNA enrichment, with alignment efficiency increasing from 32.81% in the unprocessed samples to 88.82% in enriched samples.

Conclusion

Human-specific RNA enrichment kits effectively removed African elephant ribosomal RNA prior to sequencing and increased the number of uniquely mapped reads to the elephant reference genome. This successful pre-processing for RNA-seq supports further downstream analysis and de novo assembly of the African elephant transcriptome, which will enable investigation of immune pathways in this endangered species.

Particulate matter modulates PBMCs transcriptome, dysregulates cell metabolism and enhances their carcinogenic activity

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Introduction

Particulate matter (PM), classified by the International Agency for Research on Cancer as a carcinogen for humans, is a significant air pollutant that induces both in vitro and in vivo disorders, mainly associated with the immunological activity. In this sense, Peripheral Blood Mononuclear Cells (PBMCs) play an active role in response to PM through changes in their immunological profile. Nevertheless, there is evidence that PM also affects the PBMCs transcriptome, disrupting critical pathways involved in cellular homeostasis. Similarly, the gene expression profile of cancer patients is altered in these cells, suggesting a significant interplay in carcinogenic processes.

Materials & Methods

PBMCs isolated from heatlhy volunteers were seeded and divided in two groups: cells exposed to PM10 and cells without treatment. Total RNA was extracted and RNA sequencing was performed. Genes with an absolute fold change value 2 and an FDR 0.05 were considered differentially expressed (DEG). Further analyses were performed to identify and characterize the differential gene expression patterns related to the hallmarks of cancer.

Results

PBMCs suffered a differential remodeling of 1,226 genes upon PM10 exposure, deregulating critical biological processes such as angiogenesis, apoptosis, the cell cycle, inflammation, and metabolism, which may promote cancer initiation, progression, metastasis, and immune evasion. Moreover, common genes seemed to be altered in different cell types upon PM exposure, highlighting the role of AKR1C1, which was regulated in all the compared studies, and suggesting shared mechanisms in response to this pollutant. Interestingly, MET oncogene was notably overexpressed, and other important genes like IL1B, EREG, HBEGF, and CCL3 were also upregulated, in contrast to the downregulation of NRG1 and different tumor suppressors. Finally, an association between the genes implicated in the abovementioned cancer-related processes and the transcription factors EGR1, NUCKS1, RELA and RELB was observed.

Conclusion

PM10 has strong modulatory effects on the PBMCs transcriptome, suggesting that genetic remodeling may lead to cancer. In addition, AKR1C1 and HBEGF were identified as potential markers for cancer progression and metastasis, and could be suitable therapeutic target candidates. Further research is encouraged to better understand the molecular mechanisms by which such genes interact and ultimately lead to carcinogenesis.

Poster session I

Immunology

Presenters

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Yashika Kalra
Niels Vreeswijk
Negar Nejati
Fernando Martín del Campo Sánchez
Eleni Christina Giannoukaki
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Phenotypic and functional evaluation of NK cells in transgender women with high risk of HIV-1 infection in Medellin, Colombia.

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Introduction

HIV-1 infection, the cause of AIDS, remains a global public health challenge. While constant exposure to HIV-1 often leads to infection, a subgroup of individuals known as HESN (HIV-1-exposed seronegative) remain seronegative despite high exposure and statistical odds. HESN could be found into key population with HIV prevalence exceeding 1%, such as men who have sex with men (MSM), transgender women (TW), homeless individuals, intravenous drug users, sex workers, and incarcerated populations. TW is a relevant cohort for studying natural resistance due to high infection prevalence (1829%), increased risk through unprotected receptive anal sex, psychoactive substance use, limited prevention access and hormone replacement therapy associated with increased susceptibility.Studies on HESN indicate that NK cells play a vital role in HIV-1 resistance, displaying enhanced effector activity and IFN- production compared to unexposed individuals. Emerging evidence also suggests NK cells may develop immunological memory after viral exposures, as seen in cytomegalovirus, chikungunya, and HIV-1 infections.

Materials & Methods

Our study aims to evaluate NK cell phenotype and effector capacity in co-culture with autologous CD4+ T cells infected with HIV-1 using flow cytometry, ELISA , antiviral molecule production via CBA, and gene expression changes through RNA-seq.

Results

To date, 13 participants have been enrolled: six at low risk (TW-LR) and seven at high risk (TW-HR) (16 and 36 sexual contacts in the past three months, respectively). TW-HR reported higher rates of sexually transmitted infections (57.14% vs. 16.67%) and sexual contacts (180 vs. 7.5; $p = 0.0006$). TW-LR exhibited higher proportions of CD56+ and CD16+ NK cells, while TW-HR showed increased mature and memory-like NK cells. In co-culture, NK cells from TW-LR more effectively reduced p24 levels, whereas TW-HR displayed lower p24 expression density.Data for CBA and RNA-seq analysis will be processed soon. These additional analyses will provide further insight into the functional and molecular responses of NK cells in this population.

Conclusion

These findings suggest phenotypic and functional differences in NK cells between the studied groups. Further research is needed to understand the role of these cells in HIV-1 infection within this population.

ELL as a Tumor Suppressor: Modulating EMT and Cellular Behavior in Esophageal Cancer

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Introduction

Esophageal cancer is an aggressive malignancy with a five-year survival rate among the lowest of all cancers. Despite advancements in treatment, the prognosis remains poor, highlighting the need for novel therapeutic targets. Transcription factors, such as eleven-nineteen lysine-rich leukemia (ELL), regulate key cellular processes and their dysregulation can drive cancer progression. This study investigates the role of ELL in esophageal cancer, particularly its influence on epithelial-to-mesenchymal transition (EMT), a critical process in tumor metastasis and progression.

Materials & Methods

The esophageal cancer cell line KYSE-410 was used to overexpress ELL. EMT marker expression (CDH2, vimentin, FYN, and CDH1) was assessed using quantitative RT-PCR and Western blotting. Colony formation assays evaluated the effect of ELL on cellular proliferation. Co-immunoprecipitation assays in HEK cells determined the interaction between ELL and hypoxia-inducible factor 1-alpha (HIF1).

Results

ELL overexpression in KYSE-410 cells led to significant downregulation of mesenchymal markers (CDH2, vimentin, and FYN) and upregulation of the epithelial marker CDH1, indicating a reversal of EMT. Colony formation assays revealed a marked reduction in colonies in ELL-overexpressing cells, suggesting tumor-suppressive activity. Furthermore, co-immunoprecipitation assays confirmed a direct interaction between ELL and HIF1, implicating a potential mechanism through which ELL modulates cellular behavior in cancer.

Conclusion

This study identifies ELL as a potential tumor suppressor in esophageal cancer by inhibiting EMT and reducing cell proliferation. The interaction with HIF1 highlights a novel mechanistic pathway. These findings contribute to our understanding of ELLs role in cancer and underscore its potential as a therapeutic target. Future research should explore downstream pathways and clinical applications of ELL in esophageal cancer therapy.

New bispecific IgG kills neuroblastoma by neutrophils in vitro without activating the complement system

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Introduction

Immunotherapy targeting GD2 has improved treatment of neuroblastoma. Nonetheless, administration of anti-GD2 antibodies precipitates severe and dose-limiting neuropathic pain due to complement activation. To try to overcome this, the IgG1 ch14.18 (dinutuximab) antibody was reformatted with a point mutation (K332A) or into the IgA-isotype. However, the K332A did not relieve the neuropathic pain due to remaining, albeit low, complement activation. In addition, the IgA antibody had a shorter antibody half-life, although it did relieve the neuropathic pain in mouse models. An advantage of utilizing the IgA isotype is that it predominantly induces antibody-dependent cellular cytotoxicity (ADCC) through neutrophils, which constitute 60% of the immune cells in the blood and a considerable percentage in neuroblastoma tumors, through the activation of the Fc alpha receptor (FcRI/CD89). This is in contrast to IgG, which activates natural killer (NK) cells, which occupy only a small percentage of the immune system, via CD16a. Moreover, IgG can activate macrophages, a function that is also exhibited by IgA.

Materials & Methods

To generate an antibody that overcomes the problems of complement activation and short half-life, we engineered GD2xCD89 IgG1 and IgG4 bispecific antibodies (bsAbs) with or without complement activation preventing mutations, that combine the advantages of IgG and IgA antibodies. A panel of bsAbs were evaluated in binding, ADCC, C5a-induction and complement-dependent cytotoxicity (CDC) assays.

Results

ADCC assays showed that neutrophils from healthy donors are able to kill neuroblastoma tumor cells with all GD2xCD89 bsAbs, although with variable efficiencies. The bsAbs achieves this by binding to GD2 on neuroblastoma cells with one Fab arm and by activating neutrophils by binding to CD89 with the other Fab arm. Furthermore, many bsAbs show low CDC and C5a-generation induction, with the IgG1 bsAb containing specific silencing mutations, with or without the K322A mutation, even showing no induction of both at all.

Conclusion

GD2xCD89 IgG1 bsAb K322A with specific silencing mutations is a promising novel therapy for neuroblastoma, exhibiting potent CD89-mediated tumoricidal activity while avoiding the activation of the complement system.

Efficacy and Safety of Pembrolizumab in Treating Brain Metastases: A Systematic Review and Meta-Analysis

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Introduction
Pembrolizumab, a programmed death-1 (PD-1) monoclonal antibody, has emerged as a promising therapy for brain metastases associated with cancers such as non-small cell lung cancer (NSCLC) and melanoma. While pembrolizumab demonstrates potential intracranial response, its clinical outcomes and safety profiles vary across studies, necessitating a comprehensive evaluation. This systematic review and meta-analysis aim to assess the efficacy and safety of pembrolizumab for brain metastases from various primary malignancies.

Materials & Methods
Following PRISMA guidelines, we systematically searched PubMed, Embase, Scopus, and Web of Science through November 2023 for studies reporting on pembrolizumab in brain metastases. Extracted data included patient demographics, study characteristics, treatment efficacy, and adverse events. Study quality was appraised using the MINOR criteria. Statistical analyses were conducted using STATA, employing random-effects models where applicable. Heterogeneity was assessed using the I2 statistic and chi-square Q test.

Results
Seventeen studies encompassing 1,248 patients with brain metastases were included. Patients received pembrolizumab at varying dosages. Meta-analysis results revealed a partial response rate (PRR) of 32% (95% CI: 24-41%), complete response rate (CRR) of 5% (95% CI: 1-9%), and overall response rate (ORR) of 42% (95% CI: 34-51%). Stable disease was observed in 19% (95% CI: 12-25%), while the death rate (DR) was 25% (95% CI: 4-47%). Survival analyses demonstrated a 6-month overall survival rate (OSR) of 76% (95% CI: 71-82%), 1-year OSR of 48% (95% CI: 34-62%), and 2-year OSR of 29% (95% CI: 16-42%). Adverse event analyses revealed 38% of patients experienced any grade immune-related adverse events (irAEs), with 12% experiencing grade 3 irAEs. Additionally, 73% reported any grade overall adverse events (AEs), with 36% experiencing grade 3 AEs.

Conclusion
Pembrolizumab demonstrates notable efficacy in treating brain metastases, with favorable response and survival rates across various primary cancer types. However, immune-related and overall adverse events are prevalent and necessitate careful management. These findings underscore the potential of pembrolizumab in this patient population and highlight the need for further research into optimization and combination strategies to enhance outcomes.

Role of Neutrophil-to-Lymphocyte Ratio in the Prognosis of Severe Community-Acquired Pneumonia

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Introduction

Community-acquired pneumonia (CAP) is considered an important cause of mortality and morbidity worldwide. There is a constant need to explore novel prognostic markers. Dynamic changes in immune cells response to sepsis sourced markers like the Neutrophil-to-Lymphocyte Ratio (NLR), that has shown potential usefulness in sepsis and septic shock. We aim to evaluate the ability of NLR in the prognosis of outcome in CAP.

Materials & Methods

A prospective cohort of consecutive patients admitted to the Intensive Care Unit (ICU) or Internal Medicine (IM). The study population was diagnosed with CAP, in the absence of hematological disease, immunosuppression, chemotherapy, myelotoxic agents, hemotransfusion, or liver damage. Clinical-demographic information, co-morbidity, and laboratory data were obtained from medical records. The NLR was calculated from the hemogram at admission and during 3, 5, and 7 days of follow-up. Severity scores (SOFA), its modification during evolution [DSOFA]) and the clinical outcome (unfavorable outcome: use of vasopressors, invasive ventilation, and mortality) were evaluated; as well as the hospitalization time. In addition, we explored apoptotic trends in neutrophils and lymphocytes (Western blot, Anexin V). The study population was grouped according to outcome. Mortality was analyzed separately. Students t-tests, ROC curve, Odds ratio and Pearsons correlation were used. Statistical significance, p-value < 0.05.

Results

The study population comprised 59 patients, 31 males (52.6%), mean age 65.418.8 years old. Most frequent co-morbidities were hypertension (29.5%), diabetes mellitus type 2 (22.1%), heart failure (9%) and COPD (6.3%). Exposures risk for lung disease: 49.1% smokers, 17% others. We observed the following baseline values: CURB-65 2.061.04; SOFA 6.103.04, and NLR 14.7811.06. Interestingly, the higher NLR, the higher CURB-65 score ($p<0.05$), and negative related with DSOFA, during time course analysis. Baseline data from groups with favorable and unfavorable outcomes were: CURB-65 score 1.640.78 vs 2.451.12 ($p<0.05$), SOFA 4.571.95 vs 7.583.05 ($p<0.05$) and NLR 11.25 8.7 vs 17.2110.75 ($p<0.05$), respectively. Regarding latter comparison, NLR value was higher in subpopulation with unfavorable outcome, who were admitted directly to ICU 16.308.9 compared to those admitted to IM 11.8110.31 ($p<0.05$); as well as cases who showed in-hospital death 17.618.4 ($p<0.05$). NLR (cut-off 14) was calculated based on the discriminatory ability to predict unfavorable outcomes, SE 0.68, SP 0.64, AUC=0.41 ($p<0.05$); OR 3.1 (CI95= 1.07 to 13.08, $p<0.05$). Furthermore, baseline NLR<14 was associated with shorter hospitalization time and significant correlation (Pearsons r=0.66 (CI 95=0.21-0.88, $p<0.01$). A decreased expression of Anexin V in neutrophils was observed in patients with unfavorable outcomes.

Conclusion

The NLR showed prognostic ability of unfavorable outcome in patients with CAP.

In-depth phenotyping of innate immune cells using a novel 41-Color full spectrum flow cytometry panel

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Introduction

The detection of subtle immunological changes in the peripheral blood of patients can provide valuable insight into the contribution of immune cell alterations to the pathophysiology of complex and insufficiently understood diseases. Phenotyping immune cell populations through surface marker expression using flow cytometry has long been a standard method for characterizing distinct cell subsets and assessing their functional states in the context of disease. However, identifying specific and potentially disease-relevant subpopulations often requires the simultaneous analysis of a high number of markers, which exceeds the capabilities of conventional flow cytometry . To address this, we designed a novel 41-marker panel with an optimized staining protocol tailored for whole blood samples, utilizing spectral flow cytometry, an advanced technique that enables deep phenotyping in a single staining step. With this panel, we aim to characterize immune cell composition and states in both healthy donors and patients, providing a foundation for exploring how immune dysregulation contributes to disease development.

Materials & Methods

Peripheral whole blood was collected from healthy donors and patients. Following red blood cell lysis, leukocytes were stained using a 41-color antibody panel with an optimized protocol and analyzed on the Cytek Aurora spectral flow cytometer. Data were unmixed and autofluorescence was subtracted in OMIQ to reduce background noise and minimize false positives. FlowAI was applied to remove unstable events and intensity outliers, followed by subsampling for downstream analysis and figure generation.

Results

We demonstrate the successful implementation of the 41-color antibody panel for immune profiling. We have tested the protocol across healthy donor samples and observed consistent and reproducible staining patterns. These results confirm the panel's robustness and support its future application to patient material, where it may help detect disease-associated changes in marker expression.

Conclusion

We developed and validated a 41-color full spectrum flow cytometry panel designed to perform deep phenotyping of the innate immune in whole blood. Application of this panel across multiple healthy donor samples demonstrate consistent and reliable staining, confirming its technical robustness and reproducibility. While its application to specific clinical outcomes, such as sepsis, delirium, autoimmune diseases, remains to be explored, this approach offers a promising platform for investigating immune cell alterations across a range of disease settings where the innate immune system plays a central role.

Acetate produced by commensal Escherichia coli enhances the virulence of Shiga Toxin-producing Escherichia coli in a Galleria mellonella infection model

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Introduction

The gastrointestinal microbiota plays a crucial role in intestinal homeostasis, with significant compositional changes occurring during diarrheal episodes. Shiga toxin-producing Escherichia coli (STEC) is a relevant pathogen responsible for severe diseases through the production of Shiga toxin. Acetate, a short-chain fatty acid produced by commensal E. coli, has been linked to modulating STEC virulence. In our laboratory, metagenomic analysis of STEC-positive diarrheal samples from Chilean children revealed elevated acetate levels, positively correlated with an increased abundance of non-pathogenic E. coli. These findings suggest that E. coli may modulate the intestinal metabolic environment, potentially enhancing STEC virulence

Materials & Methods

Commensal E. coli strains were isolated from stool samples of children under five years old with diarrhea positive for STEC, using MacConkey agar and biochemical profiling. The supernatants of the isolated E. coli strains were quantified for acetate production using high-performance liquid chromatography (HPLC), and the strain exhibiting the highest acetate levels was selected for subsequent analysis. To evaluate the impact on STEC virulence, the Galleria mellonella infection model was used, and survival analysis was performed using the Kaplan-Meier method.

Results

52 commensal E. coli strains were isolated from STEC-positive diarrheal samples and screened for acetate production under anaerobic conditions using HPLC. Acetate levels varied between 10.81 mM and 26.97 mM, and the highest-producing strain (AM-2) was selected for further analysis. In a Galleria mellonella infection model, larvae infected with STEC resuspended in the sterile supernatant of AM-2 showed significantly increased mortality compared to those infected with STEC alone ($p = 0.0155$). The supernatant itself was non-lethal, suggesting that metabolites derived from commensal E. coli, particularly acetate, may enhance STEC virulence in vivo.

Conclusion

These results suggest that the supernatant from E. coli strains isolated from STEC-positive diarrheal samples, which contains acetate, can enhance STEC virulence in vivo. As a future direction, we aim to evaluate the effect of bacterial consortia derived from DEC-associated microbiota, incorporating the selected commensal E. coli strain, on STEC virulence using the Galleria mellonella infection model. This approach will contribute to a better understanding of the microbial and metabolic interactions that influence STEC pathogenesis.

Poster session I

Endocrinology

Presenters

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Anna-Sophia Josephine Bush
Lili Rusznyak
Luciana Marques
Muhammad Islampanah
Yilin Liu

Exploring the causal mechanisms linking ulcerative colitis and myocarditis based on Mendelian randomization and transcriptome data analysis

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Introduction
Both ulcerative colitis (UC) and myocarditis are autoimmune-related diseases. Although special cases and previous studies have indicated potential associations between these two diseases, the casual association and underlying molecular mechanisms remain unclear.

Materials & Methods
To evaluate the possible causal association, Mendelian randomization (MR) study was conducted, supplemented by sensitivity analysis to verify the reliability. Based on transcriptome data from the Gene Expression Omnibus (GEO) database, differentially expressed genes (DEGs) analysis and gene set enrichment analysis (GSEA) were used to identify potential candidate hub genes and molecular mechanisms. Hub genes were further screened by machine learning algorithms, and the diagnostic performance of two genes were assessed by ROC analysis. Then, immune cell infiltration in UC and myocarditis specimens was analyzed using Xcell method, followed by correlation analysis exploring the relationship between key genes and infiltrating immune cells. Single sample gene set enrichment analysis (ssGSEA) was conducted to reveal the potential mechanisms. Finally, hub genes expression was verified in online datasets, and regulatory miRNAs of hub genes were predicted by miRNet.

Results
Our analysis showed that genetic susceptibility to UC was robustly associated with an increased risk of myocarditis (OR: 1.12, 95% CI: 1.01-1.24, p=0.02). PLA2G7 and SAMD9L were identified through various analyses and found to be significantly associated with UC and myocarditis. Enrichment analysis of hub genes revealed their enrichment in multiple autoimmune disease-related pathways. Immune cell infiltration analysis also showed significant associations between hub gens and multiple immune cells. ROC analysis shows that AUC values were all greater than 0.8. Finally, we verified that has-miR-27a-3p was significantly higher in patients with myocarditis than in those without myocarditis. ($p<0.05$)

Conclusion
This study established a causal association between UC and myocarditis. Two key genes, PLA2G7 and SAMD9L, associated with the pathogenesis are identified, and together with regulatory miRNA, has-miR-27a-3p may serve as potential diagnostic biomarkers for UC-related myocarditis. Our findings provide potential insights into the mechanisms of UC-related myocarditis.

Challenges in the detection of metabolic abnormalities in young adults with normal-weight obesity

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Introduction

Subjects with normal-weight obesity (NWO) are defined as those who have an adequate body mass index (BMI) but an elevated percentage of body fat (%BF). This condition has been associated with an increased risk of cardiometabolic disease due to excess adiposity, even in the absence of clinical alterations. This study aims to compare the cardiometabolic profile of individuals with NWO and normal %BF and to evaluate associated risk factors.

Materials & Methods

This cohort study was conducted with 100 subjects (72 women and 28 men), from the National Autonomous University of Mexico, aged 18-29, classified into three age groups, and further divided by biological gender: 1) normal BMI - normal %BF, 2) normal BMI - elevated %BF, and 3) high BMI - elevated %BF. Biochemical parameters were evaluated on fasting (glucose, triacylglycerides, total cholesterol, LDL, HDL), as well as anthropometric measurements (BMI, waist circumference, %BF by bioimpedance). Data analysis was conducted using the R-language and t-Student tests.

Results

Anthropometric indicators and biochemical parameters were analyzed across three groups, revealing significant differences in BMI and %BF between women and men. In Group 1, women had a BMI of 19.42 0.31 and %BF of 15.53% 2.17, while men had a BMI of 21.24 1.43 and %BF of 14.79% 3.77. In Group 2, women exhibited a BMI of 21.31 1.69 and %BF of 30.42% 4.85, whereas men had a BMI of 22.20 1.84 and %BF of 25.45% 2.77. Lastly, in Group 3, women showed a BMI of 28.69 3.21 and %BF of 40.08% 6.54, while men had a BMI of 32.73 0.04 and %BF of 38.69% 8.56. Statistical analyses confirmed significant differences ($p < 0.05$), validating the presence of normal-weight individuals with elevated %BF. Fasting biochemical parameters remained within normal ranges across all groups.

Conclusion

The results suggest that, despite biochemical parameters remaining within normal ranges, subjects may exhibit subclinical alterations. This underscores the need for more sensitive tools, including assessments of metabolic flexibility and metabolomic, to evaluate metabolic risk in seemingly healthy individuals. Early detection approaches are crucial for identifying metabolic abnormalities.

The Impact of Glucocorticoid Treatment on Fertility disorders in a Novel Knock-in Mouse Model of Congenital Adrenal Hyperplasia

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Introduction

The most common form of differences in sex development (DSD) worldwide is Congenital Adrenal Hyperplasia (CAH). CAH is an autosomal recessive inherited disease of the adrenal gland that results in dysregulated hormone production. The deficiency of glucocorticoids leads to a strong stimulation of the hypothalamic-pituitary-adrenal axis and consecutively to an excessive production of adrenal androgens. Female CAH patients experience virilisation and fertility problems in adulthood. In this experimental study, we aim to gain a more profound understanding of the aetiology of the female infertility and the potential impact of glucocorticoid treatment on the fertility disorders in CAH females.

Materials & Methods

Using embryonic stem cells and the CRISPR/Cas9 technique, we established a mouse model with the most prevalent point mutation in the 21-hydroxylase enzyme causing classic CAH in humans. Our study groups consist of female mice in different stages of sexual development, categorised into groups of homozygous mutated animals and wild-type controls with and without glucocorticoid treatment. We analyse the hormones of the hypothalamic-pituitary-adrenal axis, the oestrus cycle and the blood pressure. Histology of the adrenal glands is performed to analyse organ structure. To analyse fertility potential, we hormonally stimulate mice for superovulation and conduct in vitro fertilisation. Moreover, we test the natural fertility through long-term mating.

Results

We were able to establish a mouse line with decreased corticosterone levels, accumulation of adrenal steroid precursors and a marked adrenal hyperplasia. In the ovary development of female homozygous mutated mice, corpora lutea were absent, indicating a reduced functionality compared to wild-type mice. Natural mating of female homozygous mutated mice with potent males resulted in copulation and pseudo-pregnancy, but without living offspring. We expect improved results in the mating of glucocorticoid-treated females. This study is still ongoing. At the time of the ISCOMS, we will be able to present more results.

Conclusion

Our established preclinical model improves our understanding of fertility disorders and the effect of glucocorticoid treatment on CAH. We can potentially reduce the suffering caused by infertility in female CAH patients through improved treatment.

Differentiation of endocrine cells as a mechanism for beta cell loss in T1D

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Introduction

Diabetes mellitus is an incurable chronic disease characterized by short-term complications such as hypoglycemia and ketoacidosis and long-term micro- and macrovascular complications. In type 1 diabetes (T1D), the gradual loss of beta cells leads to impaired endogenous insulin (INS) production. However, the mechanisms behind beta cell destruction have not been fully deciphered. Immune-mediated destruction by cytotoxic T lymphocytes (CTL) represents a widely postulated but extensively discussed trigger. The lack of beta cells might partly be caused by a less investigated mechanism of endocrine cell plasticity, namely the processes of de- and transdifferentiation. These embody the transformation of one endocrine cell type into another, e.g., beta cell into alpha cell.

Materials & Methods

A lentiviral lineage tracing approach is used in this work to investigate the occurrence of transdifferentiation in human islets of Langerhans. Islets were dissociated into single cells and transduced with lentiviral vector pairs designed for Cre-dependent gene expression in alpha and beta cells separately. After that, cells were cultured in microwell-containing agarose molds to form physiological-like pseudo islets in distinct glucose concentrations. Stable viral vector expression was examined 24-48 h after induction with tamoxifen, and islets were cultured for five until up to 10 days. Potential transdifferentiation was determined by inspecting the colocalization of INS and glucagon (GCG) with the viral vectors using immunohistochemistry (IHC). Islet architecture and cell composition were analyzed using image-analysis software. Moreover, the expression of islet-cell-specific genes was studied using real-time quantitative PCR (qPCR).

Results

Beta cells were successfully transduced, and pseudo islets could be cultured and structurally maintained for up to 7 days. Although the colocalization of the beta cell lineage tracing vector with INS was observed in most of the transduced beta cells, some of these cells showed co-expression with GCG or no expression of the two islet cell hormones.

Conclusion

These findings suggest that beta cells undergo conversion into alpha cells or other cell types, but further quantification and evaluation are necessary for a conclusive interpretation of these preliminary results. Differentiation of endocrine cells is a little explored, but promising mechanism to explain beta cell loss in T1D.

Evaluation of lung inflammation using a brain death model in female rats submitted to menopause with aging

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Introduction

Lung transplantation is a treatment for advanced disease, but the limited number of available organs is a challenge. The lung is highly affected by brain death (BD), with females showing a greater inflammatory response, linked to a sharp reduction in female sex hormones. With global aging, older donors are increasing, and menopause-associated changes in female donors require evaluation. This study investigated menopause's effects in rats subjected to BD, focusing on inflammatory mediators and leukocyte influx to the lungs.

Materials & Methods

Adult female Wistar rats underwent menopause induction with 4-vinylcyclohexene diepoxide (VCD, 80 mg/kg, i.p., 5 days/week) for 6 weeks. After follicular depletion, they aged for 10 weeks. Menopause was confirmed by measuring 17-estradiol and FSH. For BD, young and menopausal rats had a balloon catheter inflated intracranially and were ventilated for 6 hours. Sham-operated rats served as controls. Blood counts, bone marrow, and bronchoalveolar lavage (BAL) were analyzed, with serum inflammatory mediators quantified. Lung tissue was examined histopathologically and cultured to assess inflammatory mediator release over 24 hours.

Results

Menopausal rats had irregular estral cycles, lower estradiol ($p<0.001$), and higher FSH ($p=0.0140$). After 6 hours of BD, white blood cell (WBC) counts were reduced in both menopausal ($p=0.014$) and young rats ($p=0.011$) compared to Sham. Menopausal BD (M-BD) rats showed fewer blood granulocytes than young BD (Y-BD) rats ($p=0.01$). BAL in M-BD rats showed increased granulocytes compared to Sham ($p=0.018$) and Y-BD ($p=0.009$). Bone marrow cells increased in M-BD versus Y-BD ($p=0.035$). IL-10 was lower in M-BD than Y-BD ($p=0.003$), while IL-1 and IL-6 increased in lung culture for both groups.

Conclusion

Menopause influences lung inflammation after BD, increasing leukocyte infiltration. Understanding menopauses impact on lung response can improve donor management strategies.

Serum TriglycerideGlucose Index and Risk of All-Cause and Cause specific Mortality in Subjects without Cardiovascular Diseases: A 10-year longitudinal follow-up study

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Introduction
Cardiovascular disease remains the top global cause of death. The triglyceride-glucose (TyG) index, a simple marker of insulin resistance, has shown promise in predicting cardiovascular disease (CVD) and mortality. This study assessed the association between TyG index, and the risk of all-cause, CVD, coronary heart disease (CHD), and stroke-related mortality in participants of the Mashhad Stroke and Heart Atherosclerotic Disorder (MASHAD) cohort.

Materials & Methods
Subjects without CVD at the baseline were enrolled in this study. Of 9704 individuals aged 3565 years that were followed for almost 10 years, 9430 met the inclusion criteria. Multivariable Cox proportional hazards models evaluated the relationship between TyG index quartiles (quartile 1: <8.12, quartile 2: 8.12 8.52, quartile 3: 8.52 8.96, and quartile 4: >8.96) and mortality. Chi-square test was used to compare categorical variables. A one-way ANOVA test was used for comparison between continuous variables. Restricted cubic splines (RCS) assessed potential non-linear associations, and subgroup analyses explored variability across strata.

Results
During follow-up, 400 deaths occurred (168 from CVD, 127 from CHD, 30 from stroke, and 75 from other causes). KaplanMeier curves revealed significantly higher mortality rates across all categories with increasing TyG index (log-rank p for all < 0.001). RCS analysis indicated non-linear (U-shaped) associations of TyG index with all-cause (p = 0.003), CVD (p = 0.003), and CHD (p = 0.005) mortality. In the fully adjusted model, hazard ratios with 95% confidence intervals for the highest (>8.96) vs. lowest (<8.12) quartile of TyG were 1.108 (0.790-1.553) for all-cause (p = 0.552), 1.028 (0.606-1.743) for CVD (p = 0.919), 0.925 (0.508-1.691) for CHD (p = 0.803), and 2.897 (0.685-12.257) for stroke mortality (p = 0.148).

Conclusion
Elevated or reduced TyG index levels showed U-shaped associations with all-cause, CVD, and CHD mortality after 10 years, highlighting its potential prognostic value. However, it failed to capture a statistical significance in the fully adjusted Cox proportional hazards models. More investigations are required to completely understand the predictive importance of the TyG index among various populations.

Mediation of the Relationship between Obesity and Psoriasis by SIRI: A Cross-Sectional Study from the National Health and Nutrition Examination Survey

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Introduction
Obesity is closely associated with psoriasis; however, the underlying mechanisms have not yet been fully elucidated. This study aimed to explore the relationship between obesity-related indicators and psoriasis and investigate the potential mediating role of the systemic inflammation response index (SIRI).

Materials & Methods
We included 16,514 participants from the National Health and Nutrition Examination Survey (NHANES) aged 20 years. Participant characteristics were analysed while considering sample weights. Adjusted multivariable logistic regression models were used to analyse the relationships between weight-adjusted waist index (WWI), lipid accumulation product (LAP), body mass index (BMI), and the risk of psoriasis, with nonlinear relationships tested using restricted cubic splines. Mediation analysis was conducted to explore the potential mediating role of lnSIRI in the relationship between obesity-related indicators and the risk of psoriasis. Subgroup and sensitivity analyses were conducted to verify the robustness of the results.

Results
Among the participants, 24.54% were over 60 years old, and 50.8% were female. WWI (OR = 1.31, 95% CI: 1.111.54, p = 0.002), lnLAP (OR = 1.19, 95% CI: 1.021.39, p = 0.03), and BMI (OR = 1.02, 95% CI: 1.011.04, p = 0.01) demonstrated a positive correlation with the risk of psoriasis. Mediation analysis indicated that lnSIRI played a mediating role in the relationship between WWI (mediation percentage: 22.9%, p = 0.044), lnLAP (mediation percentage: 9.14%, p < 0.002), and BMI (mediation percentage: 7.17%, p < 0.001) with psoriasis.

Conclusion
Our findings suggest that WWI, lnLAP, and BMI are positively associated with the risk of psoriasis in the population and that lnSIRI mediates these relationships. These results highlight the potential role of inflammation in the development and progression of obesity-related psoriasis and suggest that integrating the SIRI into the clinical assessment of psoriasis could help in the early identification and management of psoriasis in populations with obesity.

Poster session I

Epidemiology

Presenters

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Silke Hoekstra
Vaidehi kale
Yuxian Wang
Andrea Berenice Mendieta Peña
Wei Ren Matt Kon

Non-random aggregations of healthy and unhealthy lifestyles and its population characteristics - pattern recognition in a large population-based cohort

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Introduction
Studies showed that multiple healthy and unhealthy lifestyle factors can coexist within an individual. However, there is currently no consensus on the number of domains of lifestyle factors to include in such studies. Whether and how lifestyle factors combinations occur non-randomly remains unclear. Furthermore, few studies compared whether lifestyle patterns provide parallel information as summed (un)healthy lifestyle scores regarding healthy levels.

Materials & Methods
Latent class analysis was performed to identify lifestyle patterns among 112,842 participants aged >=18 years from the Dutch Lifelines cohort. Ten lifestyle factors were selected based on the six pillars of Lifestyle Medicine: smoking habits, binge drinking, daily alcohol intake, diet quality, ultra-processed food consumption, long-term stress, physical (in)activity, sleeping, TV watching time and social connections. Lifestyle factors were assessed using validated self-report questionnaires.

Results
We identified five lifestyle patterns: Healthy but physically inactive (8.6% of the total population), Unhealthy but no substance use (8.5%), Healthy in a balanced way (37.2%), Unhealthy but light drinking and never smoked (31.6%) and Unhealthy (14.2%). These patterns primarily differed in smoking habits, binge drinking, daily alcohol intake, diet quality, ultra-processed food consumption, long-term stress and physical (in)activity. Sleep, TV watching time and social connections lacked strong clustering properties. Socio-demographic characteristics including age distribution, sex, education level, income and employment status differed significantly (nominal $p<0.05$) across lifestyle patterns. Healthy lifestyle scores decreased from Healthy but physically inactive to Unhealthy patterns gradually and no clear gradients were observed from unhealthy lifestyle scores across lifestyle patterns.

Conclusion
The five identified lifestyle patterns reveal distinct, non-random clustering of lifestyle behaviours, each associated with different socio-demographic groups. Understanding these clustering tendencies can help identify target populations and understand barriers of unhealthy lifestyle behaviours, facilitating the design of tailored health interventions.

Social Support Trajectories Following Bariatric Surgery and Their Impact on Health Behavior Change and Health Outcomes

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Introduction

Obesity is a condition contributing to non-communicable diseases and disability worldwide, and its prevalence is increasing. As of today, bariatric surgery is the most effective treatment, but suboptimal weight loss or weight regain is frequently observed. This is partly due to the inability of patients to change or maintain health behaviors and low social support. The patients social network plays an important role in adopting health behaviors. They can facilitate (e.g. exercise together) or impede implementation (e.g. reinforce old eating habits). Thus, how social support for health behaviors develops post-surgery could be important in achieving favorable health outcomes. Therefore, in this project, it will be investigated how social support develops over time following bariatric surgery with the aim of identifying distinct trajectories.

Materials & Methods

This project is part of the ongoing BARIA Study, a cohort that includes patients with obesity who underwent bariatric surgery. The study has a longitudinal design and measurements started pre-surgery and are collected up to two years post-surgery. Latent class growth modeling will be used to model social support for exercise and diet as a function of time since surgery. Then, it will be investigated whether different trajectories are associated with health behavior and health outcomes.

Results

Expected results will show how social support develops pre-surgery to two years post surgery and identify different trajectories (e.g., increasing and decreasing). The analysis will explore how members of these trajectories differ from or resemble each other demographically. Lastly, it will be demonstrated whether trajectory membership is associated with physical activity, compliance to dietary recommendations, weight loss, and quality of life.

Conclusion

Currently, post-surgery treatment is mostly focused on individual behavior (e.g., cognitive behavioral therapy), showcasing that social network interventions might have underutilized potential. The identification of different social support trajectories will provide insight into whether specific subgroups could benefit from different interventions.

From pH Testing to Colposcopy: A Comparative Analysis of Sequential Screening Tools for Cervical Cancer in Low-Resource Settings

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Introduction

Cervical cancer remains a leading cause of cancer-related mortality in women globally, with disproportionate impacts in low-resource settings. Conventional screening methods like cytology and HPV testing are resource-intensive, making them inaccessible in underserved areas. This study explores the utility of a sequential cervical cancer screening strategy, integrating PrePap QR (pH testing), VIA (Visual Inspection with Acetic Acid), cytology, and colposcopy, as a feasible and cost-effective model for early detection in tribal populations.

Materials & Methods

This prospective, cross-sectional study was conducted in the tribal regions of Khapri District, Nagpur. A total of 154 women aged 3060 years were recruited during organized cervical screening camps. Trained health workers, including ANMs and ASHAs, conducted sequential screening: PrePap QR (cervical pH testing) as the initial tool, followed by VIA, cytology (Pap smear), and on-site colposcopy for further evaluation of suspicious cases. Sensitivity, specificity, and feasibility were assessed for each method individually and as a combined strategy.

Results

PrePap QR identified abnormal pH levels in 25% of participants, of which 80% correlated with abnormal findings in subsequent tests. VIA showed acetowhite lesions in 20% of cases, and cytology detected precancerous changes in 15% of participants. Colposcopy confirmed high-grade lesions in 10% of cases. The combined sequential approach improved detection rates, reduced unnecessary colposcopies, and proved feasible in the low-resource setting.

Conclusion

The sequential cervical cancer screening model using PrePap QR, VIA, cytology, and colposcopy demonstrated high accuracy and feasibility for early detection in tribal populations. Training local health workers ensured effective implementation and scalability, offering a cost-effective alternative for cervical cancer screening in underserved areas.

Relationship Between Novel Lipid Parameters and the Risk of Diabetes in Individuals Recovered from Dyslipidemia: A Cohort Study

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Introduction
Lipid profiles are valuable for type 2 diabetes (T2D) risk assessment, but individuals recovered from dyslipidemia are often overlooked, leaving their risk unclear. This study aims to assess T2D risk in individuals with varying lipid change patterns, with a specific focus on the associations between novel lipid parameters and T2D in those recovered from dyslipidemia.

Materials & Methods
In this prospective cohort study using data from the Kailuan Study, we first analyzed 39,283 non-diabetic participants to evaluate the T2D risk across different lipid change patterns using the Cox proportional hazards model. We then focused on 3,850 individuals recovered from dyslipidemia, examining the association between both traditional and novel lipid parameters and T2D using Cox models and restricted cubic splines. The C-index of the univariable models was used to compare their predictive value. Statistical analyses were performed using SAS v.9.4 (SAS Institute, Inc, Cary, NC, USA).

Results
A total of 5,223 participants (13.3%) developed T2D. Individuals recovered from dyslipidemia had a higher T2D risk (hazard ratio [HR], 1.37; 95% CI, 1.25-1.51) compared to those with consistently normal lipids. Among this group, high-density lipoprotein cholesterol (HDL-C) was inversely associated with T2D risk, while triglyceride (TG), lipoprotein combine index (LCI), atherogenic index of plasma (AIP), non-HDL-C, Castellis index-I, Castellis index-II and triglyceride-glucose index (TyG) showed positive associations. TG, LCI, AIP, and TyG showed better performance in predicting risk of T2D than other lipid markers, and even outperformed fasting glucose in non-prediabetic population.

Conclusion
Individuals recovered from dyslipidemia remain at elevated risk of T2D. Certain novel lipid parameters remained significantly associated with T2D in this specific group, and could provide valuable predictive information for diabetes risk, particularly among non-prediabetic individuals.

Occupational Skill Level, All-Cause and Cause-Specific Mortality: A Sub-Analysis of the Mexico City Prospective Study

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Introduction

According to the International Labour Organization, 2.3 million work-related deaths are recorded worldwide each year, with approximately 6,300 individuals dying daily, and one person dying every 15 seconds from a work-related accident or disease. This situation reflects health inequalities, which are, in turn, the result of underlying social inequalities. Occupation acts as an intermediate social determinant of health, mediating between sociodemographic, biochemical, and clinical factors. The relationship between occupation and overall mortality remains unclear, representing a gap in the literature. This study aims to assess the association between occupational skill level and overall mortality, as well as cause-specific mortality, in participants of the Mexico City Prospective Study (MCPS).

Materials & Methods

MCPS is a prospective cohort study of 159,597 adults from two districts in Mexico City. We included men and women aged 35-74 years with complete occupation data, excluding those aged 85 or older, students, pensioners, and participants with incomplete data. Occupational skill level, based on the International Standard Classification of Occupations (ISCO), was the primary exposure variable. Occupations were reclassified into seven groups: Managers, Professionals, Technicians, Services and Sales Workers, Craft and Related Trades Workers, Plant and Machine Operators, and Elementary Occupations. Each group was categorized into low, medium, or high skill levels, with an additional category for unemployed participants. The primary outcome was all-cause mortality, categorized into nine causes of death: cardiac, neoplastic, renal, respiratory, cerebrovascular, acute diabetic, gastrointestinal, external causes, and other vascular deaths. Cox regression estimated mortality ratios (RRs) for all-cause and cause-specific mortality associated with occupational skill levels. Models were adjusted for lifestyle factors, comorbidities, adiposity markers, and social determinants of health.

Results

The final sample included 143,527 participants. Among men, 35% were high-level, 39% medium-level, 15% low-level, and 11% unemployed. Among women, 13% were high-level, 12% medium-level, 75% low-level, and 0.5% unemployed. Lower occupational skill levels were associated with higher mortality rates. After adjusting for confounders, low occupational skill and unemployment were associated with higher all-cause mortality compared to high occupational skill.

Conclusion

Occupation is a key factor influencing mortality. These findings highlight the need for identifying specific occupational factors and implementing targeted health interventions based on occupational risks.

Health screenings to improve the public health of blue-collar migrant workers in Singapore: A cross-sectional and cohort study

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Introduction
Migrant workers (MWs) face great struggles in accessing healthcare in Singapore. While paths are in place for them to seek medical support, barriers remain such as the high costs of treatment and their employers lack of flexibility in allowing them to seek help. We aimed, by organising monthly health screenings at various locations, to map the migrant health status quo, and empower MWs to take charge of their own health through a structured screening and outreach programme.

Materials & Methods
Firstly, we conducted a cross-sectional study to examine the prevalence of chronic diseases and work-related MSK disorders among a simple-random sample of n = 1,815 MWs between January and December of 2024. Then, upon completion of the screening circuit at which they were given lifestyle and socio-behavioural advice, as well as basic physiotherapeutic exercises to self-manage MSK pain, a post-survey was administered to analyse their reception to the outreach programme.

Results
Our results reflect that there is high demand for a free screening programme which is physically accessible to the MWs as shown by the high rate and consistency of attendance. Moreover, we found that 25.6% had random blood glucose levels 11.0 mmol/L, while 61.8% had elevated BP. Of these, 96.6% had no past history of diabetes, and 98.8% had no past history of hypertension, indicating a high prevalence of undiagnosed and unmanaged chronic disease. 72.6% experienced MSK pain in at least one region of the body, most commonly the lower back (35.2%), knees (26.8%), shoulders (25.9%), and ankles/foot (20.3%). Finally, 94.6% of MWs who took the multi-lingual post-survey indicated having learnt something new, 97.1% hoped to eat healthier, and 99.5% hoped to make lifestyle adjustments such as adopting the physiotherapeutic exercise regime into their daily routine.

Conclusion
There is a pressing need for more preventive health measures to be implemented in the local migrant health scene, focused on education and self-management. Future work could employ a longitudinal study design to evaluate the long-term impacts of lifestyle change and the aforementioned educational interventions on the MWs health.

Poster session I

Infectious Disease

Presenters

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Sachitith Maduranga
Narek Petrosyn
Jimmy Banda
Julia Reis
Vitor Gabriel Lopes da Silva
Aygun Maharramova

Machine Learning Identifies New Genes to Explain Respiratory Viral Infections

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Introduction

Next to SARS-Cov-2, influenza A virus, human metapneumovirus, rhinovirus, and respiratory enteroviruses remain the leading causes of acute respiratory infections worldwide. Seasonal epidemics caused by these viruses still pose a societal challenge, especially for otherwise-healthy individuals with a genetic predisposition to respiratory viral infections, for which the key susceptibility genes remain unidentified. Current diagnostic tools also require improvement in sensitivity and specificity. Therefore, identifying key susceptibility genes and new diagnostic biomarkers is essential for future pandemic preparedness. In this study, next to new biomarker candidates, we aimed to identify differentially expressed genes shared among patients infected with influenza A virus, enterovirus/rhinovirus, and human metapneumovirus, and investigate whether the identified genes contribute to predisposition to respiratory viral infections.

Materials & Methods

Using the Recursive Ensemble Feature Selection, with its nested approach within a 10-fold cross-validation scheme, we processed 133 RNAseq samples from BioProject PRJNA660611 (GEO accession: GSE157240), including 65 adults infected with influenza A virus, 31 with enterovirus/rhinovirus, 17 with human metapneumovirus, and 20 asymptomatic controls. We analysed them in two conditions: 1) all infections were merged into one group and controls were kept separately; 2) data was divided into four categories (controls, influenza, enterovirus/rhinovirus, and human metapneumovirus) to find a minimum number of genes with maximum accuracy of distinguishing between each category. The feature selection was then validated using a different set of independent classifiers to prevent data leakage.

Results

Out of 19,203 genes, we identified 7 differentially expressed genes shared in all three infections. We also identified 166 genes capable of distinguishing between the three viruses. Out of these, we selected 5 biomarker candidates for improved diagnosis of both respiratory viral infections as a whole and infections by each virus individually. Lastly, we identified genes that could explain the increased predisposition to respiratory viral infections within a population of otherwise-healthy individuals. The diagnostic accuracy at each step was >0.99.

Conclusion

In this study, we propose new biomarkers for diagnosing respiratory viral infections together, and influenza A, enterovirus/rhinovirus, or human metapneumovirus infections individually. We also highlight candidate genes of predisposition to respiratory viral infections. Our findings can thus help improve future pandemic preparedness.

Identifying mutation hotspots in within host variants of dengue infection

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Introduction

Dengue is a mosquito borne RNA viral infection prevalent in over 127 countries and with an estimated 3.9 billion people at risk. Related RNA viruses generate swarms of within host variants. Insights into within-host variants in chronic infections like HCV and HIV have shed light on viral adaptations to host immune responses, as well as on drug and vaccine development. However, data on short-lived infections in humans is limited. In this study, we aim to investigate the dynamics of Dengue viral mutations by sequencing within host viral variants.

Materials & Methods

Whole genome sequencing of 345 samples were carried out with Oxford Nanopore Technology. After quality control 104 samples were found to have adequate depth to run Nano-Q, a bioinformatics pipeline that generated 6000 bp length sequences of within host variants and their relative abundances. For each sample Shannon entropy of variants was calculated for each nucleotide position and was averaged over all samples. Selection was estimated using a 500 randomly selected variant sequences using Fixed Effects Likelihood (FEL), A Fast, Unconstrained Bayesian AppRoximation for Inferring Selection (FUBAR), and mixed effects model of evolution (MEME) algorithms. Sites of mutational hotspots were defined as sites that meet the Shannon entropy threshold with all 3 supporting selection metrics.

Results

Over 900 variant sequences were generated with Nano=Q. 65 loci were identified that have a higher Shannon entropy value above 2 standard deviations from the mean. The FEL algorithm identified 13 sites with evidence for diversifying/positive selection ($p<0.05$) while FUBAR identified 12 sites of diversifying / positive selection (posterior probability>0.9). The MEME algorithm found 49 sites subject to episodic diversifying selection ($p<0.05$). Twelve sites were selected by all 3 selection algorithms that correspond to high entropy loci.

Conclusion

Mutation hotspots appear to cluster in core gene (3 loci), NS1 (5 loci), NS2A, NS2B (1 locus each), NS3 (2 loci). Further study is needed to identify the selection pressures that these residues face, in the function of viral proteins and in turn in the pathogenesis of Dengue.

Cheminformatic profiling of the existing chemical space of human influenza virus inhibitors

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Co-authhors: Dr. Hovakim Zakaryan

Introduction

Analyzing the existing antiviral chemical space of influenza virus inhibitors helps to systematize and consolidate growing knowledge, revealing hidden patterns, shared chemical features, and promising structural motifs that could lead to the discovery of new inhibitors.

Materials & Methods

All analyses used Python and RDKit. Molecular data for influenza A and B viruses were sourced from ChEMBL and PubChem, combined, and cleaned and deduplicated. Promising molecules had activity <1000 nM with few similar counterparts. Multitarget molecules were identified by shared graph frameworks targeting both viruses.

Results

We analyzed 364045 unique small molecules annotated in ChEMBL and PubChem, derived from phenotypic and target-specific antiviral assays. Our first step was to assess the physicochemical properties of these molecules. The majority of molecules (90.6%) meet the criteria for RO5. In comparing hemagglutinin (HA)-targeting molecules to others, we found that these molecules had significantly higher molecular weight, TPSA, HBD, HBA, and RBs ($P < 0.001$). We analyzed the distribution of these properties across different inhibitory activity categories. Molecules with higher inhibitory activity had larger TPSA values and more HBDs compared to inactive ones ($P < 0.001$).Then, we examined the structural properties of molecules. Common motifs were identified by activity categories, with aromatic amines being the most prevalent nitrogen-containing motif, especially in highly active compounds. The sulfonamide motif was more common in inactive molecules. Among the most active antiviral molecules, cyclohexene (11.9%), dihydropyran (5.7%), and pyrimidine (5.1%) were the most frequent ring structures (excluding benzene).We identified unique and active inhibitors with promising chemical space. We searched for structurally similar compounds within the broader chemical space to find new candidates for further in vitro evaluation. We identified highly active inhibitors targeting two or more influenza proteins, indicating that they hold potential for the development of multitarget antiviral drug candidates.

Conclusion

We curated small molecules tested against human influenza A and B viruses from ChEMBL and PubChem. These were analyzed for structural, physicochemical properties, and activity. Unique, promising molecules were identified, and multitarget frameworks were proposed for antiviral design.

T cell repertoire analysis reveals a distinct phenotype of mycobacterium tuberculosis in (Mtb) specific T cells in people living with HIV (PLHIV)

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Introduction

People living with HIV (PLHIV) are at increased risk of developing lower respiratory tract infections, including tuberculosis (TB), compared to HIV-uninfected individuals. HIV depletes and impairs the function of Mtb-specific T cells, which are crucial for controlling Mtb infection. The impact of HIV on Mtb-specific T cell receptors (TCRs) in alveolar T cells is incompletely understood.

Materials & Methods

Peripheral blood and bronchoalveolar lavage (BAL) samples were collected from PLHIV on long-term ART (average of 12 years) and HIV-uninfected adults at Queen Elizabeth Central Hospital, Blantyre, Malawi. Alveolar and peripheral blood lymphocytes were stimulated with Mtb antigens for 18 hours and analyzed using TCR bulk sequencing.

Results

Mtb-specific TCR repertoires from HIV-uninfected individuals showed increased clonality and diversity compared to PLHIV in both the airway and blood. In PLHIV not on ART, a lower clonal count was observed compared to those on long-term ART, suggesting some restoration of repertoire clonality with long-term ART. CDR3 length distribution analysis revealed a higher and more diverse distribution of TCR amino acid lengths in Mtb-specific T cell repertoires in BAL and PBMCs of HIV-uninfected individuals compared to PLHIV. In PBMCs, the highest CDR3 peak lengths were observed between 14-16 amino acids, characterized by TRBV12 and TRBV14. In BAL, peaks in CDR3 lengths were observed between 12-15 amino acids, dominated by TRBV12, TRBV13, and TRBV14.

Conclusion

HIV significantly impacts Mtb-specific TCR diversity and clonality in both blood and airway. Long-term ART appears to partially restore TCR clonality. Identifying highly expressed TRBV segments provides insights into host protective immunity mechanisms in HIV and TB, offering crucial targets for vaccine development and preventive therapies.

Impact of maintenance immunosuppressive regimen after kidney transplantation on the vaccine-induced protective immunity anti-SARS-CoV-2 following ChAdOx1 as primary vaccination

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Introduction

Kidney transplant recipients (KTRs) are at increased risk of severe COVID-19 due to chronic immunosuppression, which may impair vaccine-induced immunity. Mycophenolate sodium (MPS) and azathioprine (AZA) are commonly used immunosuppressive agents, but their effects on anti-SARS-CoV-2 antibody kinetics remain unclear. This study compares the kinetics of protective immunity following ChAdOx1 primary vaccination in KTRs receiving MPS versus AZA.

Materials & Methods

In this prospective, single-center, observational study, 89 transplant patients with advanced chronic kidney disease (CKD) who had seroconverted after ChAdOx1 vaccination were included. The inclusion occurred in the transplantation data. Patients were stratified by maintenance immunosuppression: MPS (n=51) or AZA (n=38). Anti-SARS-CoV-2 IgG titers and neutralizing antibody activity were assessed at baseline (immediately before transplantation) and at 1-, 3-, 6-, and 12 months post-transplantation. Linear regression models and generalized estimating equations were used to evaluate group and time effects.

Results

Patients were 47 years old, 53% male; most prevalent CKD etiology was undetermined (34%) or glomerulopathy (27%); 83% undergoing hemodialysis for 29 months, longer in the MPS group, p=0.006, with no other differences between groups in the demographic characteristics. At baseline (immediately before transplantation), IgG titers were 12,059.2 AU/mL (MPS) and 14,369.3 AU/mL (AZA), with both groups experiencing a decline at month 1 post-transplant (9,483.9 AU/mL and 11,023.5 AU/mL, respectively). By month 12, IgG titers stabilized at 11,626.8 AU/mL (MPS) and 13,851.4 AU/mL (AZA; p=0.286). Neutralizing antibody activity was initially higher in the AZA group (0.924 vs. 0.764 at baseline; p=0.006) but converged with the MPS group by month 3 (0.937 vs. 0.871; p=0.161). Booster doses significantly enhanced responses, 1.250.82 and 1.40.60 dose/patient-year (MPS and AZA, respectively, p=0.22), with a mean gain of 0.175 in neutralizing activity over 12 months, similar in both.

Conclusion

Compared with MPS, AZA offers a transient early advantage in vaccine-induced protective immunity, but antibody kinetics until 1-year after transplantation were comparable. Booster doses are critical for sustaining immunity in KTRs, underscoring the need for tailored vaccination strategies in this population.

Humoral and cellular response to five Covid-19 vaccine doses in 55 Inborn Errors of Immunity patients compared to healthy controls

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Introduction

Inborn Errors of Immunity (IEI) are associated with impaired immunity to infections and vaccines. SARS-CoV-2 infection can be more severe in IEI patients. We evaluated humoral and cellular immune responses to Covid-19 vaccines in IEI and healthy controls.

Materials & Methods

Fifty-five IEI (13-61y) and 60 controls (13-71y) were immunized for Covid-19 using regimens with inactivated-SARS-CoV-2 (CoronaVac), non-replicating viral-vectored (AstraZeneca-ChAdOx1-nCov-19) or mRNA (Pfizer-BioNTech-BNT162b2) vaccines. Patients and controls were sampled five times. Humoral immunity was assessed for detection of neutralizing antibodies to Spike, Nucleocapsid, RBD-Wuhan, RBD-Delta, RBD-BA.1, RBD-BA.2 and RBD-BA.5. Spike and Nucleocapsid T-cell responses were assessed by ELISpot. Statistical analysis was assessed by linear or logistic regression models.

Results

Mean antibodies to Nucleocapsid, RBD-Wuhan, RBD-Delta, RBD-BA.2 and RBD-BA.5 in IEI and controls differed over time after 1st-booster for IEI and the 2nd-boosters for controls ($p<0.05$). Controls had higher antibodies than IEI (examples: 11977 vs 8814 IU/mL for RBD-BA.1 and 271 vs 201 IU/mL for RBD-Wuhan one-month after 2nd-booster; $p<0.05$). The same timepoints evaluated in controls and IEI for seropositivity showed 98.3% vs 92.9% for RBD-BA.1 ($p<0.05$) and 100% vs 97.6% for RBD-Wuhan ($p=0.061$). T-cell response to Nucleocapsid and Spike was similar between IEI and controls ($p>0.05$), but IEI had a more robust response to Spike (405.2 vs 149.8 spots-forming-cells/106 PBMCs after 2-boosters; $p=0.002$). Both groups showed an increasingly stronger cellular immunity to Nucleocapsid over time ($p=0.017$), a reflexion of SARS-CoV-2 infections that occurred during this period. Covid-19 hospitalization among IEI patients was reduced from 5.45% (3/55) to no hospitalization after the 1st-booster.

Conclusion

IEI patients with predominantly humoral defects responded to a three-dose SARS-CoV-2 immunization scheme with cellular immunity similar to controls. However, IEI had a lower humoral response. Boosters provide increase in humoral and cellular immunity. T-cell responses may be involved in protecting IEI patients from severe Covid-19 and death.

Chronic Obstructive Pulmonary Disease and Pulmonary Tuberculosis comorbidity: Comparative Analysis of Bronchodilator Therapies

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Introduction
Chronic obstructive pulmonary disease (COPD) and pulmonary tuberculosis (TB) are major public health challenges with significant socio-economic impacts. The coexistence of these diseases exacerbates their clinical severity, highlighting the need for safe and effective therapies to improve treatment outcomes.This study aimed to compare the effectiveness of tiotropium bromide (LAMA) and a combination of tiotropium bromide/formoterol fumarate (LAMA/LABA) as adjunct therapies in correcting airway obstruction in patients with TB and COPD comorbidity.

Materials & Methods
A prospective study was conducted involving 62 patients with TB+COPD.Participants were divided into two groups: Group 1 (n=31) received tiotropium bromide (18 mcg/day), while Group 2 (n=31) received tiotropium bromide/formoterol fumarate (18/12 mcg/day). Treatment effects were assessed over three months using the Modified Medical Research Council (MRC) dyspnea scale, COPD Assessment Test (CAT), and spirometry. TB therapy outcomes, including smear negativity, cessation of bacterial excretion, and closure of cavitation, were also evaluated after six months.

Results
Both groups showed significant improvement in dyspnea severity (MRC scoredecreased by 1 point). FEV1 increased by 150 ml in Group 1 and 180 ml in Group 2.CAT scores improved, with Group 2 showing a greater reduction (10 points) compared to Group 1 (12 points). TB treatment outcomes were slightly better in the LAMA/LABA group, with smear negativity in 94.1% of cases versus 88.2% in the LAMA group. Bacterial excretion cessation was achieved in 80.0% (Group 2) and 77.8% (Group 1) (2=14,727; 0,001), while cavity closure rates were 65.0% and 66.7 %(2=11,636; 0,001), respectively.

Conclusion
The combination of LAMA/LABA offers superior benefits in managing TB+COPD by improving respiratory function and enhancing treatment adherence. Its inclusion in comprehensive therapy regimens can improve patient outcomes and reduce TB treatment duration.

Poster session I

Gastrointestinal Medicine I

Presenters

Erfan Sabouri
Gaisha Hayya Alhaura Muchsin
Qiao Chen
Aarushi Ahuja
Harshini Nadella

Gastrointestinal Bleeding in COVID-19 patients: Identifying the Predictors of Mortality

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Introduction

The high transmission rate of Coronavirus Disease (COVID-19) led to a global pandemic with substantial fatalities, primarily due to acute respiratory distress syndrome. Gastrointestinal bleeding (GIB) with a notable prevalence of 1.5-3% in COVID-19 is another prominent cause of death, resulting from altered hemodynamics, hypovolemic shock, and multiple organ dysfunction. This study was conducted to evaluate GIB prevalence and mortality rate in COVID-19 patients and to assess the role of potential risk factors on patient outcomes.

Materials & Methods

This retrospective cross-sectional study, used the records of all confirmed COVID-19 adults, admitted to Isfahan Shariati Hospital between March 2020-2022. Following the ethical guidelines, mentioned records were assessed by two physicians, independently, for overt GIB symptoms (melena, hematochezia, and hematemesis). Patients with prior history of GIB, peptic ulcer disease, diverticulitis, hepatic cirrhosis, inflammatory bowel disease, end-stage renal disease, and gastrointestinal malignancies were excluded. Data on demographics, comorbid conditions (e.g., hypertension, diabetes mellitus, and cardiovascular disease), manifestations of GIB, bleeding onset, and anticoagulants administration was extracted. Patient outcomes in 30 days after discharge were determined through phone interviews. Subjects were divided in two groups of alive and deceased to assess the role of variables on outcome by Chi-square tests and logistic regression models using IBM SPSS Statistics (Version 26).

Results

Among 7243 COVID-19 patients, 107 (1.5%) individuals experienced GIB symptoms. After exclusion, 63 patients (0.86%) with a mean age of 66.66 13.51 years were enrolled, of which 71.4% were male and 47.6% were reported deceased. The most common manifestations were hematemesis (42.9%) and melena (33.3%), indicating a 76.2% upper GIB source. The prevalence of hypertension, diabetes, and cardiovascular disease was 39.7%, 31.7%, and 19%, respectively. 61.9% of GIB occurred during hospitalization, while 81.0% of patients received anticoagulants. Other than significant associations between the outcomes and gender (P=0.013, OR=3.70), and the onset of bleeding (P=0.001, OR=5.658), no statistically significant relationship was found among variables.

Conclusion

In-hospital bleeding and female gender are crucial prognostic factors of mortality in COVID-19 patients experiencing GIB. Considering the fatal consequences of GIB in COVID-19 patients, further studies are recommended to assess the roles of risk factors to prevent adverse outcomes.

Risk of Gastrointestinal Bleeding Events Following Non-vitamin K Antagonist Oral Anticoagulants in Atrial Fibrillation: A Systematic Review and Meta-Analysis

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Introduction
Atrial Fibrillation (AFib) is the sustained arrhythmia most frequently found in clinical practice. This condition contributes to a reduction in the quality of life and an increase in mortality, mainly due to stroke and venous thromboembolism (VTE). Recently, Non-vitamin K Antagonist Oral Anticoagulants (NOACs) agents have proven successful in many RCTs in the prevention and treatment of stroke and VTE for AFib patients. NOACs offer comparable efficacy to traditional anticoagulants like warfarin, with the added advantage of not requiring routine monitoring. However, these drugs have been associated with an increased risk of gastrointestinal (GI) bleeding. We performed systematic review and meta-analysis to evaluate the risk of GI bleeding in patients receiving these drugs.

Materials & Methods
Study search and selection were conducted in PubMed, Scopus, Google Scholar, and Web of Science until 18th January 2024 for studies that compare NOACs with conventional therapies for AFib. RoB 2.0 was used to assess the quality of the included studies. We conducted a meta-analysis using Review Manager 5.4, reporting risk ratio (ORs) with 95% confidence interval (CI) with the primary outcome was major GI bleeding.

Results
Our systematic review included a total of 8 studies and 4 were included in the meta analysis. In the prevention of thromboembolism for AFib patients, our study shows no significant differences between NOACs and conventional therapies in the risk of GI bleeding with p=0.52 and OR: 0.92 (95% CI:0.70, 1.20). Similar results found in 5 studies and other 3 studies show dabigatran and rivaroxaban have an increased odds of GI bleeding compared to conventional therapies.

Conclusion
In this systematic review and meta-analysis, NOACs and conventional therapies relatively have similar GI bleeding risk. Thus, NOACs can be used as an alternative for thromboembolism prevention in AFib patients with minimal monitoring compared to conventional therapies. Further research to assess GI bleeding risk among NOACs are needed.

Ketogenic diet ameliorates cholestatic liver disease through regulating Ly6C-/Ly6C+ balance in a liver microbiota-dependent manner

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Introduction

Cholestatic liver disease (CLD) is a microbiota-associated disease with limited treatment options. Liver microbiota has been found in both patients and murine model of CLD; however, its role in CLD hasnt been elucidated. Ketogenic diet (KD) can intervene in many diseases by regulating gut microbiota, but the consequences of KD on CLD remain unknown. Therefore, we aimed to investigate whether KD could intervene in CLD by modulating liver microbiota.

Materials & Methods

C57BL/6J mice was induced CLD by bile duct ligation (BDL), alpha-naphthylisothiocyanate (ANIT) and Mdr2 knockout. Gut and liver microbiota were analyzed through 16S rRNA sequencing (16S-seq). We constructed fluorescently labeled bacteria by d-amino acid-based in vivo labeling. Bacterial fluorescence tracing experiment was performed by in vivo imaging system. Whole-genome sequencing or microbial mass spectrometry was used for strain identification. High-throughput mass cytometry (CyTOF) was used for deep immune profiling.

Results

Compared with control diet, KD significantly reduced liver injury-related parameters and liver necrosis area in BDL, ANIT and Mdr2-/- mice. Fecal microbiota transplantation using stool samples from KD-treated mice or KD-treated patients revealed that KD alleviated CLD in a microbiota-dependent manner. 16S-seq showed KD significantly reduced intestinal and hepatic Lactobacillus. Moreover, qRT-PCR revealed marked decrease in hepatic and intestinal Lactobacillus johnsonii (L. johnsonii) after KD treatment. The hepatic L. johnsonii reduction was further confirmed by bacterial culture of liver tissues and fluorescence in situ hybridization. Bacterial fluorescence tracing experiment confirmed the hepatic L. johnsonii originated from the gut, and KD reduced gut-liver translocation of L. johnsonii. Administration of L. johnsonii abolished the ameliorating effects of KD on CLD. Furthermore, CyTOF revealed KD selectively downregulated the frequency of hepatic CD11b+F4/80-Ly6C+ macrophages as well as upregulated the ratio of hepatic CD11b+F4/80-Ly6C- macrophages, while L. johnsonii showed opposite regulatory effects on Ly6C-/Ly6C+ macrophages. Additionally, KD significantly increased circulating and intestinal -hydroxybutyrate concentrations and -hydroxybutyrate directly inhibited the growth of L. johnsonii.

Conclusion

KD directly inhibits the growth of intestinal L. johnsonii by increasing -hydroxybutyrate concentrations, thereby alleviates CLD through reducing gut-liver translocation of L. johnsonii and regulating hepatic Ly6C-/Ly6C+ balance.

Achalasia cardia in pediatric and adolescent subjects: Clinico-radiological spectrum and subtyping on high resolution manometry

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Introduction
Achalasia cardia (AC) is a rare esophageal motility disorder in pediatric populations. Limited data exist on the distribution of AC subtypes as per the Chicago classification of esophageal pressure topography (EPT). This study aimed to evaluate the clinic-radiological profile and esophageal motility patterns in pediatric and adolescent patients with AC.

Materials & Methods
Clinical, radiological and manometric features of pediatric/adolescent patients (age <12, 12-18 years) with achalasia cardia were evaluated. High resolution manometry (HRM) was performed using 16-channel esophageal manometry catheter. Data was recorded at baseline followed by ten 5-ml water swallows in supine position. Chicago classification criteria was followed for AC diagnosis and subtype categorization (Types I, II, III). Upper GI Endoscopy and barium swallow/CT scan were performed prior to HRM in all subjects.

Results
Out of 57 patients, 34 (59.6%) were females. Median age was 14 (3-17) years. Dysphagia (100%) and regurgitation (75.4%) were the most common symptoms. Retrosternal chest pain (24.6%) and heartburn (10.5%) were less frequent. Two patients presented with triple A syndrome (Alacrimia, Achalasia, Adrenal insufficiency). Median duration of symptoms at presentation was 3 (1-7) years. HRM identified Type II achalasia as the most common subtype (63.2%), followed by Type I (21.1%) and Type III (15.8%). Type III patients more often experienced chest pain and exhibited higher basal LES pressure and maximal esophageal pressurization. Barium swallow/CT Imaging revealed a dilated esophagus with bird-beak narrowing at the GE junction in 80.7%, with mid/lower esophageal diverticula in 15.8% and near normal esophagogram in 3.5% of subjects.

Conclusion
Dysphagia and regurgitation are hallmark symptoms of AC in pediatric patients, with Type II being the most prevalent subtype. Alacrimia should prompt clinicians to consider triple A syndrome in this population. These findings emphasize the importance of HRM and imaging in diagnosing and subtyping pediatric AC to guide individualized management strategies.

Insights into Non-Cirrhotic and HCC-Associated Portal Vein Thrombosis in South India: An 18-Year Ambispective Analysis

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Introduction

Portal vein thrombosis (PVT) is the obstruction of the portal venous system by a thrombus. While PVT is a well-recognized complication in patients with advanced chronic liver disease (CLD), its occurrence in non-cirrhotic (NCPVT) and hepatocellular carcinoma (HCC) patients remains less understood, particularly in the Indian population. In this study, we aim to decode the risk factors and prognosis of these patients

Materials & Methods

We conducted an 18-year ambispective analysis (20052023) at our tertiary care center in South India, identifying 795 portal vein thrombosis (PVT) cases, of which 117 were non-cirrhotic with no prior history of chronic liver disease (CLD) and 511 had HCC. This study investigates the underlying risk factors, clinicopathological characteristics, associated complications, and patient outcomes

Results

Among 117 patients with NCPVT, 74% were male. Notable findings included a prevalence of myeloproliferative disorders (2.6%), JAK mutations (63%), and deficiencies in Protein S (62%), Protein C (62%), and Anti-thrombin (63%). Complications included portal cavernoma (27%), superior mesenteric vein occlusion (26% partial), and splenic vein occlusion (18% partial). Of the 511 with HCC PVT, 93% were male, the majority of whom had cirrhosis (95%). Increased risks for HCC PVT were noted in patients with systemic diseases (29%) and those using diuretics (45%). Tumor development was linked to a 72% mortality rate, whereas only 11% of NCPVT patients experienced mortality.

Conclusion

The analysis underscores that NCPVT is primarily associated with acquired and inherited thrombophilia, with extrahepatic thrombus extension being a major complication. Notably, patients with HCC PVT face the highest mortality rates. These findings in the South Indian population emphasize the need for personalized management strategies to reduce complications and improve patient outcomes

Poster session I

Public Health I

Presenters

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Swatski Mandal
Catherine Rejoice Nyirenda
Nino Gagua
Samir Mir Mahmoud
Anna Albero
Zsanna Hetényi
Mastewal Erango

The Future of Immunisation in Primary Care: A Quality Improvement Project (QIP) Exploring Barriers to Flu Vaccine Access

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Introduction

Influenza is a major public health concern in the UK, causing significant morbidity and mortality, particularly among older adults [1]. Despite the flu vaccine's effectiveness in reducing transmission at individual and population levels, uptake remains below targets [2]. Addressing logistical and educational barriers is essential in reducing the Influenza burden.This survey evaluated patient satisfaction with the flu vaccine program at a GP practice in an area with high socioeconomic indicators in South-West London, serving approximately 8,700 patients. The project was driven by a Care Quality Commission report highlighting that the practice's vaccine uptake was below the Clinical Commissioning Group and national averages. Specifically, 63% of patients over 65 were vaccinated, compared to the 71% national average.

Materials & Methods

Between December 2023 and February 2024, 1,807 registered adult patients received an anonymous online survey via SMS to identify barriers to flu vaccine uptake. Answers were collected from closed and open-ended questions to inform recommendations for improving vaccine uptake.

Results

The survey received 299 responses (16.5% response rate), with 18.8% expressing 'very low confidence' in flu vaccine safety and effectiveness. While statistical analyses found no significant age-related differences, those under 60 reported slightly higher confidence (mean score of 3.83 out of 5) than those over 60 (mean score of 3.62 out of 5). A significant proportion of respondents preferred pharmacies over GP practices for vaccination (45.2% versus 34.5%, $p = 0.038$). Key barriers included poor communication regarding vaccine availability, limited vaccine education, and concerns about side effects (18.9%, $n = 280$).

Conclusion

Educational initiatives addressing concerns about possible side effects and misinformation may improve confidence. Qualitative interviews and focus groups could facilitate this. Enhanced coordination between GPs and pharmacies, through signposting available appointments, could streamline vaccine distribution and accessibility.

A Knowledge, Attitude and Practice study amongst medical students of Kolkata, India regarding Transgender Health Issues .

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Introduction
Transgender individuals face unique healthcare needs that are often unmet due to systemic barriers and social stigma. Medical students are future doctors, hence it is imperative to study their mindset regarding Transgender (TG) health issues. This study was conducted to evaluate and gain insights into the knowledge, attitudes, and practices (KAP) of 2nd year MBBS students concerning transgender healthcare.

Materials & Methods
A cross-sectional study was conducted between December 2024-January 2025 using a web-based survey distributed to 2nd year MBBS students of a private Medical College in Kolkata, India. A validated questionnaire was used to understand themes related to medical knowledge, education, and profession about TG health issues. A convenient sampling was done and 99 students were chosen. $p < 0.05$ is considered statistically significant. Mann-Whitney U test was conducted using STATA 14 software.

Results
Majority of the participants (69.7%) strongly agreed to the necessity of including transgender issues in the medical curriculum which is currently lacking in India. Lower perception was noted in familiarity with transgender medical issues (32.32% strongly agreed, mean = 3.76), and comfort in treating transgender patients for gender-related issues (38.38% strongly agreed, mean = 3.60), suggesting gaps in familiarity and comfort.45.45% participants strongly agreed to the necessity for more training in transgender medicine (mean = 4.04), and 55.56% strongly agreed to be comfortable in treating transgender patients for non-gender-related issues (mean = 4.16). For each parameter, the p value of Mann-Whitney U test was found to be < 0.0001.

Conclusion
This study highlights the lack of of transgender inclusive training among the 2nd year medical students of the private Medical College of Kolkata. This is a concerning finding considering gaps already persist in familiarity with transgender-specific medical issues and comfort in addressing gender-related concerns worldwide. There is an immediate requirement of addition of TG specific healthcare issues in the Indian medical curriculum to ensure training of TG inclusive doctors in the country.

EVALUATON OF UTILIZATION OF THIRD LINE ANTIBIOTICS (MEROPENEM, VANCOMYCIN AND PIPERACILLIN+TAZOBACTAN) IN MALAWI: A PHARMACIST S PERSPECTIVE.

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Introduction

Antimicrobial Resistance (AMR), including resistance to antibiotics, has emerged as a global health crisis with Sub-Saharan Africa being disproportionately affected. The convergence of factors such as frequent misuse and overuse, limited healthcare infrastructure, widespread poverty, and insufficient public health policies contribute significantly to the rise in resistance. In Malawi, there is an increase in reports of resistance to second-line antibiotics, which has led to a significant shift to the utilization of Third Line Antibiotics (TLAs): meropenem, vancomycin, and piperacillin-tazobactam for the management of confirmed and suspected bacterial infections. The broad objective of this study was to evaluate the utilization of TLAs in Malawi. The study specifically determined the frequency of TLA prescriptions, determined the rate of adherence to TLA prescribing and dispensing protocols with the aim of analyzing the current state of antimicrobial resistance in Sub-Saharan Africa, and potential strategies for effective intervention.

Materials & Methods

A retrospective qualitative study was conducted where data was drawn from healthcare records. Collected data included all TLA prescriptions and TLAs dispensing registers. The methodology encompasses a multidisciplinary approach, combining insights from pharmacology, epidemiology, public health, and healthcare policy.

Results

The results showed that meropenem had the highest frequency of prescriptions than other TLAs. It was noted that 43.15%, 22.81%, and 20.69% of the total meropenem, vancomycin, and piperacillin-tazobactam prescriptions had sensitivity test results available prior to prescribing and dispensing of the respective drugs. Sensitivity test results also take long (35 days) before they are available, hence, clinicians and pharmacy personnel deem it necessary to save the dying patients as they are waiting for sensitivity test results. Evidently, the results show a high level of antimicrobial resistance in the region.

Conclusion

The findings indicate an urgent need for improving diagnostic infrastructure to speed up sensitivity testing, enforcing strict adherence to prescribing protocols, and training healthcare providers on antimicrobial stewardship. Strengthening public health policies and healthcare systems is crucial to mitigate AMR in Malawi and Sub-Saharan Africa.

Highlighting challenges and bringing change in rural healthcare through visual storytelling

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Introduction

With a focus on storytelling through photography, the project "6 Days of Country Doctors" aimed to address healthcare challenges in rural areas of Georgia, raise awareness about country doctors and health determinants, while empowering medical students to work in rural areas. The project provides an opportunity to assess the rural healthcare gaps.

Materials & Methods

17 students visited four mountainous regions of Georgia over three years (2022-2024). The students were trained in photography and storytelling to document the experiences of country doctors. After the expedition, a survey assessed the impact of the experience among 2022-2023 participants. A questionnaire with multiple-choice and open-ended questions was administered to doctors (n=11) and students (n=12), achieving an 83% response rate.

Results

Photography helped bridge the gap between underserved rural areas and public awareness. Digital storytelling allowed students to highlight the dedication of CDs and make their work visible to diverse audiences. As reported by one of the participant physicians, following the project local populations' trust increased towards country doctors. Visual storytelling encouraged discussion about rural healthcare challenges. Impact extended in the following areas: 1) dermatological screening outreach in rural areas organized by Tbilisi Medical Academy (TMA); 2) TMA has been offering English classes to CDs based on their identified needs; and 3) one CD has joined TMAs Grant Commission for Social and Cultural Student Projects. The project caught attention and was covered by different media and broadcasters.

Conclusion

The project had an important impact on healthcare. It highlighted the importance of partnership, while connections between CDs, rural communities, and a broader audience suggest a model for equity in healthcare. The third and final season of the project concluded in September 2024. Consequent activities are planned for early 2025. Further collaborative initiatives, are also in the planning stages, highlighting an ongoing commitment to rural health improvement and education through partnerships.

Improving respiratory health and well-being in Tehrans apartments: role of green roofs in regulating indoor temperatures and air quality

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Introduction

Respiratory diseases are a major public health concern in Tehran, exacerbated by high indoor temperatures and poor air quality in residential buildings. Green roofs, which involve planting vegetation on rooftops, offer a sustainable solution to regulate indoor temperatures and improve air quality, potentially reducing respiratory symptoms and enhancing overall well-being. This study evaluates the impact of green roofs on indoor temperature regulation, air quality, respiratory health, and well-being in Tehrans apartments.

Materials & Methods

The study was conducted in 10 apartment buildings in Tehran over six months (MayOctober 2024). Five buildings were retrofitted with green roofs, while the remaining five served as controls. Indoor temperature, humidity, and air quality parameters (PM2.5 and CO2) were monitored using sensors installed in living rooms and bedrooms. Respiratory symptoms were assessed using the St. Georges Respiratory Questionnaire (SGRQ), while overall well-being was measured using the World Health Organization Well-Being Index (WHO-5), a validated tool for assessing mental and physical well-being.

Results

Buildings with green roofs showed significant improvements in indoor environmental conditions. Indoor temperatures were 4C lower (26C vs. 30C) on average during peak summer months compared to control buildings, while humidity levels remained stable, enhancing indoor comfort. PM2.5 levels decreased by 20%, from 35 g/m3 to 28 g/m3, and CO2 levels dropped by 15%, from 1,200 ppm to 1,020 ppm, due to improved ventilation and pollutant absorption by vegetation. Residents in buildings with green roofs reported a 15% reduction in respiratory symptoms, including coughing, wheezing, and shortness of breath, and a 20% improvement in overall well-being, with higher energy levels, better mood, and improved sleep quality.

Conclusion

Green roofs significantly improve indoor temperature regulation, air quality, respiratory health, and overall well-being in Tehrans apartments, offering a low-cost, sustainable solution to urban environmental challenges. These findings highlight the importance of integrating green infrastructure into residential design to promote public health. By adopting green roofs, policymakers and urban planners can create healthier living environments, reducing the burden of respiratory diseases and enhancing well-being in Tehran and similar cities.

Ethnic density and other neighborhood characteristics influence birth outcomes: evidence from a cohort study

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Erasmus MC

Introduction

Perinatal outcomes in The Netherlands vary significantly across neighborhoods, mainly because of maternal and neighborhood characteristics. However, one factor: ethnic density, defined as the concentration of ones own ethnic group within a population presents a paradox. While studies found that Western women generally have better birth outcomes than non-Western ones, this trend seems reversed in socioeconomically disadvantaged neighborhoods with high concentrations of ethnic minorities. In these neighborhoods, Western women show worse birth outcomes than their non-Western counterparts. The aim of this study is therefore to determine how ethnic density and other neighborhood characteristics lead to health disparities.

Materials & Methods

We conducted a retrospective cohort study using registry data from 2010-2021. Logistic regression analysis was performed in RStudio to evaluate the association between neighbourhood variables and three birth outcomes: low preterm birth, late entry into prenatal care and small for gestational age (SGA). Cofounding variables, such as maternal age were included in the model. Results were presented using odds ratios and 95% confidence intervals.

Results

Ethnic density significantly influenced all three outcomes, with the effects varying by ethnic group. For non-Western women, negative birth outcomes decreased by 5.66% when going from low to medium ethnic density areas, while for Western women the difference was only 0.69%. For preterm birth, the ORs for medium and high ethnic density, compared to low density were 0.913 (95% CI 0.9130.971) and 0.919 (95% CI 0.9190.980), respectively, indicating a slight protective effect when ethnic density increases. Similar trends were observed for late entry: OR (0.75170.8036 and 0.74260.7951) and SGA: OR (0.91880.9492 and 0.94030.9792). Interaction terms showed that ethnic density's impact was also influenced by socioeconomic status and urban density.

Conclusion

Ethnic minority status is a risk at the individual level. However, higher ethnic density in neighborhoods reduces the risk of negative outcomes for non-Western women, whereas Western women seem to get minimal benefit. This protective effect is most likely due to an increased sense of community and reduced discrimination. These findings show the importance of enhancing neighborhood resources and support.

Characterizing frailty in kidney transplant recipients with concurrent skin cancer: results from the TransplantLines Biobank and Cohort studies

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Introduction

Cutaneous squamous cell carcinoma (cSCC) is a common long-term side-effect for kidney transplant recipients (KTRs) due to chronic immunosuppression. While cSCC is generally manageable, transplant recipients face higher risks of multiple, metastatic, or high-risk cSCC, necessitating aggressive treatments. Frailty, a condition marked by diminished physical, cognitive, and physiological reserves, may further complicate treatment for KTRs with SCC, yet it is not routinely assessed. In our study we explored frailty prevalence and characteristics in KTRs with and without cSCC, hypothesizing more deficits in those with cSCC.

Materials & Methods

This retrospective cohort study utilized data from the TransplantLines biobank at the University Medical Centre Groningen and the Dutch nationwide pathology database PALGA. We identified KTRs with and without cSCC and assessed our primary outcome, frailty, using the Clinical Frailty Scale (CFS). Secondary outcomes included reconstructing different geriatric domains: functional, somatic, psycho-cognitive, social, and life quality. We attempted to identify deficits in these domains based on questionnaire data.

Results

The study included 444 patients, of which 73 were diagnosed with cSCC and 53 were identified with high-risk, multiple, or metastatic cSCC. The mean age of cSCC patients was 63 years, and the mean time since transplantation was 13 years. Frailty based on the CFS was found in 22% of cSCC patients and 15.9% in the non cSCC group. Among high-risk cSCC patients, 24.5% were frail. The most prevalent deficits were mobility limitations (46.6%), polypharmacy (95.9%, mean 9 medications), and cognitive impairment (18%). Age and time since transplantation were the only significant predictors of cSCC development ($P < .001$).

Conclusion

Our study highlights a significant frailty burden among KTRs, as it was prevalent in 22% of 73 patients with cSCC. Deficits were most prominent in the somatic and functional domains, with high rates in mobility, polypharmacy, and comorbidities. Differences in age and longer time after transplantation seem to explain the increased frailty in the cSCC group. This highlights the importance of frailty assessments in treatment planning to reduce complications, prevent overtreatment and improve outcomes for this vulnerable population. Our findings provide a foundation for further studies aimed at enhancing care strategies for KTRs with cSCC.

Pooled prevalence of optimal complementary feeding practice and its determinants among children aged 6-23 months in Ethiopia: Systematic review and meta-analysis

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Introduction
Optimal complementary feeding practice (OCFP) is essential to meet the nutritional needs of infants and young children in the early years of life. This systematic review and meta-analysis (SRMA) aimed to determine the pooled prevalence of OCFP and identify its determinants among mothers of children aged 6-23 months in Ethiopia.

Materials & Methods
Pubmed, EMBASE, HINARI, Cochrane Library, African Journals Online, Science Direct, Wiley Online Library, Jane and Google Scholar were searched. Twenty-nine observational studies involving 19,600 mother-child pairs were included. The studies were conducted in six regions and one city administration from 2013 to 2024. Two reviewers independently extracted the data, and a critical appraisal of the studies was conducted. Data analysis was performed using STATA version 17. Cochrane (Q test) and I2 test were used to test the heterogeneity of the studies. Publication bias was checked using the funnel plot for asymmetry and Egger's regression test. The random-effects meta-analysis was used to synthesize the data, which exhibited significant heterogeneity.

Results
The pooled prevalence of OCFP is 24.59% (95% CI: 18.47-30.71). Maternal education of secondary or above (OR=4.84, 95%CI: 2.93-7.99), having frequent antenatal care (ANC) contacts (OR=2.34, 95%CI: 1.77-3.10), institutional delivery (OR=2.91, 95%CI: 1.71-4.94), postnatal care (PNC) attendance (OR=3.71, 95%CI: 2.7-5.09), receiving advice on child feeding practice (OR=5.33, 95%CI: 3.03-9.37), maternal knowledge of child feeding practice (OR=5.66, 95%CI: 3.75-8.55), age of child 18-23 months (OR=3.38, 95%CI: 1.95-5.87) and household food security (OR=3.05, 95%CI: 2.62-3.55) were associated with increased odds of OCFP.

Conclusion
The pooled prevalence of OCFP was low in Ethiopia. Maternal education, maternal and child care utilization, maternal knowledge about child feeding, child age and household food security were the determinants of OCFP. This SRMA showed a need for coordinated intervention to improve children's feeding practices by counseling mothers regarding child-feeding practices and the benefits of delivering at health facilities during ANC and PNC follow-ups, educating mothers and engaging households in food security programs.

Poster session I

Vascular Medicine

Presenters

Jagoda Bobula
Mai marika Kubisova
Julia Szostek
Sudhir Rajbhandari
Elham Valimohammadi
Weronika Nowicka
Xueling Chen
David Araujo

Can you cut out my aneurysm? 3D printed models as a tool for effective communication with the surgical patients

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Introduction

Three-dimensional (3D) printing has emerged as a valuable tool in medicine, enabling the creation of models that can be examined from multiple perspectives and effectively employed in patient education. This study aimed to determine whether educating patients about aortic aneurysms and their planned surgery using 3D models is more effective than traditional consultations.

Materials & Methods

Three physiologically sized aneurysm models were prepared: a classic abdominal aortic aneurysm, an abdominal aortic aneurysm involving renal arteries, and an aortoiliac aneurysm. Patients undergoing open aortic repair (OAR) or endovascular aneurysm repair (EVAR) at the Vascular Surgery Department of the University Clinical Center in Gdansk between August 2024 and January 2025 were randomized into two groups using the Random application: Group A (education with a 3D model) and Group B (education without a 3D model).A structured questionnaire was developed to evaluate the education process comprehensively. Before the educational session, the questionnaire assessed: exclusion criteria (diagnosis of Alzheimers disease, depression, or anxiety disorders), generalized anxiety levels using the Generalized Anxiety Disorder Questionnaire (GAD-7), baseline understanding of the procedure the patient was scheduled to undergo, and the current level of anxiety regarding the procedure.After the educational intervention, the following were re-assessed: understanding of the procedure, and current level of anxiety regarding the procedure. Additionally, Group A patients were asked to evaluate the 3D aneurysm model.

Results

Preliminary results from 25 participants (13 in Group A) revealed that patients educated with 3D models reported a greater improvement in understanding the procedure compared to those in Group B. The difference between baseline and post-education comprehension was also higher in Group A. However, anxiety levels did not differ significantly between the groups.

Conclusion

Education using 3D models appears to be a more effective communication tool than traditional conversation about aortic aneurysms and their treatment. Continued recruitment, aiming for a total of 60 participants, is expected to provide more robust data and deeper insights into the benefits of this approach.

Life-long stroke disability prevention with healthy diets and antihypertensive medication

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Erasmus MC

Introduction

Studies and guidelines show that many of the stroke cases could be prevented with modifiable risk factors, the main one being hypertension. Prevention of hypertension mainly includes the combination of lifestyle changes and antihypertensive medication. However, the usefulness of these interventions is not well established in primary prevention of strokes. This study aims to systematically investigate the importance of primary stroke prevention, specifically through healthy diets and antihypertensive medication.

Materials & Methods

A systematic search was conducted through PubMed (MEDLINE) and Google Scholar. 18 randomised controlled trials (RCTs) and observational studies were identified that assessed the efficacy of these interventions for primary stroke prevention in adults with and without hypertension. A meta-analysis was performed afterwards using a random-effects model in order to find the most effective medication and the diet with highest association to stroke reduction.

Results

In 13 healthy diet studies included, first stroke events were reported in 12,351 out of 337,568 participants (Hazard Ratio (HR) 0.80, 95%CI 0.71-0.88). The diet with the highest association with total stroke reduction was the Dietary-Approaches-to-Stop-Hypertension (DASH) diet with spicy food (HR 0.44, 95%CI 0.32 to 0.65). Meanwhile, the 5 antihypertensive medication trials showed 562 primary strokes in 12,351 participants (HR 0.71, 95%CI 0.41-1.00). The most effective drug was the polypill (hydrochlorothiazide, aspirin, atorvastatin and enalapril) in fatal stroke prevention (HR 0.37, 95%CI 0.17 to 0.81).

Conclusion

Healthy diets and antihypertensive medication may help prevent the development of chronic diseases, namely hypertension and stroke. This is most evident with the use of the DASH diet with spicy food and the polypill. The identification of the best prevention methodology could help doctors prescribe suitable medication and/or lifestyle changes, starting from early age, to maximise clinical recovery and reduce the disease burden. Future studies confirming the effectiveness of primary stroke prevention will aid in preventing at-risk population from a life with disability.

Second-Generation Carotid Stents Show Similar Outcomes Compared to First-Generation Stents: A Retrospective Analysis

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Introduction

Carotid artery stenting has emerged as a critical intervention for patients with carotid artery stenosis (CS), offering a less invasive alternative to surgical endarterectomy. Advances in stent technology have led to the development of second-generation stents (SGS) with distinct design features compared to the first-generation stents (FGS). However, the comparison between FGS and SGS in terms of efficacy and safety remains a topic of ongoing investigation.

Materials & Methods

A single-center retrospective study included 1104 (721 men, 380 women) patients treated for CS with FGS and SGS between February 2018 and June 2024. Data on general, surgical, clinical characteristics, along with long-term outcomes, were collected.

Results

FGS was used in 475 (43.03%), while SGS in 629 (56.97%) patients. Preoperative internal carotid artery (ICA) stenosis was similar between the FGS group and the SGS group (70.65% vs 71.87; p=0.06). Durations of the procedure were comparable between both groups (40 IQR 15 minutes in FGS and 40 IQR 15 minutes in SGS group; p=0.53). Postoperative change in ICA diameter was smaller in FGS than in SGS (3.60 vs 3.90, p=0.002). Thirty-day neurological complications occurred in 12 (2.53%) patients with FGS and in 16 (2.55%) patients with SGS (p=0.85). Thirty day mortality was 1.05% in the FGS and 0.48% in the SGS (p=0.44). Long-term neurological complications occurred in 13 (2.74%) patients with FGS and in 14 (2.23%) patients with SGS (p=0.58). Long-term mortality was 1.90% in the FGS and 1.27% in the SGS (p=0.40).

Conclusion

FGS and SGS demonstrate comparable thirty-day neurological complication rates. However, FGS has a smaller postoperative change in ICA diameter. Notably, SGS has similar thirty-day and long-term neurological complications compared to FGS, as well as similar long-term mortality rates. These findings highlight the similarity of SGS compared to FGS in terms of overall outcomes.

Enhanced Recovery After Surgery (ERAS) is the Outcome of Minimally Invasive Cardiovascular Surgery (MICS)

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Introduction

The advantages and benefits of minimally invasive cardiovascular surgery (MICS) are questioned and doubted time and again. This clinical research study aims to determine the fact by meticulously analyzing sizeable data related to minimally invasive cardiac surgery in comparison to conventional open heart surgery by median sternotomy.

Materials & Methods

In total, 100 adult patients were selected for the study at a single referral center (n =100). Among them, 50 patients selected under control group underwent conventional open heart surgery by median sternotomy whereas, the other 50 patients selected under observational group underwent minimally invasive cardiovascular surgery (MICS). The ages of total selected patients ranged from 22 year(s) to 88 years (median age = 51 years). Essential parameters involved with both groups were analyzed to arrive at an accurate and unbiased conclusion.

Results

Gender, age, BMI, diagnoses of heart diseases, comorbidities, NYHA class of heart failure, and 2D echocardiogram had no significant differences between the two groups compared. ($P>0.05$).Total operation time length, total intraoperative blood loss, total intraoperative blood transfusion, total postoperative mechanical ventilation time length, total postoperative blood transfusion, postoperative drainage volume at 24 hours after surgery, total postoperative drainage volume, total postoperative drainage tube functioning time length, total postoperative intensive care unit (ICU) stay, total in-hospital stay, amount of analgesic drugs administered during surgery, amount of analgesic drugs administered in postoperative ICU, amount of analgesic drugs required after discharged from hospital, total postoperative complications, total number of redo surgery due to postoperative complications, and the total financial cost of surgery were significantly less i.e. better in patients under observational group compared to control group ($p<0.01$).Overall health condition and essential cardiac functions at 1 week, 3 months, 6 months and 1 year after the surgery were significantly better in patients under observational group compared to control group ($p<0.01$).

Conclusion

Enhanced Recovery After Surgery (ERAS) is the most predictable and highly anticipated outcome of Minimally Invasive Cardiovascular Surgery (MICS). Therefore, its reasonable to select MICS as the first choice of treatment, and also encourage MICS in routine and regular cardiovascular surgical practices.

The Effect Of Intravenous Dexmedetomidine During Surgery In The Prevention Of Shivering After General Anesthesia In Patients Undergoing Spinal Surgery :A Randomized-Clinical-Trial

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Introduction
Postoperative shivering is an involuntary, spontaneous and repetitive contractions of skeletal muscles, which causes patient restlessness, increased oxygen consumption, wound infection, surgical bleeding, and cardiac events. Patients undergoing spine surgery in the prone position are susceptible to hypothermia. Due to the importance of controlling postoperative shivering in these patients, this study was conducted with the aim of investigating the effect of intraoperative dexmedetomidine infusion in preventing shivering after general anesthesia in patients undergoing spine surgery in the prone position.

Materials & Methods
In this double-blind randomized clinical trial, 60 ASA class I or II patients underwent vertebra surgery in the prone position. Patients the study group (n=30) received dexmedetomidine infusion during the surgery and patients in the placebo group (n=30) in the same volume of 0.9% normal saline. Hemodynamic variables, frequency and severity of shivering and drug side effects were recorded.

Results
The mean MAP in 90 min (p=0.022), immediately before (p=0.001) and after (p=0.001) extubation, and HR values in 60 (p=0.020) and 90 (p=0.001) min, immediately before (p=0.001) and after (p=0.001) extubation, was significantly lower in study group than placebo group. The frequency of bradycardia (26.7% vs. 0%, p=0.002) and hypotension (20% vs. 0%, p=0.012) was significantly higher in the study group than the placebo group. In all evaluated times, the mean body temperature in patients of the study group was significantly higher than that of the placebo group (p<0.05). The frequency (10% vs. 30%, p=0.003) and he intensity group (p=0.001) of shivering in the study group was significantly lower than the placebo group.

Conclusion
In this study, the preventive use of dexmedetomidine infusion during surgery reduces the frequency and severity of postoperative shivering in patients undergoing spinal surgery in the prone position. This method was associated with hypotension and bradycardia in a some of patients.

Co-Delivery of miR-7-5p and Temozolomide as a Strategy to Overcome Multidrug Resistance in Glioblastoma

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Introduction

Glioblastoma (GB) is the most common primary brain tumor in adults, with a 5-year survival rate of only 6%. Temozolomide (TMZ) is the standard chemotherapeutic agent for GB, but its efficacy is often compromised by multidrug resistance (MDR). Recent studies suggest that combining TMZ with miRNA-7-5p (miR-7-5p) enhances treatment outcomes. However, the mechanisms underlying miR-7-5p-mediated sensitization of GB cells to TMZ are not fully understood.

Materials & Methods

Expression levels of miR-7-5p were assessed in GB patient specimens and two GB-derived cell lines: A172 (drug-sensitive) and T98G (drug-resistant). To restore endogenous levels of miR-7-5p, cells were transfected with synthetic miR-7-5p, followed by TMZ treatment. RNA sequencing (RNA-seq) was conducted to identify molecular pathways involved in overcoming MDR following miR-7-5p transfection, with subsequent validation using qPCR, luciferase assay, and functional assays.

Results

We observed that miR-7-5p expression was significantly downregulated in GB patient samples and correlated with the upregulation of MDR-associated ABC transporters (e.g., MRP1, MRP6, PGP). Moreover, transfection of GB cells with miR-7-5p enhanced TMZ sensitivity and reduced ABC transporter expression. The analysis of RNA-seq results revealed downregulation of MDR-related pathways. GO and KEGG analyses for T98G cells showed suppression of pathways associated with ABC transporters, transcriptional misregulation, transmembrane transport, and drug transport across the blood-brain barrier. In A172 cells, pathways related to cellular metabolism, DNA repair, cell proliferation, and migration were suppressed. Despite differences in regulated pathways, shared miR-7-5p targets were identified between the two cell lines, providing insight into its role in overcoming MDR.

Conclusion

Restoring miR-7-5p levels enhances the therapeutic efficacy of TMZ in glioblastoma by targeting MDR mechanisms. This combination therapy has the potential to improve outcomes, particularly for patients resistant to standard treatments. Identifying pathways and genes regulated by miR-7-5p in both drug-sensitive and drug-resistant cells provides a deeper understanding of MDR development and suggests potential therapeutic targets. This study was funded by Grant No. 2021/41/N/NZ5/04408

Reduced expression of syncytin-1 in trophoblast cells impairs endothelial cell function, contributing to preeclampsia

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Introduction

Preeclampsia, a sporadic systemic vascular disorder, is characterized by the onset of hypertension and proteinuria; however, its underlying pathogenesis remains elusive. Syncytin-1, a unique endogenous retroviral envelope protein specifically expressed in placental trophoblast cells, is renowned for its fusion function. Our previous research has shown reduced syncytin-1 expression in the placentas of preeclamptic patients. This study aims to delve into the potential role of syncytin-1 in the pathogenesis of preeclampsia by examining its impact on placental endothelial injury.

Materials & Methods

Syncytin-a conditionally knockout mice were induced with tamoxifen on embryonic day (E) 11.5, followed by the collection of fetuses and placentas on E17.5. The effects of syncytin-1 knockdown on the biological behaviors of trophoblasts and co-cultured endothelial cells in vitro were detected. The RUPP preeclampsia mouse model was constructed on E12.5 to verify syncytin-a expression and perform morphological analysis.

Results

Syncytin-a gene knockout resulted in abnormal fetal development, abnormal placental labyrinth layer and fetal vascular endothelial injury. ERVW-1 (the gene encoding syncytin-1) knockdown in JAR cells decreased cell proliferation and migration ability while increased cellular apoptosis and oxidative stress. Conditioned medium co-cultured-HUVECs exhibited decreased proliferation, migration ability, increased apoptosis, oxidative stress and endothelial injury. Key proteins in the RAS system, ACE2 and MAS1, were markedly downregulated and downstream PI3K/Akt/eNOS signaling pathway was inhibited, resulting decreased vasodilatation. In RUPP pregnant mice, the resistive index and pulsatility index of uterine artery were increased on E17.5 compared to E11.5. Renal tubular casts and glomerular capsule exudation indicated renal injury and dysfunction, confirming the validity of the RUPP model. Compared to the sham group, fetal mice in the RUPP group showed abnormal development and placental dysplasia, with decreased syncytin-a expression and endothelial injury. The RAS pathway was also inhibited in the renal tissue of pregnant mice.

Conclusion

The decrease of syncytin-1 not only affected the biological function of trophoblastic cells but also resulted in endothelial injury and dysfunction through the PI3K/Akt/eNOS pathway, further disrupted the RAS system, and contributes to the pathological changes observed in preeclamptic placenta. However, the therapeutic effect of restoring syncytin-a in the RUPP preeclampsia model warrants further investigation.

Impact of diabetes on ICU and hospital LOS following cardiac surgery with CPB: a systematic review and meta-analysis

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Introduction
Diabetes is common among patients undergoing cardiac surgery with cardiopulmonary bypass (CPB) and may affect postoperative outcomes such as intensive care unit (ICU) and hospital length of stay (LOS). This study aimed to evaluate the correlation between the proportion of diabetic patients and ICU LOS after cardiac surgery with CPB. Secondary objectives included analyzing the relationship between diabetes and hospital LOS (HLOS) and assessing the impact of age, gender, and body mass index (BMI) on these outcomes.

Materials & Methods
A systematic review and meta-analysis were conducted following PRISMA guidelines. PubMed, Scopus, Embase, and the Cochrane Library were searched for clinical trials published between 2004 and 2024 reporting ICU and hospital LOS in patients undergoing cardiac surgery with CPB, stratified by diabetic status. The study protocol was registered on the Open Science Framework (DOI: https://doi.org/10.17605/OSF.IO/6WMAH). Weighted correlation analyses assessed the relationships between diabetic patient proportion and ICU LOS, as well as HLOS. Additional analyses evaluated the impact of age, gender, and BMI on these outcomes. Statistical analyses were performed using SPSS version 26.

Results
Thirteen studies comprising 1,588 patients met the inclusion criteria. The correlation between diabetic patient proportion and ICU LOS was weak and not statistically significant ($r = 0.176$, $p = 0.574$). A weak but significant negative correlation was observed between diabetic proportion and HLOS ($r = 0.255$, $p = 0.002$), suggesting shorter hospital stays with higher diabetic proportions. Age and BMI did not significantly impact ICU LOS. A significant gender distribution difference was noted, with females comprising 24.98% and males 75.02% of the patients.

Conclusion
Diabetes does not significantly affect ICU LOS but may be associated with shorter hospital stays following cardiac surgery with CPBan unexpected finding warranting further investigation. The study highlights the importance of considering gender disparities in future research and suggests that while age and BMI were not significant factors in this analysis, they remain relevant to postoperative outcomes. Further research should address these findings to enhance postoperative care for diabetic patients.

Poster session I

Neurology I

Presenters

Abdulrahim Alrasheed
Silvana Yalú Cristo Martínez
Ahmed Shaheen
Armina Shafti
Marian Alexandru Isacov
Aynaz Mohammadi
Manon Stern

Safety and Efficacy of Atogepant for the Preventive Treatment of Migraines in Adults: A Systematic Review and Meta-Analysis

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Introduction
Migraine is a common neurological condition marked by unilateral recurrent pulsating headaches, often associated with systemic signs and symptoms. Recently, calcitonin gene-related peptide (CGRP) antagonists, including atogepant, an oral CGRP receptor antagonist, have emerged as effective and safe treatments. The current study sought to assess the efficacy and safety of atogepant for preventing episodic migraines in adults.

Materials & Methods
A comprehensive search, following PRISMA guidelines, was conducted using PubMed, Web of Science, and Cochrane Library to identify randomized, double-blind, placebo-controlled trials published up to June 2024.

Results
The studies included adult participants with episodic migraine treated with atogepant. The primary outcomes assessed were changes in mean monthly migraine days (MMDs) and monthly headache days (MHDs) over 12 weeks. Secondary outcomes included reduction in acute medication use, 50% responder rates, and adverse events. A meta-analysis using a random-effects model was performed to evaluate efficacy and safety. Six trials with 4569 participants were included. Atogepant significantly reduced mean monthly migraine days (MMDs) and monthly headache days (MHDs) compared to placebo at all doses (10 mg, 30 mg, 60 mg), with the 60 mg dose showing the greatest reduction (mean difference: 1.48 days, $p < 0.001$). Significant reductions in acute medication use and improved 50% responder rates were also observed for all doses. The safety profile of atogepant was favorable, with common adverse events being mild to moderate, such as constipation and nausea. There were no significant differences in serious adverse events between the atogepant and placebo groups.

Conclusion
Atogepant is an effective and well-tolerated option for preventing episodic migraines, showing significant reductions in migraine frequency and acute medication use. However, further studies are necessary to assess its long-term safety and efficacy, especially at higher doses, and to investigate its potential role in personalized treatment strategies for migraine prevention.

Unraveling Alzheimer's disease through information-theoretic network analysis of single-nucleus RNA sequencing data

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Introduction

Alzheimer's disease (AD) is a neurodegenerative disorder characterized by progressive cognitive decline. Understanding its molecular mechanisms requires advanced approaches to analyze single-nucleus RNA sequencing (snRNA-seq) data, which capture cellular heterogeneity at an unprecedented resolution. This study aims to reconstruct gene coexpression networks using an information-theoretic framework, analyze their modular and k-core structures, and associate these network features with known molecular functions to uncover key pathways implicated in AD.

Materials & Methods

We utilized publicly available snRNA-seq data from AD patients and controls (https://www.nature.com/articles/s41593-024-01774-5). Single-sample coexpression networks were reconstructed using information-theoretic approaches. Network modularity and k-core decomposition analyses were performed to identify hierarchical structures. Modules and k-cores were annotated with molecular functions through hypergeometric enrichment tests. Finally, cells were clustered based on the functional associations of their respective networks.

Results

Reconstructed networks revealed distinct modular and k-core structures between AD cases and controls, reflecting differential gene interaction patterns. Enrichment analyses associated these structures with key molecular functions, including synaptic signaling and immune response pathways. Function-based cell clustering further identified novel subpopulations with potential roles in AD pathology.

Conclusion

Our approach demonstrates the utility of information-theoretic methods and network science in analyzing snRNA-seq data to reveal molecular disruptions in Alzheimer's disease. These findings provide insights into disease mechanisms and potential avenues for targeted therapeutic interventions.

A Comparative Study of Shallow and Deep Learning Models for Predicting Postoperative Complications in Neurosurgical and Clinical Applications with a Real-World Example

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Introduction

exploring the potential uses of LLM and SML models in predicting post-operative complications in patents with cervical spondylosis, and to compare the pros and cons of the two approaches in terms of accuracy, cost-effectiveness, and patient confidentiality and data security.This study compares Shallow Machine Learning (SML) and Large Language Models (LLM) in predicting post-operative complications in neurosurgical applications.

Materials & Methods

Data were extracted from the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) registry. The postoperative outcomes evaluated included infections, cardiorespiratory events, thrombosis, bleeding, readmission, and reoperation. We employed multivariate logistic regression, machine learning algorithms, and nomograms for the analyses

Results

A total of 13,287 patients were included, with postoperative complications occurring in 5.4%. The most common complication was infection (2.3%). For predicting any adverse event, the Best AutoML algorithm had the highest performance, achieving an AUC of 0.7989. The RuleFit Model excelled in predicting cardiovascular events (AUC of 0.7688) and infections (AUC of 0.7885).In terms of LLM models, the Llama 3 8b model had a prediction accuracy of 70% with a training time of 2.5 hours for one epoch. The BioMedLM model reached 60% accuracy for any complication, while the BioMestral model demonstrated 77% accuracy with a training time of 4 hours for 3 epochs

Conclusion

SML models are cost-effective and suitable for many clinical application scenarios, unlike LLM models that require high-cost training, maintenance, and engineering. The LLM models still need further training and testing; there is still room for improvement and fine-tuning. Also, further training with larger datasets can significantly improve the results.Model's Link: **https://huggingface.co/ShaheenLab/DR_SHAHEENAI**

Revolutionizing Pharmacist Training: Cutting-Edge Headache Management Software Powered by Machine Learning Algorithms

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Introduction

Headaches are among the most common complaints driving patients to seek assistance from pharmacists, the most accessible healthcare professionals. To address this widespread issue effectively, pharmacists must not only possess advanced knowledge but also adopt a comprehensive, multidimensional approach to headache management. Yet, evaluating the clinical competency of pharmacy students in realistic patient care scenarios presents significant challenges. The advent of advanced technologies, particularly artificial intelligence (AI), offers transformative opportunities in medical education. This study aims to design cutting-edge software that rigorously evaluates pharmacy students' expertise in managing a wide spectrum of headaches, preparing them for real-world clinical practice.

Materials & Methods

Data on primary and secondary headache disorders were meticulously extracted from authoritative sources, including Uptodate, Applied Therapeutics: The Clinical Use of Drugs, The 5-Minute Clinical Consult, Symptoms in the Pharmacy, Community Pharmacy, and Aminoff's Neurology and General Medicine. Leveraging machine learning frameworks, these datasets were transformed into simulated patient cases. Synthetic datasets, generated via probabilistic models and fine-tuned with SDV.metadata (Synthetic Data Vault), achieved a high degree of realism. These enhanced datasets were integrated into the software to create dynamic and interactive test scenarios. The software provides performance feedback in two intuitive formats: an in-app interactive summary and a detailed, downloadable report.

Results

Through the seamless integration of diverse headache characteristics with robust clinical frameworks, the software produced highly realistic, scientifically grounded simulated cases. By tailoring scenarios to individual needs and offering evidence-based management strategies, this tool has demonstrated exceptional efficacy as an engaging and innovative educational resource for pharmacy students.

Conclusion

This state-of-the-art software revolutionizes the bridge between theoretical education and real-world clinical application. By delivering personalized, scientifically validated headache scenarios, it not only enhances the clinical skills of pharmacy students but also fosters their confidence in patient care. This pioneering AI-driven tool underscores the immense potential of technology in advancing healthcare education, equipping future pharmacists to excel in the complex and dynamic realm of clinical practice.

Multifaceted impact of 3-polyunsaturated fatty acids on Kv1.2 channels

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Sant'Anna School of Advanced Studies

Introduction

Kv1.2 is a voltage-gated potassium channel of the Shaker family, and plays a critical role in neuronal physiology by regulating membrane potential, action potential firing, and neurotransmitter release. Mutations in the KCNA2 gene encoding Kv1.2 are linked to several neurological disorders, including epilepsy, ataxia, and autism spectrum disorders. Docosahexaenoic acid (DHA), an omega-3 polyunsaturated fatty acid, has demonstrated therapeutic potential in managing conditions such as autism, ADHD, and refractory epilepsy, likely through its influence on microglia, barin innate immune system, and neuronal plasticity. At physiological concentrations (50 nM), DHA acts as a positive allosteric modulator of Kv1.2, facilitating channel activation and slowing down deactivation kinetics, but its effects at pharmacological levels (50 M) remain less well-characterized.

Materials & Methods

Here, using a stable CHO cell line expressing wild-type Kv1.2 channels, we performed patch-clamp experiments in calcium-free conditions to investigate the dose-dependent effects of DHA on Kv1.2 currents.

Results

. At 50 M, DHA significantly reduced Kv1.2 current amplitude following prolonged depolarizing pulses (+90 mV, 500 ms). This reduction was characterized by two distinct phenomena: a reduction in the initial peak current amplitude, suggesting closed-channel block, and a diminished inactivation time constant, potentially linked to incomplete recovery rather than open-channel block.

Conclusion

Our findings reveal that DHA exerts dual and opposing effects on Kv1.2 at physiological and pharmacological concentrations. This highlights the nuanced role of omega-3 fatty acids in modulating neuronal excitability and may explain variable responses to ketogenic diets in refractory epilepsy. Understanding these concentration-specific effects on Kv1.2 could inform the development of targeted therapies for neurodevelopmental and neurological disorders.

Abnormal body mass index is associated with risk of multiple sclerosis: a systematic review and meta-analysis

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Introduction
It is widely recognized that obesity is characterized by a chronic low-grade inflammatory condition. In the context of childhood and adolescent obesity, there is also a noteworthy correlation with elevated levels of inflammatory markers such as C-reactive protein, interleukin-6, and leptin. These markers signify a proinflammatory state that may have relevance to the development of multiple sclerosis (MS). In the upcoming systematic review and meta-analysis, we aim to comprehensively explore the relationship between childhood, adolescent, and adulthood obesity and the risk of developing MS in the life course.

Materials & Methods
We conducted a systematic review and meta-analysis following PRISMA guidelines, searching MEDLINE, Scopus, EMBASE, and Web of Science up to February 17, 2023. Studies were included if they reported BMI categories before MS onset and provided risk estimates (Risk ratio (RR), odds ratio (OR), or hazard ratio (HR)) or sufficient data for their calculation. Case reports, animal studies, and articles focusing on non-MS demyelinating diseases were excluded.

Results
Of 6,285 identified citations, 15 studies met inclusion criteria for qualitative synthesis, with 10 eligible for meta-analysis. The pooled RR for underweight individuals was 0.96 (95% confidence interval (CI): 0.851.09, I2=0%), indicating no significant MS risk. Overweight and obese individuals had significantly higher risks, with RRs of 1.38 (95%CI: 1.271.49, I2=49%) and 1.88 (95%CI: 1.502.35, I2=76%), respectively. Obesity posed a greater risk than overweight. Gender-based subgroup analysis revealed that obese females had a significantly higher RR (2.22, 95%CI: 2.022.43) compared to obese males (1.54, 95%CI: 1.112.12)(p-value for subgroup difference=0.03). Age-based analysis showed that obesity in individuals aged 20 years had a higher RR (2.35, 95%CI: 1.653.34) compared to those <20 years (1.66, 95%CI: 1.302.12), though the difference was not statistically significant (p=0.11).

Conclusion
In summary, our meta-analysis confirms a significant link between higher body weight and an increased risk of developing MS. Overweight and obese individuals show elevated risks, underlining the relevance of weight status in understanding MS susceptibility. Our findings highlight the role of chronic inflammation, immune responses, and changes in gut microbiota and adipokines in connecting obesity and MS.

Mild and Deep Hypothermia Differentially Affect Cerebral Neuroinflammatory and Cold Shock Responses Following Cardiopulmonary Bypass in Rats

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Introduction

Neuroinflammation is a key contributor to neurocognitive complications after cardiac surgery involving cardiopulmonary bypass (CPB). Targeted temperature management (TTM) is used for neuroprotection and is thought to exert its effects, at least in part, through the induction of cold shock proteins; however, its impact on neuroinflammation remains unclear. This study compared the effects of mild (33C) and deep (18C) hypothermia during CPB on neuroinflammation and cold shock protein expression in rats.

Materials & Methods

Rats underwent 1 hour of CPB or sham procedure at either 33C or 18C. Neuroinflammation was assessed using PET imaging with the TSPO ligand [11C]PBR28 on days 1, 3, and 7 post-procedure. Hippocampal and cortical tissues were collected for mRNA analysis of M1/M2 microglia-associated cytokines and for Western Blot analysis of cold shock protein RBM3 and its receptor TrkB.

Results

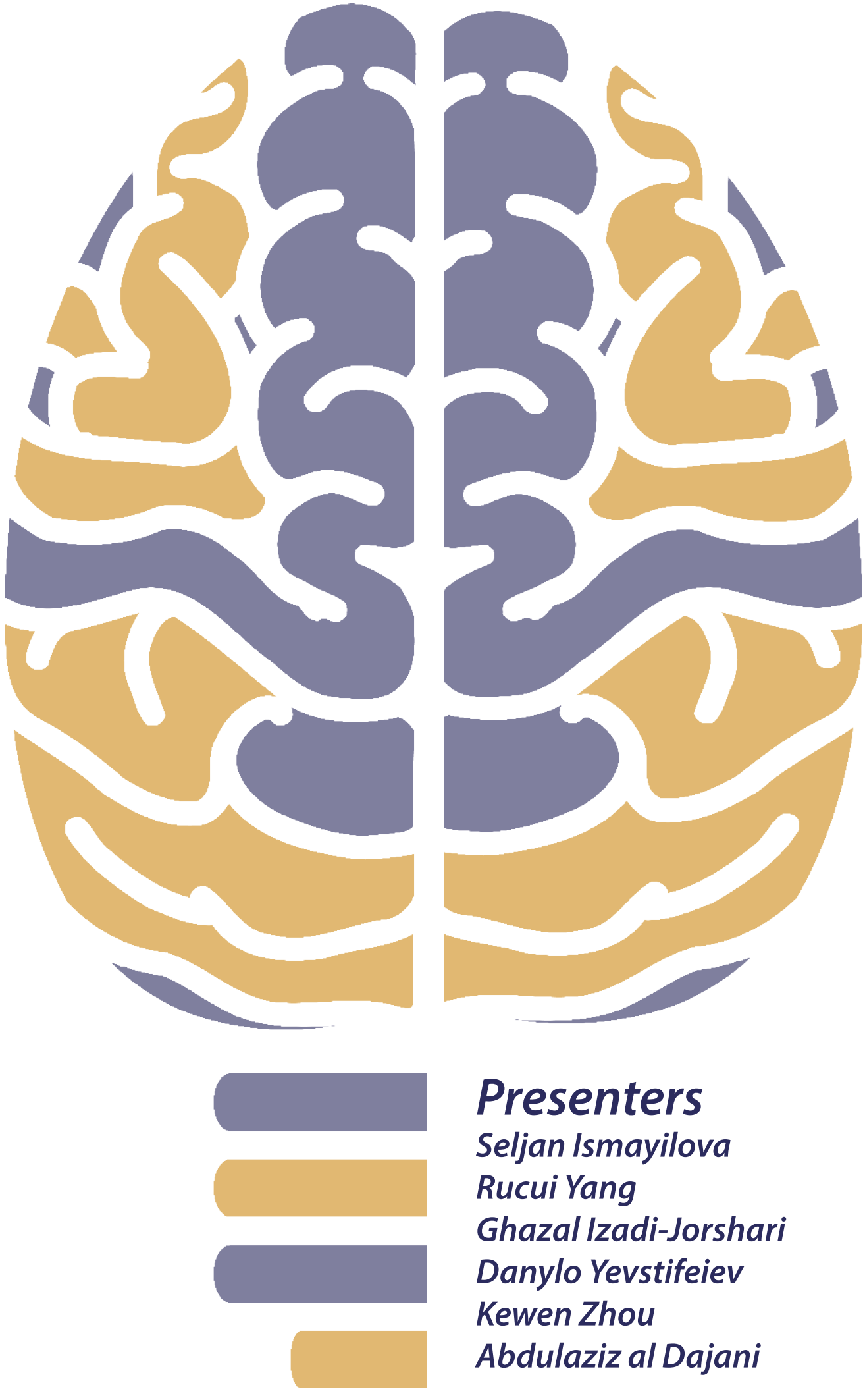
PET imaging showed no difference in neuroinflammation between CPB and sham rats at days 1 and 3. However, by day 7, rats in the 18C CPB group had significantly higher [11C]PBR28 uptake in the amygdala and hippocampus compared to the 33C group. There were no differences in cytokine expression between the temperature groups. RBM3 protein levels in cortex and hippocampus were significantly higher in CPB 33C compared to CPB 18C and sham 33C, at day 1 and day 7, respectively.

Conclusion

Compared to deep hypothermia, TTM at 33C is associated with reduced neuroinflammatory responses following CPB, potentially through upregulation of cold shock proteins. These findings support the idea that mild hypothermia activates protective mechanisms in the brain.

Poster session I

Ophtalmology



Presenters

Seljan Ismayilova
Rucui Yang
Ghazal Izadi-Jorshari
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Study on the Progression of Myopia Among School-children Due to Increased Screen Time During the COVID-19 Pandemic

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Introduction
Myopia is a refractive vision disorder among schoolchildren, often leading to vision problems. Remote education during the COVID-19 pandemic increased screen time and reduced outdoor activities, accelerating the progression of myopia. The purpose of this study is to examine the prevalence of myopia from 2020 to 2023 and the factors influencing it.

Materials & Methods
This study was conducted among 245 children aged 1013 years, monitored between 2020 and 2023. Data were collected on screen time, outdoor activities, family history of myopia, and refractive values. Refractive measurements were taken using the Topcon KR-800 refractometer, biometric parameters with the Zeiss IOL Master 700, intraocular pressure with the Topcon CT-800 tonometer, and fundus pathologies were assessed using fundoscopy.

Results
Mean age was 11.56 (1.13). From 2020 to 2023, the prevalence of myopia increased by 86%. Statistical analysis was conducted to compare myopia progression during and after the pandemic, with a P-value < 0.05. The annual MP amount is 0.82 (0.98) diopters (D) for 2020 and 2021, 0.73 (0.52) D for 2021 and 2022, and 0.60 (0.55) D for 2022 and 2023. Additionally, 8% exhibited other retinal pathologies. During the 20202021 lockdown, average screen time was 5 hours, while outdoor activity was limited to 1 hour daily. This led to a faster progression of myopia compared to the 2021-2022 and 2022-2023 periods, when the lockdown had already been cancelled.Myopia was 12.5% more common in females than males (57.5% vs. 43.5%) and significantly higher in children with a family history of the condition (59% vs. 41%). Urban children were approximately more affected than rural ones, underscoring the impact of lifestyle and heredity.

Conclusion
The findings reveal that prolonged screen time and limited outdoor activities during the pandemic significantly increased myopia prevalence. Early interventions, encouraging outdoor activities, are critical for managing myopia progression.

Microcirculation Disorders and Inflammation Caused by Abnormal Lipid Metabolism Impair the Structure and Function of the Retina

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Introduction

Changes in modern human lifestyle and excess nutrition can lead to various health problems, and atherosclerosis caused by lipid metabolism disorders is linked to the development of many diseases. Studies have found that abnormal lipid levels may carry an additional risk for the development of eye diseases such as glaucoma. Apolipoprotein E (ApoE) plays an important role in lipid metabolism, and ApoE-/- mice fed a high-feed diet (HFD) are a common model for atherosclerosis. We aim to investigate whether lipid metabolism abnormalities induced by HFD of ApoE-/- mice of different weeks of age cause damage to retinal structure and function.

Materials & Methods

A mouse model of atherosclerosis induced by abnormal lipid metabolism was established by feeding HFD and knocking out the ApoE gene in C57BL/6 mice. Blood lipid levels and plaque formation in mouse models were investigated by hematoxylin-eosin staining and oil red staining. Fundus fluorescein angiography was performed to investigate the microcirculation of retinal vessels. quantitative real-time PCR and western blot assay were used to evaluate the expression changes of retinal inflammatory factors and key proteins. The condition of retinal ganglion cells was detected by III-tubulin immunofluorescence staining. The structure and function of the retina were evaluated using optical coherence tomography, HE staining, and electroretinogram.

Results

C57BL/6 mice with ApoE gene knockout were fed HFD to 42 weeks of age, and total cholesterol and low-density lipoprotein cholesterol increased, plaque area increased, and a model of atherosclerosis caused by abnormal lipid metabolism was established. Retinal blood perfusion decreased significantly in atherosclerotic mice, and microcirculation disorders appeared. The increased expression of Tnf- indicates eye inflammation. The thickness of nerve fiber layer near optic nerve was reduced and the number of RGCs decreased. The amplitudes of a-wave, b-wave and Photopic Negative Response were reduced, and the latency was prolonged, suggesting that the structure and function of retina were seriously damaged.

Conclusion

Atherosclerosis caused by abnormal lipid metabolism can aggravate the abnormal microcirculation and microenvironment inflammation in the eye, causing retinal structural and functional damage in the later stage of the model.

Visual and Refractive Outcomes After Cataract Surgery in Keratoconus Patients with Previous Penetrating Keratoplasty Versus Deep Anterior Lamellar Keratoplasty

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Introduction
Keratoconus (KCN) is an inflammatory condition characterized by progressive corneal thinning. Advanced KCN is treated with corneal transplantation, primarily penetrating keratoplasty (PK) and deep anterior lamellar keratoplasty (DALK). PK entails full-thickness corneal replacement, while DALK replaces only the anterior portion, preserving the Descemet membrane and endothelium. Post-transplant patients may develop cataracts requiring surgery in subsequent years. Since both keratoplasty and cataract surgery can cause endothelial damage and reduce endothelial density, a previous keratoplasty may influence the anticipated postoperative outcomes of cataract surgery. This study aims to compare the postoperative outcomes of cataract surgery in patients with prior DALK or PK.

Materials & Methods
This study enrolled 26 KCN eyes that received either PK (n=13) or DALK (n=13) followed by cataract surgery. The outcome measures were visual and refractive outcomes, including post-operative best corrected visual acuity (BCVA), change in BCVA, sphere, cylinder, and spherical equivalent refraction (SE). A linear regression model was performed to compare these outcomes between the DALK and PK groups after adjusting for sex, age, simultaneous keratorefractive surgery (KRS) with cataract surgery, follow-up duration, pre-operative SE, mean keratometry, and axial length.

Results
The mean follow-up duration for both groups was 60.82 36.88 months (74.00 32.90 and 47.64 37.07 in PK and DALK groups respectively). Postoperative BCVA was markedly better in the DALK group with 0.30 0.14 and 0.17 0.06 logMAR in the PK and DALK groups, respectively (P = 0.016). The DALK group also showed a better improvement in BCVA with -0.01 0.19 and -0.16 0.14 logMAR change in the PK and DALK groups, respectively (P = 0.011). There was no significant difference in post-operative refractive outcomes (sphere, cylinder, SE) and intraocular pressure between the two groups (P > .05).

Conclusion
The patients receiving DALK had better post-operative visual acuity and improvement after cataract surgery than the PK group. Our results suggest that the eyes receiving DALK had better corneal stability and underwent less endothelial damage caused by cataract surgery. This may indicate that DALK may be a preferable choice for a KCN patient who may require cataract surgery in the future.

Sorafenib as a potential therapeutic agent targeting glial responses in diabetic retinopathy

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Introduction

Current therapeutic options for diabetic retinopathy (DR) show limited effectiveness, particularly in addressing early retinal cellular dysfunction and glial reactivity. This study investigates the potential of sorafenib, a multi-kinase inhibitor, to attenuate glial responses in early DR.

Materials & Methods

Diabetes mellitus (DM) was induced in 60 male Wistar rats (3 months old, 140160 g) via a single intraperitoneal injection of streptozotocin (50 mg/kg). Rats from the control group were injected with citrate buffer. Hyperglycaemia (blood glucose > 15 mM/l) was confirmed seven days post-injection and monitored every three days using a glucometer and glucose test strips. Hyperglycaemic rats were randomly divided into three groups (N = 20 each): untreated, insulin-treated (30 IU intraperitoneally), and insulin + sorafenib-treated (30 IU insulin + 50 mg/kg sorafenib orally).Retinal tissues were analysed at 7, 14, 28 days, and 3 months post-injection using immunohistochemistry for glial reactivity markers: glial fibrillary acidic protein (GFAP) and S100 calcium-binding protein (S100). Western blotting was performed to quantify GFAP levels. Statistical analysis employed one-way ANOVA.

Results

GFAP and S100 expression significantly increased in the nerve fibre and inner nuclear layers of the untreated retina by day 7, spreading through Muller cell processes by day 28. At 3 months, widespread positivity in Muller cells and astrocytic fibres indicated persistent reactive gliosis. Histology showed elongated GFAP-positive Muller cell processes forming dense networks near the inner limiting membrane. S100 expression, prominent near vasculature, suggested its role in vascular dysfunction and inflammation, aligning with chronic neuroinflammation and structural remodelling in DR-induced retinal injury.Insulin treatment moderately reduced GFAP and S100 expression, while combined insulin and sorafenib treatment almost completely suppressed GFAP upregulation and significantly decreased S100 levels. Western blotting confirmed a 5-fold GFAP elevation in the untreated group ($p < 0.05$), while the insulin group showed a 3.6-fold and insulin+-sorafenib group a 2.2-fold increase ($p < 0.05$) compared to controls.

Conclusion

Sorafenibs inhibition of various protein kinase cascades (STAT3, ERK/c-MYC, etc.) and its anti-inflammatory effects appear to attenuate glial responses in the diabetic retina. Further studies are needed to delineate the underlying molecular mechanisms for such tissue-specific neuroprotective properties.

Elaidic Acid: the New Discovery of Metabolites in Aqueous Humor of Primary Open Angle Glaucoma

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Introduction

By analyzing the non-targeted and targeted oxidative lipid metabolomics of aqueous humor in patients with primary open-angle glaucoma, this study aims to explore the pathogenesis of POAG in addition to the risk factors of high intraocular pressure, providing new ideas for the treatment of POAG.

Materials & Methods

12 POAG patients and 15 cataract patients were included in this case-control study. We performed a non-targeted metabolomic analysis of aqueous humor samples by UHPLC-MS. After data preprocessing, based on the SIMCA 14.1 platform, differential metabolites and significantly altered metabolic pathways that may identify POAG patients were screened. Perform a correlation analysis between differential metabolites and clinical data. Apply multiple linear regression analysis to clarify the impact of drugs on differential metabolites. Screen for potential biomarkers based on comprehensive metabolomics and correlation analysis results.

Results

Non-targeted metabolomics detected 81 differential metabolites. Pathway enrichment analysis showed significant changes in six metabolic pathways, including the caffeine metabolic pathways ($p<0.05$). Correlation analysis showed that there was a significant correlation ($p<0.05$) between the clinical changes in POAG and the levels of elaidic acid, petroselinic acid, 11-DTB2 and 5-hydroxymethylcytosine. Based on the results of metabolomics and correlation analysis, we will consider elaidic acid, petroselinic acid, 11-DTB2 and 5-hydroxymethylcytosine as a potential biomarker.

Conclusion

This study found significant changes in the microenvironment of aqueous humor metabolism in patients with POAG, which may contribute to a better understanding of the disease progression mechanisms of POAG. In addition, this study also discovered the presence of elaidic acid and petroselinic acid in the aqueous humor of POAG patients for the first time, which are closely related to oxidative stress, inflammatory responses, and eye changes in POAG.

A meta-analysis demonstrating Epi-on corneal collagen cross-linking as a safer alternative to Epi-off in managing corneal ectasia.

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Introduction
Corneal ectasias are progressive ocular disorders causing vision distortion and reduced quality of life. Corneal collagen cross-linking (CXL) stabilizes ectatic progression by strengthening the cornea. Debates regarding the safety and efficacy of Epi-on versus Epi-off techniques persist, with mixed findings in the literature. This systematic review and meta-analysis aim to evaluate and compare the safety and efficacy of these techniques in patients with corneal ectasia, focusing on visual outcomes, corneal topography, and complication rates to guide clinical decision-making and improve patient care. By clarifying differences between these techniques, this study seeks to guide clinical decision-making and improve patient care.

Materials & Methods
We conducted comprehensive searches of PubMed, Medline, Web of Science, Cochrane Central, Google Scholar, and Scopus databases (inceptionJuly 2024) using MeSH terms and keywords. Randomized controlled trials (RCTs) published in English were included. Primary outcomes included maximal keratometry (Kmax) changes at 12 months, with secondary outcomes such as visual acuity, keratometry values, corneal thickness, endothelial cell density, and safety. Data extraction, risk of bias assessment (Cochrane Risk of Bias Tool), and quantitative synthesis (RevMan software) followed PRISMA guidelines. Mean differences with 95% confidence intervals (CIs) were calculated, with heterogeneity assessed using I2 statistics. Subgroup and sensitivity analyses were conducted, and publication bias was evaluated using funnel plots.

Results
Thirteen RCTs (872 patients, 1,041 eyes: 478 Epi-on, 563 Epi-off) were included. No significant differences were found between Epi-on and Epi-off in Kmax, K steep, K flat, spherical equivalents, corneal thickness, or visual acuity (BCVA/UCVA). Epi-off showed higher endothelial cell count (ECC) changes but was associated with more adverse events, including delayed epithelial healing, stromal haze, and scarring.

Conclusion
Both Epi-on and Epi-off CXL are effective for corneal ectasia, with Epi-on offering a safer alternative. keratometry parameters were reduced in Epi off groups. Also, the Epi-off CXL was associated with a higher incidence of adverse events, including delayed epithelial healing, stromal haze, and corneal scarring. In contrast, Epi-on CXL had a more favorable safety profile with fewer complications. These results highlight the importance of carefully selecting the appropriate CXL technique based on individual patient profiles, weighing the desired treatment outcomes against the potential risks.

Poster session I

Pharmacology I

Presenters

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Hovhannes Matevosyan
Farzad Bargharary
Yasaman Ahmadi Tabataei
Mirjam Brinkman
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Efficacy of Pharmacological and Non-Pharmacological Interventions for Patients with Antipsychotic Induced Weight Gain: A Systematic Review and Network Meta-Analysis

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Introduction
Schizophrenia, a severe mental disorder affecting approximately 0.28% of the global population, is characterized by symptoms such as hallucinations, delusions, and cognitive impairments. Antipsychotic medications, the primary treatment, effectively manage symptoms but often cause significant side effects, including antipsychotic-induced weight gain (AIWG). AIWG affects up to 49% of patients, increasing the risk of metabolic syndrome, cardiovascular diseases, and treatment non-adherence, highlighting the need to identify the most effective interventions for managing AIWG. Previous studies have explored individual interventions, such as Metformin, Liraglutide, and nutritional education, but a comprehensive comparison of all available options is lacking. Our network meta-analysis aims to address this gap by evaluating the efficacy of AIWG interventions, synthesizing evidence from 52 randomized controlled trials (RCTs) involving 2,639 patients.

Materials & Methods
Following PRISMA guidelines, we conducted a systematic review and meta-analysis of randomized controlled trials (RCTs) comparing all pharmacological and non-pharmacological interventions to treatment-as-usual (TAU) in schizophrenia patients. Our database search spanned PubMed, Scopus, Web of Science, and Cochrane CENTRAL. The focus was on anthropometric measurements and lipid profiles. We performed the analysis using MetaInsight (version 6.2.0). The primary OUTCOME was weight change (Kg), while secondary outcomes included body mass index (BMI), waist-hip ratio, waist circumference, hip circumference, total cholesterol, Low-Density Lipoprotein (LDL), High-Density Lipoprotein (HDL), and Triglycerides.

Results
Fifty-two studies involving 2639 patients contributed to the meta-analysis. Regarding weight change, Metformin + NutriEx ranked first, followed by Liraglutide. Compared to the TAU, both interventions showed significant differences (MD -6.36, 95% CI [-9.63, -3.15]) and (MD -5.37, 95% CI [-8.01, -2.72]), respectively. According to BMI, the top-ranked intervention was Nizatidine MD -1.90 [-3.40, -0.421]. As observed in waist circumference, The top-ranked intervention was Liraglutide (MD -4.96 [-7.81, -2.56]). Both interventions demonstrated significant differences compared to the TAU. Neither intervention significantly benefited either group's lipid profile, hip circumference, or waist-hip ratio ($P > 0.05$).

Conclusion
Our network meta-analysis provides comprehensive evidence suggesting that integrating pharmacological and non-pharmacological interventions may be the most effective approach for managing AIWG in weight reduction. Future studies should explore more flexible treatment protocols that combine multiple interventions, leveraging their complementary effects on different outcomes.

Comparative Data Analysis of Inhibitors for Chikungunya and Venezuelan Equine Encephalitis Viruses: Targeted Assays, Chemical Properties, and Pharmacological Implications

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Introduction

In 2024, the WHO R&D Blueprint for Epidemics identified high-risk viruses, including those from the Togaviridae family, such as Chikungunya and Venezuelan equine encephalitis viruses. These viruses cause Chikungunya virus disease and Venezuelan equine encephalitis. Numerous biological assays target these viruses, which can be categorized into mosquito control methods and virus-targeted assays. This study presents data analysis of targeted assays against these viruses to provide insights into their pharmacological applications.

Materials & Methods

Data was collected from PubChem and ChEMBL, focusing on Chikungunya virus (CHIKV) and Venezuelan equine encephalitis virus (VEEV). From PubChem, 781 CHIKV and 306 VEEV assays were retrieved, and after curating the data (removing assays for other viruses and toxicity assays), 606 CHIKV assays with 5092 compounds and 262 VEEV assays with 1179 compounds remained. We filtered out compounds without SMILES and those with molecular weight >1000, resulting in two datasets: 364 CHIKV assays with 2600 compounds and 250 VEEV assays with 884 compounds. Data from ChEMBL was processed similarly, merging datasets and removing duplicates.

Results

The datasets were categorized into four activity classes: high, moderate, low, and inactive. Among the common compounds with differing activities (8 compounds), only derivatives of Benzoannulene phenylamide were identified due to their highest frequency. Ring analysis was performed between the top 5 rings in both datasets, showing no overlap, excluding benzene. ADMET analysis revealed significant differences in BBB_Martins and Bioavailability_Ma, which are promising, especially for VEEV, as it causes encephalitis. PC analysis showed that CHIKV had higher MW, RB, and logP values than VEEV, with significant differences in several properties.

Conclusion

This study highlights significant differences between Chikungunya virus (CHIKV) and Venezuelan equine encephalitis virus (VEEV) datasets in terms of compound activity, ring structures, and chemical properties. The identified compounds and promising ADMET and PC profiles suggest potential for developing targeted therapies for both viruses, particularly emphasizing VEEV's distinct pharmacological characteristics.

Anti-Alzheimer's Potential of Royal Jelly: Antioxidant Properties, Cholinesterase Inhibition, and In Silico Studies

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Introduction

Alzheimers disease (AD) is a progressive neurodegenerative disorder characterized by memory loss and cognitive decline. Its pathology involves oxidative stress, amyloid-beta plaques, tau protein tangles, and cholinergic dysfunction. Given the limitations of current treatments, natural products such as royal jelly (RJ), recognized for their antioxidant and neuroprotective properties, provide promising therapeutic alternatives. This study evaluates the antioxidant activity, cholinesterase inhibitory effects, and molecular interactions of RJ components with AD-related targets.

Materials & Methods

Royal jelly samples were sourced from certified suppliers and lyophilized for uniformity. Antioxidant capacity was assessed using the DPPH radical-scavenging assay, with absorbance measured at 517 nm. Results were expressed as IC50 values (g/mL). Enzyme inhibition studies targeted acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE) using Ellmans method, wherein hydrolysis of acetylthiocholine iodide and butyrylthiocholine iodide was monitored spectrophotometrically at 412 nm. The inhibitory concentrations were determined in triplicates for accuracy. For in silico analyses, major bioactive components of RJ10-hydroxy-2-decenoic acid (10-HDA) and major royal jelly proteins (MRJPs)were identified via published databases. Molecular docking was conducted using AutoDock software against AChE, BuChE, and tau proteins. Ligand-protein interactions, binding affinities, and key residues involved in stabilization were analyzed and visualized with PyMOL.

Results

RJ exhibited significant antioxidant activity with an IC50 value of 79 g/mL, demonstrating its potential to neutralize free radicals. Cholinesterase inhibition tests revealed a dose-dependent suppression of enzymatic activity, with a maximum inhibition of 65% for acetylcholinesterase and 60% for butyrylcholinesterase at a concentration of 200 g/mL. Molecular docking showed that RJ components like 10-HDA and MRJPs formed stable interactions with key binding sites of acetylcholinesterase and tau proteins, with binding energies of 6.8 kcal/mol and 7.2 kcal/mol, respectively.

Conclusion

These findings emphasize RJs potential as a multi-target therapeutic agent for AD by mitigating oxidative stress, inhibiting cholinesterase activity, and directly interacting with pathological targets. Further preclinical studies are warranted to translate these effects into clinical benefits.

Apoptotic Effects of Linarin and Its Derivatives on MDA-MB-231 Breast Cancer Cells: A Molecular and Cellular Investigation

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Introduction
Triple-negative breast cancer (TNBC) is an aggressive subtype of breast cancer with limited therapeutic options due to the absence of hormone receptors and HER-2 expression. Linarin, linarygenin, and propargyl linarinflavonoids extracted from the hydroalcoholic extract of Salvia speciesexhibit antioxidant, anti-inflammatory, and pro-apoptotic properties. This study investigates the apoptotic effects of these compounds on MDA-MB-231 cells, focusing on key molecular mechanisms and potential therapeutic pathways.

Materials & Methods
MDA-MB-231 cells were cultured in DMEM supplemented with 10% FBS and antibiotics. Cytotoxicity of linarin, linarygenin, and propargyl linarin was assessed using the MTT assay, and IC50 values were determined. Apoptosis was evaluated through Annexin V/PI staining followed by flow cytometry, while cell cycle arrest was analyzed at the IC50 concentration using PI staining. Western blotting was performed to assess the inhibitory effect of these compounds on STAT3 phosphorylation and the expression of apoptotic markers such as Bax, Bcl-2, and Caspase-3.

Results
Linarin, linarygenin, and propargyl linarin exhibited IC50 values of 610 M, 18 M, and 15 M, respectively. Treatment with these compounds significantly reduced cell viability in a dose- and time-dependent manner. Flow cytometry revealed increased early and late apoptotic cells post-treatment, particularly with linarygenin and propargyl linarin. Western blot analysis confirmed upregulation of pro-apoptotic proteins (Bax, Caspase-3) and downregulation of anti-apoptotic proteins (Bcl-2). Additionally, all compounds inhibited STAT3 phosphorylation, highlighting their role in disrupting cell survival pathways.

Conclusion
This study demonstrates the potent apoptotic effects of linarin and its derivatives on MDA-MB-231 cells through modulation of intrinsic apoptotic pathways and STAT3 inhibition. The findings suggest these compounds, especially linarygenin and propargyl linarin, as promising candidates for TNBC therapy, warranting further preclinical studies.

Impact of Centrifuge Temperature on the Free Fraction of Linezolid and Flucloxacillin

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Introduction

Therapeutic drug monitoring is crucial for optimizing antibiotic dosing by ensuring effective drug levels in the plasma whilst limiting toxicity. Most drugs bind to proteins in the blood, affecting their efficacy, since only unbound drug is active. Factors influencing protein binding include protein and drug concentration, binding site affinity, drug lipophilicity, pKa, solution pH, and temperature. In clinical practice, to determine free concentration, samples are ultrafiltrated at room temperature by centrifuging. There is literature that states that centrifuging at physiological temperature might result in free concentrations that better reflect the free concentration in patients. This study compares the impact of ultrafiltration temperature on protein binding of linezolid and flucloxacillin across a range of drug/protein ratios.

Materials & Methods

Flucloxacillin (10 and 200 mg/L) and linezolid (2 and 40 mg/L) samples in either albumin (2 and 4%) or pooled human serum (HS) were ultrafiltrated at room and physiological temperature (37oC) after which protein binding was assessed by determining total and free concentration in sixfold. The free fraction (FF) was calculated by dividing the free by the total concentration. Outliers were excluded using the Grubbs test, and differences between temperatures were analysed using a two-sided unpaired t-test.

Results

For flucloxacillin, the FF increased statistically, but not clinically significant in the lowest drug concentration (10mg/L) in HS at 37oC compared to room temperature. The temperature did not significantly change the FF in other drug/protein ratios.The FF of linezolid was affected by temperature in most drug/protein ratios. The effect was inconsistent, as the FF decreased (4-8%) for some ratios and increased (3-4%) for others. These changes were not clinically relevant. The FF was strongly influenced by the drug/protein ratio, with the FF increasing with higher drug/protein ratios, possibly due to protein saturation.

Conclusion

For both flucloxacillin and linezolid, performing the ultrafiltration at physiological temperature compared to room temperature did in some cases result in statistically but never clinically significant changes in the FF. Thus, it holds no added value over the current methods. The drug/protein ratio influenced the FF more than the centrifuging temperature.

Integrative Approach to Hepatotoxicity: Carvedilols Antioxidant Potential in Cyclophosphamide-Treated Rats

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Introduction
Cyclophosphamide is a potent antineoplastic and immunosuppressive drug used in various types of cancers and also autoimmune diseases. Cyclophosphamide-induced hepatotoxicity triggered by oxidative stress and inflammation has limited its clinical use. Carvedilol, a widely utilized - antagonist antihypertension drug, has demonstrated antioxidant ability by scavenging oxygen free radicals and interfering with lipid peroxidation. The hepatoprotective effect of carvedilol on cyclophosphamide-induced hepatotoxicity has not been evaluated. This study aimed to assess this effect.

Materials & Methods
32 male Wistar rats (200-250 grams) were randomly divided into 4 groups (n= 8): (a) Control: normal saline (0.5ml/day) orally for 10 days. (b) Cyclophosphamide group: normal saline orally for 10 days, with intraperitoneal Cyclophosphamide (200 mg/kg) on day 10. (c) Pre-treatment group: oral carvedilol (5 mg/kg) for 10 days, with intraperitoneal Cyclophosphamide on day 10. (d) Post-treatment group: normal saline orally for 10 days, with intraperitoneal Cyclophosphamide on day 10 and oral carvedilol on days 11 and 12. On day 12 blood samples and liver specimens were evaluated in terms of AST, ALT, ALP, oxidant indicators: nitric oxide (NO), malondialdehyde (MDA), and antioxidant indicators: Ferric-reducing antioxidant power (FRAP), glutathione peroxidase (GP), and catalase enzymes values. Liver species were also collected for histological analysis using H&E staining.

Results
The cyclophosphamide group exhibited a significant increase in AST, ALT, ALP, NO, and serum/tissue MDA as well as a substantial drop in FRAP, GP, and catalase activity in comparison to the control group ($p<0.05$). Both pre and post-treatment groups demonstrated a lower serum MDA in addition to elevated FRAP, GP, and catalase activity compared to the cyclophosphamide group ($p<0.05$). The pre-treatment group also showed decreased AST, ALT, ALP and NO levels in comparison with the cyclophosphamide group ($p<0.01$). Liver enzymes did not change significantly in the post-treatment group compared to the cyclophosphamide group ($p>0.05$). Histological analysis also revealed carvedilol hepatoprotective effect as hepatotoxicity-related histopathological changes decreased in pre and post-treatment groups.

Conclusion
Both pre and post-treatment administration of carvedilol can promote cyclophosphamide-induced hepatotoxicity, with pre-administration offering a more protective effect on liver damage. This effect was supported by the antioxidant capacity of carvedilol.

Altered Polarization and Glucose Metabolic Reprogramming of Macrophages by Novel -Boswellic Acid-Triazole Derivatives

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Introduction

-Boswellic Acid (-KBA) is well-known for its potent anti-inflammatory properties. To enhance its immunomodulatory effects, we synthesized two novel -KBA derivatives incorporating 1H-1,2,3-triazole scaffolds: benzyl-triazole KBA (BzT-KBA) and bromo-benzyl-triazole KBA (BrBzT-KBA). The 1H-1,2,3-triazole scaffold is a pharmacophore recognized for its significant biological activities, including anticancer, antiviral, and anti-inflammatory effects. We investigated the effects of BzT-KBA and BrBzT-KBA on RAW 264.7 and Bone Marrow-Derived macrophages in terms of polarization, glucose metabolism, and cytokine expression, and compared their effects to -KBA.

Materials & Methods

RAW 264.7 macrophages and BMDMs were cultured and treated with -KBA (5 and 10 M), BrBzT-KBA (5 and 10 M), and BzT-KBA (10 and 20 M) for 24 hours. Macrophage polarization was analyzed using flow cytometry by assessing CD86, CD206, and F4/80 surface markers. Cytokine expression (IL-10, TGF-, TNF-,and IL-6) and macrophage-associated genes (iNOS and Arg-1) were quantified via qPCR with -actin as the internal control. Glucose metabolism was analyzed using 600 MHz NMR spectroscopy and colorimetric assays.

Results

Both BrBzT-KBA and BzT-KBA altered glucose metabolism, reducing the levels of glucose (and anomers), G6P, lactate, citrate, and acetyl-CoA, while pyruvate and F6P remained unchanged. BrBzT-KBA significantly altered the immunoregulatory properties of -KBA, as demonstrated by increased TNF-, IL-10, and IL-6 and decreased mRNA TGF- levels. Flow cytometry confirmed the M2 polarization shift of BrBzT-KBA, and BzT-KBA treated macrophages, compared to -KBA, showing increased CD206 and decreased CD86 expression. When compared to -KBA, BrBzT-KBA demonstrated remarkable effects in promoting M2 polarization, as indicated by the upregulation of Arg-1 and downregulation of iNOS.

Conclusion

Our findings revealed that BrBzT-KBA alters macrophage polarization and modulates glucose metabolism in RAW 264.7 macrophages, with more enhanced effects compared to -KBA. These results suggest that incorporating the 1H-1,2,3-triazole scaffold into -KBA enhances its immunomodulatory properties. Regarding glucose metabolism, our ongoing research is focused on macrophages derived from type 2 diabetes mellitus (T2DM) mice, including comparative analyses across wild-type, homozygous, and heterozygous models.

The Effect of L-Carnitine Supplements in Cancer-Related Fatigue: A Randomized, Double-Blind, Placebo-Controlled Trial

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Tehran University of Medical Science

Introduction
Cancer-related fatigue (CRF) is a prevalent and debilitating condition affecting cancer patients, significantly reducing their quality of life. Fatigue in cancer patients may result from multiple factors, including the metabolic impact of cancer and its treatments. L-carnitine, a naturally occurring amino acid derivative, plays an essential role in energy metabolism and may help reduce fatigue in cancer patients. This study aims to evaluate the efficacy of L-carnitine supplements in reducing fatigue among cancer patients compared to a placebo.

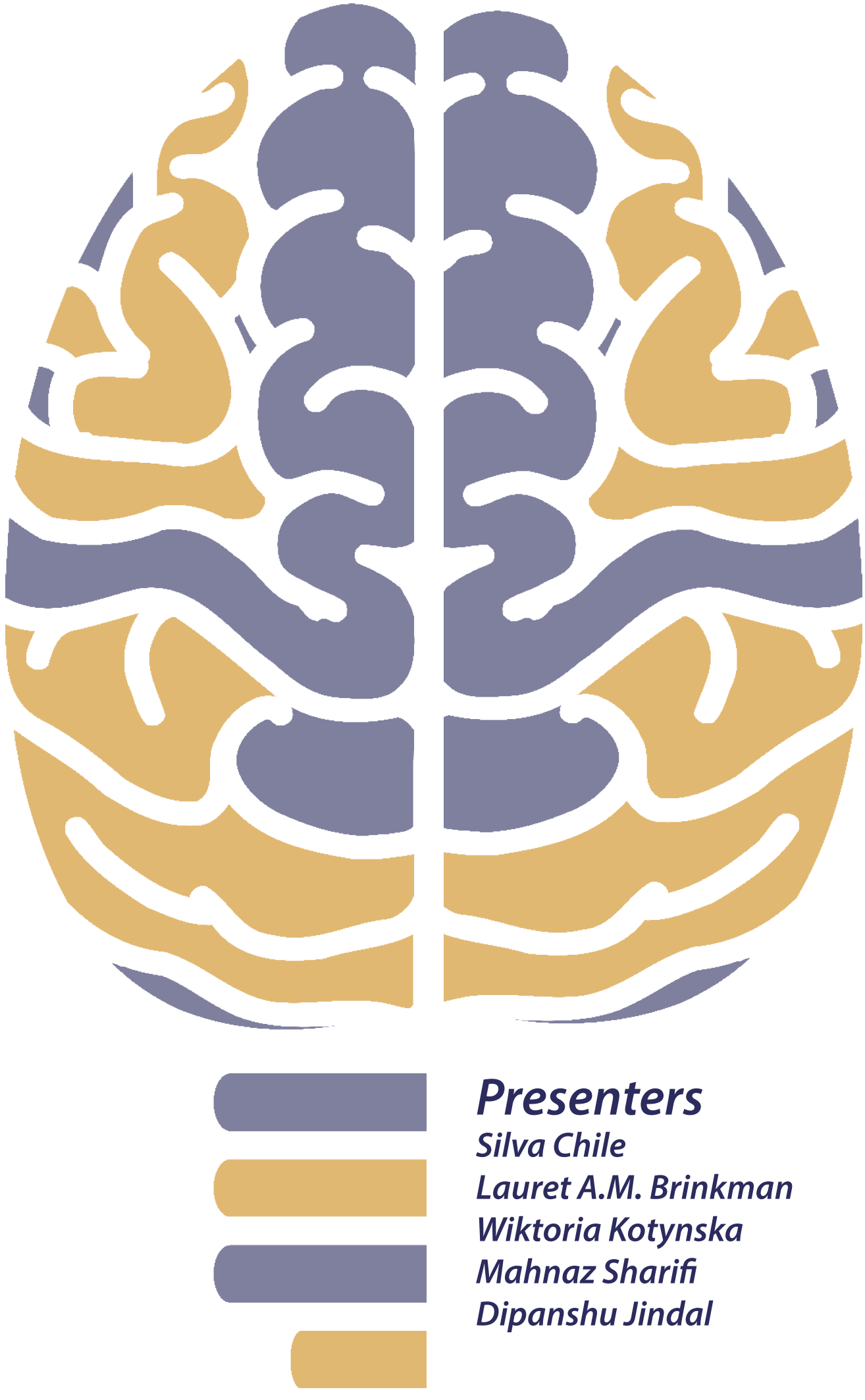
Materials & Methods
A randomized, double-blind, placebo-controlled trial was conducted involving 150 cancer patients suffering from moderate to severe fatigue. Participants were randomly assigned to receive either 2 g/day of L-carnitine or a placebo for 8 weeks. Fatigue levels were assessed at baseline, week 4, and week 8 using the Brief Fatigue Inventory (BFI) and the Functional Assessment of Cancer Therapy-Fatigue (FACT-F) scale. Secondary outcomes included quality of life (QoL) measured by the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30).

Results
Preliminary findings show that patients in the L-carnitine group experienced a 25% reduction in fatigue scores, as measured by BFI, compared to a 10% reduction in the placebo group at the end of the 8-week period ($p < 0.05$). Additionally, improvements in QoL were noted in the L-carnitine group, particularly in physical and emotional well-being domains.

Conclusion
L-carnitine supplementation appears to be an effective intervention for alleviating cancer-related fatigue. Larger-scale studies are recommended to further validate these findings and explore the long-term benefits of L-carnitine in cancer care.

Poster session I

Reproductive Medicine



Presenters

Silva Chile
Lauret A.M. Brinkman
Wiktoria Kotynska
Mahnaz Sharifi
Dipanshu Jindal

Gestational diabetes mellitus-increased intracellular pH recovery is partially restored by H2S in HUVECs depending on maternal pre-pregnancy body mass index

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Co-authhors: Ms. Fernanda Espinoza, Mr. Gonzalo Fuentes, Ms. Paola Valero

Introduction

Hydrogen sulphide (H2S) is an endogenous gasotransmitter that regulates the endothelial function. The synthesis of H2S is reduced in gestational diabetes mellitus (GDM) and in patients with obesity resulting in increased inflammation. Human umbilical vein endothelial cells (HUVECs) from women with GDM pregnancies show alkaline intracellular pH (pHi) but the effect of pre-pregnancy body mass index (BMI) on its regulation and involvement of H2S is unknown. Aim: to determine whether exogenous H2S regulates the pHi in a differential manner in HUVECs from women with different pre-pregnancy BMI.

Materials & Methods

HUVECs were from women with normal (N) or GDM (D) pregnancies and subgrouped by pre-pregnancy weight: normal weight (Nnw, Dnw), overweight (Now, Dow), or obese (Nob, Dob) (n=3-4) (Clinical Hospital UC-CHRISTUS, with patient consent, Ethics #220723001). The pHi was measured in cells preloaded with BCECF-AM (12 M, 10min, pH-sensitive probe) exposed to NH4Cl (20mM). Basal pHi and pHi recovery rate (dpHi/dt) were estimated in the absence or presence of NaHS (1 M, 30 min).

Results

Basal pHi were similar ($P<0.05$, one-way ANOVA) in Nnw (pHi 7.410.2), Now (pHi 7.420.1), and Nob (pHi 7.490.1) and it was unaltered by NaHS in Nnw and Now, but reduced (0.4 pHi units) in Nob. Basal pHi values were higher in Dnw (pHi 7.780.1), Dow (pHi 7.640.1), and Dob (pHi 7.820.2) compared to corresponding groups in normal pregnancies. NaHS did not alter the basal pHi in cells from GDM. The dpHi/dt was similar in Nnw (0.00620.0002 pHi units/s) and Now (0.00430.0008 pHi units/s), but higher in Nob (0.00950.0006 pHi units/s). NaHS abolished the dpHi/dt in Nnw but increased it in Now (3.7-fold) and Nob (2.9-fold). The dpHi/dt in Dnw (0.01180.0004 pHi units/s) and Dow (0.00990.0003 pHi units/s) were higher than in Nnw and Now (1.9 and 2.3-fold, respectively) but comparable in Dob (0.00720.0002 pHi units/s) versus Nob. NaHS decreased the dpHi/dt in Dnw (38%) and Dow (32%), but less effectively in Dob (22%).

Conclusion

The pHi is differentially regulated by maternal pre-pregnancy BMI and GDM status in HUVECs. NaHS potentially benefits pHi regulation in GDM but is less effective in women with GDM and a pre-pregnancy obesity (i.e. gestational diabesity).

Gestational diabetes mellitus-increased intracellular pH recovery is partially restored by H2S in HUVECs depending on maternal pre-pregnancy body mass index

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Introduction

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Materials & Methods

HUVECs were from women with normal (N) or GDM (D) pregnancies and subgrouped by pre-pregnancy weight: normal weight (Nnw, Dnw), overweight (Now, Dow), or obese (Nob, Dob) (n=3-4) (Clinical Hospital UC-CHRISTUS, with patient consent, Ethics #220723001). The pHi was measured in cells preloaded with BCECF-AM (12 M, 10min, pH-sensitive probe) exposed to NH4Cl (20mM). Basal pHi and pHi recovery rate (dpHi/dt) were estimated in the absence or presence of NaHS (1 M, 30 min).

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Conclusion

The pHi is differentially regulated by maternal pre-pregnancy BMI and GDM status in HUVECs. NaHS potentially benefits pHi regulation in GDM but is less effective in women with GDM and a pre-pregnancy obesity (i.e. gestational diabesity).

Outcomes Following Surgical Management of Postpartum Haemorrhage at the Royal United Hospital NHS Trust Bath

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Introduction

Postpartum haemorrhage (PPH) is the loss of 500mL of blood from the genital tract in the 24 hours following birth. After the failure of pharmacological treatment, it may be managed surgically; these interventions tackle 3 of the 4 causes of PPH: trauma, tone, tissue. This audit explores the surgical interventions employed at the Royal United Hospital NHS Trust Bath (RUH) in 83 cases of PPH of 2000mL from April 2022 to May 2024.

Materials & Methods

105 patient records of women who had experienced a major obstetric haemorrhage of 2000mL blood loss from April 2022 May 2024 at the RUH were reviewed. Total blood loss data was found in the data set and patient notes. Standard practice at the RUH involves measuring blood loss quantitatively through weighing items used during delivery. 22 cases were excluded. These involved either medical management alone (including bimanual compression) or the combination of medical management and closing the original incision created during a Caesarean section.

Results

83 of the 105 patients had surgical interventions for the management of PPH. The repair of obstetric lacerations was the most common intervention. It was found that RUHTB guidelines were followed effectively, leading to a relatively low average duration of hospital stay after delivery (2 days) and a mean blood loss of 2536mL. Maternal demographics, complications, returns to theatre and blood products were also noted.

Conclusion

4 in 5 patients who have a major postpartum haemorrhage required at least 1 surgical intervention to treat the haemorrhage. The repair of obstetric lacerations was the most common surgical intervention. This audit may be used to guide future PPH management and clinical decision-making locally. It would be useful to repeat this audit and include patients with blood losses of less than 2000mL.

To Assess Acceptability of the Content, Functionality and Usability of a co-designed fertility preservation decision aid

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Introduction

Paediatric cancer affects over 400,000 children annually, with survival rates exceeding 80%. However, 62% of survivors face infertility risks. Our 2016 Fertility Preservation Decision Aid, developed according to International Patient Decision Aid Standards (IPDAS), supports informed choices. Latest research highlights the need for further refinement. Aims: To Co-design the DA based on previous studies results and literature review.

Materials & Methods

This study employed a multi-stage approach. Stage 1: Literature Review. Stage 2: Co-design and assessing DA acceptability and usability through qualitative focus group or interview with paediatric cancer survivors (Youth Cancer Action Board), clinicians, parents of survivors and newly diagnosed patients. Theoretical Framework of Acceptability (TFA) is used to assess acceptability and usability. Participants were asked to review the tool (content refreshed from stage 1). Stage 3: Finding from stage 2 translated into design for new DA website in collaborate with Digital Transformation for Health Centre, University of Melbourne.

Results

Stage 1: Following literature review, key areas for revision were identified: clarity, navigation, usability, content, and design. Updates implemented March 7-12, 2023. Stage 2: 12 survivors (18-25 yrs) participated in a focus group (Mar 16, 2023). Key finding: DA is beneficial throughout cancer treatment (before, during, and after) Stage 3: New website is developed with necessary changes by working with the digital health experts.

Conclusion

DA was highly acceptable to participants. Some areas of improvement addressed including: Low-intensity version, diversity friendly and improve website navigation. Survivors have unmet FP information needs, they also have desire for open communication with experts after reviewing the DA. Next step: Future RCT to evaluate DA's impact on paediatric cancer survivors unmet FP information needs.

ACCEPTABILITY OF ALTERNATE BIRTHING POSITIONS AND COMPARISON OF MATERNOFETAL OUTCOME WITH THAT OF DORSAL POSITION

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Introduction
Despite the regular dorsal position for delivery of a baby there are various alternative birthing positions like hydrolabour, squatting,sitting, ball,bar, birthing chair etc. which are less likely to be known by common people in developing countries.

Materials & Methods
850 primigravida women with vertex presentation with absence of any pregnancy related complications were selected and out of which 500 opted for dorsal and 350 for alternate birthing position. Many different parameters were selected for comparisons i.e Pain, Degree of perineal tear, Amount of blood loss, Duration of stages of labour, need for episiotomy, mean cervical dilatation rate, Fetal and neonatal outcome. The consent was taken from both mother and family and they have been told about various birthing options and related complications.

Results
58.8% opted for dorsal and 41.2% for alternate birthing position out of which 33.71% chose birthing chair (most selected) and hydrolabour by only 5.14% (least selected). Blood loss >500 ml was found in 16.8% of delivery in dorsal position whereas 6.86% in alternative position. Mean duration of second stage of labour in alternative positions was 37.67 minutes in comparison to 73.79 minutes in dorsal position. Pain score calculated in alternative positions was 4.11 and that in dorsal positions was 7.03. Mean cervical dilatation rate was 1.43 cm/hour in alternative positions and 1.38 cm/hour in dorsal position. Episiotomy was required in 18% of women who delivered in alternative positions in comparison to 38.2% of women who delivered in dorsal position. Perineal injury in 21 women (6%) in alternative positions in comparison to 83 (16.60) women in dorsal position. 41 babies born by dorsal positions were admitted to NICU whereas 24 babies born by alternative positions were admitted.

Conclusion
Our data concludes that, in absence of any complications, the alternative birthing positions may positively influence labour process, reducing maternal pain, duration of second stage of labour with faster cervical dilatation rate, lower amount of blood loss, lesser perineal injuries ,reduced need for instrumentation and lower caesarean section rate and with no increase in NICU admission.

Poster session I

Dental Surgery & Dermatology

Presenters

Mohammad Hossein Davarian
Reza Shakiba
Mehran Farhadi
Mohsen Malekigorji
Amin Yasami
Sepideh Jafarzadeh rastin
Mohsen Kazemian
Shahriar Eftekharian

Evaluation of Soft-Tissue augmentation on implant health of the aesthetic area: A systematic review

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Co-authhors: Dr. Reza Shakiba, Dr. Afshin Yaghobi

Introduction
Dental implant treatments are a primary option for reconstructing edentulous spaces. The presence of keratinized tissue around implants is crucial for their long-term maintenance and stability, even more so than around natural teeth. However, some patients may lack sufficient keratinized tissue due to gingival recession, injuries, lesions, or infections. In such cases, soft tissue grafting techniques are employed to restore this necessary tissue. These periodontal surgical procedures are recommended for achieving optimal biological, functional, and aesthetic outcomes in both short and long-term contexts, particularly in aesthetic zones.

Materials & Methods
This systematic review aimed to evaluate the impact of soft tissue grafting on the success of implant treatments in aesthetic areas. Keywords were developed based on PICO questions, and a comprehensive search was performed across various databases. Selected studies underwent a rigorous bias assessment using the Cochrane tool, with findings reported systematically.

Results
Among the studies reviewed, nine articles met inclusion criteria, categorized into two groups: six studies comparing connective tissue grafting (CTG) to a control group and three comparing CTG to synthetic grafts. In the first group, significant improvements in soft tissue metrics were noted for the graft group; however, conclusions regarding hard tissue outcomes remain insufficiently supported. In the second group, aesthetic differences were not significant, though one study indicated that crestal bone loss on the mesial side of implants with CTG was significantly less than with xenografts. Additionally, pain assessment via the Visual Analog Scale (VAS) showed significantly lower scores in the xenograft group, suggesting greater patient comfort.

Conclusion
The literature indicates that grafted areas exhibit improved surface healing, although aesthetic outcomes are contentious. Future clinical trials with extended follow-up are essential to substantiate the role of soft tissue grafting in standard implant practices. The review also highlights that grafting does not significantly influence bone tissue, and other crucial factors, including gingival biotype, implant placement, and surgical protocols, play significant roles in determining long-term results.

Mallampati score in patients with temporomandibular joint disorders: A pilot casecontrol study

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Co-authhors: Prof. Azam Sadat Madani, Dr. Saeed Hassanzadeh

Introduction
Temporomandibular joint disorder (TMD) is defined as any functional abnormalities in different parts of the face and neck. The Mallampati index is an indicator for determining the extent of airway blockage. No study has examined the relationship between TMD and Mallampati score. Most studies have investigated the relationship between temporomandibular joint problems and sleep problems. This pilot study aimed to assess the Mallampati index scores among TMD patients.

Materials & Methods
Eighty-four people were divided into the case (based on RDC/TMD) and control groups. Demographic information, neck circumference, tongue size, Mallampati score, and other variables were asked of people. STOP-BANG and Pittsburgh Sleep Quality Index (PSQI) were also completed for each patient. Data were analyzed with Chi-square, Fisher's exact, and Mann-Whitney tests.

Results
The Mallampati and PSQI questionnaire scores in the case group were significantly higher than in the control group ($P < 0.001$). The results showed that larger tongue and neck circumference patients had a higher Mallampati score. Pearson correlation coefficient showed that the Mallampati score had a direct and significant relationship with Body Mass Index (BMI) and PSQI ($P < 0.001$).

Conclusion
The results of this study show that Mallampati scores were significantly higher among patients with TMD than among healthy individuals.

Influence of Residual Alveolar Bone Walls of the Maxillary Sinus on Bone Formation Quality After Sinus Lift Surgery

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Introduction
Reconstruction of the posterior maxilla with insufficient bone height is a significant clinical challenge, especially in patients requiring dental implants. Maxillary sinus lift surgery has emerged as an effective technique to address this issue by augmenting the bone volume in the posterior maxilla. However, the role of residual alveolar bone walls in influencing the quality of newly formed bone after surgery remains underexplored. This study investigates how the number of residual alveolar bone walls affects bone formation quality, including angiogenesis, osteoblast density, and implant stability, following sinus lift surgery.

Materials & Methods
This clinical trial included seven edentulous patients undergoing sinus lift surgery at Mashhad University of Medical Sciences. Patients were categorized into two groups based on the number of residual alveolar bone walls: 3-wall and 5-wall groups. All procedures were performed by the same surgeon using a lateral window technique with xenograft bone material. After 6 months, bone biopsies were collected for histological analysis of angiogenesis and osteoblast density. Implant stability was assessed using the Osstell Mentor device.

Results
Patients in the 5-wall group demonstrated significantly higher levels of angiogenesis (mean 27% vs. 17%, $p<0.05$), osteoblast density (1.88/mm2 vs. 1.13/mm2, $p<0.005$), and implant stability (mean ISQ 81.66 vs. 67.50, $p<0.005$) compared to the 3-wall group. These findings suggest that the presence of additional alveolar bone walls supports better bone regeneration and implant outcomes.

Conclusion
The number of residual alveolar bone walls significantly impacts bone quality, angiogenesis, and implant stability after sinus lift surgery. This study highlights the importance of maintaining alveolar bone structure to optimize surgical and implant success, particularly in cases of severe bone resorption.

Comparison of Post operative Pain, Edema and Wound Healing in Surgical Extraction of Impacted Third Molars:Scalpel Versus Radiofrequency

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School of Dentistry, Shahid Beheshti University of Medical Sciences

Introduction
This study aimed to compare the level of pain, wound healing, facial edema, and surgeons comfort in surgical extraction of impacted third molars using surgical scalpel versus radiofrequency (RF) incision.

Materials & Methods
This split-mouth clinical trial evaluated 41 patients with bilateral impacted third molars in one jaw with the same Pederson difficulty index (between 5 and 7, moderate difficulty). The surgical incision was made using a surgical scalpel on one random side and an RF device on the contralateral side. The level of pain was measured using a numerical rating scale (NRS) 7 days postoperatively. The wound healing was evaluated using the wound evaluation scale (WES) 4 weeks postoperatively. Facial edema was quantified using a tape measure 7 days postoperatively. Surgeons comfort was assessed by asking the surgeons regarding the level of easiness of the procedure. The pain score, wound healing score, facial edema, and surgeons comfort in surgical extraction of impacted third molars were compared between the two sides using SPSS 22 via paired t-test and McNemars test.

Results
The surgeons comfort was significantly higher in the use of a surgical scalpel ($P<0.001$). The difference in pain score ($P=0.95$), wound healing ($P=0.32$), and facial edema ($P>0.05$) was not significant between the two groups.

Conclusion
The results of this study showed no significant difference in surgical extraction of impacted third molars using a surgical scalpel or an RF device regarding the level of pain, wound healing, or facial edema.

Achilles tendon abnormalities in psoriasis: correlating ultrasonographic findings with clinical severity

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Co-authhors: Dr. Navid Jalili

Introduction
Cutaneous psoriasis is often associated with subclinical enthesopathy, particularly in the Achilles tendon, which may precede the development of psoriatic arthritis (PsA). Early detection of tendon abnormalities is critical for timely intervention. This study aimed to evaluate Achilles tendon thickness, vascularity, and structural changes using high-resolution ultrasonography (HRUS) in psoriasis patients and to correlate these findings with disease severity and clinical symptoms.

Materials & Methods
A cross-sectional study was conducted involving 60 participants: 30 patients with cutaneous psoriasis and 30 age- and sex-matched healthy controls. Achilles tendon thickness was measured in millimeters (mm) using HRUS, and vascularity was assessed using power Doppler ultrasound (PDUS) and graded on a semi-quantitative scale (0-3). Structural abnormalities, such as hypoechoic areas and tendon tears, were also recorded. Clinical symptoms were evaluated using a patient-reported pain scale (0-10), and disease severity was quantified using the Psoriasis Area and Severity Index (PASI). Statistical analysis was performed using SPSS, with significance set at p0.05.

Results
Psoriasis patients exhibited significantly greater Achilles tendon thickness compared to controls (mean-standard deviation (SD): 5.80.9 mm vs. 4.30.7 mm, $p<0.001$). Vascularity was detected in 68% of psoriasis patients, compared to 12% of controls ($p<0.001$), with a mean vascularity grade of 1.80.7 in the psoriasis group versus 0.30.5 in controls ($p<0.001$). Hypoechoic areas, indicative of tendon degeneration, were observed in 52% of psoriasis patients but were absent in controls ($p<0.001$). A moderate positive correlation was found between tendon thickness and PASI scores ($r= 0.45$, $p<0.01$), as well as between vascularity and patient-reported pain scores ($r= 0.51$, $p<0.01$). Disease duration was also positively correlated with tendon abnormalities ($r= 0.47$, $p<0.01$).

Conclusion
HRUS and PDUS are effective tools for detecting subclinical Achilles tendon abnormalities in psoriasis patients, demonstrating increased thickness, vascularity, and structural changes compared to healthy controls. These findings correlate strongly with disease severity and clinical symptoms, underscoring the importance of routine ultrasonographic assessment in psoriasis patients. Early identification of enthesopathy may facilitate timely intervention and reduce the risk of progression to PsA. This study highlights the potential of advanced imaging techniques in improving the management of psoriasis-related musculoskeletal complications.

Advancing Dermatological Knowledge Acquisition with Enhanced Retrieval-Augmented Generation Models

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Introduction

Dermatology practitioners face an ongoing challenge in accessing reliable, up-to-date information for accurate diagnosis and treatment planning. Traditional methods of information retrieval often suffer from inefficiency and lack of detail, limiting clinicians' ability to make timely, well-informed decisions. Retrieval-Augmented Generation (RAG) is an emerging technique that combines information retrieval with generative AI models, offering a novel solution to enhance the efficiency and quality of dermatological knowledge acquisition. This study investigates the potential of RAG in dermatology by comparing its performance against traditional AI models, such as BERT and T5, focusing on its ability to improve knowledge retrieval and decision support.

Materials & Methods

A diverse and extensive dataset was compiled, including medical literature, dermatology textbooks, and annotated image datasets covering a range of skin conditions. For model training, RAG was optimized by integrating a retrieval module designed to extract relevant data from this corpus, followed by a generative module tasked with synthesizing this information into concise, context-specific responses. Unlike previous studies, this approach incorporated a novel feedback loop, allowing the generative model to self-correct based on retrieval performance, enhancing its overall efficiency. Dermatological queries, spanning from basic skin conditions to more complex diagnostic challenges, were used to assess RAGs performance, comparing it with two state-of-the-art models: BERT and T5. The evaluation metrics focused on relevance, comprehensiveness, and overall accuracy.

Results

The RAG model achieved an overall accuracy of 89%, significantly outperforming BERT (71%) and T5 (70%). RAG demonstrated a 18% improvement over the other models in terms of accurately identifying and synthesizing relevant dermatological data for complex queries. It also excelled in generating detailed, contextually appropriate responses, tailored to specific clinical scenarios. Notably, RAG produced more comprehensive and context-sensitive answers, especially in difficult diagnostic cases involving rare conditions or complex symptomatology.

Conclusion

This study highlights the significant promise of Retrieval-Augmented Generation in transforming dermatological knowledge acquisition. RAGs superior accuracy, contextual relevance, and ability to generate tailored responses point to its potential to support clinical decision-making in dermatology. By integrating RAG into dermatological practice, clinicians can benefit from more precise, efficient access to critical information, enhancing both diagnostic accuracy and patient care outcomes. Future developments could expand RAG's application to further domains of healthcare, improving clinical workflows and patient education.

Design and validation of a new machine-learning-based diagnostic tool for the differentiation of dermatoscopic skin cancer images

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Introduction
Skin cancer is the most common cancer in the United States. Current estimates are that one in five Americans will develop skin cancer in their lifetime. A skin cancer diagnosis is challenging for dermatologists requiring a biopsy from the lesion and histopathological examinations. In this article, we used the HAM10000 dataset to develop a web application that classifies skin cancer lesions.

Materials & Methods
This article presents a methodological approach that utilizes dermoscopy images from the HAM10000 dataset, a collection of 10015 dermatoscopic images collected over 20 years from two different sites, to improve the diagnosis of pigmented skin lesions. The study design involves image pre-processing, which includes labelling, resizing, and data augmentation techniques to increase the instances of the dataset. Transfer learning, a machine learning technique, was used to create a model architecture that includes EfficientNET-B1, a variant of the baseline model EfficientNET-B0, with a global average pooling 2D layer and a softmax layer with 7 nodes added on top. The results of the study offer a promising method for dermatologists to improve their diagnosis of pigmented skin lesions.

Results
The model performs best in detecting melanocytic nevi lesions with an F1 score of 0.93. The F1 score for Actinic Keratosis, Basal Cell Carcinoma, Benign Keratosis, Dermatofibroma, Melanoma, and Vascular lesions was consecutively 0.63, 0.72, 0.70, 0.54, 0.58, and 0.80.

Conclusion
We classified seven distinct skin lesions in the HAM10000 dataset with an EfficientNet model reaching an accuracy of 84.3%, which provides a promising outlook for further development of more accurate models.

Curcumin Effect on the Prevention of Gingival Overgrowth Following Phenytoin Consumption in Rats: A Clinicohistological and Immunohistochemical Study

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Introduction
At the moment there is no clear evidence with clinico-histological and immunohistochemical studies in animals to show the curcumin effect on the gingival overgrowth following phenytoin consumption. The purpose of the present study was to identify this subject

Materials & Methods
In this experimental study, 50 adult male Wistar rats were divided into three groups. The rats in groups I and II received 100 mg/kg of phenytoin per day. Group II also received 20 mg/kg intraperitoneal curcumin per day. The control group received the curcumin vehicle only. Gingival clinical dimensions were measured at the beginning and end of the study. The rats were then sacrificed, biopsy of gingiva was prepared, and the samples were stained with hematoxylin-eosin. Morphometry was performed to evaluate the degree of inflammation, epithelial thickness, number, and cross-sectional area of the blood vessels. Immunohistochemical staining was performed using Ki67 and -SMA.

Results
Compared to the control group, Phenytoin in group I increased gingival volume. There was significance difference in group II with group I and control after intervention in the clinical view ($p = 0.002$). The difference in the number of blood vessels between groups I and II was statistically significant ($p = 0.001$). Significant differences were observed in blood vessel cross-sectional area ($p = 0.001$), epithelial thickness ($p = 0.002$), Ki67, and -SMA expression between groups I and II ($p = 0.001$)

Conclusion
In rats, curcumin seems to exerts its effects in preventing an increase in gingival volume caused by Phenytoin through decreasing the inflammatory infiltration, decreasing the number of blood vessels and increasing their cross-sectional area, decreasing the thickness of the epithelium, and decreasing the expression of Ki67 and -SMA

Poster session II

Oncology II

Presenters

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Revealing Intracellular Dynamics in CAR-T Heterogeneity by Multi-Color Live Imaging

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Introduction

T-cell therapies have limited efficacy in solid tumors, underscoring the need to better understand CAR-T biology. BEHAV3D, a recent immune-organoid imaging method, provided insights into the dynamic T-cell behaviors underlying heterogenous CAR-T therapy response. We drew inspiration from the Cell Paint assay, a high-throughput screening method, to improve BEHAV3D by incorporating organelle-targeting and functional live-dyes. We aim to use this novel 3D Live Cell Paint Assay to visualize 12 live-cell dyes, labeling intracellular targets including nucleus, mitochondria and cytoskeleton, enabling detailed phenotyping without genetic modification. This technological development enables detailed tracking of CAR-T cell engagement with cancer cells, including target recognition, immune synapse formation, and cytotoxic dynamics over time. Linking this to difference in killing ability proves insights into the mechanisms underlying heterogeneity of immunotherapy efficacy.

Materials & Methods

Co-cultures with Breast Cancer organoids and B7H3 CAR-T cells are labeled with up to 12 commercially available live dyes. Multispectral imaging is performed with the Zeiss LSM980, creating 3D timelapse videos with 90-second intervals. To analyze dynamic intracellular changes, we aim to train a YOLO deep learning model to recognize organelle positions linked to behavioral phenotypes.

Results

We optimized a 7-dye panel for nucleus, membrane, mitochondria, lysosomes, tubulin, actin, and T-cell tracking for multispectral imaging. Preliminary data reveals dynamic phenotypes in CAR-Ts: active, elongated shapes transition to a rounded, inactive state. We hypothesize these morphologies encompass specific organelle organizations, which we will characterize further. We also visualized directed movement of T-cells, with a leading nucleus, followed by the centrosome and mitochondria. We will also characterize organelle arrangements during immune synapses formation. Lastly, we will compare organelle polarization in dysfunctional CAR-T cells versus effective "super-engagers," shedding light on killing capacity and therapeutic potential.

Conclusion

With the 3D Live Cell Paint Assay we will link real-time phenotypic profiling with dynamic intracellular changes. With seven dyes optimized and plans to expand to 12, it provides an unprecedented "seeing is believing" view of cellular components in live CAR-T cells. By revealing intricate details of CAR-T cell heterogeneity and function, it offers groundbreaking insights into immune responses and paves the way for next-generation immunotherapies.

Functionalized PLGA nanoparticle-encapsulated hybrid molecules for potential targeted delivery at colorectal cancer cells

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Introduction

Colorectal cancer (CRC) is the second leading cause of cancer-related deaths globally, with cases projected to rise by 60% by 2030. Current treatments, such as chemotherapy, radiotherapy, and surgery, are limited by drug resistance and side effects, underscoring the need for innovative and harmless strategies. Hybrid molecules (HMs), which combine multiple pharmacophores, show promise for enhanced anticancer efficacy but face challenges like poor solubility and specificity. Poly(lactic-co-glycolic acid) (PLGA) nanoparticles (NPs) improve bioavailability, enable controlled drug release, and enhance targeted delivery. Furthermore, cancer cell-coated NPs offer an innovative surface functionalization approach, leveraging cancer cells' homotypic aggregation and immune evasion properties. This study investigates the synergistic potential of nanoencapsulating HMs and functionalizing NPs with biomimetic materials for CRC therapy.

Materials & Methods

HMs were encapsulated into PLGA NPs using a high-energy emulsion solvent evaporation method and PLGA (2438 kDa) with different lactic-to-glycolic acid ratios. NPs properties were characterized, including size, dispersity, zeta potential, encapsulation efficiency (EE), and drug loading capacity (DLC). Drug release kinetics was evaluated at different pH. NPs were surface-functionalized with cell material (CM) from SW480 CRC cells by extrusion and high-energy homogenization methods varying NPs:CM ratios to optimize functionalization.

Results

The PLGA NPs exhibited particle sizes of 160260 nm, a dispersity of 0.100.23, and zeta potentials of -32 to -46 mV, indicating proper size and morphology for the intended application and high colloidal stability. EE ranged from 6877%, with DLC between 3.74.9%. Drug release showed controlled, pH-dependent profiles, with cumulative release, including an initial burst phase followed by sustained release. CM was successfully extracted, yielding similar protein contents using the two methods tested, 0.42 and 0.47 mg, respectively. Surface functionalization was achieved, and surface protein content was measured, obtaining 10.6 g of total protein on NPs.

Conclusion

The synthesized NPs demonstrated efficient HM encapsulation, optimal stability, and sustained, pH-responsive drug release. Future studies will evaluate the improved uptake of CM-functionalized NPs in various CRC cell lines to demonstrate the synergy of HMs nanoencapsulation and NPs functionalization on the antiproliferative effect. These findings highlight their potential for targeted and prolonged CRC therapy.

Distinct Predictive Factors for Postoperative Complications and Survival in Right and Left Colon Cancer: Insights from a Retrospective Cohort Study

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Introduction
Colorectal cancer (CRC) is a leading cause of cancer-related mortality, with distinct biological and clinical differences between right colon cancer (RCC) and left colon cancer (LCC). This study aimed to identify predictive factors for postoperative complications and overall survival (OS) in patients undergoing surgical treatment for RCC and LCC.

Materials & Methods
This retrospective study included 254 patients who underwent surgical resection for colon cancer between January 2014 and December 2023. Patients were divided into RCC (123; 48.43%) and LCC (131; 51.58%) groups based on tumor location. Predictive factors for postoperative complications and OS were analyzed using univariate and multivariate logistic regression, as well as Cox proportional hazards regression models.

Results
The univariate analysis in the whole cohort revealed that C-reactive protein ($p < 0.001$), CRP/albumin ratio ($p = 0.01$), ASA score IIIV ($p = 0.03$), emergency admission mode ($p < 0.001$), and the stoma ($p < 0.001$) influenced the occurrence of postoperative complications. Additionally the emergency admission mode ($p < 0.001$) and stoma ($p = 0.003$) were potential predictors in the LCC group. However, in the multivariate analysis, no significant predictive factors for postoperative complications were identified in the whole cohort, RCC, or LCC groups. In the multivariate analysis for OS in the whole cohort, higher platelets count ($p = 0.01$), mucinous tumor ($p < 0.001$), stoma ($p < 0.001$), and AJCC stage IIIIV ($p < 0.001$) were identified as independent predictive factors for decreased OS. In the RCC group, independent predictors of decreased OS included AJCC stage IIIIV ($p < 0.001$), stoma ($p < 0.001$), and higher platelets count ($p < 0.001$). In the LCC group, higher BMI ($p = 0.001$) and stoma ($p = 0.01$) were found to be independent predictive factors for decreased OS.

Conclusion
This study underscores the importance of tumor localization-specific factors in predicting OS in colon cancer. While no significant predictors for postoperative complications were identified in the entire cohort, RCC, or LCC groups, distinct factors were associated with decreased OS. These findings highlight the need for tailored, tumor location-specific strategies to improve outcomes in colon cancer patients

CD146 Induces Immune Escape by Up-Regulating FABP4 Expression and Decreasing Macrophage Phagocytosis of tumor Cells

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Introduction

Tumor-associated macrophages (TAMs) contribute to the immunosuppressive tumor microenvironment (TME) in breast cancer, often adopting an M2 phenotype that promotes tumor progression. Lipid metabolism reprogramming in macrophages has emerged as a critical determinant of their functional state. CD146, a cell adhesion molecule implicated in tumor metastasis and immune regulation, has been recently linked to metabolic reprogramming. However, its role in macrophage lipid metabolism and phagocytic activity remains unclear. Therefore, our study aims to investigate the role of CD146 in regulating macrophage lipid metabolism and its impact on antitumor phagocytosis against breast cancer cells.

Materials & Methods

Primary human preadipocytes were chemically differentiated into mature adipocytes to produce adipocyte-conditioned medium (ACM). Macrophages with CD146 knockdown were generated using lentiviral plasmids. Lipid droplet uptake and accumulation were assessed by Nile Red staining. Macrophage chemotaxis and phagocytosis were evaluated using Transwell assays and flow cytometry. Expression of CD146, FABP4, and macrophage-related polarization markers was analyzed using qRT-PCR and Western blot.

Results

TCGA and GEO analyses revealed that increased lipid abundance in breast cancer is associated with poor prognosis and an immunosuppressive TME. High CD146 expression in macrophage subpopulations was associated with metabolic reprogramming and diminished antitumor activity. ACM-treated macrophages exhibited increased lipid droplet (LD) accumulation, M2 polarization, and reduced tumor chemotaxis and phagocytosis towards MDA-MB-231 and BT549 cells. ACM or oleic acid treatment elevated CD146 expression, while CD146 inhibition (via shRNA or CD146-targeted antibody 112-2) reduced lipid droplet (LD) uptake and accumulation, suppressed M2 polarization, and restored macrophage phagocytosis. Mechanistically, scRNA-seq and TCGA data analysis revealed that CD146 expression was positively correlated with FABP4. Knockdown or antibody-mediated inhibition of CD146 resulted in a decrease in FABP4 protein.

Conclusion

Our findings suggest that CD146 promotes lipid droplet accumulation and drives macrophage M2 polarization and impairs phagocytosis in high-lipid environments. Although the potential interaction between CD146 and FABP4 has been observed, further investigation is required to confirm the exact nature of this relationship. We will further explore the therapeutic potential of targeting CD146 using antibodies or small molecules in animal models to validate its role and identify strategies to restore macrophage function and enhance antitumor immunity.

Deciphering the Role of PANK4 in Melanoma: Insights from Independent Component Analysis

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Introduction

Melanoma is a dangerous form of skin cancer caused by ultraviolet (UV) light damage, leading to many mutations in the tumour cells. This high mutation rate makes melanoma very likely to trigger a strong immune response. Despite progress in immunotherapy, many patients do not respond well, highlighting the need for new treatment options.

Materials & Methods

This study used a technique called Independent Component Analysis (ICA) to analyse gene expression in melanoma biopsies. The focus was on the role of the gene PANK4, which is involved in cellular metabolism. Data were collected from clinical trials and biobanks, processed to ensure quality, and then analysed to identify patterns and correlations in gene activity.

Results

PANK4 was found to be significantly active in certain gene expression patterns, particularly in a component called IC38. This component showed a strong negative correlation with another component, IC101, which includes the enzyme PPCS. This suggests that PANK4 and PPCS might interact in regulating Coenzyme A (CoA) biosynthesis, an essential process for cellular metabolism. Further analysis revealed that PANK4 is associated with genes involved in RNA processing, immune responses, and cell division.

Conclusion

The study indicates that PANK4 plays an important role in melanoma, especially in immune response and metabolism. Previously thought to be inactive, PANK4 is now recognized as a phosphatase that influences CoA synthesis, crucial for cell function and immune regulation.The findings highlight the potential of PANK4 as a therapeutic target in melanoma. Future research should explore how PANK4 regulates RNA processes and immune responses to develop new treatments for melanoma.

Efficacy of Probiotics in Alleviating Gastrointestinal Symptoms in Gastric Cancer Patients

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Introduction
Gastric cancer (GC) patients frequently endure debilitating gastrointestinal (GI) symptoms, which can persist even after treatment. This study aims to evaluate the efficacy of a probiotic supplement including Lactobacillus acidophilus, Bifidobacterium lactis, and Bifidobacterium longum, in alleviating these symptoms and enhancing patients quality of life.

Materials & Methods
In this randomized clinical trial, 60 GC patients were assigned to either a probiotics group (receiving daily probiotic capsules for 2 weeks) or a placebo group (receiving daily placebo capsules for 2 weeks). participants rated the severity of their GI symptoms they on a visual analogue scale (VAS), where 0 indicated no pain and 10 represented the worse possible pain, at baseline, and at four and eight weeks post-intervention. The average VAS score for each symptom were compared between the two groups at each time point using the Mann-Whitney test. Additionally, VAS scores within each group were analyzed across different time points using Greenhouse-Geisser test.

Results
The probiotics group exhibited a significant reduction in VAS scores for upper abdominal pain and heartburn at eight weeks post-intervention compared to baseline (P value = 0.001). Furthermore, they reported significantly lower severity scores for constipation after eight weeks of treatment (P value < 0.001). No significant improvements were observed for other GI symptoms in this patient population.

Conclusion
Two weeks of probiotic supplementation significantly alleviate upper abdominal pain, heartburn, and constipation in GC patients. These findings indicates that probiotics may serve as a beneficial adjunctive treatment for managing gastrointestinal symptoms in this patient population.

Poster session II

Paediatrics

Presenters

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Metabolic Abnormalities in Duchenne Muscular Dystrophy

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Introduction

Duchenne muscular dystrophy (DMD) is an X-linked recessive neuromuscular disorder caused by a DMD gene mutation. Progressive muscular atrophy causes ambulation loss in adolescence and death by the 3rd decade. Though incurable, steroid therapy prolongs ambulation, delays scoliosis progression, and slows respiratory and cardiovascular decline. However, treatment side effects and other factors increase obesity prevalence. Nutritional status assessment is crucial, yet few studies examine metabolic laboratory abnormalities.

Materials & Methods

Total of 133 DMD patients of the University Clinical Centre, Gdansk, Poland, were divided into 3 age-related subgroups (1st 0-6.9, 2nd 7-12.9, 3rd 13-17.9 years), consistent with disease progression. Medical history, physical examination and laboratory tests were performed, including lipid profile and OGTT test, a HOMA-IR cut-off of 2.5 indicates insulin resistance.Mean age of patients was 11.224.38 years (max-min: 17.92-1.92), 72 were ambulant, with a mean age at loss of ambulation was 10,32,8 years (max-min: 19,9-3,4). Majority (78%) were on steroid therapy (68 on Calcort, 36 on Encorton), with a mean length of treatment of 52.63 46.74 months. Anthropometric evaluation revealed increased BMI z score in 41.24% of studied cohort.

Results

Dyslipidemia was shown in 81% of patients (43% hypercholesterolemia, 34% decreased HDL, 40% increased LDL and 55% hypertriglyceridemia). Furthermore, we noted, statistically significant decrease in lipids level in the 1st-2nd-3rd age group (LDL 113-108-98 mg/dl; p=0,002 and TG 114-101-77 mg/dl; p=0,014, respectively). OGTT test results revealed increasing glucose [mg/dl] and insulin [uU/ml] level in analyzed age subgroups. The glucose level in 0:80-78-79 (p=0,746), 60:96-98-119 (p=0,008), 120 :91-96-116 (p=0,049) and insulin levels 0 :3-8-11 (p=<0.001), 60: 18-38-60 (p=0,003), 120:24-37-96 (p=<0.001). HOMA-IR level showed age-related increase 0,6-1,5-2,1 (p=<0.001), with 19 patients having insulin resistance.

Conclusion

The study highlights that obesity complications among DMD boys are a growing issue, causing metabolic and nutritional challenges. We observe a high prevalence of dyslipidemia with evidence of insulin resistance with increasing age and disease progression.

Molecular Characterization and Prevalence of Viral Pathogens in Paediatric Acute Gastroenteritis in Malaysia

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Introduction

Paediatric acute gastroenteritis (AGE) remains a significant health concern, particularly in low- and middle-income countries. Common causative agents include rotavirus, adenovirus, and norovirus, which are responsible for a substantial disease burden. While rapid diagnostic kits facilitate timely identification of these pathogens, molecular techniques enable detailed characterization of viral strains, providing valuable epidemiological data. This study aimed to evaluate the prevalence of viral pathogens in paediatric AGE cases and to characterize their strains using molecular methods, contributing to improved disease surveillance and intervention strategies.

Materials & Methods

This cross-sectional study was performed in Malaysia, involving stool samples from 200 children presenting with AGE symptoms at selected healthcare facilities. Initial screening for rotavirus, adenovirus, and norovirus was conducted using commercial rapid diagnostic kits. Samples testing positive were subjected to further analysis using reverse transcription polymerase chain reaction (RT-PCR) and sequencing to identify specific viral genotypes. Patient demographic and clinical data were also collected and analysed to assess correlations with infection patterns.

Results

Among the detected viral pathogens, rotavirus was the most frequently identified, followed by norovirus and adenovirus. Molecular analysis revealed that the G1P[8] strain was the dominant genotype for rotavirus, while norovirus infections were predominantly caused by genogroup II (GII), especially GII.4 strains. Adenovirus species F strains were also identified. Coinfections with multiple viral pathogens were observed but were relatively uncommon. Molecular profiling highlighted the diversity of circulating strains and provided insights into potential associations between specific strains and the severity of clinical symptoms.

Conclusion

This study demonstrates the prevalence of viral pathogens in paediatric AGE and underscores the importance of integrating rapid diagnostics with molecular techniques for comprehensive disease surveillance. The findings emphasize the need for continued molecular monitoring to track viral strain evolution and inform public health strategies, including vaccination programs and infection control measures.

Muscle Ultrasonography in Costello Syndrome:unveiling new clinical insights of a complex muscular phenotype

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Introduction

Costello syndrome is a rare genetic disorder within the spectrum of RASopathies, caused by mutations in the HRAS gene, leading to the dysregulation of the RAS/MAPK signaling pathway. A more severe musculoskeletal involvement, including reduction in muscle force and impaired mobility, has been described as part of the syndrome phenotype. This study aims to evaluate these features using ultrasonography, a widely recognized technique for its diagnostic value in neuromuscular disorders. Despite its established role in muscle health assessment, it has never been conducted in RASopathies to date.

Materials & Methods

Notably, ultrasonography is a radiation-free technique that visualizes muscle architecture, particularly fibroadipose infiltration (FAI), which appears as increased echogenicity due to pathological remodeling. Additionally, the study explored associations between muscle involvement, metabolic factors, and nutritional parameters.The research cohort consisted of 20 individuals (13 females, 7 males, median age of 19 years) with molecularly confirmed CS diagnoses.Ultrasonographic evaluations were conducted using a Samsung RS85 Prestige machine equipped with a 711 MHz linear transducer. Muscles assessed included paravertebral muscles, rectus femoris, vastus medialis and lateralis, and gastrocnemius. FAI was graded according to the Heckmatt scale (1-4), whereas nutritional assessments included macronutrient intake analysis and measurements of resting energy expenditure.

Results

The analysis revealed that FAI was identified in 100% of participants, with the lumbar paravertebral muscles being the most commonly affected ones, showing grade II involution (<30%) in almost the entire cohort (85%). In addition, a higher percentage of patients showed FAI in vastus lateralis (70%). No significant association was found between FAI and age, biochemical parameters and nutritional profile of the patients.

Conclusion

Consequently, we speculate that FAI in individuals with CS may be predominantly linked to the underlying molecular background rather than modifiable factors.Despite its strengths, the study is limited by the small cohort size, reflective of the rarity of CS, and the operator-dependent nature of ultrasonographic imaging. Therefore, prospective studies involving larger cohorts are crucial to validate these findings, monitor disease progression and assess the efficacy of targeted interventions.In conclusion, this study underscores the potential of ultrasonography to enhance clinical management in individuals with CS and related RASopathies.

COVID-19 Outcomes in Pediatric Kidney Transplant Recipients: A Multicenter Study with Comparison with Non-Transplanted Children

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Introduction
Early in the COVID-19 pandemic, children were noted to experience less severe disease compared with adults. However, evidence regarding the clinical outcomes of COVID-19 in pediatric kidney transplant recipients (pKTRs) remains limited. This study aimed to characterize COVID-19 outcomes in pKTRs and compare these outcomes to those observed in non-transplanted children.

Materials & Methods
We conducted a retrospective cohort study of 112 pKTRs (<18 years old) diagnosed with COVID-19 between 2020 and 2023 across seven transplant centers in Brazil. Outcomes included hospitalization, intensive care unit (ICU) admission, and mortality. Case-fatality rates were compared between pKTRs and non-transplanted children using data from the state of Sao Paulo, encompassing cases diagnosed up to January 2022. Statistical comparisons were performed using the Chi-square test.

Results
KTRs were 9.8 years old, 62% male, and 66% White. The time from transplantation to COVID-19 diagnosis was 2.5 years. Among pKTRs, 11.6% required hospitalization, 3.6% were admitted to the ICU, and 2.7% died. During the pre-vaccine era, rates of hospitalization, ICU admission, and mortality were 14.5%, 4.8%, and 3.2%, respectively, compared with 8.0% (p = 0.28), 2.0% (p = 0.63), and 2.0% (p = 0.69) in the post-vaccine era. For those diagnosed within the first year post-transplant, rates of hospitalization, ICU admission, and death were 14.8%, 7.4%, and 7.4%, respectively, compared with 10.6% (p = 0.55), 2.4% (p = 0.24), and 1.2% (p = 0.08) for those diagnosed later. Younger children (<12 years) had hospitalization, ICU admission, and mortality rates of 18.8%, 3.8%, and 3.1%, respectively, compared with 8.8% (p = 0.14), 3.1% (p = 0.99), and 2.5% (p = 0.99) among teenagers (1218 years). Lastly, in non-transplanted children, the COVID-19 case-fatality rate in Sao Paulo was 1.9 per 1,000, compared with 23.8 per 1,000 among pKTRs (RR = 12.5; 95%CI: 3.4143.49; p = 0.01).

Conclusion
Although COVID-19 case-fatality rates in pediatric KTRs were low, they were significantly higher than in non-transplanted children. Mortality was notably elevated in the first year post-transplant. These findings underscore the need for enhanced surveillance and targeted interventions in this vulnerable population.

A novel TRPC3 mutation alters neuronal function and contributes to the pathogenesis of spinocerebellar ataxia

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Introduction

Spinocerebellar ataxias (SCA) represent a heterogeneous group of neurodegenerative disorders, characterised by progressive degeneration of cerebellar Purkinje cells. Affected patients suffer from severe impairments in motor coordination, balance and muscle control. While over 40 subtypes of SCA have been identified, more than 50 % of cases remain genetically unexplained. Currently, no effective treatment exists, with therapies limited to symptom management. In this study, we investigated the pathogenic role of a novel de novo mutation in TRPC3 (p.Arg625Gln) associated with spinocerebellar ataxia type 41 (SCA41) in a 5-year-old patient presenting with spastic paraparesis. We aimed to elucidate the functional consequences of this mutation using differentiated patient-derived induced pluripotent stem cells (iPSCs).

Materials & Methods

Dermal fibroblasts were collected from the patient and a healthy control, and reprogrammed into iPSCs using Sendai virus vectors. iPSCS were subsequently differentiated into motor neurons via dual SMAD inhibition and small-molecule modulation. Motor neuron precursor cells (MNPs) and mature motor neurons were characterised through qPCR and immunofluorescence. Functional analyses included multi-electrode array (MEA) recordings to assess electrophysiological activity, apoptosis assays using Caspase-GloTM, and mitochondrial function testing via the Seahorse Cell Mito Stress Test.

Results

Patient-derived and control motor neurons showed no significant difference in TRPC3 gene expression. However, patient-derived MNPs exhibited accelerated differentiation, indicated by significantly elevated expression of PAX6 ($p < 0.01$) and markers of mature motor neurons such as CHAT, ISLET1 and HB9 ($p < 0.05$). Preliminary findings in ongoing electrophysiological analyses revealed an increased firing rate in patient motor neurons. Surprisingly, patient-derived MNPs demonstrated significantly reduced apoptosis rates compared to controls, diverging from the previously investigated Moonwalker (Mwk) mouse model harbouring a toxic TRPC3 mutation (p.Thr635Ala). Mitochondrial function assays revealed no significant differences in oxygen consumption rates or ATP-production rates, suggesting no increased oxidative stress.

Conclusion

Our preliminary findings suggest that the TRPC3 mutation alters neuronal function by accelerating differentiation, enhancing activity, and reducing apoptosis, potentially pointing to compensatory mechanisms in patient-derived neurons. These observations are contrary to prior models and underline the complexity of TRPC3-mediated pathogenesis in SCA41. Ongoing investigations will further clarify these mechanisms and provide a foundation for developing therapeutic strategies for spinocerebellar ataxia.

Are Appendicitis Scoring Systems Accurate Enough to Distinguish Acute Appendicitis from MIS-C?

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Introduction
During the COVID-19 pandemic, evaluating appendicitis with clinical scoring systems became challenging. We must distinguish from Multisystem inflammatory syndrome in children (MIS-C) in patients with abdominal pain. For this reason, in this study, we evaluated the accuracy of three clinical scoring systems [(Appendicitis Inflammatory Response Score or AIR), (Alvarado Score), (Pediatric Appendicitis Score or PAS)] in both COVID-19-infected and non-infected patients.

Materials & Methods
We conducted this study during the COVID-19 pandemic at Tabriz Children's Hospital, Tabriz, Iran. We included all patients admitted with acute abdomen and divided them into two groups. In the case group, we included COVID-19-infected patients detected by positive PCR tests; however, in the control group, we included non-infected patients. We used three scoring systems (AIR, ALVARADO, and PAS) for the screening of acute appendicitis and calculated the specificity and sensitivity, positive predictive value, negative predictive value, and the accuracy of scoring systems in both case and control groups with the ROC analysis method in SPSS 26 and compared them. The gold standard test for acute appendicitis diagnosis is the post-operative pathology result and one-month follow-up in not operated patients.

Results
Based on the results of PCR tests, we included 63 patients in the case group and 95 patients in the control group. The sensitivity and specificity of the AIR screening test were 0.44 and 0.66 for the case group and 0.6 and 0.98 for the control (P value < 0.009). The ALVARADO screening test: 0.74 and 0.47 for the case group and 0.98 and 0.85 for the control (P value < 0.0001). The PAS screening test: 0.81 and 0.33 for the case group and 0.98 and 0.76 for the control consecutively (P value < 0.0001).

Conclusion
We found statistically significant changes in appendicitis scoring systems in COVID-19-infected patients. The screening scoring systems should be replaced by more accurate tools in the COVID-19 pandemic and MIS-C.

Accuracy of Disease Prediction in Pediatric Intensive Care Unit Patients Using Modified Early Warning Score: A Randomized Controlled Trial

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Introduction
Due to their young age and limited communication, pediatric patients in internal medicine wards are vulnerable to nursing assessment errors, which can result in adverse events. Implementing a risk management scale enables quick identification of critically ill or at-risk patients, enhancing treatment outcomes. To explore the application effect of modified pediatric early warning score (PEWS) on the severity assessment of children in pediatric intensive care unit (PICU).

Materials & Methods
This study was a single-blind, two-arm randomized controlled trial involving 300 pediatric inpatients at a tertiary hospital in Guangdong Province from June 2021 to December 2023. Patients were randomly assigned to an observation group (150 cases) or a control group (150 cases). The control group received standard treatment and routine nursing care, while the observation group received an intervention combining the PEWS with a graded nursing management model. PEWS scores were analyzed upon admission, and its effectiveness in assessing illness severity was evaluated using a receiver operating characteristic (ROC) curve. The study compared treatment outcomes, complication rates, mortality, and parental satisfaction between the two groups.

Results
The observation group had significantly lower mortality, complication rates, hospital stay duration, and costs compared to the control group ($P<0.05$). Parental satisfaction was also significantly higher in the observation group ($P<0.05$). A modified PEWS score of 1 was identified as the threshold for predicting the need for nursing intervention in critically ill patients, with an area under the curve (AUC) of 0.91, sensitivity of 92.1%, specificity of 75.4%, and a Youden index of 0.675.

Conclusion
The modified PEWS effectively assesses patient conditions, increasing nursing care likelihood for scores above 1. It aids early illness detection and monitors patient changes, enabling timely interventions that reduce complications and mortality, shorten hospital stays, lower costs, and improve parental satisfaction. This approach deserves promotion.

Predictors of Treatment Resistance in Pediatric Nocturnal Enuresis: A Comparative Study of Clinical and Urinary Factors

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Introduction
Nocturnal enuresis (NE) poses a persistent challenge in pediatric care, with variable responses to established treatments. This study investigates factors distinguishing treatment-responsive and treatment-resistant NE in children, aiming to guide improved management strategies.

Materials & Methods
A cross-sectional study was conducted in 2017 at Mohammad Kermanshahi Hospital, Iran, involving 144 children aged 58 years diagnosed with NE. Participants were divided into treatment-controlled (n=85) and treatment-resistant (n=59) groups. All children received Desmopressin nasal spray (10 mcg/spray nightly) for three months. Clinical, behavioral, and ultrasonographic data were analyzed using descriptive statistics and Fishers exact test.

Results
Children in the treatment-responsive group exhibited a higher prevalence of factors such as deep sleep (85.9%), daytime urinary control (77.6%), high daily fluid intake (76.3%), and reduced enuresis frequency with fluid management (65.9%). In contrast, treatment-resistant cases were associated with poor medication adherence (94.9%), large nocturnal urine volumes (86.4%), multiple episodes per night (64.4%), and abnormal post-void residual urine volumes (61.0%). Emotional and behavioral problems were also more prevalent in the resistant group (30.5%).

Conclusion
The findings underscore distinct clinical and behavioral patterns between treatment-responsive and resistant NE cases, highlighting the need for tailored therapeutic approaches. Addressing medication adherence, emotional factors, and urinary dynamics may enhance outcomes in resistant cases. Further longitudinal research is recommended to validate these observations and explore novel treatment strategies.

Poster session II

Genetics II

Presenters

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Weronika Stelmaszczyk
Jella-Rike J.A.H.Spijkervet
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Exploring secretory autophagy in cell models of Alzheimer's disease

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Introduction

Neurons are polarized cells with characteristic protrusions called axons and dendrites that transmit signals over long distances. To maintain the health of these protrusions, neurons continuously autophagocytose dysfunctional organelles and misfolded proteins. Autophagic cargo is then loaded into organelles called amphisomes and transported toward the cell body for lysosomal degradation. In Alzheimer's disease (AD), however, lysosomal function is impaired, resulting in the accumulation of amphisomes in axonal swellings , which contribute to neurodegeneration. In non-neuronal cells, lysosomal dysfunction has been found to trigger amphisome exocytosis, resulting in the secretion of autophagic cargo into the extracellular space. Whether accumulated axonal amphisomes in AD neurons can fuse with the plasma membrane is currently unknown. Here, we investigate whether secretory autophagy is elevated in two cell models of Alzheimers disease.

Materials & Methods

We generated two human induced pluripotent stem cell-(iPSC)-derived neuron (iNeuron) models for Alzheimers disease: PSEN1-knockout iNeurons and JIP3-knockout iNeurons. PSEN1 loss of function is a major risk for familial Alzheimers disease, impacting amyloid precursor protein processing, amphisome transport, and lysosomal acidification. JIP3 is an adaptor protein involved in transport of amphisomes to the cell body. We used genome editing with CRISPR/Cas9 to generate PSEN1-knockout and JIP3-knockout iPSCs. To differentiate these iPSC into neurons, we used PiggyBac-mediated stable integration of the master neuronal transcriptional regulator neurogenin-2 (NGN2) under a doxycycline-inducible promoter.

Results

We successfully made PSEN1 and JIP3 KO iPSC lines. We are currently differentiating these cells into neurons. We will use immunofluorescence microscopy to image axonal amphisome accumulation. To visualize secretory autophagy, we will use the fluorescent reporter CD63-pHluorin, which can be used to image amphisome exocytosis. Additionally, secretory autophagy will be measured by quantifying autophagic cargo markers in the culture medium using immunoblotting.

Conclusion

The PSEN1- and JIP3-knockout iNeurons will help us understand the role of secretory autophagy in Alzheimers disease. Expanding our understanding of neuronal secretory autophagy may ultimately contribute to the development of novel therapeutic strategies against Alzheimers disease.

Co-Delivery of miR-7-5p and Temozolomide as a Strategy to Overcome Multidrug Resistance in Glioblastoma

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Introduction

Glioblastoma (GB) is the most common primary brain tumor in adults, with a 5-year survival rate of only 6%. Temozolomide (TMZ) is the standard chemotherapeutic agent for GB, but its efficacy is often compromised by multidrug resistance (MDR). Recent studies suggest that combining TMZ with miRNA-7-5p (miR-7-5p) enhances treatment outcomes. However, the mechanisms underlying miR-7-5p-mediated sensitization of GB cells to TMZ are not fully understood.

Materials & Methods

Expression levels of miR-7-5p were assessed in GB patient specimens and two GB-derived cell lines: A172 (drug-sensitive) and T98G (drug-resistant). To restore endogenous levels of miR-7-5p, cells were transfected with synthetic miR-7-5p, followed by TMZ treatment. RNA sequencing (RNA-seq) was conducted to identify molecular pathways involved in overcoming MDR following miR-7-5p transfection, with subsequent validation using qPCR, luciferase assay, and functional assays.

Results

We observed that miR-7-5p expression was significantly downregulated in GB patient samples and correlated with the upregulation of MDR-associated ABC transporters (e.g., MRP1, MRP6, PGP). Moreover, transfection of GB cells with miR-7-5p enhanced TMZ sensitivity and reduced ABC transporter expression. The analysis of RNA-seq results revealed downregulation of MDR-related pathways. GO and KEGG analyses for T98G cells showed suppression of pathways associated with ABC transporters, transcriptional misregulation, transmembrane transport, and drug transport across the blood-brain barrier. In A172 cells, pathways related to cellular metabolism, DNA repair, cell proliferation, and migration were suppressed. Despite differences in regulated pathways, shared miR-7-5p targets were identified between the two cell lines, providing insight into its role in overcoming MDR.

Conclusion

Restoring miR-7-5p levels enhances the therapeutic efficacy of TMZ in glioblastoma by targeting MDR mechanisms. This combination therapy has the potential to improve outcomes, particularly for patients resistant to standard treatments. Identifying pathways and genes regulated by miR-7-5p in both drug-sensitive and drug-resistant cells provides a deeper understanding of MDR development and suggests potential therapeutic targets. This study was funded by Grant No. 2021/41/N/NZ5/04408

Age and histotype of ovarian and breast cancer in PALB2, RAD51C and RAD51D germline pathogenic variant carriers

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Introduction
Women who carry a germline pathogenic variant (GPV) in the PALB2, RAD51C, or RAD51D gene have an increased risk to develop breast cancer (BC) and ovarian cancer (OC). Evidence also suggests that these women may develop BC and OC at an earlier age compared to the general population. Unlike for the well-studied BRCA1/2 GPVs, data on clinical characteristics of OC and BC in women with a PALB2, RAD51C, or RAD51D GPV remains scarce. This hampers guideline development concerning screening and preventive measures in these women. Therefore, this study aimed to describe the characteristics of BC and OC in women with a PALB2, RAD51C, or RAD51D GPV and to compare with national data.

Materials & Methods
A consecutive series of female PALB2, RAD51C, or RAD51D GPV-carriers tested before July 2023 at the University Medical Center Groningen was included. Cancer diagnoses were obtained through linkage with the Dutch Nationwide Pathology Databank (PALGA). Median age of onset and histotypes were compared to data of the Netherlands Cancer Registry (NCR).

Results
Among 164 GPV-carriers (125 PALB2, 30 RAD51C, 9 RAD51D), 55 BC and six OC cases were identified. Median age of BC onset was 51.0 (n=51), 71.0 (n=3) and 43.0 years (n=2) for PALB2, RAD51C, and RAD51D, respectively, compared with 62.0 years in the NCR. All BC cases in RAD51D carriers were of the lobular histotype, versus 13% in the NCR. No BC histotype differences were observed in PALB2 or RAD51C carriers. No OC cases occurred in PALB2 carriers. Median age of OC onset was 66.0 (n=4) and 56.0 years (n=2) for RAD51C and RAD51D carriers, respectively, versus 67 years in the NCR. All RAD51D carriers had high-grade serous carcinoma, compared to 51.5% in the NCR.

Conclusion
Differences in age of onset and histotypes were observed between GPV-carriers and national data. Further research on cancer characteristics is needed to optimize counselling and cancer prevention in women with a genetic predisposition to OC and BC.

Identifying Key Genes and Signaling Pathways Associated with Aggressive Breast Cancer : A Bioinformatics Study

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Introduction

Breast cancer remains one of the most prevalent malignancies worldwide, characterized by its heterogeneity and varying clinical outcomes. Tumor aggressiveness is often influenced by key molecular factors, including hormone receptor (ER/PR) status and tumor grade, which are critical determinants of prognosis and therapeutic response. This study focuses on comparing gene expression patterns between ER/PR-negative and ER/PR-positive tumors, as well as grade 3 and grade 2 tumors.

Materials & Methods

Gene expression data were obtained from the GSE36771 dataset comprising 107 breast cancer tumor samples. GEO2R was used to perform differential gene expression analysis, comparing Grade 3 tumors versus Grade 2 tumors and ER/PR-negative versus ER/PR-positive tumors. Differentially expressed genes (DEGs) were identified based on an adjusted p-value threshold of < 0.05 and significant logFC values. From these comparisons, 55 DEGs associated with tumor grade and 100 DEGs linked to receptor status were prioritized for further analysis. Key genes were validated and ranked using the DisGeNET tool based on their Gene-Disease Association (GDA) scores. Enrichment analysis was conducted using Enrichr and KEGG databases to identify relevant signaling pathways, providing insights into the molecular mechanisms of tumor progression.

Results

The analysis identified key genes and pathways driving breast cancer aggressiveness. FABP7 and MMP1 emerged as critical genes with significantly elevated expression levels in ER/PR-negative tumors compared to ER/PR-positive tumors. Pathway enrichment analysis of the 100 receptor-related genes highlighted the NF-kappa B, glycine, serine, and threonine metabolism, and IL-17 signaling pathway as pivotal in receptor-negative tumors. For tumor grade, genes such as ESR1, PDZK1, and PGR were prominently associated with higher-grade tumors. Enrichment analysis of the 55 tumor grade-related genes identified significant roles in the chemical carcinogenesis and estrogen signaling pathway, underlining their importance in tumor progression and malignancy.

Conclusion

This study identified IL-17, estrogen signaling, and chemical carcinogenesis as important signaling pathways, as well as PGR, FABP7, MMP1, ESR1, and PDZK1 as important molecular factors influencing the aggressiveness of breast cancer. These findings highlight potential biomarkers and therapeutic targets that can inform future research and clinical interventions. Further experimental validation and translational studies are essential to enhance the understanding and management of aggressive breast cancer subtypes, ultimately improving patient outcomes.

Pairwise Correlation Between Polygenic Risk Scores for Five Psychiatric Disorders Among Patients with Schizophrenia Spectrum Disorders

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Introduction

Schizophrenia spectrum disorder (SSD) refers to a related group of severe, chronic psychiatric conditions with marked clinical heterogeneity and a multifactorial etiology. Recent genome-wide association studies (GWAS) have shown significant overlap in genetic risk between SSD and the five common psychiatric disorders such as major depressive disorder (MDD), autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) and bipolar disorder (BP), contributing to their overlapping symptomatology and outcomes. However, how these shared genetic liabilities are reflected specifically in patients with SSD remains under-explored. This study aims to investigate the genetic correlation between the five psychiatric disorders in SSD patients, revealing their genetic intersections and their potential relevance to SSD pathophysiology.

Materials & Methods

This study utilized data from 710 patients with SSD from the Genetic Risk and Outcome of Psychosis (GROUP) cohort. PRSs for SSD, MDD, BP, ADHD and ASD were constructed via SBayesRC method using summary statistics from the largest recent GWAS from Psychiatric Genomics Consortium. Polygenic risk scores (PRSs), a tool for quantifying the cumulative risk for individual genetic variants (SNV), were calculated for the five designated disorders. Pairwise Pearson correlation coefficients (r) were calculated to assess the relationships between PRSs, and statistical significance was determined using two-tailed tests in R.

Results

The five PRSs revealed significant overlaps among several disorders. SSD PRS demonstrated significant correlations with MDD, BP, ADHD and ASD ($r = 0.16$ to 0.26, $p<0.001$). MDD PRS showed significant correlations with BP and ADHD ($r=0.10$ to 0.35, $p<0.032$), but not with ASD. BP PRS correlated significantly with ASD ($r=0.78$, $p<0.001$). In contrast, ADHD and ASD PRSs exhibited weaker, non-significant correlations with each other.

Conclusion

These significant correlations highlight shared genetic risk across psychiatric disorders, consistent large-scale GWAS findings. Clinically, they may reflect subtle overlaps in symptomatology and inform personalized treatment or prediction models.

Structural analysis of the methylmalonic acidemia-causing variant p.Arg108Cys: in silico approach by molecular dynamics and docking

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Introduction

Human methylmalonyl-CoA mutase (MUT) is an enzyme coded by the MMUT gene. MUT catalyzes the isomerization of methylmalonyl-CoA to succinyl-CoA, a key step in propionyl-CoA metabolism. MUT functions as homodimer, with each subunit organized into specific domains: mitochondrial leader (132), dimerization (3385), catalytic (86423), linker (423577), and cofactor-binding (578750). MUT deficiency is caused by pathogenic variants in MMUT and leads to methylmalonic acidemia, a disorder characterized by increased levels of methylmalonic acid in blood and urine. To date, 233 variants of MMUT have been reported, with c.322C>T or p.Arg108Cys variant being the most frequent in Mexican individuals. This variant is associated with a severe, early-onset clinical presentation, although its structural pathogenic effect remains incompletely studied.

Materials & Methods

To predict the structural changes caused by the p.Arg108Cys variant, the crystallographic structure of MUT (PDB: 2XIQ) was used to compare the structure of the wild-type (WT) enzyme with the variant. In silico mutagenesis was performed, followed by molecular dynamics and docking analyses. The root mean square deviation was determined between the Wt enzyme and the p.Arg108Cys variant. Molecular docking between the Wt and the p.(Arg108Cys) variant was also performed, followed by the use of the PDBsum web server of the European Bioinformatics Institute to analyze their interface interactions.

Results

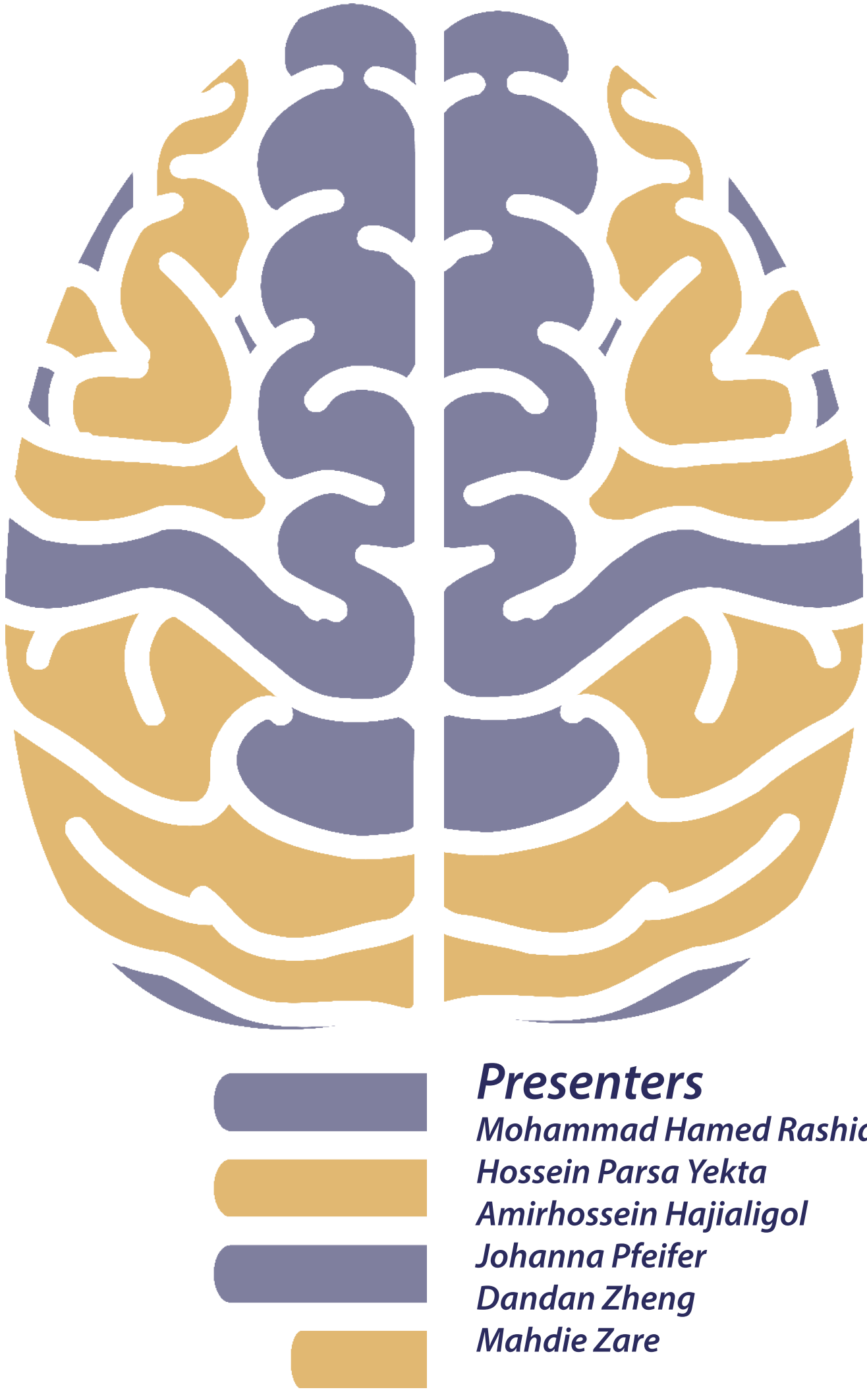
Molecular dynamics revealed significant changes in MUT tertiary structure, particularly in the catalytic and dimerization domains. Key interactions between Arg108 residue and its closest neighbors were lost when substituting it by a Cys residue. Structural analysis of Arg108Cys variant revealed 51 changes in secondary structure motifs (17 sheets and 34 helices), with the catalytic domain being the most affected. Additionally, molecular docking showed that the interface between the variant and the Wt enzyme was not formed in the correct region, suggesting alterations in protein functionality.

Conclusion

These findings provide evidence that the substitution of arginine by cysteine would severely impact the structure and function of MUT, which would partially explain the severe phenotype observed in homozygous patients. Further ex vivo functional studies, such as enzymatic activity measurements in patient fibroblasts are needed to confirm our predictions.

Poster session II

Gastrointestinal Medicine II



Presenters

Mohammad Hamed Rashidi
Hossein Parsa Yekta
Amirhossein Hajialigol
Johanna Pfeifer
Dandan Zheng
Mahdie Zare

Evaluation of synergistic effects of selected combination therapy in comparison with mesalazine on characteristics of ulcerative colitis experimental model

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Introduction
Individuals with Crohn's disease and ulcerative colitis suffer from chronic intestinal diseases known as "inflammatory bowel diseases," which are costly to treat. Despite currently prescribed medications, there are still adverse effects that must be reduced or avoided altogether. Therefore, the use of natural supplements may be useful in order to reduce the drug dose and the symptoms of the disease. Goal: The purpose of the present study is to investigate the synergistic effects of combined treatment of selected probiotics, vitamin D, pomegranate extract, propolis, and curcumin compared to mesalazine on the clinical and immunological features of ulcerative colitis model mice.

Materials & Methods
Nine groups of mice were administered either a single treatment or a combination of agents after the animal model was induced with acetic acid. After a month, samples were taken, and colorimetric techniques were used to assess the expression levels of inflammatory cytokines (IL-1, IL-6, and TNF-) and oxidative agents (Myeloperoxidase and nitric oxide). The Disease activity index (DAI) and histopathological condition were also considered after mice scarification. MTT assay was carried out to assess cell growth.

Results
Our results demonstrated that combination therapy reduced DAI, nitric oxide, and Myeloperoxidase activity, proliferation, and inflammatory cytokines in the treated groups. Additionally, these treated groups also experienced a decrease in pathology scores. Except when the combination of treatments was administered, these declines were not significant. As demonstrated in this study, a combination of anti-inflammatory agents had a suppressive effect comparable to mesalazine.

Conclusion
By administration combining lactobacillus casei, VIT D, propolis, pomegranate, and curcumin in induced-ulcerative colitis mice, oxidative and inflammatory parameters were alleviated. Result similar to mesalazine were also obtained with this treatment.

Gut microbiome composition and its impact on pain severity and quality of life in adolescents with chronic pain

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Introduction
Chronic pain in adolescents is a significant public health concern, often leading to reduced quality of life and long-term disability. Emerging evidence suggests that the gut microbiome may play a critical role in modulating pain through the gut-brain axis, but its association with pain severity and quality of life in adolescents remains underexplored.

Materials & Methods
A cross-sectional study was conducted with 150 adolescents aged 1218 years diagnosed with chronic pain. Stool samples were collected for 16S rRNA sequencing to assess gut microbiome diversity, measured using the Shannon index. Participants completed validated measures of pain severity (Visual Analogue Scale, VAS) and quality of life (Pediatric Quality of Life Inventory, PedsQL). Linear regression models were used to examine associations between microbiome diversity, pain severity, and quality of life, adjusting for covariates such as age, gender, and antibiotic use.

Results
Higher gut microbiome diversity was significantly associated with lower pain severity (= -0.32, 95% confidence interval (CI): -0.45 to -0.19, p<0.01). Specific microbial taxa were also associated with pain severity: higher abundance of Faecalibacterium, a genus known for its anti-inflammatory properties, was associated with lower pain severity (= -0.20, p=0.02), while higher abundance of Ruminococcus, a genus linked to pro-inflammatory pathways, was associated with higher pain severity (= 0.16, p=0.04). Higher microbiome diversity was also significantly associated with better quality of life (= 0.28, 95%CI: 0.15 to 0.41, p<0.01). Adolescents in the highest quartile of microbiome diversity reported significantly higher PedsQL scores compared to those in the lowest quartile (mean difference= 12.3, p<0.01), indicating a substantial improvement in daily functioning and well-being.

Conclusion
This study demonstrates that higher gut microbiome diversity is associated with lower pain severity and better quality of life in adolescents with chronic pain. Specific microbial taxa, such as Faecalibacterium and Ruminococcus, may modulate pain through inflammatory pathways. These findings highlight the potential of targeting the gut microbiome as a novel therapeutic approach for chronic pain management in adolescents. Future research should explore interventions such as probiotics, prebiotics, or dietary modifications to enhance microbiome diversity and improve pain outcomes and quality of life.

Investigation of the Detection Rate of Machine Learning Models in Recognition and Classification of Colorectal Polyps

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Introduction

Colorectal polyps are diagnosed and treated with colonoscopy. There are two challenges in the discussion of colorectal polyps. First, the rate of undetected polyps in colonoscopies, where 25% of polyps are not detected, which can be due to poor bowel preparation, lesions located in areas that are difficult to evaluate, lack of experience or distraction of the endoscopist, the appearance of the polyp, and inappropriate techniques. The second challenge is to distinguish different types of polyps, especially adenoma and hyperplastic types. Because adenomas are preferred for polypectomy due to the risk of malignancy compared to hyperplastic polyps. In this study, we intend to use recorded images of polyps and diagnostic algorithms to produce an artificial intelligence platform for quick detection and classification of polyps.

Materials & Methods

In this study, our sample size was 250, and colonoscopy was performed using the 170-cv OLYMPUS system. The imaging parameters were set by the endoscopist and the required number of images was recorded for each polyp. The sample removed by the endoscopist was sent to the pathology laboratory. The criterion for diagnosing the type of polyp was the sample pathology report.

Results

The experimental data set contains 250 complete colonoscopy images from 250 different patients. The ratio of males to females was 1.43, the average age was 61.25 (interquartile range: 54-70), the overall accuracy of CNN in detecting visible tools in the test dataset was 86.12%, and the loss bonding box was close to zero (0.04) for the class. “Adenoma”, precision was 0.86, recall was 0.92, and F1 score was 0.89. For the “Non Adenoma” class, precision was 0.86, recall was 0.73, and F1 score was 0.78.

Conclusion

In conclusion, our study shows that instrument detection using artificial intelligence technology is reliable and has high sensitivity and specificity. Therefore, the new artificial intelligence system can be useful to reduce distracting CAde diagnoses during conoscopy procedures. Although the clinical benefits of the new AI system require further evaluation, our study demonstrates the great potential of AI technology beyond superficial evaluation.

Differentiation of hepatocellular carcinoma, regenerative nodules, and cirrhotic liver tissue using Quantitative Ultrasound in affordable handheld ultrasound devices

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Introduction

The differentiation of hepatocellular carcinoma (HCC), regenerative nodules, and cirrhotic liver tissue represents a diagnostic challenge, especially given the rising prevalence of these conditions. In addition, diagnostic equipment is often expensive and limited in availability, particularly in underserved regions. A promising non-invasive, accessible and cost-effective alternative could be Quantitative Ultrasound (QUS) techniques in Handheld Ultrasound Devices (HUS). QUS quantifies frequency-dependent signal changes, caused by tissue-specific scattering properties. One such method is the Backscatter Coefficient (BSC), a quantitative parameter that reflects tissue microstructure.

Materials & Methods

Ultrasound raw data was collected from patients with confirmed HCC (n=13), regenerative nodules (n=7), and cirrhotic liver tissue (n=9) using a HUS (Clarius C3 HD3) at the University Hospital Dresden. All patients had fully developed cirrhosis. The raw data was processed via BSC analysis, employing a short-time fast Fourier transform to decompose signals into localized frequency spectra. The data was normalized using a fixed attenuation coefficient (=0.62), as recommended by literature.

Results

Spectral analysis suggested distinct BSC patterns among the groups. BSC values were higher for HCC and cirrhotic tissue at lower frequencies, while regenerative nodules exhibited elevated BSC values at higher frequencies. Additionally, the BSC values of cirrhotic tissue were generally higher than those of HCC. After adjustment for multiple testing, significant differences in BSC values between cirrhotic tissue and regenerative nodules were observed, with p-values <0.01.

Conclusion

The detected tendencies suggest that QUS could serve as a powerful tool for distinguishing between cirrhotic liver, regenerative nodules, and HCC. As a non-invasive approach, it has the potential to enhance diagnostic accuracy while reducing the need for invasive procedures. Furthermore, the use of HUS improves diagnostic accessibility, enabling better healthcare delivery in resource-limited regions. To further advance this approach, we aim to employ artificial intelligence to identify additional features and patterns within the data, potentially improving diagnostic precision. However, the limited number of patients in this study represents a significant limitation and further studies with larger cohorts are required to validate these findings and refine the methodology.

Rotating shifts change gut microbiota and sleep in shift workers: an observational study

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Introduction
Shift work can adversely impact workers sleep conditions and change gut microbiota composition. Meanwhile, a bidirectional relationship exists between gut microbiota and sleep regulation via the brain-gut axis. This study aimed to determine the associations between gut microbiota and sleep alterations in shift workers.

Materials & Methods
A total of 31 shift workers and 44 controls were recruited from June 2018 to July 2021 (mean age=27.714.38 years, female%=77%). Shift work was defined as workers involved in 8-hour rotations for more than 3 years. Subjective and objective sleep were assessed via questionnaires and polysomnography (PSG), respectively. Poor sleep efficiency (SE) was defined as SE<85% assessed by PSG. The fecal samples were collected during the PSG recording day and immediately stored at -80C until 16S rRNA sequencing. Linear and logistic regressions were used to examine the relationship between shift work, microbiota and sleep. All statistical analyses were performed using IBM SPSS 27.0. A p-value < 0.05 was used to determine statistical significance.

Results
Compared to controls, shift workers exhibited lower subjective (87.2711.31% vs. 93.726.00%, p=0.004) and objective (86.0711.01% vs. 91.664.33%, p=0.013) SE. Furthermore, we found that the reciprocal-transformed abundance of Collinsella was significantly lower in shift workers compared with controls (0.82 vs. 0.93, p=0.029). After adjusting for age and sex, shift work was associated with both the reciprocal-transformed abundance of Collinsella (=-0.11, p=0.033) and poor objective SE (OR=9.30, p=0.005), while the reciprocal-transformed abundance of Collinsella was significantly correlated with poor objective SE (OR=0.05, p=0.018). The association between shift work and poor objective SE was diminished by the reciprocal-transformed abundance of Collinsella (OR=7.70, p=0.012), though the mediating effect was insignificant.

Conclusion
Shift workers showed changes in gut microbiota composition and lower sleep efficiency. Collinsella may be the potential key microbiota linking the relationship between sleep and shift work. Microbiota might be a beneficial therapeutic targeting of sleep disturbances in shift workers.

Chondrogenesis by Grape Seed Extract and Zingiber Officinale Extract using Adipose Derived-Stem Cells and Fibrin Scaffold

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Introduction
Cartilage diseases, including osteoarthritis, lack a definitive cure. Mesenchymal stem cells and tissue engineering are emerging strategies. We investigated the effects of substances Ginger and Grape seed Extract (GSE) on cartilage production.

Materials & Methods
Adipose tissue from three patients was processed to isolate stem cells, which were cultured and embedded in fibrin scaffolds. The constructs were divided into five groups: control (no growth factors), growth factor Ginger, growth factor GSE, combination of Ginger and GSE, and TGF-. These constructs were incubated in chondrogenic medium with medium changes every three days. After 14 days, cell viability was assessed using Trypan blue staining, and cartilage-specific gene expression (collagen II, aggrecan, SOX9, collagen X) was analyzed by RT-PCR.

Results
Cell viability was highest in the control group, significantly surpassing all other groups ($p < 0.0001$). Group Ginger exhibited higher viability than TGF- ($p = 0.0109$), GSE ($p < 0.0001$), and Combination ($p = 0.0007$). GSE had the lowest viability, and the combination group showed no significant advantage over GSE alone ($p = 0.3361$). TGF- notably increased collagen type II expression compared to all groups ($p < 0.0001$), while Ginger, GSE, and Combination groups showed non-significant increases compared to Control. Aggrecan expression was highest in TGF- ($p < 0.0001$), and Combination group significantly exceeded control group ($p = 0.0010$), but not Ginger or GSE. The Combination group significantly enhanced SOX9 expression compared to control, Ginger, and GSE ($p < 0.0001$), though it was not significant compared to TGF- ($p = 0.9923$). GSE showed higher SOX9 expression than Ginger ($p = 0.0328$), with both exceeding control group. Collagen type X expression, indicating hypertrophy, was significantly lower in Ginger, GSE, and Combination groups compared to TGF- ($p < 0.0001$), with no significant differences between Ginger, GSE, and Combination ($p > 0.05$).

Conclusion
Substances Ginger and GSE synergistically promoted the expression of chondrogenic genes, particularly SOX9, while limiting collagen type X expression, indicating reduced hypertrophy. The TGF- group, while showing superior chondrogenesis, was associated with higher hypertrophic marker expression. This highlights the potential of Ginger and GSE in cartilage tissue engineering.

Poster session II

Neurosurgery

Presenters

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David Aguirre-Padilla
Otari Chankseliani
Gabriela Saba
Gaganjot Gaganjot

Leveraging Artificial Intelligence for Predicting Epileptogenic Foci in Tuberous Sclerosis Complex Based on Multimodal Imaging Data: A Multi-Center Cross-Sectional Study

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Introduction
Tuberous sclerosis complex (TSC) is the major cause of severe drug-resistant epilepsy (DRE), and multiple cortical tubers are the potential origin for DRE. Resection of epileptogenic foci is the most effective way to treat DRE in TSC. Preoperative prediction of epileptogenic foci from multiple cortical tubers determines surgical outcomes yet remains challenging clinically. In this study, we developed a noninvasive predictive model of epileptogenic foci based on artificial intelligence (AI) algorithms and multimodal imaging data.

Materials & Methods
This study was conducted from June 2013 to February 2023. Multimodal imaging data (CT, MRI, and 18F-FDG PET) of patients with TSC from five hospitals were collected. Radiomics features were extracted and selected. Six machine learning (ML) models were developed based on the selected radiomics features. Receiver operating characteristic (ROC) curves and accuracy (Acc) were used to evaluate the performance of the models. Follow-up data of 1-, 3-, and over 5-years were collected.

Results
523 cortical tubers (152 epi tubers and 371 non-epi tubers) of 116 TSC patients from our hospital were enrolled as the training set. The logistic regression (LR) model demonstrated the best stability and superior predictive performance (Acc: 0.85, area under the curve [AUC]: 0.89) compared to random forest (Acc: 0.76, AUC: 0.83), naive Bayes (Acc: 0.82, AUC: 0.86), decision tree (Acc: 0.64, AUC: 0.67), GBDT (Acc: 0.76, AUC: 0.83), and SVM (Acc: 0.70, AUC: 0.84). Decision curve analysis supported the clinical utility of the LR model. Furthermore, the multimodal LR model exhibited good performance in predicting the surgical outcomes (1-year: AUC=0.90, Acc=0.87; 3-year: AUC=0.91, Acc=0.88; > 5-year: AUC=0.93, Acc=0.90). 530 cortical tubers (189 epi tubers and 341 non-epi tubers) of 122 TSC patients from other four hospitals were enrolled as the test set to confirm the reliability of the model. Finally, a web application derived from the predictive model was displayed for economic and efficient use.

Conclusion
The LR model provides a noninvasive, precise, and clinically practical method to identify the epileptogenic foci and predict the surgical outcomes of TSC patients. Clinical application of this model indicates that epileptogenic foci detection in TSC enters the era of AI.

The Radiological Analysis of Lamina terminalis: Neurosurgical Perspectives

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Introduction

The lamina terminalis (LT) is a critical anatomical structure forming the anterior wall of the third ventricle in the brain. Composed of a thin sheet of gray matter covered by a pial layer, the LT spans from the rostrum of the corpus callosum to the optic chiasm, serving as both a significant radiological landmark and an operative corridor in various neurosurgical procedures. Its role is pivotal in maintaining the structural integrity of the third ventricle and facilitating cerebrospinal fluid (CSF) dynamics. Despite its importance, there is a notable gap in the literature regarding the radiological parameters and shape variations of the LT. This study aims to characterize the radiological features of the LT, including its length, width, and its spatial relationship with the anterior communicating artery, to highlight its clinical and surgical implications.

Materials & Methods

From January 2021 to January 2023, a comprehensive collection of data was conducted at neurosurgery teaching hospital in Baghdad, Iraq. The dataset comprises midsagittal and axial MRI-T2 scans obtained from patients without any ventricular system abnormalities. Radiological parameters include lamina terminalis dimensions, angle with horizontal/Reids lines and shape variation were analyzed.

Results

The dimensions of the lamina terminalis were analyzed, with the length ranging from 4.2mm to 15.3mm and the width ranging from 1.5mm to 7.2mm. the angle formed between the LT and the horizontal line, which ranged from 50 to 97 degrees, with an average of 72.1 degrees, while the angle with Reid's line exhibits a range of 58 to 108 degrees, with a mean of 80.5 degrees. Three variations in shape were observed, with the most common shape being linear without curvature.

Conclusion

The radiological characteristics of lamina terminalis can impact the selection and planning of interventions targeting the anterior part of the third ventricle. The angle with the horizontal plane, the shape category, and the relation to the optic chiasm are beneficial measures to understand the radiological anatomy of lamina terminalis.

EFFECT OF SUBSTANTIA NIGRA PARS COMPACTA DEEP BRAIN STIMULATION IN LEWY PATHOLOGY, INFLAMMATION AND OXIDATIVE STRESS IN PARKINSONS DISEASE

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Introduction

It is well-stablished that deep brain stimulation (DBS) therapy is a valuable tool for managing movement disorders such as Parkinson's disease (PD). Although DBS has been shown to significantly alleviate the symptoms of PD, there is still a considerable gap in how DBS influence the underlying pathogenesis of PD, especially with regards to pathological proteins. The accumulation of alpha-synuclein (-Syn) protein is a key factor in the degeneration of dopaminergic neurons, making the study of this protein crucial for advancing our understanding of the disease. In this study, we investigated the effects of DBS on -Syn levels and oligomerization, inflammation and oxidative stress in a rodent model.

Materials & Methods

For an early-staged PD model we used viral-mediated overexpression of -Syn in the substantia nigra pars compacta (SNpc) of rats, combined with high frequency stimulation that mimics the DBS parameters used for PD, usually in the subthalamic nucleus (STN). To detect and quantify -Syn oligomers, we utilized bimolecular protein complementation with split fluorescent protein reporters. For inflammation we used NLRp3, NFkB/p65 and for oxidative stress we used NRF2 and H2DCFDA.

Results

SNpc-DBS, as opposed to STN-DBS, decreased oligomers and overall levels of -Syn in the substantia nigra. We also observed an increase in inflammation, with no changes in oxidative stress.

Conclusion

Our findings showed that direct high-frequency electric stimulation reduces the accumulation and pathological forms of -Syn in the substantia nigra in vivo. These findings open a window to understanding the mechanisms that may underlie the disease-modifying effects of SNpc-DBS in PD.

Comparing Microvascular Decompression and Gamma Knife Radiosurgery for Trigeminal Neuralgia: Efficacy in Pain Alleviation and Complication Profiles

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Introduction

Trigeminal neuralgia (TN) is a severe facial pain disorder characterized by sudden, electric shock-like pain triggered by minor stimuli. Microvascular Decompression (MVD) and Gamma Knife Radiosurgery (GKRS) are two prominent treatment approaches for TN, each with distinct procedural characteristics and efficacy profiles. This study aims to compare the effectiveness and complication rates of MVD and GKRS in achieving sustained pain relief for TN patients.

Materials & Methods

The study cohort included 93 patients diagnosed with TN, divided into two groups: 55 patients (Group A) underwent MVD, while 38 patients (Group B) received GKRS. Patient demographics, including age and sex, were documented. Efficacy was measured based on pain relief outcomes (complete, partial, or recurrence) over a follow-up period, while complication profiles were evaluated based on the incidence and type of adverse events. Statistical analyses were conducted to compare the effectiveness and complication rates between the two treatment modalities.

Results

In Group A (mean age 568.2, 63% female), 80% of patients reported complete pain relief post-MVD, while 15% experienced partial relief, and 5% had recurrent pain. Complications, such as cerebrospinal fluid leaks or wound infections, were observed in 7% of the cases. In Group B (mean age 59.57.6, 68% female), 70% of patients achieved complete pain relief with GKRS, 20% experienced partial relief, and 10% reported recurrence. The primary complications for Group B were facial numbness or sensory disturbances, occurring in 5% of patients.

Conclusion

Both MVD and GKRS demonstrate substantial efficacy in alleviating TN pain, though MVD yields a higher rate of complete pain relief, likely due to its direct approach in addressing neurovascular compression. GKRS, while less invasive, offers a comparable level of pain relief with a slightly lower complication rate. The choice between MVD and GKRS should be based on patient preferences, with consideration for each treatments unique benefits and risk profile. Future research and extended follow-up are recommended to establish long-term outcomes and optimize treatment selection.

Intraoperative non-invasive evaluation of cerebral compliance and correlation with early postoperative cognition status in elderly patients undergoing surgery in Trendelemburg position

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Introduction

The Trendelenburg position can impair cerebral venous return, increasing intracranial pressure (ICP) and potentially contributing to postoperative cognitive dysfunction (POCD). As routine invasive monitoring of ICP intraoperatively is unfeasible, this study aimed to evaluate cerebral compliance as a non-invasive surrogate, its correlation with optic nerve sheath diameter ultrasound (ONSD), and its association with POCD in elderly patients.

Materials & Methods

After Institutional Ethics Committee approval, a prospective observational study was conducted on 48 male patients aged over 40 undergoing general anesthesia for laparoscopic or robotic prostatectomy in the head-down tilt position. In addition to hemodynamic and respiratory monitoring, processed EEG (SedLine), optic nerve sheath diameter ultrasound, cerebral oximetry (O3), and cerebral compliance (Brain4Care) were measured throughout surgery. Brain4Care assesses skull movement, with a P2/P1 ratio > 1.2 indicating increased ICP. Cognitive function was evaluated using the Montreal Cognitive Assessment (MoCA) pre- and postoperatively. Data were analyzed using the t-test with Welch's correction and the Mann-Whitney test, with effect sizes calculated using Cohen's d and rank-biserial correlation; significance was set at $P < 0.05$.

Results

The mean age of participants was 64.60 8.67 years. Significant P2/P1 ratio variations indicated changes in cerebral compliance during surgery in half of the patients. A mixed-effects model, accounting for variability between subjects and repeated measures, revealed that patient weight (OR 0.93, $P < 0.001$), surgery duration (OR 4.05, $P = 0.03$), intraoperative mean arterial pressure (OR 1.04, $P < 0.001$), and intraoperative heart rate (OR 1.03, $P = 0.04$) were significant predictors of changes in cerebral compliance. The same model showed that age (OR 13.3, $P < 0.001$) and surgery duration (OR 1.32, $P < 0.001$) significantly predicted postoperative cognitive impairment.

Conclusion

Trendelenburg positioning during prostatectomy in elderly patients was associated with reduced cerebral compliance, suggesting a transient rise in ICP. Non-invasive cerebral compliance monitoring may facilitate early detection and management of ICP increases, though further studies are required to confirm these findings.

Anti-nociceptive effect of intrathecal co-administration of Morphine and Ropivacaine acute post-operative pain model in rats

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Post Graduate Institute of Medical Sciences

Introduction

Ropivacaine is a commonly used long-acting local anesthetic during surgeries. It is structurally similar to bupivacaine but significantly less lipophilic. Ropivacaine provides superior motor blockade thus have safer outcome. Morphine is gold standard drug for treating moderate to severe pain. Due to its side effects eg tolerance, newer drug combinations are required. There are limited studies accessing antinociceptive effects of drug combination of ropivacaine and morphine. In this current study, the anti-nociceptive effectiveness of single and combined doses of ropivacaine and morphine was assessed.

Materials & Methods

50 Sprague Dawley rats of weight 250300 g were taken, which had undergone surgical implantation of intrathecal catheters, were subjected to administration of either ropivacaine (10g), morphine (10g), or a combination of both ropivacaine and morphine (5 g each). The post-operative pain model was standardised under isoflurane anesthesia. After 2 hours, drugs were administered. Mechanical allodynia was assessed by using callibrated Von Frey filament at time intervals of 1 hour, 4 hours, 10 hours, and 24 hours. This was performed four hours after making the incision. The physical activity of rats was monitored, and data was analyzed statistically.

Results

Mechanical allodynia was decreased by the administration of both ropivacaine and morphine, but later was more effective. The co-administration of both drugs showed enhanced effects at a 4-hour and 10-hour time interval. Rats treated with morphine showed significant activity in comparison to all other groups. Interestingly, combined dosage showerd increased analgesic effect than seperated single dosage of both drugs.

Conclusion

This increased anti nociception could be explained by number of neural mechanisms. Morphine blocks Ca2+ channels through Mu opoid receptors and G-Protein receptor. Whereas Ropivacaine works by blocking sodium channel which further prevents generation of action potential. Thus providing a enhancing effect with co-administered dosage. These results could be of clinical relevance.

Anti-nociceptive effect of intrathecal co-administration of Morphine and Ropivacaine acute post-operative pain model in rats

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Poster session II

Psychiatry

Presenters

Lanfang Hu
Astrid Jaqueline Miranda Miranda
Justine Grace Regala
Aleksandra Rykachevskaia
Haules Zaniku
Mohamed Mansour
Sonia Nada Sokoine

White matter microstructural subgroups of children with ADHD: similar clinical presentations and distinct neuropsychological profiles

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Introduction

ADHD is a heterogeneous disorder. The current study aimed to explore whether it is possible to subgroup ADHD using white matter microstructural characteristics.

Materials & Methods

In a cohort comprising subjects with ADHD (n = 227) (all aged 6-15 years) and their healthy counterparts (n = 89), the Diffusion Tensor Imaging technique was utilized to measure the brain microstructural integrity (indicated by the fractional anisotropy (FA) value), and several clinical questionnaires and neuropsychological tests were applied to fully access the clinical and neuropsychological profile of each participant. Responses to pharmacological treatment (methylphenidate) of some of the subjects with ADHD (n=52) were also documented. Cluster Analysis was performed to stratify the ADHD participants, and subsequent between-group comparisons were carried out, with age and sex as covariates.

Results

Cluster analysis revealed that participants with ADHD could be grouped into two clusters (Cluster-1 and Cluster-2). Subsequent analyses revealed minimal differences between the two ADHD groups. Nevertheless, group-wise differences were observed in several cognitive domains. The Cluster-2 (lower FA) group performed worse in processing speed tasks, while the Cluster-1 (higher FA) group performed worse in response inhibition and sustained attention tasks. Additionally, the cluster-2 group exhibited a superior response to methylphenidate treatment, compared to the cluster-1 group.

Conclusion

Although with similar clinical features, ADHD participants can be stratified by their microstructural characteristics, which were further linked to distinct cognitive dysfunction and responses to methylphenidate. The comprehensive analysis in the current study contributes to a broader understanding of heterogeneity in ADHD.

Antidepressants drugs, gene perturbation profiles and adverse effects: a network pharmacology approach

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Introduction

Antidepressants are drugs widely used to treat depression and other psychiatric disorders, yet they exhibit low efficacy rates. This is partly due to poor adherence, as patients often experience significant adverse effects. Interestingly, the existence of non-canonical molecular targets associated with these adverse effects opens opportunities to identify new therapeutic uses. Moreover, the exact mechanisms by which antidepressants improve symptoms remain unclear. This study aims to address the following research question: What are the biological mechanisms underlying antidepressants' therapeutic and adverse effects , and how can this knowledge guide drug repurposing and the development of safer and more effective treatments?

Materials & Methods

We used a computational network pharmacology approach to explore the pharmacological space of 28 antidepressants. Using chemical structures, gene expression profiles, and adverse effects reports, we constructed bipartite networks to model drug interactions with genes and adverse effects. Quantitative analysis enabled clustering antidepressants based on structural and functional similarities to visualize relationships for potential drug repurposing. We also performed a gene set enrichment analysis (GSEA) for each cluster to identify specific biological pathways affected.

Results

Our network pharmacology analysis revealed a structured, well-connected bipartite network in which antidepressants efficiently target key genes, with ELOVL6, PAK6 and GPC1 showing the highest connectivity. Isocarboxazid , bifemelane and maprotiline were linked to the largest number of genes, suggesting broad therapeutic potential. Only 24.40% of genes were shared among antidepressants, highlighting opportunities to target underutilized and unique genes. While cluster analysis revealed significant structural similarities among antidepressants, functional analysis demonstrated varied activation and inhibition pathways, possibly explaining the differences in efficacy and side effect profiles despite structural similarities. GSEAs showed diverse biological pathways across clusters, with network-wide analysis revealing enhanced neural connectivity and plasticity as key targets.

Conclusion

These findings suggest strategies to optimize antidepressant therapies. As evidenced by cluster analysis, while antidepressants share some similarities, they also affect distinct pathways, creating unique antidepressant profiles that may serve as a foundation for drug repurposing to address unrelated conditions. This insight highlights the potential to precisely map molecular pathways in the future, enabling personalized medicine by minimizing unwanted side effects while preserving therapeutic benefits.

Effectiveness of digital interventions for insomnia and work productivity among workers: a systematic review and meta-analysis of randomized controlled trials

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Introduction
Insomnia is a prevalent issue among adult workers, negatively impacting work productivity and quality of life. Cognitive Behavioral Therapy for Insomnia is the gold standard treatment but is often inaccessible, especially in low- and middle-income countries like the Philippines. Digital interventions, such as web-based platforms and mobile applications, present a potential solution, though their impact on improving work productivity remains uncertain. We aimed to assess the efficacy of digital interventions in reducing insomnia symptoms and improving work productivity among adult workers in randomized controlled trials (RCTs).

Materials & Methods
Systematic search in electronic databases (PubMed, Cochrane, ScienceDirect, HERDIN, and Google Scholar) and other resources between 2019 to October 31, 2024 was conducted. RCTs comparing digital interventions to waitlist controls in adult workers were eligible. The primary outcome was Insomnia Severity Index (ISI), while secondary outcomes included presenteeism, absenteeism, and work ability index. Effect sizes were expressed as mean difference (MD) or standardized mean difference (SMD), as appropriate, using the random-effects model.

Results
Eight articles were included in the meta-analysis. Digital interventions significantly reduced insomnia severity (MD = -2.78, 95% CI [-4.39, -1.18], p = 0.0007) and presenteeism (SMD = -1.65, 95% CI [-3.20, -0.11], p = 0.04) compared to waitlist controls. No significant effects were observed for absenteeism (SMD = -0.45, 95% CI [-2.59, 1.70], p = 0.68) or work ability index (MD = 0.50, 95% CI [-0.09, 1.09], p = 0.09). However, the effectiveness of different digital interventions requires further investigation due to considerable heterogeneity arising from variations in their components and delivery methods.

Conclusion
The use of digital interventions shows promise in alleviating insomnia severity and presenteeism in the workplace, while its effects may not translate into curbing absenteeism and improving work ability. If confirmed by further studies, these findings could impact healthcare providers in offering alternative treatment options and shape workplace wellness programs, especially for workers with limited access to traditional treatments.

Autism symptoms in relation to gender diversity: comparisons between a general population sample and a clinical sample

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RUG

Introduction

Gender is a multidimensional concept encompassing identity, expression, and contentedness. Gender identity denotes an individual's subjective sense of self, that may or may not align with their sex assigned at birth. Gender incongruence (GI) refers to a mismatch between gender identity and assigned sex. Autism spectrum disorder (ASD), a neurodevelopmental condition marked by social and behavioral impairments, is more prevalent among transgender and gender-diverse (TGD) individuals. Studies have demonstrated associations between ASD symptoms and gender diversity; however, most have focused on clinical samples, leaving gaps in understanding within general populations and across diverse measurement methods. This study examines ASD symptoms in relation to gender diversity in a general population and in a clinical sample of individuals referred for GI.

Materials & Methods

This retrospective, cross-sectional cohort study analyzes data from the Lifelines Cohort Study (n=63,190) and a clinical sample from University Medical Center Groningen Genderteam (n=205). Gender identity in Lifelines was assessed using categorical and dimensional gender items. ASD symptoms in both datasets were evaluated using Adult Social Behavior Questionnaire (ASBQ). Linear regression models will be used to examine associations between ASD symptoms and gender diversity. Propensity score matching will be applied to compare ASD symptoms in clinical and general population samples, controlling for sex assigned at birth, age, and education. This study aims to advance understanding of the relationship between ASD and gender diversity in general and clinical population, leveraging dimensional and categorical approaches to gender diversity to address limitations in previous research and inform healthcare practices.

Results

We hypothesize that TGD individuals in general population have higher ASD symptoms than cisgender individuals. Additionally, gender incongruence on dimensional items (e.g., low femininity in assigned at birth females) is associated with higher ASD symptoms. Lastly, we hypothesize that individuals referred to gender clinic exhibit higher ASD symptoms than gender-diverse individuals in general population.Data analysis will take place between January and February 2025, and findings will be presented at the conference.

Conclusion

Current research may add more knowledge to intersection of gender diversity and neurodevelopmental disorders, it has uniquely large dataset to analyze, and relatively unique way to measure gender through the dimensional gender item.

Loss To Follow Up from mental health care and associated factors in Neno District, Malawi: A retrospective cohort study

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Introduction
Mental health disorders affect 970 million people globally, with a rising burden in low-income countries. However, there is a lack of research on how mental health patients interact with care, especially in hard-to-reach areas. We determined the proportion of mental health patients in Neno District with loss to follow up (LTFU) and associated sociodemographic factors

Materials & Methods
We utilized a retrospective cohort study design through Electronic Medical Records (EMR) for all mental health patients aged 18 years enrolled in all 14 health facilities in Neno District from 1 January 2021 to 31 December 2022. We extracted socio-demographic data, clinical variables, comorbidities and treatment outcomes. We used descriptive statistics, univariate and multivariate Cox regression using STATA 14. A Kaplan-Meier curve was drawn for cumulative LTFU rates over the period. We considered a p-value of < 0.05 statistically significant.

Results
Out of 813 total mental health patients, the majority were females 74.9% (n= 609), and the median (IQR) for age was 41 (33-51). Most (80.4%, n=654) had mood disorders higher among women than men (p<0.001). Two or more co-morbid conditions were present in 6.6% (n=54) with HIV as the most common co-morbidity (51.2%, n=416). Cohort outcomes included patients active in care (75.4%, n=613), LTFU (19.9%, n=162), stopping treatment (0.1%, n=1), transferring out (3.8%, n=31), and dying (0.7%, n=6). The LTFU rate was higher among men than women (28.0% vs.17.2%, p<0.001) with more LTFU likelihood in younger age (18-35 years age) [aHR 1.49 95% CI 1.02-2.16; p<0.039] "Insert figures 1 and 2 here". Having a co-morbidity that requires treatment (asthma [aHR 0.10 95%CI 0.01-0.76; p<0.026], hypertension [aHR 0.17 95%CI 0.07-0.39; p<0.001], HIV [aHR 0.31 95%CI 0.17-0.57; p<0.001]), and closer distance (8.0km) from nearest health facility [aHR 0.29 95%CI 0.09-0.93; p<0.037] reduced LTFU risk.

Conclusion
Overall, the LTFU rate in mental health patients was one out of every five patients. We found a higher LTFU rate in men, especially those younger, but having comorbidity and shorter distance to health facilities was protective of LTFU. Further research is needed on mental health stigma, patient preferences in receiving care, and protective social structures for care.

Efficacy of Pharmacological and Non-Pharmacological Interventions for Patients with Antipsychotic Induced Weight Gain: A Systematic Review and Network Meta-Analysis

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Introduction
Schizophrenia, a severe mental disorder affecting approximately 0.28% of the global population, is characterized by symptoms such as hallucinations, delusions, and cognitive impairments. Antipsychotic medications, the primary treatment, effectively manage symptoms but often cause significant side effects, including antipsychotic-induced weight gain (AIWG). AIWG affects up to 49% of patients, increasing the risk of metabolic syndrome, cardiovascular diseases, and treatment non-adherence, highlighting the need to identify the most effective interventions for managing AIWG. Previous studies have explored individual interventions, such as Metformin, Liraglutide, and nutritional education, but a comprehensive comparison of all available options is lacking. Our network meta-analysis aims to address this gap by evaluating the efficacy of AIWG interventions, synthesizing evidence from 52 randomized controlled trials (RCTs) involving 2,639 patients.

Materials & Methods
Following PRISMA guidelines, we conducted a systematic review and meta-analysis of randomized controlled trials (RCTs) comparing all pharmacological and non-pharmacological interventions to treatment-as-usual (TAU) in schizophrenia patients. Our database search spanned PubMed, Scopus, Web of Science, and Cochrane CENTRAL. The focus was on anthropometric measurements and lipid profiles. We performed the analysis using MetaInsight (version 6.2.0). The primary OUTCOME was weight change (Kg), while secondary outcomes included body mass index (BMI), waist-hip ratio, waist circumference, hip circumference, total cholesterol, Low-Density Lipoprotein (LDL), High-Density Lipoprotein (HDL), and Triglycerides.

Results
Fifty-two studies involving 2639 patients contributed to the meta-analysis. Regarding weight change, Metformin + NutriEx ranked first, followed by Liraglutide. Compared to the TAU, both interventions showed significant differences (MD -6.36, 95% CI [-9.63, -3.15]) and (MD -5.37, 95% CI [-8.01, -2.72]), respectively. According to BMI, the top-ranked intervention was Nizatidine MD -1.90 [-3.40, -0.421]. As observed in waist circumference, The top-ranked intervention was Liraglutide (MD -4.96 [-7.81, -2.56]). Both interventions demonstrated significant differences compared to the TAU. Neither intervention significantly benefited either group's lipid profile, hip circumference, or waist-hip ratio ($P > 0.05$).

Conclusion
Our network meta-analysis provides comprehensive evidence suggesting that integrating pharmacological and non-pharmacological interventions may be the most effective approach for managing AIWG in weight reduction. Future studies should explore more flexible treatment protocols that combine multiple interventions, leveraging their complementary effects on different outcomes.

Religious Practices and Quality of Life in Palliative Care: Insights from Tanzania

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Co-authhors: Prof Gad Kilonzo, Ms Nadia Ahmed, Mr Kelvin Sawe

Introduction

Palliative care aims to improve the quality of life for patients with life-limiting illnesses by addressing physical, emotional, and spiritual needs. Religious practices play a critical role in coping mechanisms, yet their impact remains underexplored in specific cultural contexts. This study examines the influence of religious practices on the quality of life among palliative care patients in Tanzania, focusing on spiritual support, psychological well-being, and symptom management.

Materials & Methods

A cross-sectional study was conducted at Ocean Road Cancer Institute (ORCI), involving 150 palliative care inpatients selected through systematic random sampling. Data were collected using structured questionnaires incorporating WHOQOL-BREF and WHOQOL-SRPB tools.The study assessed the effects of prayer, scripture reading, community worship, and spiritual counseling on well-being. Key variables analyzed included pain levels, psychological distress, social support, and spiritual fulfillment. Statistical analysis was performed using chi-square tests and multiple linear regression to determine correlations between religious engagement and quality of life.

Results

Religious practices significantly correlated with improved quality of life ($p < 0.05$). Patients engaging in prayer and spiritual counseling reported lower distress levels (mean reduction: 1.8 0.5, $p = 0.02$) and higher emotional resilience. Religious community support was linked to better pain management (mean pain score reduction: 2.3 0.6, $p = 0.01$) and reduced isolation. While 90% of participants expressed a need for religious practices, 84.7% still reported poor quality of life, highlighting gaps in spiritual care integration.

Conclusion

Religious and spiritual practices contribute significantly to palliative care patients' well-being in Tanzania. Integrating spiritual care into treatment plans enhances psychological and social support, improving patient outcomes. Further research is needed to explore culturally tailored interventions for optimizing spiritual care in low-resource settings.

Poster session II

Cardiology

Presenters

Abdulla Zahi Othman Hourani
Iona Perrine
Bingqing Bai
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Amin Yasami
Clemens Weisner

A Multimodal Transformer-Based LLM for Predicting Clinical Outcomes in Critically Ill Cardiac Patients

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Introduction

Accurate risk prediction in Cardiac Intensive Care Units (CICUs) is critical for optimizing patient management and improving survival outcomes. Traditional clinical models struggle to integrate the complex and heterogeneous data generated in ICU settings, including high-resolution ECG waveforms, echocardiography images, continuous vital signs, static clinical data, and unstructured clinical notes.This study presents a multimodal deep learning (DL) model incorporating a transformer-based Large Language Model (LLM) to predict key cardiac ICU outcomes, including mortality, length of stay (LOS), cardiac arrest, hemodynamic instability, and shock. Additionally, the model predicts echocardiographic findings from ECG waveforms, offering a cost-effective and non-invasive alternative to imaging in resource-limited settings.

Materials & Methods

This study utilized a multimodal deep learning framework to integrate structured and unstructured data for predicting clinical outcomes in CICU patients. The dataset included ECG waveforms, vital signs, laboratory values, echocardiographic images, and physician notes. Preprocessing involved imputation of missing data, feature extraction, and embedding techniques for different modalities. A transformer-based architecture processed ECG and time-series data, while a Vision Transformer analyzed echocardiographic images. Clinical notes were embedded using a fine-tuned ClinicalBERT model. A late-fusion layer combined these representations to predict mortality, length of stay, cardiac arrest, hemodynamic instability, and shock.

Results

The models multimodal fusion architecture contributed to its robustness, particularly in cases where certain data modalities were missing. Ablation studies confirmed that integrating ECG, vitals, and clinical notes yielded the highest performance, while image data further improved predictive accuracy.Overall, this multimodal transformer-based framework offers a highly effective solution for real-time ICU decision support, personalized patient management, and early intervention strategies, showcasing its potential to transform cardiac critical care through AI-driven analytics. Results of performance will be presented in different metrics and will be made available for use at different hospital units

Conclusion

The results of the model will be shown at the conference as the model is still being fine-tuned. The model promises to enhance patient management using multimodal techniques.

The Role of the Autonomic Nervous System in 24-hour Variation of Repolarization Markers

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Co-authhors: Dr Veronique Meijborg

Introduction

Sudden cardiac death (SCD) is a leading cause of mortality worldwide. Understanding the mechanisms underlying SCD could significantly improve outcomes and survival rates. Diurnal (ie. Twenty-four-hour) variation in electrocardiogram (ECG) derived repolarization markers, such as QT-interval and short-term variability of the QT interval (STVQT), has been associated with elevated SCD risk. These diurnal patterns contain two specific peaks corresponding to moments of major autonomic turnover, implicating the autonomic nervous system (ANS) as a regulator. This study aims to investigate the role of cardiac ANS (cANS) innervation in generating these repolarisation patterns.

Materials & Methods

In this cross-sectional study, we compared twenty-four-hour patterns in repolarisation (QT-interval and STVQT) between patients who underwent heart transplantation, thus lacking cANS innervation, (HTx, n=3) and controls (n=3). Holter ECG data (twenty-four hours) were analysed and the QT-interval and STVQT were calculated using custom software. Data per group are averaged per hour standard deviation and compared using a student's T-test (significance: p-value < 0.05). The response to the Valsalva manoeuvre was also recorded to quantify dANS functionality.

Results

Preliminary results suggest that HTx patients exhibit increased STVQT variation with two small peaks (at 8:00 and 16:00) while controls have no discernable elevations (8:00: 5.45 3.62 versus 0.58 0.24, 16:00: 3.38 4.2 versus 1.43 1.22). A weak correlation was observed between Valsalva's response and the magnitude of STVQT variation (R2 = - 0,5725). Regression analysis indicates greater QT-interval diurnality (amplitude) in HTx patients than in controls (4.55 ms vs 1.5ms).

Conclusion

The findings show that disrupted cANS innervation, as in HTx patients, may contribute to increased STVQT and greater diurnal repolarisation variability. These results support the hypothesis that dANS plays an important role in regulating and stabilising repolarisation diurnality. The inclusion of further patients in the coming months will allow us to confirm these findings and their greater implications for understanding the processes underlying SCD.

The Predictive Value of Peak Oxygen Uptake for Adverse Prognosis in Patients with Coronary Heart Disease

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Introduction

Coronary heart disease (CHD) remains a significant global health burden. Peak oxygen uptake (Peak VO2) is a well-established predictor of disease prognosis, yet its effect and predictive value on the prognosis of CHD require further exploration. This study investigates the prognostic value of Peak VO2 and its dose-effect relationship with adverse outcomes in CHD.

Materials & Methods

A total of 768 CHD patients who underwent cardiopulmonary exercise testing between October 2013 and March 2023 were included. Participants were stratified into three groups based on the Weber KT standard for Peak VO2 [ml/(kgmin)]: Group 1 (>20), Group 2 (1620), and Group 3 (<16). Endpoints included major adverse cardiovascular events (MACE), cardiovascular disease (CVD)-related mortality/rehospitalization, and all-cause mortality/rehospitalization. Kaplan-Meier curve compared the occurrence of events with different outcomes. Multivariate Cox proportional hazard regression model, the test for linear trend and the restricted cubic spline evaluated the relationship between Peak VO2 and endpoints.

Results

The median patient age of was 60 years old, with a median follow-up of 33.34 months. There were 102 MACEs, 138 all-cause rehospitalizations, 81 CVD-related rehospitalizations, and 16 all-cause deaths,. After multivariate analyses, compared to Group 1, adjusted MACE risks increased 1.24 (0.75, 2.02), 2.54 (1.48, 4.38) times in Group 2 and Group 3 respectively (P trend=0.003). All-cause rehospitalization risks increased 1.09 (0.73, 1.64) times and 1.76 (1.08, 2.86) times respectively (P trend=0.055). The adjusted risk of all-cause mortality increased 4.12(0.45, 38.05) times in Group 2. RCS analysis revealed a significant decline in risks of MACE, all-cause rehospitalization, and CVD rehospitalization when Peak VO2 was <20 ml/kg/min, with a slower decline beyond this threshold (P for nonlinearity <0.05).

Conclusion

Peak VO2 demonstrates strong predictive value for poor prognosis in patients with CHD, with higher Peak VO2 levels associated with a lower risk of adverse events.

Mixture modeling for pulmonary thromboembolism; A latent class analysis study

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Introduction

Acute pulmonary embolism (PTE) is a major cause of death and severe disability. There are many clinical parameters to evaluate the prognosis of PTE. The most common is the Pulmonary Embolism Severity Index (PESI). Also, the availability of some blood parameters can also help us determine the prognosis of PTE. This study was designed and implemented to perform a modeling for PTE mortality risk factors with the help of latent class method.

Materials & Methods

The current study was a cross-sectional study. All PTE patients who were admitted to Shahid Madani Hospital and their information was recorded in the PTE registry of this center and also died during hospitalization or underwent thrombolytic therapy were included in this study after obtaining the necessary ethical patient information was extracted from the PTE registry system and were analyzed. Modeling was done with the help of Mplus software and other analyzes were done with the help of SPSS software.

Results

In general, 263 patients were included in this study. 49.4% of them were men and 50.6% of them were women. The average age of the patients was 69.30 Finally, a model with two hidden classes was selected that obtained the highest percentage of prevalence, the highest percentage of change and the best fit for lower BIC (9.4158) and higher entropy (0.986). The classes were named with low risk profile and high risk profile labels. Patients who were members of the high-risk class had significantly lower hemoglobin, higher systolic blood pressure, and more history of heart failure. Finally, according to the logistic regression results, the determined high-risk class had a significant relationship with the mortality of PTE patients.

Conclusion

For the first time, this study performed modeling using the hidden class method for PTE disease. The results of this study show that there is a significant relationship between the defined model variables and the in-hospital mortality of PTE patients.

Achilles tendon abnormalities in psoriasis: correlating ultrasonographic findings with clinical severity

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Introduction

Cutaneous psoriasis is often associated with subclinical enthesopathy, particularly in the Achilles tendon, which may precede the development of psoriatic arthritis (PsA). Early detection of tendon abnormalities is critical for timely intervention. This study aimed to evaluate Achilles tendon thickness, vascularity, and structural changes using high-resolution ultrasonography (HRUS) in psoriasis patients and to correlate these findings with disease severity and clinical symptoms.

Materials & Methods

A cross-sectional study was conducted involving 60 participants: 30 patients with cutaneous psoriasis and 30 age- and sex-matched healthy controls. Achilles tendon thickness was measured in millimeters (mm) using HRUS, and vascularity was assessed using power Doppler ultrasound (PDUS) and graded on a semi-quantitative scale (0-3). Structural abnormalities, such as hypoechoic areas and tendon tears, were also recorded. Clinical symptoms were evaluated using a patient-reported pain scale (0-10), and disease severity was quantified using the Psoriasis Area and Severity Index (PASI). Statistical analysis was performed using SPSS, with significance set at p0.05.

Results

Psoriasis patients exhibited significantly greater Achilles tendon thickness compared to controls (mean-standard deviation (SD): 5.80.9 mm vs. 4.30.7 mm, $p<0.001$). Vascularity was detected in 68% of psoriasis patients, compared to 12% of controls ($p<0.001$), with a mean vascularity grade of 1.80.7 in the psoriasis group versus 0.30.5 in controls ($p<0.001$). Hypoechoic areas, indicative of tendon degeneration, were observed in 52% of psoriasis patients but were absent in controls ($p<0.001$). A moderate positive correlation was found between tendon thickness and PASI scores ($r= 0.45$, $p<0.01$), as well as between vascularity and patient-reported pain scores ($r= 0.51$, $p<0.01$). Disease duration was also positively correlated with tendon abnormalities ($r= 0.47$, $p<0.01$).

Conclusion

HRUS and PDUS are effective tools for detecting subclinical Achilles tendon abnormalities in psoriasis patients, demonstrating increased thickness, vascularity, and structural changes compared to healthy controls. These findings correlate strongly with disease severity and clinical symptoms, underscoring the importance of routine ultrasonographic assessment in psoriasis patients. Early identification of enthesopathy may facilitate timely intervention and reduce the risk of progression to PsA. This study highlights the potential of advanced imaging techniques in improving the management of psoriasis-related musculoskeletal complications.

C-type natriuretic peptide and its modified analog Cenderitide mediate antiarrhythmic effects via PDE2 in mice with heart failure

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Introduction

Heart failure (HF) represents a major health burden, affecting over 64 million people globally. Arrhythmias increase the risk of mortality in HF patients leading to sudden cardiac death. The sympathetic nervous system is chronically activated in HF patients to compensate for impaired heart function, ultimately resulting in deleterious chronic beta-adrenergic cAMP-signaling in cardiomyocytes (CM), disrupting intracellular Ca2+-homeostasis and promoting arrhythmias. The activation of phosphodiesterase 2 (PDE2) might reduce arrhythmogenic cAMP-levels and thereby arrhythmias in diseased hearts. PDE2 can be stimulated by cGMP, which is intracellularly generated by membrane-bound guanylyl cyclases (pGC-A, pGC-B) in CM. We aim to assess the antiarrhythmic potential of pGC-B stimulation with C-type natriuretic peptide (CNP) and pGC-A/B co-stimulation with the designer NP Cenderitide in CM of mice with HF.

Materials & Methods

HF was induced in control mice (PDE2-WT) and mice with CM-specific PDE2 knockout (PDE2-KO) using a 60% high-fat diet (HFD) and the NO-synthase inhibitor L-NAME (0.5 g/L) in drinking water for 5 weeks. Cardiac function was assessed by echocardiography. In isolated ventricular CM, pro-arrhythmic spontaneous Ca2+-waves (SCWs) and Ca2+-sparks (CaSp) were quantified using Ca2+-imaging techniques and single-cell contractility was detected by video-based analysis of sarcomere-shortening. Statistical significance was evaluated using the Kruskal-Wallis test with Dunn's post-hoc analysis (GraphPad Prism).

Results

After 5 weeks, HFD and L-NAME significantly increased body weight and mean arterial pressure, leading to diastolic dysfunction with enhanced E/E in PDE2-WT and PDE2-KO. Interestingly, PDE2-KO showed reduced systolic heart function compared to PDE2-WT. In CM of failing PDE2-WT, beta-adrenergic stimulation with isoprenaline (ISO) significantly increased the number of pro-arrhythmic SCWs and CaSp, which were markedly reduced by CNP. This antiarrhythmic effect was abolished by PDE2 inhibition with BAY 60-7550, and was absent in CM of PDE2-KO with HF. Notably, the pGC-A/B co-stimulator Cenderitide also significantly decreased the number of ISO-induced CaSp in CM of diseased PDE2-WT. PDE2 inhibition blunted this cardioprotective effect. Both CNP and Cenderitide clearly enhanced contraction amplitudes in CM of PDE2-WT mice with HF.

Conclusion

By cGMP-dependent PDE2 activation, CNP and Cenderitide significantly reduced cAMP-dependent pro-arrhythmic Ca2+-signals and improved CM contraction in mice with HF, offering a promising novel antiarrhythmic approach for HF patients.

Poster session II

Nephrology

Presenters

Muhammad Islampanah
Tom Grootswagers
Jinwei Guo
Francisco De Nardi
Fernando Martín del Campo Sánchez
Melise Mariano
Lingqian Zheng
Zhina Sheikh aghaei

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Serum TriglycerideGlucose Index and Risk of All-Cause and Cause specific Mortality in Subjects without Cardiovascular Diseases: A 10-year longitudinal follow-up study

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Introduction
Cardiovascular disease remains the top global cause of death. The triglyceride-glucose (TyG) index, a simple marker of insulin resistance, has shown promise in predicting cardiovascular disease (CVD) and mortality. This study assessed the association between TyG index, and the risk of all-cause, CVD, coronary heart disease (CHD), and stroke-related mortality in participants of the Mashhad Stroke and Heart Atherosclerotic Disorder (MASHAD) cohort.

Materials & Methods
Subjects without CVD at the baseline were enrolled in this study. Of 9704 individuals aged 3565 years that were followed for almost 10 years, 9430 met the inclusion criteria. Multivariable Cox proportional hazards models evaluated the relationship between TyG index quartiles (quartile 1: <8.12, quartile 2: 8.12 8.52, quartile 3: 8.52 8.96, and quartile 4: >8.96) and mortality. Chi-square test was used to compare categorical variables. A one-way ANOVA test was used for comparison between continuous variables. Restricted cubic splines (RCS) assessed potential non-linear associations, and subgroup analyses explored variability across strata.

Results
During follow-up, 400 deaths occurred (168 from CVD, 127 from CHD, 30 from stroke, and 75 from other causes). KaplanMeier curves revealed significantly higher mortality rates across all categories with increasing TyG index (log-rank p for all < 0.001). RCS analysis indicated non-linear (U-shaped) associations of TyG index with all-cause (p = 0.003), CVD (p = 0.003), and CHD (p = 0.005) mortality. In the fully adjusted model, hazard ratios with 95% confidence intervals for the highest (>8.96) vs. lowest (<8.12) quartile of TyG were 1.108 (0.790-1.553) for all-cause (p = 0.552), 1.028 (0.606-1.743) for CVD (p = 0.919), 0.925 (0.508-1.691) for CHD (p = 0.803), and 2.897 (0.685-12.257) for stroke mortality (p = 0.148).

Conclusion
Elevated or reduced TyG index levels showed U-shaped associations with all-cause, CVD, and CHD mortality after 10 years, highlighting its potential prognostic value. However, it failed to capture a statistical significance in the fully adjusted Cox proportional hazards models. More investigations are required to completely understand the predictive importance of the TyG index among various populations.

Cold Ischemia Time and Kidney Transplant Outcomes: Minimal Impact on Delayed Graft Function and Survival

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Introduction

Cold ischemia time (CIT) plays a key role in kidney transplantation outcomes, with prolonged CIT linked to delayed graft function (DGF) and potential graft loss. While the effects of shorter CIT, particularly under 12 hours, are less clear, studies suggest even brief CIT can increase DGF risk. This study aimed to assess the impact of CIT on DGF and graft survival using the NOTR database, hypothesizing that shorter CIT with hypothermic machine perfusion (HMP) minimizes ischemia-reperfusion injury without compromising graft survival.

Materials & Methods

Data from the Nederlandse Orgaantransplantatie Registratie were analyzed to evaluate the effects of CIT on DGF and graft survival. Logistic regression models identified DGF predictors, and Cox proportional hazards models and Kaplan-Meier analyses assessed graft survival across different CIT and donor type groups. All analysis was performed in R software.

Results

Logistic regression showed no significant association between CIT and DGF across donor types. DCD donors had a higher likelihood of DGF compared to DBD donors (= 1.52, 95% CI [0.44, 2.60], p = 0.007). No significant differences in DGF outcomes were found across CIT groups for either donor type.Univariate regression identified HLA mismatch (= 0.14, 95% CI [0.02, 0.26], p = 0.02), creatinine serum levels (= 0.40, 95% CI [0.03, 0.77], p = 0.03), and diabetes (= 0.64, 95% CI [0.31, 0.98], p < 0.001) as significant predictors. For DBD donors, HLA mismatches (OR = 1.37, 95% CI [1.04, 1.82], p = 0.02) and creatinine levels (OR = 2.52, 95% CI [1.40, 4.54], p = 0.002) were significant. Kaplan-Meier analysis showed CIT significantly impacted graft survival in DBD donors (p = 0.04), but not in DCD donors (p = 0.77).

Conclusion

This study suggests CIT does not significantly impact DGF or graft survival in kidney transplants across different CIT groups. Donor type, particularly DCD donors, plays a more crucial role, with diabetes being a key predictor for DCD donors and creatinine levels . These findings emphasize the importance of donor characteristics over CIT duration in determining kidney transplant outcomes.

Different effects of EP3 on renal parenchymal cells and myeloid cells in acute oxalate nephropathy

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Introduction

In the short term, a large number of oxalate crystals deposited in the kidney can cause acute oxalate nephropathy, in which necro-inflammation plays an important role. Recently, it has been shown that prostaglandin E2 is widely involved in the progression of inflammatory diseases through the downstream receptor EP3. In addition, renal parenchymal cells EP3 also participates in the metabolism of water and salt in the kidney, and plays an important role in the composition of urine. However, it is unclear how EP3 affects the progression of acute oxalate nephropathy. Therefore, this study aims to explore the effect of EP3 on acute oxalate nephropathy and its potential mechanism by intervening EP3 expression in different cell types.

Materials & Methods

Using C57BL/6N wild-type (WT) mice, systemic Ep3 gene knockout mice (Ep3-/-) and myeloid cell conditioned knockout mice (Ep3F/F; Lyz2CRE), acute oxalate nephropathy model was established by intrabitoneal injection of 1% sodium oxalate solution (dosage is 100mg/kg) and 3% sodium oxalate solution drinking water. HE, WB, immunofluorescence, ELISA and rt-qPCR were used for corresponding experimental content.

Results

Compared to EP3F/F, the level of kidney injury in Ep3F/F; Lyz2CRE was decreased. Meanwhile, deficiency of EP3 in myeloid cells resulted in reduced neutrophil infiltration. In addition, renal apoptosis, necroptosis, and pyroptosis related proteins were decreased in Ep3F/F; Lyz2CRE. Serum levels of IL-6 and DAMPs were lower in Ep3F/F; Lyz2CRE. However, Ep3-/- did not show signs of improved kidney function, with a larger range of smaller crystals than the control group.

Conclusion

Therefore, blocking the expression of EP3 in myeloid cells can effectively improve acute oxalate nephropathy in mice by reducing inflammatory cell infiltration and renal cell death to block the “self-amplifying” effect of necro-inflammation. Ep3-/- can not improve acute oxalate nephropathy as a whole because it also affects oxalate excretion.

Impact of high levels of pre-transplant parathormone on delayed graft function and one-year glomerular filtration rate in kidney transplant recipients

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Introduction

Persistent hyperparathyroidism seems to be associated with poor outcomes in kidney transplant recipients (KTRs), but the impact on delayed graft function (DGF) has not been investigated. The DGF is the most frequency early transplant complication in Brazil (almost 60%). Thus, this study aimed to evaluate the impact of pre-transplant parathormone (PTH) on DGF and 1-year estimated glomerular filtration rate (eGFR) in Brazilian KTRs.

Materials & Methods

A retrospective cohort study including 380 deceased donor KTRs from Nov/22 to May/23, stratified according to the pre-transplant PTH: <800pg/mL (l-PTH, n=281) or 800pg/mL (h-PTH, n=99). The frequency of DGF was compared using X2 test, the differences in eGFR (ml/min/1.73m2) were calculated using linear generalized estimating equations, and death-censored graft survival (GS) using Kaplan-Meier.

Results

Recipients were 49.5 years, 63.9% men, and 57.9% white. The h-PTH group had a longer duration of dialysis prior to transplantation (54.7 vs. 32.5 months, p<0.001). Donors were 48.0 years, 57.4% men, 50% white, the KDPI was 58% vs. 55% (p=0.90), and the frequency of expanded criteria donors was 29.3% vs. 33.1% (p=0.49), with no other differences in recipients and donors characteristics. The overall incidence of DGF was 68.4%, similar in both groups (h-PTH 72.7% vs. l-PTH 66.9%; p=0.28), as was the duration of DGF (6.0 vs. 5.0 days; p=0.70). The eGFR increased by 4.95 (2.82 to 7.01) from 1 month to 1 year after transplantation (p<0.001), achieving 45.3 (40.750.0) in the h-PTH group and 50.4 (47.453.3) in the l-PTH group, with no significant difference between groups (p=0.11) or in the time-group interaction (p=0.15). Considering only the patients who had DGF, at 1 month after transplantation, the eGFR was 40.9 (36.3 to 45.4) vs. 40.6 (37.7 to 43.5) for h-PTH and l-PTH patients, respectively, and 40.9 (36.0 to 45.8) vs. 46.9 (43.5 to 50.4) at 1 year, with a significant interaction between time-group (p=0.04). The 1-year GS was 89.4% vs. 94.8% for h-PTH and l-PTH patients, respectively, p=0.07.

Conclusion

High pre-transplant PTH was not associated with DGF incidence or duration. However, among patients with DGF, it was associated with a lower 1-year eGFR and a trend toward lower graft survival.

GlycA and all-cause mortality in kidney transplant recipients: Results of the TransplantLines Biobank and Cohort Study

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Introduction

Despite the benefits of kidney transplantation compared to dialysis, life expectancy in kidney transplant recipients (KTR) remains 25-30% lower than that of age-matched peers in the general population. Chronic inflammation is a key contributor to poor outcomes in KTR. GlycA is a composite biomarker of systemic inflammation associated with all-cause mortality in general population studies, but there are no data on GlycA concentrations and outcome in KTR.

Materials & Methods

This prospective study was performed using data of stable outpatient KTR participating in the TransplantLines Biobank and Cohort Study. GlycA concentration was measured by nuclear magnetic resonance spectroscopy. We performed multivariable linear regression to analyze the association between concentrations of GlycA and conventional biomarkers of inflammation. To test for the association between GlycA concentration and all-cause mortality, Cox regression was used.

Results

We had data of 909 KTR, mean age 56 (13) years, 557 (60.9%) males, and GlycA concentration 435 (92) mol/L. During a median follow-up of 5.5 [Interquartile range=4.0-6.7] years, 196 (21.4 %) KTR died. After adjusting for sex, age, and body mass index, GlycA was positively associated with log-transformed high sensitivity C-reactive protein (hsCRP) (standardized B coefficient (std B) = 0.68, P<0.001) and negatively with albumin (Std B= -0.25, P<0.001). With strengths of associations expressed per standard deviation change, GlycA was more associated with all-cause mortality than hsCRP (Hazard ratio (HR) = 1.56, 95%CI 1.41-1.73, P<0.001 vs. HR = 1.25, 95%CI 1.16-1.39, P<0.001 respectively). After adjusting for age, sex, and estimated glomerular filtration rate the respective HR were 1.46, 95%CI 1.30-1.64, P<0.001 and 1.19, 95%CI 1.09-1.29, P<0.001. After adjusting for hsCRP GlycA was associated with all-cause mortality (HR= 1.55, 95%CI 1.30-1.84, P<0.001). hsCRP was not associated with all-cause mortality after adjusting for GlycA (HR=0.92, 95%CI 0.76-1.12, P= 0.40).

Conclusion

In KTR, GlycA showed an independent association with an elevated mortality risk. GlycA was more strongly associated with all-cause mortality than hsCRP. Further research is warranted to evaluate whether GlycA values could be relevant to improving clinical outcomes in KTR.

Nephroprotective effects of combining semaglutide and empagliflozin in a mouse model of type II diabetes, diabetic kidney disease and obesity

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Introduction

The prevalence of type 2 diabetes mellitus (T2DM) and obesity has been increasing globally. Recent studies by the NCD Non-Communicable Diseases Risk Factor Collaboration (NCD-RisC) estimate that over 800 million people have diabetes, and nearly one billion are living with obesity. Obesity is a major risk factor for the development of T2DM, amplifying the effects of genetic predisposition and environmental factors contributing to this condition. Moreover, approximately 40% of individuals with T2DM develop diabetic kidney disease (DKD), a condition characterized by structural and functional kidney changes that manifest as proteinuria, hypertension, and progressive kidney function decline. Currently, glucagon-like peptide-1 receptor agonists (GLP-1 RAs), such as semaglutide, and sodium-glucose co-transporter-2 inhibitors (SGLT2is), such as empagliflozin, are effective therapeutic options for managing these conditions. However, the combination of these therapies may offer greater potential in slowing the progression of DKD.

Materials & Methods

This study utilized BTBRob/ob mice, a robust model of T2DM, DKD, and obesity, characterized by hyperphagia, hyperglycemia, albuminuria, and histopathological changes. The combination of semaglutide and empagliflozin was evaluated for its therapeutic effects. Functional data, including body weight, fasting blood glucose levels, and plasma and urine samples, were collected biweekly until the mice reached 14 weeks of age. Biochemical analyses were conducted to assess creatinine levels, glycosuria, and estimated glomerular filtration rate (eGFR). Structural assessments of the glomeruli, mesangial cells, and podocytes were performed, along with molecular analyses of podocyte markers.

Results

Preliminary findings demonstrated effective body weight control and a significant trend toward improved blood glucose regulation in the group receiving combined therapy compared to the BTBRob/ob control group ($p < 0.05$). Additionally, ongoing evaluations in the group treated with empagliflozin and semaglutide aim to assess the attenuation of mesangial expansion, preservation of podocyte numbers, and upregulation of podocyte structural markers.

Conclusion

The combination of semaglutide and empagliflozin shows significant potential for mitigating the progression of T2DM and DKD, representing a promising therapeutic strategy for these conditions.

Efficacy of mesenchymal stem cells in the treatment of peritoneal fibrosis in animal models: a meta-analysis

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Introduction
Peritoneal fibrosis is a severe complication of peritoneal dialysis. Prolonged peritoneal dialysis can lead to peritoneal function deterioration and morphological changes, resulting in withdrawal from peritoneal dialysis. Numerous studies have proven mesenchymal stem cells (MSCs) to exhibit immunomodulatory and antifibrotic properties in various animal models. Consequently, MSCs could be a useful therapeutic option for peritoneal dialysis patients. To evaluate the efficacy of MSCs, we conducted a meta-analysis in animal models of peritoneal fibrosis.

Materials & Methods
We searched the literature extensively from its inception to April 27, 2024, using PubMed, the Cochrane Library, Web of Science, and EMBASE. Then, we screened the literature for inclusion by reading the abstracts using Endnote 20. Two individuals collected the data independently and analyzed them using RevMan 5.3 and STATA 17.0.

Results
Fifteen studies met the inclusion criteria. MSC treatment reduced the levels of pro-inflammatory and profibrotic markers, including IL-6, IL-1, TGF- (SMD = -1.79, 95%CI: -2.32, -1.25; P <0.00001), TNF- (SMD= -1.57, 95%CI: -2.71, -0.44; P = 0.006). MSCs also decrease the submesothelial thickness (MD= -63.14, 95%CI: -78.52,-47.76; P<0.00001) and down-regualate the level of mesenchymal markers such as-SMA (SMD= -2.26, 95%CI: -2.83, -1.68; P<0.00001), Snail, E-cadherin, Collagenland Collagen III (SMD= -1.50, 95%CI: -2.05, -0.96; P<0.00001). MSC treatment group could improve the ultrafiltration capacity (MD=1.21, 95% CI: 0.64, 1.77; P<0.0001), D/D0 of glucose (MD=0.14, 95%CI: 0.05,0.23; P=0.004) in peritoneal fibrosis animal models. However, there were no statistical differences in the level of VEGF, D/P of Na, D/P of BUN, D/P of protein, and Glucose mass transfer between the MSC treatment group and the control group.

Conclusion
This meta-analysis indicates that MSC therapy significantly reduces key inflammatory and fibrotic markers while improving peritoneal function in animal models of peritoneal fibrosis. These findings provide a foundation for future research on MSC-based therapies for peritoneal fibrosis. However, given the limited quantity and quality of the included studies, further clinical trials are necessary to confirm these findings and establish robust clinical evidence.

Effects of Pentoxifylline on Inflammatory Factors and Quality of Life in Maintenance Hemodialysis Patients

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Introduction
Increased inflammatory cytokines including C-reactive protein (CRP) and tumor necrosis factor-alpha (TNF-) are a common finding in patients with particularly those with end-stage renal disease (ESRD), which can lead to several complications in these patients and reduce their quality of life. Considering the anti-inflammatory effects of pentoxifylline, this drug could play a role in reducing inflammatory factors and improving quality of life (QoL) of hemodialysis (HD) patients.

Materials & Methods
In this randomized placebo-controlled trial 88 chronic HD patients were divided into two groups with equal numbers. The intervention group received a tablet of pentoxifylline 400 milligrams and control group received the matching placebo, daily for 3 months. At baseline and after 3 months, inflammatory factors including serum levels of TNF- and CRP were measured. Also, the Medical Outcome Study 36-Item Short-Form Health Survey (SF-36) QoL questionnaire was completed by each patient at the beginning and end of the study.

Results
Significant reduction in serum levels of TNF-, and CRP as well as substantial improvement of all dimensions of QoL were observed in the intervention group after 3 months of pentoxifylline treatment ($P = 0.04$; $P < 0.001$, $P < 0.05$ respectively). Between groups comparison showed a marked reduction in inflammatory markers including TNF- and CRP in recipients of pentoxifylline than the control group at the end of the study ($P = 0.003$ for both). In addition to dimensions of physical component score (PCS), mental component score (MCS) and overall score of QoL showed significant improvement in the pentoxifylline group compared to the placebo group at month 3 of the study ($P = 0.003$; $P = 0.027$, $P = 0.002$ respectively).

Conclusion
Use of pentoxifylline in HD patients illustrated positive effects on inflammation and health-related QoL.

Poster session II

Public Health II

Presenters

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Nutrition Interventions in Early Life and Infant Development in The Gambia: Report based on a clinical research project

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Introduction

Background: Undernutrition encompasses underweight, stunting, wasting, and micronutrient deficiencies. These conditions have significant global burdens, with 149.2 million children under five stunted, and 45.4 million wasted. In The Gambia, the prevalence of stunting remains high at 26%, and wasting at 6.2%, despite four decades of nutrition intervention. Literature shows that undernutrition in infancy can lead to adverse effects on child development during the early years. The objective of this report is to explore the impacts of undernutrition on development in infants, by assessing nutritional status and infants ability to achieve physical development milestones in fine and gross motor skills.

Materials & Methods

Methods: This novel analysis uses pooled data from ENID +Growth randomised controlled trial. The mothers were recruited from the West Kiang region of The Gambia, and their infants followed from birth to two years of age. Measures of infant anthropometry were used to calculate z-scores, representative of nutritional status. Achievement of fine and gross developmental milestones was assessed using the WHO questionnaire.

Results

Results: A total of 875 mothers were included in the trial, with 775 live infant births. Strong associations were observed between current infant nutritional status and developmental outcomes, i.e., HAZ score and gross motor scores at 52 weeks (coefficient 0.44, $p < 0.0001$) and HAZ with fine motor scores at 104 weeks (coefficient 0.41, $p = 0.009$). Associations for stunting as a predictor of poor developmental outcomes were statistically significant, but less so for sex differences, low birth weight and supplementation.

Conclusion

Conclusion: Overall, the study shows statistically significant associations of infant nutritional status with developmental outcomes, consistent with recent literature. Considering the strength of associations uncovered in this study, the integration of these findings with current nutrition interventions in The Gambia would likely yield positive impacts on development in early childhood, particularly for children experiencing growth faltering.

Assessment the Relationship between Health Literacy and General Health in Women with Gestational Diabetes

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Introduction
Health literacy includes cognitive and social skills that enable individuals to understand and use health information effectively. It significantly influences health outcomes in society. Women with gestational diabetes often have low health literacy and need better education. This study explored the link between health literacy and overall health in these women.

Materials & Methods
This cross-sectional study involved 200 women with gestational diabetes referred to the Beheshti Endocrinology Clinic in Hamadan, Iran. Participants were selected through consecutive sampling, and data were collected using self-reported questionnaires covering age, education, number of pregnancies, health literacy (via a 33-question tool by Montazeri et al., 2014), and general health (measured with an 11-question standard tool). Data analysis was performed using SPSS version 26 with a 95% confidence level, utilizing Student's t-test and one-way analysis of variance.

Results
A total of 200 individuals with gestational diabetes were referred to the clinic, with a mean age of 29.63 years (95% CI: 28.8930.37). The health literacy score averaged 77.41 (95% CI: 75.1379.69) out of a possible 165. The public health score had a mean of 42.03 (95% CI: 41.4442.62), with scores ranging from 28 to 52. It is important to note that in the standard General Health Questionnaire, a higher score indicates a worse state of health. Significant relationships were observed: there was a positive correlation between health literacy and general health ($r=-0.538$, $P < 0.001$), as well as between health literacy and education ($p < 0.001$) and between public health and education ($P < 0.001$).There was no significant correlation between health literacy scores and age($P=0.12$) or the number of pregnancies($P=0.18$).

Conclusion
Most women with gestational diabetes have moderate to borderline health literacy. There is a significant relationship between health literacy levels, higher education, and overall health. To control and prevent gestational diabetes, it is recommended that efforts be made to improve the health literacy of pregnant women, thereby enhancing public health outcomes.

Knowledge, Attitudes, and Practices Towards Premarital Genotype Testing for Sickle Cell Among Youth in Dar es Salaam, TANZANIA.

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Kairuki University

Introduction
Sickle cell disease (SCD) is a significant inherited blood disorder affecting millions worldwide, with the highest burden in sub-Saharan Africa. Tanzania has a high prevalence, with an estimated 11,000 children born annually with SCD. Premarital genotype testing is a critical preventive strategy that enables informed reproductive choices, yet uptake remains low due to various barriers. This study evaluates the knowledge, attitudes, and practices (KAP) of youth in Dar es Salaam toward premarital genotype testing and explores factors influencing its uptake.

Materials & Methods
This descriptive cross-sectional study was conducted among 264 youth aged 1845 years residing in Dar es Salaam. Participants were selected using random sampling techniques, and data were collected through structured questionnaires and focus group discussions. Quantitative data were analyzed using SPSS version 26, employing descriptive statistics and ANOVA to explore associations between KAP and demographic factors.

Results
The findings indicated that 76% of participants were aware of genotype testing, while 86% had basic knowledge of SCD. Notably, 91% recognized the importance of premarital testing, and 83% expressed willingness to undergo testing. However, only 24% had been tested, and 32% had discussed it with family or friends. Barriers to uptake included cost, lack of awareness, fear of stigmatization, and cultural or religious beliefs. Higher education levels were strongly associated with better knowledge and positive attitudes.

Conclusion
Despite widespread awareness and favorable attitudes, the uptake of premarital genotype testing among youth in Dar es Salaam remains low. Key interventions should include community-based education campaigns, engagement with religious and cultural leaders, and initiatives to subsidize testing costs. Addressing misconceptions and promoting open family discussions can further encourage testing. These efforts are essential to reducing the prevalence of SCD and its associated health burden

Mental Health Consequences of Perceived Sexism: Insights from Women at a Medical University in Iran

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Introduction

One of the United Nations' Sustainable Development Goals is to achieve gender equality in education, health, economic empowerment, and political participation. Studies have indicated that gender inequality is associated with mental health disorders, including post-traumatic stress and depression. Research on gender discrimination in Iran, a low-middle-income country under an Islamic government, has predominantly concentrated on sociological aspects, with insufficient emphasis on psychological and public mental health perspectives. This study aims to investigate the impact of perceived sexism on the mental health of women employed at Tabriz University of Medical Sciences, North-West of Iran.

Materials & Methods

This study involved 200 female participants, comprising 100 from the clinical group and 100 from the office group. Each participant completed The Schedule of Sexist Events (SSE) and the Depression, Anxiety, and Stress Scale (DASS-21) questionnaires. Following scoring, the data were analyzed using descriptive statistics, Pearson's correlation coefficient, and multiple regression to assess the relationship between variables.

Results

Baseline characteristics and the SSE scores were not significantly different between the two groups. Among the areas of sexism, sexism in close relationships had a higher standardized mean score of 32.20 27.31%. Approximately half of the participants reported a degree of mental health disorder, with the clinical group experiencing significantly higher levels of anxiety and stress ($P< 0.05$). There was a significant positive correlation between perceived gender discrimination throughout life and depression (0.268), anxiety (0.261), and stress (0.320) ($P < 0.01$). The strongest correlation was found between discrimination in close relationships and depression (0.351, $P < 0.01$). The regression analysis revealed that total SSE was a significant predictor in all three models: depression, anxiety, and stress. Additionally, age was an effective predictor in the depression and anxiety models, while clinical job status was a significant predictor in the stress and anxiety models.

Conclusion

The findings of this study indicate a significant positive correlation between perceived sexism among female employees of an Iranian Medical University and their self-reported levels of depression, anxiety, and stress. These results, consistent with previous studies, emphasize the impact of gender inequalities on the mental health of women, particularly working women.

Evaluating the Healthiness of Lifestyle Features Among College Students: A Judgment Analysis

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Introduction

People may think differently about what makes a healthy lifestyle. Relatedly, people may have different standards about what makes a healthy lifestyle for men versus women. The purpose of this study is to assess the subjective weights assigned to various cues, or lifestyle features (Exercise, Vaping, Eating a Vegetarian Diet, Gender) as student participants form judgments of the healthiness of hypothetical students. The secondary purpose is to determine the extent to which the gender of the hypothetical student influences judgments of healthiness.

Materials & Methods

A questionnaire included 16 hypothetical profiles (2x2x2x2 factorial design) and participants were asked to rate each profile on a scale from -10 (extremely unhealthy) to +10 (extremely healthy). The SONA system was used to recruit participants, 56 completed the judgment task. SPSS was used to determine the correlation between each of the cues and judgements of health.

Results

These correlations indicate the strength of each cues influence, and were cluster analyzed to explore subgroups who used the cues differently. Analysis revealed that the Exercise and Vaping cues received the most weight when participants judged the health of the hypothetical students. The Gender cue showed a small and positive average correlation, indicating a slight bias towards considering females as more healthy than their male counterparts. Cluster analysis revealed that most participants perceived a Vegetarian Diet as healthy, but a small minority perceived a Vegetarian Diet as unhealthy relative to a Typical American Diet.

Conclusion

Certain cues were given a positive bias while others were given a negative bias. Looking at gender in specific was thought to be generally positive. If the data obtained can be applied to a large population, it would indicate that any biases that are presented in a professional setting may not derive from the undergraduate education system. Future studies building on these findings could examine how medical students and physicians make similar judgements.

Optimizing Patient Flow in Pediatric Emergency Departments: A Systematic Review of Innovative Interventions and Their Impact on Key Performance Indicators.

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Introduction
Pediatric Emergency Departments (PEDs) all over the world face increasing pressure from rising patient volumes using finite resources. From developmental details and complex family dynamics to varied clinical presentations, the distinctive challenges in the care of children necessitate very precise and adaptive interventions to ensure timeliness, high quality of service, and optimization of operational performance.Objective: This systematic review critically assesses the effectiveness of targeted interventions like telemedicine, fast-track systems, nurse-initiated protocols, and quality improvement initiatives on key performance indicators such as waiting times, length of stay (LOS), left without being seen (LWBS) rates, hospital admission rates, and revisit rates for Pediatric Emergency Departments (PEDs).

Materials & Methods
A literature search was done through PubMed, EMBASE, CINAHL, and Scopus databases using guidelines from PRISMA. Of 1,690 screened records, 22 met strict inclusion criteria and included various observational studies and randomized controlled trials. Since the methods used in the studies varied widely, the results were analyzed qualitatively concerning trends and effectiveness across different settings.

Results
Telemedicine showed promise in reducing waiting times, particularly in resource-poor environments; however, it presented challenges related to the integration of remote providers with on-site providers. Fast-track systems appeared to have more consistent reductions in waiting times and LOS, particularly in high-resource EDs, and demonstrated their effectiveness in managing patients presenting with low-complexity complaints. Nurse-initiated protocols demonstrated variable results based on the extent of protocols implemented and the authority of nursing staff, thus requiring an individual approach to implementation. Quality improvement initiatives uniformly positively affected operational efficiency and LWBS rates but required sustained institutional investment in the programs to continue their success. The impact on ED hospital admission and revisit rates was mixed, and longitudinal follow-up will be required for a comprehensive understanding of the effect of these interventions.

Conclusion
Effective management of patient flow in pediatric EDs depends on using targeted, evidence-based interventions.Telemedicine, fast-track systems, and nurse-initiated protocols will work when they are in an appropriate context. The quality improvement processes offer more sustainable benefits but depend on institutional supports and resources. Further research should be directed at developing adaptable and standardized models to help ensure that improvements will be sustained across diverse pediatric ED environments.

DETECTION OF EARLY KIDNEY INJURY USING URINARY L-FABPBIOMARKER AMONG BINGE ALCOHOL DRINKERS: A STUDY INTONDO, MANILA, PHILIPPINES

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Introduction
The rising incidence of acute kidney injury (AKI) and limitations in traditional diagnostic methods highlight the need for more sensitive early detection tools. Alcohol consumption, a known risk factor for kidney damage, remains widespread in the Philippines due to deeply ingrained cultural norms, particularly in socioeconomically disadvantaged areas like Tondo, Manila, where alcohol use is notably prevalent among young adults. This study investigates urinary liver-type fatty acid-binding protein (uL-FABP) as a potential early biomarker for AKI among binge alcohol drinkers in Tondo.

Materials & Methods
A quantitative research design was utilized, employing the RENISCHEM L-FABP POC Kit to semi-quantitatively assess uL-FABP levels. Participants aged 1835 included binge drinkers, with non-binge drinkersdefined as having minimal to no alcohol intakeserving as the control group. Standard kidney function tests, such as serum creatinine and BUN, were conducted for comparison.

Results
Results showed that 17 of 20 binge drinkers tested positive with uL-FABP concentrations greater than or equal to 12.5 ng/mL but less than the threshold of 100 ng/mL, while 18 of 20 non-binge drinkers tested negative (less than 12.5 ng/mL). The two uL-FABP-positive results in the non-binge group may reflect participant misclassification, while the three negative results in the binge group were all among participants aged 23 or younger. The Mann-Whitney U test yielded a p-value of 0.000, indicating a significant difference between groups and a strong association between elevated uL-FABP levels and binge drinking behavior.

Conclusion
All participants had normal creatinine and BUN levels, suggesting that uL-FABP may detect renal stress earlier than conventional markers. It highlights uL-FABPs promise as a sensitive, non-invasive biomarker for early AKI detection, particularly in high-risk communities like Tondo. The findings support further research on uL-FABPs clinical utility and potential use alongside or as an alternative to current kidney function tests.

Improving respiratory health and well-being in Tehrans apartments: role of green roofs in regulating indoor temperatures and air quality

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Introduction

Respiratory diseases are a major public health concern in Tehran, exacerbated by high indoor temperatures and poor air quality in residential buildings. Green roofs, which involve planting vegetation on rooftops, offer a sustainable solution to regulate indoor temperatures and improve air quality, potentially reducing respiratory symptoms and enhancing overall well-being. This study evaluates the impact of green roofs on indoor temperature regulation, air quality, respiratory health, and well-being in Tehrans apartments.

Materials & Methods

The study was conducted in 10 apartment buildings in Tehran over six months (MayOctober 2024). Five buildings were retrofitted with green roofs, while the remaining five served as controls. Indoor temperature, humidity, and air quality parameters (PM2.5 and CO2) were monitored using sensors installed in living rooms and bedrooms. Respiratory symptoms were assessed using the St. Georges Respiratory Questionnaire (SGRQ), while overall well-being was measured using the World Health Organization Well-Being Index (WHO-5), a validated tool for assessing mental and physical well-being.

Results

Buildings with green roofs showed significant improvements in indoor environmental conditions. Indoor temperatures were 4C lower (26C vs. 30C) on average during peak summer months compared to control buildings, while humidity levels remained stable, enhancing indoor comfort. PM2.5 levels decreased by 20%, from 35 g/m3 to 28 g/m3, and CO2 levels dropped by 15%, from 1,200 ppm to 1,020 ppm, due to improved ventilation and pollutant absorption by vegetation. Residents in buildings with green roofs reported a 15% reduction in respiratory symptoms, including coughing, wheezing, and shortness of breath, and a 20% improvement in overall well-being, with higher energy levels, better mood, and improved sleep quality.

Conclusion

Green roofs significantly improve indoor temperature regulation, air quality, respiratory health, and overall well-being in Tehrans apartments, offering a low-cost, sustainable solution to urban environmental challenges. These findings highlight the importance of integrating green infrastructure into residential design to promote public health. By adopting green roofs, policymakers and urban planners can create healthier living environments, reducing the burden of respiratory diseases and enhancing well-being in Tehran and similar cities.

Poster session II

Medical Physiology

Presenters

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Vusi Ntywankile
Tamryne Brink
Timur Mušić
Karen Gisselle Rodriguez Pintor
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Acomys cahirinus demonstrate a distinctive response to bleomycin-induced lung injury

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Introduction

Pulmonary fibrosis, characterised by excessive deposition of extracellular matrix (ECM) in lung interstitium, often leads to irreversible tissue changes and respiratory failure. In most mammals, the ability to restore after such damage is limited. However, Acomys cahirinus (spiny mice) have been shown to scarlessly regenerate multiple tissues to full functionality, making them a promising model for studying antifibrotic mechanisms, particularly in pulmonary fibrosis. In our research, we aim to uncover the cellular and molecular mechanisms driving lung regeneration after bleomycin-induced injury in Acomys cahirinus.

Materials & Methods

Pulmonary fibrosis was induced in M. musculus (C57BL/6) and A. cahirinus via intratracheal injection of bleomycin (3,5,15 U/kg, n=3-5 for each dose). MRI as well as histological, immunostaining, Western and Dot blot analyses of lung tissue, were performed to assess the severity of fibrotic changes in the lung structure, ECM content (collagen I&IV, FN, EDA-FN) and the presence of key cell populations (marked by FAP, SMA, CD206, CD45, PCNA, E-cadherin) involved in fibrosis development. Mann-Whitney and Kruskal-Wallis H-test with Dunn test were used for statistical analysis.

Results

MRI revealed minor lung density alterations in spiny mice, even at bleomycin doses lethal to M. musculus (5-15 U/kg). Histological analysis showed reduced respiratory region area without classical fibrosis markers such as SMA+ fibrotic foci or ECM accumulation, observed in M. musculus. Instead, collagen I&IV, FN and EDA-FN levels in A. cahirinus lungs declined after damage. Notably, the count of CD45+ leukocytes, key players of inflammation, remained unelevated in spiny mice upon bleomycin administration. Overall, while A. cahirinus lungs exhibited fewer proliferating cells compared to M. musculus, a pronounced increase in epithelial cell proliferation suggested enhanced alveolar re-epithelialization during fibrosis progression.

Conclusion

Spiny mice fail to develop “classic” pulmonary fibrosis, even after the administration of bleomycin in doses lethal to M. musculus. Bleomycin injury drives distinct stromal, immune and epithelial cell responses in both genera, accompanied by differences in ECM composition. These findings provide novel insights into the mechanisms of fibrosis development, laying the groundwork to address fibrotic diseases. The work was supported by the Russian Science Foundation, grant #23-15-00198, https://rscf.ru/en/project/23-15-00198/.

Investigation into the effects of a high sugar diet and anti-psychotic drug olanzapine on pancreatic histology in Wistar rat model

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Introduction

: The pancreas is crucial for glucose homeostasis. Research indicates that a high sugar diet (HSD) disrupts glucose regulation and impairs insulin secretion. Additionally, use of the anti-psychotic drug Olanzapine (OLZ) has been associated with elevated fasting glucose levels and insulin resistance. However, limited research has been conducted on the specific OLZ- and HSD-induced histological changes within the pancreas.

Materials & Methods

Ninety-six Wistar rats n=48 males and n=48 females were divided into four groups: control diet, control diet + OLZ, HSD, HSD + OLZ (n=12 per group). OLZ was administered at a dose of 1.5 mg/kg body weight daily, and all interventions lasted for 12 weeks (from age 8 weeks to 20 weeks). Following euthanasia, the pancreas and was harvested, weighed, fixed, and stained with haemtoxylin and eosin for evaluation of islet distribution in QuPath. .

Results

In males, the HSD + OLZ group had the lowest relative pancreas weight, while the same group in females had the highest. The total pancreatic islet counts were 142 per 5000 m2 in females and 157 per 5000 m2 in males. The OLZ group showed the largest decrease in the average islet counts per reference area compared to controls in females, while the HSD-OLZ group showed the largest decrease in males.

Conclusion

Decrease in pancreatic islet number results in fewer beta cells as they form the majority of islets, leading to decreased insulin production capacity. Therefore, this indicates a potential decrease in insulin production capacity which may have detrimental effects on glucose metabolism.

Investigating the effects of olanzapine and a high-sugar diet on the cardiovascular system of male and female wistar rats.

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Introduction

Olanzapine (OLZ), a second-generation antipsychotic used to treat schizophrenia and bipolar disorder, is known to cause weight gain, adverse metabolic side-effects and hypertension. However, the complex interaction between metabolic and cardiovascular risk factors associated with OLZ use remains poorly understood. This study aimed to investigate the effects of OLZ combined with a high-sugar diet (HSD) on the cardiovascular system in male and female Wistar rats.

Materials & Methods

Ethics approval was obtained from Stellenbosch University (ACU-2023-28213). Male and female Wistar rats (n=12/group) were randomly assigned to control and HSD groups, with OLZ subgroups receiving 1.5 mg/kg OLZ daily. Blood pressure was measured at baseline, and thereafter at 6 and 12 weeks of diet/drug intervention. At the 6-week time-point, acute effects of OLZ on blood pressure were also measured at 30 minutes after OLZ administration. Rats were euthanised after 12 weeks of intervention and aortas were excised for vascular function assays, utilising phenylephrine and acetylcholine to induce contraction and relaxation respectively.

Results

The HSD/OLZ combination resulted in the highest increase in blood pressure in males and females at 6 weeks, with 12% ($p= 0.0017$) and 4% ($p>0.05$) mean increase respectively, compared to the control groups. Acute hypertensive effects of OLZ treatment (30 minutes post treatment) were observed in for both sexes. Blood pressures returned to baseline level at 12 weeks for all groups. Significant sex-dependent differences in contraction and relaxation responses were observed across all groups. Notably, in the OLZ/HSD group, vascular relaxation was limited to approximately 40% in males and 60% in females compared to controls ($p<0.0001$).

Conclusion

This study highlights the significant cardiovascular effects of OLZ combined with a HSD in male and female Wistar rats. Both sexes exhibited elevated blood pressure following OLZ administration, although chronic hypertensive effects resolved over time. Additionally, alterations in vascular function were evident, with males showing more pronounced changes in contraction and relaxation, suggesting greater sensitivity to the combined interventions.

Exploring the Impact of Blood Flow Restriction on Cardiovascular Response During and Following Aerobic Exercise in Healthy Athletes

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Introduction

Blood flow restriction (BFR) is an exercise technique applying the cuffs around the limbs to reduce blood flow, resulting in oxygen deprivation of the occluded area. While the cardiovascular benefits of aerobic exercise are well-established, the combined effects of BFR and aerobic exercise are not fully elucidated. This study aims to investigate the impact of BFR on cardiovascular responses, focusing on its effects on heart rate (HR), stroke volume (SV), and mean blood pressure (MBP) during and after aerobic activity in young healthy participants.

Materials & Methods

In a crossover study 15 healthy males (aged 25.13 4.51 years) exercised on a cycle ergometer under two different conditions at two separate occasions: 1) BFR by occluding the thighs with 100 mmHg and 2) control without BFR. At both tests, after 5 minutes rest, the subjects cycled at 40% of predefined VO2max for 5 minutes followed by another 5 minutes at 60% VO2max and recovered passively for 15 minutes. Cardiovascular parameters were measured before exercise, at the end of each exercise intensity and at the end of the measurements (Cosmed Quark PFT). Two-way ANOVA for repeated measures (time/BFR) was performed to determine interaction or main effects. Bonferroni correction was used for post-hoc analysis, $p<0.05$ was chosen for significance.

Results

Interaction was found between time and BFR for all three parameters. Cycling with BFR induced a significant increase in HR ($p<0.001$) and MBP ($p<0.001$), along with a significant decrease in SV ($p<0.016$) in BFR at both exercise intensities compared to control. In the recovery, a significantly higher HR was observed ($p<0.05$) in BFR, while no significant changes were found in MBP or SV.

Conclusion

Our findings indicate that BFR exercise has an impact on the cardiovascular system. However, the extent to which it may trigger cardiovascular stress remains unclear. A limitation of our study is the measurement of SV, as we were unable to detect potential changes in arteriovenous difference in the oxygen content between the two conditions. Future research should investigate the potential therapeutic benefits of BFR for individuals with compromised physical capacity due to various cardiovascular conditions (heart failure, valvular heart disease, cardiomyopathies).

Single-fiber atrophy and Ca2+ kinetics in a murine model of lung cancer cachexia

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Introduction

Cancer-induced cachexia (CC) causes severe skeletal muscle wasting (Kays et al. 2018), worsening prognosis and treatment response (Aoyagi et al. 2015). Despite advances, many features of the CC pathophysiology remain unclear. Structural alterations found in the sarcoplasmic reticulum in cachectic muscle (Martin & Freyssenet, 2021), the main Ca2+ store inside the muscle fiber, suggest functional alterations in Ca2+ kinetics. To test this hypothesis, we investigated Ca2+ dynamics in single-muscle fibers using a murine model of CC, aiming to shed light on mechanisms underlying CC-related muscle degeneration.

Materials & Methods

Passage 4 LLC1 cultured cells (ATCC-CRL: 1642) and C57BL/6 adult mice were used. Tumor-bearing (TB) mice (N=6) were injected 1 million LLC1 cells, while controls (CN) (N=4) received PBS. After 241.8 days, 10-week-old mice were sacrificed. Post-mortem, Flexor Digitorum Brevis (FDB) muscles were dissected and treated with collagenase type II to isolate single fibers. Only alive, contracting fibers were analyzed for Ca2+ transients using the fluorescent dye Mag-Fluo-4 AM and Tyrode solution. The pClamp v10 suite and SPSS v26 were used for analyses and statistics.

Results

Weight and thigh and calf circumference reductions indicated CC in the treated animals. For the FDB fibers (CN, n=26; TB, n=14) the following kinetic parameters were found: Peak (Pk) (AU): CN 7.01.7, TB 5.72.3 (p=0.069). Rise time (Rt) (ms): CN 0.90.1, TB 1.00.1 (p=0.120). Decay time (Dt) (ms): CN 14.84.9, TB 18.46.0 (p=0.048). Half width (Hw) (ms): CN 3.44.3, TB 4.30.7 (p=0.004). 1 of decay (ms): CN 1.90.5, TB 2.10.5 (p=0.395). 2 of decay (ms): CN 18.57.4, TB 14.92.6 (p=0.087). The peak [Ca2+] (M) was higher in control than in cachexic fibers: CN 18.145.09, TB 14.77.1 (p=0.090).

Conclusion

These preliminary results show altered Ca2+ release and reuptake in cachexic FDB muscle fibers, which can be explained by either intracellular alterations or a transition of fibers type IIX to IIA and I. The determination of the specific altered structures/molecules in the excitation-contraction coupling phenomenon in CC is an objective for future experiments (CODI 2021-40170; FUA-001-2024 and 2025-0072)

Evaluation of nitric oxide and epidermal growth factor levels in the saliva of the children with type 1 diabetes in Ilam city

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Introduction
Diabetes is associated with dysfunction and long-term impairment of various organs, particularly salivary function. It leads to reduced salivary flow and changes in its composition, such as Nitric Oxide(NO) and epidermal growth factor(EGF). NO may play an important role in the onset of diabetic complications, including inflammatory changes in the oral mucosa. It is believed that salivary growth factors, such as EGF, may play a significant role in healing oral wounds in diabetic patients. the aim of this study was the level of NO and EGF in the saliva of children with type-I diabetes.

Materials & Methods
This cross-sectional study was conducted on children 6-12 years old referred to the Diabetes Treatment Center in Ilam city and the Faculty of Dentistry. Informed consent was obtained from all participants. Information regarding age, gender, FBS, and HbA1c levels was extracted from the medical records. The use of any medication other than insulin, the presence of other systemic diseases, and xerostomia were considered exclusion criteria for the study. Non-stimulating saliva was collected by spitting method from 55 children with type-I diabetes(DG) and 55 healthy children(HG) who were matched by age and gender. Griess reaction and ELISA methods used for evaluating levels of NO and EGF, respectively. Data were analyzed using Mann-Whitney, kruskal-wallis and spearman's correlation in SPSS V.24(<0.05)

Results
Fifty-six girls[(%50.9),28HG,28DG]and 54 boys[(%49.1),27HG,27DG] with mean age 8.81(1.92)years old enrolled. No statistically different between mean age or gender among two groups(p>0.05). mean values of NO, EGF, FBS, and HbA1c in HG and GG were[33.21(4.43),51.02(8.61)], [46.25(6.81),86.21(16.27)], [98.19(11.10),151.09(20.96)],and [5.14(0.41),6.93(0.52)] respectively. The mean level of NO and EGF in DG were significantly higher than HG(P<0.001). based on Mann-Whitney test, NO and EGF levels showed no significant differences by age and gender in either group. The correlation coefficient between NO and EGF levels in DG and HG were r=0.448 and r=0.514,respectively(both P<0.001). There were a positive and significant correlation between NO and EGF levels with FBS and HbA1C in both groups.

Conclusion
The levels of NO and EGF in saliva in DG were significantly higher than in HG. a positive and significant correlation was found between the level of NO and EGF.

Poster session II

Neurology II

Presenters

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Flores-Abarca
Kimia Omidvar
Amirreza Naseri
Mehul Saxena
Mohadeseh Abdi

Evaluating Immune Checkpoint Inhibitors in Recurrent Glioblastoma: A Systematic Review and Meta-Analysis of Therapeutic Efficacy and Challenges

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Introduction

Glioblastoma (GBM) is the most aggressive primary brain tumor, with a poor prognosis due to its tendency to recur despite standard treatments. Immune checkpoint inhibitors (ICIs) have shown promise in several cancers and are being investigated as a potential therapy for recurrent GBM. This study evaluates monotherapy and combination ICI regimens for recurrent GBM.

Materials & Methods

A systematic review was conducted following PRISMA guidelines, searching PubMed, DOAJ, ClinicalTrials.gov, and Google Scholar for studies published between 2010 and 2024. Keywords included "immune checkpoint inhibitors," "pembrolizumab," "nivolumab," "anti-PD-1," and "glioblastoma." From 932 identified studies, 10 clinical and randomized trials met the inclusion criteria, focusing on recurrent glioblastoma treated with ICIs alone or in combination. Bevacizumab was used as the control group. Risks of bias were assessed independently by two reviewers.

Results

This study included 927 patients (aged 18-75) with recurrent glioblastoma multiforme (GBM) treated with the Stupp protocol. Immune checkpoint inhibitors (ICIs) included anti-PD-1 agents (tislelizumab, nivolumab, pembrolizumab), the anti-CTLA-4 agent (ipilimumab), and anti-PD-L1 agents (durvalumab, avelumab), with regimens ranging from monotherapies to combinations with radiation, chemotherapy, or bevacizumab. Nivolumab + RT + TMZ showed the highest median overall survival (OS) at 28.9 months, followed by tislelizumab monotherapy at 14.3 months. PFS ranged from 2.4 to 14.1 months, with the longest PFS (14.1 months) for nivolumab + RT + TMZ. Nivolumab + RT + TMZ had the highest incidence of grade 3/4 events (52.4%). Pembrolizumab + bevacizumab reported gastrointestinal effects and fatigue. Progression rates ranged from 75% to 100%, and death rates varied from 30% to 100%. Heterogeneity among studies will be assessed through subgroup analysis, hazard ratios (HRs), sensitivity analyses, and other metrics. Ongoing analysis aims to evaluate the comparative efficacy of ICIs, their combinations, and bevacizumab as a control.

Conclusion

ICIs, with appropriate dosages, showed varying overall survival outcomes and manageable adverse events in recurrent glioblastoma patients, highlighting their promising therapeutic potential and suggesting a valuable role in future treatment strategies.

Nanoencapsulated Resolvin E1 abrogates astrocyte reactivity

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Introduction

During neuroinflammation, astrocytes, the most abundant glial cells in the central nervous system (CNS), respond to damage through a process called astrogliosis. This state is characterized by elevated glial fibrillary acidic protein (GFAP) expressionand can exacerbate the neuroinflammatory process by releasing proinflammatory cytokines. The resolution of neuroinflammation is an active process regulated by specialized pro-resolving lipid molecules (SPMs). Resolvin E1 (RvE1) is a rapid degrading SPM derived from Omega-3 that exhibits potential as therapeutic agent for inflammatory and neurodegenerative diseases. However, whether RvE1 exe protective effects on the CNS by inhibiting astrocyte reactivity and whether nanoencapsulation prevents its degradation and increases its delivery efficacy in a neuroinflammatory context is unknown. In the present study, we analyzed the pro- resolving activity of free and nanoencapsulated RvE1 on astrocyte reactivityin vitro.

Materials & Methods

Polyarginine-coated lipid nanocapsules loaded with RvE1 (RvE1-NCs) were synthesizedby a modified solvent displacement method. GFAP expression and astroglios associated morphology were analyzed using flow cytometry and confocal microscopy, respectively. The activation status of the proinflammatory NF-B transcription pathway was determined by fluorescence microscopy.

Results

RvE1-NCs, with a size of 1585nm, polydispersity index of 0,1010,002, and zeta potential of 49,41,8 mV, were not cytotoxic. Interestingly, RvE1-NCs significantly reduced GFAP expression in astrocytes stimulated with IFN-gand LPS and delayed astrogliosis-associated hypertrophy, compared to free RvE1. Preliminary results show that RvE1-NCs inhibit NF-B pathway activation.

Conclusion

Therefore, RvE1 encapsulation could offer CNS protection by reducing astrocyte reactivity, proposing it as a potential new treatment neurodegenerative diseases.

From habits to cognition: investigating lifestyle as a predictor of cognitive performance

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Introduction

Cognitive decline is a significant public health concern, particularly in aging populations. Identifying modifiable lifestyle factors associated with cognitive performance can inform prevention strategies. This study explores the relationship between lifestyle behaviors, as assessed by the FANTASTIC questionnaire, and cognitive function, measured using the Mini-Mental State Examination (MMSE), in community-dwelling older adults.

Materials & Methods

This cross-sectional study included 310 participants aged 40-75 years and older. Lifestyle behaviors were evaluated using the FANTASTIC questionnaire, which assesses nine domains: family, activity, nutrition, tobacco use, alcohol consumption, sleep, type of personality, insight, and coping. Cognitive function was measured with the MMSE, categorizing participants into normal cognition (MMSE27), mild cognitive impairment (MMSE=2126), and significant cognitive impairment (MMSE20). Multivariate regression and logistic models were used to examine associations, controlling for age, sex, and education.

Results

The total FANTASTIC score was moderately correlated with MMSE scores (r = 0.66, p<0.01), indicating that healthier lifestyles were associated with better cognitive performance. Among the FANTASTIC domains, physical activity (= 0.58, p<0.01), balanced nutrition (= 0.52, p<0.01), and stress management (= 0.44, p<0.01) emerged as significant predictors of MMSE performance. Minimal use of tobacco (= 0.56, p<0.05) and alcohol (= 0.47, p<0.05) also contributed positively to cognition. Interaction analyses revealed that the association between lifestyle scores and MMSE was stronger in participants aged 65 years and older (p for interaction<0.05). Logistic regression indicated that participants in the highest tertile of the FANTASTIC score had a 35% reduced odds of mild cognitive impairment (Odds ratio (OR) = 0.65, 95% CI: 0.500.78) compared to those in the lowest tertile. Participants with normal cognition consistently scored higher across all FANTASTIC domains compared to those with cognitive impairment (p<0.05).

Conclusion

Healthier lifestyles, including regular physical activity, balanced nutrition, stress management, and minimal substance use, are positively associated with cognitive performance in older adults. These findings support the need for lifestyle-based interventions to promote cognitive resilience and healthy aging. Longitudinal studies are needed to confirm causal pathways and evaluate the long-term impact of lifestyle modifications.

The effects of probiotic supplementation on cognitive outcomes in minimally disabled relapsing-remitting multiple sclerosis patients: a randomized double-blind placebo-controlled trial

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Introduction
Probiotic supplementation, via the gut-brain axis, is indicated to improve clinical outcomes in patients with Multiple sclerosis (MS) and also found to improve cognitive function. This study examined the effects of probiotic supplementation on cognitive outcomes in minimally disabled relapsing-remitting MS (RRMS).

Materials & Methods
In this parallel, randomized, double-blind, placebo-controlled trial, 90 RRMS patients, with Expanded Disability Status Scale (EDSS)<4, received either the probiotics supplementation (Lactocare) or a placebo twice daily for four months. Visual information process speed (IPS) was evaluated using the Symbol Digit Modalities Test (SDMT), and the three-second version of the Paced Auditory Serial Addition Test (PASAT-3) was used to assess auditory IPS. Independent sample t-test, Mann-Whitney U test, and chi-square were utilized to determine the difference between the groups. Analysis of covariance (ANCOVA) -adjusted based on before values- was also conducted using the SPSS software with 95% confidence intervals and 0.05 level of significance for p-value.

Results
Sixty participants completed the trial (29 in the probiotics group, 31 in the placebo group). Median disease duration was 60 [IQR: 93] and 48 [IQR: 63] in the probiotics and placebo groups, respectively and most of the participants were females (72.4% and 80.6% in the probiotics and placebo groups, respectively). Neither scores nor rates of impairment in the cognitive assessment scales were significantly different between the groups of the study (p-values>0.05) [Data is presented in table].

Conclusion
Supplementation with a seven-strain probiotics supplementation does not result in a significant improvement in cognitive outcomes in minimally disabled RRMS patients.

The Interplay of Pain, Disability, and Psychological Well-Being in Brachial Plexus Injuries: A Tertiary Hospital Perspective

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Introduction

Brachial plexus injury (BPI) is a severe and life-altering condition that results in significant motor, sensory, and psychological impairments. These injuries not only compromise physical functionality, such as arm movement and hand dexterity, but also lead to considerable emotional and mental health challenges, including depression, anxiety, and stress. The combined impact of these impairments often results in a marked reduction in overall quality of life, limiting the ability to perform daily activities and diminishing social and occupational participation. This study aims to comprehensively evaluate both the functional limitations and the psychosocial consequences of BPI, highlighting the critical need for holistic and multidisciplinary management approaches to improve outcomes for affected individuals.

Materials & Methods

The study included 72 male patients with traumatic brachial plexus injuries (BPI). Functional status was assessed using the Disabilities of the Arm, Shoulder, and Hand (DASH) score, while pain levels were measured with the Visual Analog Scale (VAS). Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI), and psychosocial well-being was assessed through the Depression Anxiety Stress Scale-21 (DASS-21). Statistical analyses, including Spearman's correlation and Kruskal-Wallis tests, were conducted, with significance set at $p < 0.05$.

Results

The average age of the participants was 26.2 years. The median DASH score was 81.46, highlighting substantial functional impairment, while the mean VAS score of 5.8 indicated notable pain levels. PSQI assessments revealed poor sleep quality, which showed a significant correlation with pain levels ($p=0.01$). According to DASS-21 scores, psychological distress was prevalent, with 41.7% of patients experiencing moderate to severe depression and 29.2% reporting mild to severe anxiety. Chronic pain, disrupted sleep, and diminished self-efficacy emerged as major contributors to psychological distress in this population.

Conclusion

Brachial plexus injuries (BPI) profoundly affect both physical function and mental well-being, making a multidisciplinary approach to care essential. Prioritizing early psychological evaluation alongside tailored strategies to address pain, emotional health, and sleep issues can greatly improve patient recovery and overall quality of life. This study highlights the critical importance of integrating mental health support into the comprehensive management of BPI.

Enlarged Perivascular Spaces alongside White Matter Hyperintensities predict poor MoCA outcomes among elderly individuals

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Introduction

Enlarged perivascular spaces (EPVS) are considered a pathologic sign of impaired clearance of fluid and toxins and are related to cerebral small vessel disease (CSVD). Some studies assess the relationship between EPVS and MMSE as a cognitive function test and have yielded varying results. MoCA is a more sensitive test that detects cognitive dysfunction in earlier stages. Because EPVS is an early marker of cognitive dysfunction, the relationship between MoCA and EPVS is crucial. In this study, we aimed to investigate the hypothesis of a positive relationship between EPVS and MoCA.

Materials & Methods

A total of 105 subjects were enrolled in this retrospective study. White matter hyperintensities (WMHs) and EPVS were evaluated based on brain MRI. The total EPVS score was created by combining counts in the basal ganglia PVS (BG-PVS) and centrum semiovale PVS (CSO-PVS) in both hemispheres. White matter hyperintensities in periventricular (PVHs) and deep white matter hyperintensities (DWMHs) were graded from 0 to 3 based on the Fazekas scale. After adjusting for different covariates, univariable and multivariable linear regression analyses were performed to investigate the relationship between the total EPVS scores and MoCA scores.

Results

In the linear regression analyses, the total EPVS (p-value= 0.018, = -0.175, 95% CI = -0.0321 to -0.030) and BG-PVS (p-value= 0.018, = -0.190, 95% CI = -0.347 to -0.034) were negatively associated with MoCA scores, after adjusting for age, gender and education. After adjustment for other CSVD risk factors, the total EPVS counts were marginally associated with MoCA scores (p-value = 0.06, = -0.147). However, we found no significant association between EPVS counts and MoCA scores when PVHs and DWMHs were considered (p-value = 0.73, = -0.031, std- = -0.035).

Conclusion

: EPVS and WMHs showed a negative correlation with MoCA scores. These findings suggest that the presence of EPVS and lower MoCA scores are related to the early stages of cognitive impairment and could be addressed as an early-stage dementia treatment.

Poster session II

General Surgery

Presenters

Edwin Joy
Gustavo Dantas
Zohreh Tavakoli
Ke-xi Liao
Samareh Heydari
David Araujo
Nitin Chauhan

Serum Bilirubin: A Key Diagnostic Marker for Acute Appendicitis and its Complicated Cases

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Introduction
Acute appendicitis is common in childhood and early adulthood, often requiring surgery. Current diagnostic tools include clinical evaluation, Alvarado scoring, and imaging. Serum bilirubin, a cost-effective marker, is elevated in complicated appendicitis due to systemic inflammation and sepsis, which impair bilirubin excretion. Pro-inflammatory cytokines reach the liver via the superior mesenteric vein (SMV), causing hepatic dysfunction and elevated bilirubin levels. This study in Central Kerala, India assesses serum bilirubin's role as a rapid, affordable diagnostic tool for acute and complicated appendicitis.

Materials & Methods
This is a cross-sectional diagnostic accuracy study conducted in the General Surgery department of a tertiary care hospital in central Kerala, India between June 2024 and November 2024. The study included 124 consenting patients without any preexisting conditions that could elevate serum bilirubin, who underwent open or laparoscopic appendectomy, with available histopathology reports. The data was analyzed using IBM SPSS Statistics Version 30.0.0 and diagnostic performance measures were calculated using histopathological findings as the gold standard.

Results
In the 124 patients examined the male to female ratio is 1.95:1 and the mean age is 24.16 13.07 years. For cases of acute appendicitis, serum bilirubin showed a sensitivity of 28.43%, specificity of 81.82%, positive predictive value of 87.88%. 101 patients were confirmed to have acute appendicitis on histopathological examination. On further analyzing them for complications like perforation, acute gangrenous and necrotizing appendicitis, serum bilirubin exhibited a higher sensitivity of 77.78%, specificity of 73.91% and the negative predictive value was 97.14%. The accuracy for complicated appendicitis was 74.26%, highlighting bilirubins diagnostic value for complicated cases.

Conclusion
Serum bilirubin is a valuable diagnostic marker for acute appendicitis, particularly for complicated cases. While its sensitivity for acute appendicitis is moderate, its high specificity and positive predictive value make it effective in confirming the diagnosis. For complicated appendicitis, bilirubin demonstrates high sensitivity, accuracy, and a strong negative predictive value, making it reliable for ruling out complicated cases. In rural India and developing countries, where advanced diagnostics might be limited, serum bilirubin provides a simple, cost-effective tool to improve patient care, particularly for complicated appendicitispromoting accessible and harmonious healthcare for all.

Erector Spinae Plane Block (ESPB) for neuropathic pain management in cardiac surgery via sternotomy: a systematic review and meta-analysis

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Introduction

Introduction: Neuropathic pain after cardiac surgeries, particularly following sternotomy, is challenging to manage with opioids due to side effects and limited efficacy. The Erector Spinae Plane Block (ESPB), introduced in 2016, offers promising analgesia by reducing postoperative pain and opioid use. However, further trials are needed to validate its efficacy and safety.Aims: To evaluate the efficacy of the Erector Spinae Plane Block (ESPB) compared to conventional analgesia in controlling postoperative pain and reducing opioid consumption in cardiac surgeries.

Materials & Methods

Study Design: This systematic review and meta-analysis adhered to PRISMA guidelines.Methods: A comprehensive literature search was conducted in PubMed, SCOPUS, Cochrane, EMBASE, and Web of Science. Eligible studies included clinical trials examining the use of ESPB in cardiac surgeries. A total of 8 clinical studies met the inclusion criteria. Data analysis was performed using Review Manager (RevMan), with heterogeneity assessed by the I2 index.

Results

Results: ESPB significantly reduced ICU stay (-27.10 hours, 95% CI: -27.21, -26.99) and intraoperative fentanyl consumption (-17.16 mg morphine-equivalent, 95% CI: -17.43, -16.88). Pain scores also showed notable reductions, particularly at the 4th hour post-extubation (-1.51, 95% CI: -1.98, -1.05), in the 6th hour (-0.67, 95% CI: -1.10, -0.25) and in the 12th hour (-0.49, 95% CI: -0.81, -0.17). MAP and HR remained unaffected across time points.

Conclusion

Conclusion: ESPB shows promise in reducing postoperative pain, fentanyl use, extubation time and ICU stay in cardiac surgery. However, due to study heterogeneity, further randomized controlled trials are necessary to establish consistent recommendations.

Diagnostic accuracy of ultrasound for detecting small bowel obstruction in the emergency department

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Introduction
Small bowel obstruction (SBO) poses a significant diagnostic challenge in the emergency department, characterized by disrupted intraluminal flow in the small intestine. While computed tomography (CT) remains the gold standard for SBO detection, its limitations include cost, time consumption, and radiation exposure. This study evaluates the diagnostic accuracy of ultrasound as a rapid, non-invasive alternative for detecting SBO in emergency settings.

Materials & Methods
In this multicenter cross-sectional study, 100 patients with clinically suspected SBO and symptoms such as vomiting, nausea, and constipation underwent ultrasound examinations by trained emergency physicians. Final diagnoses were confirmed by surgeons using CT scans. The ultrasound criteria for obstruction included excessive gas, bowel wall thickening, interloop free fluid, lumen size > 2.5 cm, and reduced peristalsis. The diagnostic metrics (sensitivity, specificity, efficacy, and likelihood ratios) were calculated using SPSS version 19.

Results
Of the 100 patients (mean age 64.4 14.56 years; 55 male, 45 female), 20% were diagnosed with SBO and 22% with partial SBO. Ultrasound identified lumen size 2.5 cm and reduced peristalsis as the most efficient parameters (efficacy: 73%, 95% CI: 63% - 81%). Excessive gas (specificity: 89%, 95% CI: 75% - 97%) and bowel wall thickening (specificity: 82%, 95% CI: 66% - 92%) were highly specific, while interloop free fluid and lumen size 2.5 cm were the most sensitive (sensitivity: 77%, 95% CI: 65% - 87% each). The ROC curve for 1 abnormality yielded an AUC of 0.81 (P<0.001). Sensitivity decreased (98% to 50%) and specificity increased (34% to 89%) with more abnormalities, while efficacy remained stable (~74%) except for 4 abnormalities (65%).

Conclusion
Ultrasound demonstrates considerable diagnostic potential for SBO, particularly when using criteria such as lumen diameter 2.5 cm and reduced peristalsis. Due to its high sensitivity for finding abnormal findings, it is possible to easily rule out SBO if there were no abnormal findings in ultrasound. the presence of at least three positive findings, making ultrasound a valuable tool in emergency settings for a rapid, cost-effective and non-invasive imaging modality to diagnose SBO.

Laparoscopic Anatomical Versus Non-anatomical hepatectomy in theTreatment of Hepatocellular Carcinoma: A randomised controlled trial

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Introduction
The choice of surgical modality for laparoscopic hepatectomy for hepatocellular carcinoma (HCC) has not been supported by high level of medical evidence hitherto. A prospective randomised controlled trial (RCT) was conducted to compare the perioperative and follow-up outcomes of patients with HCC treated by laparoscopic anatomical hepatectomy (LAH) and non-anatomical hepatectomy (LNAH).

Materials & Methods
Between March 2013 and Jan 2018, eligible patients undergoing LAH and LNAH were enrolled and divided randomly into LAH group and LNAH group in this study. The perioperative and follow-up outcomes of both groups were compared and analysed.

Results
A total of 385 patients with HCC were randomly divided into LAH (n = 192) and LNAH (n = 193) groups. The groups were evenly matched for age, sex, liver background, segment involvement, tumor size, Child-Pugh grade and preoperative liver function. The operative time in the LAH group was longer than that of the LNAH group (p = 0.003). No significant between-group differences in intraoperative blood loss (p = 0.368), transfusion rate (p = 0.876), conversion to laparotomy rate (p = 0.365), overall complication rates (p = 0.054) were observed. The 1-year, 3-year and 5-year overall survival rates (OS) in the LAH group were 91.1%, 67.2%, 43.2%, respectively. The corresponding data in the LNAH group were 89.1%, 63.7%, and 35.2%, respectively. No sig- nificant difference was observed with regard to the 5-year OS rate (p = 0.054) between the two groups. The 1- year, 3-year and 5-year disease-free survival (DFS) rates in the LAH group were 87.0%, 54.7%, 33.9%, respec- tively. The corresponding data in LNAH group were 70.5%, 34.7%, and 30.1%, respectively. The 5-year DFS rate in the LAH group was significantly higher than that in the LNAH group (p = 0.009).

Conclusion
LAH versus LNAH for selected HCC patients was associated with increased DFS, lower intrahepatic ipsilateral recurrence rate, comparable long-term OS and postoperative complications. LAH is therefore rec- ommended for selected HCC patients.

The Association Between Advanced Glycation End Products and Premenopausal Invasive Breast Cancer: A Case-Control Study

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Introduction
Advanced Glycation End Products (AGEs) are formed when proteins or lipids undergo glycation, often due to hyperglycemia, oxidative stress, or aging. This process leads to the production of abnormal glycated products that can disrupt cellular functions and increase the risk of disorders like diabetes and cancer. Given that breast cancer is the most common cancer worldwide and a leading cause of cancer-related deaths in women, we studied the relationship between serum and tissue levels of AGEs and breast cancer (BC) in pre-menopausal females.

Materials & Methods
This is a multicenter case-control study. The cases (n=44) comprised women who were newly diagnosed with hormone receptor-positive premenopausal BC, while the controls (n=42) included women with healthy breasts who had no positive family or self history of BC or other breast diseases. Serum AGE (sAGE) and breast tissue AGE (tAGE) were measured on blood and tissue samples. All analyses were performed using SPSS-24.

Results
The mean age of the participants was 42.511.4 years. In the case group, sAGE was 626.11695.00 ng/ml, while in controls was 713.93829.67. tAGE was positive in 34.1% of cases and 28.6% of controls. Although the mean sAGE was higher in controls than in BC patients, this difference was not statistically significant (p=0.11). Furthermore, tAGE-continuous (tAGE-cont) and tAGE-category (tAGE-cat) did not show statistically significant differences between the two groups. We assessed tAGE levels in normal and tumoral tissue of the BC group, the majority of cases (81.8%) exhibited similar tAGE levels in both types of tissues. Only 8 cases had negative tAGE in normal tissue but positive tAGE in tumoral tissue.

Conclusion
While some studies have established a link between certain malignancies and AGE, our research did not support the significant relationship between serum and tissue AGE levels in BC patients. Our study population was young and in premenopausal status, likely leading to more accurate results, especially regarding the effects of aging on serum AGE levels noted in previous studies. Additionally, by excluding patients with a history of diabetes, cardiovascular, and rheumatologic diseases as potential confounding factors, we believe our results are closer to the truth.

Impact of diabetes on ICU and hospital LOS following cardiac surgery with CPB: a systematic review and meta-analysis

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Introduction
Diabetes is common among patients undergoing cardiac surgery with cardiopulmonary bypass (CPB) and may affect postoperative outcomes such as intensive care unit (ICU) and hospital length of stay (LOS). This study aimed to evaluate the correlation between the proportion of diabetic patients and ICU LOS after cardiac surgery with CPB. Secondary objectives included analyzing the relationship between diabetes and hospital LOS (HLOS) and assessing the impact of age, gender, and body mass index (BMI) on these outcomes.

Materials & Methods
A systematic review and meta-analysis were conducted following PRISMA guidelines. PubMed, Scopus, Embase, and the Cochrane Library were searched for clinical trials published between 2004 and 2024 reporting ICU and hospital LOS in patients undergoing cardiac surgery with CPB, stratified by diabetic status. The study protocol was registered on the Open Science Framework (DOI: https://doi.org/10.17605/OSF.IO/6WMAH). Weighted correlation analyses assessed the relationships between diabetic patient proportion and ICU LOS, as well as HLOS. Additional analyses evaluated the impact of age, gender, and BMI on these outcomes. Statistical analyses were performed using SPSS version 26.

Results
Thirteen studies comprising 1,588 patients met the inclusion criteria. The correlation between diabetic patient proportion and ICU LOS was weak and not statistically significant ($r = 0.176$, $p = 0.574$). A weak but significant negative correlation was observed between diabetic proportion and HLOS ($r = 0.255$, $p = 0.002$), suggesting shorter hospital stays with higher diabetic proportions. Age and BMI did not significantly impact ICU LOS. A significant gender distribution difference was noted, with females comprising 24.98% and males 75.02% of the patients.

Conclusion
Diabetes does not significantly affect ICU LOS but may be associated with shorter hospital stays following cardiac surgery with CPBan unexpected finding warranting further investigation. The study highlights the importance of considering gender disparities in future research and suggests that while age and BMI were not significant factors in this analysis, they remain relevant to postoperative outcomes. Further research should address these findings to enhance postoperative care for diabetic patients.

Effect of Distal Fragment Length on Construct Stability in an Extra-Articular Distal Tibial Fracture Model fixed with Locked Intramedullary Nailing: A Biomechanical Study

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Co-authhors: Dr. Siddhartha Sharma

Introduction

Fractures of the distal tibia are complex injuries often associated with high complication rates, including delayed union, non-union, and wound issues such as dehiscence and infection. Locked intramedullary nailing and plating are the two most commonly used internal fixation methods. While nailing is considered more biological and less invasive to soft tissues, controversy remains over which method offers superior fixation. Moreover, there is no clear consensus on the minimum distance from the tibial plafond at which intramedullary nailing remains effective. This study aims to evaluate how distal fragment length, relative to total tibial length, affects the stability of locked IM nail constructs.

Materials & Methods

A prospective biomechanical study was conducted using 28 fourth-generation composite tibial sawbones. Osteotomies were created at 12%, 15%, 20%, and 25% of the total tibial length (38 cm) from the distal articular surface, forming four experimental groups (AD; n=7 per group). All models were stabilized with 10 mm stainless steel interlocking nails. Mechanical testing was performed using a servo-hydraulic fatigue testing machine and included mediolateral (ML) and anteroposterior (AP) three-point bending and cyclic axial loading. Outcome measures included bending stiffness, neutral zone (construct laxity), fracture gap angle, axial micromotion, and construct failure.

Results

Bending stiffness was consistently lower in the AP plane compared to the ML plane across all groups. Similarly, the neutral zone and peak fracture gap angle were higher in the AP plane. Group A (12% distal fragment) showed significantly lower AP stiffness, higher AP neutral zone, and greater AP fracture gap angle compared to Group D (25% distal fragment), indicating greater instability. No significant differences were observed among groups in ML bending or axial loading.

Conclusion

This biomechanical study demonstrates that comminuted extra-articular distal tibial fractures exhibit significant instability in the sagittal (AP) plane when the distal fragment length is only 12% of the total tibial length. These findings suggest that very short distal fragments may not provide sufficient stability for locked intramedullary nailing, emphasizing the importance of distal fragment length in surgical planning.

Poster session II

Pharmacology II

Presenters

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Mahsa Ghaffari Novin
Johanna Pedroza -Díaz
Ana Maria Sepúlveda
Atousa Zia
Tania-Frances Vulpeș
Mohsen Malekigorji

Efficacy of Platelet-Rich Plasma in Endoscopic Sinus Surgery for Chronic Sinusitis: A Systematic Review and Meta-Analysis

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Introduction
Chronic sinusitis (CS) is a persistent inflammation of the nasal mucosa and paranasal sinuses. Endoscopic Sinus Surgery (ESS) is a procedure that improves sinus drainage and ventilation. Despite advancements in ESS, additional corrective procedures post-ESS are often needed. Clinical trials have explored the efficacy of platelet-rich plasma (PRP) as adjunctive therapy after ESS. This study aims to provide evidence supporting the efficacy of PRP post-ESS for CS patients.

Materials & Methods
Independent authors searched four electronic databases (Medline, Embase, and CENTRAL) and assessed the methodological quality of included studies using the Cochrane risk of bias tool (RoB2). Only randomized clinical trials (RCTs) were included. We pooled standardized mean differences with corresponding 95% confidence intervals (CIs) using a random-effects model.

Results
Five high-quality RCTs met our inclusion criteria. Among 260 patients, 133 were allocated to PRP, and 127 to the control group. PRP was associated with significantly lower postoperative nasal endoscopy scores (-1.74 [95% CI -2.96, -0.52], P = 0.005) and Lund- Kennedy scores (-3.05 [95% CI, -4.97, -1.13], P = 0.002). PRP also significantly lowered SNOT- 22 scores at 1 and 3 months follow-up (-8.25 [95% CI -11.26, -5.24], P < 0.00001) and (-2.75[95% CI -5.38, -0.12], P = 0.04) respectively. Sub-group analysis based on the location of administration showed borderline significance in the middle meatus group (-2.70 [95% CI -5.35, -0.04], P = 0.05).

Conclusion
This meta-analysis supports using PRP following ESS for CS patients. Despite promising results, further RCTs are needed to confirm long-term efficacy.

Effects of edaravone on spermatogenesis in busulfan induced azoospermic mice

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Introduction
The Spermatogenesis process is sensitive to anticancer drugs. Azoospermia and oligozoospermia also occur due to toxin exposure and anticancer drugs such as cyclophosphamide and busulfan. Antioxidants prevent damage caused by free radicals and other reactive metabolites by averting their formation, scavenging them, or facilitating their degradation into various less-damaging molecule breakdowns. Therefore, due to their reducing effects on ROS levels in seminal plasma, antioxidant-based treatment is a possible and effective approach to improving male fertility potential. The current study aimed to investigate the effects of edaravone on spermatogenesis in mice induced by busulfan.

Materials & Methods
In this experimental study, 40 mice were equally divided into the following four groups: I) Control; II) Edaravone (10mg/kg); III) Busulfan (45 mg/kg); IV) Busulfan + Edaravone (45 mg/kg+Edaravone10 mg/kg).) Subsequently, animals were euthanized for future examination. Samples of sperm were obtained for sperm parameter analysis, as well as testis samples for histopathological experiments. Serum levels of testosterone, FSH, and LH were evaluated.

Results
Our study showed that edaravone notably improve in sperm parameters such as; serum testosterone, FSH, LH, testis weight, testis volume, and seminiferous tubule length. Edaravone also prevented a decrease in the number of testicular cells including, spermatogonia, primary spermatocyte, round spermatid, and Leydig cells, thereby increasing Sperm DNA fragmentation and sperm with immature chromatin in busulfan-induced mice. Our rsults also showed that the increasing in the reactive oxygen species (ROS) and reduction in the glutathione (GSH) production after treatment by edaravone compared to busulfan-induced mice

Conclusion
In conclusion, this study showed that edaravone can be significantly considered as an free radical scavenging improved the busolphan-induced structural alterations and spermatogenesis in the testicular tissue.

Synthesis and Characterisation of Multifunctional Hybrid Metallic Nanoparticles for Enhanced Drug Delivery in Cancer Therapy

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Introduction

Metallic nanoparticles (MNPs) have drawn significant attention in biomedical science, particularly for cancer therapy, due to their versatile functional properties. This study explores the potential of iron oxide-Au hybrid metallic nanoparticles (HNPs) for targeted drug delivery and tumor ablation, aiming to enhance drug delivery specificity and efficacy in cancer treatments.

Materials & Methods

Iron oxide-Au HNPs were synthesised through a co-precipitation method followed by gold coating. The drug binding capability of HNPs was analyzed by varying chitosan molecular weights (low, medium, high) and drug concentrations. UV-Vis absorption spectroscopy, Fourier-transform infrared spectroscopy (FTIR), and transmission electron microscopy (TEM) were employed to characterise particle structure, size, and surface properties. The cytotoxicity and efficacy of HNP-drug complexes were tested in vitro using cyclophosphamide as the model drug.

Results

The results revealed that decreasing the chitosan molecular weight and increasing drug concentration significantly improved the binding efficiency of cyclophosphamide to HNPs. Specifically, low molecular weight chitosan with high drug concentration exhibited the highest drug binding capacity. Additionally, cell viability assays demonstrated that HNPs loaded with cyclophosphamide reduced cancer cell viability more effectively than the free drug, indicating enhanced therapeutic potential.

Conclusion

Iron oxide-Au HNPs show strong promise as a multifunctional drug delivery system in cancer therapy, providing controlled and targeted drug release with increased therapeutic efficacy. This work establishes a foundation for further optimisation and clinical translation of HNPs in cancer treatment, potentially allowing for reduced dosage and minimised side effects in patients.

Chlorogenic Acid Esters in Colorectal Cancer: Cytotoxic and Antiproliferative Activity of Butyl Chlorogenate

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Introduction

Colorectal cancer (CRC), a gastrointestinal tumor disease, ranked fourth in incidence and third in mortality worldwide in 2022. While surgical resection is effective in early stages, high rates of metastasis and recurrence, as well as resistance and limited therapeutic response to common chemotherapeutics like 5-fluorouracil, highlight the urgent need for new treatment strategies. Among these, natural dietary compounds such as chlorogenic acid (CGA) have shown promising antitumor properties in CRC studies. However, CGA's low absorption and variable bioavailability limit its drug development potential, suggesting that the formation of esters from CGA to increase lipophilicity could be useful in improving its pharmacokinetic profile.

Materials & Methods

Various CGA esters were synthesized via Fischer esterification, purified using HPLC, and validated through nuclear magnetic resonance (NMR). To evaluate their effects on cytotoxicity and proliferation, two commercial human CRC cell lines, SW480 and HT-29, were used. Pure CGA served as a control, tested at identical concentrations (1, 10, 100, and 1000 M) and treatment times of 24 and 48 hours as the esters.

Results

The purified CGA esters exhibited high purity, as confirmed by chromatograms obtained through HPLC, while the characterization by 1H NMR yielded results consistent with the literature. In terms of cytotoxic effects, the esters demonstrated a time- and concentration-dependent decrease in cell viability. However, Butyl Chlorogenate (CGA-But) exhibited a significantly lower IC50 compared to pure CGA in both cell lines. An antiproliferative effect was also observed across various CGA esters.

Conclusion

In general, the CGA esters evaluated in this study reduced cell viability and proliferation in a time- and concentration-dependent manner. Notably, CGA-But demonstrated the highest cytotoxic and antiproliferative activity at lower concentrations compared to pure CGA. Further studies are needed to explore the potential antitumor effects of CGA-But. This research was supported by the Instituto Tecnologico Metropolitano (Project code: P23203), Universidad de Antioquia, and Universidad Nacional de La Plata.

The Ctn-2 peptide, derived from Crotalicidin, exhibits a cytotoxic effect in triple-negative breast cancer cells

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Introduction

Breast cancer impacts millions worldwide, with treatment strategies varying depending on the molecular characteristics of the tumor. Among its subtypes, triple-negative breast cancer (TNBC) lacks specific molecular targets, leaving patients with limited options and reliance on aggressive therapies. This urgent challenge necessitates the exploration of alternative treatments to improve patient outcomes. Bioactive peptides have emerged as a promising therapeutic strategy since they present anticancer properties that could offer more specific and less aggressive alternatives against triple-negative breast tumors.

Materials & Methods

The Ctn-2 peptide, derived from crotalicidin, an antimicrobial peptide isolated from the venom of the South American rattlesnake, was assessed for cytotoxic activity against the human TNBC cell line MDA-MB-231 (Sigma, 92020424). Treatment involved peptide concentrations on the M scale and exposure times of 1 h, 6 h, and 24 h to determine the mean inhibitory concentration (IC50). Cell viability was quantified using the MTT assay. Untreated cells were used as a negative control, and LTX-315 (OncoporeTM) was used as a positive control.The Ctn-2 peptide was obtained through a structural design by the University of Antioquia in conjunction with the University of the Andes.

Results

The experiments carried out showed that the Ctn-2 peptide presents cytotoxic activity against TNBC, with IC50 values of 32.84 M at 1h, 30.96 M at 6h, and 27.58M at 24, a lower dose compared to the control peptide, LTX-315. These results suggest that Ctn-2 is bioactive against TNBC cells, achieving significant effects at relatively low concentrations within a short timeframe.Crotalicidin is a peptide reported to have antibacterial and antitumor activity. Currently, structural and biophysical analyses are carried out in search of determining which fragments of its structure contain this activity and present greater stability. In this study, the biological evaluation of the Ctn-2 fragment highlights its potential as an antitumor agent, specifically targeting TNBC cells.

Conclusion

The results demonstrate that the Ctn-2 peptide presents cytotoxic activity in triple-negative breast cancer cells. These promising results provide a foundation for further research into the peptides anticancer potential and its viability as a therapeutic option for TNBC treatment. The project is supported by ITM and UdeA (project P23208)

Antitumor compounds from halophilic Streptomyces tendae M4 against triple-negative breast cancer

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Introduction

Triple-negative breast cancer (TNBC) accounts for approximately 15% of all invasive breast cancer cases. Treatment options for TNBC are notably limited, as this subtype does not respond to established therapeutic approaches, including hormonal therapies and anti-HER2 treatments, leading to a significantly poorer prognosis than that of other breast cancer subtypes. Actinobacteria have emerged as promising candidates for cancer prevention and treatment, owing to their ability to produce anticancer compounds. The primary aim of this study was to assess the antitumor efficacy of an extract derived from halophilic Streptomyces tendae M4 on the MDA-MB-231 breast cancer cell line, which is recognized as a triple-negative cell line.

Materials & Methods

The cytotoxic effects of the M4 extract were assessed by the MTT assay on MDA-MB-231 and MCF-10A cell lines. Evaluate gene expression changes (CASPASE 8, CASPASE 9, and P53) via flow cytometry and real-time PCR. Histopathological analysis of tumor tissues from a breast cancer mouse model was performed, and LC-MS was employed to identify bioactive compounds.

Results

M4 extract showed selective cytotoxicity, with an IC50 of 48.04 g/ml for MDA-MB-231 cells and 132 g/ml for MCF-10A cells after 48 hours.Flow cytometry showed that treatment led to the induction of cell death through apoptosis. Real-time PCR results showed a decrease in the expression level of CASPASE 9, while the expression levels of CASPASE 8 and P53 genes increased, indicating the involvement of an extrinsic pathway in the apoptosis mechanism induced by S. tendae M4 extract. Histopathological analyses of breast cancer mouse model tumors showed that the extract reduced the number of mitoses, nuclear pleomorphism, and angiogenesis in tumor tissue.

Conclusion

This study represents an inaugural demonstration of the cytotoxic effects of Streptomyces tendae M4 extracts on triple-negative breast cancer. The findings indicated dose-dependent cytotoxicity of the extract as assessed by the MTT assay and revealed apoptosis via the extrinsic pathway. In vivo, analyses showed the significantly reduced angiogenesis, nuclear pleomorphism, and mitotic counts in the tumor tissue.

Predicting fluoropyrimidine toxicity through DPYD RT-PCR: a retrospective DPYDwt cohort study

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Introduction

Toxicity to fluoropyrimidine (FP) chemotherapy results from dihydropyrimidine dehydrogenase enzyme (DPD) disfunctions and uracil build-up. Currently, 4 out of 20 DPYD gene mutations in the Clinical Pharmacogenetics Implementation Consortium guidelines are validated for clinical testing as predictive for toxicity. This study aims to assess the presence of adverse effects (AEs) in a group determined to be wild type (wt) for the four selected polymorphisms.

Materials & Methods

We conducted a retrospective cohort study involving patients with gastrointestinal cancers (colon, stomach and gallbladder adenocarcinoma) treated at the Cluj-Napoca Oncological Institute between 2022 and 2025. The inclusion criteria consisted of DPYDwt status, FP-based treatment protocols and a minimum of 4 complete chemotherapy cycles at the date of inclusion. Patients with stage 3A or higher kidney disease were excluded to reduce confounding factors. The DPYDwt status was established through RT-PCR testing using a European Medicines Agency approved in vitro diagnostics kit, based on DPYD*2A, DPYD*13, p.D949V and A-HapB3 polymorphisms.

Results

We included 35 patients (43,8% females and 56,2% males) with a median age of 64 at the start chemotherapy. FP-related AEs consisted of hematological abnormalities (n=18), digestive toxicities (n=15), neurotoxicity (n=9) and febrile neutropenia (n=4); 34.25% of patients exhibited multiple toxicities. From the selected cohort, 40% of patients required FP dose reductions and 45.7% had a chemotherapy cycle postponed due to AEs. Fishers Exact test (with the Monte Carlo method in the case of categorical variables; 50,000 tables sampled with a C.I.=95%) was used in order to assess the association of AEs with the following risk factors: modified renal (p=1), hepatic (p=0.553) and cardiovascular (p=0.390) function before treatment; ECOG (p=0.108) and age groups (p=0.468) at the start of therapy; 5-fluorouracil (p=1) and capecitabine (p=0.171) dose categories.

Conclusion

The lack of significant corelation suggests that toxicity could result from tertiary factors, possibly DPD dysfunction. Our findings prove that DYPDwt status achieved through the current clinical standards is insufficient in predicting significant FP toxicities. This can be determined by polymorphisms not covered by the four gene panel. Through our study, we highlight the need for further research towards developing alternative predictive strategies to improve patient outcomes.

Comparison of Post operative Pain, Edema and Wound Healing in Surgical Extraction of Impacted Third Molars:Scalpel Versus Radiofrequency

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Introduction
This study aimed to compare the level of pain, wound healing, facial edema, and surgeons comfort in surgical extraction of impacted third molars using surgical scalpel versus radiofrequency (RF) incision.

Materials & Methods
This split-mouth clinical trial evaluated 41 patients with bilateral impacted third molars in one jaw with the same Pederson difficulty index (between 5 and 7, moderate difficulty). The surgical incision was made using a surgical scalpel on one random side and an RF device on the contralateral side. The level of pain was measured using a numerical rating scale (NRS) 7 days postoperatively. The wound healing was evaluated using the wound evaluation scale (WES) 4 weeks postoperatively. Facial edema was quantified using a tape measure 7 days postoperatively. Surgeons comfort was assessed by asking the surgeons regarding the level of easiness of the procedure. The pain score, wound healing score, facial edema, and surgeons comfort in surgical extraction of impacted third molars were compared between the two sides using SPSS 22 via paired t-test and McNemars test.

Results
The surgeons comfort was significantly higher in the use of a surgical scalpel ($P<0.001$). The difference in pain score ($P=0.95$), wound healing ($P=0.32$), and facial edema ($P>0.05$) was not significant between the two groups.

Conclusion
The results of this study showed no significant difference in surgical extraction of impacted third molars using a surgical scalpel or an RF device regarding the level of pain, wound healing, or facial edema.

Poster session II

Orthopaedics & Rehabilitation Medicine

Presenters

Ava Parvandi
Vasanth Bharathidasan
Reza Shakiba
Monthana Al Jaber
Ahmad Adnan Shoukat
Yunhao Wang
Edris Bavardi Moghadam
Farzin Tahmasbi Arashlow

Tourniquet Effect on Cement Penetration in Total Knee Arthroplasty: A Systematic Review and Meta-Analysis

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Introduction
Total knee arthroplasty (TKA) is a standard orthopedic procedure for severe knee arthritis, often resulting in high patient satisfaction. However, complications, such as aseptic loosening, remain a significant concern, usually linked to insufficient cement penetration. Using a tourniquet during surgery to improve cement penetration is a topic of debate, with evidence regarding its mixed effectiveness. This review aims to evaluate the impact of tourniquet application on cement penetration, surgical outcomes, and related complications during TKA.

Materials & Methods
A meta-analysis adhering to PRISMA guidelines was conducted, analyzing RCTs and NRSIs from PubMed, Scopus, Web of Science, and Embase up to May 2024. Eligibility criteria focused on studies assessing tourniquet effects on cement penetration, complications, and other surgical outcomes. Data extraction and quality assessment followed standardized protocols. Statistical analyses employed a random-effects model to account for heterogeneity, including sensitivity analyses and publication bias assessments.

Results
The meta-analysis included 16 studies encompassing 1,516 observations. Tourniquet use showed no significant improvement in cement penetration (SMD=0.4693, 95%-CI = 0.06370.8749; p=0.0233; I2=91.3%). A 52% reduction in blood transfusion likelihood was observed in the tourniquet groupno significant differences in hemoglobin levels (SMD=0.0; p=1). No differences were noted in surgical time (SMD=-0.1522; p=0.263) or postoperative pain (VAS scores; p=0.1835).

Conclusion
Tourniquet use did not enhance cement penetration or significantly affect surgical duration and pain but reduced blood transfusion rates. The findings contrast with previous studies suggesting improved cementation with tourniquet application. Variability in surgical techniques and methodologies among included studies likely contributed to these discrepancies. Future research must use standardized methodologies to resolve inconsistencies and confirm these results.

Surgical Outcomes in Multiple Myeloma of the Spine: A Seven-Year Single-Center Experience

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Introduction

Multiple myeloma (MM) is the most common primary malignancy of the adult spine. Though radiosensitive, it can result in neurological impairment or spinal instability, necessitating surgical intervention. This study looks at the epidemiology, surgical indications, and outcomes of 30 patients with MM of the spine operated at a single center over a seven-year period, along with the relationship between preoperative serum albumin levels and postoperative hospital stay and complications

Materials & Methods

The study selected 30 patients who underwent posterior instrumentation for multiple myeloma from January 2016 to July 2023. Details such as biodata, comorbidities, ASA class, functional status, surgery level, postoperative complications, and mortality were analyzed. Pre-operative serum albumin, creatinine, WBC count, and platelet count were also collected and compared with post-operative length of stay for statistical significance using SPSS.

Results

Of 30 patients with a mean age of 56.77 10.07 years, 19 (63.33%) were male, 2 (6.67%) were classified as ASA class 1, 24 (80%) as class 2, and the rest were ASA class 3. As for functional status, 1 patient (3.33%) was independent, 24 (70%), partially dependent, and 4 (13.33%), completely dependent. Postoperatively, 28 patients were independent. The mean follow-up period was 39.63 months. 6 patients had unplanned readmissions within 6 months. At the final follow-up, 3 patients (10%) expired, and 2 (6.67%) underwent reoperation. The average length of stay was 12.74 8.99, and 10 patients (33.33%) were hypoalbuminous pre-operatively, with no significant difference in hospitalization length between hypoalbuminous and normal patients or between patients with higher and lower SIN scores. There was a statistically significant difference in length of stay observed in older patients (>55 years) ($p = 0.044$).

Conclusion

In this 7-year study, we report the outcomes of patients with MM who underwent posterior instrumentation for spinal instability. These patients showed functional improvement and reduced complication rates, implying the effectiveness of surgical intervention as an option in such patients. No significant correlation between preoperative albumin and hospitalization length was found.

Mallampati score in patients with temporomandibular joint disorders: A pilot casecontrol study

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Introduction
Temporomandibular joint disorder (TMD) is defined as any functional abnormalities in different parts of the face and neck. The Mallampati index is an indicator for determining the extent of airway blockage. No study has examined the relationship between TMD and Mallampati score. Most studies have investigated the relationship between temporomandibular joint problems and sleep problems. This pilot study aimed to assess the Mallampati index scores among TMD patients.

Materials & Methods
Eighty-four people were divided into the case (based on RDC/TMD) and control groups. Demographic information, neck circumference, tongue size, Mallampati score, and other variables were asked of people. STOP-BANG and Pittsburgh Sleep Quality Index (PSQI) were also completed for each patient. Data were analyzed with Chi-square, Fisher's exact, and Mann-Whitney tests.

Results
The Mallampati and PSQI questionnaire scores in the case group were significantly higher than in the control group ($P < 0.001$). The results showed that larger tongue and neck circumference patients had a higher Mallampati score. Pearson correlation coefficient showed that the Mallampati score had a direct and significant relationship with Body Mass Index (BMI) and PSQI ($P < 0.001$).

Conclusion
The results of this study show that Mallampati scores were significantly higher among patients with TMD than among healthy individuals.

Acute Intermittent Hypoxia for Improving Limb Functions in People with Incomplete Spinal Cord Injury: A Systematic Review and Meta-Analysis

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Introduction
Acute intermittent hypoxia is an emerging technique that can be used to improve limb functions in people with neurological conditions. The current review was designed and conducted to assess the role of acute intermittent hypoxia in improving limb functions in people with incomplete spinal cord injury.

Materials & Methods
A systematic review was conducted and reported according to PRISMA guidelines. Randomized controlled clinical trials (parallel design, crossover, or cluster clinical trials) that assessed the effects of acute intermittent hypoxia for improving limb functions (upper or lower limb) in people with motor incomplete spinal cord injury (ASIA C and D), published in English language from earliest record to December 2024 were included. Title & abstract screening, full-text screening, data extraction, and risk of bias assessment were performed. Meta-analysis was conducted using a random effects model. This systematic review was registered in the PROSPERO database under registration number CRD42024621664.

Results
Thirteen studies were included in the review. Five studies evaluated the functioning of the upper limbs, while eight studies focused on the lower limbs. All the included studies reported that acute intermittent hypoxia (9% or 10% oxygen) significantly improved limb functions compared to the control condition (Sham hypoxia provided in the form of normoxia i.e. 21% oxygen) in people with motor incomplete spinal cord injury. The quantitative synthesis (meta-analysis) also showed that acute intermittent hypoxia improved upper limb functions (SMD 0.87, 95% CI 0.42-1.32) and lower limb functions in people with incomplete spinal cord injury.

Conclusion
Acute intermittent hypoxia has the potential to improve limb functions in people with incomplete spinal cord injury.

Digital Twin-Based Numerical Analysis of Composite Insoles for Rehabilitation Medicine

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Introduction

This study focuses on the mechanical evaluation of insoles fabricated with Thermoplastic Polyurethane (TPU) and Polylactic Acid (PLA) using 3D printing techniques. The research aims to enhance biomechanical performance and mitigate deformation risks by leveraging the mathematical rigor of the Finite Element Method (FEM). The primary objective is to understand the stress-strain behavior and dynamic response of the composite structure under realistic loading conditions.

Materials & Methods

The insole design was modeled using the principles of continuum mechanics, discretized into finite elements for numerical evaluation. Material properties were defined based on TPU's hyperelasticity and PLA's linear elasticity to capture the composite behavior. Static and dynamic analyses were conducted under physiological load conditions, incorporating boundary constraints that simulate real-world plantar pressures. The numerical solutions were derived by solving the governing equations of motion and stress equilibrium.

Results

The biomechanical analysis revealed that the TPU-PLA composite insoles effectively addressed biomechanical challenges by reducing localized stress and deformation while enhancing structural stability. Finite Element Analysis demonstrated that the maximum deformation under physiological loading conditions was 0.094 mm, while the peak von Mises stress reached 0.75 MPa. These results highlight the effective stress distribution and mechanical resilience of the composite design. Computational analysis further confirmed the insole's capacity to endure transient forces, indicating its long-term applicability and durability. The use of numerical models provided a precise and efficient platform for iterative design and optimization, validating the insole's performance as a patient-specific solution.

Conclusion

This study underscores the potential of integrating advanced materials and computational methods to develop innovative, patient-specific orthopedic devices. By combining TPU's flexibility and PLA's structural support, the insoles demonstrated superior biomechanical performance, supported by robust numerical analysis. The application of digital twin technology facilitated the customization and iterative refinement of the design, enabling solutions tailored to individual anatomical and clinical needs. These findings contribute to the advancement of personalized medical devices, offering new opportunities for innovative, data-driven approaches in orthopedic care.

Application of non-imaging-guided hip arthrocentesis with a multipoint infiltration technique for hip pain

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Introduction

Hip arthrocentesis is a crucial approach for alleviating patient symptoms. However, there are challenges of conventional hip arthrocentesis techniques such as puncture difficulty, procedural complexity, and puncture site injury. In this study, a non-imaging-guided technique was proposed for more convenient, efficient and effective hip arthrocentesis. By evaluating the therapeutic effects of this innovative technique on hip pain, we aimed to provide an additional theoretical basis for its widespread application.

Materials & Methods

A retrospective analysis of hip pain symptoms was conducted at Meizhou People's Hospital from January 1, 2020, to December 31, 2023. The study encompassed a spectrum of conditions, including hip synovitis, necrosis of the femoral head, and femoroacetabular impingement syndrome, and included a total of 106 patients who underwent non-imaging-guided hip arthrocentesis with the multipoint infiltration technique (NGHAMIT). The patients were assessed preoperatively and at 1, 3, and 6 months, and at 1 year postoperatively using the visual analog scale (VAS), the Harris Hip Score, and additional indicators such as operative duration, injection success rate, and incidence of complications.

Results

All the patients were successfully injected using the described technique, and the average procedure time was 5-10 minutes, with no side effects or complications. The VAS scores at 1, 3, and 6 months and at 1 year after treatment were 2.561.51, 1.271.42, 0.751.41 and 0.651.37 respectively and were significantly lower than the baseline scores as 7.251.01 ($p<0.001$). Similarly, the Harris Hip Scores at 1, 3, and 6 months and at 1 year after treatment were 69,9313.77, 77.9710.94, 81.1510.78, 83.4410.43 respectively and were also significantly higher than the baseline scores as 19.0527.80 ($p<0.001$).

Conclusion

NGHAMIT is a safer, more effective hip arthrocentesis method. This technique can be easily conducted without imaging guidance, does not irradiate patients or doctors and minimizes damage to surrounding tissues, including cartilage, at the puncture site.

The effects of functional fatigue and trunk muscle fatigue during functional, semi-functional, and static balance tasks in male soccerplayers.

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Introduction
Balance and postural control are critical to athletic performance, particularly in soccer, where injuries often arise from compromised stability during fatigue. Balance relies on sensory and neuromuscular inputs, and core stability has been emphasized to prevent non-contact injuries, such as strains and ligament ruptures. Core strength training (CST) is widely accepted in sports to enhance stability and reduce injuries by supporting balance and core strength. While core fatigue is suspected to impact balance negatively, studies show conflicting results. This study investigates how functional and local core muscle fatigue affects different types of balance in male soccer players.

Materials & Methods
The study involved 48 male soccer players divided into three groups: functional fatigue, core fatigue, and a control group (16 players each). The functional fatigue group performed lateral hops, while the core fatigue group completed core exercises until they reached voluntary fatigue. The control group performed no fatigue exercises. Each group underwent three balance testsTimed Up and Go (TUG), modified Star Excursion Balance Test (SEBT), and Stork Testbefore and after the fatigue protocol. A two-factor Mixed Methods ANOVA was used to assess pre-post differences among the groups.

Results
Both the functional and core fatigue groups showed reduced balance performance post-fatigue. The functional fatigue group exhibited a 64% increase in Timed Up and Go test scores, an 8% reduction in Y-balance reach, and a 37% decrease in Stork test balance duration. In the core fatigue group, scores worsened by 40%, reach decreased by 11%, and static balance time fell by 56%, highlighting fatigue's impact on various balance tasks.

Conclusion
Core and functional fatigue notably affect balance in soccer players, with implications for training and injury prevention. Traditional practice schedules might overlook these fatigue-induced impairments. Testing balance in a fatigued state could better reflect real game conditions, potentially guiding more targeted balance and stability training protocols to mitigate injury risks and improve on-field performance.

Comparing Ultrasound and Radiography for Assessing Shoulder Dislocation Reduction in the Emergency Department: A Cross-Sectional Study

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Introduction
Shoulder dislocation is one of the most frequent presentations in emergency departments, often requiring immediate and accurate diagnosis to ensure timely management and prevent complications. Traditionally, simple radiography (X-ray) has been the standard diagnostic tool for confirming reduction of shoulder dislocation ;however, ultrasound (US) has emerged as a promising alternative due to its portability, rapidity, and lack of ionizing radiation. This study aims to investigate the accuarcy of ultrasound in confirming shoulder dislocation reduction, potentially providing insights into the reliability of US as a diagnostic modality in acute settings.

Materials & Methods
This cross-sectional study was conducted at Hazrat-e-Rasoul Hospital, Tehran, Iran, between June 2022 and March 2023, and 100 patients with suspected shoulder dislocation were randomly assigned to two groups. A single emergency medicine specialist examined all patients, and demographic and clinical data were recorded. All participants underwent standard plain radiography (AP, lateral, and scapular Y views), reviewed by radiology attending. Following reduction, One group was assessed using bedside ultrasound. The second group underwent post-reduction assessment with plain radiography. Orthopedic follow-up was performed at 24 hours and 14 days, with clinical and radiographic evaluation to assess reduction success. Statistical analysis was done using the Chi-square test to compare demographic characteristics and reduction success between the two groups.

Results
A total of 100 patients (91% male, mean age 31.6 years) were included in the study. The most common dislocation type was sub-coracoid (61%). Both ultrasound and radiography demonstrated high sensitivity for detecting shoulder reduction (ultrasound: 88%, radiography: 94%). The two groups showed no significant differences in demographics, reduction methods, or complications. The most common complication was Hill-Sachs fracture (15%). Although ultrasound required slightly more repeat reductions, it provided real-time, bedside imaging, while radiography was performed after reduction. No incomplete reductions were reported during follow-up.

Conclusion
Our study indicates that ultrasound may offer advantages over plain radiography for confirming shoulder dislocation reduction, including easier access at the bedside, reduced radiation exposure, and less reliance on anesthesia drugs. These benefits highlight the use of ultrasound as a practical tool for shoulder dislocation assessment, leading to more efficient care while minimizing risks associated with radiation.

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We hope you enjoy the congress as much as we enjoyed organising it, and we look forward to seeing you again next year.

Kind regards,

Vera Stroosma

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