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The 8th International USERN Congress and Prize Awarding Festival

ՅՈՒՍԵՐՆ

Yerevan, Armenia

November 2023

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The 8th International USERN Congress and Prize Awarding Festival

November 8th - 10th, 2023
Yerevan, Armenia

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Elahe Radmehr
Fatemeh Ghazvinian
Fatemeh Madani
Hana Tahmouresi
Hedieh Mohammadi
Helia Sharif
Helia Zamani Mahmoudi
Heliya Ziaei
Hesam Malekfarnoud
Kawthar Mohamed
Ali Jaberipour
Kimia Kazemzadeh
Mahan Esbakian
Mahdi Taghizadeh
Mahsa Keshavarz-Fathi
Mahshad Naserpour
Mahshid Jomepour
Malihe Abedi
Maryam Tonekaboni
Mehdi Azhdari
Mehrshad Esnaashari
Mohaddeseh Pourashoury
Mohammad Hossein Khanmirzaei
Mohammadeza Mirzaee Goodarzi
Mohammadhossein Eslami
Negin Jarrah
Nikki Asgari
Niloofar Ziadali
Pariya Mohammadyari
Pegah Mirshafei
Pegah Niktalab
Reihaneh Banihashemi
Reyhane Abdi
Reza Farzam
Saba Sajadi Tabar
Sadra Behrouzieh
Saghar Rouzrokh
Sahel Noorikoloori
Sepideh Razi
Shaghayegh Mohammadioun
Tara Shahmoradi
Yasaman Azad
Zahra Haj Molla Ali Kani
Zeynab Zahedi

USERN Junior Ambassadors

Hassan Alipanahzadeh, Afghanistan
Amine Harbi, Algeria
Luis Alejandro Boccalatte, Argentina
Araks Ulikhanyan, Armenia
Assil Albahash, Australia
Samaneh Zoghi, Austria
Fareeda Sayed Jaber Hashem, Bahrain
Md. Shahidul Islam, Bangladesh
Svetlana O. Sharapova, Belarus
Mohammad Hossein Khosravi, Belgium
Otavio Cabral Marques, Brazil
Mariya Vlado Ivanovska, Bulgaria
Mickael Essouma, Cameroon
Niyoosha Yoosefi, Canada
Chunfeng Xiao, China
Amanuel Godana Arero, Ethiopia
Hongbo Zhang, Finland
Aram Pascal Abu Hejleh, Germany
Aliyu Tijani Jibril, Ghana
Orsolya Cseprekal, Hungary
Mujtaba Shaw, India
Laila Rahmah, Indonesia
Sila Kaya, Ireland
Ahang Abdullah Kareem, Iraq
Giulia Grancini, Italy
Shadrack Oriama, Kenya
Lindelwa Mmema, Kingdom of Eswatini
Ayesha Mushtaq, Kyrgyzstan
Sara A. Makka, Lebanon
Harris Tokpah, Liberia
Dalia Sabaliauskiene, Lithuania
Irene Ling, Malaysia
Sarah Cuschieri, Malta
JUAN CARLOS BUSTAMANTE OGANDO, Mexico
Dharmagat Bhattarai, Nepal
Chagajeg Soloukey Tbalvandany, Netherlands
Sunny Okechukwu Abarikwu, Nigeria
Abdullah Mohamed Al-Lawati, Oman
Amjad Khan, Pakistan
Adeeb Mohammed Saber Naser Eddin, Palestine
Magaly Alison Cavalcanti Castillo, Perú
Leander Marquez, Philippines
Piotr Rzymski, Poland
Tiago Ribeiro, Portugal

Bianca Gegea, Romania
Zalina Kudzoeva, Russia
Matjaz Perc, Slovenia
Jahan Hara Mohammed Nazeer, Sri Lanka
Annabelle Robyn Graeme Armstrong, South Africa
Rayan Goda, Sudan
Sergii Yakunin, Switzerland
Isfandiyor Muhsinjonovich Usmonov, Tajikistan
Lamin Ndow, The Gambia
Faten Bahar, Tunisia
Esra Hazar, Turkey
Frank Kiwanuka, Uganda
Kseniia Alexandrovna Minakova, Ukraine
Fiona Morrison, United Kingdom
Swaumu Idrisa Kishari, United Republic of Tanzania
Ajeet K Kaushik, United States
Eduardo Rodriguez-Roman, Venezuela
Faiz Alnusairi, Yemen
Rangarirai Makuku, Zimbabwe

USERN Interest Groups

AstraBionics Research Network (ARN)
Tissue Engineering Hub (TEHUB)
International Network of Stem Cell (INSC)
Food Science and Nutrition Group (FSANG)
Applications of Cochrane Evidence in Everyday's Life Group (ACEELG)
Persian Medicine Network (PMN)
Multiple Sclerosis research group (MSRG)
History of Medicine Network (HiMedNet)
Network of Neurosurgery and Artificial Intelligence (NONAI)
Systems Artificial Intelligence Network (SAIN)
Animal Models Integrated Network (AMIN)
G-Quadruplexes as INnovative ThERApeutiC Targets (G4_INTERACT)
Network of Empirical, Gustatory and Olfactory Aesthetics (NEGOA)
Cancer Biology Signaling Pathway Interest Group (CBSPIG)
Fuzzy Logic Lab Interest Group (FLLIG)
One Health Association (OHA)
Interest Group of CoronaVirus 2019 (IGCV_19)
Network of Interdisciplinarity in Neonates and Infants (NINI)
Early Childhood Education, Development, and Intervention research group (ECEDI)
Integrated Science Association (ISA)
Regenerative Medicine Group (REMED)
Digital Innovation And Lifestyle Interventions Network (DIAL_IN)
Immunology Board for Transplantation And Cell-based Therapeutics (Immuno_TACT)
Brain Cancer research Core (BCRC)
ImmunologyToday, Immunology (ImmunologyToday)
Scientific Union of Community Health (SUCH)
Association of Science and Art (ASA)
Iranian Association of Magnetic Resonance in Medicine (IAMRM)
Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA)
International Neurosurgery Group (ING)
BioMedical Visualization Association (BMVA)
Network of Dermatology Research (NDR)
Association of Nuclear Medicine and Molecular Imaging (ANMMI)
Tissues and Biomaterial Research Group (TBRG)
Handicapped and Elderly Life Promotion Network (HELP)
Medical Genetics Network (MeGeNe)
Microbial Toxin's Physiology Group (MTPG)
Universal Council of Epidemiology (UCE)
Space Biology and Astrobiology Research Team (SBART)
International Hematology/Oncology of Pediatrics Experts (IHOPE)
Neurosurgical Research Network (NRN)
Primordial Prevention of Non Communicable Disease Group (PPNCDG)
Gastrointestinal Pharmacology Interest Group (GPIG)
MetaCognition Interest Group (MCIG)
Systematic Review and Meta-analysis Expert Group (SRMEG)
Universal Council of Ophthalmology (UCO)
PhytoPharmacology Interest Group (PPIG)
Nanomedicine Research Association (NRA)
International Network for Photo Medicine and Photo Dynamic Therapy (INPMPDT)
Health and Art (HEART)
Primary Immunodeficiency Diseases Network (PIDNet)
Cancer Immunology Project (CIP)

USERN Anthem Vocals

Ali Sani
Arash Barzkar
Ariana Rezaei
Arnika Rezaei
Ghazal Mahdavi
Helia Mojtabavi
Melina Sharbati
Pejman Mansouri
Saina Ahmadi Moghaddam
Shayan Shekarabi
Zahra Rahimi Pirkoohi

Message from USERN President

Tommaso Dorigo

USERN President
First Researcher of Experimental Particle Physics, Italian Institute for Nuclear Physics (INFN), Member of the CMS Experiment at CERN, Padua, Italy

I am extremely happy to welcome you to the 8th international congress of USERN. This year we meet in Yerevan, Armenia, at a difficult time for peoples living in this part of the world. Wars and international disputes are looming on them, and this deeply saddens and concerns us all. Yet we as scientists and researchers must keep a broader view and higher thoughts, and we must not be distracted by those events. Our goal with USERN is a longer term one than the definition of borders and disputes among countries. We work to overcome borders, not to feel imprisoned by them. In fact, we aim to pursue a better future of humankind through an advancement of our understanding of Nature, an improvement of education throughout the world, and a stronger and united cooperation among all of us regardless of our country of birth or provenance, regardless of our religious beliefs or political inclinations, and across our breadth of scientific knowledge. So let us work together to ensure that those goals remain clear and our path straight. This 8th USERN congress will be the ideal place to create new collaborations, to meet new scientists that share our ideals, and to learn about the advancement of science in all directions. Our congress will also be a place where we can enjoy art, and reward young artists who participated in this years' edition of the festival for pediatric patients.

Let this also be their congress, a place where they can experience directly how the world of scientists is a friendly, serene environment, where we work together in peace and harmony. Welcome to Yerevan!

Message from USERN Founder

Nima Rezaei

USERN Founder
Professor of Clinical Immunology, Tehran
University of Medical Sciences, Tehran, Iran

During all these years, starting as a junior medical student and researcher, and then as a faculty member, I often wondered, what makes a perfect researcher, a perfect teacher, a mentor, or a leader? Realizing that none of these would make me a perfect human, was one of the most important discoveries of my life. As one dives deep into his own scientific field, interacting with his colleagues, and joining educational and research groups, we realize how high we've built the walls around ourselves, and those who share the same interests as us. We learn not to resist invaders into our territories and to think and behave as affiliates of a certain virtue. Art, Medicine, Plants, Mathematics, and Astronomy, are all parts of the heritage of ancient, true pioneers of knowledge. The enormity of this prodigious legacy can only reach its true potential when these segments, reunite as a whole and into knowledge without borders. It is undeniable that science today, is unintentionally mistaken for a line to draw boundaries with, a weapon to display power, or a rule to rank orders. We believe that the golden key to this reconciliation, is by the hands of the scientist themselves, by the hands of artists, mathematicians, and by the hands of anyone who has an ability to share what they know, for the greater good.

USERN has been established with the main purpose of the peaceful and humanitarian promotion of education and research, universally. It comprises of top 1% of scientists in all scientific fields as the advisory board members who would manage and supervise the educational and research programs in their field of specialty. There are more than 600 top scientists, including nineteen Nobel/Abel Laureates, among the advisory board members of USERN. The theme of the Congress this year will be "Contemplate the Universe, Discover Science", emphasizing the important role of looking carefully at all phenomena around us and thinking deeply in science! The gathering of senior and junior scientists in the context of the USERN Congress would be a forward step in eliminating the age and level borders of science. Not only the senior scientists but also junior students/scientists would get the chance to present their experiences in science within USERN Congress in the context of "Junior Talks/Posters".

The concept of USERN has been supported by a hundred scientific centers and universities. Importantly and beyond the Nobel goal of USERN Congress in scientific promotions, USERN Prize has been also established in order to identify the most talented qualified junior scientists in all areas of science, who have devoted their time to science promotion and performed outstanding scientific projects so far! The bests of bests in each field will be awarded each year to be distinguished to the scientific world and to be acknowledged for their humanitarian efforts. The USERN Prize Awarding Festival will be held annually on November 10th, the Global Day of Science for Peace and Development. Respecting the USERN slogan of "Science Without Borders" and in order to eliminate the geographical border of science, the USERN Congress and Prize Awarding Festival is to be held annually hosted by a scientific center worldwide. Proudly, to date, we have organized the previous USERN Congresses and Festival in Iran (Tehran), Ukraine (Kharkiv), Italy (Reggio Calabria), Hungary (Budapest), Iran (Tehran), and Turkey (Istanbul), Oman (Muscat) respectively; all highly welcomed by the international academic population. Now, here as we are standing on the verge of the seventh official international event of this network, the USERN Congress and Prize Awarding Festival 2023, let us express our gratitude to your presence, and together witness the propagation of Science without Borders.

Host Welcome Message

Arsen Arakelyan

Roksana Zakharyan

Sevan Iritsyan

With immense pride, we would like to welcome you all to the 8th USERN Congress here in Yerevan, Armenia, a country with an impressive history and people. As the local organizing committee, we are deeply humbled to host this prestigious gathering on our home turf, and we are keenly aware of the responsibility and honor this role bestows upon us.

USERN, as we all know, is not just about advancing knowledge; it's about breaking down walls, fostering collaborations, and creating a harmonious global scientific community. And today, this mission feels particularly resonant, as we not only kickstart our congress but also take a moment to honor the exceptional individuals who have been awarded the USERN Prize this year.

These laureates, with their groundbreaking contributions to the field of biomedicine, epitomize what USERN stands for dedication, innovation, and the spirit of collaboration. Their achievements remind us of the transformative power of research and the boundless potential that resides within our global community.

In this congress, we promise a stimulating milieu of discussions, workshops, panel talks, and of course, the much-anticipated presentations by our USERN Prize laureates and renowned speakers. It is our sincere hope that the rich tapestry of events we have laid out will inspire, engage, and foster new partnerships among all attendees.

We would like to extend our deepest appreciation to everyone involved in making this event possible – from our tireless organizing team, our international organizers, and our generous sponsors, to every individual who has worked behind the scenes, ensuring that this conference is not just an event, but an experience.

We would like to address our delegates, especially young scientists and students! Let this conference be more than just a passive attendance. Engage in dialogues, ask challenging questions, explore new partnerships, and most importantly, carry the spirit of USERN beyond these conference halls, into your labs, classrooms, and communities.

To our esteemed USERN Prize laureates, we salute your achievements and contributions. You stand as beacons of inspiration for us all, illuminating the path toward a brighter, more collaborative, and more enlightened future.

In the spirit of discovery, collaboration, and celebration, let us commence the 8th USERN Congress. Here's to a journey of intellectual exploration and mutual growth!

Thank you.

In-Person Scientific Program
Yerevan, Armenia

	November 8, 2023 **Main Hall A**
08:00 - 09:00	Registration
09:00 - 09:10	Opening Session *Armenia Anthem, USERN Anthem*
09:10 - 09:20	Welcoming Message *Edward Sandoyan, RAU Rector*
09:20 - 09:30	Organizing USERN 2023 *Arsen Arakelyan, Congress Local Chair*
09:30 - 09:35	Messages from the Nobel Laureates
09:35 - 09:45	USERN History and the Update *Tommaso Dorigo, USERN President*
09:45 - 09:55	Art Performance *Piano*
09:55 - 10:05	USERN 2023 Scientific Program *Nima Rezaei, USERN Founder*
10:05 - 10:15	Art Performance *Singing and Piano*
10:15 - 10:35	Keynote lecture: Challenges and Gratification of Academic Life *Abass Alavi, USA*
10:35 - 10:45	Art Performance *Singing and Piano*
10:45 - 11:00	Coffee Break
11:00 - 11:50	IFPPP Awarding Session
11:50 - 12:00	Art Performance *Singing and Indian Performance*

◆ **All times are in Yerevan Time**

	November 8, 2023 **Hall B, Oral Presentation 1** Moderators: Tommaso Dorigo (Chair), Michael Schreiber, Ute Römling
13:00 - 13:20	Keynote Lecture: True or False, Fact or Fake? Can We Believe What We See or Hear? *Michael Schreiber, Germany*
13:20 - 13:40	Keynote Lecture: Benefits of Irreproducibility in Science *Ute Römling, Sweden*
13:40 - 14:50	Junior Talks 1: Formal and Physical Sciences: From Artificial Intelligences to Integrated Science *Juries: Nima Rezaei, Frank Sellke, Dragana Ciric, Rossella Castagna, Emilio Parisini, Maha Al-Khaduri*
14:50 - 15:10	Coffee Break
	November 8, 2023 **Hall B, Oral Presentation 2** Moderators: Arsen Arakelyan (Chair), Artem Oganov, Dragana Ciric
15:10 - 15:30	Keynote Lecture: Evolutionary Crystal Structure Prediction and Computational Materials Discovery *Artem Oganov, Russia*
15:30 - 15:50	Keynote Lecture: Generative and AI methods in architecture and urbanism: urban networks, smart mobility, and movement path planning, design, and computation *Dragana Ciric, Serbia*
15:50 - 17:00	Junior Talks 2: Chemical and Biological Sciences: From Nanomedicine and Vaccines to Pharmaceutics in Cancer *Juries: Tommaso Dorigo, Alexander Leemans, Naveed Akhtar, Hans Binder, Jonathan Schug, Hailiang Wang, Amedeo Amedei, Jianing Fu, Prashant Kesharwani*

◆ **All times are in Yerevan Time**

	November 8, 2023 **Hall C, Workshop 1**
13:00 - 14:30	In vivo tracking of brain pathways with ExploreDTI *Alexander Leemans, the Netherlands*
	November 8, 2023 **Hall C, Workshop 2**
15:15 - 16:45	Using Lifestyle Medicine to Promote Well-Being in Times of Stress and Trauma *Joseph Firth, UK; Simon Rosenbaum, Australia*
	November 8, 2023 **Hall D, Meet the Expert 1**
13:00 - 14:30	*Joseph Firth, UK; Simon Rosenbaum, Australia*
	November 8, 2023 **Hall D, Meet the Expert 2**
15:15 - 16:45	*Abass Alavi, USA*
	November 8, 2023 **Hall G, Poster Presentation 1**
13:00 - 14:30	Poster Presentation 1: Biological Sciences *Moderators: Arsen Arakelyan (Chair), Abass Alavi, Naveed Akhtar, Artem Oganov, Amedeo Amedei, Jianing Fu, Hans Binder, Hailiang Wang, Iraj Mohammadzadeh*

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November 9, 2023
Hall B, Oral Presentation 3
Moderators: Abass Alavi (Chair), Alexander Leemans, Bruno Scarpa

08:30 - 08:50	Keynote Lecture: UR-Index and H-Index: An Example of Comparison *Bruno Scarpa, Italy*
08:50 - 09:10	Keynote Lecture: Unparalleled Impact of PET-CT-MRI on the Day to Day Practice of Medicine *Abass Alavi, USA*
09:10 - 09:30	Keynote Lecture: Mapping Brain Connections with Magnets and Diffusion of Water Molecules *Alexander Leemans, the Netherlands*
09:30 - 10:20	Junior Talks 3: Medical Sciences: From Animal Studies to Internal Medicine and Surgery *Juries: Roksana Zakharyan, Naveed Akhtar, Artem Oganov, Joseph Firth, Ute Römling, Simon Rosenbaum, Dragana Ciric, Iraj Mohammadzadeh*
10:20 - 10:40	Coffee Break

November 9, 2023
Hall B, Oral Presentation 4
Moderators: Frank Sellke (Chair), Emilio Parisini, Maha Al-Khaduri

10:40 - 11:00	Keynote Lecture: Tackling future pandemics through international collaborations *Emilio Parisini, Latvia/Italy*
11:00 - 11:20	Keynote Lecture: Effects of Anti-Diabetic Drugs in Myocardial Function and Perfusion *Frank Sellke, USA*
11:20 - 11: 40	Keynote Lecture: PCO: A Multidisciplinary Approach *Maha Al-Khaduri, Oman*
11:40 - 12:30	Junior Talks 4: Public Health Sciences: COVID-19 *Juries: Sevan Iritsyan, Amedeo Amedei, Rossella Castagna, Jianing Fu, Prashant Kesharwani, Michael Schreiber, Dragana Ciric, Hailiang Wang, Fatemeh Ramezanzadeh*

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	November 9, 2023 **Hall C, Panels**
08:30 - 09:20	Immune Disorders Panel *Sevan Iritsyan (Chair), Vahan Mukuchyan, Armine Hakobyan, Araks Davtyan*
09:30 - 10:20	Cancer Genomics and Bioinformatics Panel *Arsen Arakelyan (Chair); Hans Binder, Jonathan Schug*
10:20 - 10:40	Coffee Break
10:40 - 12:00	AI in Drug Discovery/Development *Roksana Zakharyan (Chair), Grigor Arakelov (Biosim), Nelly Babayan and Zaven Navoyan (Toxometris.ai), Hovakim Zakharyan (DeNovo Science), Narek Abelyan (Biocentric.ai)*
	November 9, 2023 **Hall D, Meet the Expert 3**
08:30 - 10:00	*Tommaso Dorigo, Italy*
	November 9, 2023 **Hall D, Meet the Expert 4**
10:30 - 12:00	*Nima Rezaei, Iran*
	November 9, 2023 **Hall G, Poster Presentation 2**
08:30 - 10:00	Poster Presentation 2: Medical Sciences *Moderators: Sevan Iritsyan (Chair), Amedeo Amedei, Maha Al-Khaduri, Rossella Castagna, Jianing Fu, Prashant Kesharwani, Nima Rezaei, Frank Sellke, Emilio Parisini, Michael Schreiber, Fatemeh Ramezanzadeh*

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November 9, 2023
Hall B, Oral Presentation 5
Moderators: Rossella Castagna (Chair), Jianing Fu, Amedeo Amedei

13:00 - 13:20	Keynote Lecture: Immune Profiling of T Cells in Patients Receiving Lung Transplantation: Insights into Rejection Diagnosis and Tolerance Induction *Jianing Fu, USA*
13:20 - 13:40	Keynote Lecture: The Microbiota-Immunity Interplay in Human Neuroinflammation *Amedeo Amedei, Italy*
13:40 - 14:00	Keynote Lecture: Designing Ligands for Photopharmacology: a palette of Opportunities for Photoswitchable Molecules *Rossella Castagna, Latvia*
14:00 - 14:50	Junior Talks 5: Immunological Sciences: From Bench to Bedside *Juries: Nima Rezaei, Naveed Akhtar, Hans Binder, Hailiang Wang, Maha Al-Khaduri, Prashant Kesharwani, Emilio Parisini*
14:50 - 15:10	Coffee Break

November 9, 2023
Hall B, Oral Presentation 6
Moderators: Joseph Firth (Chair), Simon Rosenbaum

15:10 - 15:30	Keynote Lecture: Tackling Health Inequalities in People with Mental Illnesses *Joseph Firth, UK*
15:30 - 15:50	Keynote Lecture: Effects of Anti-Diabetic Drugs in Myocardial Function and Perfusion *Simon Rosenbaum, Australia*
15:50 - 17:00	Junior Talks 6: Social Sciences: From Psychology to General Socioeconomic Sciences *Juries: Arsen Arakelyan, Jonathan Schug, Ute Römling, Bruno Scarpa, Artem Oganov, Michael Schreiber, Abass Alavi*

◆ **All times are in Yerevan Time**

	November 9, 2023 **Hall C, Workshop 3**
13:00 - 14:30	Scientific Publication *Nima Rezaei, Iran; Gonzalo Cordova, the Netherlands*
	November 9, 2023 **Hall C, Workshop 4**
15:15 - 16:45	Artificial Intelligence: Consequences in Science and Society *Tommaso Dorigo, Italy; Pietro Vischia, Belgium*
	November 9, 2023 **Hall D, Meet the Expert 5**
13:00 - 14:30	*Alexander Leemans, the Netherlands*
	November 9, 2023 **Hall D, Meet the Expert 6**
15:15 - 16:45	*Frank Sellke, USA*
	November 9, 2023 **Hall G, Poster Presentation 3**
13:00 - 14:30	Poster Presentation 3: Formal, Physical, and Social Sciences *Moderators: Roksana Zakharyan (Chair), Tommaso Dorigo, Joseph Firth, Dragana Ciric, Jonathan Schug, Alexander Leemans, Ute Römling, Simon Rosenbaum, Bruno Scarpa*

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November 10, 2023 Main Hall A	
08:30 - 09:15	Talk Theater
09:15 - 10:00	USERN Prize Awarding Festival
10:00 - 11:00	USERN Laureates' Talk
11:00 - 11:30	Coffee Break
11:30 - 11:35	Art Performances
11:35 - 12:15	Closing Ceremony
12:15 - 13:00	Art Performance

◆ **All times are in Yerevan Time**

Virtual Programs

November 8, 2023
Physical and Chemical Sciences

17:00 - 17:20	Sustainable Energy Transportation: Enhancing Efficiency and Protecting the Environment *Salim Newaz Kazi, Malaysia*
17:20 - 17:40	An Insight into Cryogenic Treatment of Lightweight Magnesium Based Materials for a Greener Future *Manoj Gupta, Singapore*
17:40 - 18:00	Olefin Metathesis Approach for Synthesis of Bio-Based Polyesters and Efficient Chemical Recycling *Kotohiro Nomura, Japan*
18:00 - 18:20	Understanding and Applications of Contact Electrification *Zong-Hong Lin, Taiwan*
18:20 - 18:40	Engineering at the Nanoscale: A Strategy for Developing High Performance Functional Materials from Agrowaste *Sabu Thomas, India*
18:40 - 19:00	PNN-MABAC Strategy for Multiple Attribute Group Decision Making Under Pentapartitioned Neutrosophic Number Environment *Surapati Pramanik, India*
19:00 - 19:20	Physics Opportunities at the Future Circular Collider *Patrizia Azzi, Italy*
19:20 - 19:40	Nanowires Towards Environmental Sustainability: Chemical Sensing and Renewable Energy *Elisabetta Comini, Italy*
19:40 - 20:00	The Birth of Modern Cosmology *Massimo Capaccioli, Italy*
20:00 - 20:20	The Early Universe, About A Billionth of a Second After the Big Bang, As Seen by Particle Accelerators After Ten Years of the Higgs Boson Discovery *Alberto Ruiz, Spain*
20:20 - 20:40	Advances in Quantum Electrochemistry *Paulo Roberto Bueno, Brazil*
20:40 - 21:00	Question and Answer

◆ **All times are in Yerevan Time**

November 9, 2023
Biological and Medical Sciences

17:00 - 17:20	Focus on Tumor Infiltrating Lymphocytes in Cancer Research *Sara De Biasi, Italy*
17:20 - 17:40	Tumor Metabolism as a Target for Drug Development *Godefridus J. Peters, The Netherlands*
17:40 - 18:00	Nanomedicine: A New Frontier in Precision Medicine *Moein Moghimi, UK*
18:00 - 18:20	Urinary TERT Promoter Mutations Are Detectable Up to 10 Years Prior to Clinical Diagnosis of Bladder Cancer: Evidence from the Golestan Cohort Study *Reza Malekzadeh, Iran*
18:20 - 18:40	Cure of All Chronic Myelogenous Leukemia Patients *Shinya Kimura, Japan*
18:40 - 19:00	Eco-Friendly Approaches to Valorize Olive Oil Waste *Francisco Barba, Spain; Sergio Martinez-Terol, Spain*
19:00 - 19:20	Planetary Population and Personalized Nutrition for Precision Health *Alfredo Martínez Hernández, Spain*
19:20 - 19:40	Can Neurotechnologies Contribute to Global Peace? *Fabien Lotte, France*
19:40 - 20:00	Transdisciplinary Scientific Approaches to Complex Problems of Earth *Shuji Ogino, USA*
20:00 - 20:20	Question and Answer

◆ **All times are in Yerevan Time**

November 10, 2023
Medical and Social Sciences

17:00 - 17:20	Immunity, Inflammation and Diseases: Research and Training Based on International Collaboration *Diana Boraschi, Italy*
17:20 - 17:40	Challenges of Functional Conformation in Missense Mutations: NFKB1 Defects in Antibody Deficiencies *Hassan Abolhassani, Sweden*
17:40 - 18:00	Role of United Science for Rapid and Proper Diagnosis of Infectious Keratitis *Mozhgan Rezaei Kanavi, Iran*
18:00 - 18:20	Towards a Conceptual Framework for Sustainable Entrepreneurship: A Theoretical Approach *Georgios Vousinas, Greece*
18:20 - 18:40	If We Look After the Mental Health of Mothers and Fathers in Perinatal Period, We Will Reduce Violence and Crime by Their Children *Vivette Glover, UK*
18:40 - 19:00	Can We Find Peace Inside the Skinner Box? *Umberto Crisanti, UK*
19:00 - 19:20	Nature, Evolution and Obesity *Richard Johnson, USA*
19:20 - 19:40	Selective IgM Deficiency: A Long Ignored Primary Immunodeficiency *Sudhir Gupta, USA*
19:40 - 20:00	The Collective Virtual Mind *Kenneth Kosik, USA*
20:00 - 20:20	Cognitive Disengagement Syndrome/Sluggish Cognitive Tempo Among Children, Adolescents and Young Adults: State-of-The-Art and Future Research Avenues *Serge Brand, Switzerland; Dena Sadeghi-Bahmani, USA*
20:20 - 20:40	Partisan Public Responsiveness to the News *Christopher Wlezien, USA*
20:40 - 21:00	Total Unity as a Saving Intention and/or Paradigm of Humanity *Natalya Shelkovaya, Ukraine*
21:00 - 21:20	Question and Answer

◆ **All times are in Yerevan Time**

Junior Oral Presentations

November 8, 2023 | 13:40 - 14:50 , Hall B

Junior Talks 1: Formal and Physical Sciences: From Artificial Intelligences to Integrated Science

Juries: Nima Rezaei, Simon Rosenbaum, Frank Sellke, Dragana Ciric, Rossella Castagna, Emilio Parisini, Maha Al-Khaduri

Maintaining Scientific Integrity and High Research Standards Against the Backdrop of Rising Artificial Intelligence Use Across Fields
Fiona Morrison

The Role of Artificial Intelligence in Startups Growth
Mohammad Sedaghati Jahromi

Open AI versus True Knowledge in Epidemiology: Double Blind Study
Behnaz Nikoubin

Radiomics and Genomics in Brain Tumors: AI-driven Perspective
Kimia Kazemzadeh

Advancements in Cancer Stem Cell Detection with Artificial Intelligence: A Promising Perspective for Cancer Treatment
Mohammadreza MirzaeeGoodarzi

Chemoinformatics and AI: A Synergistic Approach for Drug Discovery
Kosar Zolfaghari

Making a Dialogue Between Meta-research and Medicalization Studies
Navid Ravan

Myths Came to Truth: A Historical Review of Mythical Stories That Have Been Proven True by Modern Medical Science
Amir Reza Mazandarani

History of Medicine and its Importance in Medical Education
Hamed Ahansazan

Diode Laser or Cold Plasma? Which Could Enhance Fibroblasts Proliferation More?
Helia Sharif

Beyond the Stratosphere: The Effect of Outer Space on Oral Tissues
Mobina sadat Zarabadi

November 8, 2023 | 15:50 - 17:00 , Hall B

Junior Talks 2: Chemical and Biological Sciences: From Nanomedicine and Vaccines to Pharmaceutics in Cancer

Juries: Tommaso Dorigo, Alexander Leemans, Naveed Akhtar, Hans Binder, Jonathan Schug, Hailiang Wang, Amedeo Amedei, Jianing Fu, Prashant Kesharwani

Single-walled Carbon Nanotubes Modeled as Flügge Shell Theory: Poisson's Ratio Influence
Muzamal Hussain

Chemical Recycling of Plastic Waste: A Promising Pathway to a Sustainable Future
Maryam Sadat Tonekaboni

Prospects for the Use of Different Plant-based Milk Alternatives for the Manufacture of Fermented Beverages and Ice Cream with Adaptogenic and Probiotic Effects
Natalia Iakovchenko

Cancer Vive
Sahel Noorikoloori

Non-Coding RNAs in Cancer: Potential Roles and Delivery Strategies
Alireza Sarkar Lotfabadi

Long-term Environmental Metal Exposure is Associated with Hypomethylation of CpG Sites in NFKB1 and Other Genes Related to Oncogenesis
Ani Stepanyan

Engineered Antimicrobial Peptides Inhibit Cell Viability, Promote Apoptosis and Induce Cell Cycle Arrest in SW620 Human Colon Adenocarcinoma Cells
Sheema Hashem

The Ketogenic Diet and the Increase the Response to Treatment in Colorectal Cancer: With Targeting Kirsten-ras (KRAS)
Elahe Aleebrahim-Dehkordi

Exosomes as Drug Delivery and Diagnostic Modality in Cervical Cancer
Mohaddese Pourashoury

The Effect of Hypoxia-induced Metabolic Alterations on Chemoresistance in Breast Cancer
Hana Tahmouresi

Production of Nanoprotein Containing Exosome and Natural Human Blood Cell Proteins for Treating Lupus: A New Approach in the Treatment of This Autoimmune Disease
Rahele Khosravi Nessiani

November 9, 2023 | 9:30 - 10:20 , Hall B

Junior Talks 3: Medical Sciences: From Animal Studies to Internal Medicine and Surgery

Juries: Roksana Zakharyan, Naveed Akhtar, Artem Oganov, Joseph Firth, Ute Römling, Simon Rosenbaum, Dragana Ciric, Iraj Mohammadzadeh

Study the Demographic Features and Clinical Outcomes of Children Admitted to Children's Medical Centre with Opioid Toxicity from 2019 to 2022
Mehrnaz Olfat

The Impact of Conventional Smoking Versus Electronic Cigarette on the Expression of VEGF, PEMPA1, and PTEN in Rat Prostate
Milad Akbarzadehmoallemkolaei

The Effect of Melatonin, Diosmin, And Their Synergistic Effect on Antioxidant Indices in Testicular Tissue Following Acrylamide Consumption in a Rat Experimental Model
Seiedeh Reihaneh Banihashemi

Understanding Presenilin-1 Expression in Parkinson's Disease: A Cellular Model Approach
Ramyar Rahimi Darehbagh

Alzheimer's Disease Hypotheses; Complementary or Contradictory?
Foad Mirzaei

Epi-Longevity Review: Exploring Immortality Potential Through Epigenetic Studies
Tara Shahmoradi

Open Versus Minimally Invasive Morgagni Hernia Repair in Pediatric Surgery
Dorsa Safari

Surgical Technique A New Technique for Superficial Limbus Harvest Using an Automated Microkeratome and a Novel Globefixation System
Zahra Bibak Bejandi

November 9, 2023 | 11:40 - 12:30 , Hall B

Junior Talks 4: Public Health Sciences: COVID-19

Juries: Sevan Iritsyan, Amedeo Amedei, Rossella Castagna, Jianing Fu, Prashant Kesharwani, Michael Schreiber, Hailiang Wang, Fatemeh Ramezanzadeh

Outcomes of Coronavirus Disease 19 Patients with a History of Rheumatoid Arthritis: A Retrospective Registry-based Study in Iran
Mahsa Zargaran

Intestinal Ischemia Following COVID-19: A Multicenter Case Series
Elahe Meftah

Effects of Prophylactic or Therapeutic Dose of Enoxaparin on Overall Survival in Severe COVID-19 Patients: A Randomized Clinical Trial
Mohammad Reza Fattahi

The Silent Pandemic: Novel Therapeutics for Overcoming Antibiotic Resistance as a Global Burden
Pegah Niktalab

A Potent Trivalent Multi-Epitope DC-inducing mRNA-based Vaccine Against Monkeypox, Cowpox, and Vaccinia Viruses Using Immunoinformatics Approaches
Kiarash Saleki

Essential Immune Signaling Against COVID-19: A Systematic Review and Meta-analysis on Inborn Errors of Immunity
Saba Fekrvand

Incidence of Mental Disorders During COVID-19 Pandemic in Patients with Autoimmune Arthritis: A Systematic Review
Azin Eslami

Pediatric Bell's Palsy Following COVID-19 Infection or COVID-19 Vaccination
Atousa Moghadam Fard

November 9, 2023 | 14:00 - 14:50 , Hall B

Junior Talks 5: Immunological Sciences: From Bench to Bedside

Juries: Nima Rezaei, Naveed Akhtar, Hans Binder, Pietro Vischia, Hailiang Wang, Maha Al-Khaduri, Prashant Kesharwani, Emilio Parisini

Hypermethylation of RUNX3 Gene Promoter in Peripheral Blood Mononuclear Cells as a Diagnostic and Prognostic Biomarker in Systemic Lupus Erythematosus
Maryam Fakhri

NLRP3 in Juvenile Systemic Lupus Erythematosus
Niloufar Yazdanpanah

NLRP3 Inflammatory Pathway: Can We Unlock Depression?
Ghazaleh Ghaffaripour Jahromi

Virus-Like Particles (Vlps) from Synthesis to Targeted Drug Delivery, Vaccine Approaches, and Gene Therapy
Alireza Bolouriyan

Advancements in Multi-Epitope Vaccine Development for Multiple Sclerosis: An Innovative Approach
Parsa Alijanizadeh

Microbial Infections Can Trigger Neuro Autoimmunity
Hesam Malekfarnood

Role of Long Non-coding RNAs in Aging
Saghar Rouzrokh

Pyogenic Arthritis, Pyoderma Gangrenosum and Acne (PAPA) and PAPA-Like Syndromes: Systematic Review of the Literature
Amirhossein Hajialigol

November 9, 2023 | 15:50 - 17:00 , Hall B

Junior Talks 6: Social Sciences: From Psychology to General Socioeconomic Sciences

Juries: Arsen Arakelyan, Jonathan Schug, Ute Römling, Bruno Scarpa, Artem Oganov, Michael Schreiber, Abass Alavi

The Melody of Life (Art and Science)
Niloofar Ziadali

Bioart: The Moment Art and Biotechnology Collide with One Another
Reihaneh Golroo

Doctors Without Borders, Representatives of Peace in Medicine
Rojina Kakaei

Integrative Lifestyle Medicine: Discovering More Factors for Health Maintenance
Niusha Esmaealzadeh

From Traditional Medicine to Modern Therapeutics: A Novel Approach to Treating Anxiety and Stress
Subhrajit Barua

The Effect of Digital Storytelling (DS) on Patients with Cancer: A Narrative Review
Mahshad Naserpour

Effects of the Mother Language on the Connectivity in the Brain: A Narrative Review
Nazanin Abbasi

The Use of Gamification as a Solution-based Oral Health Promotion for Non-dental Providers. A Non-Randomized Trial
Leyli Shadman

Transforming Healthcare Delivery: The Role of Telemedicine in the COVID-19 and Post-Pandemic Era
Seyedeh Saba Sajadi Tabar

Will Telemedicine be Continued in Pediatric Surgery After COVID-19 Pandemic?
Negin Jarrah

The Perspectives of Medical Students on the Attributes of the Role Models at Tehran University of Medical Sciences
Negar Sadat Ahmadi

Investigating the Life Expectancy of People with Breast Cancer and Neoplastic Meningitis in the World
Zeynab Zahedi

Junior Poster Presentations Program

November 8, 2023 | 13:00 - 14:30 , Hall G

Poster Presentation 1: Biological Sciences

Moderators: Arsen Arakelyan (Chair), Abass Alavi, Naveed Akhtar, Artem Oganov, Amedeo Amedei, Jianing Fu, Hans Binder, Hailiang Wang, Iraj Mohammadzadeh

Evaluation The Anti-proliferative Effects of Wild-type Newcastle Disease Virus on Lactate Dehydrogenase Secretion and Induction of Apoptosis in A549 Cells
Ali Zahiri

Characterization of Mutations in BRCA1/2 Genes Associated with Familial Breast Cancer in Armenian Population
Ani Melkonyan

The Impact of Fecal Microbiota Transplantation on Metabolic State: A Systematic Review and Meta-analysis
Azin Pakmehr

The Evaluation of Saponin Effects in Cholestatic Liver Fibrosis Induced by Bile Duct Ligation Model in Rats
Diba Sabuni Aghdam

A Novel Drug Delivery System
Ghazal Mohammadbeigi

Effects of Lipopolysaccharide from Porphyromonas Gingivalis and Escherichia Coli on Gene Expression Levels of Toll-like Receptors and Inflammatory Cytokines in Human Dental Pulp Stem Cells
Hanieh Mojtahedi

The Protective Role of Crocin on Memory Impairment Induced by Chronic Unpredictable Mild Stress in Rats
Homayoon Khaledian

Leucocyte Membrane Camouflaged Nanoparticles-based Combinatorial Therapy for the Targeted Treatment of Breast Cancer
KM Rafiya

Inflammaging and Alzheimer's Disease
Mahdi Shakeri

TERT Mutations as a Biomarker for Bladder Cancer Detection; A Narrative Review to a Non-invasive Detection and Therapeutic Approach
Maryam Jafari

The Interconnected Role of MicroRNAs, Hypoxia, and Inflammasomes in Neurological Disorders
Mohammad Ramezankhah

Malignoma Tumor Recurrence After CAR T Cell and CAR NK Cell Therapy and the Key Role of Inflammation
Mohammad Amin Khodadad Hossyni

Investigate the effect of NQO1 (RS1800566) Polymorphism on Gestational Diabetes in Pregnant Women of Shiraz
Pardis Hemmat

NLRP3 Inflammasome: Illuminating Its Role, Significance and Potential Therapeutic Targets to Advance Solid Organ Transplantation
Pershia Davoodi Karsalari

Molecular Detection and Typing of Non-polio Enteroviruses (NPEVs) in Primary Immunodeficiencies (PID) Patients in Iran
Razieh Babak

Pharmacogenetics Role in Alzheimer's Disease Treatment: A Comparative Study with Special Emphasis to Diagnostic and Individual Medicine in Iran
Saba Mirian

The Potential Protective Effect of Modafinil in Renal Ischemia Reperfusion Injury in Rats
Sepideh Poshtdar

Identification of Important MicroRNAs Involved in Immunological Signaling Pathway in HTLV-1 Associated Adults T Cell Leukemia Lymphoma (ATLL)
Zeynab Asgari

November 9, 2023 | 8:30 - 10:00 , Hall G

Poster Presentation 2: Medical Sciences

Moderators: Roksana Zakharyan (Chair), Tommaso Dorigo, Joseph Firth, Katrien Fransen, Dragana Ciric, Jonathan Schug, Alexander Leemans, Ute Römling, Simon Rosenbaum, Bruno Scarpa

Long-Term Impact of Various Endocrine Therapy Regimens on Mortality, Local Recurrence, and Metastasis in Breast Cancer: A 25-Year Retrospective Study
Aida Hossein Nezhad

The Effect of Radioactive Iodine Therapy on Ovarian Reserve in Women with Thyroid Cancer at Reproductive Age; A Prospective Study
Ali Hosseini

Exercise and Adiposity: A Systematic Review with Network Meta-analysis of Randomized Trials in Children and Adolescents with Overweight and Obesity
Ali Jafari

Aspiration and Sclerotherapy Versus Hydrocelectomy for Treating Hydroceles: A Systematic Review and Meta-analysis
Ali Faegh

The Role of Platelet-to-lymphocyte Ratio and Neutrophil-to-lymphocyte Ratio in the Diagnosis and Severity of Inflammatory Bowel Disease in Children
Arefeh Zahmatkesh

Major Depressive Disorder in Pregnancy
Aylin Hajizade

Assessment of ESA Maintenance Therapy and IV Iron Sucrose Treatment in CKD Patients Under Hemodialysis: Efficacy, Safety, and Guideline Adherence
Elaheh Mousavialmaleki

Family Specific Pulmonary Involvement Pattern by COVID-19: Analysis of Pulmonary CT Findings
Elaheh Khodaei

Currarino Syndrome in a 25-Year-Old Woman Presenting with Sacral Agenesis: A Case Report with Review of the Literature
Faranak Rahmani

The Assessment of Patients' mortality Rate and its Relation to Off-hours and Holidays in Patients Admitted to Different Wards of Imam Khomeiny Academic Hospital from Sep 2021 to Sep 2022
Fatemeh Rezaee

The Effects of the Mediterranean Diet on Some Neurological Disorders, Such as, Multiple Sclerosis (MS), Migraine, Parkinson's Disease, Depression and Neuropathy: A Narrative Review Article
Marjan Falahati

Evaluation of the Effects of Oenothera Biennies on Inflammatory Factors in Clinical Studies: A Systematic Review
Melika Sharifi

Dermatologic Presentation of Hyper IgE Syndrome in Pediatric Patients
Mohammad Mahjoubi

Comparing the Pharmaco-mechanism of Analgesic Effects of Cinnamaldehyde and Resveratrol in Chronic Neuropathic Pain
Mohammad Hamed Rashidi

Epidemiology of Antibiotics Resistance in Southern of Iran, in Light of COVID-19 Pandemic: A Retrospective Observational Study
Negin Namavari

Evaluation of Unsafe Acts of CCU Nurses in One of Izeh Hospitals by Safety Sampling Method
Negin Rastegar

Allergy in Patients with Selective IgA Deficiency
Pouria Ghiaee

Diversity of Malignancies in Patients with Different Types of Inborn Errors of Immunity
Samaneh Delavari

Skin Prick Test for Common Food Allergens in Infants with Food Protein-induced Proctocolitis
Sara Mostafavi

Cerebral Blood Flow in Nicotine Smokers: A Review of ASL MRI Studies
Arian Daneshpour

November 9, 2023 | 13:00 - 14:30 , Hall G

Poster Presentation 3: Formal, Physical, and Social Sciences

Moderators: Roksana Zakharyan (Chair), Tommaso Dorigo, Joseph Firth, Dragana Ciric, Jonathan Schug, Alexander Leemans, Ute Römling, Simon Rosenbaum, Bruno Scarpa

Machine Learning Algorithms for Predicting Mortality in Locally Advanced Colorectal Cancer Patients following Tumor Resection: An Innovative Analysis of Post-Surgery
Ali Mehri

Social Psychoneuroimmunology: Lack of Methodology or Fanaticism?
Amir Hakimjavadi

Assessment of Genotoxic Effects of Environmental Exposure to Heavy Metals in Kapan Mining Area
Arpine Minasyan

Evaluation of the Effect of Nano-selenium on Hormonal Parameters in Rat's Testis After X-ray Radiation
Hamoon Baghaei

Sexual-related Determinants of Life Satisfaction Among Married Women: A Cross-sectional Study
Mobina Hosseini

The Bibliometric Analysis of EEGLAB Software in the Web of Science Research Articles
Mohammad Fayaz

Disease Modeling and Therapeutic Applications of Patient iPSC-derived Beta Cells from Bench to Bedside
Mohammad Amin Kaviari

AI Hallucinations in Large Language Models (LLM): Impacts on Medical Researches and Community
Mohammad Reza Fadaei Fard

Nano Lipid Carrier Based Targeted Combinatorial Drug Loaded Nanoformulation Loaded Gel for the Treatment of Skin Cancer
Nazeer Hasan

Comparison the Effect of Charcoal-containing, Hydrogen Peroxide-containing, and Abrasive Whitening Toothpastes on Color Stability of a Resin Composite; An in vitro Study
Sara Mehrgan

Intersecting Frontiers: Exploring Tissue Engineering Applications in Astrobiology for Future Space Exploration
Sara Asl Motaleb Nejad Sarkhab

Reviving Martian Art: Preserving Ceramics Across Planetary Borders
Sepideh Sargoli

Comparative Efficacy of Four Stain Removal Methods for Bleach Shade Composite Resins After Immersion in Staining Solutions an in vitro Study
Shaghayegh Khoshgou

Precision in a Shifting Landscape: Towards Vaccines Tailored to Conserved Epitopes in Dynamic Viral Strains
Sina Hassani

Optimal Disinfection Method for an Accidentally Dropped Autograft During an Anterior Cruciate Ligament Reconstruction Surgery: A Double-Blind Study
Soheil Pourheidar

The Effectiveness of Emotional Schema Therapy on Emotion-cognitive Regulation, Relationship beliefs, Body Self-Relation, Partner-Related Obsessive Compulsive Symptoms in Students
Tara Ebrahimpour Lish

Human-AI Collaboration in Legal Proceedings: Prospects and Pitfalls
Zahra Dolatkhah

Quercetin and Its Derivatives as Potential Neuroprotective Agents Against Spinal Cord Injury
Mohammad Mehdi Gravandi

Art Performances Program

November 8, 2023	
09:45 - 09:55	Piano *Tommaso Dorigo*
10:05 - 10:15	Singing and Piano *Ariana Rezaei and Sardar Sarmast*
10:35 - 10:45	Singing and Piano *Kalliopi Petrou and Tommaso Dorigo*
11:00 - 11:05	Singing and Piano *Arnika Rezaei and Saghar Rouzrokh*
11:50 - 12:00	Singing and Performance *Zalak Panchal, Nita Rathod, Harshinee Shah*
November 10, 2023	
08:30 - 09:15	Talk Theater *Pegah Niktalab, Faeze Darvishi, Sahel Noorikoloori, Mobina Sadat Zarabadi, Arian Daneshpour, Mohaddese Pourashoury, Seyedeh Saba Sajadi Tabar, Elahe Meftah, Tara Shahmoradi, Reyhaneh Golroo, Amirhossein Hosseinbeiki, Saghar Rouzrokh, Zahra Sheikhzadeh, Ariana Rezaei*
10:00 - 11:00	Paintings *Niloofar Ziadali, Mahshad Naserpour, Seyedeh Saba Sajadi Tabar*
11:30 - 12:15	Violin, *Milad Akbarzadeh* Ceramic Bodies, *Sepideh Sargoli* Painting, *Viara Pencheva*
12:15 - 13:00	Concert *Hasmik Karapetyan, Sardar Sarmast, Melina Sharbati, Ariana Rezaei, Sara Ansari, Sarina Rad, Abana Darabi, Sevana Der Ghukasian*

◆ **All times are in Yerevan Time**

USERN Congress In-Person Keynote Speakers

Abass Alavi

Unparalleled and Revolutionary Impact of PET-CT-MRI on Day-to-Day Practice of Medicine

Perelman School of Medicine, University of Pennsylvania, USA

Modern tomography was introduced by investigators at the University of Penn in the 1960s which substantially enhanced the role of imaging in medicine. Initially, applications of this methodology were primarily focused on detecting the blood-brain barrier in tumors and strokes. The introduction of contrast-enhanced CT in the early 1970s substantially challenged the role of this approach. This led to introducing a novel tracer, 18F-Fluorodeoxyglucose (FDG), to assess glucose metabolism in the brain and other domains. In 1976, Dr. Alavi and colleagues at Penn administered the first dose of FDG to normal volunteers and generated tomographic and total body planar imaging of these subjects. In parallel with these developments, instrumentation for Positron Emission Tomography (PET) imaging improved substantially, and by the 1980s, a major effort was made to employ PET imaging as a powerful modality for research purposes at advanced universities around the world. The initial research studies were confined to central nervous system disorders, including Alzheimer's disease, seizure disorders, a variety of psychiatric diseases and head injury. However, one of the major applications of PET in the brain was detection and characterization of brain tumors during the course of the disease, particularly after therapeutic intervention. This observation led the community to utilize FDG-PET for assessment and monitoring of a variety of cancers, including those of the lung, breast, head and neck, and hematological malignancies. Applications of FDG-PET in oncology was a major factor in the survival of this technology over the past 3 decades. The introduction of advanced PET imaging instruments and the availability of FDG in many countries around the world have significantly changed the day-to-day practice of medicine. Over the years, FDG has been shown to be a very powerful tracer in assessing inflammatory and infectious disorders and this has further enhanced the role of this technique in the practice of medicine. In 2000, investigators at the University of Pittsburgh introduced PET/CT which allowed co-registration of PET to CT images and this invention further enhanced the role of PET in the day-to-day practice of medicine. A decade later, PET/MRI was introduced as another powerful modality, particularly for assessing diseases of the brain, cardiovascular structures, and musculoskeletal system. Over the years, numerous PET tracers have been introduced to detect and accurately quantify many pathologic states in various organs. These include radiotracers for detection of cell proliferation, movement disorders, hypoxia, and fibroblast activity in cancers and benign disorders. In conclusion, the role of PET-based imaging has been substantially enhanced over the past 5 decades and therefore, its impact in research and day-to-day practice of medicine is unparalleled by any other modality in the history of medicine.

Artem R. Oganov

Evolutionary crystal structure prediction and computational materials discovery

Skolkovo Institute of Science and Technology, 30 bldg. 1 Bolshoy blvd., 121205 Moscow, Russia

Until mid-2000s it was thought that crystal structures are fundamentally unpredictable. This has changed, and a special role in this transformation was played by our evolutionary method USPEX (https://uspex-team.org). Thus method allows one to predict stable crystal structures for a given chemical composition], predict all stable compounds formed by given elements, and even predict among all possible compounds the structure and composition that have desired combination of properties. Here I will discuss:

1. Discovery of novel chemical phenomena at high pressure: transparent non-metallic allotrope of sodium, counterintuitive novel sodium chlorides, chemical reactivity of helium, prediction and discovery of new exotic compounds approaching room-temperature superconductivity.
2. Recent extension of crystal structure prediction to finite temperature, and first results for planet-forming materials.

Bruno Scarpa

UR-Index and H-Index: An Example of Comparison

Department of Statistical Sciences, University of Padova, Italy

A number of bibliometric indices have been developed to evaluate a scholar's research output, the majority of which attempt to balance scholarly output and scholarly impact.
USERN (Universal Scientific Education and Research Network) recently proposed the Universal Research Index (UR-Index) as a metric that seeks to provide a more comprehensive measure of research output based on various factors.
In this talk, we compare the UR-Index with the H-index to understand if the new index outperforms the old one in measuring a researcher's scientific profile in the long term.
We focus on Italian researchers in three specific fields (Mathematics, Statistics, and Geology) and propose two exercises. One compares the behaviour of the two indices in time for all the researchers who are currently full professors. The other considers all the starting researchers around 2000 and examines their indices and career progression over time.
As a result, although both indices show good predictive qualities, it seems that the H-index has better predictive power in the early years of a researcher's career. However, as time progresses, the predictive performance of the H-index decreases compared to the UR-Index. By considering a number of additional factors compared to the H-index, the UR-Index allows for more precision in measuring bibliometric impact, making it more comprehensive. However, the H-index is much simpler to obtain and easier to interpret.

Dragana Ciric

Generative and AI methods in architecture and urbanism: urban networks, smart mobility, and movement path planning, design, and computation

Independent Scientific Associate/Research Assistant Proffesor, Architect and PI at unit

The talk will present one of the case studies performed as a test for the possibilities of generative and AI methods application in architecture and urbanism, or more broadly in spatial engineering sciences. The research has been situated within the areas of urban computing and informatics, urban design, and urban analysis and analytics, being part of the broader strategy of smart, intelligent, and programmable cities, targeting particularly the subcategory of urban mobility and transportation regarding all the layers of complex urban systems.

In that respect, a two-stage generative design problem has been defined, firstly at the scale of the urban city-region and territory (the construction of the transportation system as a dynamic transformable network and geometry for specific performances), and then focusing on individual actors performing within the chosen system (the construction of agents' movement paths, experiences, or activities in general, as being directed by the defined parameters and with respect to the constructed system). Greater Paris (the Grand Paris Express network) has been chosen as the dynamic network and field of operation, implying the boundedness of each particular movement scenario to its domain of control and range of legal actions (the movement policy regarding the spatial and relational arrangement and constraints of the designed network).

The computational set of problem-solving methods marking the path from generative problem identification and definition to its solution and visualisation will be presented, including specific exercises created for each part or a phase of the decomposed methodological set. Each exercise can be considered an autonomous problem or a part of this problem-solving and decision-making chain, which makes them multivalent considering possible applications.

Emilio Parisini

Tackling future pandemics through international collaborations

University of Bologna (Italy) and Latvian Institute of Organic Synthesis (Latvia)

As of October 2023, the official figures of the COVID-19 crisis have hit the stunning level of nearly 700 million cases and almost 7 million deaths worldwide. However, aside from the death toll that has been directly caused by the SARS-CoV-2 infection, the pandemic has also created huge collateral damage to many essential services in most health systems across the world, thus indirectly causing further casualties. To the credit of the scientific community, extensive international cooperation has allowed to develop effective COVID-19 vaccines in record-breaking times. However, this is not enough and we must now ensure that we will continue to work toward the development of technologies and logistics infrastructures that will allow us to react much more swiftly, effectively and equitably when the next pandemic hits.

Jianing Fu

Developing a multidimensional immunological toolset to facilitate rejection diagnosis and mechanistic understanding of chronic lung allograft dysfunction after human lung transplantation

Columbia Center for Translational Immunology, Department of Medicine, Columbia University, New York, United States

Rejection and infection are risk factors for chronic lung allograft dysfunction (CLAD) that limit lung transplantation (LuTx) success. Despite the importance of T cells in driving alloresponses and immune defense, the dynamic repopulation, clonal distribution, alloreactivity, and anti-microbial reactivity of T cells after LuTx are largely unknown.

Our cohort includes 13 LuTx recipients. We utilized a combination of flow cytometry for chimerism determination and T cell phenotyping, and high-throughput sequencing of T cells from post-Tx bronchoalveolar lavage (BAL) and PBMCs. We set up mixed lymphocyte reactions with pre-Tx cells and then identified alloreactive T cell receptors (TCRs) in graft-vs-host (GvH) and host-vs-graft (HvG) directions. We defined and tracked pathogen-reactive TCRs by integrating publicly available databases.

Patient (Pt) 2 and Pt5 were excluded due to early death. Remaining patients had a low rate of ACR (3/11), but high rates of infection (11/11) and either definite (4/11) or probable (6/11) CLAD. Recipient CD14+ cells showed rapid infiltration in BAL post-Tx, suggesting a role in priming GvH response. Much higher levels of HvG compared to GvH clones were associated with faster recipient T cell repopulation in the BAL. We observed high levels of HvG-reactive TCRs among recipient mappable repertoires in BAL, but not paired PBMCs, of patients with early ACR. In other patients with high levels of HvG TCRs identified in BAL, pathology was read as negative for early ACR, despite multiple complications occurring later. Recipient graft-infiltrating CD8+ T cells gradually acquired tissue-resident memory features, and elevated CD28 expression on these cells correlated with early ACR. In patients who were infected with EBV and CMV post-Tx, we observed an increase in EBV- or CMV-reactive TCRs in the BAL that are enriched for non-alloreactive repertoires.

Our data suggest that cellular and clonal repertoire changes may have already happened in lung allografts when histology is not diagnostic of rejection. Developing an immunological toolset at the chimeric, alloreactive clonal and phenotypic levels is expected to facilitate rejection diagnosis and mechanistic understanding of CLAD after human LuTx.

Joseph Firth

Tackling Health Inequalities in People with Mental Illnesses

Division of Psychology and Mental Health, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK

Across the world, people with severe mental illness die 15-30 years younger than the general population. However, this gap in life expectancy is primarily due to physical diseases, rather than mental health causes. Although these severe inequalities in physical health are gaining more attention than ever, the large disparities in health outcomes for those with mental illness have persisted over time and may even be worsening in some regions. In 2019, the Lancet Psychiatry Commission was convened, to produce a "Blueprint for protecting physical health in people with mental illness". Since then, the research and real-world implementation efforts in this landscape has evolved significantly, especially in the domain of lifestyle medicine. This presentation will discuss the rigorous process of updating the Lancet Psychiatry Commission, spotlighting the latest, actionable solutions in lifestyle interventions and how these can be best implemented in mental healthcare. A special emphasis will be placed on the transformative potential of digital health technologies, like smartphone applications, for delivering lifestyle interventions in scalable and sustainable ways, to improve both physical and mental health outcomes.

Alexander Leemans

Mapping brain connections with magnets and diffusion of water molecules

PROVIDI Lab, UMC Utrecht, the Netherlands

The complex network of fiber pathways that make up the brain's circuitry plays an important role in understanding brain functions. Diffusion magnetic resonance imaging (MRI) is a crucial in vivo tool for investigating microstructural brain tissue properties. Through the development of diffusion MRI fiber tractography methods, scientists can map the intricate network of white matter fiber pathways, similar to cartographers creating maps of the land. The multi-scale nature of the brain's connections and the various characteristics that define the boundaries between brain regions make this a challenging field of study. In this presentation, we will provide an overview of the key concepts in diffusion MRI and tractography, and highlight some of the major challenges that researchers are currently facing. Attendees will have gained a deeper understanding of the exciting potential of diffusion MRI in advancing our knowledge of the brain's structural connectivity.

Maha Al-Khaduri

PCOS: A Multidisciplinary Approach

Department of Obstetrics and Gynecology, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman

Polycystic ovarian syndrome (PCOS) is a complex endocrine and metabolic disorder with a multifactorial etiology, occurring in about 6-20% of females in reproductive age. The most recent international evidence-based guideline for the assessment and management of PCOS 2023 recommends that diagnosis of PCOS should be using the revised consensus Rotterdam criteria which in adults requires the presence of two of the following: i) clinical/biochemical hyperandrogenism, ii) ovulatory dysfunction and iii) polycystic ovaries on ultrasound or elevated anti-mullerian hormone (AMH) levels, after other causes of these features are excluded.

In recent years, many advances have been made in the understanding of pathophysiological mechanisms, diagnosis and management of PCOS.

Insulin resistance, cardiovascular diseases, abdominal obesity, psychological disorders, infertility, and cancer are all related to PCOS. Although the etiology of this disorder is unclear, environmental and genetic factors are primarily involved. Lifestyle or diet, environmental pollutants, genetics, gut dysbiosis, neuroendocrine alterations, and obesity are among the risk factors that predispose females to PCOS. Currently there are four recognized phenotypes of PCOS: 1) hyperandrogenism+oligo-anovulation+polycystic ovarian morphology; 2) hyperandrogenism+oligo-anovulation; 3) hyperandrogenism+polycystic ovarian morphology; and 4) oligo-anovulation+polycystic ovarian morphology, each with different long-term health and metabolic implications. Once diagnosed with PCOS, assessment and management should address reproductive, metabolic, cardiovascular, dermatologic, sleep and psychological features. Integral management by a multidisciplinary team may help the patients to adhere to lifestyle interventions and thereby reduce body adiposity and recover their metabolic and reproductive health.

Rossella Castagna

Designing Ligands for Photopharmacology: a palette of Opportunities for Photoswitchable Molecules

Assistant Professor, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano, Italy
Researcher, Latvian Institute of Organic Synthesis, Aizkraukles street 21, LV-1006, Riga, Latvia

Through photochromic materials, light enables a spatio-temporal control over the activation-deactivation of physical-chemical functions. Photochromic switches can be designed to be converted with electromagnetic radiation all over the UV-vis light spectrum. Color, transmittance, refractive index, dipole moment and electrical conductivity are some of the physical-chemical properties that reversibly change by irradiation with light of suitable wavelength because of an isomerization that converts the species in a stable or metastable photoproduct .
Thanks to the modular synthesis of photochromic switches, a wide range of functional compounds featuring good optical fatigue resistance, remarkable structural changes as well as fast responses, can therefore be designed and assembled for smart devices.
The action of a photochromic switch can have an impact in a wide range of applications in the field of optics, optoelectronics and, as more recently demonstrated, in pharmacology and life science.
Indeed, photopharmacology has established itself as an innovative complement to optogenetics to control and manipulate biological activity with light. To date, photopharmacology has been extensively used to manipulate biological activity at the cellular level by targeting ion channels, G protein-coupled receptors, enzymes and protein-protein interactions. In order to reduce phototoxicity of light used in photopharmacology, low-energy light (i.e. red light) should be used (less scattering in tissue and deeper penetration in the body) and red-absorbing photodrugs need to be designed.
Donor-acceptor Stenhouse adducts are a rapidly emerging class of photochromic compounds whose conformation can be efficiently switched using visible and near-infrared light. Over the last year, the switching mechanism of DASA has been extensively studied. However, the use of these compounds in water has been hampered by a spontaneous and irreversible conversion to a non photoactive form.
To this end, here, we present the molecular design of a novel γ-aminobutyric acid type A receptors (GABAARs) ligand derivative based on the DASA scaffold that displays photochromic properties with red light and is active in neuronal GABAARs.

Michael Schreiber

True or False, Fact or Fake? Can we believe what we see or hear?

Institut für Physik, Chemnitz University of Technology, Germany

The dichotomy between truth and falseness is an interesting aspect of simulations in the sciences. Here simulation means the modeling of reality, especially systems, phenomena and processes by large-scale computation. In some fields such numerical experiments have become a well accepted third way of doing research in between traditional experiments and analytical theory. Typical examples range from traffic simulations, game theory, econophysics, chaos in billiards and effects in special relativity and astrophysics. Large scale simulations comprise weather forecast and climate prognosis. Accuracy, validity and reproducibility should be questioned in the framework of the aforementioned dichotomy.

In contemporary culture, the concept of simulation is often used in order to explain phenomena which seem to subvert the dichotomy between fact and fiction, original and copy. I mention pertinent concepts like aura, authenticity, original hyperreality, copy, fictionality, forgery, counterfeits. The objects of interest include philosophical texts, literary texts, and non-literary narratives like urban legends, but also works of art, movies, and computer games. E.g., ChatGPT can simulate own creative work even in scientific publications; thus it crosses the border between original work and plagiarism. And deep fakes should make us skeptical about what we can believe or whether we can believe anything in the media.

Frank W. Sellke

Effects of Anti-Diabetic Drugs on Myocardial Function and Perfusion

Alpert Medical School of Brown University, Providence RI, USA

Regenerative therapies such as growth factor treatment, gene therapy and stem cell therapy have been used to treat patients with refractory heart disease over the past 30 years with minimal or no improvement in clinical condition. However, recently, sodium-glucose cotransporter-2 inhibitors (SGLT-2i) and DPP4 inhibitors (DPP4i), which are antidiabetic medications, have been shown to decrease cardiovascular events and heart failure-related mortality in clinical studies regardless of diabetic status. The off target effects and mechanisms of these novel drug treatments are not well defined. We have demonstrated improved cardiac function and myocardial perfusion but a lack of increased vascular density following administration of SGLT-2i in a porcine ameroid occluder model of chronic myocardial ischemia (CMI). The SGLT-2i canagliflozin improved vasodilatation to both endothelium-dependent and independent agents. Canagliflozin also reduced myocardial fibrosis, in part by decreased Jak/STAT signaling, suggesting a mechanism for its success in treating diastolic heart failure. The DPP4i drug sitagliptin, which has also been associated with improved cardiovascular outcomes in some clinical trials, did not improve cardiac function, but did improve collateral-dependent perfusion in our model of CMI. Sitagliptin did increase arteriolar density and increased expression of pro-arteriogenic signaling markers in CMI. Sitagliptin reduces interstitial and perivascular fibrosis. Both canagliflozin and sitagliptin reduced oxidative stress. Thus, despite a failure of 3 decades of regenerative medicine research in providing any clinically relevant improvements in cardiovascular outcomes, 2 classes of oral diabetes medications provide clinical improvements in both systemic and diastolic cardiac dysfunction and improve collateral development in chronic myocardial ischemia. The mechanisms for these effects continues to be investigated.

Amedeo Amedei

The microbiota-immunity interplay in human neuroinflammation

Department of Experimental and Clinical Medicine, University of Florence, Largo Brambilla 3, 50134, Florence, Italy

The implication of gut microbiota (GM) in the control of nervous system functions in health and disease is a novel, currently emerging concept. Increasing data suggest that GM exerts its action at least in part by modulating the neuroinflammation.

Amyotrophic lateral sclerosis (ALS) is a rare and severe neurodegenerative disease affecting the upper and lower motor neurons, causing diffuse muscle paralysis. Etiology and pathogenesis remain largely unclear, but different factors (environmental, genetic, and molecular) are thought to be involved in ALS development. Emerging data define an association between GM dysbiosis and neurodegenerative diseases, such as ALS, where neuroinflammation is being increasingly recognized as a driver for its onset and progression. GM plays a relevant role in modulating the immunity, and changes in GM composition can influence neural function by affecting neuro-immune interactions, synaptic plasticity, myelination, and skeletal muscle function.

Recently, we compared the inflammatory and microbiota profile of ALS patients (showing different clinical characteristics) with healthy family caregivers. Measuring a panel of 30 inflammatory cytokines in serum and fecal samples, we observed a distinct cytokines' signature both at the systemic and intestinal level in patients compared to controls and even in patients with different clinical phenotypes and progression rates. The 16S targeted metagenome analysis revealed slight differences in patients compared to controls as well as in patients with slow progression, marked by the reduction of butyrate-producing bacteria and a decrease of the Firmicutes/Bacteroidetes ratio in ALS. Finally, the short chain fatty acid analysis did not show a different distribution among the groups. In conclusion, the inflammatory cytokine profile and the microbial composition could be appropriate biomarker candidates for deciphering ALS heterogeneity.

Pietro Vischia

From fundamental physics to Isaac Asimov: how high-dimensional models can shape the world

Ramón y Cajal Senior Researcher, Universidad de Oviedo and ICTEA

Humankind has synthesized the world using maps and charts for almost 30 thousand years. The advent of large computer models has fuelled an Artificial Intelligence revolution, where we are now able to make abstract representations of many, if not most, aspects of our daily life as a species. Large computer models, fuelled by recent hardware and software developments, assist us in achieving breakthroughs in fundamental sciences, and in modelling social phenomena. It is commonly thought that maps are an expression of our representations of the world: in this work I will argue, under the lens of information theory, that maps obtained through artificial intelligence tools can actually shape our representation of the world, and I will discuss some of the dangers that can stem from this

Ute Römling

Beneficial effects of 'irreproducibility' in scientific experimentation

Department of Microbiology, Tumor and Cell Biology, Karolinska Institutet, Stockholm, Sweden

Reproducibility of experimentation is a hallmark of trustability into scientific experiments. Reductionism in the experimental set-up to investigate the effect of single components is a hallmark of experimentation in basic life science disciplines. This reductionistic approach is performed to ensure tractability and reproducibility of experimentation which is a prerequisite for the credibility of experimental outcome. Here I argue that two factors can mainly determine irreproducibility of scientific experimentation and its translation: insufficient information about the reductionistic experimentation condition as well as assay conditions poorly reflecting 'real life' conditions. Adjustment of these two factors equally as build-up of reference databases will aid to increase the knowledge base to trace the conditions leading to apparent irreproducible experimentation. With such measures, not only will reproducibility and translatability increase, but novel components affecting biological systems will be discovered.

Simon Rosenbaum

Physical activity, mental health, and social exclusion: how do we reach the most disadvantaged?

Discipline of Psychiatry and Mental Health, UNSW Sydney, Australia

While physical activity can help improve mental health outcomes, an important implementation question remains: do the most disadvantaged people in our society have access to safe, supportive physical activity programs?

The common answer is no. People experiencing social exclusion including refugees, asylum seekers, people living with severe mental illness and those experiencing financial hardship, are often unlikely to have access to supportive and safe physical activity environments, despite being at increased risk of experiencing poor mental and physical health outcomes including cardiometabolic diseases.

This talk will outline the potential benefits, challenges and opportunities of creating for-purpose, safe, supportive physical activity spaces to address the mental, physical and psychosocial needs of disadvantaged and socially excluded people.

Drawing on robust experimental, epidemiological and co-design, qualitative evidence, in addition to the presenters first-hand experience running workshops on physical activity and mental health in over 25 countries, this talk will provide practical examples of how we can better utilise the mental health enhancing potential of physical activity to help improve outcomes for at risk groups, from Bondi Beach (Australia) to Bangladesh.

Iria Giuffrida

Artificial Intelligence (AI) and the Impact on the Development and Practice of Law

Assistant Dean for Academic & Faculty Affairs, Professor of the Practice of Law, William & Mary Law School

Artificial Intelligence systems are leading a wave of innovation across sectors; however, this wave is also causing ripples. The purpose of this talk is to offer a broad overview of AI systems' impact on the development and practice of law. The talk will cover three main areas. First, it will highlight some of the most serious challenges that AI systems pose to legal systems, such as issues of liability, and intellectual property ownership. It will then explore how different legal systems are addressing the questions of how to regulate AI and incentivize the development of "ethical AI". Finally, the talk will consider how lawyers and judges are interfacing with these new challenges.

Daniel Shin

Confidentiality Breach and Privacy Issues with AI Models

Cyber Security Researcher, Adjunct Professor of Law, William & Mary Law School

Although there have been wide discussions on the increasing capabilities of newer AI models, some researchers have demonstrated techniques that can compromise the confidentiality of data that has been used as a training data set to develop the model, raising wider questions about data privacy. In other developments, the issue of personal privacy and the right to self-image have been implicated with the proliferation of deepfakes, where AI enthusiast communities use publicly available AI models to synthesize media depicting another individual and share them publicly without consent. This talk will present two different ways confidentiality breaches and privacy issues emerge in the context of AI models by first presenting a survey of AI model attack techniques breaching the confidentiality of data and also introducing how certain nefarious uses of AI models can implicate privacy issues further in the form of unconsented deepfake media.

Fredrik Sandin

Redefining the AI Landscape: The Neuromorphic Approach to Sustainable ICT for All

Professor of Machine Learning, Luleå Technical University

By introducing the foundational principles of neuromorphic computing, this talk will illuminate its role in enhancing the resource efficiency of artificial intelligence (AI) solutions for a sustainable and broadly accessible information and communication technology (ICT) future.

Naveed Akhtar

Enabling transparent and trustworthy AI: Connecting the dots for deep learning manipulation and interpretation in computer vision

Department of Computer Science and Software Engineering, The University of Western Australia, Crawley, WA 6009, Australia

Deep learning has become a crucial technology in scientific fields that rely on machine learning, such as computer vision. Its ability to solve complex problems at a human-level performance has been well documented, but it does so using 'black-box' models. Furthermore, recent research has shown that deep learning models are highly vulnerable to covert manipulation of both the input signals and the learned models. The black-box nature of deep learning and its susceptibility to adversarial attacks are major concerns for the research community, especially in safety-critical applications in computer vision. This presentation will discuss Dr. Akhtar's contributions to the study of adversarial attacks, defences, and interpretation of deep learning visual models. It will frame the insight that adversarial manipulation and model interpretation in deep learning for computer vision can be seen as two sides of the same coin.

Katrien Fransen

From autocracy to empowerment: Harnessing the human potential for improved team effectiveness and enhanced well-being across cultures

Department of Kinesiology, KU Leuven, 3001 Leuven, Belgium

What is it that allows some teams to excel while others lag behind? Why do some teams foster a nurturing and positive environment, while others are plagued by high rates of burnout and turnover? Studies indicate that leadership plays a pivotal role in both gaining a competitive advantage and promoting the wellbeing of team members. Over the past decade, the research conducted by our expertise centre Leading Insights (www.leadinginsights.be/en) has sparked a significant shift from the traditional focus on vertical leadership (where the leader is hierarchically superior to the team) towards a model of shared leadership, where leadership is shared between the formal leader and team members. Our research has shown that identifying, appointing, and further developing the leaders within the team – referred to as peer leaders – significantly enhance team members' motivation, confidence, performance, as well as their health and well-being. Crucially, our research has demonstrated that these peer leaders are vital in various contexts (such as organisations, sports teams, walking groups, and universities) and their importance even transcends cultural boundaries. We truly hope that these findings can further inspire leaders around the world to empower their team members. By harnessing the human potential in their teams, leaders will cultivate a nurturing environment that not only propels the team's performance to new heights but also significantly enhances the wellbeing of their team members.

Prashant Kesharwani

A combinatorial delivery of survivin targeted siRNA using cancer selective nanoparticles for triple negative breast cancer therapy

Department of Pharmaceutics, School of Pharmaceutical Education and Research, Jamia Hamdard, New Delhi, 110062, India

Triple-negative breast cancer (TNBC) is one major type of cancer for which there has been no effective therapy to date. An important reason for it being the lack of expression of important receptors such as estrogen, progesterone and human epidermal growth factor receptor-2 (HER-2). Since they are majorly undiscovered in normal cells and survive only in highly expressed cancerous cells which results in the promotion of chemoresistance and poor prognosis. In this project, we developed doxorubicin (Dox) (chemotherapeutic) and lycopene (LCP) (chemo-protective) loaded polyamidoamine (PAMAM) dendrimer as an extensive anti-survivin siRNA nanocarrier (DLP/siRNA). The developed dendriplex was characterized by FTIR, DSC, NMR, Zetasizer and AFM. In vitro study depicted an elevated apoptosis rate and tumor cell uptake rate for this formulated dendriplex. Additionally, the gel retardation technique confirmed the siRNA-protecting ability of dendrimer from nuclease. Most importantly, the silencing of survivin siRNA as observed in the cancer cell population with the combined effect of chemotherapeutic and chemo-protective agents inhibited the cancer cell stemness and suppressed the tumor growth without causing cardiac toxicity in the TNBC xenograft model. Altogether, this combinatorial approach of gene delivery and chemotherapy with an application of chemo-protective effect suggests an enhanced therapeutic efficacy in the

Hailiang Wang

CO2 Utilization and Water Treatment Opportunities Enabled by Molecular Electrocatalysis

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Transition to clean energy, mitigation of carbon emissions, and protection of water resources are critical challenges for the world. Solving these challenges requires precise control of many important chemical reactions with sluggish kinetics and myriad possible reaction pathways and associated products. There is a critical need for selective, active, durable and low-cost catalysts. This talk will present our research efforts aimed at bridging the gap between homogenous catalysis and heterogeneous catalysis to realize materials with new or improved electrocatalytic properties for the CO2 and nitrate reduction reactions. Combining molecule-nanocarbon hybridization and second-coordination-sphere tailoring, we discovered the first molecular electrocatalyst for CO2-to-methanol conversion in significant yield and stability. The reduction proceeds via formaldehyde, an intermediate potentially reactive to N nucleophiles. Following this path, we developed the first electrosynthesis of methylamine from CO2 and nitrate. This 15-proton 14-electron reduction reaction proceeds via an 8-step catalytic cascade with the spontaneous condensation reaction between the formaldehyde and hydroxylamine intermediates to form the C-N bond. Further, we advanced the chemistry to ethylamine formation and N-methylation reactions, opening the door for our electrocatalytic reactions to be used for organic synthesis using CO2/nitrate as a C1/N1 building block.

Alberto Ruiz

The Early Universe, About A Billionth of a Second After the Big Bang, As Seen by Particle Accelerators After Ten Years of the Higgs Boson Discovery

Instituto de Física de Cantabria, University of Cantabria, Santander, Spain

The standard model of particle physics establishes the fundamental building blocks of the Universe and the forces that define its evolution and behaviour.
With the discovery of the Higgs boson in 2012, the theoretical framework is complete, only awaiting further precision in the measurement of its parameters.
However, this framework can only explain about 5% of the matter-energy of the Universe, so it must be an effective, but not complete, theory.
In the past 11 years and for the foreseeable years to come, scientists will try to look for discrepancies with the standard model and for clues to new physics that will allow us to expand our knowledge of the Universe.
I will give a summary of the current situation and future prospects.

Alfredo Martínez Hernández

Precision personalised, population and planetary nutrition for global health

Precision Nutrition and Cardiometabolic Health, IMDEA-Food Institute (Madrid Institute for Advanced Studies), UAM+CSIC, Madrid, Spain

Nutrition is a holistic science that was originally conceived to analyse and biologically integrate endogenous processes related to the metabolism of food into energy and nutritional components utilization for cellular functions and body homeostasis. These physical-chemical reactions and biological processes are involved in human development to guarantee life expectancy and long-term human well-being, with a relevance for personal, population and planetary health based on individualised, epidemiological, and sustainable precision nutrition, respectively. Currently, nutritional challenges and the interests of nutritionists are focused in physical, emotional, intellectual, cognitive, spiritual, environmental, and occupational health facets and endeavours. Furthermore, according to the new emerging health scenarios, food intake must be evaluated in relation to social, satisfaction, satiety, security, and sustainability determinants. In this context, two seemingly alternative approaches, one derived from a global public health perspective and another derived from a personalized precision nutrition paradigm, should be harmonized and debated, as they are complementary to each other and, as such, tailored, participatory, preventive, and predictive strategies are needed to maintain a healthy state, as well as to prevent and manage diseases.
In fact, precision nutrition should consider and integrate all the factors involved in global quality of life and metabolic well-being based not only on genotype, but also on dietary intake and associated healthy lifestyles, to be developed and worldwide applied in personalized, population and planetary settings for individual, public and global health, taking into account genetic/ethnic considerations and non-genetic phenotypes as well as environmental interactions.

Christopher Wlezien

Partisan Public Responsiveness to the News

College of Liberal Arts, University of Texas at Austin, Austin, USA

Research demonstrates public responsiveness to policy that is mediated by news coverage of government actions. It is however not clear whether and how groups respond differently to the news. There is reason to expect responsiveness to vary across partisan groups, who not only may have different information about policy change but may also react differently to the same information. We analyze relationships between policy, the news, and partisan public preferences in the United States, focusing on three spending domains where measures of the different variables are available and thermostatic responsiveness is evident: defense, welfare, and health. Expectedly, our analyses reveal substantial differences in levels of policy support for Democrats, Independents, and Republicans, but partisan preferences also move in parallel over time, if imperfectly. Based on our analysis, the heterogeneity at least partly reflects differences in responsiveness to the news. Although all partisan groups respond almost identically to changes in spending, Republicans respond more to the media spending signal than Independents and especially Democrats. Interestingly, Republicans are not more responsive to any particular channel, e.g., Fox, and just seem to reflect the general media signal that is evident in multiple outlets. Although the reasons for the differences are not clear from our analyses, we can -- and do -- consider the possibilities, probing connections to other research.

Diana Boraschi

Immunity, inflammation and diseases: research and training based on international collaboration

Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China

Immune responses, in particular innate immunity and inflammation, are of key importance in maintaining the physical and functional integrity of the body, as well as in protecting against infections and other diseases. Complex regulatory mechanisms ensure that the protective/homeostatic innate immune activity is kept under control and does not cause unwanted damages. Chronic inflammatory and autoimmune diseases have, at their basis, an uncontrolled innate immune/inflammatory activation. Recent emphasis on innate memory may open the way to a new approach to the therapy of such diseases as well as to the design of personalised preventive tools, based on the controlled enhancement or regulation of innate/inflammatory reactivity. Progress in this field, as far as I am personally concerned, is entirely based on collaboration with colleagues worldwide. I started my research work in the area of innate immunity and inflammation in health and disease almost 50 years ago, and this has allowed me to go through exciting scientific developments and to meet and work with excellent colleagues across the globe. Teaching and mentoring young scientists became a very important part of my scientific activity. I have worked and taught students from many African and European countries, Brazil, China, Korea, USA. Science has no borders: working together on scientific issues of common interest is very easy because we have a common language and it is very easy to understand each other. Science may become the ground on which we can build mutual understanding and long-lasting peace.

Elisabetta Comini

Nanowires towards environmental sustainability: chemical sensing and renewable energy

Sensor Lab, Department of Information Engineering, University of Brescia, Brescia, Italy

Environmental awareness and the pursuit of sustainability have seen significant growth recently. Consequently, the need for continuous environmental monitoring and the utilization of renewable energy sources has become crucial, particularly in light of the escalating human activities focused on industrial and technological advancements. There is also an increasing demand for highly efficient chemical sensing devices. This presentation will cover the preparation and characterization of metal oxide nanostructures, employing various growth and characterization techniques.

In the realm of cutting-edge technologies, metal oxide nanostructures hold great promise due to their high charge carrier mobility, ease of fabrication, and impressive stability. Many of these structures demonstrate a reversible interaction with their surrounding atmosphere, which can result in alterations to key material properties like electrical conductance, capacitance, work function, or optical characteristics, as well as charge separation effects. These phenomena can be harnessed in both chemical/gas sensors and fuel cells. While all metal oxides, when sufficiently porous (possessing a high surface-to-volume ratio and controlled electrical properties from surface states), display consistent reactivity, they must meet specific criteria, including sensitivity, selectivity, stability, high efficiency, and reliability, to function as active materials in chemical sensors and solid oxide fuel cells. Among nanostructured materials, one-dimensional (1D) semiconductor metal oxides like nanowires (NWs) have garnered significant attention due to their distinctive chemical and physical properties.

Various growth techniques have been employed for different nanostructure formations, including vapor phase evaporation and condensation, thermal oxidation, electrochemical anodization, hydrothermal synthesis, and atomic layer deposition. The surface morphology of the nanostructures was examined using scanning electron microscopy, while structural characterization was conducted through X ray diffraction, transmission electron microscopy, Raman and UV-Vis spectroscopy.

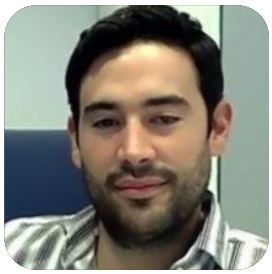
A significant challenge lies in the dependable integration of quasi-1D nanostructures onto specific transducers used in the fabrication of chemical sensors and solid oxide fuel cells, ensuring stable electrical contacts over prolonged operation. Both the accomplishments in chemical sensing and solid oxide fuel cell technology will be presented.

Fabien Lotte

Can neurotechnologies contribute to global peace?

Inria Center at the University of Bordeaux, Talence, France

Neurotechnologies, and in particular Brain-Computer Interfaces (BCI) are systems that translates users' brain activity, typically measured using ElectroEncephaloGraphy (EEG), into commands for an application. For instance, they can be used to move a computer cursor on screen towards the left or right by having users imagining left or right hand movements, recognized from EEG signals. They appear very promising for numerous applications, including assistive technologies for motor-impaired users, video games or neuroadaptive technologies, adapting the interaction content (e.g., game difficulty) to the users' mental states (e.g., mental fatigue). With this year's USERN congress topic, "United Science and Art: The Power For Peace", one may thus wonder whether Neurotechnologies and BCIs could also be used to favor global peace. At first glance, they do not seem to be able to do so, and indeed, they were not made for that in the first place. Moreover, to the best of my knowledge, there is no research work using BCI for peace. However, in this talk, I will speculate on how BCIs might be used to do so, to promote peace, in the future. In particular, I will mention three existing applications of BCI that may be used to do so in the future: 1) mental state monitoring and neuro-adaptive education: BCI can monitor users' mental states such as attention and workload so as to provide teaching material adapted to the learners' current mental state, to optimize the efficiency and effectiveness of education in general, and thus possibly of peace education in particular; 2) neurofeedback: BCI can provide real-time visualisation of a given brain activity pattern to a user using a BCI so he/she can learn to self regulate it. This could be used to train users to willfully reduce the occurence of their own mental states likely to favour conflict or to promote those likely to favour peaceful conflict resolution; 3) hyperscanning, which can measure synchronous brain activities across multiple users, and thus identify neural markers of successful collaborations, such collaborations between users and communities beeing a driving factor of peace. None of these systems exist currently, but they might be worth exploring in the future.



Francisco J. Barba

Eco-friendly approaches to valorize olive oil waste

Sergio Martínez-Terol

Eco-friendly approaches to valorize olive oil waste

Research group in Innovative Technologies for Sustainable Food (ALISOST), Department of Preventive Medicine and Public Health, Food Science, Toxicology and Forensic Medicine, Faculty of Pharmacy, Universitat de València, Avda. Vicent Andrés Estellés s/n, Burjassot, 46100 València, Spain

Industrial processes for olive oil production generate a considerable amount of oil wastewater, also known as "olive mill wastewater" (OMW) or alpechín, involving important environmental concerns and a problem for this production sector. Due to its composition, it is a potential reservoir of high-added-value compounds (HAVCs), such as oleuropein, hydroxytyrosol and tyrosol. The conventional methods are characterized by low extraction yield, long extraction time, high solvent and energy consumption and potential health risks due to solvent residues. The shortcomings of these conventional methods have stimulated interest in innovative green processing technologies, which better preserve target HAVCs. Among these innovative techniques are Pulsed Electric Fields (PEF), Pressurised Liquid Extraction (PLE), Supercritical Fluid Extraction (SFE), Microwave Assisted Extraction (MAE) and Ultrasound Assisted Extraction (UAE). The aims of this study are the optimization of the extraction and processing techniques to obtain high-added-value compounds from olive-mill wastewater ponds and the characterization of the extracts obtained. Furthermore, the ALISOST research group looking to promote industrial symbiosis, closing the cycles of production, where waste flows from an oil mill become resources for another plant, improving the environmental and economic benefits through the efficient reuse of resources. To carry out the study, ten samples of oil mill wastewater (OMW) and ten samples of alpechín sludge from abandoned ponds in the Mediterranean area and southern Spain are being analyzed. The first results obtained indicate the presence of phenolic compounds in all the ponds, with quantities that ranged between 1 and 38 mg GAE/g of fresh alpechín. The polyphenol content of the alpechín samples was influenced by factors such as the state of the matrix, seasonality, location, and the degree of abandonment of the ponds and vegetation water. This study provides a solid basis for the implementation of innovative strategies for the valorization of this waste material as potential bioactive compounds for the agri-food industry.

Georgios Vousinas

Towards a conceptual framework for Sustainable entrepreneurship: A theoretical approach

National Technical University of Athens, School of Mechanical Engineering, Sector of Industrial Management & Operational Research, Greece

The concept of Sustainable Development (SD) has gained worldwide attention, especially over the last decade, also driven by the decision of the United Nations General Assembly to set the tone by adopting a new development program, the wellknown "2030 Development Agenda". Therefore, Sustainable Entrepreneurship (SE) has received substantial acknowledgement as it is considered a promising approach, focusing on and playing a prominent role in solving complex environmental, social and governance (ESG) issues, as well as financial challenges, by offering innovative solutions. The purpose of this paper is to propose a conceptual framework for SE grounded on the best practices of the European market. For this purpose, a targeted literature review is provided regarding various aspects of SDGs in the context of the European Union (EU). Based on the findings, the author proposes a conceptual sustainable entrepreneurship framework that aims to act as a reference point and is scheduled to be applied in the Greek economy in future research efforts. Overall, this paper contributes to the current research on such a critical issue as the SE by proposing a conceptual framework as well as providing useful insights for an effective transition to a globally sustainable economy, offering incentives for synergies among academic institutions and the private sector and hopefully initiating a fruitful discussion among all stakeholders.

Godefridus J. Peters

Tumor metabolism as a target for drug development

Department of Medical Oncology, Cancer Center Amsterdam, Amsterdam U.M.C., VU. University Medical Center (VUMC), Amsterdam, the Netherlands
Department of Biochemistry, Medical University of Gdansk, Gdansk, Poland

Already at an early stage of cancer drug development it was recognized that metabolism in cancer cells is different from normal cells. The Warburg effect postulates that in (hypoxic) tumor cells energy supply switches from the mitochondrion to the cytoplasmic glycolysis. Nobel laureates Georges Hitchings and Gertrude Elion developed a number of drugs targeting metabolism, which appeared to be life-saving such as antifolates and thiopurines. These drugs are not only the mainstay in curative treatment of pediatric leukemia, but are also standard medication for various inflammatory diseases. Their rational design of antimetabolite based combinations formed the basis for the curative treatment of various viral diseases (e.g. AIDS-HIV) and cancer. All these approaches have in common that various pathways in cellular metabolism are being targeted.
Targeting metabolism benefits from methodologies such as genomics, proteomics and most importantly metabolomics. Genomics enables to characterize potential targets in tumors, while metabolomics (using e.g. imaging mass spectrometry) enables to determine hundreds of metabolites demonstrating major metabolic changes in cancer cells. With molecular modeling effective drugs were designed (with suitable ADME properties) that target key enzymes in metabolism. We have demonstrated that some of these enzymes, such as lactate dehydrogenase A (LDH-A) and transporters such as GLUT1, are increased in tumors, including non-small cell lung cancer (NSCLC), pancreatic ductal adenocarcinoma (PDAC) and malignant pleural mesothelioma (MPM). Specific inhibitors of LDH-A (NHI-1, NHI-2) were more effective against hypoxic tumor cells, and increased the efficacy of standard chemotherapeutics such as gemcitabine and pemetrexed in PDAC and MPM, respectively. A combination of LDHA and GLUT1 inhibitors was synergistic in MPM cells, and associated with specific depletion of adenine nucleotides and NAD+/NADH. In order to increase the cellular uptake of NHI-2, a glycosylated derivative was synthesized (NHI-GLC-2), which showed a marked antitumor effect against MPM cells. Targeting of pyruvate dehydrogenase kinase (PDK1) in NSCLC cells with compound 64 in combination with LDH-A inhibitors was highly synergistic leading to increased apoptosis and inhibition of the AKT-mTOR pathway, as well as normalization of mitochondrial respiration, The combination of LDH-A and PDK1 inhibition was also very effective in an in vivo model of NSCLC.
In conclusion, novel inhibitors of the glycolytic pathways have marked anticancer activity in notably resistant tumors, such as PDAC, MPM and NSCLC. Synergism (both in vitro and in vivo) was observed for combinations with standard anticancer drugs, as well as for combined inhibition of e.g. LDH-A and GLUT-1 or LDH-A and PDK1.

Hassan Abolhassani

Challenges of functional confirmation in missense mutations: NFKB1 defects in antibody deficiencies

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Department of Biosciences and Nutrition, Karolinska Institutet, Stockholm, Sweden

The majority of the NFKB1 (Nuclear factor kappa B subunit 1) heterozygous pathogenic variants that are currently known have harmful flaws such severe truncations, internal deletions, and frameshift variations. These together make up the most prevalent monogenic cause of common variable immunodeficiency (CVID) that has been discovered thus far. The mature NF-B component p50 is produced by restricted proteasomal processing of the C-terminal half of the transcription factor precursor p105, which is encoded by NFKB1. A well-known disease mechanism is the p105/p50 haploinsufficiency caused by severe genetic damage and protein loss, but the pathogenic significance of many NFKB1 missense variants is still unknown and/or unstudied due to the lack of reliable test procedures to establish causality. In this work, we functionally identified 47 different missense variations that are located in the N-terminal domains and influence both the unprocessed p50 and the p105 precursor proteins. We investigated the effects of transient overexpression of mutant p105 and p50 fused to EGFP on subcellular localization, protein stability and precursor processing, DNA binding, and RelA-dependent target promoter activation, using fluorescence microscopy, Western blotting, electrophoretic mobility shift assays (EMSA), and reporter assays, respectively. While two missense variations had no effect on protein stability but resulted in a decrease in DNA-binding activity, nine missense variants were shown to be detrimental and to intensify protein degradation. Four of the examined single amino acid variations had relatively slight negative impacts, whereas seven generated unclear protein abnormalities. Test results for 25 variations were identical to those of the wildtype controls, making it difficult to determine how harmful they could be. In conclusion, our research demonstrates that pathogenic missense mutations affecting the Rel-homology domain might result in DNA-binding deficiencies or protein-decaying problems, which are similar to the disease processes of p105/p50 haploinsufficiency. However, until appropriate testing have confirmed they are benign, uncommon variations (with a population frequency of less than 0.01%) with modest abnormalities or with neutral tests should still be evaluated as possibly harmful.

Kenneth S. Kosik

The Collective Virtual Mind

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The sudden leap in the performance of artificial intelligence (AI) has inserted another type of doom near or at the top of the catastrophe list. Because the fingerprints of neuroscience are all over artificial intelligence how AI draws upon human brains is a matter for scrutiny. The most important task of the brain is to predict the future. Predicting the future accurately requires imagining the future. Learning from the past can improve the accuracy of predictions and therefore learning is positively selected in evolution for its survival advantages. However, the complexity of the past—its content, its boundaries—begs the question what elements from the past provide the best lessons for divining the future. And even optimizing the most predictive elements from the past, surprises quite reliably counter our predictive confidence. As a learning tool, the past functions only as well as objective events are filtered once they transition into memory. The disarray of a time past full of distortions and the forgettable once encoded as memory makes it hard to conceive that such an imperfect record can in any way serve as an effective learning tool. Nevertheless, these imperfections in memory become features when converted to salience and when useless information is discarded. In the burgeoning world of AI, the algorithm decides on salience, nothing is forgotten and their storehouses hold the world's collective knowledge. When tasked to do what humans do within their generative and transformer architectures any resemblance to human cognitive state is an uncanny deception. Nevertheless responsibilities placed on AI are increasingly demanding and when they fail the human toll is great.

Kotohiro Nomura

Olefin Metathesis Approach for Synthesis of Bio-Based Polyesters and Efficient Chemical Recycling

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Development of functional polymers from renewable feedstocks, sustainable alternatives from fossil oil, has been recognized as an important subject in the field of polymer chemistry and green sustainable chemistry. Development of advanced aliphatic bio-based polyesters by precise polymerization techniques, attracts considerable attention. Moreover, acid-, basefree depolymerization of polyesters to monomers, efficient chemical recycling under mild conditions, has also been considered as one of the key subjects to establish the circular economy.
We recently demonstrated synthesis of biobased aliphatic polyesters by acyclic diene metathesis (ADMET) polymerization of 1,ω-dienes (derived from castor oil, sugars, organic acids in fruits etc.) and subsequent tandem hydrogenation under mild conditions. The method not only enabled synthesis of high molecular weight polymers with unform compositions (better for the material property), but also enabled the depolymerization (after the ADMET polymerization) by treating with ethylene. Moreover, we demonstrated efficient catalytic depolymerization of polyesters, even conventional polymers (PEA, PBA, PET, PBT etc.), by transesterification with alcohols to afford monomers (chemical recycling, upcycling) exclusively. The basic concept of this project including more recent progress for synthesis, analysis of (thermal and mechanical) properties in the biobased polymers, and their chemical recycling (depolymerization and conversion to fine chemicals), upcycling.

Manoj Gupta

An Insight into Cryogenic Treatment of Lightweight Magnesium Based Materials for a Greener Future

Department of Mechanical Engineering, National University of Singapore, Singapore

Magnesium is a nutritional element for humans, animals, and plants in context of the proper functioning of their vital biological systems. In context of engineering, magnesium is the lightest weight structural metallic element capable of providing ~ 33% weight saving (component vs component) if it replaces aluminum. This translates to significant fuel and energy savings wherever energy is required for the functioning of a system. Industrial sectors that can benefit from lightweight magnesium-based materials include automotive, aerospace, space, marine, rail, robotics, sports, and electronics sectors. Being one of the most abundant elements in soil and water (sea) bodies of planet earth, magnesium provides a wonderful option to engineers for widespread use. However, the use of magnesium is still underutilized and that can be attributed to the lack of technology and ignorance of many researchers. As a result, the choice of commercial magnesium alloys for engineering/biomedical applications is limited as they display a limited range of properties. Currently, many efforts are being placed to increase the span of properties that magnesium alloys can display and one of the methods is to modify the microstructure through cryogenic treatment. Accordingly, the primary aim of this presentation is to highlight the capability of one such sub-zero (deep cryogenic treatment) treatment to favorably affect the properties of novel magnesium-based nanocomposites. The results are encouraging and capable of opening a new line of research.

Massimo Capaccioli

The Birth of Modern Cosmology

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At the start of the 1900s, cosmology, which had been prey to myths and superstitions for millennia, took a giant step forward thanks to Einstein's new theory of gravitation and the discoveries made by virtue of innovative and powerful instruments for observing the heavens. The talk will succinctly retrace the most salient steps of this exciting adventure that led us to the modern Standard Model, seductively satisfying.

Moein Moghimi

Nanomedicine: A New Frontier in Precision Medicine

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Today, healthcare is harnessing the power of genomics, gene editing, and nanotechnology to build a solid foundation for a more patient-centric and individualized approach to healthcare and improving clinical outcomes. The emergence of the "precision medicine" paradigm is helping with the discovery of novel drug targets, drug repurposing, and drug repositioning. Developments in nanotechnology are introducing responsive entities for controlled delivery of therapeutic and diagnostic agents across difficult biological barriers for the treatment of immunological, cardiovascular, and neurological diseases and disorders. Technological breakthroughs in targeted drug delivery together with advances in biomarker discovery are becoming the driving force of precision medicine. However, an effective treatment planning must not only consider disease heterogeneity, but also the broader aspects of disease microenvironment as therapy progresses. These include the dynamics of immune system microenvironment, rate-limiting biological barriers and transport processes. This presentation will address these challenges through systems approaches and introduces work in progress towards development of biomarker detection technologies, more effective and safer vehicles and therapeutic nanoplatforms than lipid nanoparticles for the delivery of nucleic acid therapeutics across the biological barriers, and global solutions to nanoparticle-mediated adverse reactions.

Mozhgan Rezaei Kanavi

Role of united science for Rapid and Proper Diagnosis of Infectious Keratitis

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Infectious keratitis as the 5th leading cause of blindness worldwide is of great importance in ophthalmology in terms of early diagnosis and proper management. Each of the clinical and adjunctive paraclinical tools such as microbiology, PCR, and in vivo confocal microscopy, if used alone, are not sufficient for making a rapid diagnosis of infectious keratitis. However, if we make a diagnostic setup to unite these different sciences, i.e. clinic, microbiology, and confocal microscopy, there will be a high possibility for increasing and expediting the rate of correct diagnosis of infectious keratitis cases. This diagnostic setup was established at the Confocal Scan Unit of Central Eye Bank of Iran, Tehran in 2006 under supervision of an ophthalmologist who was also an ophthalmic pathologist. By uniting the clinic (slit-lamp biomicroscopy), fast microbiology (wet mount preparations or microbiologically stained smears), and corneal confocal microscopy, the proper and rapid (less than 2 hours) diagnosis reached 97.8% in 1,011 referred infectious keratitis cases between 2006 and 2019. However, the high cost of confocal microscopy and the need for an experienced person to perform and interpret the results of the united sciences may be shortcomings of this setup.

Natalya Shelkovaya

Total Unity as a Saving Intention and/or Paradigm of Humanity

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The paradoxical nature of the modern world lies in the unity of the incompatible: globalization and the splitting of the world into many worlds and little worlds fighting with each other. Serious passions boil in the modern world, the emergence, perception and evaluation of which are limited by the horizon of the dominant subjective and social determinants. However, human existence is multidimensional, it has not only personal and social, but also spiritual determinants. Forgetting this fact leads to an inadequate perception of what is happening and, consequently, inadequate actions. If we consider all the events taking place in the world as icebergs, then it becomes obvious that seeing only the tip of the iceberg, its abovewater part, does not lead to the understanding of its nature, the reasons for its occurrence here, now and just that one, because the causes are under water.

The most important, in my opinion, causes of inadequate perception of reality, leading to antagonistic splits within and between countries, are: a narrow "own's own little world" of the world perception, passed off as the truth in the final instance; absolutization of the mind, which considers itself omniscient and able to know everything; the cultivation of negative information and cruelty in society; manipulation of the worldview and worldfeelings of people, their depersonalization and zombification in the interests of the ruling political elites with the help of the media; antagonistic dichotomy of the world perception; lack of a sense of connection of everything that exists, in particular of a sense of unity of "I" and "Thou;" loss of the "culture of heart" and the ability to love. Evil is a disconnection from unity, from a sense of the organic connection of everything, elevating oneself to the all-knowing, omniscient and able to do everything with the people around him and the world Absolute. As a result of this disconnection, "the world lies in evil." All tragedies, crises, wars on Earth are a consequence of forgetting ones unity with the world and the Universe. Only by changing the causes that give rise to the "world of evil and separation" can the lost integrity and harmony of man, society and world civilization be restored. The revival of the earth's civilization is possible only in total unity.

Patrizia Azzi

Physics Opportunities at the Future Circular Collider

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The 2020 visionary update of the European Strategy for Particle Physics endorsing the FCC feasibility study as a top priority for CERN and its international partners provides the HEP community with a powerful tool of investigations.
The electron-positron stage (FCC-ee) is a precision frontier factory for Higgs, electroweak, flavour, top quark, and QCD physics.
It is designed to operate in a 91-km circular tunnel built at CERN, and will serve as the first step towards O(100 TeV) proton-proton collisions (FCC-hh).
The very high luminosity, the exquisite energy calibration at the Z, WW, ZH and ttbar energies, the possibility of monochromatisation at $\sqrt{s}$ = mH, and the multiple detectors are building blocks of a unique program for FCC-ee, with high potential for discoveries. Such a machine offers ideal conditions for the study of the four heavy particles of the standard model with a flurry of opportunities for precision measurements, the observation of tiny violations of established symmetries, the searches for rare or forbidden processes, and the exploration of the dark sector with the possible discovery of feebly coupled particles.
The combination of these two machines, FCC-ee and FCC-hh, offers an incredible discovery potential, unique on the market, with a careful mixture of precision measurements sensitive to very weak coupling or very heavy objects, and very high energies where the new heavy particle could be directly produced.
A digest of this diverse and rich physics programme and of the corresponding experimental and theoretical challenges will be given in this presentation.

Paulo Roberto Bueno

Advances in Quantum Electrochemistry

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Electrochemistry permeates several processes in our daily lives. It is not only important in driving the conversion of chemical into electric energy, but also in governing the conversion of solar into chemical energy. Electrochemistry drives the electric circuitry of biology and so on. The quantum mechanical applications of electrochemistry have been limited for our lack of understanding of how the electrons are transported from one molecule to another and to control it. This is not only a problem concerning electrochemistry, but also an electronic issue as Kirchhoff's law does not apply at the nanoscale.

In this lecture it is introduced the quantum rate first-principle concept that comprises with Planck-Einstein relationship that comprises with PlanckEinstein relationship E = hν, where ν = e2/hCq is a frequency associated with the quantum capacitance Cq and E = e2/Cq is the energy associated to ν. For a single state mode of transmittance, e2/Cq corresponds to the chemical potential differences Δμ between donor and acceptor state levels comprising an electrochemical reaction. By applying statistical mechanics consideration over E, as it is required to compute the contribution of the thermal dynamics at finite temperature (required for electrochemical reactions at room temperature), the Arrhenius equation for the temperature dependence of the reaction rate is obtained as well as Marcus's Arrhenius-type electron-transfer rate constant as particular settings of the quantum rate ν. Consequently, this ν concept provides the quantum mechanical foundations for electrochemical reactions. The present work also demonstrates that the electron-transfer rate of heterogeneous (diffusionless) reactions can be detailed studied within this theory by measuring Cq using time dependent electrochemical methods.

Owing to the demonstration that electron transfer follows a statistical mechanics version of Planck Einstein E = hν relationship, it alludes to electrochemical reaction dynamics cannot be appropriately modelled using nonrelativistic Schr¨odinger wave mechanics, which is the ongoing quantum approach to electrochemistry. Accordingly, a relativistic analysis that takes into account the spin dynamics of the electron is more appropriate. The latter assumption implies a quantum electrodynamics within a particular quantum transport mode intrinsically coupled to the electron-transfer rate of electrochemical reactions that have not been considered so far. Here it is demonstrated that the consideration of this inherent quantum transport is key for an in-depth understanding of the electron transfer phenomenon.

Finally, the theory is validated through its applications to describe electrontransfer, quantum conductance and capacitance in different electro-active molecular films.

Reza Malekzadeh

Urinary TERT promoter mutations are detectable up to 10 years prior to clinical diagnosis of bladder cancer: Evidence from the Golestan Cohort study

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Detecting pre-clinical bladder cancer (BC) using urinary biomarkers may provide a valuableOpportunity for screening and management. Telomerase reverse transcriptase (TERT) promoter mutations detectable in urine have emerged as promising BC biomarkers.
We performed a nested case-control study within the population-based prospective GolestanCohort Study (50,045 participants, followed up to 14 years) and assessed TERT promoter mutations in baseline urine samples from 38 asymptomatic individuals who subsequently developed primary BC and 152 matched controls using a Next-Generation Sequencing-based single-plex assay (UroMuTERT) and droplet digital PCR assays.
Results were obtained for 30 cases and 101 controls. TERT promoter mutations were detected in 14 pre-clinical cases (sensitivity 46.67%) and none of the controls (specificity 100.00%). At an estimated BC cumulative incidence of 0.09% in the cohort, the positive and negative predictive values were 100.00% and 99.95% respectively. The mutant allelic fractions decreased with the time interval from urine collection until BC diagnosis ($p = 0.033$) but the mutations were detectable up to 10 years prior to clinical diagnosis.
Our results provide the first evidence from a population-based prospective cohort study of the potential of urinary TERT promoter mutations as promising non-invasive biomarkers for early detection of BC. Further studies should validate this finding and assess their clinical utility in other longitudinal cohorts.

Richard J. Johnson

Nature, Evolution and Obesity

Professor of Medicine, University of Colorado Anschutz Medical Campus, Aurora, Colorado, USA

An epidemic of metabolic disorders continues to reign worldwide, characterized by obesity, metabolic syndrome, diabetes, non-alcoholic fatty liver disease, hypertension and cardiac and kidney disease. Much attention has focused on the role of western diet as being a principle driver but whether it is driven by excessive eating in general, or from a specific type of food (fat vs carbohydrate) has been debated. Here we have gained insight for why, how and when animals purposely become obese and couple studies in Nature with evolutionary biology to identify a biologic switch that triggers metabolic disorder. The pathway is triggered by the metabolism of fructose (either present in the diet, primarily as added sugars) or that is generated endogenously (from high glycemic carbohydrates and salty foods). Fructose is unique as a nutrient in that it lowers the active energy in the cell (ATP), shunting calories to stored energy (fat), and also triggering metabolic effects that induce hunger, leptin resistance, a reduction in resting energy metabolism, insulin resistance, a stimulation of fat production, and a block in fat oxidation. The central mechanism appears to be suppression of mitochondrial function driven by oxidative stress mediated by NADPH oxidase and intracellular uric acid. Humans are particularly susceptible due to a genetic mutation in uric acid metabolism that occurred during a period of near extinction of our species in the mid-Miocene. The marked rise in obesity today is due in part to the dramatic increased in added sugar intake that triggers the switch, coupled with intake of high fat foods (especially seed oils) that provide energy dense food. Treating obesity requires both reduction in foods that contain or generate fructose as well as measures to improved mitochondrial function, such as zone2 exercise. Thus, nature and evolution can provide remarkable insights into the pathogenesis of many of the diseases humans suffer from today.

Sabu Thomas

Engineering at the nanoscale: a strategy for developing high performance functional materials from Agrowaste

International and Inter University Centre for Nanoscience and Nanotechnology (IIUCNN), Mahatma Gandhi University, Kottayam, Kerala, India

The design and synthesis of nano-architected cellulose and chitin can act as efficient materials for water purification. The talk aims to study and compare the performance of a polyvinylidene fluoride (PVDF) electrospun membrane, unmodified cellulose nanofiber (CNF) based PVDF membrane, and Meldrum's acid (2,2-dimethyl-1,3-dioxane-4,6-dione) modified CNF-based PVDF membranes against the Fe2O3 nanoparticle filtration and crystal violet (CV) dye adsorption. Herein, we introduced a facile method to produce a unique green adsorbent material from cellulose nanofibers (CNFs) via a nonsolvent assisted procedure using Meldrum's acid as an esterification agent to enhance the adsorption toward positively charged crystal violet dyes. Most of the surface modifications of cellulose nanofibers have been done using toxic organic solvents like pyridine, dimethyl acetate, (2,2,6,6-tetramethylpiperidin-1-yl)oxyl (TEMPO), etc. So far, this is the first report on the surface modification of cellulose nanofibers via a nonsolvent assisted procedure. Both CNF-based PVDF membranes were prepared by successive coating of modified and unmodified CNFs on to the surface of a PVDF electrospun membrane. All the demonstrated membranes showed high filtration capacity against the Fe2O3 nanoparticles. With the 10 mg/L of crystal violet (CV) aqueous solution, CV adsorption of PVDF electrospun membrane, and unmodified CNF-based PVDF membrane was around 1.368 and 2.948 mg/g of the membrane respectively, whereas it was 3.984 mg/g of the membrane by Meldrum's acid CNF-based PVDF membrane. The demonstrated Meldrum's acid modified CNF-based PVDF membrane was proven to be the efficient media that can concurrently eliminate the Fe2O3 nanoparticles and CV dyes from the water. The investigation into the surface chemistries of cellulose nanofibers beyond the adoption of toxic solvents can enhance the economic usefulness of the process and also yield a new eco-friendly adsorbent material that is agreeable to adsorbing various toxic pollutants.

Sara De Biasi

Focus on tumor infiltrating lymphocytes in cancer research

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Phenotypical and metabolic heterogeneity of tumor infiltrating lymphocytes (TIL) could play a fundamental role in determining the prognosis in non-small cell lung cancer (NSCLC). Here we investigate the phenotype and metabolic profile of different subpopulation of B and T cells expressing P-selectin glycoprotein ligand-1 (PSGL-1, CD162) and one of its ligang V-domain immunoglobulin suppressor of T cell activation (VISTA).

Thrity-seven patients with resectable non-small cell lung cancer (NSCL) were enrolled. The phenotype of B and T cells within tumor microenvironment (TME) was analyzed using two flow cytometry (FCM) panels, with a particular focus on novel immune checkpoints (CD226, CD96, CD162, VISTA). The metabolic profile was analyzed by using a 45-parameter mass cytometry panel (single-cell metabolic regulome profiling, scMEP by CyTOF). NicheNet and NSCLC spatial trascriptomics datasets (CosMX, Nanostring) were used to infer ligands-receptors interaction and their gene regulatory effects on interacting cells.

A total of 11% of CD4+ and 19% of CD8+ tissue resident memory (TRM) cells expressed different levels of CD162, and they displayed different metabolic profile ranging from highly metabolic activation to poor glycolytic capacity. Tumor B cells were enriched of B regulatory (BREG) cells expressing Interleukin 10 (IL)-10 and VISTA, characterized by high activation of aminoacidic, glycolytic, pentose, fatty acid oxidation (FAO) and tricarboxylic acid cycle (TCA) pathways. In silico inference of intercellular communication between T and B cells predicted CD162-VISTA as putative receptor-ligand target in NSCLC samples. Analysis of NSCLC spatial datasets showed that T and B were in close contact within tertiary lymphoid structures.

CD162-VISTA axis could point out a functional interaction between B and T cells in the TME of NSCLC patients. Ongoing experiments are investigating mechanism of this interaction that could be associated with local immune modulation.

Serge Brand

Cognitive Disengagement Syndrome (CDS; formerly: Sluggish Cognitive Tempo; SCT) among children, adolescents and adults – a brief historical overview and current trends in research

Dena Sadeghi-Bahmani

Cognitive Disengagement Syndrome (CDS; formerly: Sluggish Cognitive Tempo; SCT) among children, adolescents and adults – a brief historical overview and current trends in research

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Typically, individuals scoring high on Cognitive Disengagement Syndrome (CDS; formerly: Sluggish Cognitive Tempo SCT) report a set of behavioral symptoms that includes excessive daydreaming, mental confusion and fogginess, being lost in one's thoughts, and slowed behavior and thinking. Symptoms of SCT show overlap with a broad range of other symptoms such as attention-deficit/ hyperactivity disorder-inattentive type, anxiety, and depression, though, CDS is clearly and factor-analytically distinctive from ADHD- inattentive type.
The present lecture provides a brief historical overview of the development of CDS, and current trends in research. More specifically, the lecture provides evidence that CDS is factor-analytically distinctive from ADHD-inattentive type and that such differentiation has implications for the treatment.

Shinya Kimura

Cure of all chronic myelogenous leukemia patients

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Most people still think "Leukemia is death disease". However, today, leukemia has become the most curable malignant disease with drug therapy. Until the 21st century, chronic myeloid leukemia (CML) was the most intractable disease of all leukemias, always resulting in death within several years, no matter what drug therapy was used, except for hematopoietic stem cell transplantation which is very risky treatment. However, the advent of the ABL tyrosine kinase inhibitor (TKI) imatinib, a molecular targeting therapy that inhibits the causative BCR::ABL protein, had dramatically improved the prognosis of CML, making the disease virtually deathless if taken properly. However, some patients still have problems with resistance, intolerance and side effects from long-term use of imatinib. To overcome imatinib resistance, we first focused on the fact that zoledronic acid (ZOL), a drug used to treat osteoporosis, inhibited RAS protein that existed in the downstream of BCR::ABL protein, and found that the combination of ZOL augmented the effect of imatinib (Blood 2003). Subsequently, we developed a second-generation drug, bafetinib, which was 55 times more potent than imatinib in inhibiting ABL (Blood 2005, Blood 2007, Cancer 2010). Since ABL TKIs are ineffective against CML stem cells, it was believed that CML patients must take ABL TKI for live. Therefore, side effects and treatment costs due to long-term medication were problematic. We found that about half of patients did not relapse after discontinuing dasatinib, one of second generation ABL TKIs, whether used second-line or first-line (Lancet Haematol 2015, Lancet Haematol 2020). We also proved that in many CML patients over 70 years of age, only one-fifth of the standard dose of dasatinib was sufficient (Lancet Haematol 2021).Relapse after TKI discontinuation has been attributed to an unfavorable immune environment and the presence of CML stem cells. We found that TKIs cannot be discontinued when the combinations of genotypes of NK cell killer cell Ig-like receptors (KIRs) and HLA were unfavorable (Mol Cancer Ther 2021). We also found that hypomethylating agent OR-2100 which we developed (Blood 2020) was useful for eliminating CML stem cells (Cancer Lett 2022). Utilizing such drug discovery and drug development, I hope to cure all CML patients in near future.

Sudhir Gupta

Selective IgM deficiency: a long ignored primary immunodeficiency

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There are more than 500 different primary immunodeficiencies and 400 disease causing genes have been described. Selective IgM deficiency (SIgMD) was first described in 1968; however, it was not recognized as a primary immunodeficiency disease until 2017 when following our publication in 2014, IUIS committee on primary immunodeficiency officially listed it as primary immunodeficiency disease. SIgMD is defined by serum IgM levels below mean and 2 standard deviation and normal total IgG and IgA and causes of secondary low IgM have been excluded. Approximately 30-40% of patients are asymptomatic. Although familial cases have been described, gene (s) responsible for SIgMD remains unclear. Clinically, patients present with recurrent upper and lower respiratory tract infection, and serious infections including meningitis and sepsis. Autoimmune diseases and autoantibodies are present in 25-35% of SIgMD and approximately 30% manifest allergic symptoms. Although a number of malignancies associated with SIgMD have been reported, it is unclear if there is true increase prevalence of malignancy in SIgMD. Immunological features resemble mice with IgM deficiency including normal number of B cells with surface IgM, and impaired IgG specific antibody response to T-independent antigens (30% of cases). There are alterations in various subsets of B cells. Occasional cases are transitioned to common variable immunodeficiency. Patients with impaired specific IgG antibody response to polysaccharide antigens respond to immunoglobulin-replacement therapy.

Surapati Pramanik

PNN-MABAC strategy for multiple attribute group decision making under pentapartitioned neutrosophic number environment

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As the generalization of the fuzzy set and neutrosophic set, the pentapartitioned neutrosophic set (PNS) has emerged as a mathematical tool to deal with realistic multi-attribute group decision-making (MAGDM) problems in uncertain environments. Pentapartitioned neutrosophic is characterized by five independent components, namely degree of truth, contradiction, unknown, ignorance, and falsity that help in dealing with uncertainty comprehensively and the experts can express their opinions easily. The Multi-Attributive Border Approximation Area Comparison (MABAC)) strategy deals with issues of uncertain decision-making by computing the distance between each alternative and the border approximation area (BAA). Extending the conventional MABAC strategy and some fundamental theories of pentapartitioned neutrosophic numbers (PNNs), we introduce the PNN-MABAC strategy to solve MAGDM problems. First, we briefly review some basic theories related to PNS and the conventional MABAC strategy. then PNN- MABAC strategy is developed. A supplier selection for medical devices has been solved to validate the new strategy and some comparisons between the novel PNN-MABAC strategy and existing strategies are provided to reflect the merits of the PNN- MABAC strategy.

Umberto Crisanti

Can we find peace inside the Skinner box?

Psychotherapist in Private Practice, Canterbury, Kent, England

Despite numerous efforts and teachings dedicated to fostering peace, humanity continues to grapple with achieving harmonious coexistence on individual and societal levels. This presentation explores the profound concept that our innate human nature is intricately shaped by the complex workings of our brains and neural networks. Taking inspiration from psychologist B.F. Skinner's pioneering Skinner Box operant conditioning chamber experiment, I delve into the depths of neural functioning, human behaviour, and the potential biases of thought. By transcending the confines of conditioned thinking, the argument put forth in this presentation is that we have the ability to transform our perception of others and deepen our self-understanding. Through a critical examination of the complexities of our conditioning, this presentation encourages participants to think beyond the limitations imposed by the Skinner box, liberating their minds and expanding their understanding of peace.

Vivette Glover

If we look after the mental health of mothers and fathers in perinatal period we will reduce violence and crime by their children

The Imperial College London, Institute of Reproductive and Developmental Biology, Department of Metabolism, Digestion and Reproduction Hammersmith Hospital Campus, London, UK

If mothers are anxious, depressed or stressed while they are pregnant this increases the risk for a range of neurodevelopmental problems in their child. The child is at greater risk of being anxious or depressed themselves, but also of having ADHD, conduct disorder or cognitive problems. These last three conditions are strong risk factors for later violent or criminal behaviour. A major source of stress for the mother is abuse or violence from the father. In contrast a supportive partner or father can reduce her own feelings of depression or stress.

We are starting to understand the biological mechanisms by which stress in the mother can alter the development of the brain of her future child. If the mother is stressed this can cause a down regulation of 11b-HSD2 in the placenta. This is the enzyme which breaks down cortisol and a reduction in its activity allows more cortisol to cross the placenta, and this in turn alters the neurodevelopment of the fetal brain.

All this implies that we have to do more to detect mental health problems and domestic violence during pregnancy and do more to intervene. There is a role in this for health professionals, but also family and friends. In India it has been found that a good way to reduce domestic violence is to involve the father's mother. In the Gambia it has been shown that antenatal groups which sing and dance together have fewer symptoms of depression and anxiety.

Zong-Hong Lin

Triboelectric nanosensor: a prototype of self-powered sensor based on surface triboelectrification

Department of Biomedical Engineering, National Taiwan University, Taipei, Taiwan

Designing devices with self-powered sensing function has become a popular research field since its emergence in recent decades. Triboelectrification occurs when two materials come into contact with each other, causing charge transfer that leads to oppositely charged surfaces; the amount of charge transfer varies depending on material composition. By combining triboelectrification with electrostatic induction, relevant devices can be designed. If used for energy collection purposes, scientists generally refer to them as Triboelectric Nanogenerators (TENGs); but if used for self-powered sensing purposes, scientists call them Triboelectric Nanosensors (TENSs). In our previous research on TENSs, we demonstrated the concept of selective detection of some targets by specific materials or their surface-modified probes. When the targets are adsorbing or binding to the surface, different electrical output signals will be generated compared to before, and these changes can be used for qualitative and quantitative analysis of the targets. In the past few years, we have further developed solid-liquid TENSs for measuring targets such as metal ions, small molecules, proteins and microorganisms. Compared with our previously developed solid-solid TENSs, we have not only improved several shortcomings but also established sensing mechanism and working principle which are very important research achievements in this field. We also look forward to expanding the applications of the solid-liquid TENSs in the near future.

Jonathan Schug

The Human Pancreas Analysis Program – a perspective on multi-modal, long-term, cutting-edge data collection

University of Pennsylvania Perelman School of Medicine

USERN Junior Talks and Poster Presentations

Alireza Sarkar Lotfabadi

Non-Coding RNAs in Cancer: Potential Roles and Delivery Strategies

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Noncoding RNAs (ncRNAs), a heterogeneous class of RNA molecules, have emerged as key participants in a variety of cellular processes. Contrary to their non-coding nature, ncRNAs exert a substantial effect on gene expression. They are classified as long non-coding RNAs (lncRNAs), microRNAs (miRNAs), and small ncRNAs. These molecules have been linked to tumor initiation and progression in the context of cancer. In addition to uncontrolled proliferation, angiogenesis, evasion of growth-inhibiting signals, and metastasis, aberrant expression of ncRNAs contributes to the hallmarks of cancer.
Considering their pivotal roles, ncRNAs are attractive targets for cancer treatment. Harnessing the potential of RNA interference (RNAi), strategies for targeted delivery of ncRNAs have gained traction. These strategies involve exploiting existing knowledge on RNAi and oligonucleotide delivery to target protein-coding mRNAs. Notably, siRNA-based therapies have shown promise in clinical trials, and efforts are ongoing to determine their therapeutic efficacy. The diagnostic potential of ncRNAs extends their versatility. Certain small stable ncRNAs can be detected in body fluids, providing a minimally invasive cancer screening method. In addition, recent developments have revealed the therapeutic potential of ncRNAs in modulating cancer-related pathways. lncRNAs, for example, can function as oncogenes or tumor suppressors, with precise spatial and temporal expression patterns. This specificity makes them attractive targets for the development of anticancer drugs.
In light of these advancements, the purpose of this review is to examine comprehensively the mechanisms underlying ncRNA involvement in the development and progression of cancer. It illuminates the diverse roles played by various types of ncRNAs in various aspects of tumor formation and outlines strategies for their targeted delivery. Despite the encouraging results observed in experimental research, the clinical success of ncRNA-based therapies remains limited. Nonetheless, as our comprehension of ncRNA functions and delivery strategies grows, these molecules have the potential to revolutionize cancer treatment.

Keywords:
Non-coding RNAs, Cancer Therapy, Targeted Delivery

Alireza Bolouriyan

Virus-Like Particles (Vlps) from Synthesis to Targeted Drug Delivery, Vaccine Approaches, and Gene Therapy

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VLPs are spontaneously generated from viral capsid proteins. VLPs imitate genuine viruses visually and physiologicallybut lack viral DNA. Various VLP designs provide structural and functional appeal. Spontaneous polymerization of viral capsid proteins may result in VLPs with geometrical symmetry, which are often icosahedral, spherical, or rod-like.Moreover, functionalized VLPs may precisely target cancer cells and recruit macrophages to destroy them. The ability to target tumors for therapeutic drug delivery through using VLP-based delivery platforms in novel and intriguing aspects related to cancer treatment is the primary goal of VLP design. Cancer therapies require precise targeting of diagnostic or therapeutic elements to tumor cells while avoiding healthy cells and tissues. VLPs offer an innovative approachas site-specific drug delivery systems reducing systemic toxicity and injury to healthy cells. Immunotherapy, which boosts the host's immune system, has fewer side effects. Cancer vaccines aim to induce an immune response that provides protection against tumor cells. Due to their naturally fitted particle size and repetitive structural order, VLPs may be employed as a vaccine without any adjuvant. This review aims to provide basic information on VLPs and outline current studies on their use as drug and vaccine delivery systems in different cancers, highlighting their potential as a promising cancer treatment strategy.

Keywords:
Virus-like Particles (VLPs), Drug Delivery, Multi-capsid VLPs, Gene therapy

Amir Reza Mazandarani

Myths Came to Truth: A Historical Review of Mythical Stories that Have Been Proven True by Modern Medical Science

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Myths and legends have always been a reflection of the human perspective of their respective eras. Despite being filled with fantastical events such as monsters, fairies, witches, and so on, parts of these tales have become reality throughout history with the help of human knowledge and ingenuity. This study aims to historically review events from myths and legends that have been proven true today with the aid of modern medicine, from pre-Christian times to the 19th century.

To extract important stories, a bibliographic search was conducted, started with Homer's Odyssey as the cornerstone of mythology. Various mythological stories were reviewed in a historical overview from the Odyssey, which dates back to before Christ, to the most medically contemporary legend, Mary Shelley's Frankenstein in the 19th century.

This study extracted seven key stories that include Nepenthe, the anti-depressant drug of Helen; Circe's hallucinogenic drug and its antidote prescribed by Hermes; the story of Rostam's birth by Caesarean section; the healing of wounds by Simurgh, the mythical bird; the fountain of youth in the mythical land of Bemini; and the story of organ transplantation and life-giving by Dr. Frankenstein.

This historical review shows that human ingenuity has always been in service to human imagination, and that these cases, which are not limited to medical science, have become a pretext for the development of science and technology towards achieving their dreams.

Keywords:
Mythology, Modern Medicine, Imagination

Amirhossein Hajialigol

Pyogenic Arthritis, Pyoderma Gangrenosum and Acne (PAPA) and PAPA-Like Syndromes: Systematic Review of The Literature

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PAPA (pyogenic sterile arthritis, pyoderma gangrenosum, and acne) syndrome is a rare autosomal dominant autoinflammatory disorder caused by mutations in the PSTPIP1/CD2BP1 gene. We systematically reviewed 93 patients with PAPA and PAPA-like syndrome.Most patients were male (65.9%) mainly born to non-consanguineous parents. The median (IQR) age at the onset of symptoms and diagnosis was 6.0 (2.0-8.0) and 25.0 (7.0-32.0) years, respectively. 62.5% of patients were presented with arthropathies and septic arthritis was the most common (54.2%) initial diagnosis. Joint disorders were the most common findings (n=71, 78.9%) starting at the median (IQR) age of 4.0 (2.0-8.0) years, mainly in the knee (56.5%), ankle (36.9%), and elbow (47.8%). Skin involvement (62 (66.7%)) initially presented at a median (IQR) age of 12.0 (20.-10.0) years and included pyoderma gangrenosum (n=41, 44.1%), acne (n=43, 46.2%), and nodulocystic acne (n=19, 20.4%). There was a stronger association between skin manifestations and the development of classic triad (P<0.001) compared to joint disorders (P=0.05) and patients with lower age of onset were more prone to the progression of the complete triad (p=0.18). Corticosteroids (n=45, 50.0%) with or without anakinra (33.3%) were the treatments applied in the majority of patients. Conclusion: PAPA/PAPA-like syndromes involve mainly non-axial joints in early childhood and later skin in the second decade of life. Only 26.4% of the patients manifested the classical triad of PAPA syndrome. There is no clear genotype-phenotype association in these disorders. More studies are required to investigate the therapeutic options in PAPA/PAPA-like syndromes.

Keywords:
PAPA, PSTPIP1, Pyogenic Sterile Arthritis, Pyoderma Gangrenosum, and Acne, PAPA-like Syndrome

Ani Stepanyan

Long-term Environmental Metal Exposure is Associated with Hypomethylation of CpG Sites in NFKB1 and Other Genes Related to Oncogenesis

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Long-term environmental exposure to metals leads to epigenetic changes and may increase risks to human health. The relationship between the type and level of metal exposure and epigenetic changes in subjects exposed to high concentrations of metals in the environment is not yet clear. The aim of our study is to find the possible association of environmental long-term exposure to metals with DNA methylation changes of genes related to immune response and carcinogenesis. We investigated the association of plasma levels of 21 essential and non-essential metals detected by ICP-MS and the methylation level of 654 CpG sites located on NFKB1, CDKN2A, ESR1, APOA5, IGF2 and H19 genes assessed by targeted bisulfite sequencing in a cohort of 40 subjects living near metal mining area and 40 unexposed subjects. Linear regression was conducted to find differentially methylated positions with adjustment for gender, age, BMI class, smoking and metal concentration.

In the metal-exposed group, five CpGs in the NFKB1 promoter region were hypomethylated compared to unexposed group. Four differentially methylated positions (DMPs) were associated with multiple metals, two of them are located on NFKB1 gene, and one each on CDKN2A gene and ESR1 gene. Two DMPs located on NFKB1 (chr4:102500951, associated with Be) and IGF2 (chr11:2134198, associated with U) are associated with specific metal levels. The methylation status of the seven CpGs located on NFKB1 (3), ESR1 (2) and CDKN2A (2) positively correlated with plasma levels of seven metals (As, Sb, Zn, Ni, U, I and Mn).

Our study revealed methylation changes in NFKB1, CDKN2A, IGF2 and ESR1 genes in individuals with long-term human exposure to metals. Further studies are needed to clarify the effect of environmental metal exposure on epigenetic mechanisms and pathways involved.

Keywords:
NFKB1, Uranium, DNA Methylation

Atousa Moghadam Fard

Pediatric Bell's Palsy Following COVID-19 Infection or COVID-19 Vaccination

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Vaccines have been a source of concern for some subjects worldwide and COVID-19 vaccines increased this concern. Bell's palsy is one of the most reported and important peripheral nervous system-related (PNS-related) adverse events following COVID-19 infection and vaccination. Bell's palsy is a unilateral lower motor neuron facial palsy that is described as a unilateral, sudden-onset facial paralysis. It is believed that the disease occurs due to the inflammation, edema, and swelling of the facial nerve; which result in compression, demyelination, and ischemia of the facial nerve and lead to facial paralysis.

Although pediatric Bell's palsy has a good prognosis, it is an uneasy and challenging condition for affected children, their families, and physicians, which affects the quality of their life badly. Considering the important role of COVID-19 vaccines in controlling the pandemic and reducing the mortality rate, the importance of pediatric vaccination against COVID-19, and the importance of pediatric Bell's palsy, we aimed to discuss pediatric Bell's palsy following COVID-19 infection and COVID-19 vaccination.

There has been an increase in pediatric Bell's palsy cases during the COVID-19 pandemic, and some studies have found the increase in Bell's palsy cases significant and have considered COVID-19 infection as a trigger of Bell's palsy. However, studies have reported a few Bell's palsy cases following COVID-19 vaccination, and to the best of our knowledge there have been only two reported pediatric Bell's palsy cases following COVID-19 vaccination. Based on evidence there is no association between COVID-19 vaccines and Bell's palsy. Although there are a few reported Bell's palsy cases following COVID-19 vaccination; Considering the COVID-19-related mortality and complications, the remarkable benefits of COVID-19 vaccination, and the insignificant association between Bell's palsy development and COVID-19 vaccination, we recommend parents to get their children vaccinated against COVID-19.

Keywords:
Bell's Palsy, Facial Nerve Paralysis, COVID-19 Vaccination, Pediatric Bell's Palsy

Azin Eslami

Incidence of Mental Disorders During COVID-19 Pandemic in Patients with Auto immune Arthritis: A Systematic Review

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The COVID-19 pandemic has had a profound impact on various aspects of individuals' lives, including physical health, social interactions, and mental well-being. While the focus has primarily been on the physical manifestations of the virus, the psychological repercussions of the pandemic cannot be overlooked, particularly for vulnerable populations such as patients with autoimmune arthritis. Autoimmune arthritis encompasses a group of chronic inflammatory diseases, including rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis, which can significantly impair physical functioning and quality of life.

In order to assess the prevalence of mental disorders, namely anxiety, depression, post-traumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD), in patients with autoimmune arthritis following the COVID-19 lockdown, a comprehensive search was conducted in four reputable databases, namely Web of Science, Scopus, Embase, and PubMed. A total of 10,547 papers were initially screened, and after careful evaluation, 18 studies were ultimately included in the analysis. These studies were subjected to a thorough assessment of their risk of bias using the Joanna Briggs Institute (JBI) and Newcastle-Ottawa Scale (NOS) criteria.

Regarding depression, a wide range of reported values, ranging from 13.2% to 84.4%, have been observed. Notably, studies that have examined the severity of depressive symptoms consistently indicate that a significant proportion of individuals affected by depression experience symptoms of moderate intensity. Specifically, the prevalence of moderate depressive disorders within the overall population varies between 6.74% and 34.5%. In the context of anxiety disorders, the reported prevalence rates from different studies exhibit significant variation, ranging from as low as 5.2% to as high as 90.5%. As for Post-Traumatic Stress Disorder (PTSD), a relatively smaller number of studies have been conducted, resulting in a range of reported prevalence rates spanning from 20% to 41%. It is important to note that among the participants included in these studies, approximately 38% displayed symptoms of moderate intensity

Keywords:
COVID-19, Mental Disorders, Arthritis, Systematic Review

Behnaz Nikoubin

Open AI versus True Knowledge in Epidemiology: Double Blind Study

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This study delves into the transformative role and challenges of Large Language Models (LLMs) in the educational sector, specifically focusing on medical students in the domain of epidemiology. While these tools hold promise for personalized, intelligent learning experiences, they also raise ethical concerns such as over-reliance on technology and the potential for disseminating incorrect or biased information. This study aims to assess the risks of using LLMs as learning aids, including the possibility of students passing exams without adequate knowledge or understanding of the subject matter.

The study employed three Large Language Models (LLMs) from OpenAI evaluated through a three-phase: Conceptual, Multiple-choice, and Descriptive. Utilizing OpenAI's Application Programming Interface (API), the models were tested with a standardized Question-Answer framework across three various prompt engineering levels. Scores were calculated by comparing the model answers with the answer key by GPT4

Phase 1

The score of GPT-3.5-turbo-16k at the level 2 was the best (407 out of 430) and all AI models were able to provide correct definitions for at least 87% of the basic concepts.

Phase 2

The bast performance was 58.7%gained by GPT4 at level 2 while the worst one was 27.5% (GPT-3.5-turbo-16k at level 0).

Phase 3

An appreciable difference is observed between the Level 2 responses across all models compared to other levels, such that the average score at Level 2 was up to 97.5 points higher than the average scores of the models at other levels. and the best score was 155 achieved by GPT4 at level 2.

The study evaluated the proficiency of GPT-4, GPT-3.5 Turbo, and GPT-3.5 Turbo-16K in answering epidemiological questions across three complexity levels. GPT-4 led in each level. Despite their differences, all models showed an increase in scores as complexity levels rose.

Keywords:
Open artificial intelligence, GPT4, GPT3.5, Epidemiology, Education

Dorsa Safari

Open Versus Minimally Invasive Morgagni Hernia Repair in Pediatric Surgery: A Review

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Morgagni hernia (MH), Also known as anterior diaphragmatic hernia, is an uncommon congenital hernia of the diaphragm. Due to rarity, there is no established guideline for surgical repair of MH. The present study reviews various methods to repair MH in the pediatric population.
A search in the Medline database was conducted to find surgical options for MH in children. Studies consisting of robotic-assisted surgery, laparoscopy, laparotomy, thoracotomy, and thoracoscopy over the last twenty years were assessed.
Regarding MH in children, male sex and right-sided hernia were reported by the authors more frequently. Most of the diagnosed cases have been presented with respiratory and gastrointestinal symptoms. MH seems connected with the anomalies from which Down syndrome (DS) and congenital heart disease are the most frequent malformations. The abdominal approach, specifically laparoscopy, has been found to be the most popular approach for repairing MH in children. In contrast, the transthoracic approach has been insufficient in cases of bilateral MH or concomitant bowel malrotation. The robotic-assisted MH repair has been performed on several pediatric cases in the literature and demonstrated relatively acceptable outcomes. In general, reported complication and recurrence rates were low. Presumably, repair with prosthetic mesh prevents MH recurrence in children. Hernia sac cauterization, comparable to sac resection, has been performed to prevent MH recurrences.
Laparoscopy is the preferred option to repair MH in children. However, in emergent conditions and the hardship of the procedure, laparotomy is the best approach. It would seem reasonable to consider prosthetic mesh in children with DS or recurred hernias to prevent probable recurrences. Robotic surgery is revealed to be safe and effective in childhood MH repair. However, further studies with prolonged follow-ups are required to evaluate the new methods in pediatric surgery.

Keywords:
Morgagni, Diaphragmatic hernia, Laparoscopy, Laparotomy, Robotic

Elahe Meftah

Intestinal Ischemia Following COVID-19: A Multicenter Case Series

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Gastrointestinal symptoms are common among COVID-19 patients and may rarely indicate a severe pathology like intestinal ischemia. The present study describes COVID-19 patients with bowel ischemia, necrosis, or perforation.

This retrospective case series was conducted from April 2020 to February 2022 in the surgical wards of two tertiary referral Iranian hospitals. We included adult patients with COVID-19 and intestinal ischemia. Diagnosis of COVID-19 was confirmed with reverse transcriptase-polymerase chain reaction on nasopharyngeal samples.

Twenty-four patients with a median age of 61.5 years were included. Sixteen (67%) patients were male, and 13 (54%) were without comorbidities. Macrovascular mesenteric obstruction was not identified in the imaging and surgical exploration of 21 patients (87.5%). Gastrointestinal manifestations appeared on the median of seven days (range 2–21) after the diagnosis of COVID-19. All the patients had a significantly elevated C-Reactive Protein prior to surgery, ranging from 68 to 362 mg/L. D-dimer was measured in eight patients and ranged from 1,878 to over 5,000 ng/mL. All the patients had received the prophylactic dose of either unfractionated or low molecular weight heparin. One was later switched to the therapeutic dose of unfractionated heparin since conservative management was favorable in his case. Only three patients had received all three doses of the COVID-19 vaccine. One had received two doses, and the rest were unvaccinated. Except for one patient with angioinvasive mucormycosis and another with leukocytoclastic vasculitis, the histopathologic evaluation did not reveal a specific etiology for intestinal ischemia. Bowel necrosis accompanied mortality of 15 (62.5%) patients and a median of 6.5 days of hospital stay.

Intestinal ischemia in COVID-19 patients is associated with a high mortality rate. Intestinal ischemia could occur secondarily to the infection or due to its complications. Further research is needed to elucidate the dynamics of intestinal ischemia in COVID-19.

Keywords:
SARS-CoV-2, COVID-19, Intestinal Ischemia, Bowel Necrosis, Case Series

Elahe Aleebrahim-Dehkordi

The ketogenic diet and the increase the response to treatment in colorectal cancer: with targeting Kirsten-ras (KRAS)

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Colorectal cancer (CRC) is a prevalent and aggressive form of carcinoma that occurs worldwide, with poor prognosis and unfavorable treatment outcomes. The development of CRC involves various genetic alterations and signaling pathways, both common and uncommon. Mutations in specific genes acting as tumor suppressors or oncogenes contribute to the pathogenesis of CRC, with Kirsten-ras (KRAS) mutations playing a significant role and serving as strong predictors. However, the presence of KRAS mutations has been associated with reduced response rates to certain chemotherapeutic agents, highlighting the need for additional techniques to enhance conventional anticancer treatments. Therefore, considering the mutational status of KRAS is crucial when implementing targeted therapies. Recently, there has been growing interest within the scientific community regarding the ketogenic diet (KD) as an adjunctive approach to standard cancer therapy. Epidemiological evidence suggests a link between diet and mutations in the KRAS gene involved in CRC development. The ketogenic diet is characterized by high fat content, low carbohydrate intake, and adequate protein levels. It has demonstrated potential in improving the efficacy of standard cancer treatment by exploiting altered metabolism in cancer cells. Consequently, it represents a promising adjuvant therapy option. In fact, it has been found that the ketogenic diet can reduce the amount of glucose available to tumors and convert it into the production of ketone bodies. For cancer patients, this dietary approach requires careful supervision and follow-up from healthcare providers.

Keywords:
Colorectal cancer, Ketogenic diet, Cellular mechanisms, Kirsten-ras, Mutations

Fiona Morrison

Maintaining Scientific Integrity and High Research Standards Against the Backdrop of Rising Artificial Intelligence Use Across Fields

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Artificial intelligence (AI) technologies have already played a revolutionary role in scientific research, from diagnostics to text-generative AI used in scientific writing. The use of AI in the scientific field needs transparent regulation, especially with a longstanding history of use – the first AI technologies in science having been developed in the 1950s. Since then, AI has gone from being able to alter texts, to producing them using up to trillions of parameters to generate accurate and natural texts. However, scientific work requires high ethical and professional standards, and the rise of AI use in the field has led to many institutions and journals releasing statements and restrictions on its use. AI, being reliant on its user, can exacerbate and increase existing biases in the field without being able to take accountability. AI responses can also often lack specificity and depth. However, it is important not to condemn the use of AI in scientific work as a whole. This article has partial use of an AI LLM (Large Language Model), specifically ChatGPT, to demonstrate the theories with clear examples. Several recommendations on both a strategic and regulatory level have been formulated in this paper to enable the complementary use of AI alongside ethically-conducted scientific research or for educational purposes, where it shows great potential as a transformative force in interactive work. Policymakers should create wide-reaching, clear guidelines and legal frameworks for using AI to remove the burden of consideration from educators and senior researchers. Caution in the scientific community is advised, though further understanding and work to improve AI use is encouraged.

Keywords:
Artificial Intelligence, GPT, Manuscript Writing, Research, AI

Foad Mirzaei

Alzheimer's Disease Hypotheses; Complementary or Contradictory?

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Numerous theories regarding Alzheimer's disease genesis have arisen over the past few years. However, the contradictory and supplementary impacts of these theories create a challenge in pinpointing a particular pathway. We aim to analyze well-known theories, comparing and contrasting their impacts and overlaps.

We conducted a comprehensive literature search on PubMed to identify and gather prominent theories concerning the pathogenesis of Alzheimer's disease. This review adopts a narrative approach, focusing on well-recognized theories within the field, and presents a comparative analysis to assess their respective contributions and commonalities, ensuring the integrity of the content.

This narrative review summarizes and examines significant ideas on the etiology of Alzheimer's disease. We have emphasized the complicated and multidimensional character of this neurodegenerative illness by a thorough investigation. Furthermore, when the human body is seen as a complex system, it becomes clear that several of these hypotheses may interact and complement one another in the etiology of Alzheimer's disease. In light of this, we recommend that a supplementary hypothesis be considered, which may bridge gaps and give a more comprehensive view of Alzheimer's disease pathophysiology.

Keywords:
Alzheimer's Disease, Alzheimer's Disease Pathogenesis, Alzheimer's Disease Theories

Ghazaleh Ghaffaripour Jahromi

NLRP3 Inflammatory Pathway. Can We Unlock Depression?

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Depression holds the title of the largest contributor to worldwide disability with the numbers expected to continue to grow. Currently, there are neither reliable biomarkers for diagnosis of the disease nor are the current medications sufficient for creating a lasting response in almost 50% of patients. In this review, we compared previous thought pathophysiology of the disease and how inflammatory theory encompasses previous findings while opening new treatment options. NLRP3 inflammasome activation plays a major role in depressive inflammation, evident in humans and animal models. Its activation is found in CNS neurons, astrocytes, and microglial cells. NLRP3 inflammasome dysregulation is also evident in the enteric and peripheral immune response, altering the Microbiota-gut-brain axis. The integrity of the brain blood barrier (BBB) and intestinal epithelial barrier (IEB) are also compromised with this inflammation. We go over each area with possible modulating mechanisms of the inflammasome pathway in hopes of finding new targets for more effective therapies.

Keywords:
Depression, NLRP, Inflammasome, CNS, BBB, Microbiome

Hamed Ahansazan

History of Medicine and its Importance in Medical Education

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In a simple and classical view, medical history has only a reminder function and a proud element in creating national identity. From the point of view of educational policy makers, medical students should be educated about moral, social, cultural, identity, and historical values in order to be able to fulfill their professional role properly. Meanwhile, if history is understood as a set of events determined by specific causes, with specific consequences that vary depending on social, economic, cultural, religious, and political conditions, it presents complexities and intertwined concepts that It is difficult for most medical students and professors to understand it. In addition, the history of medicine plays a role in creating the necessary perspective to shape the future of medicine in the upcoming decades. In this context, this article discusses about the various functions of medical history and its importance in medical education and related fields.

Keywords:
History of Medicine, Medical Education

Hana Tahmouresi

The Effect of Hypoxia-induced Metabolic Alterations on Chemoresistance in Breast Cancer

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Hypoxia is a condition found in advanced human tumors and is significantly associated with an increased rate of metastasis and mortality in patients. Cancer cells use physiological processes that encourage a shift from oxidative to glycolytic metabolism to adapt to hypoxia. This shift in the metabolic pathway will result in tumor microenvironment transition and also changes the immune system responses to the tumor. It has been estimated that breast cancer is the most common cancer in females worldwide with about 2.26 million new cases and 684,996 deaths among women in 2020. Chemotherapy as one of the most used treatments for cancer is not always giving the best results because of a phenomenon called chemo resistance in which tumor cells are resistant to the chemotherapy drug by various methods. This article aims to examine the effect of hypoxia on chemoresistance in breast cancer and its microenvironment.

Keywords:
Hypoxia, Breast cancer, Tumor Microenvironment, Chemoresistance

Helia Sharif

Diode Laser or Cold Plasma? Which could Enhance Fibroblasts Proliferation More?

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Low-level laser therapy (LLLT) has been developed for a wide range of applications, such as pain management, dermatology, smile design and wound healing, while also possessing antibacterial properties. Similarly, non-thermal atmospheric pressure plasma (NTAPP) or cold plasma has recently been utilized in various fields, such as sterilizing biological and non-biological environments, surface activation, surface modification, wound healing, and even animal husbandry. In recent years, both of these devices have gained recognition for their ability to stimulate fibroblast proliferation. The aim of this in vitro study was to compare the effects of a 980m diode laser with NTAPP on the proliferation of human gingival fibroblasts (HGF). Nine groups of cultured HGFs were prepared: The control group did not get any radiation. Two test groups were exposed to a 980m diode laser. Six test groups were exposed to NTAPP, with three different flow rates of Helium gas. All test groups were treated for 15 or 30s at a distance of 1cm. The proliferation and viability of HGFs were assessed using the MTT assay on days 1, 3 and 5 after treatment. The results of the study showed that 30s exposure to 980mm diode laser led to higher viability and proliferation of fibroblasts compared to other groups. Although NTAPP did not cause cell death, a 15s exposure to NTAPP significantly increased cell viability and proliferation less than other groups. In conclusion, the 980m diode laser was found to be a more effective modality than NTAPP in promoting the proliferation of HGFs.

Keywords:
Diode Laser, Fibroblasts, Low Level Laser Therapy, Non-thermal Atmospheric Pressure Plasma, Wound Healing

Hesam Malekfarnood

Microbial Infections can Trigger Neuro Autoimmunity

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Neuro autoimmunity refers to a group of disorders where the immune system unintendedly attacks the central nervous system (CNS), resulting in significant neurological conditions such as multiple sclerosis (MS), acute disseminated encephalomyelitis (ADEM), and progressive multifocal leukoencephalopathy (PML). Although their exact causes remain unknown, these conditions are becoming more prevalent globally. Emerging evidence suggests that microbial infections including viral, bacterial, and fungal may play a pivotal role in triggering neuro autoimmune response through mechanisms like molecular mimicry and bystander activation. Molecular mimicry is a phenomenon when microbial antigens resemble self-antigens in the CNS, leading the immune system to mistakenly attack self-tissues. For instance, Epstein-Barr virus (EBV) has been linked to MS because of molecular mimicry. Bystander activation describes how an infection may dysregulate immune responses, causing autoreactive cells to target self-tissues in the CNS, as seen with ADEM following a preceding infection. Emerging research indicates disruptions to the gut microbiota and mucosal immunodeficiencies influence susceptibility to infections that induce neuro autoimmunity. As the gut microbiota plays a vital role in shaping immune tolerance, alterations in its composition (dysbiosis) are linked to autoimmune disorders by disrupting tolerance and increasing infection risk. Understanding the molecular links between infections and neuro autoimmunity is crucial for developing targeted therapies. Moreover, characterizing the relationship between gut microbiota dysbiosis, mucosal immunodeficiencies, and infection-induced neuro autoimmunity may reveal new therapeutic targets.
This narrative review aims to explore current literature on how microbial infections can trigger conditions like MS, ADEM, and PML by examining molecular mimicry and bystander activation mechanisms. It will also assess how gut microbiota alterations and mucosal immunodeficiencies impact susceptibility to infections that may induce neuroautoimmune responses.

Keywords:
Autoimmunity, Infections, Neurologic Disorders, Microbial Cross-reactivity

Kiarash Saleki

A Potent Trivalent Multi-Epitope DC-inducing mRNA-based Vaccine Against Monkeypox, Cowpox, and Vaccinia Viruses Using Immunoinformatics Approaches

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Monkeypox virus (MPXV) is a novel virus that has spread over the world and caused human disease. More than 86 thousand infection cases have been confirmed, which has concerned the World Health Organization. With the present challenges of MPXV, a vaccine that completely prevents infection will save people who become infected. In this field, the mRNA vaccine could be a sufficient way to control the virus's transmissibility around worldwide study; we used immunoinformatic approaches that aided the pathway to develop the novel mRNA vaccine.
We used the three proteins (A35R, cell surface binding, and M1R) that are conserved in Cowpox and Vaccinia viruses for designing vaccines and estimated the potent immunogen epitopes that the constructed vaccines assemble with the fused finalized epitopes and Beta-defensin 3 adjuvant that is a significant stimulation of dendritic cells, and the PADRE/TAT were added. Vaccine was modeled with Robetta server that validated by PROCHECK,ERRAT,Z-score, and physicochemical properties. Disulfide engineering, immune simulation, and molecular docking with TLR3 were implemented. In the end, the construction of mRNA was designed in silico, the mRNA vaccine structure was predicted, and then the molecular dynamics simulation analysis such as RMSD, RMSF,Rg was performed to investigate the TLR3-vaccine dynamics.
18 conserved epitopes were selected by machine learning. 350 amino acids were constructed, and the epitopes were attached by linkers and modelled through Robetta Server. Ramachandran plot revealed majority of the residues were in most favorable/permitted locations and multi-epitope structure displayed ERRAT score of 99.11%. We designed the mRNA construct with the 5'UTR, start codon, signal peptide, ORFs, stop codon, 3'UTR, and polyA. Additionally, immune simulation showed favorable response and molecular dynamic simulation demonstrated stable TLR3-Vaccine binding.
We designed an mRNA vaccine against MPXV covering the Cowpox and Vaccinia viruses. Future wet lab validation is warranted.

Keywords:
Immunoinformatic, Monkeypox, Computational Immunology, Reverse Vaccinology, Molecular Dynamic Simulation

Kimia Kazemzadeh

Radiomics and Genomics in Brain Tumors: AI-driven Perspective

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Brain tumors are a complex and heterogeneous group of diseases with varying clinical outcomes. Understanding the underlying tumor characteristics and identifying appropriate treatment strategies are critical in ensuring better patient outcomes. In recent years, the integration of radiomics and genomics has emerged as a promising approach to gain comprehensive insights into brain tumor biology. Furthermore, the advent of artificial intelligence (AI) technologies has propelled the integration of radiomics and genomics, enabling more precise and personalized management of brain tumors.

Herein, we explore the state-of-the-art advancements in the field of radiomics and genomics in brain tumors, with a specific focus on the AI-driven perspective. Radiomics refers to the extraction and analysis of quantitative imaging features from medical images, providing detailed information about tumor heterogeneity and behavior. Genomics, on the other hand, involves the study of an individual's genetic makeup and gene expression, enabling the identification of molecular subtypes and potential therapeutic targets.

The integration of radiomics and genomics data in AI-driven approaches has immense potential in brain tumor research. AI algorithms can efficiently analyze these complex datasets to identify imaging patterns, genetic alterations, and molecular signatures associated with tumor characteristics and treatment response. Such integrative approaches can facilitate early diagnosis, risk stratification, and treatment planning, leading to improved patient outcomes. However, several challenges exist in the application of radiomics and genomics within an AI-driven framework. Standardization of imaging protocols, data sharing, and addressing the limitations of AI algorithms are crucial factors to ensure the reproducibility and generalizability of results.

This narrative review provides a comprehensive overview of the current state and future directions of radiomics and genomics in brain tumors from an AI-driven perspective. By understanding the extensive potential of this integration, further research can pave the way for more precise diagnostics, improved treatment strategies, and ultimately, enhanced patient care in brain tumor management.

Keywords:
Radiomics, Genomics, Brain Tumors, Artificial Intelligence, AI-based Algorithms, Brain Tumor Management

Kosar Zolfaghari

Chemoinformatics and AI: A Synergistic Approach for Drug Discovery

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Combining Chemoinformatics and Artificial Intelligence (AI) has become a significant and influential approach in drug development as researchers seek innovative therapeutic molecules. Recently, there has been an increasing inclination towards using AI in conjunction with chemoinformatics to automate various processes involved in drug discovery, including data mining and molecular modeling.

Chemoinformatics, a field historically focused on the computer analysis of chemical data, has become an indispensable tool for understanding intricate molecular structures and interactions. Incorporating AI in conjunction with machine learning and deep learning methodologies has brought about a transformative shift in the field of drug discovery. By using this collaborative effort, researchers can now utilize extensive datasets to accelerate many phases of drug development; this will provide a comprehensive explanation of the fundamental concepts of chemoinformatics, with a particular emphasis on its significance in the representation of chemical data, analysis of structure-activity relationships (SAR), and the process of virtual screening. The foundational methodologies discussed above establish the framework for the subsequent examination of AI's intervention, which is thoroughly investigated. Machine learning algorithms, driven by artificial intelligence, facilitate the predictive modeling of compound characteristics, pharmacokinetics, and toxicity profiles. Consequently, they enhance the discovery of new therapeutic candidates with unprecedented precision.

Furthermore, this paper examines the ethical considerations of using AI in drug development. It aims to provide insights into the importance of adopting responsible and transparent approaches within this dynamic and ever-changing domain.

In summary, combining chemoinformatics and artificial intelligence presents a synergistic methodology to transform the pharmaceutical research and development field. It will show the significant potential of this collaboration, shedding light on how it enables researchers to navigate the complex field of drug development, ultimately facilitating the identification of safer and more effective medicinal molecules.

Keywords:
Chemoinformatics, AI, Drug discovery, Machine Learning

Leyli Shadman

The Use of Gamification as a Solution-based Oral Health Promotion for Non-dental Providers. A Non-randomized Trial

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Prevention has always been the first line of defense for maintaining optimum general health. While oral and preventive dental care is integral to general health, the non-dental health care providers' knowledge in this field is currently limited. Also, Healthcare providers including medical, allied health, nursing professionals, and students play an important role in patients' oral health and well-being. This campaign aimed to evaluate the effect of gamification as an innovative method in health care providers' knowledge of preventive oral health care and oral conditions.

A three-day game-based campaign called "Healthy Smile Week" was performed at medical, allied health, and nursing schools of Qazvin University of Medical Sciences. It consisted of six stations which were gamified using the game mechanics including points, levels, leaderboards, feedback mechanisms, and prizes. A pre-test/ post-test intra-personal comparison was used to evaluate the campaign's effectiveness.

A total of 105 students and university staff (41 males, 64 females) submitted their completed questionnaires. The post-test scores for scientific questions were significantly higher in comparison to the pre-test scores (P-value<0.001). The majority of participants (90%) were satisfied with the overall program quality and 72% found the campaign excellent for improving their knowledge of preventive dental care.

This campaign indicated that, despite limited existing oral health knowledge, the game-based program significantly engaged the user and improved the overall awareness of the non-dental providers.

Keywords:
Gamification, Oral hygiene, Public Health Dentistry, Preventive Dentistry, Oral Health

Mahsa Zargaran

Outcomes of Coronavirus Disease 19 Patients with a History of Rheumatoid Arthritis: A Retrospective Registry-based Study in Iran

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We aimed to study the outcomes of coronavirus disease 2019 (COVID-19) in patients with a history of rheumatoid arthritis (RA) in Iran, where most patients re- ceive corticosteroids and are at high risk for COVID-19 infection.
We collected the demographic, diagnostic, and treatment data of all COVID-19 patients by the clinical COVID-19 registry system. We recruited 38 RA patients and 2216 non-RA patients from the COVID-19 registry. The primary out- come was mortality due to COVID-19. We also studied the risk of intensive care unit admission and intubation in RA patients compared to non-RA patients. We used mul- tiple logistic regression analysis to study the association between RA and the risk of COVID-19 outcomes.
We recruited 38 RA patients and 2216 non-RA patients from the COVID-19 registry. The RA patients had a higher mean age (59.9 years) than the non-RA patients (57.7 years). The group of RA patients had a larger proportion of women (76.3%) than the non-RA patients (40.8%). The death rate due to COVID-19 was significantly higher in RA patients than non-RA patients (odds ratio [OR] = 2.69, 95% confidence inter- val [CI] = 1.24-5.81). The OR was higher among those who received prednisolone than among those who did not (OR = 3.59, 95% CI = 1.54-7.81). The odds of intuba- tion were statistically significant among patients who received corticosteroid therapy (OR = 2.58, 95% CI = 1.07-6.18).
The risk of COVID-19 outcomes was higher in RA patients than non-RA patients, especially for RA patients who received a low dose of prednisolone. The results of this study can be used to triage RA patients who get infected by COVID-19. Further studies with larger sample sizes are required to more precisely define the high-risk groups.

Keywords:
COVID-19, Outcome, Pandemic, Rheumatoid Arthritis

Mahshad Naserpour

The Effect of Digital Storytelling (DS) on Patients with Cancer: A Narrative Review

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Digital Storytelling (DS) is a creative and innovative form of media, enabling users to share stories, experiences, or thoughts using modern technologies combined with other elements such as graphics, audio, videos, etc. It allows people to express themselves in an increasingly interactive and accessible way. Due to its capacity for conveying complex medical experiences, it is applied in various environments, particularly health care and cancer. Therefore, this study aims to review the current literature about the effect of DS on patients with cancer.

In the analyses of included studies, DS was shown to positively affect cancer patients at preventive, diagnosis, screening, and treatment stages. This method, with particular effects, photos, and videos suitable for culture, is aimed at raising awareness of the disease in society. It's also used to facilitate the sharing and expression of experiences and feelings by cancer patients. Furthermore, DS provides more detailed information on the disease and experience of these patients and addresses their challenges and problems. In addition, this approach enables patients to reacquaint themselves with family and friends, increasing their empathy. For cancer patients, DS could be a starting place for discussing the disease. With this method, cancer patients inform healthcare workers about their conditions to better understand their health conditions and hidden points that were not considered before. DS provides a platform for cancer patients to connect with the experiences of others who have had similar conditions and reduce feelings of isolation and loneliness.

In conclusion, DS is a creative tool and combination of science, technology, and art with the potential to help reduce the burden for cancer patients as well as improve support and awareness about this disease. In addition, it facilitates the exchange of experience and insight between patients and other people about their condition.

Keywords:
Digital Storytellig, Cancer, Digistory, Digital Stories

Maryam Fakhri

Hypermethylation of RUNX3 Gene Promoter in Peripheral Blood Mononuclear Cells as a Diagnostic and Prognostic Biomarker in Systemic Lupus Erythematosus

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Systemic lupus erythematous (SLE) as a chronic inflammatory disease are influenced by some genetic, epigenetic and environmental factors. Several studies demonstrated that DNA methylation aberration participates in the pathogenesis of SLE. Recent studies have persuaded the scientists to find new diagnostic and prognostic biomarkers based on methylation dysregulations in SLE patients. Therefore, in this study, we evaluated the methylation level of RUNX3 promoter in peripheral blood mononuclear cells (PBMCs) of SLE patients and healthy controls.
In the current case-control study, 80 Iranian SLE patients and 77 healthy individuals were contributed. The methylation quantification endonuclease-resistant DNA (MethyQESD) method was used to assess methylation levels of RUNX3 in extracted DNA of PBMCs.
Our finding revealed that RUNX3 promoter was significantly hypermethylated in SLE patients compared with healthy individuals. (62.88±26.66 vs 35.93±24.40; $P < 0.001$). Receiver operating characteristic (ROC) curve analyses indicated that the diagnostic power of the RUNX3 promoter methylation level for CRC was 0.769, with a sensitivity of 81.30% and specificity of 71.40%. Furthermore, RUNX3 gene methylation level was significantly higher in patients with renal involvement in comparison with SLE subjects without renal involvement (86.29±10.30 vs 40.28±24.21; $P <0.001$). Additionally, RUNX3 methylation level was demonstrated to be significantly associated with creatinine level ($P<0.001$) but it was not correlated with anti-dsDNA, C3, and C4 levels ($P>0.05$).
The results of this study showed the RUNX3 methylation level in PBMCs of SLE patients can be used as a good diagnostic biomarker for early strategies.

Keywords:
Systemic Lupus Erythematosus, DNA Methylation, RUNX3, Biomarker

Maryam Sadat Tonekaboni

Chemical Recycling of Plastic Waste: A Promising Pathway to a Sustainable Future

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Plastic waste is a significant environmental concern, and researchers have explored various approaches to recycle it, including mechanical, biological, and chemical methods. traditional mechanical recycling and incineration methods have faced limitations in quality and value recovery. Chemical recycling is a promising solution that can convert plastic waste into valuable products, such as fuels, chemicals, and composites.
This article highlights the definition and types of chemical recycling, the catalysts and conditions used in its methods, advantages and disadvantages of chemical recycling, and comparison of this technique with other recycling methods.
Overall, this research provides a comprehensive overview of the recent advances and approaches for chemical recycling of plastic waste, highlighting the potential of this method to address the plastic waste problem and contribute to a more sustainable and circular economy.

Keywords:
Chemical recycling, Plastic waste, Waste management, Pyrolysis, Gasification

Mehrnaz Olfat

Study the Demographic Features and Clinical Outcomes of Children Admitted to Children's Medical Centre with Opioid Toxicity from 2019 to 2022

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Opioids are a class of drugs that are naturally extracted from the opium poppy plant or are made synthetically and mimic this substance. However, opioids are known as one of the most common drugs of abuse among adults, it has wide clinical application such as sedative and analgesic. Opioid toxicity may occur accidentally in children. The classic symptoms of opium intoxication are miosis, decreased level of consciousness, and bradypnea. The known antagonist of opioids in cases of toxicity is naloxone which rapidly reverses the symptoms. Herein, we study the demographic features and outcomes of children with opioid toxicity referring to Children's Medical Centre.

In this retrospective cross-sectional study, medical records of patients aged 1 month to 18 years old referred to Children's Medical Centre with opioid toxicity were studied. The data were collected using a questionnaire. The period of study was from 2019 to 2022.

Of all fifty-nine patients, 62% were male and 38% were female. The median age of the patients was 20 months. The median for referral delay, from the onset of symptoms to hospital arrival, was 6 hours. The most common used substances were opium (36.2%) and methadone (25.9%). The most common clinical manifestations were miosis, drowsiness, seizures, loss of consciousness, and abnormal respiration patterns. The mean for naloxone infusion duration was 31.79 hours, which was significantly longer in cases of methadone toxicity compared to cases of opium toxicity (P-value=0.05). only two patients (3.4%) experienced return of symptoms after discontinuation of naloxone infusion. 38% of patients were admitted to the pediatric intensive care unit and 7% of patients were intubated and mechanically ventilated. Median for hospital length of stay (LOS) was 3 days. Only one patient experienced prolonged hypoxia and no death has occurred.

The most common substances of opioid toxicity in our region were opium and methadone. The possibility of opioid toxicity should be considered in patients with miosis, loss of consciousness, seizures, and bradypnea. As methadone has a long half-life, it needs longer naloxone infusion and hospital LOS. In any child with suggestive symptoms, opioid toxicity should be considered and managed in order to avoid serious complications.

Keywords:
Opioids, Methadone, Naloxone, Mosis

Milad Akbarzadehmoallemkolaei

The Impact of Conventional Smoking Versus Electronic Cigarette on the Expression of VEGF, PEMPA1, and PTEN in Rat Prostate

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The use of electronic cigarettes (e-cigarettes), the alternative to conventional smoking, is increasing considerably worldwide; however, their safety is a matter of debate. Several studies have demonstrated their toxic effects, but no study assessed their effects on the prostate.

Objective: The current study aimed at evaluating e-cigarettes and conventional smoking prostate toxicity and effects on the expression of vascular endothelial growth factor A (VEGFA), phosphatase and tensin (PTEN), and prostate transmembrane protein androgen induced 1 (PMEPA1).

30 young Wistar rats were categorized into three groups (n ¼ 10) as follows: the control group, the conventional smoking group, and the e-cigarette group. The case groups were exposed to cigarettes or e-cigarettes for 40 minutes, 3 times a day for four months. Serum parameters, prostate pathology, and gene expression were measured at the end of the intervention. Data were analyzed by Graph Pad Prism 9.

Histopathological findings presented that both types of cigarette-induced hyperemia and induced inflammatory cell infiltration and hypertrophy of smooth muscle of the vascular wall in the e-cigarette group. Expression of PMEPA1, and VEGFA genes significantly increased in conventional (2.67- fold; P ¼ 0.0108, 1.80-fold; P ¼ 0.0461 respectively) and e-cigarettes (1.98-fold; P ¼ 0.0127, 1.34-fold; P ¼ 0.938, respectively) groups compared to the control group. Expression of the PTEN gene non-significantly decreased in the case of groups compared to the control group.

We found no significant differences between the two groups in terms of PTEN and PMEPA1 expression, whereas VEGFA was significantly more expressed in a conventional smoking group compared to the e-cigarette group. Therefore, it seems that e-cigarettes could not be taken into account as a better option than conventional smoking, and quitting smoking still is the optimal option.

Keywords:
Cancer, Electronic Cigarettes, Gene Expression, Wistar Rat

Mobina sadat Zarabadi

Beyond the Stratosphere: The Effect of Outer Space on Oral Tissues

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Astronauts encounter various physical and psychological challenges during extended periods in space. Altering in gravity, ionizing radiation and psychological problems influence human body in multiple ways including immune system suppression, bone loss, and muscle atrophy. The oral cavity consists of hard and soft tissues such as jaw bone, teeth, oral mucosa, masticatory muscles and salivary glands that can be influenced during spaceflight. Microgravity, a near-weightless condition in outer space, is associated with mandible osteoporosis and can lead to periodontal problems and changes in masticatory functions. Additionally, the lack of gravity can alter salivary composition such as decreased vitamin C levels and following oral diseases. Cosmic radiation is another factor that can adversely affect oral health. Exposure to ionizing radiation can damage DNA and alter cellular function, leading to an increased risk of cancer. Studies have shown that radiation exposure can also affect the bacterial profile of the oral cavity, leading to dysbiosis and potentially increasing the risk of infection.
This study aims to investigate the effects of the space environment on the different oral tissues in astronauts to identify any potential damage caused by long-term exposure to space-related factors for obtaining oral health maintenance.
As space missions become longer, it is crucial to prioritize the medical aspect of crew members to ensure their well-being including their oral health. Both microgravity and cosmic radiation can jeopardize oral function by altering the orientation and homeostasis of cells. However, the effect of space is still contradictory in masticatory function and due to lack of evidence, several researches must be conducted. It is noteworthy that these efforts will be achieved through a collaborative spirit across various transdisciplinary approaches among the nations.

Keywords:
Space Medicine, Aeronautic Dentistry, Microgravity, Oral health

Mohaddese Pourashoury

Exosomes as Drug Delivery and Diagnostic Modality in Cervical Cancer

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Exosomes, which typically measure around 100 nm in size, are a type of extracellular vesicle released by most cells. These vesicles include diverse bioactive chemicals, including nucleic acids, proteins, and lipids. Furthermore, exosome composition indicates the physiological state of the cells from which they originate. Exosomes have inherent benefits, including notable biocompatibility and limited immunogenicity, which make them highly effective for transporting therapeutic substances, such as chemotherapeutic medicines, nucleic acids, and proteins. Cervical cancer presents notable obstacles, and exosomes provide the potential for transforming both its diagnostic and therapeutic approaches. This review aims to elucidate the application of exosomes in managing cervical cancer. The review highlights the isolating techniques, possible immune responses, and immunogenicity of exosomes. The review also elucidates the progress in administering therapeutic agents, including small molecules, nucleic acids, and proteins, to cancer cells via exosomes. This approach has demonstrated improvements in drug stability and targeted delivery.

Keywords:
Cervical Cancer, Exosomes, Drug Delivery, Cancer Diagnosis

Mohammad Sedaghati Jahromi

The Role of Artificial Intelligence in Startups Growth

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Artificial intelligence has a wide range of uses in businesses, including streamlining job processes and aggregating business data. Artificial intelligence (AI)-enabled products are expected to drive economic growth. Training data are important for firms developing AI-enabled products; without training data, firms cannot develop or refine their algorithms. As described in the AI Index 2018 Annual Report (Shoham et al., 2018), artificial intelligence (AI) has advanced rapidly over the past decade. Many scholars believe that AI has the potential to boost human productivity and economic growth (Athey, 2018; E. Brynjolfsson et al., 2021; Furman and Seamans, 2019). The outcome of these studies develops intelligent systems. The impact of AI in business is rising day by day. You engage with AI regularly without even realizing it. It is even more than you can imagine. Businesses today have access to more data than ever before. According to Forbes, the amount of data created and consumed increased by 5000% between 2010 and 2020. So startups are now able to change the world.
For business and startups leaders in particular, this means one thing: AI cannot be ignored. From the smallest local business to the largest global players, every company needs to come to terms with the intelligence revolution and identify how and where AI will make the biggest difference to their business. It affects every sector, from manufacturing to finance, bringing about never before seen increases in efficiency. In this study I extend both AI and entrepreneurship literature by showing how AI-powered startups leverage AI at scale to optimize scale, scope, and learning.

Keywords:
Artificial Intelligence, Startup, Deep Learning

Mohammad Reza Fattahi

Effects of Prophylactic or Therapeutic Dose of Enoxaparin on Overall Survival in Severe COVID-19 Patients: A Randomized Clinical Trial

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Coronavirus disease 2019 (COVID-19) has been associated with a hyper-coagulopathy state, however, the efficacy of different anticoagulant regimens in preventing thrombotic events is not clear. We aimed to compare therapeutic versus prophylactic enoxaparin therapy in severe COVID-19 patients.

In this single-center, open-label, randomized controlled trial, adult patients with severe COVID-19 presentations and an increased D-dimer level of more than four times the normal upper limit, were randomly assigned to receive either prophylactic or therapeutic dose of enoxaparin. All patients were followed for at least four months regarding the overall survival as the primary outcme. Hospitalization duration, the need for ICU admission, the need for mechanical ventilation, and major adverse events (MAEs) were also analyzed as the secondary outcomes.

Overall 237 patients (152 males and 85 females) were randomized to either arm (121 to prophylactic and 116 to therapeutic groups). Mortality rate was 27 (22.3%) and 52 (44.8%) in prophylactic and therapeutic arms, respectively. Prophylactic enoxaparin was associated with better survival in log rank test (p-value: 0.00, HR: 0.42). Additionally, a significantly lower rate of ICU admission, a lower rate of MAEs, and a shorter hospitalization was observed in prophylactic arm (p-value: 0.00, p-value: 0.00, and p-value: 0.02, respectively).

The results of the current study were in favor of anti-coagulant treatment with prophylactic doses of enoxaparin. Still, due to the limitations of this paper, we suggest that these outcomes be treated cautiously.

Keywords:
Enoxaparin, Survival, COVID-19

Mohammadreza MirzaeeGoodarzi

Advancements in Cancer Stem Cell Detection with Artificial Intelligence: A Promising Perspective for Cancer Treatment

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Cancer stem cells (CSCs) are some tumor-initiating cells that are recognized as one of the most important key factors in determining tumor cell characteristics and cancer prognosis. Since the importance of CSCs has been revealed, various methods have been introduced to identify these cells in tumor environments. The utilization of these detection techniques has revealed a significant correlation between tumor behavior and prognosis, as well as the presence of CSC in tumoral tissues. In recent times, the potential of artificial intelligence (AI) in data analysis and prediction has been used as a complementary tool to conventional methods to facilitate the detection of CSCs and propose personalized cancer therapies.
The ability of stem cells to self-renewal in addition to producing all sorts of human cells through differentiation is called stemness. An instance of the utilization of machine learning algorithms for the identification of CSCs involves the quantification of stemness levels in various tumor phenotypes. For this purpose, molecular characteristics that represent stemness have been recognized and measured in normal stem cell populations through genomic, epigenomic, transcriptomic, and proteomic studies. Consequently, machine learning algorithms can be employed to predict the degree of stemness in tumoral tissues by analyzing the molecular profile of cancerous cells. The Cancer Genome Atlas (TCGA) is among the projects that provided cancerous cell genome data through gene sequencing. The one-class logistic regression (OCLR) is a useful machine-learning algorithm for evaluating the dedifferentiation level in tumoral tissues via utilizing mRNAsi and mDNAsi, two major stemness indices. Previous research has demonstrated that the stemness of tumors' distinct phenotypes is diverse in relation to the quantification of mRNAsi and mDNAsi. This study aims to overview the current potentials of AI in better detecting CSCs, more accurately predicting tumor prognosis, and considering more effective cancer therapies.

Keywords:
Artificial Intelligence, Cancer Stem Cell, Cancer Therapy

Muzamal Hussain

Single-walled Carbon Nanotubes Modeled as Flügge Shell Theory: Poisson's Ratio Influence

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A numerical approach is developed for the vibration of SWCNTs based on Sander's shell theory. The GLT is used to extract the frequencies of CNTs in the form of eigen value. Some examples are presented in tabular form to compare the results. The accuracy is found for excellent convergence behavior. A detailed parametric study is displayed for the influence of Poisson ration on armchair zigzag and chiral tubes with simply supported and clamped simply supported edge condition. It is seen that the frequencies increasing on increasing the Poisson's ratio. When inclusion of Poisson's effect is included during vibration then the effective stiffness increases which increase the natural frequencies. The estimated frequency values of C-SS are high as compared of SS-SS. The frequency value increases with the increase of indices of single walled carbon nanotubes. The frequency pattern with all boundary conditions are seems to be parallel for overall values of Poisson's ratio. In the materials, Poisson's ratio directly measures the deformation and material shows a large elastic deformation due to high Poisson's ratio. When the Poisson's ration increases the moduli are expected to become so high and in result sufficiently high frequencies observed. In stretching and compression, Poisson's ratio is a useful measure of how much a material deforms. It is important for mechanical engineering as it allows materials to be chosen that suit the desired function.

Keywords:
Armchair, Zigzag and Chiral SWCNTs, Poisson's Ratio, Boundary Conditions

Natalia Iakovchenko

Prospects for the Use of Different Plant-based Milk Alternatives for the Manufacture of Fermented Beverages and Ice-cream with Adaptogenic and Probiotic Effects

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The issue of creating specialized and functional plant-based foods is very popular due to lactose intolerance, allergy to milk protein, environmental, ethical and religious aspects. It is worth noting that there is an urgent problem such as non-specific reactions of the body to external stimuli, such as stress, high production loads, epidemics of viral diseases, antibiotic therapy, unfavorable environmental conditions. The use of herbal substances with adaptogenic properties and probiotic microorganisms can be used in the prevention of negative conditions of the body. The aim of this research work was to create a new fermented plant-based functional product, which can be used for the manufacture of beverage and ice-cream enriched with biologically active substances with adaptogenic action and probiotic bacteria. Technological parameters for obtaining vegetable milk from lentils, soybeans, pumpkin seeds and wheat have been worked out. The influence of the obtained types of vegetable-based milk alternatives on the process of fermentation by probiotic bacteria of the genus Lactobacillus and genus Bifidobacterium have been studied. Changes in acidity during fermentation of vegetable milk from soy, wheat, pumpkin seeds and lentils, as well as organoleptic indicators, antioxidant activity and the increase in the biomass of probiotic bacteria during fermentation are experimentally shown. The influence of various adaptogenic extracts, namely, lemongrass, leuzea, rhodiola, eleutherococcus, echinacea, garlic, rosehip, sea buckthorn, on the process of acid accumulation, antioxidant activity and survival of probiotic microorganisms during fermentation of the plant milk alternatives have been studied. Reasonable concentrations of dry powders were selected to create composition with adaptogenic properties to achieve high consumer characteristics. Based on the data obtained, the composition and production technology of fermented vegetable base for beverage and ice-cream manufacture, which provides probiotic and adaptogenic effects when used systematically have been developed. The functional properties of the obtained base have been investigated in in vitro model system.
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Keywords:
Plant-based Milk, Adaptogens, Probiotics

Navid Ravan

Making a Dialogue Between Meta-research and Medicalization Studies

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Meta-research is defined as a critical and theoretical reflection on scientific research. Medicalization studies is a field that investigates the origins and consequences of medicalization. Medicalization is a process by which everyday aspects of human life are defined as medical problems that need medical observation and intervention. This study is aimed to investigate how meta-research and medicalization studies can inform and enrich each other.
For this purpose, first, a comprehensive search strategy was designed. By using medicalization, meta-research, and related keywords, related articles were selected and categorized. Then, a meta-synthesis method was used to deepen our understanding of both subjects and find their connections and interrelations.
Since 2005, when John Ioannidis introduced the field of meta-research, scientists have been paying more and more attention to this field. The main challenges in this field are replication crisis, interactions in scientific communities, research incentives, etc. One of the main concerns of meta-research in the field of biomedical science is the incentives of research that lead to futile and meaningless results.
On the other side, one of the most important topics in medicalization studies is a classic question in the philosophy of medicine: "What is the meaning of health and disease?" Some researchers believe that medicalization shows that what was not a real disease has been dragged into the realm of medicine illegitimately. So, it cannot be perceived without having a definition of health and disease.
Meta-research and medicalization studies can potentially make an effective dialogue and inform each other in some fields. Meta-research shows that challenges in biomedical research such as impaired incentives from pharmaceutical companies result in medicalization. Medicalization studies show that medicalized research subjects are an unseen aspect of the crisis in biomedical research. We suggest that future studies can merge the insights from both fields in an interdisciplinary manner.

Keywords:
Medicalization, Medicalization Studies, Meta-research, Research Crisis

Nazanin Abbasi

Effects of the Mother Language on the Connectivity In the Brain; A Narrative Review

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An important discovery of neuroscientists in current decades is the discovery of the complex and extensive language processing system in the human brain. Based on previous studies, intercultural differences that are more manifested in linguistic diversity; affects the functioning of the human brain. However, until recently there had been no clinical studies investigating the consequences of the characteristics of a particular language on brain structure. In this narrative review, I examine how the neuroanatomy of structural language connectivity is modulated by lifelong experience of speaking a specific language. Languages have differences due to their vowels, the way of the word's connection in sentence, structure, grammar and semantic communication. A new study, published on April 15, 2023, in collaboration with cognitive and human brain scientists, compared the connections between the language white matter and the speech production network in a large group of native speakers of very distinct languages: A morphologically and syntactically complex Indo-european (Germanic) and a root-based Semitic language (Arabic). In this study, researchers used magnetic resonance imaging of the brains of native German and Arabic speakers and discovered variations in the wiring of language areas in the brain. German native speakers showed more potent connectivity in the parts that associated with complex syntax processing. In evaluation, Native Arabic speakers have shown more potent connections among semantic language areas. In an older study published in 2022; had shown that speaking one-of-a-kind language produces a unique pattern in the white matter connections of monolingual speakers of English, German, and Chinese. The method of this study is based on mapping the connection of language areas with fiber tractography and looking for classification with machine learning. The clinical studies reports that scientists are eager to research longitudinal structural modifications inside the brains of Arabic-speaking adults who learn German over six months.

Keywords:
Mother Language, Structural Connectivity, Language Connectome, Human Brain

Negar Sadat Ahmadi

The Perspectives of Medical Students on the Attributes of the Role Models at Tehran University of Medical Sciences

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Role modeling is one of the integral parts of medical education, which significantly impacts the attitudes, clinical competency, and professional behaviors of medical students. Despite the high importance of role modeling, many clinical teachers do not have enough self-awareness regarding this role. Therefore, considering the undeniable impact of teachers' role modeling on students and the lack of sufficient evidence about the characteristics of role models in the general medicine course of Iranian universities, this study aims to determine the perspectives of medical students on the attributes of the role Models at Tehran University of Medical Sciences.
The current research is a descriptive-analytical cross-sectional study. In this study, we used the questionnaire "assessing attitudes of medical students towards characteristics of role modeling" developed by Mafinejad et al. After reaching the sample size in each group, the data were analyzed with appropriate statistical tests using SPSS 25.
In total, 447 questionnaires were collected and analyzed. The participants evaluated professionalism, communication skills, and humanistic behaviors as the most effective characteristics of teachers as role models. The research skills and reputation of teachers had the least importance in being accepted as role models from the student's point of view. Also, there is a significant correlation between medical students' perspectives regarding the characteristics of role models and their education level, role model group, role model gender, role model seniority, and the environment of exposure to role models.
According to the results of this study, professionalism, communication skills, and humanistic behaviors are the most effective attributes of teachers in being role models for medical students at Tehran University of Medical Sciences. Therefore, special attention should be paid to reinforcing these characteristics in teachers to maximize positive impact on students in the context of medical education.

Keywords:
Role model; Clinical teacher; Medical student; Medical education

Negin Jarrah

Will Telemedicine be Continued in Pediatric Surgery after COVID-19 Pandemic? A Narrative Review

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Telemedicine delivers telecommunication between health care providers and patients. Telemedicine was initially developed to improve inequity in medical care. It helped medical professionals in time of crisis and disasters to better triage and manage patients. Before the COVID19 pandemic, pediatric surgeons were unfamiliar with telemedicine and had resistance towards it. Lockdown policies and social distancing during pandemic, drove more patients and pediatric surgeons to use virtual appointments. Families and Providers with prior use of videocalls that are more familiar with technology are happier and satisfied with their virtual visits. Among providers, younger surgeons felt more fulfilled with their video call appointments.
Telemedicine crosses geographical borders and delivers sub-specialty care with significant cost savings for patients and clinics. It reduces unnecessary refers to emergency departments while providing immediate and effective care. It educates families to better understand and cope with their children's condition and their possible post-operative complications. It also increases opportunities to provide post-operative psychological support. Moreover, the decrease in distance travelled, other than lowering treatment costs, cuts carbon foot print and therefore helps to move towards 'green' surgery.
Limitation in physical examination, is a great challenge for pediatric surgeons as kids cooperate less virtually. In Addition, low socioeconomic state, illiteracy of virtual processes, low education, language barriers and also limited access to devices and good internet connection, affects the quality of care telemedicine delivers.
Telemedicine can give high quality virtual care equivalent to in-person pre-operative or post-operative visits and it is best used along with in-person appointments specially in complex conditions. However, standard policies should clarify legislation for cybersecurity, insurance coverage and malpractices. In this narrative review we aimed to study pediatric surgeons' and patients' tendency to continue using telemedicine by studying their satisfaction from the process, and reviewing advantages, disadvantages and barriers of implementing telemedicine.

Keywords:
Telemedicine, Pediatric Surgery, COVID19, Virtual Visiting, Satisfaction

Niloofar Ziadali

The Melody of Life (Art and Science)

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When we hear the words 'art' and 'science,' they may initially seem like two opposite concepts. One involves creativity, while the other involves hard formulas and data. However, upon closer inspection, we realize that these two are not only opposites but can also complement each other. In many cases, they share common goals and can jointly create significant events. Creativity is essential for creation. There are ideas in our minds that we can understand or imagine, and there are things we can bring into existence with the necessary tools. Through study and research, we encounter remarkable instances where science and art converge, such as the works of Leonardo da Vinci. He was not only an artist but also an inventor and scientist, demonstrating the exquisite balance and harmony between science and art.

We currently live in a technology-driven era, where it is crucial to establish an environment that integrates science education with the visualization of art. Art can aid our understanding of complex aspects of the natural world. Numerous scientific studies provide evidence that art improves brain function. It influences the brain waves of the nervous system and can even elevate serotonin levels. Art has the power to alter people's attitudes and enhance their perception of the world. Research has demonstrated that art cultivates brain networks that offer a wide range of benefits, from motor skills to creativity and emotional balance. In scientific progress, art can contribute just as much as science itself, leveraging creativity.

Keywords:
Art, Science, Brain, Cognitive Science

Niloufar Yazdanpanah

NLRP3 in Juvenile Systemic Lupus Erythematosus

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Juvenile systemic lupus erythematosus (JSLE) is a multifactorial disorder with heterogeneous clinical manifestations and a complex etiopathogenesis. Environmental and genetic factors, and dysregulated immune system responses are known to contribute to JSLE etiopathogenesis. NLRP3 inflammasome, which is involved in immune-mediated inflammatory responses, is assumed to have an important role in JSLE etiopathogenesis.
To determine whether the NLRP3 genetic variants are involved in JSLE predisposition and progression.
Fifty-three patients diagnosed with JSLE and 56 healthy sex-matched controls were studied. NLRP3 (C/G rs10754558, C/T rs3806265, C/T rs4612666, A/C rs35829419) gene polymorphisms were evaluated using a TaqMan single-nucleotide polymorphism assay.
C allele at position rs3806265 was detected in higher frequencies in patients than in the control group (37.74% vs 23.21%, P-value = .028). At the genotype level at the same position, CT has a significantly higher frequency in patients than the healthy subjects (75.47% vs 46.43%, P-value = .003). The NLRP3 rs3806265 CT genotype was detected at a higher frequency in patients with JSLE than in the healthy control group.

Keywords:
Inflammasome, JSLE, Juvenile Systemic Lupus Eryhtematosus, NLRP3, Polymorphism

Niusha Esmaealzadeh

Integrative Lifestyle Medicine: Discovering More Factors for Health Maintenance

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Non-communicable diseases (NCDs) such as cancer, diabetes, obesity, hypertension, metabolic syndrome, and chronic respiratory diseases are increasing worldwide due to the competitive and stressful lifestyle of the population. Lifestyle behaviors are major determinants of NCDs. Lifestyle medicine is a critical and essential approach for the prevention and management of chronic lifestyle-related disorders. Medical practitioners can provide guidance and coaching to help patients adopt lifestyle behaviors that can prevent and manage chronic diseases. These behaviors, or five pillars of lifestyle medicine, include regular physical activity, balanced diet, good sleep hygiene, avoidance of harmful substance consumption, and social activity. According to Traditional Persian Medicine, more factors needed to be integrated to the mentioned ones, which include regular excretion of waste materials, maintaining healthy emotional status, and residence in a climate that matches the individual's health condition. Also, it is highly recommended to take daily amounts of Adaptogen herb, plants that regulate neuro-hormonal status during internal and external stress.
To understand the effect of each factor on specific chronic diseases, more studies are required.

Keywords:
Lifestyle Medicine, Integrative Medicine, Persian Medicine, Integrative Lifestyle Medicine, Health Coaching

Parsa Alijanizadeh

Advancements in Multi-Epitope Vaccine Development for Multiple Sclerosis: An Innovative Approach

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Multiple Sclerosis (MS) is a widespread neurodegenerative disease. Myelin Basic Protein (MBP) plays a crucial role in MS. Recent studies suggest that immunizing against Epstein-Barr virus (EBV) is promising for MS. Additionally, some MS patients have active human herpes virus 6 (HHV-6) infections, which may be linked to relapses. To address this, a new chimeric vaccine for MS is being developed using immunoinformatics techniques targeting these antigens.
MBP, EBV antigen-1 (EBNA-1), HHV-6 early antigen (p41/38), and HHV-6 late antigens (capsid) sequences were identified. Bioinformatics tools are used to predict MHC-1, MHC-2, and CTL epitopes. The chimeric vaccine was constructed by linking these epitopes with the TAT peptide, adjuvant, and IL-10, using linkers. The vaccine's sequence was generated using MODELLER, and Ramachandran plot used to refine 3D structure. The multi-epitope vaccine was docked with TLR-4, and a molecular dynamics (MD) simulation of the complex of the vaccine-TLR4 was conducted using GROMACS. To stimulate the immune response to the vaccine, the C-ImmSim server was used.
The newly designed chimeric vaccine displayed a well-structured composition, with an ERRAT score exceeding 85%, indicating strong stability. Furthermore, the Ramachandran plot analysis showed that over 95% of amino acid residues were positioned favorably. Molecular docking successfully linked the vaccine to TLR-4, and subsequent molecular dynamics simulations confirmed the vaccine's stable conformation throughout the study. Predictions for solubility, antigenicity, and allergenicity all fell within acceptable ranges. Immune response simulations indicated a positive reaction from both the innate and adaptive immune systems.
Through the Immunoinformatics technique, we developed an immunogenic vaccine against MS with promising results. This vaccine is scientifically valuable due to its versatility, ability to provide immunity against identified risk factors, and efficiency in terms of cost and time. The insights gained from computer simulations can guide future experimental research toward creating a practical MS vaccine.

Keywords:
Immunoinformatics, Multiple Sclerosis, Neuroimmunology, Specific Immunity

Pegah Niktalab

The Silent Pandemic: Novel Therapeutics for Overcoming Antibiotic Resistance as a Global Burden

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Antimicrobial Resistance (AMR) is the result of the evolution and mutation of microorganisms, such as bacteria, fungi, parasites, and viruses, to the point that they can no longer be treated with antimicrobial drugs like antibiotics. The negative effects of excessive or careless use of antibiotics in different contexts, primarily in clinical treatment along with agricultural use, animal healthcare, and the food system, may be one of the primary reasons of the current problem.

The "Silent Pandemic" known as AMR requires immediate attention, should be controlled more skillfully, and should not be postponed for a later time. AMR is predicted to become the world's leading cause of mortality by 2050 if no preventative actions are taken. Global estimates indicate that more than 1.2 million deaths were directly related to AMR in 2019, and if insufficient steps are done to manage AMR, this number is expected to rise to almost 10 million deaths annually by 2050.

Several strategies have been proposed for defeating antimicrobial resistance over the years such as development of vaccines, immunotherapeutics, phage and microbial therapies. We review current advances in search for novel therapeutics and the possible role of the gut microbiome in overcoming this international burden.

Keywords:
Antibiotic Resistance, Microbial Therapeutics, Microbiome

Rahele Khosravi Nessiani

Production of Nanoprotein Containing Exosome and Natural Human Blood Cell Proteins for Treating Lupus: A New Approach in the Treatment of This Autoimmune Disease

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In recent years, autoimmune diseases have posed significant challenges in the field of medicine. Lupus, in particular, has been a focus of intense research due to its complex etiology and varied clinical manifestations. Traditional treatment modalities for lupus mainly involve the use of immunosuppressive drugs, which often result in adverse side effects and suboptimal outcomes. Therefore, exploring novel therapeutic approaches is crucial for improving the quality of life for lupus patients.

In this study, we propose a novel approach for the treatment of lupus using a nanoprotein containing exosome and natural human blood cell proteins. Exosomes are extracellular vesicles known to play a crucial role in intercellular communication and immune regulation. We hypothesize that coupling naturally occurring human blood cell proteins with exosomes can enhance the therapeutic potential of exosomal-based treatments for lupus.

To validate our hypothesis, we will employ state-of-the-art techniques for the production and characterization of the nanoprotein. We will isolate exosomes from human blood samples and purify them using a combination of centrifugation and filtration techniques. Natural human blood cell proteins will be bound to the exosome surface through a specialized linker. The resulting nanoprotein will then be evaluated for its stability, immunomodulatory properties, and ability to mitigate lupus-related inflammatory responses.

We anticipate that the incorporation of natural human blood cell proteins into exosomes will confer enhanced immunoregulatory capabilities, leading to a more targeted and effective treatment for lupus. This innovative approach has the potential to revolutionize lupus therapeutics and improve patient outcomes. Our findings may pave the way for personalized medicine approaches in the treatment of other autoimmune disorders as well.

Keywords:
Lupus, Autoimmune Disease, Exosome, Nanoprotein, Immunomodulation, Therapeutic Approach

Ramyar Rahimi Darehbagh

Understanding Presenilin-1 Expression in Parkinson's Disease: A Cellular Model Approach

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A more profound understanding of genetic complexities in Parkinson's Disease (PD) is crucial for advancing future therapeutic strategies. This study aims to validate the expression of Presenilin-1, a pivotal gene in neurodegenerative diseases, using a rotenone-induced Parkinsonian cellular model in SH-SY5Y neuroblastoma cells.

Methods:

A well-established Parkinsonian model was induced in SH-SY5Y cells using 500nM rotenone. The model's reliability was confirmed through various assays including Lactate Dehydrogenase tests, oxidation-reduction measurements, and MTT assays. Quantitative real-time PCR was employed to quantify Presenilin-1 expression, with data normalized against a housekeeping gene. Statistical analyses were conducted using REST and Linreg software, and graphical representations were generated using Prism software.

Results:

This study marks a seminal finding by confirming the presence and differential regulation of Presenilin-1 in a validated Parkinson's cellular model. Notably, Presenilin-1 demonstrated a concentration-dependent response to rotenone exposure. Its expression was significantly downregulated at lower concentrations (100nM) but was robustly upregulated at higher concentrations (200nM, 500nM), suggesting a dose-response relationship critical to PD pathogenesis understanding.

Conclusion:

Our findings make a significant contribution by confirming the expression of Presenilin-1 in a rotenone-induced Parkinsonian cellular model. The observed interaction between Presenilin-1 and rotenone not only deepens our comprehension of PD pathogenesis but also establishes Presenilin-1 as both a confirmed biomarker and a prospective therapeutic target in PD research.

Keywords:

Parkinson's Disease, Presenilin-1, Rotenone, Gene Expression, SH-SY5Y Cells, qPCR, Cellular Models, Biomarkers

Reihaneh Golroo

Bioart: The Moment Art and Biotechnology Collide with One Another

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The combination of art and biotechnology has resulted in a new field of study known as bioart. This interdisciplinary approach involves the use of living organisms, tissues, and cells as artistic mediums. It has the potential to create new forms of expression that challenge traditional boundaries between art and science. Bioartists are exploring the ethical, social, and cultural implications of biotechnology through their work, which ranges from genetic engineering to tissue culture. This emerging field offers a unique opportunity for artists and scientists to collaborate and engage in critical discourse about the role of biotechnology in society. However, there are also concerns about the safety and regulation of bioart, as well as the potential for exploitation of living organisms for artistic purposes. As such, it is important for artists and scientists to work together to ensure that bioart is both innovative and responsible.

Keywords:
Bioart, Art, Biology, Biotechnology

Rojina Kakaei

Doctors Without Borders, Representatives of Peace in Medicine

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Doctors without borders, It's name is even earpleasing and sounds good to human being it reminds us the magic and power of peace. Which is reason that this organization was awarded the Nobel peace prize in 1999.
Doctors without borders or MSF that delivers emergency medical aid to others who lack health care because of social and geographical isolation.
It was founded by Bernard kouchner in 1971 in France and now it has an international network with sections in 21 countries and also is a member of the UN (United Nations).
Regardless of its name it does not only consist of Doctors any one in medical fields and also non-medical can be a part of MSF. They need mechanics and electrician also Logistician. They have done so many projects till now in different parts of the world any whereas that people lack peace and are in deed like Sudan, since 1979 MSF has been providing medical humanitarian assistance in Sudan with dangerous diseases like kala azar Syria: war torn country has been regardless over looked, from the early stages of conflict in Syria, MSF sought permission to extend ites Medical assistance to all parts of the country ,but permission has not been granted so msf s supports being limited to the regions controlled by opposition forces IDps: du to ongoing government repressiotion and intercommonal violence rohingya refugees have been fleening Myanmar/burma in large numbers in Bangladesh India: msf has worked in indian since 1999 and has helped them with HIV and AIDS and hepatitis c and also natural disasters And recently has helped Turkey with its enormous earthquake. And also in Yemen, South Africa and ....
The situation definitely is so hard and the staff faced with lots of problems and major risk during the course of their works Deaths may occur as a result of epidemics as well as arm conflicts there Are also risk of kidnapping for political reasons.
The msf organization garentee the safety of the staff but when there is no peace there is no garentee for being safe. Although MSF is impartial organization but they always belive to witness against cruilty and defense poor people.
As as memeber of MSF, they should have a high flexibility to adapt with auster situation. And harrowing scenes like illnesses, war, malnutrition, violence, and ...
But with out any doubt they feel the power of peace in life and medicine than anyone better.

Keywords:
Doctors Without Borders, Peace Project

Saba Fekrvand

Essential Immune Signaling Against COVID-19: A Systematic Review and Meta-analysis on Inborn Errors of Immunity

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During the last three years, coronavirus disease 2019 (COVID-19) has spread rapidly and infected more than 670 million individuals and caused approximately 7 million deaths. COVID-19 has a wide spectrum of symptoms and disease severity indicating the indisputable role of individual immune responses to SARS-CoV-2. Inborn errors of immunity (IEI) are congenital disorders of the immune system. Due to impaired immune system components in these patients, they are at a higher risk to develop a more severe COVID-19 course compared to the normal population. Objectives: To systematically review various aspects of IEI patients infected with COVID-19 and update the previously reported outcome. Moreover, we performed a meta-analysis aiming to determine the incidence rate of COVID-19 in patients with different entities of IEI.
We conducted electronic searches on Embase, Web of Science, PubMed, and Scopus (December 2019 to May 2023) introducing terms related to IEI and COVID-19. Studies of confirmed immunodeficient subjects and COVID-19 infection were included.
We enrolled a total number of 3239 IEI cases with a history of COVID-19 infection. The majority of patients had critical infections (946 cases, 29.2%). The highest frequency of critical and severe cases was observed in phenocopies of IEI (95.6%), defects in intrinsic and innate immunity (71.2%), immune dysregulation (29.6%) and immunodeficiencies affecting cellular and humoral immunity (24.8%). A total number of 430 cases (13.3%) succumbed to the disease and the highest mortality was observed in IEI phenocopies (37.4%). The COVID-19 incidence rate in these immunodeficient patients was 11.9% (95% CI: 8.3 to 15.5%). In sub-group analysis, innate immunodeficiency had the highest COVID-19 incidence rate, followed by IEI phenocopies [34.1% (12.1 to 56.0%) and 15.3% (3.7 to 27.0%), respectively]. Furthermore, the case fatality rate among IEI patients with COVID-19 infection is estimated as 5.4% (95% CI: 3.5-8.3%, n=8 studies, I2=17.5%).
IEI with underlying defects in specific branches of the immune system responding to RNA virus infection experience a higher incidence rate and mortality of COVID-19 infection. Increasing awareness about these entities and underlying genetic defects, adherence to prophylactic strategies and allocating more clinical attention to these patients could lead to a decrease in the incidence rate and mortality due to COVID-19 infection in these patients and preparation for the next potential pandemic.

Keywords:
Inborn Errors of Immunity, Primary Immunodeficiency Disorders, Corona Virus Disease 2019, COVID-19, Severe Acute Respiratory Syndrome Coronavirus 2

Saghar Rouzrokh

Role of Long Non-coding RNAs in Aging

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Worldwide, people are living longer and the population is aging quickly. One in six people in the world will be 60 or older by 2030 and the number will be nearly doubled by 2050. These changes in population have significant public health implications and socio-economic consequences. Aging is a natural phenomenon that results in progressive degenerative alterations in both functional process and anatomic structures of body over time, leading to various age-related diseases like neurodegenerative diseases, musculoskeletal disorders, and cardiovascular diseases. To intervene in the aging process and combat its comorbidities, we need to understand the underlying mechanisms of aging, which include cellular senescence, mitochondrial dysfunction, telomere attrition, genomic instability, epigenetic changes, chronic inflammation, etc.

Long non-coding RNAs (lncRNAs) have received a lot of interest recently among studies due to their role in cellular regulation. These are DNA transcripts longer than 200 nucleotides in length that lack reading frames and do not encode any proteins. They are essential for cell proliferation, apoptosis, and senescence via controlling gene expression, translation, transcription, and chromatin modification. LncRNAs can induce senescence by interfering with aging pathways, including cell cycle arrest, progression of Senescence-Associated Secretory Phenotype (SASP), telomere attrition, and chromatin remodeling. Various unregulated lncRNAs via the aforementioned processes have been discovered in organs affected by age-related diseases, such as the brain, cardiovascular system, immune system, kidneys, bones, and muscles. By targeting the responsible lncRNAs, we can design early interventions to mitigate organ function loss and promote healthy aging and longevity. We hope to pave the way for new disease diagnostic and therapeutic targeting by studying lncRNAs' association with aging processes in both organic and cellular levels.

Keywords:
Long Non-coding RNAs, Aging, Senescence, Age-related Diseases

Sahel Noorikoloori

Cancer Vive

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The term "cancer" was first introduced in 370 BC as abnormally growing cells due to chromosomal alterations. Yet, still, in the 21st century cancer is among top 10 leading causes of death in the globe with the mortality rate of about 10 million people each year. This means that unfortunately, many people would be involved in the journey of cancer-vive.
Current cancer treatments include surgery removal, chemotherapy, radiotherapy, and immunotherapy. Although chemotherapy might be effective to some degree, its widespread application is restricted. Although, in recent decades, the introduction of nanotechnology has unlocked new prospects for improving the efficacy of chemotherapy known as targeted therapeutic delivery which attributed towards the development of nano-based drug delivery systems. These nano-carriers have been engineered to release and increase the duration time of drug and protect the therapeutic agent from early degradation and removal by phagocytic cells. But, it seems too good to be true, and in fact, it has been shown that the difficulty in targeted drug delivery to tumor tissue is beyond the preparation of new types of nanoparticles. As a result, a question comes to mind, "Has designing criteria in drug delivery field been occupied by the notion of nanoparticles?". This talk will elaborate, engineering nanoparticles as delivery system in cancer treatment.

Keywords:
Cancer, Target delivery, Nanoparticles

Seiedeh Reihaneh Banihashemi

The effect of melatonin, Diosmin, and their synergistic effect on antioxidant indices in testicular tissue following acrylamide consumption in a rat experimental model

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I conducted my project under the supervision of Dr. Meisam Tehrani Sharif. It was titled" The Effect of Melatonin, Diosmin, and their synergistic effect on antioxidant indices in testicular tissue following acrylamide consumption in a rat experimental model." I experimented on 63 healthy male Sprague-Dawley rats aged 6 to 7 weeks with an average of 180-200 grams weight. Weight measurement, Behavioral Evaluation Indices (Step Ranking), Histopathological Evaluation, and Biochemical Evaluation: the levels of MDA, GSH, GSHpx, SOD, GPx, CAT, and testosterone were determined using commercial kits, and according to the protocol And the result, we found out that melatonin and the synergistic effect of it could be effective in this experiment which was the novelty of the investigation. First, the results were processed using Excel software and evaluated statistically using Medcalc software. Considering the normality of the data, we used a T-test and a significance level of $p \leq 0.05$.

Keywords:
Acrylamide, Biochemical Evaluation, Melatonin

Seyedeh Saba Sajadi Tabar

Transforming Healthcare Delivery: The Role of Telemedicine in the COVID-19 and Post-Pandemic Era

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Technological advancements in chronic disease management have reduced hospitalizations, readmissions, and expenses. Telemedicine is a powerful technology and transformative factor in the healthcare industry, enabling the provision of accessible, efficient, and patient-centered care. The capacities of telemedicine are enhancing access to healthcare, addressing geographical disparities, and promoting equity in healthcare delivery. The presence of telemedicine as a pivotal instrument during the pandemic is facilitating the uninterrupted provision of healthcare services while mitigating the risks of infection. For instance, this technology mitigated COVID-19 transmission by minimizing direct contact between medical professionals and patients. It provided medical expertise to rural populations and reduced travel costs.

Telemedicine is expected to become an integral part of the future healthcare system. Its utilization has become an essential element of healthcare in the aftermath of the pandemic, effectively meeting the demand for medical treatments that are both easily accessible and efficient. Policymakers and medical organizations can safeguard patient privacy and data security through the establishment of regulatory frameworks, so enabling patients to derive advantages from telemedicine while upholding the confidentiality of sensitive information. Furthermore, the incorporation of telemedicine into patient-centered digital healthcare systems gives a significant opportunity to improve healthcare accessibility and quality.

This research emphasizes the significance of a prudent expansion of telemedicine, emphasizing its capacity to transform the provision of healthcare.

Keywords:
Telemedicine, Healthcare Transformation, Pandemic

Sheema Hashem

Engineered Antimicrobial Peptides Inhibit Cell Viability, Promote Apoptosis and Induce Cell Cycle Arrest in SW620 Human Colon Adenocarcinoma Cells

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Colorectal cancer (CRC) is the third most common cancer worldwide, and several therapeutic strategies have been proposed for CRC. Antimicrobial peptides have recently emerged as promising alternatives for cancer therapeutics. In this study, we aimed to investigate the effects of two silico-engineered antimicrobial peptides (EAMPs) on SW620 colon cancer cells and determine their anti-cancer activity.

CellTiter-Glo Luminescence Assay was used to measure cell proliferation. Clonogenic assay was used to measure cell survival. Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) was used for detecting DNA fragmentation. Flow cytometry was performed to detect cell apoptosis, cell cycle distribution and mitochondrial membrane Western blotting was used for measuring protein expression/activation in apoptotic and pro-carcinogenic cellular signaling pathways.

Our in vitro data showed that EAMPs preferentially and, in a dose-dependent way, inhibited colon cancer cell proliferation but were not toxic to normal colon mucosa epithelial cells. EAMPs induced cellular DNA damage, cell cycle arrest at the S/G2 phase, cell apoptosis, and mitochondrial membrane depolarization. In addition, EAMPs inhibited the activation of NF-kB, STAT3, Akt, EGFR, β-catenin and c-Myc signaling pathways and upregulated the expression of p21 and p27.

Our in vitro results revealed the anti-cancer activity of novel EAMPs in CRC cells. These findings pave the way for future in vivo studies of EAMPS to confirm their role as potential anti-tumor agents against CRC.

Keywords:
Antimicrobial Peptides, Apoptosis, Cell Proliferation, Cell Cycle, Colorectal Cancer

Subhrajit Barua

From Traditional Medicine to Modern Therapeutics: A Novel Approach to Treating Anxiety and Stress

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According to a survey done by the American Psychological Association in early 2023, three-quarters of adults say their stress levels have increased over the past year. While chemical interventions have failed to produce significant results, traditional knowledge of herbal medicine have provided us with a slight glimpse of hope. Taking inspiration from the traditional knowledge of herbal medicine of different civilizations of the world, a better and more efficient form of remediation has been found.

The vital role of the gut-brain axis in stress-related responses is much appreciated nowadays. Therefore, in this paper, we propose a way to reduce stress and anxiety by regulating the HPA and gut-brain axes with an adaptogenic blend. Adaptogens are natural substances that possess the remarkable ability to help the body adapt to stress while supporting usual metabolic functions. They have been found to increase the body's potential to resist physical, biological, emotional, and environmental stressors. The knowledge and use of these herbs can be dated back thousands of years in ancient India (Ayurveda) and China (Traditional Chinese Medicine - TCM). However, the proper scientific study of these herbs only began in the late 1940s, when Soviet scientists explored the benefits of these substances for relieving stress, preventing illness, maintaining homeostasis, and enhancing overall resistance.

Using the potential of such adaptogens, we are developing an agonist to cortisol which is a stress-inducing hormone released by the adrenal gland when stimulated by the pituitary gland. This method of treating stress is non-invasive and has minimal side effects compared to any other conventional forms of stress medication. This method can also be incorporated in our daily diet making it even more convenient to consume.

Keywords:
Adaptogen, Stress, Anxiety, Herbal Medicine

Tara Shahmoradi

Epi-Longevity Review: Exploring Immortality Potential through Epigenetic Studies

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Longevity is a lesser-known process and it's been one of the main concerns of scientists in recent years. It is generally accepted that a molecular and chemical process is the cause of what we know as senescence. But it's still unknown which specific molecular mechanism this process depends on. Aging is frequently accompanied by a decline in independence, increased vulnerability, and the onset of diseases such as cancer. However, there are three main theories about the aging process; Program theory, damage theory, and combined theory which is more recent.

New studies explained that epigenetic changes can be the most possible answer to "how we age". Also, Scientists brought up an idea in which the aging process can be reversed by controlling epigenetic changes. It has been said that changes in H3k27ac can influence cell identity maintenance and based on this fact, reversing the aging process in mammals seems practical. It is a common occurrence that parts of DNA break during normal cell processes. To investigate the impact of this phenomenon a twin mouse with the same genetic sequence was used and epigenetic changes were artificially accelerated by further breaking the DNA in one of them. It has been confirmed that after a specific study time, the mouse was biologically older than his same twin which can reject the hypothesis of mutation as the cause of aging. Moreover, as the result of this review, the rejuvenating process in mice has been confirmed and by examining laboratory methods in this regard, it is considered possible to reverse the aging process in mammals. In this study, after reviewing the theories about aging I investigated epigenetic approaches, new experiments, results, and its role in stepping forward to what we know as immortality.

Keywords:
Epigenetic, Longevity, Aging, Immortality, DNA Break

Zahra Bibak Bejandi

Surgical Technique A New Technique for Superficial Limbus Harvest Using an Automated Microkeratome and a Aovel Globefixation System

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To introduce an unprecedented technique, instrumentation, and setup for the superficial limbus harvest from the human cadaver donor whole globe.
Method: We studied several superficial limbus harvest alternatives and developed a preferred approach with our available instruments and optimized it on a handful of seropositive cadaver donors of whole globes.
The globe is pressurized to about normal intraocular pressure by viscoelastic
injection through the optic nerve stump. The globe is then mounted on a custom-made dynamic globe fixator which maintains negative pressure in its stabilizing socket. Exertion of the negative pressure effectively elevates globe intraocular pressure (up to about 50 mm Hg) and makes the corneoscleral wall tight. The socket is then held tilted to the left side for about 30 degrees to put the limbal zone horizontal, and mildly 'chin-up'. Next, the microkeratome (ONE Turbine Microkeratome and its single-use blade; (Moria Surgical Inc, Antony, France) is put on the uppermost and exposed limbus of the globe and activated; and the socket is rotated clockwise under the microkeratome head and its oscillating blade, allowing an effective revolution of the static head around the limbal belt (for a right-handed operator and a counterclockwise cut).
We succeeded in cutting intact 360-degree pieces of smooth superficial limbus by using blades with varying depths. Our method can be further equipped and optimized, and be used by the eye banks and the surgeons for keratolimbal grafting as a more efficient superficial limbus harvest technique.

Keywords:
superficial limbus harvest, keratolimbal allograft, microkeratome, human cadaver donor whole globe, globe fixation system

Zeynab Zahedi

Investigating the Life Expectancy of People with Breast Cancer and Neoplastic Meningitis in the World: A Systematic Review

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Neoplastic meningitis (NM) is a diffuse spread of tumor cells in the cerebrospinal fluid, leptomeninges, or both, and is a common problem in neuro-oncology, occurring in approximately 5-10% of malignancies, most commonly in breast cancer, lung cancer, and B-cell lymphoma. It is a complication of the central nervous system caused by metastatic cancer to the meninges and cerebrospinal fluid. It is relevant for cancer specialists because of the impact this disease has on the quality of life and survival rates of patients. The purpose of this study is to investigate the life expectancy of people with breast cancer and neoplastic meningitis in the world.

We systematically searched the five scientific databases including PubMed, Cochrane, Web Of Science, Embase and Google scholar inception until September 2022 with 3-related keywords: breast cancer, neoplastic meningitis, and life expectancy To ensure the completeness of the search results, the sources of the articles were checked. Strobe checklist was used to check the quality of the articles.

A total of 72 articles were reviewed and finally 26 articles were selected that were related to the purpose of the study. Studies have shown that We have Life expectancy extension with non-hormone-targeted therapy in HER2- or hormone receptor-positive metastatic breast cancer. the incidence of neoplastic meningitis is increasing, because breast cancer patients are surviving longer, partly due to the use of new treatments with weak central nervous system penetration. Long-term survival is occasionally observed in patients with neoplastic meningitis associated with breast cancer, but overall survival is short to moderate in most patients.

The obtained results show that most patients with neoplastic meningitis have cancer and NM treatment is palliative and there is a low life expectancy in these patients.

Keywords:
Breast Cancer, Neoplastic Meningitis, Life Expectancy

Aida Hossein Nezhad

Long-Term Impact of Various Endocrine Therapy Regimens on Mortality, Local Recurrence, and Metastasis in Breast Cancer: A 25-Year Retrospective Study

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Endocrine therapy plays an essential role in the treatment of breast cancer, aiming to reduce recurrence rates and improve long-term survival. This retrospective case series study investigates the long-term effects of different endocrine therapy regimens on mortality, local recurrence, and metastasis in breast cancer patients.

A complete analysis was conducted at the Referral Breast Cancer Research Center of Shahid Beheshti University of Medical Sciences. The study included a retrospective review of medical records of 2,262 histologically confirmed breast ER+ cancer patients after 25 years. Patient data, including tumor characteristics, treatment modalities, and details of the endocrine therapy regimen, were collected. Statistical analyses were performed to assess the associations between treatment variables and outcomes.

The average age of the study participants was 49.45 years, and 99.1% of them were female. The average tumor size was 2.8 cm, and the total mortality rate was 12.3%. The most common tumor type was invasive ductal carcinoma (68.7%). Human epidermal growth factor receptor 2 (HER2), progesterone receptor (PR), and estrogen receptor (ER) positive expression were found in 70.6%, 71.8%, and 17.7% of patients, respectively. Tamoxifen was administered to 1,700 patients, letrozole to 715, and exemestane to 540. Endocrine therapy lasted, on average, 5.2 years. 10.5% of patients experienced local recurrence, according to the analysis of recurrence patterns. The bone (27.4%) was the most typical site of recurrence, followed by the liver (18.2%), lung (15.9%), and local recurrence at the initial tumor site (13.6%). The length of letrozole treatment (p 0.001) and lymph node involvement (p = 0.028) were two independent predictive variables for local recurrence that were discovered through multivariate analysis. Notably, a lower incidence of local recurrence was linked to letrozole treatment for longer periods of time. ER expression, lymph node involvement, and duration of endocrine therapy were found as independent predictive markers for recurrence and mortality. Furthermore, the length of letrozole therapy became an independent predictor of local recurrence. The duration of adjuvant endocrine therapy showed an inverse relationship with mortality, recurrence, and local recurrence.

Keywords:
Breast Cancer, Endocrine Therapy, Local Recurrence

Ali Mehri

Machine Learning Algorithms for Predicting Mortality in Locally Advanced Colorectal Cancer Patients following Tumor Resection: An Innovative Analysis of Post-Surgery

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Colorectal cancer is a significant contributor to cancer-related fatalities globally, especially in locally advanced cases. Accurate prediction of mortality risk in this group is vital for treatment decisions and better clinical outcomes. Machine learning algorithms have shown promise in predicting patient outcomes across medical domains.

In this study, we employed a machine learning-based approach to analyze post-tumor resection outcomes in 290 patients with locally advanced colorectal cancer, aiming to predict death risk. We utilized six machine learning models, namely Random Forest, Support Vector Machine (SVM), Decision Tree, Neural Net, Naive Bayes, and XG Boost. The training and testing samples were randomly split in an 8:2 ratio.

Results revealed that the Decision Tree model achieved the highest accuracy at 0.944, closely followed by the Random Forest model at 0.930. The XG Boost and Naive Bayes models performed well with accuracies of 0.902 and 0.875, respectively. However, the Neural Network model showed the lowest accuracy at 0.694. Several factors were considered, including sex, age, tumor location, recurrence status, recurrence-free survival, surgical techniques, tumor stage, circumferential resection margin, distal resection margin, recurrence type (none, local, systemic, local + systemic), complications (stenosis, obstruction, anastomosis leak, collection, rectovaginal fistula, bleeding, and impotency), and surgery duration.

Risk factor analysis conducted by the Random Forest and XG Boost models identified the five most influential risk factors for tumor-related mortality. According to the Random Forest model, they were recurrence-free survival, recurrence type, recurrence status, surgical techniques, and circumferential resection margin. The XG Boost model highlighted recurrence-free survival, recurrence status, age, surgery duration, and recurrence type as the most influential risk factors.

Our findings have significant implications, offering valuable insights that can enhance prognostication and personalize treatment strategies for this patient population. Integrating these insights into clinical practice has the potential to improve clinical outcomes and extend overall survival for patients.

Keywords:
Machine Learning, Prediction, Colorectal Cancer

Ali Hosseini

The Effect of Radioactive Iodine Therapy on Ovarian Reserve in Women with Thyroid Cancer at Reproductive Age; A Prospective Study

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Thyroid cancer is a prevalent malignancy that, based on treatment requirements, involves the use of radioactive iodine following thyroidectomy surgery. This study aims to explore the impact of iodine therapy on the ovarian reserve among women of reproductive age.
This prospective study involved the inclusion of 60 patients, aged 18 to 35, who were undergoing their initial iodine therapy as a part of their treatment for thyroid cancer. Patients with underlying diseases, any ovarian disorders, and those requiring repeated iodine treatments were excluded. The patients' anti-Müllerian hormone (AMH) levels were assessed on four occasions: before iodine therapy, and at 3, 6, and 12 months after iodine therapy. The significance level for evaluating the P-value in the study was set at less than 0.05.
The mean age of the patients was 29.53 ± 4.53 years. AMH levels demonstrated a significant decline with increasing age. No significant correlation was observed between variables such as smoking, age of menarche, and abnormal uterine bleeding with AMH levels. The mean AMH values before, at 3, 6, and 12 months post-iodine therapy were 2.25 ± 0.55 ng/ml, 1.15 ± 0.35 ng/ml, 1.58 ± 0.47 ng/ml, and 1.94 ± 0.58 ng/ml, respectively. These findings highlight a substantial reduction of 49.05%, 29.55%, and 13.58% in relation to the initial AMH levels ($p < 0.001$).
Given the influence of iodine therapy in diminishing AMH levels, it is advisable for women within the reproductive age bracket to undergo an assessment before initiating iodine therapy. This evaluation would ascertain their ovarian reserve status, enabling appropriate action if their AMH levels are unsuitable. In such cases, seeking consultation with a fertility preservation specialist is suggested.

Keywords:
Anti-Müllerian Hormone (AMH), Iodine Therapy, Thyroid Cancer

Ali Jafari

Exercise and Adiposity: A Systematic Review with Network Meta-analysis of Randomised Trials in Children and Adolescents with Overweight and Obesity

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This systematic review with network meta-analysis aimed to compare and rank the effects of exercise interventions, including aerobic, resistance exercise, or a combination of both, on adiposity measures such as body mass index (BMI), fat mass, and body fat percentage in children and adolescents with overweight and obesity.

A comprehensive and systematic search was conducted in PubMed, Scopus, and Web of Sciences databases up until August 2022. The inclusion criteria encompassed randomized controlled trials that examined the impacts of various exercise modalities on adiposity measures in children and adolescents with overweight and obesity. Trials comparing one of these exercise interventions against no intervention were also included.

A total of 58 trials, comprising 5075 participants with an average intervention duration of 16 weeks, were included in the analysis. Combined training, which involved both aerobic and resistance exercise, exhibited effectiveness in reducing BMI (mean difference [MD]: -1.12 kg/m2, -1.70, -0.55; low certainty evidence), fat mass (MD: -1.56 kg, -2.33, -0.78; low certainty evidence), and body fat percentage (MD: -2.87%, 95%CI: -3.67, -2.07; moderate certainty evidence) compared to no intervention. Similarly, aerobic training was found to be effective in reducing BMI (MD: -1.03 kg/m2, -1.48, -0.59; low certainty evidence), fat mass (MD: -2.07 kg, -2.93, -1.20; moderate certainty evidence), and body fat percentage (MD: -1.89%, 95%CI: -2.32, -1.45; low certainty evidence) when compared to no intervention. On the other hand, resistance training did not demonstrate effectiveness in reducing adiposity measures. In terms of effectiveness, combined training ranked highest, followed by aerobic training, in reducing BMI, fat mass, and body fat percentage.

The findings of this review suggest that combined and aerobic training interventions are effective in improving adiposity measures among children and adolescents with overweight or obesity.

Keywords:
Exercise, Adiposity, Adolescents, Children, Network Meta-analysis

Ali Faegh

Aspiration and Sclerotherapy versus Hydrocelectomy for Treating Hydroceles: A Systematic Review and Meta-analyses

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In this meta-analysis, we aimed to compare the hydrocelectomy versus aspiration and sclerotherapy for treating primary hydrocele.
We included randomized controlled trials (RCTs) and quasi-RCTs that compared aspiration and sclerotherapy with any type of sclerosants versus hydrocelectomy for primary hydrocele. Studies were identified via a systematic search of the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, and ClinicalTrials.gov. Citation tracking of related articles was performed. Data extraction and quality assessment were performed independently by two authors. The primary and secondary outcome measures were compared and analyzed using the Review Manager 5.3.5 software.
Five small RCTs were included in the present study. These 5 RCTs included 335 patients with 342 hydroceles, randomized to aspiration and sclerotherapy (185 patients; 189 hydroceles) and surgery (150 patients; 153 hydroceles). There was no significant difference in clinical cure between sclerotherapy and hydrocelectomy (RR 0.45, 95% CI 0.18 to 1.10). Meta-analysis revealed a significant increase in recurrence in the sclerotherapy group compared with the surgical group (RR 9.43, 95% CI 1.82 to 48.77). There were no significant differences between the two groups in assessing fever, infection, and hematoma.
Aspiration and sclerotherapy is an efficient technique with a higher recurrent rate; therefore, we recommend aspiration and sclerotherapy for patients at high risk for surgery or avoiding surgery. In addition, included RCTs had low methodological quality, low sample size, and invalidated instruments for outcome assessment. Therefore, there is a great need for further methodologically rigorous RCTs with the registered protocol.

Keywords:
Aspirations, Sclerotherapy, Testicular Hydrocele, Therapeutics

Ali Zahiri

Evaluation the Anti-proliferative Effects of Wild-type Newcastle Disease Virus on Lactate Dehydrogenase Secretion and Induction of Apoptosis in A549 Cells

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One of the emerging ways to treat cancer is to use oncolytic viruses. The main oncolytic mechanism of viruses is the induction of cellular apoptosis, which involves both exogenous and endogenous pathways. The aim of the present study was to Evaluation the potency of wild-type Newcastle disease virus on lactate dehydrogenase secretion and induction of apoptosis in A549 cells.

The present study was performed experimentally under cell culture conditions. Thus, after culturing A549 cell line, it was treated with different titer of wild-type Newcastle disease virus strain. Then, the oncolytic effects of the virus were evaluated using MTT (cell proliferation) tests, ROS production rate, LDH release rate, survival rate and caspase 8 and 9 protein levels to determine the path of apoptosis. In all tests, $p<0.05$ was considered as a significant level.

The results of the present study showed that wild-type Newcastle disease virus caused a significant decrease in proliferation ($p<0.05$), a significant increase in the percentage ofapoptosis ($p <0.05$), a significant increase level of ROS production ($p <0.05$) and significant increase in LDH release ($p <0.05$) compared with control group. Also, the evaluation of caspase 9 and 8 activity in A549 cells showed that the wild-type Newcastle disease virus increasing the level of caspase-9 activity ($p <0.05$) and had no significant effect on caspase 8 activity ($p = 0.65$).

According to the results of the present study, it seems that the use of wild-type Newcastle disease virus can be considered as a strong candidate for the treatment of Lung cancer.

Keywords:
Lung Cancer, Wild-type Newcastle Disease Virus, A549 Cell Line, Cell Survival

Amir Hakimjavadi

Social Psychoneuroimmunology: Lack of Methodology or Fanaticism?

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The intricate interplay between an individual's social experiences and the functioning of the immune system, whether perceived as a threat or opportunity, underscores the undeniable significance of Social Psychoneuroimmunology. In this pursuit, the term "Social Psychoneuroimmunology" was introduced by Keely in 2021, marking a pivotal moment in the field. However, a critical challenge hampering the efficacy of research in clinical immunology lies in the absence of precise social psychological factors capable of accurately predicting immune system activation analysis.

To address this gap, this study underscores the pressing need for statistically tested models, including Structural Equation Models, Multiple Level Analyses, Network Analyses, and Alternative Models or vice versa. These models should serve as a methodological framework for harmonizing the realms of psychoneuroimmunology and social psychology, facilitating rigorous empirical testing.

Furthermore, the absence of research focused on identifying social and cultural determinants and group relations analysis that inform improved diagnostic and therapeutic approaches in clinical immunology and medicine perpetuates a divide between researchers from these two distinct fields. This schism has engendered skepticism and hindered interdisciplinary collaboration.

This paper conducts a scoping review of the literature on statistical modeling, bridging psychoneuroimmunology and social psychology, highlighting key research gaps. Findings reveal a dearth of well-established methodologies for modeling integration, prompting the need for meta-analyses to scrutinize these methodologies.

In light of this analysis, it becomes evident that the field lacks robust statistical models, impeding the scientific and statistical models of social and cultural factors' predictive power. Consequently, researchers in clinical immunology and medicine are compelled to confine their investigations primarily to the biological domain, perpetuating an unfortunate divide within interdisciplinary research.

In conclusion, this study emphasizes the imperative of developing and rigorously testing statistical models that can facilitate the identification of social and cultural factors with scientific precision. Bridging the gap between psychoneuroimmunology and social psychology through robust methodologies will pave the way for a more cohesive and effective Social Psychoneuroimmunology research landscape, ultimately enhancing our understanding of the complex interplay between social experiences and immune system activity.

Keywords:
Social Psychoneuroimmunology Model Interdisciplinary

Ani Melkonyan

Characterization of Mutations in BRCA1/2 Genes Associated with Familial Breast Cancer in Armenian Population

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Breast cancer (BC) is the most common cancer among women worldwide. There were over 2 million new cases annually contributing about 11.6% of the total cancer incidence burden. In Armenia, there were over 1045 new cases in 2018 contributing about 24.4% of the total cancer incidence. The germline mutations of the BRCA1 and BRCA2 genes are the most significant risk factors for hereditary breast cancer. A woman's lifetime risk of developing breast cancer is dramatically increased if she inherits harmful mutations in these genes. It has been shown that the frequency of mutations and their correlation with BC development risk are population-specific.

The aim of the study was to characterize mutations in coding sequences of the BRCA1 and BRCA2 genes among the Armenian population using next-generation sequencing. The study group consisted of 36 patients with a confirmed family history of breast cancer (at least two cases in a family) and 39 first-degree healthy relatives.

Full gene sequencing of BRCA1 and BRCA2 was performed using the Access Array(TM) Target-Specific Panel. Libraries were prepared using the Fluidigm Access Array System according to the protocol and sequenced on the MiSeq Illumina platform.

In total, we found 25 SNVs in BRCA1 and 44 SNVs in BRCA2. In three patients two pathogenic mutations in BRCA1 (rs397509017 and rs80356962), and one mutation in BRCA2 (rs769368098) were identified. Additionally, 66 common and unclassified variants (5 described for the first time) were found. Moreover, rs1799955 which is attributed to the increased risk for breast cancer was overrepresented in patients compared with healthy relatives. Our results highlight the importance of screening of BRCA1 and BRCA2 gene variants in the Armenian population for accurate assessment of the risk of hereditary breast cancers.

Keywords:
Breast Cancer, BRCA1, BRCA2

Arefeh Zahmatkesh

The Role of Platelet-to-lymphocyte Ratio and Neutrophil-to-lymphocyte Ratio in the Diagnosis and Severity of Inflammatory Bowel Disease in Children

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The neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) are simple and inexpensive inflammatory biomarkers that reflect systemic inflammation based on complete blood count values. In this study, we investigate the role of these biomarkers in the diagnosis and severity of pediatric inflammatory bowel disease (IBD). We analyzed 73 pediatric patients with IBD with a retrospective study design who underwent measurement of fecal calprotectin (FC) and endoscopy and 67 age- and sex-matched healthy controls. NLR and PLR were compared between the patients and healthy controls. We also plotted the ROC diagrams separately for markers to obtain optimal and suitable cutoff points. We enrolled 73 pediatric patients under 18 years of age with IBD, 40 subjects with UC 33 with CD, and 67 healthy subjects as a control group with a median age of 9.00 ± 4.61 in all subjects. Furthermore, the mean score of PCDAI or PUCAI in all topics was 19.26 ± 16.31. In the ROC curve, the optimal cutoff value for NLR and PLR for detecting IBD was 2.04 (sensitivity 82.1%; specificity 82.9%) and 103 (sensitivity 67.9%; specificity 71.4%). Also, the optimal cutoff values for NLR and PLR for differentiating IBD severity (remission vs. active disease) were 2.94 (sensitivity 77.8%; specificity 50.0%) and 157 (sensitivity 88.9%; specificity 54.5%), respectively. Our findings indicate the role of easy and non-invasive markers such as NLR and PLR in order to diagnose the disease in the initial examinations as well as the severity of the disease.

Keywords:
Inflammatory Bowel Disease, Neutrophil-to-lymphocyte Ratio, Pediatric, Platelet-to-lymphocyte Ratio, Severity

Arian Daneshpour

Cerebral Blood Flow in Nicotine Smokers: A review of ASL MRI Studies

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Tobacco smoking is a primary source of avoidable fatalities globally. While the adverse impacts of cigarette smoke on gray and white matter structures are well-documented, recent advancements in neuroimaging techniques, particularly Arterial Spin Labeling magnetic resonance imaging (ASL-MRI), have offered deeper insights into the effects of smoking on cerebral blood flow (CBF). This review explores the impact of smoking on CBF evaluated with ASL-MRI. A comprehensive literature search was conducted on PubMed, Scopus, and Web of Science in June 2023. A total of 13 studies were included, exploring CBF in a total of 1,103 smokers and control subjects. The results of our investigation elucidated multifaceted alterations in the cerebral blood flow (CBF) values within various brain regions of smokers. These modifications included diminished CBF values within areas such as the inferior frontal gyrus and regions implicated in Alzheimer's disease, juxtaposed with elevated CBF within areas like the anterior cingulate cortex. Another emerging though compelling finding was discernible disparities in CBF patterns between males and females. Additional insights explored the influence of concurrent substance abuse on the perfusion patterns observed in smokers, providing a comprehensive understanding of the multifarious impacts of smoking on cerebral hemodynamics and neurological health. Limitations: The limitations of these findings primarily stem from small sample sizes and variations in data acquisition methods across studies. ASL MRI offers invaluable insights into the cerebral effects of tobacco smoking. The data underscores the profound alterations in CBF among smokers, which might be pivotal for understanding the neuropathological consequences of long-term nicotine addiction. However, variations in study designs and methodologies suggest the necessity for standardized protocols and larger cohorts to validate these findings.

Arpine Minasyan

Assessment of Genotoxic Effects of Environmental Exposure to Heavy Metals in Kapan Mining Area

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The assessment of the effects of heavy metals in populations living near mining area is very important problem and actual for Armenia where mining industry is developed. Several previous studies identified that trace elements enter the local food chain in the Kapan mining area (Armenia). The idea of the proposed study is the evaluation of possible genotoxic effects of environmental metal long-term exposure in people living in this mining region.
In the current study the cytokinesis-block micronuclei assay (CBMN) buccal epithelial cell micronuclei (MN) test, as well as Comet assay in whole blood cells were performed for the assessment of possible genotoxicity. Overall, 80 participants were enrolled in this study (40 exposed and 40 unexposed).
According to the results obtained, the MN number (mean) in exposed and unexposed groups were 3.64 and 1.26 respectively. As for DNA damage assessment, the DNA intensity and Olive tail moment were 14.4 and 3.20, and 27.3 and 4.26 in exposed and unexposed groups, respectively. Mann-Whitney U test revealed 2.88 fold increase of MN number ($p=0.00004$) in peripheral blood lymphocytes and 6.4 fold increase of DNA intensity ($p=4.8e-13$) in whole blood cells in the exposed group. However, no significant difference of MN numbers between studied groups were observed for buccal epithelial cells (unexposed vs exposed, 1.98 and 2.30). Conclusions: Our findings revealed the genotoxic effect in blood cells of the mining region residents. The CBMN and Comet assay in blood cells might be further considered as a suitable biomonitoring method for the assessment of the genotoxic effect of long-term heavy metal human exposure in this region.

Keywords:
Heavy metals, Environmental Exposure, CBMN Assay, Comet Assay

Aylin Hajizade

Major Depressive Disorder in Pregnancy

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Major depressive disorder (MDD) is a mental health condition that causes a depressed mood and loss of interest in pleasurable activities, as well as feelings of guilt or worthlessness. It can have negative impacts on an individual's personal life, work or educational life, and personal relationships. Treating pregnant mothers with MDD can be difficult due to the fact that medication treatments can be harmful to the fetus. However, it is important to consider that untreated MDD during pregnancy is associated with major depressive disorder for the baby and postpartum depression for the mother. Therefore, there is no "zero risk" solution when caring for pregnant women with MDD. A new method called Transcranial Magnetic Stimulation (TMS) is being increasingly used to treat MDD in adults. Low-frequency TMS over the right dorsolateral prefrontal cortex has shown a significant response in reducing depressive symptoms when given to pregnant women with MDD during the second and third trimester. Currently, there is no evidence to suggest that TMS therapy is unsafe for pregnant women, but there is not enough research on its effects in this population.
Overall, TMS is a well-tolerated treatment with common side effects such as headaches or local pain at the site of stimulation. The above findings suggest that TMS may be a viable treatment option for pregnant women with MDD, particularly during the second and third trimester. However, further research is needed to determine its safety and efficacy in this population. Proper monitoring and individualized treatment plans should be implemented to minimize risks to both the mother and developing fetus.

Keywords:
TMS therapy, MDD in Pregnancy

Azin Pakmehr

The Impact of Fecal Microbiota Transplantation on Metabolic State: A Systematic Review and Meta-analysis

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As gut microbiota dysbiosis is established in patients with metabolic syndrome, fecal microbiota transplantation (FMT), which alters the bacterial composition of the intestine, is supposed to help improve metabolic disturbances. We carried out this research to evaluate the impact of FMT on these parameters and gut microbiota composition of patients who has been diagnosed with at least one metabolic problem.
Eligible studies were searched through PubMed, Web of Science and Scopus databases until end of 2022. We removed duplicate studies from the initial search results and screened them until each included study was scanned for intended data. Cochrane risk of bias tool was used to evaluate the methodological accuracy of studies. Also, random effects model was used for conducting the meta-analysis.
Finally, eleven studies were included in our meta-analysis. Insulin showed a significant decrease by 24.7 Pmol/l (WMD: -24.77, 95% CI:-48.704, -0.848) after short-term follow-up and HDL increased by 0.1 (WMD: 0.106, 95% CI:0.027, 0.184) and 0.12 (WMD:0.120, 95% CI:0.003, 0.237) in those using capsule as deliver mode and in short-term follow-up, respectively. Other lipid profile, blood glucose, insulin resistance, and anthropometric indices didn't show a significant change. In addition, multiple studies reported gut microbiota alteration following the intervention including an increase in butyrate-producing species.
There are some articles demonstrating beneficial effects of FMT on metabolic parameters, we couldn't find a clinically significant alteration though. Also, information regarding proper donor and best method to induce FMT is not sufficiently investigated yet which should be taken into consideration along with means to prevent potential damages.

Keywords:
Fecal Microbiota Transplantation, Gut Microbiota, Dysbiosis, Metabolic Syndrome

Diba Sabuni Aghdam

The Evaluation of Saponin Effects in Cholestatic Liver Fibrosis Induced by Bile Duct Ligation Model in Rats

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Plants have been used for the treatment of a wide range of conditions since ancient times. Tribulus terrestris is a traditional Chinese medicine known to possess many pharmacological properties, most notably its anticancer activities, anti-inflammation, treating fever, pain, sedation, and recovering hepatobiliary function owing to its rich steroidal saponin content. The present study investigated antiglycation and antioxidant activities of crude dry extract and saponin fraction of Tribulus terrestris.
Disturbance in the production and excretion of bile acid causes cholestatic liver disease. Liver cirrhosis is a disease that occurs if cholestasis continues.
This study evaluated the protective effect of Saponin of Tribulus terrestris on liver damage caused by biliary cirrhosis.
Following the BDL operation, saponin at doses of 200 and 4000 mg/kg was administered orally once a day for 30 consecutive days.
Rats were randomly divided into 7 groups, each with 4 subjects:
1) Normal
2) sham
3) control 200 mg/kg of saponin
4) control 400 mg/kg of saponin
5) BDL
6) BDL 200 mg/kg of saponin
7) BDL 400 mg/kg of saponin
The rats were anesthetized 30 days after the BDL, followed by collecting their blood and excising their liver. Their serum was used to measure liver enzymes, and the liver was used for biochemical analysis, gene expression, and histopathological analysis.
Serum levels of liver indices, including alkaline phosphatase (ALP), alanine aminotransferase (ALT), aspartate aminotransferase (AST), total and direct bilirubin, and lipid profile (CHOL, TG, HDL, LDL, VLDL) were measured. Additionally, Glutathione (GSH) and superoxide dismutase (SOD) and Malondialdehyde (MDA) activities were assessed in liver homogenates. Histopathological evaluations were performed using Masson trichrome (MT) and hematoxylin and eosin (H&E) staining and immunohistochemical TGF_β and α_SMA method, Also evaluation of the effect of saponin on Nrf2/Keap1 gene expression in the liver tissue of the studied groups.

Keywords:
Saponin, Antioxidant Activity, Liver, Cholestasis, Bile Duct Ligation

Elaheh Mousavialmaleki

Assessment of ESA Maintenance Therapy and IV Iron Sucrose Treatment in CKD Patients Under Hemodialysis: Efficacy, Safety, and Guideline Adherence

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Anemia induced by chronic kidney disease (CKD) is a complex condition driven by factors such as reduced erythropoietin (EPO) production and inflammation. The prevalence of anemia increases with CKD progression, leading to complications like left ventricular hypertrophy. Treatment options include oral and injectable iron supplementation, as well as erythropoiesis-stimulating agents (ESAs). Injectable iron, available in various formulations, has gained preference in CKD hemodialysis patients.

The aim of this study is to investigate the efficacy and safety of maintenance therapy involving erythropoiesis-stimulating agents (ESA) and intravenous iron sucrose treatment in CKD patients undergoing hemodialysis (HD), with a specific focus on adherence to KDIGO guidelines.

The study compares two groups of CKD patients undergoing HD, with Group A exhibiting hemoglobin (Hb) levels within the recommended range and Group B exceeding 11.5 g/dl. The analysis includes examining biochemical markers, adverse effects, and the impact of iron formulations. Injectable iron options, including iron dextran, ferric gluconate, iron sucrose, ferumoxytol, ferric carboxymaltose, and iron isomaltoside, are considered. The study also assesses the potential for hypophosphatemia induced by intravenous iron, attributed to elevated Fibroblast Growth Factor 23 (FGF23) levels.

Patients in group A demonstrated superior effectiveness in terms of efficacy compared to those in group B, while there were minimal self-reported adverse effects for both groups. Notably, there was an improvement in the proportion of patients within the specified range for TSAT (>20%) and Hb (>10.5) over the course of the study. Additionally, in comparison to group B in third month, group A demonstrated significantly higher serum Ferritin levels.

And finally, there weren't any significance differences in parameters including PTH, Ca, and P between two groups at third month of treatment.

In conclusion, the adherence to guidelines in ESA maintenance therapy and IV iron sucrose treatment yielded favorable outcomes in terms of maintaining target parameter ranges. The study underscores the importance of following established guidelines for optimal treatment efficacy and patient well-being, especially in the context of emerging considerations regarding IV iron therapy.

Keywords:
Anemia, Guideline Adherence, Hemodialysis, Erythropoiesis-Stimulating Agent, Intravenous Iron

Elaheh Khodaei

Family Specific Pulmonary Involvement Pattern by COVID-19: Analysis of Pulmonary CT Findings

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Purpose: Pulmonary CT scans have the potential to play a significant role in diagnosing, identifying complications, and predicting outcomes of coronavirus disease 2019 (COVID-19). The focus of the present study was to identify certain evidence suggesting a resemblance in the pulmonary manifestations of COVID-19 through lung CT scans among family members.
Methods: CT scan of 543 persons suspicious for COVID-19 was reviewed. Family membership was registered and pulmonary involvement patterns were classified as consolidation or ground-glass opacity with size and location of the lesions ranging from nodule, patch, and massive. The prevalence of lung involvement among the family members and the prevailing patterns were analyzed.
Results: Overall, 216 (39.8%) images were interpreted as positive for pulmonary COVID-19 involvement. The chance of 2 random imaged persons with simultaneous COVID-19 pulmonary involvement was 16%. Out of 21 presented families, 6 families had at least 2 members with pulmonary COVID-19 infection. The chance of simultaneous pulmonary involvement of at least 2 members of families was 28.6% (6 out of 21). The prevailing pattern of lung involvement was similar in 5 families out of 6 including 2 families with linear consolidation, massive consolidation, patchy consolidation, and nodular GGO presented all members of 3 other families, respectively.
Conclusions: The COVID-19 infection coincidence is higher than expected value in family members and the pattern of pulmonary involvement is similar within families. Chronicity of the infection and similarity of the immunologic response to infection may justify the finding, also suspicion that different types of COVID-19 exist may remain

Keywords:
COVID-19, Pulmonary CT Scan, Family

Faranak Rahmani

Currarino Syndrome in a 25-Year-Old Woman Presenting with Sacral Agenesis : A Case Report with Review of the literature

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Currarino syndrome is a rare disease of congenital anomalies which it may include partial sacral agenesis, anorectal anomalies, presacral mass . the triad is often incomplete but here we present a 25-year-old woman with complete triad of Currarino syndrome in addition to other pathologies such as renal/ureteral anomalies, female internal genital or uterine malformations. In her past medical history, at the time of the birth, she had two vaginas, shortness in her left lower limb, and an imperforated anus as well and A Lumbar and Pelvic MRI was requested to examine the spinal cord and pelvic abnormalities. The report showed that the left kidney was crossed ectopic in the lower part of the right kidney, there were two uteri in both sides of the pelvis, and two vaginas were observed with the right vagina being lateral and posterior to its anatomical location. A presacral cyst was also observed. Here, we provide a comprehensive overview of the surgical techniques utilized to address her spinal and pelvic impairments.

Keywords:
Currarino Syndrome, Complete Triad, Spinal Impairment

Fatemeh Rezaee

The Assessment of Patients' Mortality Rate and Its Relation to Off-hours and Holidays in Patients Admitted to Different Wards of Imam khomeiny Academic Hospital from Sep, 2021 to Sep, 2022

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Due to the decrease of the number of nurses and the increase of their work shifts and intensity of care on holidays, less attention is paid to patients by nurses and medical staff. As a result, the probability of mortality rate will increase. In this survey we aims to determine the association between hospitalised patients' mortality rate and holidays (admission date, death date).
In this retrospective study we considered all patients' mortality rate by checking their medical records in Imam Khomeiny academic hospital of Sari in a period of time from September 2021 through September 2022. By setting specific questionnaire, the patients' age, gender, past medical history, admission reason, admission and death rate, work shifts and the duration of hospitalisation were recorded, We also considered the fact that wether they died on holidays or official days.
Among 690 patients who died, 57% were male. The highest mortality rate belonged to the age group of over 60 to 70 years old. Most frequent death reason were cancer, respiratory failure and gastric diseases respectively, moreover the biggest number of admission hours and death rates occurred on off-hours composed of evening and night work shifts together. There was no significant association between mortality severity and date of death by considering holidays or official days; however the rate of mortality occurrence was bigger during morning delivering work shift time.
According to statistical findings and lack of significant relationship between patients' mortality rate and holiday dates it is obvious that there has been no decreasing trend and significant difference in the quality of medical service done by hospital staffs on official days in comparison to weekends or holidays.

Keywords:
Mortality, Admission Date, Death Date, Holidays, Work Shift

Ghazal Mohammadbeigi

A Novel Drug Delivery System

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Clay minerals and specifically nanoclayes are widely used in conventional pharmaceutical dosage forms both as excipients and active agents and can be effectively used to modify drug delivery systems. Nanoclayes are layered silicate nanosheets like montmorillonite, bentonite, kaolinite, etc. Montmorillonite (MMT), is recently used as an oral drug delivery vehicle and also as a functional component in many oral bio-organic drug delivery nanosystems, resulting in improving the drug bioavailability specially the hydrophobic drugs due to the MMTs characteristics. Moreover, montmorillonite can be applied to form composites with other polymer-based delivery systems. The high adsorption capacity of montmorillonite contributes to increase drug entrapment and sustained-release of them in gastrointestinal (GI) system specially for those which are sensitive to pH. According to some studies, these nanocomposite systems are suitable for the delivery of drugs in the small intestine with a controlled manner where most of the absorption of food and drugs occurs in. In this review, perspectives of using montmorillonite as a pharmaceutical excipient in oral drug delivery systems are discussed.

Keywords:
Nanoclayes, Oral Drug Delivery, Montmorillonite, Pharmaceutical Excipient

Hamoon Baghaei

Evaluation of the effect of nano-selenium on hormonal parameters in rat's testis after X-ray radiation

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The testis is one of the most sensitive organs to radiation due to the high proliferation rate of spermatogonial cells. One of the most important strategies to decrease the damage caused by ionizing radiation is using radioprotectors. Nano-selenium has a high potential for scavenging free radicals, so it can be used as a natural antioxidant. The aim of the present study was to examine the protective role of nano-selenium as radioprotectors on the reproductive system against the effects of radiation therapy.

To evaluate the effect of nano-selenium, 40 male rats weighed approximately 230 ± 20 g and aged 48 weeks were selected. The first group served as a control group and consisted of 10 male rats. The second group consisted of 10 male rats that received nano-selenium. The third group consisted of 10 male rats that received only direct X-ray radiation at a dose of 2 Gy for 5 minutes. The fourth group consisted of 10 male rats which were exposed to direct radiation after consuming nano-selenium. For the assessment of the nano-selenium on male rats, hormonal parameters before and after X-ray radiation were investigated.

According to the findings, the mean amounts of Testosterone and LH were significantly decreased in the X-ray group compared with the control group. The mean amounts of FSH were increased in the X-ray group than in the control group.

However, the administration of selenium nanoparticles during the period of spermatogenesis improved hormonal parameters. Selenium nanoparticles can be proposed as radioprotective agents

Keywords:
Nano-selenium, Male Rats, X-ray Radiation, Radioprotectors

Hanieh Mojtahedi

Effects of Lipopolysaccharide from Porphyromonas Gingivalis and Escherichia Coli on Gene Expression Levels of Toll-like Receptors and Inflammatory Cytokines in Human Dental Pulp Stem Cells

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Periodontal diseases originated from a group of oral inflammatory infections initiated by oral pathogens. Among these pathogens, Gram-negative bacteria such as p. gingivalis play a major role in chronic periodontitis. P. gingivalis equipped with lipopolysaccharide which enables it to attach to TLR2.
Evaluate the effects of P. gingivalis and E. coli lipopolysaccharide (LPS) on genes expression of TLRs and inflammatory cytokines in human dental pulp stem cells (hDPSCs).
In the current study, we evaluated the expression level of TLR2, TLR4, IL-6, IL-10, and 1L-18 in hDPSCs which were treated with 1µg/mL of P. gingivalis LPS and E. coli LPS at three different exposure times using Real-time RT-PCR.
We found that the test group treated with P. gingivalis LPS shows a high level of TLR4 expression in 24 hours exposure period and the lowest expression in 48 hours exposure time. In the case of IL10, we found the lowest expression in 24 hours exposure period time. Although in E. coli LPS treated group, IL10 shows the highest expression in 24 hours exposure time and lowest in 48 hours exposure period. Moreover, IL-18 in P. gingivalis LPS treated group shows a significant difference between 6, 24 and 48-time periods of exposure, but not in E. coli LPS treated group. In conclusion, both types of LPS stimulate inflammation through TLR4 expression. P. gingivalis LPS performs more potentially than E. coli in terms of stimulating inflammation at the first 24 exposure hours. Nevertheless, our study confirmed that increasing P. gingivalis and/or E. coli LPS exposure time, in spite of acting as an inflammatory stimulator, apparently showed anti-inflammatory properties.

Keywords:
Dental Pulp, Interleukins, Lipopolysaccharides, Stem Cells, Toll-like Receptors

Homayoon Khaledian

The Protective Role of Crocin on Memory Impairment Induced by Chronic Unpredictable Mild Stress in Rats

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Background: This study sought to elucidate the impacts of chronic unpredictable mild stress (CUMS) and crocin treatment on male rat memory. Material and Methods: Rats were categorized into 10 groups based on CUMS exposure (none, 1, 2, or 3 weeks) and crocin treatment duration (none, 1, 2, or 3 weeks). Each crocin injection was dosed at 15 mg/kg. Memory was assessed using the Morris water maze test, quantifying the total distance swam. Results: CUMS exposure consistently led to longer swimming distances, indicating potential memory impairment. Specifically, any duration of CUMS exposure resulted in significantly longer distances compared to controls. Crocin treatment for 1 week showed a notable decrease in swimming distance in non-stressed rats, suggesting a potential protective impact on memory. However, extended crocin treatment (2 and 3 weeks) showed no significant difference from controls. A marginally significant interaction was observed between CUMS and crocin treatment, hinting at a complex link between stress exposure and treatment duration. Conclusion: CUMS appears to impair rat memory, while a 1-week crocin treatment might offer protective benefits. The interaction between CUMS and crocin warrants further exploration to decipher their combined effect on memory.

Keywords:
Crocin, Chronic Unpredictable Mild Stress, Memory Impairment, Morris Water Maze Test

KM Rafiya

Leucocyte Membrane Camouflaged Nanoparticles-based Combinatorial Therapy for the Targeted Treatment of Breast Cancer

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Multidrug resistance (MDR) and lack of site-specificity are the considerable causes of unsuccessful therapies and toxicities with conventional therapeutics in cancer chemotherapy. Biomimetic membrane camouflaged nanoparticles are one of the promising targeted delivery systems as they inherit the properties of the parent cells. Therefore, considering all scientific evidence we prepared leukocytic membrane-coated nanoparticles-based combination therapy for effective treatment of breast cancer.

The combinatorial formulation was developed by the solvent-evaporation method and optimized using Design Expert® software. Further, the optimized coated formulation is characterized by particle size. Surface morphology and X-Ray Diffraction (XRD) pattern. Then, the efficacy of the prepared formulation was evaluated in cell line studies, DAPI staining, and wound Healing analysis. Later comparative pharmacokinetic profile of the drug was analyzed followed by biodistribution analysis. Further in-vitro results were validated in egg and animal models in terms of tumor volume along with histopathological analysis.

The optimized leucocyte membrane combinatorial nanoformulations were prepared which possess particle size and zeta potential 150.2 nm, -6.29 mV, and 171.5nm, -11 mV before and after coating respectively. The SEM and TEM analysis revealed that the formulation possesses circular, smooth shape with uniform leucocytic membrane coating. Later, the cell line showed a sharp reduction in IC50 values, and the least closure was found in the wound healing assay which indicates the in vitro efficacy of the formulation. Further, pharmacokinetic as well as biodistribution studies revealed the sustained behaviour and efficacy of the formulation to reach and target the cancer site. Finally, In-Ovo and pharmacodynamic studies showed that the formulation was 10 times more potent than the conventional formulation.

Results obtained from prepared leucocytic-coated nanoformulations establish them as novel candidates for the effective treatment of solid-resistant breast cancer.

Keywords:
Nanodecoys, Drug Delivery, Cancer

Mahdi Shakeri

Inflammaging and Alzheimer's Disease

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Alzheimer's disease (AD) is one of the most prevalent and most common age-related neurodegenerative disorders. The leading theory of AD development and progress is the amyloid-β aggregation hypothesis. However, the initial mechanisms of insoluble forms of amyloid-β formation and hyperphosphorylated tau protein in neurons remain unclear. One of the factors, which might play a pivotal role in senile plaques and tau fibrils generation due to Alzheimer's disease, is inflammaging, i.e., systemic chronic low-grade age-related inflammation. The activation of the proinflammatory cell phenotype is observed during aging, which might be one of the pivotal mechanisms for the development of chronic inflammatory diseases, e.g., atherosclerosis, metabolic syndrome, type 2 diabetes mellitus, and Alzheimer's disease. Progressive researches have also shown that besides loss of neurons, the pathophysiology of AD primarily includes amyloid beta (Aβ) accumulation, generation of oxidative stress, and microglial damage leading to activation of NLRP3 inflammasome that eventually leads to neuroinflammation and dementia. It has been suggested in the literature that suppressing the activity of the NLRP3 inflammasome has substantial potential to prevent, manage, and treat Alzheimer's disease. This review discusses the role of the inflammatory processes in developing neurodegeneration, activated during physiological aging and due to AD.

Keywords:
Alzheimer, Inflammation, Neurodegenration

Marjan Falahati

The Effects of the Mediterranean Diet on Some Neurological Disorders, Such as, Multiple Sclerosis (MS), Migraine, Parkinson's Disease, Depression and Neuropathy: A Narrative Review Article

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The Mediterranean diet is a traditional dietary pattern that includes a wide variety of vegetables, processed whole grain breads and cereals, olive oil, eggs, fish, and less red meat. This diet is rich in anti-oxidant and anti-inflammatory compounds, and numerous studies have demonstrated that it can reduce the risk of developing neurodegenerative diseases, or even prevent them.
The Mediterranean Diet (MeDi) has been shown to reduce low-grade inflammation and modulate gut microbiota in those with Multiple Sclerosis (MS). It has also been linked to weight loss, reduced visceral adiposity, and a decreased risk of developing diabetic complications such as neuropathy. B vitamins and omega-3 fatty acids found in the MeDi have been found to have a positive effect on depression. This diet has also been linked to a reduction in the unbalance of redux and inflammatory response, and has been found to help alleviate the symptoms of those with Parkinson's Disease and Migraine.
This review will focus on the effects of the Mediterranean diet on some neurological disorders, such as neuropathy, multiple sclerosis, migraine, Parkinson's disease, and depression.

Keywords:
Mediterranean Diet, Multiple Sclerosis (MS), Parkinson's Disease, Migraine, Neuropathy, Depression

Maryam Jafari

TERT Mutations as a Biomarker for Bladder Cancer Detection; A Narrative Review to a Non-invasive Detection and Therapeutic Approach

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Bladder cancer (BC), is the most prevalent urinary tract malignancy with a high recurrence rate. Even though there are invasive methods for its detection, there is still a need for non-invasive ones for BC detection and progression. Telomerase Reverse Transcriptase (TERT) promoter mutations have been associated with patient survival and cancer relapse. In this review, we intend to investigate studies that have suggested TERT as a potential biomarker for BC detection and even use for target therapy.
A comprehensive search of the literature was conducted including Google Scholar, Scopus, and Pubmed databases with keywords "bladder cancer" and "TERT" from 2018 to 2023.
A total of 106 studies were further investigated in our study. -124C>T, -146C>T, and 138_-139CC>TT alternation and methylation of TERT promotor were found among BC patients, but not in bladder infection which can reduce false positive results. Also, -146G>A and C228T mutations were proposed as other prevalent mutations in BC and thus, useful biomarker tools. The former was also significantly associated with patient survival. The results of studies, confirm the reliability of measuring this biomarker but were inconsistent in terms of tumor staging and aggressiveness. Interestingly, studies reported high sensitivity and specificity in the urine-based assay for the detection and recurrence of BC. Animal studies that knocked down TRIM28 (considered as an activator of TERT) and hTERT in immune-compromised mice also resulted in reduced tumor growth and improved survival without causing any significant pathologies that are promising for the use of TERT and related factors for treatment.
A handful of studies have highlighted the usefulness of TERT and its related gene mutations for the detection of BC and its progression prediction. Due to its notable prevalence, it is of high importance to conduct further research, to achieve valid results and accuracy.

Keywords:
Bladder Cancer, TERT, Biomarker, Target Therapy

Melika Sharifi

Evaluation of the Effects of Oenothera Biennies on Inflammatory Factors in Clinical Studies: A Systematic Review

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Traditional herbal medicine has been a matter of debate for many of years. Not surprisingly, medicinal plants have enormously helped human beings in treatment, prevention, and diagnosis of ailments. The utilization of phytochemicals has a long history, in this field. Because inflammation is caused by the activation of the inflammatory cascade (cytokines, chemokines, eicosanoids, etc.) which is self-regulating and preserves host cells in the healing stages from damages, and could become chronic, resulting in inflammation. Medicinal plants could be beneficially in the management of several kinds of inflammatory disorders. One of these natural remedies could be Oenothera biennis mainly known as evening primrose. In this study, we aimed to systematically review the effectiveness of evening primrose in inflammatory diseases. Several randomized controlled trials (RCTs) have been conducted to investigate the anti-inflammatory effects of O. biennis oil. Herein, comprehensive searches in multiple databases including Google Scholar, PubMed, EMBASE, Scopus, and Cochrane Central Register of Controlled Trials, were performed to include RCT studies with populations consisting of individuals with inflammatory disorders. The risk of bias assessment was performed by two reviewers. Also, a flowchart is designed to demonstrate the process of this study. Concisely, promising evidence were selected regarding the potential benefits of O. biennis oil in inflammatory diseases. It seems that, his plant has profitable effects on reducing the symptoms of inflammatory disorders. However, it is necessary to approach the findings with caution due to the limitations of the current survey. Further high-quality studies are necessitated to draw definitive conclusions and establish O. biennis oil effectiveness as an assuring treatment option in alleviating inflammatory conditions.

Keywords:
Oenothera Biennis, Evening Primrose Oil, Inflammation, Gamma Linolenic Acid, Systematic Review

Mobina Hosseini

Sexual-related Determinants of Life Satisfaction Among Married Women: A Cross-Sectional Study

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Life satisfaction refers to the perceived satisfaction of individuals concerning various aspects of their lives. The present study investigated the predictive role of sexual-related determinants in life satisfaction among married women.
A cross-sectional study was conducted from August to November 2021. A total of 350 married women with at least six months of cohabitation with husbands were included in the study. The study utilized a multi-stage random sampling method from 10 comprehensive health centers in Qazvin, Iran. Scores on the Emotional Intimacy Questionnaire (EIQ), Dyadic Sexual Communication Scale (DSCS), Female Sexual Distress Questionnaire (FSDQ), Female Sexual Quality of Life Scale (FSQLS), Female Sexual Function Index (FSFI), and Life Satisfaction Scale (LSS) were assessed. Data were analyzed using univariable and multivariable linear regression models with a significance level of $p < 0.05$.
The mean age of participants was 33.77 years (SD = 9.77) and they had been married for an average of 10.21 years (SD = 9.93). The mean scores on the LSS were 20.16 (out of 35; SD = 6.79). Based on the multivariable linear regression model adjusted for socio-demographic characteristics, the two strongest predictors of life satisfaction among Iranian married women were marital intimacy ($\beta = 0.49$, $p < 0.001$) and sexual functioning ($\beta = 0.17$, $p = 0.009$). Together, these variables explained 45% of variance in life satisfaction. Conclusion : Given that marital intimacy and sexual functioning were the most significant sexual-related determinants of life satisfaction among married women, designing and implementing interventions which increase women's marital intimacy and sexual functioning might improve married women's life satisfaction.

Keywords:
Life Satisfaction, Married Women, Intimacy, Sexual Functioning, Sexual Distress, Dyadic Sexual Communication

Mohammad Fayaz

The Bibliometric Analysis of EEGLAB Software in the Web of Science Research Articles

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EEGLAB is one of the most famous software for processing, analyzing, and researching experiments that have Electroencephalography (EEG) datasets. Due to the numerous and famous add-ins along with global, widespread communications and online free training, its popularity increased every year.
To address this phenomenon from a bibliographic perspective, we found 20,464 citations in Google Scholar since 8/27/2023 We extract the articles and their summaries from the Web of Science (WOS) with 12,700 items. The results are analyzed with Bibliometrix from CRAN R software.
The time span of these articles is from 2004 to 2023 with 12,700 documents in 1,125 sources (journals, books, etc.), 29,125 authors, 19,062 author's keywords, 13,707 keywords PLUS, 279,617 references, total. The annual growth rate is 28.12 %, international Co-authorship is 37.27 % and Co-authors per document is s 4.89 and the average citations per document is 22.51. The most relevant sources are Neuroimage, Frontiers in Human Neurosciences, Scientific Reports, Psychophysiology, and PLOS One with 780, 526, 446,425, and 371 articles. According to Bradford's Law, these first five journals Journal of Neuroscience, Neuropsychologia, Clinical Neurophysiology, Frontiers in Neuroscience, Journal of Cognitive Neuroscience, and International Journal of Psychophysiology have 4318 (34.00%) articles and they are categorized as the core sources. The local impact of journals with H-Index, G-Index, and M-Index are discussed. The 19,416 (66.7%), 4,432 (15.2%), 1,879 (6.5%), and 292 (1.0 %) authors have only 1, 2, 3 and 7 articles, respectively. The most cited countries are the USA, Germany, and the United Kingdom with 93,093, 32,621, and 20,748 total citations, respectively.
The ERPLAB, ADJUST, and ICLabel add-ins have the local to global citation ratios equal to 85.4%, 65.1%, and 78.2% respectively. Other bibliometric analyses such as co-occurrence networks and thematic maps of abstracts, titles, and keywords are estimated and historiography is presented.

Keywords:
EEGLAB, Bibliometric Analysis, Neurosciences, R

Mohammad Mahjoubi

Dermatologic Presentation of Hyper IgE Syndrome in Pediatric Patients

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Hyper-IgE Syndrome (HIES), or Job's syndrome, is a rare primary immunodeficiency disorder characterized by recurrent infections and elevated levels of immunoglobulin E (IgE). While respiratory and systemic manifestations have been more emphasized, dermatological manifestations in HIES also play a significant role in disease presentation.
This narrative review provides a comprehensive overview of the various dermatological manifestations observed in the pediatric population with HIES, including descriptions, associated symptoms/findings, and available treatment options.
Neonatal rash, mucocutaneous candidiasis, noma neonatorum, psoriasis, cold staphylococcal abscesses, and candida onychomycosis are among the dermatological manifestations in HIES. Each manifestation has unique characteristics and treatment considerations, necessitating accurate recognition and diagnosis for effective management.
Recognizing and diagnosing dermatological manifestations in HIES is crucial for timely interventions and improved quality of life. Optimal treatment strategies involve a combination of supportive care, topical/systemic therapies, antifungal medications, and surgical interventions when necessary. Further research is needed to enhance our understanding of these manifestations and evaluate treatment modalities for individuals affected by HIES

Keywords:
Job Syndrome, Skin Manifestations, Primary Immunodeficiency Diseases

Mohammad Ramezankhah

The Interconnected Role of MicroRNAs, Hypoxia, and Inflammasomes in Neurological Disorders

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Neurological disorders are complex, with many factors contributing to their development. This field has discovered a fascinating relationship between hypoxia, inflammasomes, and microRNAs. Hypoxia causes complicated molecular mechanisms that alter cellular metabolism and transcriptional patterns. These hypoxic reactions are regulated by HIFs. HIF-1, HIF-2, and HIF-3 are heterodimeric transcription factors from the human HIF family. Stroke can cause tissue necrosis due to increased inflammation and oxygen deprivation. The inflammasome is a complex intracellular signaling system including cytosolic pattern recognition receptors like NLRs and AIM2s. The NLRP3 inflammasome, which regulates the generation of the proinflammatory IL-1b and IL-18 cytokines, is the most studied NLR inflammasome complex. HIF-1 activates the NF-kB pathway in epithelial cells to enhance pro-inflammatory chemokines and cytokines. In ischemic stroke, HIF-1 is directly linked to NF-kB and expressed. The NLRP3 inflammasome also disintegrates the plasma membrane and releases proinflammatory chemicals that trigger proptosis. HIF-1 modulates the inflammatory response and promotes cell death; hence it may be involved in NLRP3 inflammasome-mediated proptosis after an ischemic stroke. HIF-1 activates the NLRP3 inflammasome, causing pyroptosis and apoptosis after an ischemic stroke, according to recent findings. These data indicate that HIF-1 controls neuroinflammation and may be a therapeutic target for ischemic stroke cell death. MicroRNAs regulate gene expression for neural growth, synaptic plasticity, and cellular homeostasis. Previous studies showed that neurological disorders strongly express some miRs and weakly express others. miR regulates NLRP3 and the inflammasome complex. For example, miR-7, a neuron-derived repressor, can lower α-synuclein expression in Parkinson's disease by binding to its 3<-UTRs, resulting in post-transcriptional regulation. Hypoxia also modulates "hypoxamiRs." Hypoxia-induced inflammation and signaling pathway modification affect hypoxamiR expression. The purpose of this article is to investigate the intrinsic relationship between microRNA, hypoxia, and inflammation in neurological disorders and to shed light on the intricate dynamics underlying these situations.

Keywords:
Neuroimmunology, Neuroinflammation, Inflammasome, Hypoxia, MicroRNA

Mohammad Amin Khodadad Hossyni

Malignoma tumor recurrence after CAR T cell and CAR NK cell therapy and the key role of inflammation

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As recent literature shows, TBI treatment is something for which supportive patterns are essential. The various methods have been successful on rat models and on newborns. Cell migration is a property that was found to be more practical than other methods. When the signaling pathway was studied, part by part, on the brain parts, high inflammatory signal contrasts were found. This is the main challenge. Despite this, a new treatment approach that draws inspiration from tissue engineering offers some solutions: hydrogel-intergrated systems, which have been being designed since three months ago, but this system is not comfortable for patients. (The patient should stay in bed until the inflammation level has been modulated by the immune system, after which the healing process begins.)

CAR T-cell therapy

After the treatment procedure is done on brain tumors, tumors appearing again after cell therapy are a rampant problem in trauma sites. In the case of induced immune suppression, inflammation signals are disrupted. As we progress from the brain core to the cortex, the inflammation gets more potent. When SVZ or primary brain are in focus as research subjects, NPSCs could be found in both areas; however, in the cortex, the most prevalent cells are RGCs and MSCs. there is a principle by which stem cell migration is mediated from site with lower inflammation to highly inflammatory sites (this function will be disrupted in TBI) .

When immune suppression is induced for cell therapy (CAR NK-CELL, CAR T-CELL), this signaling system will be halted; afterwards, the site will prepare for cell undifferentiation. After the tumor has disappeared, the site will be empty. After immune suppressor dosing is finished, the tumor returns.

It can be proposed that this empty site contains many stem cells (MSCs as well), and when inflammatory agents and signals return to the site, cellular proliferation and differentiation are stimulated. But when it comes to cancer, it is noteworthy that DNA is the smartest sequence we have ever seen. Then there is the idea that the affected site could be the main generator of new mutations on non-cancerous stem cells (similar to the methods used for cell differentiation and undifferentiation), influenced by agents such as micro-RNA, signaling pathway combinations, etc.

Keywords:
Inflammation, Cellular Migration, Tumor, CAR T-cell Therapy

Mohammad Amin Kaviari

Disease Modeling and Therapeutic Applications of Patient iPSC-derived β Cells from Bench to Bedside

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Many individuals are suffering from diabetes worldwide and in most cases patients need multiple daily injections of insulin that can mimic the dynamic insulin production handled by pancreatic β cells. Replacing damaged or exhausted β cells might be a better solution than current therapies, which only recapitulate the function. Induced pluripotent stem cells (iPSCs) are one class of stem cells converted from mature somatic cells that can imitate several tissue-specific physiology with no risk for immunological rejection. Disease modeling with these cells can potentially illuminate the cellular and molecular abnormalities that lead to different types of diabetes and enable the expansion of innovative cell-based treatments. In this paper, we review research using patient-derived iPSC-β cells to model diabetes and evaluate the therapeutic applications of these cells.

Keywords:
Induced Pluripotent Stem Cell (iPSC), iPSC-derived β Cell (iPSC-β), Patient-derived iPSC-β Cells, Disease Modeling, Personalized Medicine

Mohammad Hamed Rashidi

Comparing the Pharmaco-Mechanism of Analgesic Effects of Cinnamaldehyde and Resveratrol in Chronic Neuropathic Pain

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Cinnamaldehyde and resveratrol as a natural polyphenolic agent can alleviate neuropathic pain symptoms. The mechanism of analgesic activity of these compounds is far from clear. The current study examines whether analgesic activity of cinnamaldehyde and resveratrol is mediated by its neuroprotective and anti-oxidant activity in the neuropathic pain. We further examine whether analgesic activity of these compounds is mediated by β-adrenoceptors in the brain.

Neuropathic pain induced by L5 spinal nerve ligation (SNL). Male wistar rats assigned into sham, SNL +cinamaldehyde (40µg/5µl), SNL+resveratrol (40µg/5µl) SNL+resveratrol (40µg/5µl), and SNL+resveratrol+propranolol (a non-selective β-adrenoceptor antagonist, 30µg/5µl), and SNL+cinnamaldehyde+propranolol (a non-selective β-adrenoceptor antagonist, 30µg/5µl) groups. Drugs injected intracerebroventricular (ICV) at day SNL surgery and daily for 6 days following SNL. Cold allodynia and anxiety examined on days of -1, 2, 4, and 6 following SNL. Electrophysiological study performed on day 6 following SNL for evaluation of resveratrol effects on sciatic nerve conduction velocity (NCV). The activity of catalase (Cat) and superoxide dismutase (SOD) enzymes in the brain assessed on days 6 following SNL.

Cinnamaldehyde and resveratrol significantly decreased cold allodynia (and not anxiety) in all experimental days. Additionally, both of compounds effectively increased NCV, and also normalized the disrupted Cat and SOD activities following neuropathic pain. Furthermore, propranolol significantly blocked the analgesic and neuroprotective effects of cinnamaldehyde and resveratrol.

It is suggested that the analgesic effects of cinnamaldehyde and resveratrol is mediated by its neuroprotective and antioxidant activities in the neuropathic rats. Furthermore, propranolol blocked the analgesic and neuroprotective effects of cinnamaldehyde and resveratrol. There was no significant differences between analgesic effects of cinnamaldehyde and resveratrol.

Keywords:
Cinamaldehyde, Resveratrol, Neuropathic Pain, Catalase Enzyme

Mohammad Mehdi Gravandi

Quercetin and Its Derivatives as Potential Neuroprotective Agents against Spinal Cord Injury

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Spinal cord injury (SCI) is a complex condition with no FDA-approved treatment available. Current interventions mainly focus on symptom reduction, while the secondary phase of SCI, characterized by inflammation, oxidative stress, apoptosis, and autophagy, leads to severe consequences. Therefore, there is a pressing need for multi-targeting agents with lower side effects and higher efficacy. Plant secondary metabolites have emerged as promising candidates due to their multi-targeting properties in combating various diseases. Among them, flavonoids have garnered significant attention in the field of neurodegenerative diseases (NDDs). Flavonoids, such as quercetin, exhibit diverse biological and pharmacological effects, including antioxidant, anti-inflammatory, anti-apoptotic, and autophagy regulatory activities. Quercetin, a well-known flavonol, has recently gained attention for its potential preventive and therapeutic properties in NDDs. Numerous preclinical studies have demonstrated its neuroprotective effects. In this systematic review, we aim to provide an overview of the biological activities of quercetin and its derivatives against SCI. Additionally, we highlight the detailed neuroprotective mechanisms of quercetin derivatives in combating SCI.

Keywords:
Quercetin, Spinal Cord Injury, Inflammation, Oxidative Stress, Pharmacology

Mohammad Reza Fadaei Fard

AI Hallucinations in Large Language Models (LLM): Impacts on Medical Researches and Community

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AI and large language models (LLM) have a huge impact on many industries and medical science and researches are not excluded. Although large language models such as ChatGPT can produce increasingly realistic text, the accuracy and integrity of using these models in scientific writing are unknown. As AI role is rocketing in academic writings such as systematic reviews, plagiarism detections, peer reviews and even data gathering for an original essay, many biases such as AI "hallucinations" and "Drifting" are detected that can lead to a huge amount of false information. An AI hallucination is when a large language model (LLM) generates false information that do not actually exist especially in Factual contradiction. In a study settled by Hussam Alkaissi et. al, ChatGPT provided an essay on liver involvement which, in reality, has not been reported yet or it completely fabricated references for the fact checkers about the essay. None of the provided paper titles existed, and all provided PubMed IDs (PMIDs) were of different unrelated papers. This huge deviation in facts can lead to a sea of false information that in a rather short amount of it cannot be distinguished from true facts. This phenomenon affects lay people more who have little knowledge about medicine. In this study we are focusing on affects AI biases on medical researches, how it is made and the best way to avoid these biases in our academic writings.

AI and large language models (LLMs) have a significant impact on many industries, including medical science and research. However, the accuracy and integrity of using these models in scientific writing are unknown. Although large language models such as ChatGPT can produce increasingly realistic text, biases such as AI "hallucinations" and "drifting" can lead to a significant amount of false information.

AI hallucination occurs when a large language model generates false information that does not actually exist, especially in factual contradiction. In a study conducted by Hussam Alkaissi et al., ChatGPT provided an essay on liver involvement that had not been reported yet or completely fabricated references for fact checkers. None of the provided paper titles existed, and all provided PubMed IDs (PMIDs) were of different unrelated papers. This deviation in facts can lead to a sea of false information that cannot be distinguished from true facts in a rather short amount of time. This phenomenon affects laypeople more who have little knowledge about medicine.

As AI's role is increasing in academic writings such as systematic reviews, plagiarism detections, peer reviews, and even data gathering for an original essay, it is essential to understand the effects of AI biases on medical research. In this study, we focus on how AI biases are created and the best ways to avoid them in our academic writings.

Keywords:
AI hallucinations, Machine Learning Drift, AI Biases

Nazeer Hasan

Nano Lipid Carrier Based Targeted Combinatorial Drug Loaded Nanoformulation Loaded Gel for the Treatment of Skin Cancer

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Non-melanoma skin cancer (NMSC) is one of the most common malignancies reported with a high number of morbidities, demanding an advanced treatment option with superior chemotherapeutic effects. Due to the high degree of drug resistance, conventional therapy fails to meet the desired therapeutic efficacy. To break the bottleneck, we prepared 5-fluorouracil and cannabidiol-loaded nanostructured lipid carriers (FU-CBD-NLCs) for efficient treatment of NMSC.

The FU-CBD-NLCs were prepared using multiple emulsion methods and characterized in terms of particle size, Zeta potential, SEM, TEM, and XRD. Then, the In-vitro efficacy of the FU-CBD-NLCs was analyzed in cell line studies which includes MTT assay, wound Healing, and DAPI staining. Further, FU-CBD-NLCs were incorporated in the gel base and then rheological as well as In-vitro, Ex-vivo characterization was evaluated followed by dermatokinetic analysis. At last efficacy studies were conducted in the In-Ovo model and animal model in terms of reduction of tumor numbers and volume.

FU-CBD-NLCs were developed and optimized using Design Expert using a central composite design which showed a particle size of 206 nm along with a zeta potential of –34 mV. The SEM and TEM analysis reveals that the NLCs possess circular, smooth shape. FU-CBD-NLCs showed promising effects in-vitro cell studies compared to plain standard drugs. Later, FU-CBD-NLCs were incorporated into the gel base and its rheological and texture profile characterization revels the gel is resistant to deformation, easily spreadable, and more adhesive. FU-CBD-NLCs gel translates higher contact time with skin which will lead to the possibly less frequent application. In dermatokinetic around three-fold drug retention was observed compared to conventional formulation. Later, a confocal study shows two folds more retention of drugs in skin layers with a low amount of irritation observed in HET-CAM analysis. Lastly, a significant reduction in tumor volume and area was observed in In-Ovo studies and In-vivo studies.

The overall study offered a novel combinatorial chemotherapy that could be an option for the treatment of NMSC with better therapeutic efficacy and safety.

Keywords:
Nanoformulation, Cannabidiol, Comniatorial Therapy

Negin Namavari

Epidemiology of Antibiotics Resistance in Southern of Iran, in Light of COVID-19 Pandemic: A Retrospective Observative Study

Negin Namavari

Antimicrobial resistance must have been taken as one of the high-priority long-lasting public health issues, although it might have been underrated due to the COVID-19 pandemic emergence. The effect of the pandemic on the trend of AMR in Iran has not been investigated yet. A comparative study among some high-priority bacteria AMR during the pandemic and pre-pandemic has been done.

2675 patients' samples have been collected and processed in a referral COVID-19 center hospital in Iran from mid-March of 2019 to mid-March 2021. Susceptibility test results in sensitivity and resistance levels have been compared pre-pandemic and the pandemic groups.

In comparison to pre-pandemic, inpatient's number has increased almost three times. On the contrary, the outpatients' number has decreased four times, approximately. Urine samples contained more than 85% of specimens. Gram-negative isolated contained 92.22% of all bacteria samples, and e. coli had 59.19% portion of them. The change rate of gram-negative bacteria resistance to antimicrobials averagely is 14% ($p<0.001$). On the other hand, the average change rate of gram-positive bacteria resistance to antibiotics has decreased by 10.96% ($p=003$). As forerunner among other gram-negative bacteria, the average change rate for Pseudomonas and Klebsiella resistance to monitored antibiotics were 79.26 and 66.36%, respectively ($p<001$). The increase in AMR among gram-negative bacteria, particularly Pseudomonas and Klebsiella, has been observed compared to the pre-pandemic. Empirical prescription, lack of appropriate guidelines to treat COVID-19, and strict surveillance might have been considered as causative factors to intensify AMR.

Keywords:
Antimicrobial Resistance, COVID-19 Pandemic

Negin Rastegar

Evaluation of Unsafe Acts of CCU Nurses in One of Izeh Hospitals by Safety Sampling Method

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Recognizing unsafe acts can help prevent desirable them. The performance of nurses plays a significant role in causing accidents due to the provision of medical care and the nature of professional nursing acts. Therefore, this study aims to determine the type of unsafe acts and their relationship with several demographic characteristics of nurses of CCU and to identify the factors affecting unsafe acts and their causes. In the present descriptive cross-sectional study, the unsafe acts of nurses in the CCU ward of a hospital were identified and evaluated using the method of safety sampling and preparing a checklist of unsafe acts through a pilot study. Finally, the percentage of unsafe acts and their relationship with demographic variables were assessed by statistical analysis of SPSS-20 software and the Chi-square test. The results showed that there were significant relationships (P-value <0.001) between age, work experience, level of education, job position, and marital status with unsafe acts. There is no significant relationship between the type of employment and unsafe acts (P-value0 = 0.176). The percentage of unsafe acts was 24.4%, the lowest rate of unsafe acts (0.03%) was about not taking medicines on time and the highest rate of unsafe acts (8.78%) was about not checking the cardiac monitor. The relevance between the distribution of unsafe acts according to their tasks showed that lack of concentration and distraction of nurses due to overloading work, stress, and anxiety were the most important reasons for unsafe nurse's acts

Keywords:
Unsafe Acts, Safety Sampling, Nurses, CCU

Pardis Hemmat

Investigate the effect of NQO1 (RS1800566) Polymorphism on Gestational Diabetes in Pregnant Women of Shiraz

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Gestational diabetes mellitus (GDM) is defined as impaired glucose tolerance with onset or first identification during pregnancy or after that.
Recent researches show the effects of GDM on the proteome, redox status, and nuclear factor erythroid 2–related factor 2 (Nrf2)-mediated antioxidant gene expression in human fetal endothelial cells.
According to our study and a few articles we presuppose that there might be relations between NQO1 and GDM which affected on NRF2 in the way that regulates the expression and coordinated induction of a battery of antioxidant phase 2 genes that protect cells against the cumulative damaging effects of oxidative stress (OS), a major contributor in the development of chronic diabetic complications. we find several polymorphisms that cause GDM which recently work on it. But we focus on new polymorphism of this gene that there is a few information about it, (rs1800566).
We design a case-control experiment in Iranian pregnant woman. The result is 12% of pregnant suffering from GDM.
According to the result of our study, there isn't any positive relationship between this polymorphism and GDM.

Keywords:
GDM, Polymorphism, NQO1

Pershia Davoodi Karsalari

NLRP3 Inflammasome: Illuminating Its Role, Significance and Potential Therapeutic Targets to Advance Solid Organ Transplantation

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Organ transplantation turned the pages of therapeutic managements among end-stage patients, but every silver-lining has its cloud. Despite all the improvements, post-transplant complications remain as inevitable challenges to conquer. In matters of immunity, the body prefers to initiate a battle rather than relinquishing its domain. As the allograft organ is isolated from the donor's body, immunological pathways embark on taking effect. The implantation triggers immune signals in the recipient, ultimately resulting in acute rejection. Ischemia-reperfusion injury is known as another complication. last but not least, chronic allograft dysfunction, including gradual damage, is known to occur due to innate and adaptive immunological signals. Hereby, the role of our mysterious yet captivating protein complex becomes more evident. The assembly and activation of the nucleotide-binding domain, leucine-rich repeat-containing protein 3 (NLRP3) inflammasome is consequent to a complex cascade, starting with danger signals stimulating pattern recognition receptors expressed on the surface of innate immune cells. In this review, we aimed to shed light on the significance of the NLRP3 inflammasome in solid organ transplantation, as well as identifying potential therapeutic targets. A comprehensive search strategy utilizing relevant keywords was used to search the MEDLINE, Scopus and Web of Science databases. Related articles were selected. A large body of evidence suggests that NLRP3 inflammasome plays a crucial role in multiple inflammatory disorders. Considering the immunological pathways implicated in allograft rejection, over the past decade, a substantial amount of research has been focused on investigating various mechanisms and pathways related to NLRP3 inflammasome, in the hopes of enhancing graft survival rates. Additionally, some studies have examined immunosuppressive therapies to evaluate responses and signal interference. Yet further investigations are required due to the vast potentials of NLRP3 inflammasome.

Keywords:
NLRP3, NLRP3 Inflammasome, Transplantation

Pouria Ghiaee

Allergy in Patients with Selective IgA Deficiency

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SIgAD is the most frequent of the primary antibody deficiencies. Patients with IgAD can be either symptomatic or asymptomatic. Symptomatic patients suffer from a wide range of manifestations including allergy, malignancy, and autoimmunity. The prevalence of allergic diseases is assumed to be increased in IgAD patients. In this study, we aimed to evaluate the frequency of allergic disorders in IgAD patients as well as a comparison between these patients and IgA deficient patients without allergy.
The present cohort study included 166 IgAD patients who were diagnosed at the Research Center for immunodeficiencies in children's medical Center. To compare clinical data and laboratory records, all IgAD patients were classified into two groups as follows: patients with allergic diseases and patients without allergic diseases.
Among 166 patients with IgA deficiency, allergy was seen in 33 patients (19.8%). In this study, respiratory tract infections were the most common clinical presentation in all patients (47.6%). Among the infectious manifestations, pneumonia and sinusitis were significantly higher in patients with allergy compared with patients without allergy (respectively 48.5% vs 26.3%; $p = 0.013$, 48.5% vs 20.3%; $p = 0.001$). Based on the laboratory data, the number of platelet and B cells (CD20+) were significantly higher in patients with allergy in comparison to patients without allergy (respectively, $p = 0.025$, $p = 0.44$).
The relation between IgAD disease and allergy could lead to severe clinical complications. Thus, these allergy disorders should be considered as an important feature for suitable management and enhancing the life quality in patients with IgAD.

Keywords:
Selective Immunoglobulin A Deficiency, Allergy, Primary Immunodeficiency Disorders (PIDs), Autoimmunity

Razieh Babak

Molecular Detection and Typing of Non-polio Enteroviruses (NPEVs) in Primary Immunodeficiencies (PID) Patients in Iran

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Non-polio enteroviruses(NPEVs) cause important and diverse viral infections in humans. The prevalence of these infections in Primary Immunodeficiencies(PID) patients have not been properly studied. The purpose of this study is to investigate the prevalence and molecular analysis of NPEVs in PID children in Iran.
For this purpose, 90 PID patients stool samples were analyzed by real-time RT-PCR method, and positive samples were investigated for typing by sanger sequencing.
The results of this study showed that 4(4.4%) samples were NPEVs positive, and their types included Coxackivirus A8, and Echovirus E6.
This study emphasizes that NPEVs infection is not common in PID children in Iran.

Keywords:
Non-polio enteroviruses (NPEVs), Primary Immunodeficiencies (PID), Real-time RT-PCR

Saba Mirian

Pharmacogenetics Role in Alzheimer's Disease Treatment: A Comparative Study with Special Emphasis to Diagnostic and Individual Medicine in Iran

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder that is characterized by the abnormal accumulation of beta-amyloid protein in the brain, the formation of neurofibrillary tangles, and the loss of neurons and synapses.
Pharmacogenetics is the study of how genetic variations can influence an individual's response to medications. In the case of Alzheimer's disease treatment, pharmacogenetics can play an important role in determining which drugs are most effective and safe for each patient. There is a growing body of research suggesting that genetic variations can influence the way individuals respond to cholinesterase inhibitors, which are commonly prescribed medications for Alzheimer's disease. Additionally, researches have suggested that variations in the apolipoprotein E (APOE) gene, which is associated with an increased risk of developing Alzheimer's disease, may also influence response to treatment with cholinesterase inhibitors. Pharmacogenetics may also be important in determining which patients are most likely to benefit from treatment with N-methyl-D-aspartate (NMDA) receptor antagonists, another class of medications used in the treatment of Alzheimer's disease, and that certain genetic variants may be associated with a greater cognitive result from these medications. Indeed, pharmacogenetic testing may help to guide medication selection and dosing in patients with Alzheimer's disease.
In this study, the diagnostic and therapeutic approach of neurologists in Iran for Alzheimer's patients was evaluated, and the consideration of genetic tests and individual medicine in choosing a treatment was monitored. First, we reviewed the latest scientific achievements in the field of Alzheimer's disease pharmacogenetics. The main tools of this stage were the reliable online databases PubMed, and Embase. Then a validated questionnaire was designed and field studies were conducted with 40 random neurologists. The collected data has analyzed and reported in this Research.

Keywords:
Alzheimer's Disease, Pharmacogenetics, Individual Medicine, Genetics, Treatment

Samaneh Delavari

Diversity of Malignancies in Patients with Different Types of Inborn Errors of Immunity

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Genetic defects in the development, maturation, and/or function of the immune cells can lead to Inborn errors of immunity (IEI) which may predispose patients to malignancies. The overall risk for cancer in children with IEI ranges from 4 to 25% and the type of malignancy is highly dependent on the specific mutant gene underlying IEI. We investigated 3056 IEI patients registered in the Iranian national registry between the years 1999 and 2020 in this retrospective cohort study. The frequency of malignancy and its association with the type of IEI in these patients were evaluated. A total of 82 IEI patients with malignancy were enrolled in this study. Among them, predominantly lymphoma was the most common type of malignancy (67.1%), followed by leukemia (11%), and cancers of the head and neck (7.3%). Among identified lymphoma cancers, non-Hodgkin's lymphomas were the most frequent type (43.9%) followed by different subtypes of Hodgkin's lymphoma (23.2%). Solid tumors (18.3%) appeared to be very heterogeneous by type and localization. The correlation between the type of malignancy and survival status and the association between the type of malignancy and IEI entities were unremarkable. The awareness of the association between the presence of IEI and cancer highlights the importance of a synergistic effort by oncologists and immunologists in the early diagnosis of malignancy and personalized therapeutic strategies in IEI patients.

Keywords:
Primary Immunodefciency, Inborn Errors of Immunity, Malignancy, Hematologic Cancers, Lymphoma, Leukemia, Solid Tumors

Sara Mostafavi

Skin Prick Test for Common Food Allergens in Infants with Food Protein-induced Proctocolitis

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Food protein-induced allergic proctocolitis (FPIAP) is a non-IgE-associated disease with some evidence of IgE sensitization in a minority of patients.
Objective: This study aimed to determine the prevalence of IgE sensitization to common foods by skin test and find its correlation for milk outgrowing in infants with FPIAP during a follow-up of 5 years.
This prospective cross-sectional study included infants with FPIAP in 2016. Skin prick tests were done with commercial extracts of 11 common food allergens. We followed these infants for five years, and the resolution was established by successfully ingesting cow's milk.
Of 126 infants analyzed, 81 infants (40 boys and 41 girls) with FPIPC completed this study. The frequency of food sensitization was 32% to at least one of the applied food allergens. Cow's milk (13.6%), egg (13.6%), and beef (6.2%) were the most frequent allergens, respectively. In this study, 45.7% of the infants developed a tolerance to the milk by the age of one year, 77.1% by the age of two, 91.3% by the age of three, and 96.3% by the age of four. Positive food sensitization and prematurity were significantly correlated with the likelihood of developing a cow's milk tolerance ($P < 0.001$).
This study suggests pointing out skin tests of infants with FPIAP for common food allergens because IgE- mediated sensitization can infer a greater chance of a persistent course of milk tolerance.

Keywords:
Milk, Food Allergy, Immunoglobulin E, Tolerance, Allergic Colitis

Sara Mehrgan

Comparison the Effect of Charcoal-containing, Hydrogen Peroxide-containing, and Abrasive Whitening Toothpastes on Color Stability of a Resin Composite; an In Vitro Study

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This study aimed to compare the effects of charcoal-containing, hydrogen peroxide-containing, and abrasive whitening toothpastes on color stability of a resin composite.
Forty-five specimens were fabricated of spectrum TPH3 composite resin and stored in artificial saliva for 24 h. Baseline color assessment was performed using a spectrophotometer device. Then, the specimens were ran- domly assigned into 5 experimental groups, namely distilled water (GC), Bencer (GB), colgate optic white (GO), perfect white black (GP) and colgate total whitening (GT) toothpastes. The specimens immersed in coffee solution for 10 min and brushed for 1 min with respective toothpaste and then stored in artificial saliva until the next day. This cycle was repeated for 30 days. After 30 days, the final color assessment was performed using the spectrophotometer. Data were analyzed using one-way ANOVA and Tukey tests.
Experimental groups were not significantly different in terms of Δa and ΔE values. However, ΔL and Δb val- ues showed significant difference among the groups. Regarding Δa, GT and GC groups showed red color shift while the other groups showed green color shift. Regarding Δb, all groups showed blue color shift except GT group which showed yellow color shift.
None of the whitening toothpastes could decrease discoloration caused by the coffee solution to the level below the perceptibility threshold except Colgate Optic White which reduced discoloration within the clinically acceptable perceptibility range.

Keywords:
Whitening Toothpaste, Discoloration, Composite Resin

Sara Asl Motaleb Nejad Sarkhab

Intersecting Frontiers: Exploring Tissue Engineering Applications in Astrobiology for Future Space Exploration

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Tissue Engineering (TE) is a fast-growing field of study focused on restoring, maintaining, improving, or replacing various types of tissues. Spaceflights present unique conditions and challenges such as microgravity; which can be a threat to human health, but it also can be used for helping in medical studies such as TE research. Microgravity can have some advantages for TE by modulating cell morphology, secretion, metabolism, proliferation, and differentiation of stem cells. Spaceflights are rare and expensive; therefore, by leveraging the principles of TE, scientists simulate and recreate extraterrestrial environments in controlled laboratory settings like simulated microgravity devices. Doing TE research under simulated microgravity conditions has led scientists to construct bioartificial organoids, spheroids, and tissue analogs with or even without scaffolds in vitro. This study reviews recent breakthroughs, applications, and challenges of TE studies in astrobiology. TE in microgravity extends beyond organ transplantation and organ support; it covers drug testing, treatment discovery, disease investigation, and advancements in Regenerative Medicine. Some of the recent studies in this field are finding treatments for paralysis and neurological diseases, studying cancer and its new possible treatments, gene therapy, and developing personalized medicine, especially for astronauts. These studies have the potential to revolutionize the future of TE. Additionally, we discuss promising prospects that open new frontiers for space exploration, promising enhanced quality of life during space travel and beyond.

Keywords:
Tissue Engineering (TE), Astrobiology, Microgravity, Regenerative Medicine, Scaffold

Sepideh Sargoli

Reviving Martian Art: Preserving Ceramics Across Planetary Borders

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Human beings have had a profound and continuous relationship with their surrounding environment since ancient times. This connection can be traced through the traces left behind in artifacts and tools, such as architecture and ceramic works, that have reached us from the past. Among these elements, the significance of soil as a vital component for recording and preserving events cannot be overlooked, as it sheds light on a significant portion of past human tools and artifacts.

In the contemporary world, with the increasing development and blurring boundaries of science and art, scholars and artists are faced with new challenges. One of these challenges is how to sustain and develop this interconnectedness with nature. A particular example is humanity's endeavor to explore and inhabit planets like Mars.

In this context, contemporary artists need to adopt approaches that, alongside creativity, preserve this natural foundation. By combining cultural expression with limited academic and artistic resources, they should be able to provide suitable responses to the meaningful and functional needs of humanity.

This article, based on library documents and field experiences related to Martian soil, takes a descriptive-analytical approach to provide an appropriate perspective for the reader. Its objective is to address the challenges faced by humanity in maintaining this ancient connection and to offer appropriate responses to the reader's needs, while also not overlooking the potential hidden in these novel challenges. Ultimately, the article aims to stimulate thought and contemplation for future generations.

Keywords:
Soil, Science and art, Mars, Human beings, Environment

Sepideh Poshtdar

The Potential Protective Effect of Modafinil in Renal Ischemia Reperfusion Injury in Rats

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Renal ischemia reperfusion injury (IRI) is a post-ischemic event which can lead to subsequent acute kidney injury (AKI), transplant failure, renal dysfunction and fibrosis by means of a wide range of physio-pathological processes leading to increased oxidative stress and production of inflammatory cytokines and chemokines. In this study we aim to assess the effect of Modafinil, a wake- prompting agent with previously proven anti-inflammatory and anti-oxidative properties on ameliorating renal IRI.
Thirty male Wistar rats were divided into five groups: sham operating group, Control group and Modafinil groups (three groups of Modafinil at doses of 50, 100, 150 mg/kg). In order to evaluate the effect of pre-treatment of Modafinil on improving renal IRI, the IRI was in induced in all groups other than sham-operating group by means of bilaterally clamping the renal arteries. The sham group underwent all the surgical procedures other than arterial clamping.
In order to evaluate the effectiveness of Modafinil we carried out pathological and biochemical studies on rats' kidneys and serum. Tissue pathological assessments indicated a reduction of glomerular, tubular and interstitial injury in doses of 50 and 100 mg/kg of Modafinil. Furthermore, the biochemical assessments showed a significant decline of pro-inflammatory factors including TNF-alpha, Interleukin 18 in tissue, increase of SOD and catalase indicating the reduction of oxidative stress, decrease of Cr, BUN and NGAL indicating the improvement of renal function in effective doses of Modafinil (50 and 100 mg/kg) in comparison to control group without pre-treatment of Modafinil.
The results from our current study suggest that Modafinil can be an effective therapeutic agent in treatment of renal IRI and can be a potential treatment option to overcome the clinical challenges, hospitalizations and morbidities subsequent to kidney IRI.

Keywords:
Modafinil, Renal Ischemia Reperfusion Injury, NGAL, IL18

Shaghayegh Khoshgou

Comparative Efficacy of Four Stain Removal Methods for Bleach Shade Composite Resins After Immersion in Staining Solutions an In Vitro Study

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Dental School of Tehran University

Bleach-shade composite resins were recently introduced to the market due to the high demand of patients for whiter teeth. This study sought to compare four stain removal methods for bleach-shade composite resins. Materials and Methods. Seventy-two discs were fabricated from each of the Filtek Z350 XT and Gradia XBW composite resins and immersed in coffee or sour cherry juice staining solutions. Each group was then divided into four subgroups to assess the efficacy of four stain removal methods (finishing with soft-lex disk "brush with pumice" bleaching with carbamide peroxide 16%, bleaching with hydrogen peroxide 40%). The color of each specimen was measured by Easyshade spectrophotometer, and data were analyzed using SPSS 25 statistical package for social sciences. Results. The home-bleaching technique was more effective than the office-bleaching and pumice for the removal of sour cherry juice stain (ΔE = 1.93) and coffee stain (ΔE = 3.32) from Gradia composite discs, almost returning the baseline original color. The Sof-Lex discs were more effective than the pumice for the removal of sour cherry juice stain (ΔE = 4.11) and coffee stain (ΔE = 4.93) from Z350 composite discs but not return the baseline original color. Conclusions. Filtek Z350 had more discoloration than Gradia Direct. The different materials and solutions reacted differently to the four stain removal methods. In GCJ group after all stain removal methods, ΔE reduced to a clinically acceptable level.

Keywords:
Bleach Shade, Composite, Removal Stain

Sina Hassani

Precision in a Shifting Landscape: Towards Vaccines Tailored to Conserved Epitopes in Dynamic Viral Strains

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Amidst the continuous evolution of viral pathogens, including the 2022 Monkeypox outbreak, Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), and the relentless influenza virus, a proactive approach to vaccine design is paramount. Leveraging machine learning, immunoinformatics, and multi-criteria decision-making, our study pioneers a revolutionary strategy.

Integrating Reverse Vaccinology and Gene Ontology, we identify six critical proteins for epitope prediction against the influenza virus. By utilizing NextClade and the Unsupervised Nearest Neighbor algorithm with ideal matrix [0 0], we calculate the conservancy scores, unveiling potential MHC-I, MHC-II, and Linear B cell epitopes for tailored vaccines.

Expanding our scope to SARS-CoV-2 and HIV, we analyze Immunodominant Regions (IDRs), Immune Epitope Database (IEDB) epitopes, and predicted epitopes. Incorporating Shannon entropy and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), we unveil epitopes with optimal conservancy and immunogenicity.

Navigating the shifting landscape of viral evolution, our comprehensive framework addresses the challenges posed by dynamic viral strains. Together, we embark on a scientific journey to forge precision-crafted vaccines, safeguarding global health against the relentless forces of viral mutation.

Keywords:
Immunoinformatics, Conserve Epitope, Hybrid Vaccine

Soheil Pourheidar

Optimal Disinfection Method for an Accidentally Dropped Autograft During an Anterior Cruciate Ligament Reconstruction Surgery: A Double-Blind Study

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There is no consensus on the optimal sterilization method for contaminated grafts during anterior cruciate ligament (ACL) reconstruction surgery. This study evaluated the efficacy of single and multiple sequential disinfectants on sterilizing the contaminated graft.
Thirty ACLs were harvested from 30 knees during total knee arthroplasty and sectioned into ten semi-identical pieces (n = 300). All grafts were dropped simultaneously on the operating room floor and left for 60 seconds. Then, the grafts were assigned to the ten study groups. The control group used no sterilizing method, and the other nine groups utilized different sterilizing solutions: 1% povidone-iodine (PI), 4% chlorhexidine (CH), antibiotics (AB), three-time washing with PI, CH, and AB, two-time washing with PI and CH, two-time washing with PI and AB, two-time washing with CH and AB, one-time washing with normal saline, and three-time washing with normal saline.
Twenty-nine out of 30 control grafts were positive for bacterial culture, mostly for Staphylococcus epidermidis (n = 28) and Micrococcus luteus (n = 13). Eight samples in the PI group were positive for bacteria. No bacterium was isolated in the CH group. Grafts washed once and three times with normal saline were positive for bacteria in 13 and 8 samples, respectively.
Our study found 4% CH solution to be the most effective sterilization method for decontaminating autografts that have been dropped accidentally on the operating room floor.

Keywords:
ACL Drop, Contamination, Povidone-iodine, Chlorhexidine, Optimal Disinfection Method

Tara Ebrahimpour Lish

The Effectiveness of Emotional Schema Therapy on Emotion-cognitive Regulation, Rlationship Beliefs, Body Self-Relation, Partner-Related Obsessive Compulsive Symptoms in Students

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This research was conducted with the aim of the effectiveness of emotional schema therapy on the cognitive regulation of emotion, communication beliefs, body image, severity of obsessive compulsive symptoms related to life partner and ambivalence in college students. The research method is a clinical trial study with a control group. The statistical sample consisted of 30 people who were selected through the available sampling method and randomly replaced in the experimental group (N=15) and the control group (N=15). The measurement tools were emotional schema therapy questionnaire, relationship-related obsessive-compulsive, Granofsky's emotional cognition, obsessive-compulsive symptoms related to life partner, body image, Relation beliefs, self-ambivalence. The experimental group received 12 emotional schema therapy sessions. The assessment included a pre-test, post-test, and follow-up period. SPSS-24 and ANOVA with repeated measure were used for data analysis. The results of the findings of this study showed that emotional schema therapy leads to a significant improvement in the cognitive regulation of emotions ($P<0.01$), communication beliefs ($P<0.01$), body image ($P<0.01$), intensity of obsessive-compulsive symptoms related to life partner and ambivalence ($P<0.01$). Based on these findings, the schema of emotional therapy can be used to improve the psychological problems related to students' common life.

Keywords:
Emotional Schema Therapy, Relationship-related Obsessive-compulsive Disorder, Cognitive Emotion Regulation, Relationship Beliefs, Body Image

Zahra Dolatkhah

Human-AI Collaboration in Legal Proceedings: Prospects and Pitfalls

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The advent of Artificial Intelligence (AI) has ushered in transformative changes across various industries, and the legal field is no exception. In arbitration and courtrooms, AI's potential to streamline processes, analyze vast amounts of data, and provide predictive insights has been both promising and challenging. AI's application in arbitration and court proceedings has enabled quicker document review, efficient case management, and data-driven insights that can aid legal professionals in making informed decisions. For instance, the famous "Ross" AI program has demonstrated its prowess in sifting through legal documents, expediting research, and offering precedent analysis.

However, the integration of AI is not without concerns. Several instances underscore AI's limitations, where reliance solely on algorithms can lead to unintended biases or errors. The well-known "Roberto Mata" case serves as a reminder of AI-generated risk in the way of citing cases that had never existed.

This study delves into the challenges posed by the "black box" nature of AI algorithms, where transparency and explainability become crucial to ensure fairness and accountability. It discusses the need for maintaining a human-centric approach in the legal domain, where human expertise complements AI's capabilities.

Ultimately, this study explores the dual nature of AI's role in dispute resolution, examining its benefits as well as the complexities it introduces. By learning from both successful implementations and cautionary tales, legal practitioners can harness AI's strengths while mitigating its vulnerabilities, paving the way for a harmonious collaboration between human intellect and technological advancement.

Keywords:
Artificial Intelligence, Technology, Transparency, Dispute Resolution, Legal Proceedings

Zeynab Asgari

Identification of Important MicroRNAs Involved in Immunological Signalling Pathway in HTLV-1 Associated Adults T cell Leukemia Lymphoma (ATLL)

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HTLV-1 is the etiological agent of adult T cell leukemia-lymphoma (ATLL), a fatal malignancy of CD4+ T cells with a considerably poor prognosis, and HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP). MicroRNAs (miRNAs) are a group of noncoding, functional RNAs that their functions can result in mRNA targets being degraded or suppressed during translation. It is now well understood that microRNAs are implicated in developing several disorders. Important microRNAs of associated immunological pathways in ATLL pathogenicity will be discussed in this study.
The GSE31629 dataset obtained with the GPL7731 platform. The dataset contains miRNA samples from peripheral blood mononuclear cells (PBMCs) and CD4+ T cells from 40 ATLL patients and 22 healthy donors. Adjusted p-value < 0.05 was determined as the threshold for DEM detection. Initial pathway analysis was performed using the Diana-mirPath web server.P53 and PI3K signaling pathways are the most important immunological pathways that can play a role in ATLL pathogenesis.
let-7f-5p , let-7a-5p are the most significant microRNAs related to mentioned immunological pathways involved in ATLL pathogenesis.
The examined microRNAs have gene targets that can be identified and measured as potential targets for the development of diagnostic, therapeutic, and preventive strategies. However, further studies are recommended to better understand the possible consequences of miRNAs and their relationship with the pathogenesis of ATLL.

Keywords:
Human T-lymphotropic Virus Type-1, HTLV-1, Adult T-Cell Lymphoma/Leukemia, ATLL ,microRNA, Immunological Pathway

USERNversity: A New Educational Innovation to Improve Young Scholars' Skills via Extracurricular Programs

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USERNversity: A New Educational Innovation to Improve Young Scholars' Skills via Extracurricular Programs

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USERN

The creation of science was to serve humanity and to apply it to improve all human life, with any nation, race, ethnicity, or religion. All people should be able to contribute to science development. A proper path from novel ideas to scientific output and the opportunity of networking with peers should be available for all junior and senior scientists. Novel ideas, research facilities, funding resources, and expert teams should connect via a suitable network. To tackle complex problems, the integration of sciences and the application of multidisciplinary, interdisciplinary, and transdisciplinary approaches are required. Indeed, in one word, all borders, either abstract or concrete, should be removed in the world of science.

Remarking "Envisioning a reliable network of universally validated resources including ideas, facilities, human, financial and educational resources in order to launch and facilitate authentic, ethical and professional scientific research intended to improve human life." as its main and only vision, Universal Scientific Education and Research Network (USERN) has made strong steps into removing borders in science, including geographical and ethnical borders, borders between senior and junior scientists, and borders between different fields of science (1,2).

USERN, with more than 21,000 members from more than 120 countries, has accomplished the publication of about two thousand scientific documents, which has resulted in an H-Index of 73 during 7 years of fruitful activity (Figure 1). By the end of 2022, USERN has 63 USERN Junior Ambassadors (UJAs), 72 USERN Interest Groups (UIGs), 45 offices, and signed 79 Memoranda of Understandings (MOUs) (Figure 2).

Education and research: two wings of USERN

USERN has organized more than 900 educational and inspirational events and helped many students to gain different skills, find their future path, and learn how to fly in the borderless sky of science. USERN has targeted borderless scientific collaborations by facilitating scientific exchange since its establishment (3); students and faculty members exchange program with Kharkiv National Medical University in Ukraine during 2017-2021, the Advanced Course of Primary Immunodeficiencies (PIDs) in collaboration with Università Mediterranea of Reggio Calabria in Italy in 2018, minor global health exchange program with Erasmus Medical Center, Rotterdam, the Netherlands in 2019, and the Global Health School in collaboration with Akkon University in Berlin, Germany, in 2022 are some examples of exchange programs initiated and organized by USERN (3-5). USERN developed the U100 platform, by which it linked 100 universities and scientific institutes to facilitate borderless scientific networking (6). During the COVID-19 pandemic, the universities› and educational institutes› activities were forced to be limited as per health protocols to prevent the spread of the disease. Hence, not only physical scientific exchange had to stop, but also the regular educational programs were disturbed for many students all over the world; this was the most challenging in the earlier days of the pandemic, but soon got better with transforming educational curriculums into virtual programs. Meanwhile, USERN kept on moving toward developing borderless scientific activities regardless of all challenges during the pandemic. The 5th International USERN Congress and Prize Awarding Festival held on November 7th-10th in Tehran, Iran, was the first hybrid congress, which has introduced new standards in practice for organizing scientific events during the pandemics (7,8). Later in May 2021, in line to continue scientific exchange in the pandemic era, USERN in collaboration with Kharkiv National Medical University and Tehran University of Medical Sciences organized a virtual mobility program, entitled the 1st TUMS-KhNMU International USERN Spring e-Course, in which a one-month educational program was designed for students with different medical sub-fields, including medicine, dentistry, nursery, rehabilitation, and public health. Faculty members and scientists from more than 5 universities/institutes joined the program as lecturers and students from more than 10 countries participated in this one-month event. This was a great example of scientific exchange with all limitations caused by the pandemic.

Professionality and business: two wings of sustainability in networking

USERN was organized as a professional non-governmental, non-profit organization and network for non-military scientific investigation and policy-making to mean science without borders. It was organized for advancement of authentic, ethical and professional scientific research and education and consequently advancement of science for non-military purposes and public good. The vision was to have a reliable network of universally validated resources including ideas, facilities, human, financial and educational resources in order to launch and facilitate authentic, ethical and professional scientific research intended to improve human life. Considering the fact that

USERN should remain as a non-profit network, there was a need to have a business plan to continue the USERN activities (Figure 3) and establish foundation(s) to arrange fundraising for sustainability in organization of the USERN congress and USERN Prize Awarding Festival. Therefore, the idea of USERN Business was developed and Universal Scientific Education and Research Foundation (USERF) and Universal Borderless Science Foundation were established, respectively (Figure 4).

USERNversity

USERN was always concerned about boosting the young scholars' skills, which are necessary to progress in the scientific community, via extracurricular programs/courses. Therefore, after organizing hundreds of educational events, it has been decided to design several courses with a defined curriculum to empower students and junior scholars with some skills, including scientific writing, basic research skills, laboratory techniques, academic presentation skills, and soft skills. In early 2022, the idea of USERNversity was conceptualized as a part of the USERN business, in which non-degree programs were initiated; four internship programs were launched: Internship for Research Skills, Internship for Laboratory Techniques, Internship for Presentation Skills, and Internship at the USERN Executive activities. For participation in each of the internship courses, Universal Accreditation System (UAS) scores are defined, as a tool to quantify educational activities and professional development (9). In addition to the graduation certificate, trainees obtain UAS score, which is recorded on their profile on the USERN website.

Internship for research skills

USERN has organized the USERN Research Week twice a year since 2018, consisting of research methodology and publication types, scientific writing, submission and peer reviewing, basic statistics, systematic review, meta-analysis, and editing books with international publishers. While the students were always satisfied with what they learned about basic research skills, scientific writing, and academic publications, many of them wanted to get involved more in research activities to use their learning in practice. Thus, the concept of the Research Internship was formed in USERNversity. Students were trained under the supervision of a mentor and contributed to different research activities during a period of 10-month program. During this internship, participants attended monthly journal clubs and some workshops. More than 350 delegates participated in the Research Week in 2022, among them, 100 were accepted to start the USERN Internship program, of which 40 finally graduated at the end of the course.

Internship for laboratory techniques

USERN has linked some research centers and started a collaboration with them to organize the USERN Laboratory School twice a year since 2021. The school was so welcomed by a great number of students and junior researchers. As many of the trainees were interested to dive deeper into laboratory techniques and to achieve more experience in laboratory work, the idea of the USERN Internship for Laboratory Techniques was formed in USERNversity. During a 10-month program, the trainees experience working in laboratory with different techniques, including DNA extraction and PCR, cell culture, flow cytometry, western blotting, and laboratory animal techniques. Also, visit from different centers related to laboratory work are another part of this course. In 2022, out of more than 300 participants in the school, 50 of them applied for the internship course; among them, 12 were accepted and graduated at the end of the program.

Internship for presentation skills

USERN has been always trying to link science to society. An important concern is that many of the scientists, although with great experience in presenting their work in the academic community, do not have the skill to present scientific information to the general community. In the absence of science in society, pseudoscience spreads and shapes the general community's mind about important issues like health, treatment for diseases like cancer, pandemics, etc. having this issue in mind, UESRN developed the concept of Miniature Talk in 2017. In the Miniature Talk, junior scientists who are interested in presenting their work to both the academic and the general communities join to compete for being recognized as the Best Junior Talk Presenter. Miniature Talk is also a great example of the integration of science and art. Besides the presentations, junior artists who are also interested in science try to create scientific artwork at the same time. In 2022, after three consecutive periods of miniature talks, the Internship for Presentation Skills was developed in USERNversity. Applicants were trained in several groups under the supervision of a mentor and then competed together in the context of Miniature Talk. In 2022, more than 270 delegates applied to join this contest; among them, 66 participants joined the internship program. Five best 5 presenters and the best 3 artists, which were selected by juries' votes and also public votes, started a 20-weeks training program to perform a Talk Theater, named "Forgetfulness" at the 7th USERN anniversary.

Internship for executive activities

USERN executive committee has been always a friendly environment letting the juniors grow in an international scientific network. In USERN executive committee, interested young scholars improve their soft skills, improve teamworking, learn different skills in design, media, and organizing events, besides management and leadership skills. USERN has nurtured many young successful managers that are working all over the world. In 2022, for the first time, the Internship at the Executive Committee was launched. Out of 180 applicants, 45 were accepted according to their motivation letter to join the program. During the internship, different workshops, gatherings, and events were held, all aiming to empower the trainees in different skills, particularly soft skills. The

trainees experience the process of organizing different events from conceptualization to holding. In this course, 35 trainees graduated.

Internship for innovation and entrepreneurship

Creativity and innovation have always been inseparable factor for educational and career development. Having this important in mind, USERNversity aims to launch the 5th internship course in 2023, entitled the Internship for Innovation and Entrepreneurship.

USERN policy-making council and presidential election

On the first day of January 2016, the first USERN advisory board meeting was organized, attended by 30 top 1% scientists. On the first day of January 2023, this number reaches more than 630, including 19 Nobel and Abel Laureates, which is beyond our expectations (10).

A new chapter has been opened in USERN; after two successful consecutive three-year periods, the USERN president has changed according to the USERN statute. Professor Nima Rezaei, the USERN Founder, has been the President since 2016. Based on the USERN Statute, the election should be made to select the Policy-Making Council (PMC) and the President every three years; 21 members of the USERN PMC from different disciplines were selected according to the votes received from the Advisory Board members in September 2022; consequently, the newly elected PMC members voted to select the new President (2023-2025). Among the 8 candidates for the Presidential election, the majority (more than 50%) of votes went to Professor Tommaso Dorigo, a physicist from the Italian National Institute of Nuclear Physics and a Professor at the Department of Statistical Sciences in Padova (10).

The 7th international USERN congress and prize awarding festival

During the 7th International USERN Congress and Prize Awarding Festival, which was held in Muscat, Oman on November 8th-10th, the composition of the newly elected Policy Making Council (PMC) of the USERN for the next three years (2023-2025) was announced. USERN targets world-scale collaborations and scientific excellence. In this path, great steps were made in 2022; publication of books and articles on interdisciplinary topics; establishment of different educational events and research activities; and the last but not least, organization of the 7th International USERN Congress and Prize Awarding Festival in Muscat, Oman, on November 8th-10th, 2022, which was a great picture of borderless international collaboration and scientific exchange. Participants from many countries and with different scientific fields joined the congress; USERN Prize laureates, keynote lecturers, junior researchers, faculty members, ambassadors, and students were all happy experiencing an international scientific environment. Purposed on acknowledging junior scientists for their scientific efforts and achievements, and empowering them to pursue their goals, the idea of the USERN Prize was formed. On the United Nations (UN) Day of Science for Peace and Development, November 10th, the USERN 2023 Prize laureates were officially announced. They received their award at the 7th USERN Congress for the amazing work they did to promote science. Different young scientists from 18 countries have been awarded the USERN Prize since 2016; this year's laureates were from France, Switzerland, USA, Italy, and UK (11,12).

USERN CSR

As part of USERN social responsibility, the "Health and Art" or "HEART" group was established. In June 2022, the 4th Football Mini World Cup was held at Children's Medical Center, Tehran, Iran. In this event, the hospitalized pediatric patients at the Children's Medical Center (as Iran's team) compete against a group of attending physicians (as the hospital team, with the Wales team clothing), a group of actors (as the HEART team, with USA team clothing), and a group of Iran national football team players (as the USERN team, with England team clothing). The kid's team was the winner and they won medals and the trophy at the end of the contest. Annually, the HEART group organizes the International Festival of Paintings for Pediatric Patients (IFPPP). This year, we have received more than 700 paintings, of which after the evaluation by international juries, the top 250 paintings were published in the IFPPP booklet. The top 3 paintings in each age group were awarded the medal and trophy of the festival at the IFPPP closing ceremony. In November 2022, along with the first day of the USERN Congress, the closing ceremony of the 8th International Festival of Paintings for Pediatric Patients (IFPPP) was held (13).

Acknowledgments

USERN is pleased to acknowledge and appreciate the guidance and support of all USERN advisory board members, stakeholders, collaborators, and particularly the executive committee. USERN executive committee members, former or current, all are young enthusiastic students interested in making science borderless. We wholeheartedly appreciate all they have done to make this initiative possible. Finally, we warmly thank those who have devoted their time to USERN for their company, cooperation, and inspiration.

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Year ↓	Documents ↑
2022	522
2021	486
2020	258
2019	232
2018	201
2017	151
2016	77
2015	35

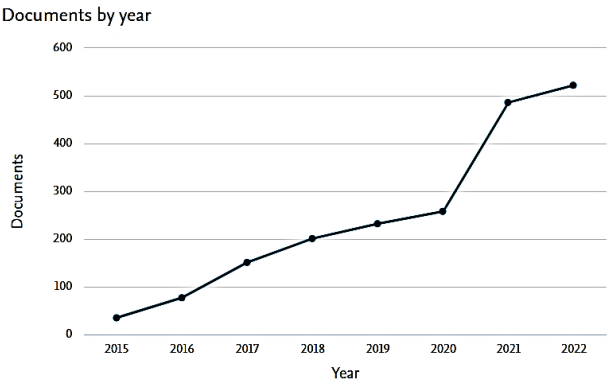

Figure 1. Trend of Publication with USERN affiliation (2015-2022). Scopus, Dec 2022

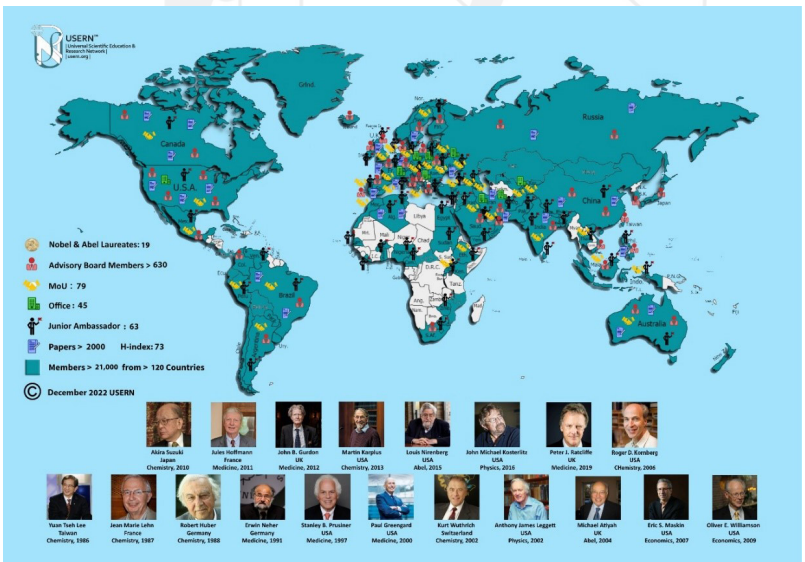

Figure 2. Updated statistics of USERN platform. Dec 2022

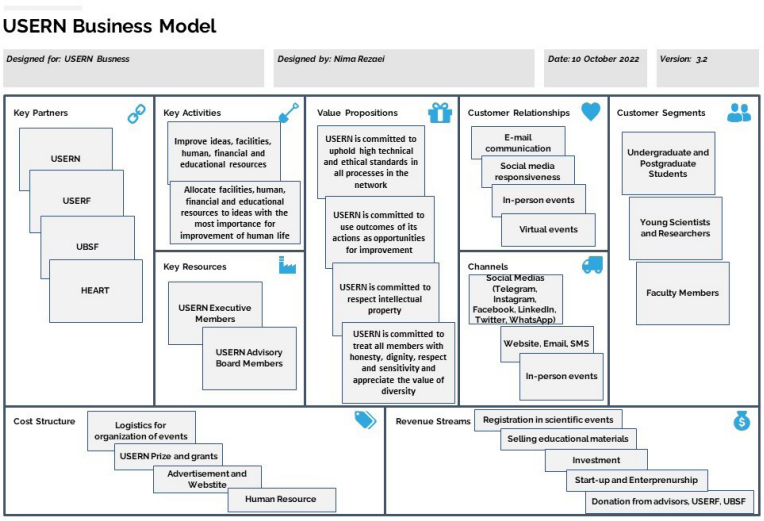

Figure 3. USERN business model

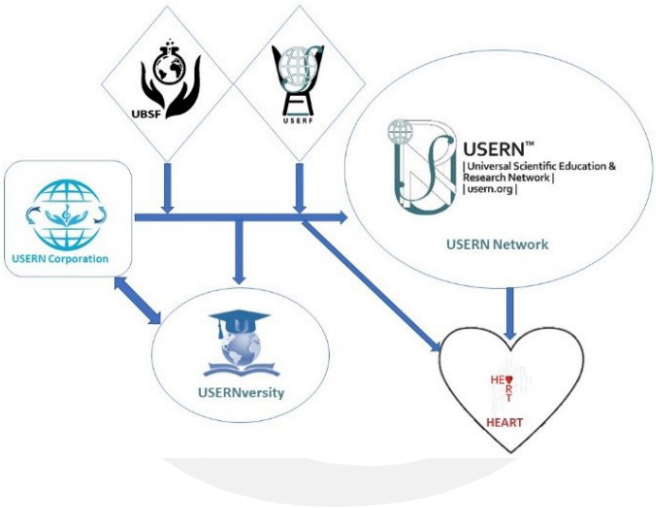

Figure 4. The connections of USEN Corporation and USERN Networking. Health and Art (HEART) act as Corporate Social Responsibility (CSR) of USERN. USERF: Universal Scientific Education and Research Foundation. UBSF. Universal Borderless Science Foundation.

Universal research index: An inclusive metric to quantify scientific research output

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Universal research index: An inclusive metric to quantify scientific research output

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UR-Index
USERN
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Leading author
CiteScore
Scholarly output
Scholarly impact

ABSTRACT

Scientometrics and bibliometrics, the subfields of library and information science, deal with the quantity and quality of research outputs. Currently, various scientometric indices are being used to quantify and compare research outputs. The most widely known is the h-index. However, this index and its derivatives suffer from dependence on the mere count of a scholar's highly cited publications. To remedy this deficiency, we developed a novel index, the Universal Research Index (UR-Index) (https://usern2021.github.io/UR-Index/) by which every single publication has its own impact on the total score. We developed this index by surveying international top 1 % cited scientists in various disciplines and included additional component variables such as publication type, leading role of a scholar, co-author count, and source metrics to this scientometric index. We acknowledge that unconscious biases built into the component variables included in the UR-Index might put research from specific groups at a disadvantage, thus continued efforts to improve equitable scholarly impact in science and academia are encouraged.

Introduction

Scientometrics and bibliometrics are among the subfields of library and information science that deal with the quantity and quality of research outputs (Chellappandi & Vijayakumar, 2018; Garfield, 2009). In this field of study, metrics are used as essential measures of quantitative, and to a lesser extent, qualitative research performance (Cuschieri, 2018). Metrics can be calculated at different levels including those of the article, author, institution, field, and journal (Aguinis et al., 2012; Cuschieri, 2018). The most frequently used author- and institution-level metrics are calculated based on counts of highly cited publications. Generally, the scholarly output is defined in terms of peer-reviewed publications, whereas scholarly impact is based on factors that demonstrate the influence of a publication on the research community of that discipline, such as citation count (Aguinis et al., 2012; Dev et al., 2015; Hobbs, 2017).

A variety of indices have been developed to assess the research output of a scholar or an institution. Most of these indices balance scholarly output with scholarly impact. The most prominent one is the Hirsch index (h-index), which is calculated by Scopus, Web of Science, and Google Scholar. The h-index reports the researcher's count (h) of publications that received $\geq$ h citations (Hirsch, 2005; Yang & Meho, 2006). If all publications of a researcher are sorted in descending order of citation count, the h-index is the rank of the publication with a citation count that is equal to or greater than the rank number (Table 1) (Hirsch, 2005). The h-index provides a simple estimation of research output, but it has limitations. In particular, it ignores publications with citations < h-index, the exact value of publications with citations > h-index, author's place in the byline, and the publication type. In addition, it provides an overestimate for scholars with too many publications that meet hyperauthorship criteria i.e., authors $\geq$100. The number of papers with hyperauthorship has been increased in recent years and this affects the citation patterns since the papers with $\geq$100 authors or $\geq$ 30 countries usually receive more citations than typical papers with $\leq$10 authors or $\leq$ 5 countries (Clarivate, 2019).

To overcome the limitations of the h-index, several modified versions of it have been proposed. For instance, the i10-index is based on the same notion as the h-index. It reports the count of publications with $\geq$10 citations. To enable differentiation of researchers with highly cited publications, the extended version of this index, that is, i100-index and i-1000 index (Teixeira da Silva, 2021), have been recommended. More importantly, the g-index is based on the count of publications with a specific citation count. It reports each researcher's count of publications that together received $\geq g^2$ citations. In other words, if all publications of a researcher are sorted in descending order of citation count, the g-index is the number of rank of the publication, which, together with its higher-ranked publications, has (square root of cumulative sums of citations) $\geq$ (the rank) (Table 1). Moreover, the average citation count is

USERN Map

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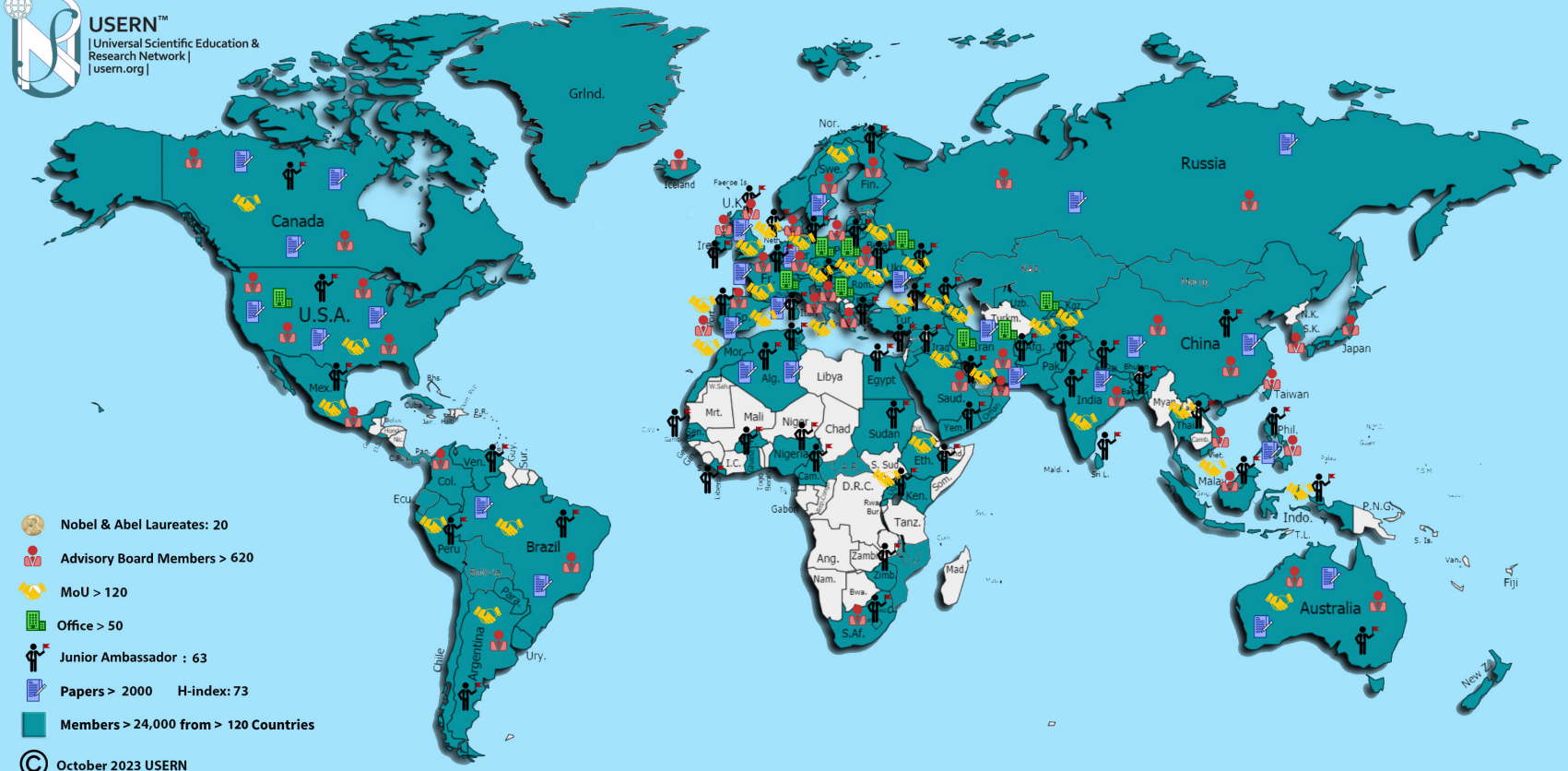
| usern.org |



- Nobel & Abel Laureates: 20
- Advisory Board Members > 620
- MoU > 120
- Office > 50
- Junior Ambassador : 63
- Papers > 2000 H-index: 73
- Members > 24,000 from > 120 Countries

Akira Suzuki
Japan
Chemistry, 2010

Jules Hoffmann
France
Medicine, 2011

John B. Gurdon
UK
Medicine, 2012

Martin Karplus
USA
Chemistry, 2013

Louis Nirenberg
USA
Abel, 2015

John Michael Kosterlitz
USA
Physics, 2016

Peter J. Ratcliffe
UK
Medicine, 2019

Roger D. Kornberg
USA
CHemistry, 2006

Drew Weissman
USA
Medicine, 2023

Yuan Tseh Lee
Taiwan
Chemistry, 1986

Jean Marie Lehn
France
Chemistry, 1987

Robert Huber
Germany
Chemistry, 1988

Erwin Neher
Germany
Medicine, 1991

Stanley B. Prusiner
USA
Medicine, 1997

Paul Greengard
USA
Medicine, 2000

Kurt Wuthrich
Switzerland
Chemistry, 2002

Anthony James Leggett
USA
Physics, 2002

Michael Atiyah
UK
Abel, 2004

Eric S. Maskin
USA
Economics, 2007

Oliver E. Williamson
USA
Economics, 2009