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SRIPD-MUP
STRATEGIC RESEARCH AND INNOVATION PROGRAM FOR THE DEVELOPMENT OF MU-PLOVDIV

MEDICAL UNIVERSITY PLOVDIV

The 9th International USERN Congress and Prize Awarding Festival

IOCEPH

Medical University of Plovdiv, Bulgaria
November 2024

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Otto Orlean Yang (USA)
Peidong Yang (USA)
Guihua Yu (USA)
Jiaguo Yu (China)
Salim Yusuf (Canada)
Jeffrey M. Zacks (USA)
Hassan Ali Zamani (Iran)
Mostafa Zandieh (Iran)
Hamid Reza Zare (Iran)
Mohammad Reza Zarrindast (Iran)
Witold A. Zaton´ski (Poland)
Jianhua Zhang (China)
Chaohui Zhang (China)
Xudong Zhao (China)
Andrey Ustyuzhanin
Martino Margoni
Patrizia Azzi
Julien Noce Donini
Alberto Ruiz
Andrea Giammanco
Calin Alexa

Support and Resource Development

USERN Executive Director
Niloufar Yazdanpanah

Managers
Alireza Bagheri
Helia Sharif
Kosar Zolfaghari
Maryam Tonekaboni
Milad Akbarzadeh
Mohammadali Tahmasbi
Reyhaneh Abdi
Zahra Haj Mola Ali Kani

USERN Junior Ambassadors

Hassan Alipanahzadeh, Afghanistan
Amine Harbi, Algeria
Luis Alejandro Boccalatte, Argentina
Araks Ulikhanyan, Armenia
Naveed Akhtar, 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
Sina Harsini, Canada
Chunfeng Xiao, China
Amanuel Godana Arero, Ethiopia
Hongbo Zhang, Finland
Lamin Ndow, Gambia
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
Sila Kaya, Ireland
Giulia Grancini, Italy
Shadrack Oriama, Kenya
Lindelwa Mmema, Kingdom of Eswatini
Kawthar Mohamed, Kuwait
Ayesha Mushtaq, Kyrgyzstan
Rossella Castagna, Latvia
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
Sheema Hashem, Qatar
Maria-Bianca Gegea, Romania
Nataliya Iakovchenko, Russia
Matjaz Perc, Slovenia
Annabelle Robyn Graeme Armstrong, South Africa
Jahan Hara Mohammed Nazeer, Sri Lanka
Rayan Goda, Sudan
Sergii Yakunin, Switzerland
Isfandiyor Muhsinjonovich Usmonov, Tajikistan
Faten Attig 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

Animal Models Integrated Network (AMIN)
Antimicrobials Research Group (ARG)
Applications of Cochrane Evidence in Everyday's Life Group (ACEELG)
Association of Nuclear Medicine and Molecular Imaging (ANMMI)

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

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 Congress Chairs

Mariya Petkova Tomakova

Marianna Murdjeva

Tommaso Dorigo

Nima Rezaei

As one dives deep into his own scientific field, interacting with colleagues, and joining educational and research groups, we realize how high we have 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 "Bringing Science to Life", emphasizing the potential power of different fields of science, when integrating, joining, and making the united science, in spreading peace globally. 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 noble goal of USERN Congress in scientific promotions, USERN Prize has been 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 borders 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), Turkey (Istanbul), Muscat (Oman) and Yerevan (Armenia) respectively; all highly welcomed by the international academic community.

The next edition of the USERN congress will be held in Plovdiv (Bulgaria), where we hope to gather all scientists who wish to contribute to our goals of a strong interdisciplinary community of researchers united in the conviction that together we can make a difference for the benefit of humanity.

In-Person Scientific Program
Plovdiv, Bulgaria

November 8, 2024
Afternoon | Auditorium I

14:00 - 14:30	**Opening Session	Welcome Messages** Rector of Medical University of Plovdiv, Angel Uchikov President of USERN, Tommaso Dorigo Founder of USERN, Nima Rezaei **Chairs:** *Mariya Tokmakova, Marianna Murdjeva*
14:30 - 15:00	**Keynote Lecture 1	Timothy Lyons, US** Advances in Astrobiology: How Earth's Early Oceans and Atmosphere Help Guide the Search for Life Beyond Our Solar System
15:00 - 16:00	**IFPPP Festival Presentation**
16:00 - 16:30	**Coffee Break** Coffee Area (Lounge, Floor 1, Auditorium complex)
16:30 - 17:00	**Keynote Lecture 2	Frank Sellke, USA** What Can We do When There are No Interventional Options for the Treatment of Cardiovascular Disease: Are Regenerative Therapies an Option?
17:00 - 18:00	**Junior Talks 1: Update in Psychoneurological Sciences** **Chairs:** *Nima Rezaei, Mariya Ivanovska* **Juries:** *Frank Sellke, Maria Maisano, Tiziana Cappello, Gonzalo Cordova, Jessica Vargas, Andrea Luppi, Dragana Ciric*

November 8, 2024 | Afternoon

Department of Medical Microbiology and Clinical Immunology, Hall 3

16:30 - 18:00	**Workshop 1 | Art Agar with Microbial World** **Mentors:** *Radoslav Tashev, Zoya Rachkovska, Michael Petrov* **Chair:** *Marianna Murdjeva*

November 8, 2024 | Afternoon

Roundtable (Floor 2, Auditorium V, Auditorium Complex of MU-Plovdiv)

16:30 - 18:00	**Workshop 2 | AI-assisted Design and Its Impact on Society** **Mentors:** *Tilman Plehn, Lara Lloret Iglesias* **Chairs:** *Tommaso Dorigo, Pietro Vischia*

November 8, 2024 | Afternoon

Exhibition Area (Floor 1, Auditorium Complex of MU-Plovdiv)

16:30 - 18:00	**Poster Presentation 1: In vitro and Animal Studies in Pharmaceutical Sciences** **Chairs:** *Alexander Leemans, Hassan Burnusuzov* **Juries:** *Timothy Lyons, Ute Romling, Dongliang Chao, Ewa Szumowska, Fabiana Corsi-Zuelli*

November 9, 2024
Morning | Auditorium I

09:00 - 09:20	**Keynote Lecture 3 | Nima Rezaei, Iran** Approach to Patients with Inborn Errors of Immunity: From Bench to Bedside
09:20 - 09:40	**Keynote Lecture 4 | Hassan Abolhassani, Sweden** Inborn Errors of Immunity Reveal the Molecular Requirements for the Generation and Maintenance of Human Th Subsets
09:40 - 10:30	**Junior Talks 2: Stem Cell, Tissue Engineering, and Novel Therapeutic Targets** **Chairs:** *Marianna Murdjeva, Ute Romling* **Juries:** *Nima Rezaei, Dongliang Chao, Gonzalo Cordova, Jessica Vargas, Hassan Abolhassani*
10:30 - 11:00	**Coffee Break** Coffee Area (Lounge, Floor 1, Auditorium complex)
11:00 - 11:20	**Keynote lecture 5 | Elissaveta Naumova, Bulgaria** Primary Immunodeficiency in Bulgaria - Challenges in Assigning the Correct Diagnosis
11:20 - 11:40	**Keynote Lecture 6 | Snezhina Kandilarova, Bulgaria** Experience in Treatment of Primary Immune Deficiencies in Bulgaria
11:40 - 12:30	**Junior Talks 3: Immune Deficiencies and Translational Science – Present State and Future Perspectives (Joint Session with the Bulgarian Associatio of Clinical Ommunology and J Project)** **Chairs:** *Nima Rezaei, Margarita Genova* **Juries:** *Marianna Murdjeva, Elissaveta Naumova, Snezhina Kandilarova, Ute Romling, Hassan Abolhassani, Fabiana Corsi-Zuelli*

November 9, 2024
Morning | Auditorium V

11:00 - 11:30	**Keynote Lecture 7 | Alexander Leemans, the Netherlands** Charting the Brain's Network with Magnets and the Diffusion of Water Molecules
11:30 - 12:30	**Junior Talks 4: Future of Artificial Intelligence** **Chairs:** *Pietro Vischia, Joseph Firth* **Juries:** *Alexander Leemans, Timothy Lyons, Maria Maisano, Andrea Luppi, Ewa Szumowska*
12:30 - 13:30	**Lunch**

November 9, 2024 | Morning

Simulation Training Center of Medical University – Plovdiv (floor 3)

09:00 - 10:30	**Workshop 3 | Simulation Medical Training – Virtual Experience** **Chair:** *Milena Sandeva*

November 9, 2024 | Morning

Hall 3 (Department of Microbiology and Immunology)

11:00 - 12:30	**Workshop 4 | mPCR in Detection of Infectious Syndromes** **Mentors:** *Eli Hristozova, Andreana Angelova* **Chair:** *Michael Petrov*

November 9, 2024 | Morning

Exhibition Area (lounge, floor 1, Auditorium Complex of Medical University of Plovdiv)

09:00 - 10:30	**Poster Presentation 2: Translational Biological and Medical Reviews** **Chairs:** *Joseph Firth, Ralitsa Raycheva* **Juries:** *Andrea Luppi, Fabiana Corsi-Zuelli, Ewa Szumowska, Maria Maisano, Tiziana Cappello, Dragana Ciric*

November 9, 2024 | Morning

Exhibition Area (Lounge, Floor 2, Auditorium Complex of Medical University of Plovdiv)

11:00 - 12:30	**Poster Presentation 3: Original Studies in Medical Sciences** **Chairs:** *Frank Sellke, Emil Slavov* **Juries:** *Gonzalo Cordova, Tiziana Cappello, Fabiana Corsi-Zuelli, Jessica Vargas, Dongliang Chao, Tiziana Cappello*

November 9, 2024 | Morning

Roundtable (Floor 2, Auditorium V, Auditorium Complex of MU-Plovdiv)

09:00 - 10:30	**Meet the Expert 1 | How to Prepare Applied Research Scientific Project Aimed at Innovation or Intellectual Property for Funding?** *- Radmilla Fileva, Project Consultant MU-Plovdiv, Expert and Jury Member in the European Innovation Accelerator in EC* *- Drew O'Sallivan, Guest – Expert, Deep Tech Venture Capital Investor, an Angel Investor* *(Supported by the Strategic Innovation Program of Medical University - Plovdiv)* **Meet the Expert 2 | Challenges in Medical Imaging** *- Alexander Leemans, Associate Professor, UMC Utrecht, The Netherlands*
11:00 - 12:30	**Meet the Expert 3 | How AI could Affect the Future of Research Worldwide?** *- Tommaso Dorigo, USERN President, Italy* **Meet the Expert 4 | Targeted and Immunotherapy in Pediatric Oncology - Who, When, and How?** *- Mariya Spassova, Head of Pediatric Oncohematology Division, Bulgaria*

November 9, 2024
Afternoon | Auditorium I

13:30 - 13:50	**Keynote Lecture 8 | Ute Romling, Sweden** The ubiquitous second messenger cyclic di-GMP - what have we learned and can still learn from this fascinating molecule
13:50 - 14:10	**Keynote Lecture 9 | Marianna Murdjeva, Bulgaria** Syndromic microbiological approach for diagnosis of infections – new horizons
14:10 - 15:00	**Junior Talks 5: Strategic Innovation program of MU-Plovdiv. Modern Approaches in Diagnosis of Infectious Syndromes and Inflammatory Disorders** **Chairs:** *Nikoleta Traykova, Ute Romling* **Juries:** *Mariya Ivanovska, Tiziana Cappello, Fabiana Corsi-Zuelli, Ewa Szumowska*
15:00 - 15:30	**Coffee Break** Coffee Area (Lounge, Floor 1, Auditorium complex)
15:30 - 15:50	**Keynote Lecture 10 | Joseph Firth, UK** Using AI to Enhance Digital Mental Healthcare: Current Evidence and Priorities
15:50 - 16:10	**Keynote Lecture 11 | Dragana Ciric, Serbia** Novel Approaches to Research and Learning: Architecturally Articulated Information and Complex Design Systems
16:10 - 17:00	**Junior Talks 6: Transdisciplinarity** **Chairs:** *Alexander Leemans, Drozdstoy Stoyanov* **Juries:** *Tommaso Dorigo, Joseph Firth, Ewa Szumowska, Hassan Abolhassani, Dragana Ciric*

November 9, 2024
Afternoon | Lounge, Floor 1, Study Complex 1

17:30 - 19:00	**Cocktail and Cultural Program, Lyrical Gala** Tommaso Dorigo (Piano), Kalliopi Petrou (Soprano), Italy

November 9, 2024 | Afternoon

Department of Medical Biology

13:30 -15:00	**Workshop 5 | Molecular Diagnosis of Mitochondrial Dysfunction** **Mentors:** *Yordan Sbirkov, Maria Gevezova* **Chairs:** *Hassan Abolhassani, Maria Kazakova*

November 9, 2024 | Afternoon

Auditorium IV

13:30 -15:00	**Workshop 6 | Scientific Writing** **Mentors:** *Gonzalo Cordova, Jessica Vargas* **Chair:** *Nima Rezaei*

November 9, 2024 | Afternoon

Exhibition Area (Lounge, Floor 2, Auditorium Complex of Medical University of Plovdiv)

13:30 - 15:00	**Poster Presentation 4: Innovation and Novelty in Interdisciplinary Sciences** **Chairs:** *Tommaso Dorigo, Pietro Vischia* **Juries:** *Timothy Lyons, Maria Maisano, Andrea Luppi, Dongliang Chao, Dragana Ciric*
15:30 - 17:00	**Poster Presentation 5: Multidisciplinarity: From Formal to Social Sciences** **Chairs:** *Frank Sellke, Nikolay Mehterov* **Juries:** *Mariya Ivanovska, Maria Maisano, Pietro Vischia, Andrea Luppi, Dongliang Chao*

November 9, 2024 | Afternoon

Roundtable (Floor 2, Auditorium V, Auditorium Complex of MU-Plovdiv)

13:30 - 15:00	**Meet the Expert 5 | Interface between Physical and Mental Health** *- Joseph Firth, Presidential Fellow at the University of Manchester, UK* **Meet the Expert 6 | Surgery – Challenges and Opportunities in Life** *- Frank Sellke, Chief of cardiothoracic surgery at Rhode Island Hospital, USA*
15:30 - 17:00	**Meet the Expert 7 | Hashimoto Thyroiditis – Pathogenesis and Co-morbidities** *- Maria Orbetsova, Professor in Endocrinology, MU-Plovdiv and Directorof Endocrinology Hospital – Sofia, Bulgaria* **Meet the Expert 8 | Advances in Astrobiology** *- Timothy Lyons, Distinguished Professor of Biogeochemistry, UC Riverside, USA*

November 10, 2024
Morning, Auditorium I

09:00 - 10:30	**USERN Festival** USERN Talk Theater 2024 USERN Awarding Festival 2024 Announcing the Host of USERN 2025 **Chairs:** *Nima Rezaei, Mariya Ivanovska*
10:30 - 11:00	**Coffee Break** Coffee Area (lounge, floor 1, Auditorium complex)
11:00 - 13:00	**USERN Laureates Talks & Closing Ceremony** **Chairs:** *Nima Rezaei, Tommaso Dorigo, Maria Tokmakova, Marianna Murdjeva*
13:00 - 14:00	**Lunch**

Virtual Programs

November 8, 2024 | Afternoon, 18:30 - 21:00

Virtual Lectures on Physical and Chemical Sciences

Chemical Recycling and Upcycling of Polyesters by Catalysis
Kotohiro Nomura, Japan

Breakthrough Processes: Innovations in Thermal Cooling and Dehumidification
Chua KJ Ernest, Singapore

Sustainability and Metal Oxide Materials: Challenges and Capabilities
Elisabetta Comini, Italy

Deep Learning for Antibiotic Discovery
James J. Collins, USA

Nanostructures in Multicomponent High-Entropy Cantor Alloys
Brian Cantor, UK

From Accelerator Physics to Medical Therapy
Alberto Ruiz, Spain

Predicting and Rationalizing New Materials and New Phenomena
Artem Oganov, Russia

November 9, 2024 | Afternoon, 18:30 - 21:00
Virtual Lectures on Medical Sciences

Strategies for Reducing Atherosclerotic Cardiovascular Disease Residual Risk
Nathan D. Wong, USA

Update on Polypill for Prevention of CVD
Reza Malekzadeh, Iran

Sugar and its Role with Alzheimer's Disease
Richard J Johnson, USA

Brain Aging at a Crossroads: Where do we go from Three Decades of Failed Therapeutics?
George Perry, USA

Extra Virgin Olive Oil and Alzheimer's Disease: from Bench to Bedside
Domenico Pratico, USA

Drug Disposition and Response in Patients with Obesity: Implications for Medication Effectivness and Safety
David J. Greenblatt, USA

November 10, 2024 | Afternoon, 18:30 - 21:00
Virtual Lectures on Biological and Social Sciences

The Cell, the Organ, the Individual, the Society, the Planet Facing Stress and Inflammation
Jean-Marc Cavaillon, France

Negativity & Misinformation in News Coverage
Christopher Wlezien, USA

Molecular Allergology
Rudolf Valenta, Austria

Update on Moderate Alcohol Drinking and Health
Carlos Camargo, USA

The Power of Empowerment: Shared Leadership in Sport Teams and Beyond
Katrien Fransen, Belgium

An Evolutionary Science Approach to Psychotherapy
Stefan G. Hofmann, Germany

Junior Oral Presentation

November 8, 2024 | 17:00 - 18:00 , Auditorium I

Junior Talks 1: Update in Psychoneurological Sciences

Chairs: *Nima Rezaei, Mariya Ivanovska*

Juries: *Frank Sellke, Maria Maisano, Tiziana Cappello, Gonzalo Cordova, Jessica Vargas, Andrea Luppi, Dragana Ciric*

Golden Years Blues: Neurotransmitter Dynamics in Depression and Anxiety Among Seniors
Tara Shahmoradi

Exploring the Role of Vault Complex in the Nervous System
Ali Rezvanimehr

Gray Matter Alternations in Alzheimer and Multiple Sclerosis
Marjan Falahati

TLR4-mediated Multiepitope Chimeric Vaccine Targeting Bacterial Infections Linked to Alzheimer's Disease and Cognitive Impairment Using Advanced Immunoinformatics
Parsa Alijanizadeh

Investigating Exosomethropy as a Novel Therapeutic Approach for Multiple Sclerosis
Melika Abrishami

The Possible Use of Arterial Spin Labeling for Predicting Brain Amyloidosis
Kimia Kazemzadeh

Graphene based Nanomaterials for Synergistic Immunotherapy in Glioma Treatment
Elaheh Mousavialmaleki

Evaluating Toxicity of Zinc Carbonate Hydroxide Micro Flaks: Vell Death Induction in L929 Cells
Anton Tkachenko

November 9, 2024 | 09:40 - 10:30 , Auditorium I

Junior Talks 2: Stem Cell, Tissue Engineering, and Novel Therapeutic Targets

Chairs: *Marianna Murdjeva, Ute Romling*

Juries: *Nima Rezaei, Dongliang Chao, Gonzalo Cordova, Jessica Vargas, Hassan Abolhassani*

Design, Manufacturing, and Performance Evaluation of Portable Hand-held 3D Bioprinter for Various Tissue Engineering Applications
Nima Beheshtizadeh

From Lab to Life: Targeting Cancer with Precision Nanoparticles
Sahel Noorikoloori

Current Role of Using Stem Cells in Bladder Regeneration
Ali Faegh

Evaluation the Effects of Mesenchymal Stem Cells Carrying Newcastle Oncolytic Virus were Treated with Lactobacillus Casei Probiotic Rxtract in the Treatment of Mice Model Colorectal Cancer
Alireza Bolouriyan

Steel-based Regenerative Approaches for the Treatment of Cleft Lip and Palate
Helia Sharif

Enhancing Maxillary Growth and Scar Management in Cleft Palate Repair Post-palatoplasty: A Regenerative Medicine Perspective
Yashmin Afshar

Ultra-overt Therapy: A Novel Medical Approach Centered on Patient Consciousness
Kamran Shirbache

Network Pharmacology for Identifying Drug Repurposing Candidates in Rare Diseases
Kosar Zolfaghari

November 9, 2024 | 11:40 - 12:30 , Auditorium I

Junior Talks 3: Immune deficiencies and Translational Science – Present State and Future Perspectives

Chairs: *Nima Rezaei, Margarita Genova*

Juries: *Marianna Murdjeva, Elissaveta Naumova, Snezhina Kandilarova, Ute Romling, Hassan Abolhassani, Fabiana Corsi-Zuelli*

Vitamin D and Interleukin-17A as Biomarkers for the Diagnosis and Monitoring of Rheumatoid Arthritis
Mina Pencheva

Bronchiectasis in Common Variable Immunodeficiency (CVID) Patients
Mahsa Zargaran

Clinical Spectrum of Immune Dysregulation in Familial Mediterranean Fever
Snezhina Kandilarova

Monogenic SLE from Genetic Etiologies to Treatment in a Prospective Era
Maryam Sadat Fakhri Bafghi

Gene Therapy Innovations for Dystrophic Epidermolysis Bullosa
Reyhaneh Abdi Andarabi

Prevalence of Medication-Free Remission and its Predictive Factors in Patients with Rheumatoid Arthritis: A Real-World Longitudinal Cohort Study
Amirreza Jabbaripour Sarmadian

Psychoanalytically-Translated Immunology: A Hypothetical Framework for Immune System Behavior and Psychological Subjectivity in Psychoneuroimmunology
Amir Hakimjavadi

November 9, 2024 | 11:40 - 12:30 , Auditorium IV

Junior Talks 4: Future of Artificial Intelligence

Chairs: *Pietro Vischia, Joseph Firth*

Juries: *Alexander Leemans, Timothy Lyons, Maria Maisano, Andrea Luppi, Ewa Szumowska*

Entrepreneurial Strategies for AI Startups
Mohammad Sedaghati Jahromi

Psychology with AI
Laleh Shadman

AI-Enabled Targeted Drug Delivery Systems: Neurodevelopmental Disorders, Neurocognitive Disorders, Neurodegenerative Disorders
Nazanin Zahra Keshvari

Animating Recovery: The Role of AI in Precision Physiotherapy
Seyedeh Saba Sajadi Tabar

The Efficacy of Peer Education of Smartphone Use on the Function and Quality of Life of Visually Impaired Patients
Mojtaba Heydari

Using Automated Machine Learning Approach for Skin Disease Diagnosis: A Feasibility Study of Classification of Acne and Normal Skin Images
Fateme Mazloomrezaei

The Potentials of High-intensity Ultrasound in Therapeutic Approaches Against Pediatric Glioma
Mohammadreza Mirzaee Goodarzi

November 9, 2024 | 14:10 - 15:00 , Auditorium I

Junior Talks 5: Modern Approaches in Diagnosis of Infectious Syndromes and Inflammatory Disorders

Chairs: *Nikoleta Traykova, Ute Romling*

Juries: *Mariya Ivanovska, Tiziana Cappello, Fabiana Corsi-Zuelli, Ewa Szumowska*

COVID-19 Aftermath
Niloufar Yazdanpanah

On-admission Anemia and Severe Outcomes in Critically ill Children With COVID-19: Report From a PICU in Iran
Mehrnaz Olfat

Complicated Urinary Tract Infections - How Polymicrobial Are They?
Milena Rupcheva

When 2 Becomes 1: Assembling Novel Drug Molecules for IBS Treatment
Miglena Milusheva

In silico Design of a Rapid Immunoassay Against Etiology of Crimean-Congo Hemorrhagic Fever (CCHF) as a Possible Candidate for the Next Pandemic
Kiarash Saleki

Effectiveness of Vacuum Assisted Therapy of Diabetic Ulcers Compared to Conventional Gauze Dressing
Ivaylo Mourdjev

Exploring the Complicated Dialogue between Gut Microbiota and Immune Checkpoint Inhibition
Mohammad Yazdi

November 9, 2024 | 16:10 - 17:00 , Auditorium I

Junior Talks 6: Transdisciplinarity

Chairs: *Alexander Leemans, Drozdstoy Stoyanov*

Juries: *Tommaso Dorigo, Joseph Firth, Ewa Szumowska, Hassan Abolhassani, Dragana Ciric*

Metaphors In Medicine: Up, Down, and Sideways
Navid Ravan

Effects of Green Buildings On Social Behaviors During Pandemics
Milad Samari

Artistic Smiles: The Intersection of Aesthetics and Dentistry in Cosmetic Dentistry
Niloofar Ziadali

The Age of Quantument
Shaghayegh Mohammadioun

From Space to Cancer Cells: Advancements in Cancer Research Under Microgravity Conditions
Sara Asl Motaleb Nejad Sarkhab

Bio-Inspired Materials: Innovations for Sustainable Applications
Maryam Sadat Tonekaboni

Medical Illustration: One Picture Is Worth a Thousand Words
Zeinab Sekhavati

Junior Poster Presentation

November 8, 2024 | 16:30 - 18:00 , Exhibition Area

Poster Presentation 1: In vitro and Animal Studies in Pharmaceutical Sciences

Chairs: *Alexander Leemans, Hassan Burnusuzov*
Juries: *Timothy Lyons, Ute Romling, Dongliang Chao, Ewa Szumowska, Fabiana Corsi-Zuelli*

Evaluation of Coenzyme Q10 Protective Effects on Tetracycline-induced Hepatotoxicity in Male Rats
Fatemeh Rezaee

The Effect of Metanolic Abstract of Hypericum Scabrum on Diabetes Mellitus and Diabetic Inflammation in Wistar Male Rats
Ftemeh Kefayat Manesh

Rutin-loaded Chitosan Nanoparticles Ameliorated Freund's Adjuvant-induced Rheumatoid Arthritis in Wistar Rats by Regulating Oxidative Stress and Inflammatory Markers
Mohammad Mehdi Gravandi

Comparative Study of Almond Milk and Cow's Milk: Impact on Enamel Microhardness of Primary Molar After Acidic Challenge, An In vitro Study
Melika Alijani

The Neuropharmacological Mechanisms, Molecular Targets, Therapeutic Potentials, and Clinical Viewpoint of Polydatin's Neuroprotective Role
Maedeh Tahvilian

Epirubicin-Induced Alterations in miR-143-3p Expression in MCF-7 and MDA-MB-231 Breast Cancer Cells
Morteza Rajabi

Identification of microRNAs Involved in PI3K-AKT Signalling Pathway in HTLV-1 Associated Adults T cell Leukemia Lymphoma (ATLL)
Zeynab Asgari

Utilizing chitosan-carboxymethyl cellulose nanogel as a transdermal delivery vehicle, Nigella sativa oil and atorvastatin are dual loaded
Ala Tahvilian

Determining and Comparing Pharmacists' Orofessional Performance in Tehran Pharmacies Managing the Provision of Non-prescription Drugs
Amirhossein Ghazizadeh Khosroshahi

The Role of Gut Microbiome in Chronic Fatigue Syndrome: An Overview
Ralitsa Nikolova

November 9, 2024 | 09:30 - 11:00 , Exhibition Area

Poster Presentation 2: Translational Biological and Medical Reviews

Chairs: *Joseph Firth, Ralitsa Raycheva*

Juries: *Andrea Luppi, Fabiana Corsi-Zuelli, Ewa Szumowska, Maria Maisano, Tiziana Cappello, Dragana Ciric*

PiRNAs; Epigenetic Factors Affecting Colorectal Cancer
Rozhin Bakhshi

Effects of lncRNAs on Main Cause of Colorectal Cancer: Wnt/β Catenin Signaling Pathway
Hamoon Baghaei

The Role of microRNAs on IBD-related Colorectal Cancer
Shaghayegh Mousavi

Revolutionary Approaches in IBS Treatment with Silver Nanoparticles
Mihaela Stoyanova

Prognostic Insights: GRP78 Levels and CD8+ T Cell Correlations in COVID-19
Steliyan Petrov

Arrhythmogenic Load in Metabolic Syndrome
Spas Kitov

The Effect of Vitamin E in Pediatrics with Non-alcoholic Fatty Liver Disease: A Systematic Review and Meta-analysis
Sepideh Radvar

Lipid Profile and Mortality in Patients with Pulmonary Thromboembolism: A Systematic Review and Meta-analysis
Seyed Nikan Seyed Ghiasi

Overutilization of Head Computed Tomography in Cases of Mild Traumatic Brain Injury: A Systematic Review and Meta-analysis
Sama Jabbaripour

Management of Allergy to Anesthesia in Dentistry
Ashkan Ghonuei Rastgar

Delirium in Patients Undergoing Valve Replacement
Mahsa Hosseini Kakroudi

November 9, 2024 | 11:00 - 12:30 , Exhibition Area

Poster Presentation 3: Original Studies in Medical Sciences

Chairs: *Frank Sellke, Emil Slavov*

Juries: *Gonzalo Cordova, Tiziana Cappello, Fabiana Corsi-Zuelli, Jessica Vargas, Dongliang Chao, Tiziana Cappello*

The Evaluation of Autologous Conjunctival Graft Perfusion After Pterygium Surgery Using Optical Coherence Tomography Angiography (OCTA)
Marzieh Pirzadeh

A Randomized, Double-blind Clinical Study Examining the Impact of Ajwain on Peripheral Neuropathy in Cancer Patients
Mehdi Pasalar

Western Ontario and McMaster Universities Arthritis Index (WOMAC) Optimal Value in Diagnosing Overlapping Fibromyalgia: A Multivariate Study on Knee Osteoarthritis
Abdolkarim Haji Ghadery

Therapeutic Plasma Exchange for Severe COVID-19; Retrospective Case-cohort Study in 100 Patients
Mohammad Rezapour Tougheri

Indwelling Pleural Catheter Efficacy and Safety in Malignant vs. Non-Malignant Pleural Effusions: A Prospective Study
Ghazal Roostaei

Efficacy and Outcomes of Salvage Therapy with Etoposide and Mitoxantrone in Refractory Acute Myeloid Leukemia: A Retrospective Cohort Study
Khashayar Danandeh

Trends and Impact of Alcohol Use Disorder and Related Diseases in Iran: Insights from the Global Burden of Disease Study 1990-2019
Arshiya Danandeh

The Burden Associated with Iodine Deficiency in Iran from 1990 to 2019: Insights Derived from the Global Burden of Disease Study
Sara Gholami

Evaluating the Recurrence of Chronic Myeloid Leukemia in Iranian Patients After Treatment-Free Remission: A 10-Year Retrospective Study
Kosar Sadat Hosseini Kolbadi

Frequency of Anxiety, Depression and Social Support in Women with A History of Recurrent Miscarriage Referred to a Public Infertility Center in Mashhad in 2022
Nazanin Abbasi

The Evaluation of Clinicopathological and Response to Treatment in Patients with Toxic Epidermal Necrolysis in Razi and Imam Khomeini Hospital Complex from 2012 to 2021
Sara Ashtari

Prevalence of Cervical Ribs and Elongated Transverse Processes in Omani Population: A Computed Tomography-based Study
Abdullah Al Lawati

Patterns of Use and Disclosure of Complementary and Alternative Medicine Among Hypertensive Patients: An Iranian Cross-sectional Survey
Mohammad Hashem Hashempur

November 9, 2024 | 13:30 - 15:00 , Exhibition Area

Poster Presentation 4: Innovation and Novelty in Interdisciplinary Sciences

Chairs: *Tommaso Dorigo, Pietro Vischia*

Juries: *Timothy Lyons, Maria Maisano, Andrea Luppi, Dongliang Chao, Dragana Ciric*

Nano-messengers of Health: Exosome's Role in Bringing Science to Life
Nadia Rahimzadeh

Increasing Anticancer Effectiveness with Docetaxel-loaded Nanoplatforms: From Cancer Therapy to Regenerative Approach
Hanieh Kolahi Azar

Innovative BCI Methods for the Management of ADHD: Current Trends and Future Directions
Mohammadamin Balibegloo

Innovations in Dental Care: Bridging Science and Smiles
Azin Qanbari

Optimizing Flow Cytometry Analysis in Childhood Acute Lymphoblastic Leukemia: A Comprehensive Evaluation of FlowJo, Diva, and Infinicyt Softwares
Alexandra Baldzhieva

Advantages and Disadvantages of Using Virtual Reality in Physical and Psychological Rehabilitation of Patient with Multiple Sclerosis
Tina Shahidi Bonjar

The marvels of Leuzea: From Traditional Applications to Modern Relevance
Velislava Todorova

Schmidt Syndrome - Autoimmune Polyglandular Syndrome Type 2: Addison's Disease with Hashimoto's Autoimmune Thyroiditis and Co-morbidity of Pernicious Anemia and Gastritis
Spaska Nacheva

Outcomes with Holmium: YAG Laser Transurethral Enucleation of the Prostate Gland
Georgi Hristov

A Review on Environmental Sustainability of Synthetic Textile Garments Compared to 3D Printed Garments
Shiva Ashraf

Highly Efficient Ruddlesden-Popper (RP) Perovskites as Electron Selective Layers Yielding over 20% efficiency in Organic-Inorganic Perovskite Solar Cells
Muhammad Awais Khan

A case study: Heterozygosity of APOB R3500Q mutation and persistent Low-Density Lipoprotein Cholesterol elevation in young Bulgarian man
Aneliya Avramova

November 9, 2024 | 15:30 - 17:00 , Exhibition Area

Poster Presentation 5: Multidisciplinarity: From Formal to Social Sciences

Chairs: *Frank Sellke, Nikolay Mehterov*

Juries: *Mariya Ivanovska, Maria Maisano, Pietro Vischia, Andrea Luppi, Dongliang Chao*

The Role of Artificial Intelligence in Personalized Medicine
Behzad Moharrami

The Role of AI in Modern Dentistry
Fatemeh Tajafrooz

Artificial Intelligence Application in Diabetic Retinopathy Diagnosis: An Umbrella Review of Systematic Reviews
Hadi Vahedi

Optimizing the PTBD Procedure to Identify Factors Associated with Technical Success, Clinical Efficacy, and Complications Using Artificial Intelligence
Arian Hajiahmadi

Brain Cancer Detection Using MRI Imaging and Artificial Intelligence: A Systematic Review
Roya Hajimalek

The Potentials of Artificial Intelligence in Addressing Bipolar Mental Disorder in Adolescences
Hooman Nekoonam

Using Artificial Intelligence in Hemodialysis to Predict Blood Pressure Crises in Tabriz, Iran
Alireza Motamedi

Overcoming the Limitations of Traditional Psychoeducation: Innovative Strategies Leveraging Technology and Experiential Learning
Azin Nateghian

The Effect of The Type of Coffee on Emotions: What Kind of Coffee Do You Drink?
Hosein Moghimi

The Impact of Childhood Trauma, Mentalization, and Alexithymia on Depression and Suicidal Ideation in Women Experiencing Marital Infidelity Trauma
Sara Fattahi

USERN Congress In-Person Keynote Speakers

Alexander Leemans

Charting the Brain's Network with Magnets and the Diffusion of Water Molecules

PROVIDI Lab, UMC Utrecht, the Netherlands

The intricate network of fiber pathways within the brain is vital for understanding its functions. Diffusion magnetic resonance imaging (MRI) serves as a valuable tool for examining brain tissue microstructure in vivo. By utilizing diffusion MRI fiber tractography techniques, researchers can map the brain's white matter fiber pathways, akin to cartographers charting terrain. However, the multi-scale nature of these connections and the complex features that define regional boundaries present significant challenges. This presentation will cover essential concepts in diffusion MRI and tractography while addressing key obstacles researchers encounter. Attendees will gain insights into the promising role of diffusion MRI in advancing our understanding of brain connectivity.

Dragana Ciric

Novel Approaches to Research and Learning: Architecturally Articulated Information and Complex Design Systems

Architecture and Urbanism Independent Scientific Associate/Research Assistant Professor

By placing research tools and methods at the scientific forefront, with an emphasis on their importance for the quality, relevance, accuracy, and communication of the research results and the research as a whole, the study presents the cases from the author's practice in which major innovation within the investigative process has been planned and made by integrating technical and methodological aspects of the research. This has resulted in new research formats, or instruments, among which two types and frameworks have been used and improved: digital (virtual) and object-based (physical). The first one, having digital learning and research environments and platforms in focus, deals with research data/information/knowledge acquisition, inquiry, validation, new articulation, and representation, and it is mostly based on logical networking, or diagrammatic reasoning and representation. The second one uses real, physical spaces and objects as means of knowledge acquisition, design, and research practice, extending likewise their initial architectural function.

Following the statement on the reciprocity between research methods and techniques, the presented projects will demonstrate how methodological and technical aspects have been reinvented for specific research tasks and how their integration can lead to the original scientific and artistic contribution. The exemplary experimental projects include the following: 1. Design Intelligence System—methodological prototype, research approach, and digital technical solution; 2) Machine Genealogy in Architecture—digital learning platform proposal; 3) Frequencies—digital learning platform and technical solution proposal; and 4) Exo, dynamic responsive architectural system and architecture-instrument—comprehensive sensing architectural prototype and technical solution. Since there is a correlation between the investigated topic and the explained methodological-technical integration, it is noted that the major research subjects and aims of the stated projects have been paired with the corresponding logic of deployed information processing and representation, along with the choice of the most suitable format for it, digital or physical.

Frank Sellke

What Can We Do When There are no Interventional Options for The Treatment of Cardiovascular Disease: Are Regenerative Therapies an Option?

Alpert Medical School of Brown University, Providence RI, USA

There are many patients with cardiovascular disease for whom traditional surgery or percutaneous therapies are unable to alleviate their symptoms. 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. Novel regenerative treatment are emerging that may offer another method to treat these patients. Extracellular vesicles derived from mesenchymal stem cells (MSC) may be engineered to increase their therapeutic potential. MSC's may be subjected to hypoxia, ischemia or increased oxidative stress or pharmacologic agents to improve their efficacy. In addition, 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. Finally metformin, which is a first line treatment for type 2 diabetes may offer survival benefit and improve myocardial function. Thus, despite a failure of 3 decades of regenerative medicine research in providing any clinically relevant improvements in cardiovascular outcomes, MSC-derived extracellular vesicles and several classes of oral diabetes medications may provide clinical improvements in both systolic and diastolic cardiac dysfunction and improve collateral development in chronic myocardial ischemia. The exact mechanism for these effects continues to be determined.

Hassan Abolhassani

Inborn Errors of Immunity Reveal the Molecular Requirements for the Generation and Maintenance of Human Th Subsets

Division of Immunology, Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden

Adaptive immunity relies heavily on CD4+ T cells as the central regulator of human immune responses. Th1, Th17, Th2, Th9, T follicular helper, and regulatory T cells are distinct subsets of CD4+ T cells that have been discovered in animal studies, however, their roles in immune regulation and host defense are becoming more well characterized in humans. Th cells that produce specific cytokines based on specific stimulation and transcription factors seem to have both protective and harmful functions in human health and illness. Important prerequisites for producing human Th subsets are still not well understood, though. Patients with inborn errors of immunity could help in evaluating the signaling mechanisms that control human CD4+ T cells' production of cytokines and interleukins. In vitro, human naïve and memory CD4+ T lymphocytes can be cultivated under various circumstances. The capacity of CD4+ T cells from a variety of patients with pathogenic mutations in important immune genes to develop into Th cells has been evaluated in order to identify the molecular pathways controlling induction in human CD4+ T cells toward specific polarizations. Our research identified pathways that might be targeted to modify TGF-b, TNF-a, IL-1, IL-4, IL-6, IL-12, IL-17, IL-9 production in both healthy and diseased conditions by revealing important non-redundant molecules involved in triggering and inhibiting Th subset synthesis by human naïve and memory CD4+ T cells and testing the recapitulation of immune signaling identified in the animal models.

Joseph Firth

Youth Mental Health in the Digital World: Improving Physical, Psychological, and Cognitive Outcomes

UKRI Research Fellow, University of Manchester
Honorary Fellow, Western Sydney University

The digital revolution has fundamentally reshaped how people interact, learn, and perceive the world, embedding internet-enabled devices into every facet of their lives. While this integration offers innovative opportunities for mental health support—such as smartphone apps, AI tools, and chatbots—it also presents significant challenges. This talk examines the latest evidence on digital interventions in mental healthcare, highlighting how advances in AI and digital technology can enhance psychological well-being. Concurrently, it addresses the downsides of pervasive digital and social media use, including impacts on mental health, cognition, and social functioning. Drawing upon large-scale studies and recent reviews, we explore how factors like age, gender, and usage patterns influence outcomes. The presentation culminates with evidence-based recommendations to mitigate negative effects, emphasizing quality over quantity in digital engagement. Attendees will gain practical strategies to harness technology's benefits while safeguarding mental health.

Timothy Lyons

Advances in Astrobiology: How Earth's Early Oceans and Atmosphere Help Guide the Search for Life Beyond Our Solar System

Department of Earth and Planetary Sciences and the Alternative Earths Astrobiology Center, University of California, Riverside, CA USA

Life and life-sustaining environments, including oceans, have existed on a dynamic Earth for more than four billion years despite the multitude of challenges that come with stellar, solar system, and planetary evolution. Each of our many past planetary states was associated with a particular atmospheric composition, and those atmospheres contained gases such as oxygen and methane that were produced by early life. Using ancient Earth to understand when and how these biosignature gases accumulated is allowing us to select targets and techniques for exploring the many Earth-like planets beyond our solar system. Further, Earth scientists and prebiotic chemists are working together in new ways to understand how and where life first emerged. This new perspective could also help guide the search for life elsewhere in the solar system and far beyond.

This presentation is about the coevolution of life and its environments on Earth over billions of years, touching on key evolutionary innovations, the steps and dynamics of biospheric oxygenation, potential tectonic controls, and nutrient cycling—among other first-order patterns and drivers. The focus will include biosignatures, emphasizing early Earth and its relevance in the search for life on exoplanets.

Ute Römling

The Ubiquitous Second Messenger Cyclic di-GMP: What have we Learned and can still Learn from this Fascinating Molecule

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

Microbes including bacteria are required to respond to their often continuously changing ecological niches in order to survive. While many signaling molecules are produced as seemingly circumstantial byproducts of common biochemical reactions, there are a few second messenger signaling systems such as the ubiquitous cyclic di-GMP second messenger system that arise through the synthesis of dedicated multidomain enzymes triggered by multiple diverse external and internal signals. Being one of the most numerous and widespread diffusible signaling system in bacteria, cyclic di-GMP signaling contributes to adjust physiological and metabolic responses of bacteria from all phyla and in all available ecological niches. Those niches range from deep-sea and hydrothermal springs to the intracellular environment in human immune cells. As the most remarkable output cyclic di-GMP signaling regulates the transition between sessility and motility on the single cell level. Biofilms are multicellular, often surface-associated, communities of autonomous cells embedded in an extracellular matrix which can overcome stressful conditions by their distinct physiological and metabolic properties. Consequently, biofilm formation is the natural mode of growth of perhaps all microorganisms living on this planet, but biofilms are also refractory towards antimicrobial agents and the actions of the immune system causing chronic infections. We hypothesize that the biofilm lifestyle and its major regulator cyclic di-GMP has its foundation already in the fundamental, surface-triggered chemical reactions and energy preserving mechanisms that enabled the development of life on earth. Subsequently, prototypical biofilm formation and the enzymes that synthesize and hydrolize its major regulator cyclic di-GMP have evolved and concomitantly diversified in composition, cell morphology and regulation with the expansion of prokaryotic organisms and their radiation enabling occupation of all possible ecological niches.

Pietro Vischia

AI-assisted Design and its Impact on Society

Ramón y Cajal Senior Researcher, Universidad de Oviedo and ICTEA

The advent of differentiable programming made it possible to design optimization pipelines for a vast realm of fields and applications, from fundamental science to industrial technology and to applications severely impacting human interaction and human rights. In this workshop, we will discuss about how these advances impact the fabric of society, both indirectly as a consequence of technological applications and directly as a consequence of AI applied to data concerning humans and their interactions (such as social networks).

Elissaveta Naumova

Primary Immunodeficiency in Bulgaria - Challenges in Assigning the Correct Diagnosis

Department of Clinical Immunology, Alexandrovska University Hospital, Medical University, Sofia, Bulgaria

Since the first described case of agammaglobulinemia by Dr. Bruton in 1952, nowadays primary immunodeficiencies (PIDs) comprise more than 400 distinct disorders. The diversity and clinically heterogeneous presentation of PIDs can make them challenging to diagnose. Despite major advances in the clinical and molecular characterization of PIDs, many patients may remain undiagnosed or have a substantially delayed diagnosis. In Bulgaria, the first published case of primary immune deficiency was reported as dysgammaglobulinemia in 1965, and in 1997 our team diagnosed the first case of common variable immune deficiency. However, more systematic work on the identification and registration of PID patients began in 2005 when Bulgarian immunologists became part of the Central-Eastern European collaborative program called J Project. Further progress has been made in management of the PIDs when an Expert Centre (ExpC) for Rare Diseases - Primary Immune Deficiencies at the University Hospital "Alexandrovska"-Sofia has been officially designated in April 2016. The delay between the onset of symptoms, diagnosis and initiation of treatment prohibits proper management and treatment of the disease, causing unnecessary distress and reduced quality of life.

In recent years, the delay in diagnosis has decreased significantly for the severe forms of PID in our country (less than 12 months of age) as well as for the patients with the most common clinically manifested immune deficiency – CVID (up to 4 years). This was possible with an increased public awareness, significantly improved diagnostic capabilities, experience in PIDs and excellent collaboration between doctors from different medical specialties on national and international level. Furthermore as part of Jeffrey Modell Centers Network our ExpC participate in the "Jeffrey's Insights", a no-charge genetic sequencing pilot program introduced by JMF in January 2019 for patients with an underlying PID, but no genetic diagnosis. As a result, 62.3% of patients in the national PID registry underwent genetic testing, and 65% had a genetically confirmed diagnosis. After genetic testing, confirmation of the initial phenotypic diagnosis was achieved in 85.4% of cases and change in the diagnosis - in 14.6%.

We believe that our efforts contribute to timely testing, diagnosis and treatment of PID patients in Bulgaria and ultimately significantly improve patient care and quality of life.

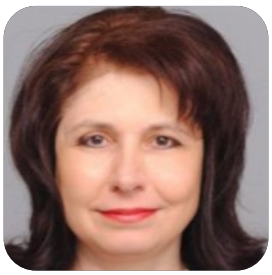
Snezhina Kandilarova

Clinical Spectrum of Immune Dysregulation in Familial Mediterranean Fever

Department of Clinical Immunology with Stem Cell Bank, University Hospital Alexandrovska, Medical University, Sofia, Bulgaria

Familial Mediterranean Fever (FMF) is a periodic fever syndrome classified as auto- inflammatory primary immunodeficiency (PID). Clinical findings and genetic testing in suspected patients could help for diagnosis. Because of variable inter- and intra-familial genetic variability detailed additional data from patients with FMF phenotype would contribute to better understanding the type and degree of immune dysregulation. We have evaluated information on patients from Bulgarian PID Expert Center Registry who met clinical and/or genetic criteria for FMF. From overall 198 subject (15 males and 4 females, average age 26.02 y.) 14 were found to be heterozygous carriers of variant in MEVF gene, 2 patients were compound-heterozygot and in 2 patients no genetic mutation was found. Although it is accepted that FMF is an autosomal recessive disorder (MedGen UID: 45811), single variants may contribute to risk for recurrent fevers (MedGen UID: 341987, PMID: 23844200). In our subjects we detected overall 12 variants in MEVF gene, 7 pathogenic and 5 VUS. Only six patients, in which the mutations were in heterozygous state had typical clinical presentation, in one subject the only pathology was evaluated as autistic spectrum disorder, 1 patient was with asymptomatic macroscopic hematuria,2 patients were with other forms of PIDs and in the rest the genetic finding was an occasional finding. Genetic evaluation contributed to shift in diagnosis from PFAPA to FMF in one child. All of the individuals with FMF related symptoms responded to colchicine and NSAID, In conclusion there is no clear association between MEVF variant zygosity and pathogenicity and individual complains. Carrying one disease causing variant is not likely to be the only cause of FMF, thus other genetic, epigenetic and environment factors seems to play additional role in immune dysregulation.

USERN Congress In-Person Workshops



Art Agar with Microbial World

Chair: Marianna Murdjeva
Mentors: Radoslav Tashev, Zoya Rachkovska, Michael Petrov

AI-assisted Design and Its Impact on Society

Chairs: Tommaso Dorigo, Pietro Vischia
Mentors: Tilman Plehn, Lara Lloret Iglesias

Scientific Writing

Chair: Nima Rezaei
Mentors: Gonzalo Cordova, Jessica Vargas

mPCR in Detection of Infectious Syndromes

Chair: Michael Petrov
Mentors: Eli Hristozova, Andreana Angelova

Molecular Diagnosis of Mitochondrial Dysfunction

Chairs: Hassan Abolhassani, Maria Kazakova
Mentors: Yordan Sbirkov, Maria Gevezova

Simulation Medical Training – Virtual Experience

Chair: Milena Sandeva

USERN Congress In-Person Meet the Experts

Radmilla Fileva **Drew O'Sallivan**

How to Prepare Applied Research Scientific Project Aimed at Innovation or Intellectual Property for Funding?

Alexander Leemans

Challenges in Medical Imaging

Tommaso Dorigo

How AI could Affect the Future of Research Worldwide?

Mariya Spassova

Targeted and Immunotherapy in Pediatric Oncology - Who, When, and How?

Joseph Firth

Interface between Physical and Mental Health

Frank Sellke

Surgery – Challenges and Opportunities in Life

Maria Orbetsova

Hashimoto Thyroiditis – Pathogenesis and Co-morbidities

Timothy Lyons

Advances in Astrobiology

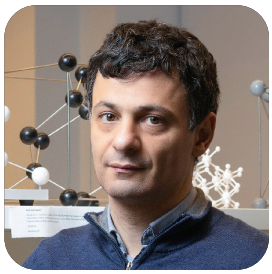
USERN Congress Virtual Keynote Speakers

Alberto Ruiz

From Accelerator Physics to Medical Therapy

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

Fundamental physics research requires the use of large particle accelerators and detectors to unravel the deepest mysteries of the structure and forces in matter.
The technology has been further complicated and improved to achieve optimal precision, delving into the behavior of radiation-matter interactions, which has led to medical applications such as electromagnetic radiation therapy and hadron therapy.
In this talk I will briefly review the history of accelerator and detector technology for use in radiotherapy and the current status of some of the developments in the field.



Artem Oganov

Predicting and Rationalizing New Materials and New Phenomena

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

The breakthrough of crystal structure prediction has resulted in breakthroughs in related problems of compound prediction and prediction of stable molecules/clusters. I will discuss several chemically significant cases:

1. Discovery of anomalous compounds under pressure, such as Na3Cl, NaCl7 and highest-temperature superconductors known to date – H3S, YH6, CaH6, ThH10, LaH10.
2. Discovery of counterintuitive phenomena at high pressure – formation of transparent insulating phase of sodium and chemical reactivity of helium.
3. Rationalization of these and other phenomena based on newly developed scales of electronegativity and chemical hardness.
4. Prediction of stable molecules – the formalism and its applications. In particular, I shall discuss the results on molecules and crystalline allotropes of sulfur, phosphorus and boron. Chemical diversity of hydrocarbons will be explained, as well as unusual molecules in the C-H-N-O system. I shall also discuss prediction of stable and catalytically active Cu-Au nanoparticles, and ultralow reaction barriers for oxidation of CO on some of these nanoparticles.

Brian Cantor

Nanostructures in Multicomponent High-Entropy Cantor Alloys

Department of Materials, University of Oxford, and Brunel Centre for Advanced Solidification Technology (BCAST), Brunel University

All human advances have depended on making new materials, and all materials are alloys, i.e. mixtures of several different starting materials or components. So the history of the human race has been the continued invention of new materials by discovering new alloys. Recently a new way of doing this, by manufacturing multicomponent high-entropy alloys, has shown that the total number of possible materials is enormous, even more than the number of atoms in the galaxy, so we have lots of wonderful new materials yet to find. And multicomponent phase space contains a surprisingly large number of single-phase extended solid solutions and compounds. The first group of these that was discovered are called Cantor alloys, an enormous composition range with a single-phase fcc structure, based loosely on the original equiatomic five-component Cantor alloy CrMnFeCoNi. This talk will discuss the previous history of alloying, the discovery of multicomponent alloys, the structure of multicomponent phase space, the fundamental thermodynamics of multicomponent solid solutions such as the Cantor alloys, the complexity of local atomic and nanoscale configurations in such materials, the effect of this on properties such as atomic diffusion, dislocation slip, and the resulting outstanding mechanical properties and potential applications, including at low and high temperatures, for corrosion and radiation resistance, and to enhance recycling and re-use.

Carlos Camargo

Update on Moderate Alcohol Drinking and Health

Massachusetts General Hospital, Harvard University, Boston, MA

Alcohol (ethanol) is a complex substance, with both nutrient properties (e.g., 7 kcal/gram) and pharmacological effects. Likewise, alcohol consumption is a complex behavior, characterized by differences in both amount and frequency of consumption, as well as different beverage types (e.g., beer, wine, liquor) and different settings of consumption (e.g., as part of the Mediterranean Diet). Alcohol use disorder, binge drinking, and heavy drinking are known to harm health. Likewise, there is general agreement that alcohol should not be consumed during pregnancy or by children. However, the health effects of "moderate" alcohol consumption by adults (i.e., daily maximum of 1 or less drink for women, and 2 or less drinks for men) remains an area of active research. Many scientific studies over the past 50 years have reported that moderate drinking has probable health benefits (e.g., lowered risk of myocardial infarction) and probable health harms (e.g., increased risk of breast cancer). The net health effect will depend on the individual consumer but, in general, regular consumption of moderate amounts of alcohol is associated with lower risk of all-cause mortality. In recent years, the health benefits of moderate drinking have been challenged based on methodological concerns about the evidence base, which is based largely on observational studies. The speaker will review evidence showing that, even after addressing these concerns, moderate drinking continues to be associated with lower risk of all-cause mortality, driven largely by lowered risk of cardiovascular disease.

Christopher Wlezien

Negativity & Misinformation in News Coverage

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

There are large and growing bodies of work highlighting inaccuracies in news coverage. In this paper, we suggest that negativity biases in news account for a substantial portion of longstanding inaccuracies (or "misinformation") in coverage of a broad range of social, medical, environmental, political, and economic domains. As an illustrative example, we use automated content analyses of over 20 years of television news transcripts merged with macroeconomic data to measure the accuracy of coverage of unemployment across the six major US broadcasters (ABC, CBS, NBS, Fox News, MSNBC and CNN), and then examine the degree to which variation in accuracy is associated with variation in the tendency to overweight negative information relative to positive information. Results reveal a connection between inaccuracy and negativity biases. We interpret this finding as it relates to our understanding of misinformation in the news.

Chua KJ Ernest

Breakthrough Processes: Innovations in Thermal Cooling and Dehumidification

National University of Singapore, Queenstown, Singapore

This presentation will explore groundbreaking research from the National University of Singapore (NUS) focused on advancing thermal cooling and dehumidification technologies. As global temperatures rise and humidity levels fluctuate, efficient climate control systems are essential for enhancing energy efficiency and improving indoor air quality. This presentation will highlight innovative breakthrough processes developed at NUS, including novel materials and game-changing systems that involve advanced heat exchangers, and smart control algorithms. We will discuss the integration of these technologies in urban environments and their potential to significantly reduce energy consumption while maintaining optimal comfort levels. This talk aims to inspire collaboration across disciplines to tackle pressing environmental challenges through innovation in thermal management solutions.

Reza Malekzadeh

Update on Polypill for Prevention of Cardiovascular Ddisease CVD

Professor of Medicine Digestive Disease Research Institute, Tehran University of Medical Science, Tehran ,Iran

CVD is the biggest epidemic the world has ever known affecting nearly one in three individuals. We aimed to Study safety, cost effectiveness fixed dose combination therapy called PolyPill for prevention of CVD.

We used data from three large long term RCTs conducted across three RCTs with a total of 18,162 participants without a prior history of vascular disease for an Individual participant data meta-analysis to look for safety efficacy and cost effectiveness of PolyPill for Prevention CVD compared to a control strategy (either placebo or minimal care). The primary outcome was a composite of CV death, myocardial infarction, stroke, or arterial revascularization. For cost effectiveness countries were categorized using World Bank economic groups: Lower Middle Income Countries (LMIC), Upper Middle Income Countries (UMIC) and High Income Countries (HIC). Country specific costs were obtained for hospitalized events, procedures, and non-study medications (2020 USD). FDC price was based on the cheapest equivalent substitute (CES) for each component.

Mean age of the study population was 63.0 (7.1) years, and 9038 (49.8) were female. 799 primary outcome CVD events and 997 deaths occurred over a median follow up of 5 years. Results on the effects on the primary outcome and on each of the components and secondary outcomes will be presented along with information on safety and tolerability.

For polypill versus control the difference in cost was $346 (95% CI: $294-$398) per participant in Lower Middle Income Countries, $838 (95% CI: $781-$895) in Upper Middle Income Countries and $42 (95% CI: -$155 to $239) (cost-neutral) in High Income Countries.

This Individual participant meta-analysis provide the most comprehensive assessment of the role of PolyPill as a safe and effective intervention for prevention of CVD in those without prior CVD. Polypill was very cost effective and produced at CES costs is cost-neutral in HIC. Governments of LMI and UMI countries should assess these results based on the ICER threshold accepted in their own country and own specific health care priorities but should consider prioritizing this strategy for patients with high 10 years CVD risk as a first step.

Domenico Pratico

Extra Virgin Olive Oil and Alzheimer's Disease: From Bench to Bedside

Temple University, Pennsylvania, United States

Alzheimer's disease (AD) is a chronic neurodegenerative condition characterized by the presence of misfolded protein deposits (amyloid beta, Ab, and tau), neuroinflammation, oxidative stress and blood-brain-barrier dysfunction. While current treatment options do not provide a cure, evidence strongly suggests that some preventative measures could be adopted to prevent or delay the onset of the disease.

Adherence to the Mediterranean diet has been shown to reduce the risk to developing mild cognitive impairment (MCI) and AD, and to even slow down the progression of MCI to AD. A key component of the Mediterranean diet is the daily consumption of extra-virgin olive oil (EVOO), which represents the biggest portion of the daily fat intake and a source of phenolic compounds such as oleocanthal, oleuropein.

Consistent pre-clinical data indicate that EVOO directly influences some of the key neuropathologic aspects of AD, such as Ab metabolism and aggregation, tau phosphorylation and tangles formation, neuroinflammation, oxidative stress and blood-brain barrier dysfunction.

Epidemiologic studies have confirmed the beneficial effects of EVOO in reducing brain aging and cognitive decline as well as the risk to develop AD and related dementias. Randomized clinical trials investigated the potential therapeutic effect of EVOO in MCI patients showed improvement of cognitive performance, brain connectivity and functionality, amelioration of cognitive tests and memory tasks, reduced blood brain barrier permeability and blood biomarkers for AD pathology However, although strong support exists for the idea that chronic consumption of EVOO may represent an effective therapeutic strategy against AD since it holds promising potential for prevention and treatment of this complex disease, further research is urgently needed to solidify these findings.

Kotohiro Nomura

Chemical Recycling and Upcycling of Polyesters by Catalysis

Department of Chemistry, Tokyo Metropolitan University, Japan

Chemical recycling, chemical conversion of used plastics to raw materials (monomers), has been an important technology for circular economy by solving our concern of the plastic waste.
Polyesters, exemplified as poly(ethylene terephthalate) (PET), are widely used as commodity thermoplastics, and PET has been reused as transparent bottles partly by so called mechanical recycling through a process of collection, sorting, cleaning, melting and reprocessing.
However, due to inferior quality of PET reused resin compared to the fresh one derived from petroleum, increasing the percentage of called "closed loop recycling" through the chemical recycling has thus been pronounced recently.
This presentation introduces the acid-, base-free depolymerization of various polyesters (PET, PBT, PEA, PBT, shown below) through the catalytic transesterification with alcohols.
These depolymerizations proceed with exlusive selectivity and enabled to convert to starting monomers in exclusive selectivity, yields. Various alcohols can be used and the method thus enabled to proceed one-pot closed-loop chemical recycling through depolymerization -repolymerization. As our more recent effort, acid-, base-free depolymerization of PET with ethanol by $FeCl_3$ gave diethyl terephthalate (DET) and ethylene glycol (EG) exclusively (98->99 %).
Successful exclusive, selective depolymerization of PET from the textile waste to afford DET (and recovered cotton waste) in the presence of $FeCl_3$ catalyst could be demonstrated, strongly suggesting the possibility of chemical recycling of textile waste by adopting this catalysis.

George Perry

Brain Aging at a Crossroads: Where Do We Go From Three Decades of Failed Therapeutics?

Department of Neuroscience Development and Regenerative Biology, The University of Texas at San Antonio, San Antonio, Texas, USA
Department of Pathology, Case Western Reserve University, Cleveland, Ohio, USA

For nearly four decades, our research has focused on dissecting the cytopathology of Alzheimer's disease (AD) with the goal of developing a cure. We have used oxidative stress as a window to view and understand AD. Oxidative damage to sugars, proteins, lipids and nucleic acids increases in neuronal cytoplasm. The same neuronal compartment has increased redox-active iron and copper, which can catalyze oxidative damage, and likely derive from mitochondrial debris (in and outside lysosomes) including cytochromes, mitochondria specific prosthetic groups and mtDNA. Mitochondria show altered axonal transport, size distribution, energetics, fusion/fission, and degradation in AD that correlate with the extent of oxidative damage suggesting they are the origin. Synaptic mitochondria abnormalities correlate with synaptic vesicular changes. Surprisingly, amyloid-β and tau are quantitatively associated with reduced neuronal oxidative damage. Copper sequestration by amyloid-β blocks copper mediated oxidation of lipids and vitamin C indicating amyloid-β can be a protective response rather than the initiator of AD. Instead of being bound to amyloid-β, iron is present as 10 nm magnetite crystals with super-paramagnetic properties as well as abundant metallic iron, along with metallic copper. This is the first report of metallic iron and copper in humans. Not just amyloid-β, but also tau, may be protective responses induced in AD to maintain neurons with altered balance for decades. While these studies put oxidative stress at the center of AD, they also highlight a complexity of multifaceted alterations that is homeostatic and requires a deeper level of understanding before an effective cure.

Stefan G. Hofmann

An Evolutionary Science Approach to Psychotherapy

Philipps-University Marburg, Marburg, Germany

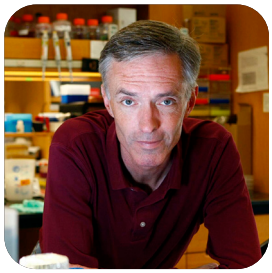
Historically, Darwin's legacy has been unappreciated or misrepresented in clinical science. Here, I consider the status of evolutionary science for psychotherapy. I will define psychopathology as maladaptation of a person to a given context that is expressed on various dimensions and levels of functioning. Specifically, maladaptation occurs as a result of unhealthy variation, selection, and retention of these dimensions and levels in a given context. Effective therapy targets one or more of the processes to move the person from maladaptation toward adaptation in a given context. This approach serves as the theoretical foundation of Process-based therapy (PBT), which offers an alternative perspective to understanding and treating psychological problems, and promoting human prosperity.

Jean-Marc Cavaillon

Facing Stress and Inflammation: From the Cell to the Planet

Institut Pasteur, Paris, France

Dr. Tedros Adhanom Ghebreyesus, WHO Director-General, declared last March, 2024,: "If our planet was a patient, it would be admitted to intensive care. Its vital signs are alarming." In 1936, Hans Selye (1907-1982), identified stress as shaping diseases. Indeed, Global health is dependent on healthy cells, healthy organs, healthy individuals, within a healthy society on a healthy planet. But all components are exposed to some specific stressors including pollution and climate change that generate an inflammatory response, which affects physical and mental health of the planet inhabitants. The cell, the organ, the individual, the society, and the planet share many stressors of which the consequences are extremely interconnected, ending in the domino effect and the butterfly effect. Furthermore, inflammation displays some yin yang properties such as stress. Indeed, a good stress (eustress) has been associated with homeostasis, a word coined by Walter Bradford Cannon (1871–1945), while bad stress is associated with alteration of global health.



James J. Collins

Deep Learning for Antibiotic Discovery

Massachusetts Institute of Technology, Massachusetts, United States

In this talk, we highlight the Antibiotics-AI Project, which is a multi-disciplinary, innovative research program that is leveraging MIT's strengths in artificial intelligence, bioengineering, and the life sciences to discover and design novel classes of antibiotics. The Antibiotics-AI Project is focused on developing, integrating and implementing deep learning models and chemogenomic screening approaches: (1) to predict novel antibiotics from expansive chemical libraries with diverse properties, (2) to design de novo novel antibiotics based on learned structural and functional properties of existing and newly discovered antibiotics, and (3) to identify, using explainable deep learning models, the chemical structures and molecular mechanisms underlying the newly discovered and/or designed antibiotics. With these deep learning approaches, we are utilizing multi-scale computation to embrace and harness the complexity of biology and chemistry, so as to discover, design and develop new classes of antibiotics, up through preclinical studies. Our platform has been designed so that it can be utilized and applied in a rapid fashion to emerging and re-emerging bacterial pathogens, including multidrug-resistant (MDR) bacteria and extensively drug-resistant (XDR) bacteria.

David J. Greenblatt

Drug Disposition and Response in Patients with Obesity: Implications for Medication Effectivness and Safety

Tufts University School of Medicine and Tufts Medical Center, Boston, MA USA

Clinical studies conducted by the late Dr. Darrell R. Abernethy and colleagues had the objective of identifying the mechanistic determinants of drug distribution, elimination, and clearance in persons with obesity, the interconnection of these variables, and the downstream clinical consequences for medication effectiveness and safety. Volume of distribution (Vd) and clearance were identified as independent biological variables which conjointly determine elimination of half-life (T½) as the dependent variable. The Vd of drugs distributed by passive diffusion was consistently increased in obesity compared to normal-weight control subjects, depending on the lipid-solubility of the individual drugs, and the degree of obesity in affected individuals. However drug clearance had only a small and inconsistent relation to obesity. Across a series of representative index drugs, the overall median ratio of clearance in obese divided by control groups was 1.21 (range, 0.75-3.11). Since drug clearance was not clearly related to lipid-solubility or extent of obesity, the prolonged T½ of lipophilic drugs in overweight persons was largely explained by the increased Vd. Further studies of chronic drug dosage in obese persons identified slow attainment of steady-state after initiation of treatment, and correspondingly delayed washout after termination of dosage, as consequences of the extended T½ in people with obesity. The potential hazards of these changes have been emphasized in contemporary studies of chronic medication administration and discontinuation in subjects with obesity. Based on current understanding, maintenance doses for drugs administered on an extended basis should be based on ideal body weight rather than total weight, unless research data indicates otherwise for a specific drug.

Richard J. Johnson

Sugar and its Role with Alzheimer's Disease

Emeritus Professor of Medicine, Univ of CO

The cause of Alzheimer's disease has been a mystery. Much work has focused on the role of amyloid plaques and aggregated tau proteins accumulating in the brain, but targeting this process with clinical drugs has been generally unsuccessful. Investigations of the early features of Alzheimer's disease have noted a triad of neuroinflammation, mitochondrial abnormalities, and cerebral insulin resistance. Recently we proposed that these features might be due to the production of fructose in the brain that can mediate these effects when it is metabolized. Fructose is a simple sugar and a component of sucrose (table sugar) but also can be generated endogenously via the polyol pathway from high glycemic carbohydrates. Here we will review the experimental and clinical evidence.

Elisabetta Comini

Sustainability and Metal Oxide Materials: Challenges and Capabilities

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

Environmental awareness and the quest for sustainability have gained considerable momentum in recent years. As a result, continuous environmental monitoring and the adoption of renewable energy sources have become essential, especially given the rise in human activities driven by industrial and technological progress. Simultaneously, there is a growing demand for highly efficient chemical sensing devices. This presentation aims to explore the preparation and characterization of metal oxide nanostructures through various growth and analysis techniques.

In the realm of advanced technologies, metal oxide nanostructures offer exciting potential due to their high charge carrier mobility, straightforward fabrication processes, and remarkable stability. Many of these nanostructures exhibit reversible interactions with their environment, leading to significant changes in material properties such as electrical conductivity, capacitance, work function, and optical attributes, alongside effects related to charge separation. These characteristics can be leveraged for applications in chemical and gas sensors, as well as in fuel cells. While all metal oxides can show consistent reactivity given a sufficiently porous structure—that is, a high surface-to-volume ratio along with controlled electrical properties—they must also fulfill specific criteria to be effective as active materials in chemical sensors and solid oxide fuel cells. This includes qualities such as sensitivity, selectivity, stability, high efficiency, and reliability.

Among the various nanostructured materials, one-dimensional (1D) semiconductor metal oxides, particularly nanowires (NWs), have attracted considerable attention due to their unique chemical and physical properties.

A variety of growth techniques have been utilized to create these nanostructures, including vapor phase evaporation and condensation, thermal oxidation, electrochemical anodization, hydrothermal synthesis. The surface morphology of the nanostructures was analyzed using scanning electron microscopy, while their structural characteristics were investigated through techniques such as X-ray diffraction, transmission electron microscopy, Raman spectroscopy, and UV-Vis spectroscopy.

One of the notable challenges is the reliable integration of quasi-1D nanostructures onto designated transducers for fabricating chemical sensors and solid oxide fuel cells. This integration must ensure stable electrical contacts over extended periods of operation. The presentation will showcase achievements in both chemical sensing technology and solid oxide fuel cell development.

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Nathan D. Wong

Novel Preventive Strategies for Cardiovascular Disease

University of California, California, United States

Katrien Fransen

The Power of Empowerment: Shared Leadership in Sport Teams and Beyond

Department of Kinesiology, KU Leuven, 3001 Leuven, Belgium

Rudolf Valenta

Molecular Allergology

Medical University of Vienna, Vienna, Austria

USERN Junior Talks and Poster Presentations

Abdolkarim Haji Ghadery

Western Ontario and McMaster Universities Arthritis Index (WOMAC) Optimal Value in Diagnosing Overlapping Fibromyalgia: A Multivariate Study on Knee Osteoarthritis

Abdolkarim Haji Ghadery, Kimia Jazi, Mohaddeseh Ebrahimpour Roodposhti, Roxana Safari, Amirhossein Parsaei, Behnam Amini, Maryam Masoumi, Rasoul Shajari, Mohammad Aghaali, Somaye Sadat Rezaei

Department of Radiology, Advanced Diagnostic and Interventional Radiology Research Center (ADIR)

In the current study we aim to assess the prevalence of overlapping FM in a population of knee OA patients and to evaluate the diagnostic performance of WOMAC for FM in OA patients.

We recruited a consecutive sample of 100 knee OA patients. They were assessed for pain, stiffness and function using WOMAC and overlapping FM using ACR 2010 criteria. To find independent predictors for fibromyalgia diagnosis, univariate and multivariate logistic regression analyses were utilized. ROC curves and Youden's J index were used to identify the best cutoff values for predictor parameters.

41 in 100 OA patients also had fibromyalgia based on ACR criteria. Age, BMI and WOMAC score were significantly higher in patients with overlapping FM than patients without FM. Univariate analysis identified that the age, BMI and WOMAC score (Ps = 0.029, 0.041, and < 0.001, respectively) are significantly associated with overlapping FM diagnosis. In multivariate analysis, WOMAC score (OR: 0.93 (95% CI 0.90–0.97), P < 0.001) was identified as independent predictors of overlapping FM. Using ROC, the AUC of WOMAC score was 0.715 (95%CI: 0.614–0.817) and the optimum cutoff point for WOMAC for FM was 43.5.

It is concluded from this study that WOMAC scores > 43.5 are useful for suggesting FM as a secondary diagnosis in knee OA patients. Future studies are necessary to establish the results of the current study in a more general context, given the limited available evidence.

Keywords: Osteoarthritis, Fibromyalgia, WOMAC, ACR

Abdullah Al Lawati

Prevalence of Cervical Ribs and Elongated Transverse Processes in Omani Population: A Computed Tomography-Based Study

Abdullah Al Lawati, Marwa Al Subhi, Eiman Al Ajmi, Husain Al Aswami, Moon Fai Chan, Srinivasa Rao Sirasanagandla

1. College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman

2. Department of Human and Clinical Anatomy, College of Medicine and Health Sciences, Sultan Qaboos University, Al-Khoudh 123, Muscat, Oman

Cervical ribs are the supernumerary ribs that usually arise from the seventh cervical vertebra. Ethnic and geographical variations in cervical ribs and elongated transverse processes have been reported. Therefore, we aimed to study the prevalence of cervical ribs and elongated transverse processes and morphometry of cervical ribs in Omani subjects using computed tomography (CT).

A total of 1165 consecutive patients' CT scans of the cervical spine who had visited the tertiary care hospital from January 2016 to December 2020 were included in the study. The CT scans were screened for cervical ribs and elongated C7 transverse processes. Fisher's exact test was used to determine the gender influence.

Cervical ribs were identified in 0.94% of patients with a male-to-female ratio of 0.37:1. Most cervical ribs were unilateral (54%). The elongated C7 transverse process was identified in 18.45% of patients, with a male-to-female ratio of 1.36:1. Female patients are more likely to have cervical ribs (effect size = 5.98, 95% CI = 1.58–22.6, $p = 0.005$) than male patients. In contrast, the elongated C7 transverse process is more frequent in males (effect size = 1.82, 95% CI = 1.34–2.47, $p < 0.001$). The length and width of the cervical ribs are presented.

The prevalence of cervical ribs in Omani subjects is close to that of accepted prevalence worldwide. However, the elongated C7 transverse process prevalence is comparatively high and close to the Saudi population.

Keywords: Cervical ribs, Thoracic outlet syndrome, Elongated transverse process

Ala Tahvilian

Utilizing Chitosan-Carboxymethyl Cellulose Nanogel as a Transdermal Delivery Vehicle, Nigella Sativa Oil and Atorvastatin are Dual Loaded

Ala Tahvilian
Medical Faculty , Najafabad Islamic Azad University, Isfahan, Iran

For the purpose of promoting wound healing, atorvastatin and Nigella sativa oil both have anti-inflammatory, immunomodulatory, antioxidant, and antibacterial qualities. In this work, N. sativa oil was loaded with chitosan-carboxymethyl cellulose to create oil nanogel (ONG), which was then loaded with atorvastatin to create atorvastatin-oil nanogel (ATONG). The average particle sizes of ONG and ATONG were determined to be 172 and 193 nm, respectively, and their surface charges were determined to be 32.2 and 34.7 mV. The sample underwent transmission electron microscopy, which revealed that the particles had spherical shapes and homogenous size distributions. Additionally, the adequate loading and release of atorvastatin was confirmed by the results of investigations into the stability, drug loading efficiency, and drug release of ATONG. ATONG can safely release atorvastatin intracellularly in fibroblasts, according to cytotoxicity evaluation. The appropriate flux of nanogels (NGs) through the layers of skin was also indicated by the results of the in vitro skin permeation of ONG and ATONG. The ATONG in vitro wound closure assay confirmed the fibroblasts' capacity for migration and proliferation, indicating the beneficial impact on wound-healing applications. Treatment with ATONG increased the expression of FGF2, TGF-b1, and VEGF genes in the scratch model of fibroblasts, which are implicated in fibroblast migration and proliferation toward wound healing ($p < .001$). Additionally, ATONG showed bactericidal properties against S. aureus, S. epidermis, and Staphylococcus species. According to the findings, ONG and ATONG showed a lot of promise for application as skin wound healing NG and transdermal medication carrier, respectively.

Keywords: Atorvastatin, Nigella-sativa, Nanogel, Wound healing

Alexandra Baldzhieva

Optimizing Flow Cytometry Analysis in Childhood Acute Lymphoblastic Leukemia: A Comprehensive Evaluation of FlowJo, Diva, and Infinicyt Softwares

Alexandra Baldzhieva
1. Department of Medical Microbiology and Immunology - "Prof. Dr. Elissay Yanev", Faculty of Pharmacy, Medical University of Plovdiv, Bulgaria
2. Research Institute, Medical University of Plovdiv, Bulgaria
3. Laboratory of Clinical Immunology – St. George University Hospital, Plovdiv, Bulgaria.

Assessment of Minimal/Measurable Residual Disease (MRD) in children with acute lymphoblastic leukemia (ALL) is a crucial prognostic factor guiding treatment decisions. Advanced MRD detection techniques like multiparameter flow cytometry (FC) can identify cancer cells at levels undetectable by standard approach. The number of parameters measured in FC plays a critical role in data resolution and accuracy. The choice between 8-color and 14-color FC impacts sensitivity, specificity, and overall diagnostic performance. While 8-color FC is more commonly used due to simplicity and cost, 14-color FC allows for more detailed immunophenotyping by increasing the number of markers assessed in parallel. However, this added complexity introduces technical challenges, including data analysis, which can be performed by conventional tools like DIVA or multidimensional software like FlowJo or Infinicyt.

This study aimed to evaluate and compare the performance of three software tools (DIVA, INFINICYT, FlowJo) and two panels (8-color and 14-color) to determine the methods offering the highest diagnostic reliability, sensitivity, and specificity, while providing insights into the advantages and limitations of each approach.

Bone marrow aspirates from 76 children with B-cell precursor ALL were processed using 8- and 14-color FC panels for MRD detection. Data analysis was performed using DIVA, FlowJo and Infinicyt software.

FlowJo with the 14-color panel provided the most accurate differentiation between MRD-positive and MRD-negative patients. In contrast, DIVA and INFINICYT 8-color panels showed the lowest diagnostic performance. Overall, the 14-color panel demonstrated superior capability across all software platforms.

Increasing the number of markers to 14 colors enhances precision in distinguishing MRD-positive from MRD-negative patients, offering significant advantages in clinical diagnostics with greater sensitivity and specificity than the 8-color approach. The accuracy of results and semi-automated nature make FlowJo a preferred method for MRD assessment, providing diagnostic reliability and a streamlined workflow.

Keywords: Flowcytometry, MRD, BCP-ALL, Infinicyt, FlowJo, DIVA

Ali Faegh

Current Role of Using Stem Cells in Bladder Regeneration: A Systematic Review

Ali Faegh[1,2], Neda Chinisaz[2], Shima Jahani[2], Abdol-Mohammad Kajbafzadeh[2], Masoumeh Majidi Zolbin[2]

1. School of Medicine, Alborz University of Medical Sciences, Karaj, Iran

2. Pediatric Urology and Regenerative Medicine Research Center, Gene Cell and Tissue Research Institute Children Medical Center, Tehran University of Medical Sciences, Tehran, Iran

Entrocystoplasty, as one of the standard alternatives in the cystectomy population, has several complications. Regenerative medicine provides new options for bladder alternatives according to recent advances. The present study presents a comprehensive systematic review of different types of stem cells employed in bladder regeneration.

Animal studies that performed bladder regeneration using stem cell and tissue engineering techniques were included. After an initial literature search, two independent authors performed the screening process. After including the studies, the full texts were reviewed, and data extraction was performed. Population, type of stem cells, scaffolds, specific conditions, and outcomes were collected.

A total of 43 studies were included. Adipose-derived and bone marrow-derived mesenchymal stem cells were the most frequently used stem cells. However, hair follicle stem cells, endothelial progenitor cells, embryonic germ cell-derived stem cells, smooth muscle-derived progenitor cells, urine-derived stem cells, and umbilical mesenchymal stem cells were also used. Bladder acellular matrix and small intestinal submucosa were the most commonly used scaffolds; however, according to the recent advances in bio-engineering, using bio-synthetic scaffolds is becoming more frequent. Also, some studies reported strengthening factors such as co-culturing with native bladder cells, using hypoxic conditions, etc.

Future studies should evaluate the role of novel types of stem cells in achieving better tissue integrity and bladder function.

Keywords: Stem cell, Progenitor cell, Tissue engineering, Bladder regeneration, Urinary bladder

Ali Rezvanimehr

Exploring the Role of Vault Complex in the Nervous System

Ali Rezvanimehr[1,2], Arian Daneshpour[1], Pegah Niktalab[1], Helia Sharif[1], Niloufar Yazdanpanah[1,4], Kiarash Saleki[1,5,6,7], Nima Rezaei[1,4,8]

1. Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran
2. Faculty of Medicine, Tehran Medical Science Branch, Islamic Azad University, Tehran, Iran
3. School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
4. Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran
5. Student Research Committee, Babol University of Medical Sciences, Babol, Iran
6. USERN Office, Babol University of Medical Sciences, Babol, Iran
7. Department of E-Learning in Medical Sciences, Faculty of Medical Education and Learning Technologies, Shahid Beheshti University of Medical Sciences, Tehran, Iran
8. Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Vault RNAs (vtRNAs) represent a novel class of non-coding RNAs that are involved in various signaling pathways. These vtRNAs are joined by three proteins Major vault protein (MVP), vault poly (ADP-ribose) polymerase (VPARP), and telomerase-associated protein 1 (TEP1) to form the vault complex. To date, only four vtRNA including vtRNA 1-1, vtRNA 1-2, vtRNA 1-3, vtRNA 2-1) have been discovered in humans. Despite their discovery several decades ago, the functional roles of vtRNAs and vault proteins have recently garnered attention, particularly in neurodegenerative disorders such as Alzheimer's disease (AD), Parkinson's disease (PD), multiple sclerosis (MS), Huntington's disease (HD), and amyotrophic lateral sclerosis (ALS) as well as brain cancers. Moreover, it is recommended to undertake novel drug design techniques to target vtRNAs to unleash their potential in the treatment of nervous system disorders. For the future, the link between vtRNAs regulation and immune response could be an interesting area to pursue, as vtRNAs could be targeted to revise the neuroimmune disarray in nervous system disorders. Moreover, it is recommended to undertake novel drug design techniques to target vtRNAs to unleash their potential in the treatment of nervous system disorders. For the future, the link between vtRNAs regulation and immune response could be an interesting area to pursue, as vtRNAs could be targeted to revise the neuroimmune disarray in nervous system disorders. This review presents the latest research on vtRNAs, focusing on their roles in neurodevelopment and the normal functioning of the nervous system. It also examines how vtRNA dysregulation contributes to neurological disorders.

Keywords: Vaults, Vault RNAs, Non-coding RNAs, Neurological disorders, Brain cancer

Alireza Bolouriyan

Evaluation the Effects of Mesenchymal Stem Cells Carrying Newcastle Oncolytic Virus were Treated with Lactobacillus Casei Probiotic Extract in the Treatment of Mice Model Colorectal Cancer

Alireza Bolouriyan, Hadi Esmaeili Gouvarchin Ghaleh
1. Applied Virology Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran
2. Student Research Committee, Baqiyatallah University of Medical Sciences, Tehran, Iran

Various studies have proven that oncolytic viruses, especially those whose hosts are not humans, have significant anti-cancer effects. But one of the disadvantages of using oncolytic viruses is their rapid clearance by the body's immune system. Therefore, the use of a suitable carrier with anti-tumor tendency is useful in the transmission of oncolytic viruses and increasing their effectiveness. Considering the many therapeutic capabilities of mesenchymal stem cells, their use as oncolytic virus carriers is approved by researchers. On the other hand, the use of microenvironments that enhance the function of mesenchymal stem cells can be indirectly useful in the process of virus transmission. For this reason, nowadays, much attention has been directed towards the use of multifactorial combined treatments. The purpose of this study is to investigate the effect of mesenchymal stem cells carrying Newcastle oncolytic virus treated with Lactobacillus casei probiotic in the treatment of colorectal cancer mouse model.

The present study was carried out in the conditions of cell culture (Laboratory of Applied Virology Research Center) and mouse modeling (Laboratory Animal Maintenance Center) of Baqiyat University of Medical Sciences (AJ). After culturing CT-26 cells (colorectal carcinoma cell line), colorectal cancer mouse modeling was done by injecting 5×106 cells into the left flank of female BALB/c mice. After observing the palpable tumor, treating them with mesenchymal stem cells carrying Newcastle oncolytic virus (105 cells-twice with an interval of one week-inside the tumor) and mesenchymal stem cells carrying Newcastle oncolytic virus treated with Lactobacillus casei extract (105 cells-twice with one week interval-intumoral). 10 days after the last treatment, half of the mice in each group were euthanized to check the effectiveness of the mentioned treatments. The other half of the mice in each group were kept to check the lifespan of the mice. A statistical difference of less than 0.05 was considered as a significant level.

The results of the present study showed that the mice receiving the virus-carrying mesenchymal stem cells have significantly better survival curves and a slower tumor growth rate than the tumor mice of the negative control group. Also, treatment with mesenchymal stem cells carrying Newcastle oncolytic virus significantly increased the production of nitric oxide and lactate dehydrogenase in spleen cell cultures of tumor-affected mice. In addition, the use of MSCs carrying oncolytic virus significantly increased the amount of IFN-γ secretion and the secretion of IL-4, IL-10 and TGF-β in the spleen cell population compared to the control group. Negatively reduced. Apart from nitric oxide production, in other variables, no significant difference was observed between the group of mesenchymal stem cells carrying Newcastle oncolytic virus treated with Lactobacillus casei extract and untreated.

According to the obtained results, it was found that the use of mesenchymal stem cells carrying Newcastle oncolytic virus is useful in the treatment of colorectal cancer, but the treatment of mesenchymal stem cells carrying oncolytic virus with Lactobacillus casei extract did not show a statistically significant difference.

Keywords: Colorectal cancer, Lactobacillus casei probiotic, mesenchymal stem cell, Newcastle oncolytic virus

Alireza Motamedi

Using Artificial Intelligence in Hemodialysis to Predict Blood Pressure Crises in Tabriz, Iran

Alireza Motamedi[1], Fatemeh Heydari[2], Saeid Hassanbaghlou[1], Saeed Pirmoradi[2]
1. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
2. Clinical Research Development Unit of Tabriz Valiasr Hospital, Tabriz University of Medical Sciences, Tabriz, Iran

Blood pressure crises during hemodialysis are a significant risk, potentially leading to sudden death. Current hemodialysis systems do not have mechanisms to predict these crises. This study aims to develop a predictive model using AI, utilizing data from 500 patients without cardiovascular problems at the dialysis department in Tabriz, Iran. The data includes demographic information, hemodialysis orders, and variations in blood pressure and electrolytes during hemodialysis.
AI Model Development:
1. Model Selection:
Develop a deep learning-based AI model trained on the collected patient data.
Benchmark its performance against other machine learning techniques such as logistic regression, random forest, and XGBoost.
Use data from the last three hemodialysis sessions to enhance model accuracy.
2. Key Predictive Features:
Mean Systolic Blood Pressure (SBP): Utilize the previous session's SBP as a primary predictor.
Ultrafiltration (UF) Target Rate: Monitor UF rate to predict fluid removal needs and potential blood pressure drops.
Interdialytic Weight Gain: Track weight fluctuations between sessions to assess blood pressure stability.
3. Metrics and Techniques:
Ankle-Brachial Index (ABI): Use ABI measurements to identify patients at higher risk of cardiovascular events.
Ambulatory Blood Pressure Monitoring (ABPM): Implement ABPM for continuous blood pressure monitoring, providing comprehensive data for the AI model.
The AI model aims to provide early warnings for blood pressure crises, enabling timely interventions and enhancing patient safety during hemodialysis.

Keywords: Artificial intelligence, Hemodialysis, Blood Pressure

Alma Naseri

Gene Therapies for Inherited Retinopathies and Optic Neuropathies

Alma Naseri
Babol university of medical sciences, Department of medical microbiology and biotechnology, Babol, Iran

The human eye has been an appealing target for gene therapies because of its outstanding characteristics. Genetic mutations affect retinal and optic nerve function, causing inherited retinopathies and optic neuropathies that are significant in the origin of visual impairment. Delivering functional copies of non-functioning genes by viral vectors, Is a gene therapy method for IRDs, such as retinitis pigmentosa and Leber congenital amaurosis. Also, FDA-approved voretigene neparvovec for RPE65 mutations is a critical point in this field.Subretinal and intravitreal injections are examples of various ongoing clinical trials exploring several gene supplementation approaches to restore visual function and slow disease progression. Cause of genetic heterogenecity in these diseases more ongoing researches are needed to point out new mutations and develop tailored therapies. Gene therapies are developed to enhance mitochondrial function and protect ganglion cells in the case of optic neuropathies, specially Leber hereditary optic neuropathy and dominant optic atrophy. addressing the difficulties brought on by the genetic variety and late onset of these illnesses by decreasing cell death and enhancing survival. Gene therapy has the potential to transform treatment theories, but there are still issues to be resolved, such as when to start treatments, how to control inflammation, and how to provide equal access to treatments. For gene therapy to fully improve outcomes for individuals with hereditary retinopathies and visual neuropathies, research and collaboration among scientists, doctors, and genetic counselors are crucial.

Keywords: Gene therapy, inherited retinal disease, optic neuropathies

Amir Hakimjavadi

Psychoanalytically-Translated Immunology: A Hypothetical Framework for Immune System Behavior and Psychological Subjectivity in Psychoneuroimmunology

Amir Hakimjavadi, Sadegh Moghimi
1. PhD Candidate in Health Psychology and Psychiatry, Department of Psychology, Universitat Rovira I Virgili (URV), Tarragona, Spain
2. Medical Student, School of Medicine, Zanjan University of Medical Sciences, Zanjan, Iran

In this review, we discuss how immunology can be translated through a psychoanalytic lens within the field of psychoneuroimmunology (PNI) in order to uncover hidden psychological processes that underlie immune function. Using psychoanalysis theory and immunological research, it examines the bidirectional relationship between psychological subjectivity and immune system function on an individual and societal level.

An analysis of the peer-reviewed literature, theoretical frameworks, and empirical studies in psychoanalysis, immunology, and PNI has been conducted between 1980 and 2023. A psychoanalytic approach is proposed to help understand immune system behaviors such as immune tolerance, autoimmunity, and inflammation, drawing on ideas of unconscious conflicts, defense mechanisms, and developmental relational patterns.

As an example, psychoanalytic concepts align with key immunological phenomena, including the view that the immune system's self-versus-non-self distinction is a biological expression of the boundaries of the ego and the development of identity. In this review, we describe how a psychoanalytically immunological approach may be applied to the study of psychosomatic disorders, functional neurological disorders (FNDs), autoimmune disorders, and inflammation-associated symptoms in somatoform disorders. Furthermore, it examines whether chronic inflammation may be linked to unresolved psychological conflicts or repressed emotions.

Using a psychoanalytic approach reveals latent unconscious dynamics that influence immune function, suggesting that individual and collective psychological experiences have an influence on immune responses. Nevertheless, challenges include the absence of empirical support, subjective interpretations, and the difficulty of translating abstract psychoanalytic ideas into quantifiable immunological measures.

A suggested method of analyzing immunological data using psychoanalytic methods, combining neuroimaging with psychoanalytic evaluations, and conducting longitudinal studies to determine how psychological development and immunity change over time is proposed in the review.

Psychoanalytically translated immunology within PNI may enable us to gain a deeper understanding of immune function, which may revolutionize our understanding of the relationship between health and disease.

Keywords: Psychoneuroimmunology (PNI), Psychoanalytically-translated immunology (PTI), Subjectivity of immune system behaviors, Psychological subjectivity, Unconscious dynamics

Amirhossein Ghazizadeh Khosroshahi

Determining and Comparing Pharmacists' Professional Performance in Tehran Pharmacies Managing the Provision of Non-prescription Drugs

Amirhossein Ghazizadeh Khosroshahi, Saba Bayat, Fatemeh Soleymani, Soha Namazi, Meysam Seyedifar

Department of Pharmacoeconomics and Pharmaceutical Administration, Tehran University of Medical Sciences, Faculty of Pharmacy, Tehran, Iran

Pharmacists, as highly trained healthcare professionals, play a crucial role in improving patient and societal well-being by ensuring the quality and safety of prescribed medications and providing guidance on over-the-counter drugs. Their responsibilities include discussing side effects, advising on dosages, checking for drug interactions, and preventing issues, which enhances treatment outcomes and reduces toxicity. The role of pharmacists has evolved, emphasizing safe pharmaceutical supply and patient interaction, influenced by factors like pharmacy congestion and health system laws. Assessing pharmacists' performance, particularly in Tehran, helps refine educational programs and improve service delivery, though no studies have yet used simulated patients in this region.

This cross-sectional study was conducted from October 2021 to May 2022 in pharmacies in Tehran as a descriptive survey to be implemented in selected pharmacies with the aid of a pre-trained patient. The simulated patient later recorded the observations using pre-designed checklists.

In a study of 155 pharmacies, 20.65% lacked a pharmacist. The average oral consultation time for OTC was 43±41.55 seconds, with an average checklist score of 3.11±2.88 out of 23 items. No significant correlation was found between performance and pharmacy busyness, location, pharmacist gender, or education place. However, pharmacists aged 20-30 scored better than older groups (P=0.022). Additionally, technicians delivered medicines more frequently in the 60+ age group (P<0.007).

Even though improvement in pharmaceutical services is desired by all pharmacists, this study showed the lack of providing the necessary explanations about drugs and how to use them in Tehran pharmacies. The amount of consultation time in our study is less than the standard provided for consultation by WHO. This low amount of time devoted to counseling and points obtained by pharmacists in the conducted studies requires more detailed investigations and finding the cause.

Keywords: Pharmacists' performance, Simulated patient, OTC, Tehran

Amirmohammad Amoozadehsamakoosh

Ophthalmological Complications Following the COVID-19 Vaccination

Amirmohammad Amoozadehsamakoosh
Babol university of medical sciences, faculty of medicine, Babol, Iran

The COVID-19 vaccine, is a huge accomplishment in public health, which provides a vital weapon in the global fight against the pandemic. These vaccines have shown effectiveness in lowering transmission and severe illness through incomparable cooperation and innovation, opening the door for a return to normalcy. Injection site pain, fatigue, headaches, or fever were mild to moderate side effects that were reported. Inflammatory disorders accounted for 47.3% of the most often reported ocular problems, with optic neuritis coming in second at 24.3%. Herpetic ocular infections, acute macular neuroretinopathy, and retinal artery and vein occlusions were among the other problems. Pfizer-BioNTech vaccine with affecting percentage of 42% with ophthalmological problems was the main cause of these complication. The results highlight the need for medical practitioners to be on the lookout for any potential ocular adverse effects following immunization, as prompt identification and treatment are essential to reducing visual morbidity. Even though the advantages of the COVID-19 vaccine are widely known, more study is required to clarify the underlying processes and risk factors due to the incidence of ocular problems. It is imperative that future research endeavors to augment comprehension and steer efficacious therapeutic approaches for impacted individuals, guaranteeing that the long-term advantages of immunization persistently outweigh any drawbacks.

Keywords: Covid-19, Acute macular neuroretinopathy, Corona virus, Corneal graft rejection

Amirreza Jabbaripour Sarmadian

Prevalence of Medication-Free Remission and its Predictive Factors in Patients with Rheumatoid Arthritis: A Real-World Longitudinal Cohort Study

Amirreza Jabbaripour Sarmadian, Alireza Khabbazi
Connective Tissue Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Rheumatoid Arthritis (RA) is a chronic systemic autoimmune disease that significantly impairs the quality of life of patients, especially in advanced stages of the disease. Therefore, lifelong treatment is typically required to prevent disease progression, avoid subsequent complications, and achieve remission. The question is, how can patients achieve remission without using any medication, known as medication-free remission?

In this study, the demographic, clinical, laboratory, and treatment data of the RA patients who were followed in the Connective Tissue Diseases Research Center RA cohort (CTDRC-RA) between 2004 and 2023 were studied. Medication-free remission was defined if patients met the American Rheumatism Association (ARA) criteria for remission after stopping all related medications, including corticosteroids and Disease-modifying antirheumatic drugs (DMARDs), for at least 6 months. Then, the associated parameters with medication-free remission were subjected to univariate analysis, and parameters with P-values of < 0.1 in univariate analysis were included in a multivariate regression analysis.

1215 RA patients were considered eligible for the study, of whom 75.5% were female. The mean age at the onset of symptoms was 44.46 ± 13.26, and the mean duration of follow-up was 110.54 ± 89.49 months. 102 patients (8.40% of all patients) achieved medication-free remission, with median medication discontinuation without flare-up time of 47 (6, 360) months. Independent predictors of medication-free remission were younger age, higher level of education, negative rheumatoid factor, less joint deformity, and better adherence to treatment.

Medication-free remission is achievable in RA patients with younger age, higher education level, negative rheumatoid factor, less joint deformity, and better adherence to treatment being the independent predictors of it.

Keywords: Rheumatoid Arthritis, Disease Modifying Antirheumatic Drugs, Remission, Longitudinal Study

Aneliya Avramova

A Case Study: Heterozygosity of APOB R3500Q Mutation and Persistent Low-Density Lipoprotein Cholesterol elevation in young Bulgarian Man

Aneliya Avramova, Emil Slavov[1,3], Krasimira Nancheva-Koleva[2], Lyuba Miteva[1]
1. Department of Molecular Biology, Immunology and Medical Genetics, Faculty of Medicine, Trakia University, Stara Zagora, Bulgaria
2. Clinical Laboratory, University Hospital "Prof. Dr. Stoyan Kirkovich AD, Stara Zagora, Bulgaria
3. Medical Center "SELENA-L" Stara Zagora, Bulgaria

Hypercholesterolemia is a group of heterogenic lipid disorders related to elevated risk for atherosclerosis. One of the most common and the most characterized point mutations in the human Apolipoprotein B (APOB) gene, due to a substitution of Arginine by Glutamine at codon 3500 (R3500Q) is associated with primary hypercholesterolemia. The frequency of R3500Q varies across the geographic region and was reported comparatively high frequency among Bulgarian hypercholesterolemic subjects at the beginning of the century. According to the above, the study aimed to examine APOB R3500Q mutation frequency in the Bulgarian population and observed a clinical case of severe hypercholesterolemia.

We analyzed 447 randomly selected, unrelated individuals (mean age 34.15±9.28 years), including 35 male and 412 female. The genomic DNA was isolated from venous blood and the genotyping was performed by StripAssay (ViennaLab Diagnostics, Vienna, Austria). The serum lipid profile including total cholesterol, triglycerides, high-density lipoprotein (HDL-C), and low-density lipoprotein (LDL-C) analyzed by direct enzymatic method.

We found one carrier of APOB R3500Q mutation (1 of 447; 0.22%) in the studied Bulgarian cohort. The carrier of APOB R3500Q mutation is a man 34 years of age, with obesity class I body mass index (34.9), waist circumference (98cm) and low waist-to-hip ratio (0.93), a never smoker, physically active and has no history of vascular or heart diseases. The lipid profile was analyzed 11 times in 5 years. Although optimizing the diet and lifestyle, the cholesterol (7.89±1.03mmol/L) and LDL-C (6.20±1.05mmol/L) mean levels remained very high during the follow-up period. The total cholesterol varied in the range of 6.05-9.41mmol/L and LDL-C 4.77-7.81mmol/L. HDL-C was at a poor level (1.18±0.193mmol/L) and the triglycerides were at desirable levels (0.70±0.23mmol/L).

We provide a detailed description of the serum lipid profile in a young carrier of R3500Q mutation in APOB followed up within 5 years. Our findings confirm the association of the significantly higher LDL-C with a R3500Q mutation and emphasize the importance of genetic testing in young patients with persistent hypercholesterolemia.

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Anton Tkachenko

Evaluating Toxicity of Zinc Carbonate Hydroxide Microflakes: Cell Death Induction in L929 Cells

Anton Tkachenko[1], Volodymyr Prokopiuk[2,3], Yuriy Kot[4], Yulia Pazura[5], Iryna Bespalova[5], Kateryna Kot[4], Anatolii Onishchenko[3], Svetlana Yefimova[5]
1. BIOCEV, First Faculty of Medicine, Charles University, Průmyslová 595, 25250 Vestec, Czech Republic
2. Research Institute of Experimental and Clinical Medicine, Kharkiv National Medical University. Nauky ave. 4, 61022 Kharkiv, Ukraine
3. Department of Cryobiochemistry, Institute for Problems of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine, Pereyaslavskaya st 23, 61015 Kharkiv, Ukraine
4. Biochemistry Department, V.N. Karazin Kharkiv National, 4 Svobody Sq., 61022 Kharkiv, Ukraine
5. Department of Nanostructured Materials, Institute for Scintillation Materials of the National Academy of Sciences of Ukraine. Nauky ave. 60, 61072 Kharkiv, Ukraine

Zinc-based nanomaterials have been recently suggested as alternative sources of dietary zinc for livestock animals. Importantly, the safety of nanotechnology-based zinc dietary supplements is indispensable for their application.
In the current study, we assessed the toxicity of zinc carbonate hydroxide Zn5(CO3)(OH)6 microflakes employing MTT assay, scratch assay and flow cytometry-based cell death-distinguishing Annexin V-FITC/7-aminoactinomycin D staining. Furthermore, contribution of Ca2+ signaling, reactive nitrogen species (RNS), alteration of cell membrane lipid order, and involvement of caspases was assessed by confocal microscopy.
Herein, we show that low concentrations of Zn5(CO3)(OH)6 microflakes (up to 10 mg/L) have no impact on cell viability, cell death and motility of L929 cells. On the other hand, at concentrations exceeding 25 mg/L Zn5(CO3)(OH)6 microflakes reduce cell viability, trigger apoptosis, and diminish migratory capacity of L929 cells. Microflakes-induced toxicity was mediated by RNS accumulation, activation of caspase-3, caspase-8, and caspase-9, elevation of intracellular Ca2+ levels, and reduction of lipid order in cell membranes of L929 cells.
Our findings indicate that Zn5(CO3)(OH)6 microflakes show dose-dependent toxicity against L929 cells. Further studies are encouraged to supplement our data on the biocompatibility of this potential nanozinc dietary source.

Keywords: Nanozinc, Nanotoxicity, Cell death

Arian Hajiahmadi

Optimizing the PTBD Procedure to Identify Factors Associated with Technical Success, Clinical Efficacy, and Complications Using Artificial Intelligence

Arian Hajiahmadi, Alireza Motamedi, Sahar Rezaei, Mahsa Karbasi, Javad Jalili
1. Medical Student, School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran
2. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
3. Tabriz USERN Office, Universal Scientific Education and Research Network (USERN), Tabriz, Iran
4. Department of Nuclear Medicine, Medical School, Tabriz University of Medical Sciences, Tabriz, Iran
5. Department of Radiology, Medical School, Tabriz University of Medical Sciences, Tabriz, Iran
6. Department of Interventional Radiology, Medical School, Tabriz University of Medical Sciences, Tabriz, Iran

Percutaneous transhepatic biliary drainage (PTBD) is an essential operation employed to treat blockages in the bile ducts, often resulting from malignancies or difficulties arising from liver transplantation. Integrating artificial intelligence (AI) can significantly boost the success rates of percutaneous transhepatic biliary drainage (PTBD), improve patient outcomes, and decrease complications.
Objectives: 1. Improved Technical Success: Utilize artificial intelligence to enhance patient selection, streamline procedures, and offer immediate guidance throughout PTBD. 2. Enhance the efficacy of clinical therapy: Employ AI-driven predictive analytics, monitoring, and personalized treatment plans to optimize patient results. 3. Mitigated repercussions: Employ AI to evaluate the level of risk in patients and preempt potential effects.
This study examined a cohort of 453 patients who underwent PTBD to alleviate symptoms resulting from malignant biliary obstruction that was not amenable to surgical intervention. The variables examined in the study included the PTBD technique, the type of catheter used (10F or 8F), the presence of additional catheters, the blood bilirubin levels before and after PTBD, the occurrence of mild and significant adverse effects, the survival of the patients, and the time between PTBD and death. The average age was 63.24 ± 13.04 years, ranging from 18 to 90. A comprehensive dataset comprising many factors, including demographic information, underlying issues, previous treatments, and imaging findings, was collected for the purpose of developing and training machine learning algorithms.
AI utilizes patient data to find the most appropriate candidates for PTBD and improves surgical planning by applying advanced imaging analysis. Artificial intelligence provides real-time assistance to professionals during medical procedures. AI enables the creation of personalized treatment plans and preventive measures by precisely forecasting results and identifying patients with a high likelihood of experiencing negative effects. Ultimately, artificial intelligence enhances technological advancements, accelerates patient recovery, and reduces complications.
Integrating AI into PTBD therapy in Tabriz has a significant potential to improve patient outcomes. The aim of this research is to harness the potential of AI to better the practices of PTBD and ultimately improve the delivery of healthcare and patient care.

Keywords: Percutaneous transhepatic biliary drainage, Artificial intelligence, Biliary obstruction, Interventional radiology

Arshiya Danandeh

Trends and Impact of Alcohol Use Disorder and Related Diseases in Iran: Insights from the Global Burden of Disease Study 1990-2019

Arshiya Danandeh, Khashayar Danandeh
Faculty of Mechanics, Electrical Power and Computer, Science and Research Branch, Islamic Azad University, Tehran, Iran

Considering the limited information on alcohol use disorder and its related diseases in Iran, this study aims to provide comprehensive evaluations of alcohol use disorder and its consequences from 1990 to 2019.

Utilizing the Global Burden of Disease (GBD) data, we assessed the burden of alcohol use disorder and three associated diseases: cirrhosis and other chronic liver diseases due to alcohol use, liver cancer due to alcohol use, and alcoholic cardiomyopathy. Data on incidence, prevalence, mortality, Years of Life Lost (YLL), Years of Healthy Life Lost due to Disability (YLD), and Disability-Adjusted Life Year (DALY) indexes across age groups, genders, and provinces in Iran from 1990 to 2019 were analyzed.

The age-standardized DALY rate of alcohol use disorder in Iran decreased by 24.1% from 55.5 per 100,000 in 1990 to 41.8 per 100,000 in 2019. Similarly, the DALY rates for cirrhosis (-28.7%), liver cancer (-20.9%), and alcoholic cardiomyopathy (-36.3%) also declined. However, alcohol use disorder had the highest DALY rate among those younger than 55 years, while cirrhosis had the highest burden among those 55 years or older in 2019. The reduction in DALY rates was observed across all provinces, but the burden remained higher in border provinces and among males compared to females.

Despite the overall reduction in the burden of alcohol use disorders and related diseases, these issues persist as significant public health concerns, particularly in Iran's border provinces. Targeted interventions for males and provinces with lower socioeconomic status may help further reduce this burden.

Keywords: Alcohol use disorder, Burden, Cardiomyopathy, Cirrhosis, Liver cancer, Iran

Ashkan Ghonuei Rastgar

Management of Allergy to Anesthesia in Dentistry

Ashkan Ghonuei Rastgar
Faculty of Dentistry, Tehran University of Medical Science, Tehran, Iran

Local anesthesia (LA) is a technique used to temporarily desensitize a specific body area, primarily for surgical procedures, dental work, or pain management. This method results in sensation loss in the targeted area by depressing excitation in nerve endings or inhibiting conduction within peripheral nerves. Among the various local anesthesia medications, lidocaine is the most widely used in dentistry due to its safety profile. Although adverse allergic reactions to local anesthetics are relatively rare, they can range from mild to life-threatening. The potential risks and side effects, especially with ester-structured drugs, necessitate vigilance. Systemic toxicity, though uncommon, can be fatal and requires prompt diagnosis and treatment to ensure patient recovery. Therefore, every dentist must possess comprehensive knowledge and skills to effectively manage any complications arising from the use of local anesthetics. This article reviews the use of local anesthetics in dentistry, highlights the potential risks, and underscores the importance of preparedness in handling adverse reactions.

Keywords: Allergy, Local anesthesia, Management

Azin Nateghian

Overcoming the Limitations of Traditional Psychoeducation: Innovative Strategies Leveraging Technology and Experiential Learning

Azin Nateghian[1], Amir HakimJavadi[2]
1. Chief Executive Officer, Psychoeducation's Inc, Ontario, Canada
2. PhD Candidate of Health Psychology and Psychiatry, Department of Psychology, Universitat Rovira I Virgili (URV), Tarragona, Spain

Since psychoeducation helps people create coping strategies and improve their awareness of their mental health, it has become ever more critical recently. Still, the conventional version of psychoeducation can be tedious and less effective as it can be easily forgotten. The development of experiential learning methods can help to transform psychoeducation. These methods can enable psychoeducation to be more interactive, flexible, and hands-on in response to the growing demand for psychological information and skill learning.

The literature exposes the shortcomings of conventional psychoeducation based on passive information distribution. On the contrary, Studies have shown how crucial experiential learning and practical knowledge are in deep understanding and practical use of information. Technology can be an excellent tool for experiential learning, as studies show that using technology-driven solutions—especially those based on artificial intelligence—may help increase the scalability, accessibility, and personalizing capacity of psychoeducational treatments.

Psychoeducation's Inc. start-up combines psychological theories, experiential learning, and technology to simplify psychoeducation, ensuring more effective learning. As an innovative solution our team launched a gaming application for kids, "Bee Secure". According to the Circle of Security intervention, Bee Secure aims to help kids understand their basic psychological needs. Children actively understand the character's needs and help it find the best solution. The application seeks to empower psychological ideas, practical coping mechanisms, and problem-solving techniques for children. We execute artificial intelligence in the new revision to create a more precise, personalized, and interactive environment.

The "Bee Secure" application might overcome the restrictions of traditional psychoeducation by applying modern technologies that emphasize gamification, artificial intelligence-driven personalizing, and experiential learning.

Bee Secure still requires more research and empirical assessment to ascertain its long-term viability and scalability. Validating the application's ability to support mental health and well-being will depend primarily on longitudinal studies, outcome-based assessments, and ongoing user testing.

Keywords: Psychoeducation, Artificial intelligence, Experiential learning, Gamification, Mental health

Azin Qanbari

Innovations in Dental Care: Bridging Science and Smiles

Azin Qanbari
International Department, Faculty of Dentistry, Tehran Unicersity of Medical Science, Tehran, Iran

Innovative advancements in dental care are seamlessly bridging the gap between scientific discovery and practical application, resulting in improved patient outcomes and enhanced smiles. This presentation delves into the latest breakthroughs in dental science and their transformative impact on clinical practice. Key areas of focus include regenerative dentistry, where tissue engineering and stem cell research offer new possibilities for repairing and regenerating oral tissues, and digital dentistry, which leverages technologies such as CAD/CAM systems and intraoral scanners to deliver precision restorations and streamline workflows. Additionally, the role of biomaterials in creating more durable and aesthetic dental prosthetics, along with the incorporation of artificial intelligence for accurate diagnostics and personalized treatment plans, are explored. By presenting case studies and recent research, this session highlights how these innovations are being integrated into everyday practice, improving efficiency and patient satisfaction. Attendees will gain insights into the future direction of dental care, understanding how cutting-edge science is being translated into practical solutions that enhance both the functionality and aesthetics of dental treatments. This overview aims to inspire dental professionals to embrace these innovations, ultimately bridging the science of dentistry with the art of creating beautiful, healthy smiles.

Keywords: Innovations, Regenerative dentistry, CAD/CAM, Aesthetic dentistry, Dental prosthetics

Behzad Moharrami

The Role of Artificial Intelligence in Personalized Medicine

Behzad Moharrami
Tehran university of medical sciences, Tehran, Iran

Artificial Intelligence (AI) has emerged as a transformative force in personalized medicine, offering unprecedented potential to tailor medical treatment to individual patient profiles. This narrative review explores the integration of AI technologies in healthcare, focusing on their application in predictive analytics, diagnostic accuracy, and therapeutic personalization. We discuss recent technological advancements, including machine learning algorithms and deep learning, that have significantly enhanced the capability of AI in medical decision-making. Moreover, we address the ethical considerations and challenges associated with AI, such as data privacy and algorithmic bias. Finally, we outline future directions, emphasizing the need for interdisciplinary collaboration and the development of robust regulatory frameworks to ensure the safe and equitable implementation of AI in personalized medicine.

Keywords: Artificial intelligence, Personalized medicine, Predictive analytics, Diagnostic accuracy

Elaheh Mousavialmaleki

Graphene Based Nanomaterials for Synergistic Immunotherapy in Glioma Treatment

Elaheh Mousavialmaleki, Banafshe Abadi
1. Department of Clinical Pharmacy, Faculty of Pharmacy, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
2. Research Assistant, Herbal and Traditional Medicines Research Center, Kerman University of Medical Sciences, Kerman, Iran

Glioblastoma (GBM) is the most common and aggressive primary brain tumor, characterized by its rapid growth and resistance to standard therapies. Current treatment options, including surgery, radiation, and chemotherapy, are often ineffective due to the heterogeneous nature of the tumor and the presence of stem cell-like GBM cells that can evade treatment. Furthermore, the blood-brain barrier (BBB) poses a significant obstacle to effective drug delivery, limiting the therapeutic options available.

Recent advancements in immunotherapy have provided new areas for treatment by harnessing the body's immune system to target cancer cells. However, GBM presents unique challenges, such as intrinsic, adaptive, and acquired resistance mechanisms that diminish the efficacy of immunotherapeutic approaches. To address these challenges, innovative drug delivery systems are essential.

Graphene-based nanomaterials, including graphene and graphene oxide (GO), have emerged as promising candidates for enhancing immunotherapy's effectiveness against GBM. These nanomaterials offer several advantages, including a large surface area for drug loading, excellent biocompatibility, and the ability to penetrate the BBB. Additionally, their unique properties allow for multimodal therapeutic approaches, such as combining drug delivery with photothermal therapy, where the materials can be heated to kill tumor cells.

This review article explores the potential of graphene-based nanomaterials in the context of GBM treatment. It discusses their synthesis, functionalization, and application in delivering immunotherapeutic agents. The review also highlights the mechanisms by which these nanomaterials can overcome the limitations of traditional therapies, such as enhancing immune response, reducing proangiogenic cytokine synthesis, and providing targeted tumor ablation through photothermal effects.

In conclusion, graphene-based nanomaterials represent a versatile and potent platform for developing advanced therapies for GBM. Their ability to improve drug delivery, target specific tumor cells, and facilitate a combined therapeutic approach could revolutionize the treatment landscape for this challenging and deadly cancer. Future research should focus on optimizing these nanomaterials for clinical applications, ensuring their safety and efficacy in human patients.

Keywords: Glioblastoma (GBM), Graphene-based nanomaterials, Immunotherapy, Drug delivery

Fateme Mazloomrezaei

Using Automated Machine Learning Approach for Skin Disease Diagnosis: A Feasibility Study of Classification of Acne and Normal Skin Images

Fateme Mazloomrezaei[1], Sina Kardeh[2,3,4], Mohsen Mazloomrezaei[2,3,4]
1. School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Surgery, Massachusetts General Hospital, Boston, Massachusetts
3. Burn Research Unit, Shriners Hospital for Children, Boston, Massachusetts
4. Department of Surgery, Harvard Medical School, Boston, Massachusetts

Deep learning methods, and in particular, convolutional neural networks (CNNs), are currently considered state-of-the-art for making predictions from imaging data. There have been numerous attempts to develop computerized systems that can conduct skin lesion segmentation, classification and attribute detection. In this study, we trained an autoML model on a dataset comprising normal skin and acne images.
Our image dataset included 2000 high-quality close-up shots of faces with normal skin and acne. Images were cropped to remove other facial components and only include skin. Consequently, we had 2 groups of labeled data, one group of normal skin images and the other group of acne images, each containing 1000 cases.
Of 2000 images, 1800 were uploaded to Google Cloud AutoML Vision as the training dataset and the remaining 200 images were used as test dataset. After training the model with the initial 1800 images, AutoML could achieve 99.5% precision and recall. 199 out of 200 test images were predicted correctly.
Wide access to autoML can ease the production of softwares such as chatbots with screening purposes for patients and also advance the development of clinical decision support systems to enhance dermatology education and diagnosis. AutoML is a powerful tool that can assist beginner users in training and prototyping high-quality custom medical machine learning models with minimum effort and expertise.

Keywords: Machine learning, Dermatology, Acne, Clinical aided diagnosis

Fatemeh Rezaee

Evaluation of Coenzyme Q10 Protective Effects on Tetracycline-Induced Hepatotoxicity in Male Rats

Fatemeh Rezaee[1], Mohammad Shokrzadeh[2]
1. Student research committee, Faculty of pharmacy, Mazandaran University of medical sciences, Sari, Iran
2. Department of Toxicology and pharmacology, Faculty of Pharmacy, Mazandarn University of Medical Sciences, Sari, Iran

Coenzyme Q10 (CoQ10), as a potent lipophilic antioxidant, can notably reduce hepatocyte damage caused by drugs. Therefore, the present study aims to evaluate the hepatoprotective effects of CoQ10 against tetracycline-induced hepatotoxicity in the rat model.
The study involved 30 male rats divided into six equal groups. The first group served as the control and received normal saline and compacted food throughout the 14-day study period. The second group was administered tetracycline at 200 mg/kg Intra Peritoneal (IP). The third group received N-Acetyl Cysteine (NAC) at 300 mg/kg/day. Groups 4 to 6 were given doses of CoQ10 at 10, 15, and 20 mg/kg/day, respectively, along with 200 mg/kg tetracycline IP. At the end of the experiment, the animals were anesthetized and sacrificed to assess serum liver enzymes and histopathological studies on liver tissue samples.
Tetracycline administration caused significant cellular toxicity, as evidenced by reduced cell viability, impaired mitochondrial function, decreased glutathione levels, increased lipid peroxidation, and elevated serum levels of liver enzymes. However, pretreatment with CoQ10 mitigated these effects, with higher concentrations showing more significant protective effects. Coenzyme Q10 attenuated cellular toxicity, improved cell viability, preserved mitochondrial function, and increased glutathione levels, indicating its antioxidant properties. Despite CoQ10's protective effects, liver tissue still exhibited some toxicity at the highest concentration, albeit less severe than the positive control group. Histopathological analysis confirmed these findings, with CoQ10-treated groups showing reduced inflammation, hemorrhage, and necrosis compared to the positive control.
The findings of this study underscore the significant potential of coenzyme CoQ10 in reducing oxidative stress-related parameters and improving liver cell function in tetracycline-induced hepatotoxicity, thereby highlighting its potential as a therapeutic agent.

Keywords: Coenzyme Q10, Tetracycline, Hepatotoxicity, Antioxidant

Fatemeh Tajafrooz

The Role of AI in Modern Dentistry

Fatemeh Tajafrooz
School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

The integration of artificial intelligence (AI) in modern dental care is transforming the landscape of oral health, offering unprecedented advancements in diagnosis, treatment, and patient management. This presentation explores the multifaceted applications of AI within dentistry, highlighting their potential to enhance precision, efficiency, and patient outcomes. AI-driven imaging tools, such as machine learning algorithms for X-ray and 3D scans, aid in detecting oral diseases, cavities, and orthodontic issues with higher precision. AI-powered diagnostic tools enable early detection of oral diseases through advanced image analysis and pattern recognition, improving treatment planning and reducing human error. this presentation underscores the significant benefits of adopting AI in dental practice, offering insights into the future directions of this rapidly evolving field. The discussion aims to provide dental professionals with a comprehensive understanding of how these technologies can be leveraged to deliver superior care and optimize clinical workflows.

Keywords: Dentistry, Artificial intelligence, Diagnosis, Machine learning

Ftemeh Kefayat Manesh

The Effect of Metanolic Abstract of Hypericum Scabrum on Diabetes Mellitus and Diabetic Inflammation in Wistar Male Rats

Ftemeh Kefayat Manesh, Mohammad Rezai poor, Mohammad Reza Yazdiyan
Student Research Committee, Department of Medical Sciences, Faculty of Medical, Qom Medical Sciences, Islamic Azad University, Qom, Iran

Diabetes mellitus (DM) is a disordered syndrome of carbohydrate, fat and protein metabolism, which is caused by the shortage or absence of insulin secretion or a decrease in tissue sensitivity to insulin. Diabetes is one of the most common endocrine metabolic disorders that has a high prevalence in the wold.

In this research, we investigated the effect of methanolic extract of Hypericum scabrum (Dihemi tea herb) on diabetes and diabetic inflammation. In this study, we divided 30 Wistar rats with an approximate weight of 280 mg into five groups, each of which contained 6 rats. Two control groups, one healthy and one diabetic, and three experimental groups were created. The experimental groups received doses of 50, 80, and 110 mg/kg of hypericum plant extract, respectively.

To make rats diabetic, we used the drug streptotocin (STZ) in a dose of 60 mg/kg of body weight. In this research, we used the extract of the Hypericum plant, which was obtained from the flower, leaf and dried stem of this plant.

By gavage, we fed the desired extract in three doses of 50, 80 and 110 mg/kg to the mice for 30 days. Then we checked the level of LDL, SGOT, and SGPT along with the amount of water and food they received.

The results showed that the mice who received the extract at the dose of 80 mg/kg of body weight had significantly decreased liver enzymes in their blood. Also, their food and water consumption had decreased, and their blood sugar had decreased and was close to that of healthy rats. These results can introduce the hypericum scabrum (dihemi tea herb) as an effective drug in comparison with antidiabetic drugs.

Keywords: Diabetes mellitus, Liver inflammation, Hypericum scabrum

Georgi Hristov

Outcomes with Holmium: YAG Laser Transurethral Enucleation of the Prostate Gland

Georgi Hristov, I.Valkanov, S.Valkanov, V.Pavlov, S.Penev, D.Tsvetkov, M.Doykov
Clinic of Urology, University Hospital "Kaspela" - Plovdiv

Since its first use in 1998, holmium: YAG laser enucleation of the prostate (HoLEP) has emerged as a minimally invasive, size-independent option for treating benign prostatic hyperplasia (BPH). With excellent short- and long-term outcomes, HoLEP is increasingly seen as a viable alternative to transurethral resection of the prostate (TURP) and prostatectomy.
OBJECTIVE: To present our experience with HoLEP for BPH.
Over 12 months, 75 patients with BPH underwent HoLEP at Kaspela University Hospital. A 100W Ho: YAG laser with 550-micron fiber was used, with parameters of 1.5-2.5 J and 30-50 Hz. Preoperative evaluations included IPSS, QoL, Qmax, RU, PSA, and prostate volume. Outcomes were measured at 1, 3, and 6 months postoperatively, and complications classified using the Clavien-Dindo scale.
The mean patient age was 68.1 years, and the mean prostate volume was 85 ml. The mean operative time was 85 minutes. Clavien 1 complications occurred in 5 patients (6.9%), Clavien 2 in 7 patients (9.2%), and Clavien 3b in 6 patients (8%). At 6 months, prostate volume decreased to 15.5 ml, with improved IPSS, QoL, PSA, Qmax, and RU.
HoLEP is highly effective with low morbidity and excellent functional outcomes, making it a strong competitor for the gold standard in BPH surgery.

Keywords: Holmuim laser, YAG enucleation, Benign prostatic hyperplasia, Surgical outcomes

Ghazal Roostaei

Indwelling Pleural Catheter Efficacy and Safety in Malignant vs. Non-Malignant Pleural Effusions: A Prospective Study

Ghazal Roostaei, Hossein Kazemizadeh, Niloofar Khoshnam rad ,Aryan Shirani, Hamidreza Abtahi ,Sedigheh Mozaffari, Maryam S. Fakhri B ,Krupa Solanki, Ramyar Mahdavi
Thoracic Research Center, Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Tehran, Iran

Refractory pleural effusions (PEs) present a significant management challenge, and indwelling pleural catheters (IPCs) have emerged as a promising therapeutic option. This study aims to evaluate the efficacy and safety of IPCs in managing refractory PEs, comparing outcomes between malignant pleural effusions (MPEs) and non-malignant pleural effusions (NMPEs).
This prospective cohort study included 74 patients, with 62 in the MPE group and 12 in the NMPE group. The average duration of IPC placement was 10.27 weeks, with a range of less than a week to 50 weeks. The primary outcome were pleurodesis success rate and time to pleurodesis, while secondary outcomes included survival after IPC placement, symptom relief, and complication rates.
The overall pleurodesis success rate was 32%, with a statistically significant lower rate in MPEs (27%) compared to NMPEs (58%) (p-value=0.024). Symptom relief was reported by 85% of patients, regardless of MPE or NMPE status. The most common complication was catheter blockage (16%), with no significant difference between MPE and NMPE groups. Factors associated with successful pleurodesis included transudative effusions (p=0.014), heart failure (p=0.039), and absence of cancer (HR=0.325, p=0.024). Survival rates were significantly higher for patients with NMPEs compared to those with MPEs at all-time points (p=0.001, 0.009, and 0.022).
This study highlights the underlying disease and effusion type as potential determinants of pleurodesis success with IPCs. Additionally, malignancy emerged as a significant factor influencing patient survival. The findings can aid in patient selection and treatment decisions for optimal outcomes.

Keywords: Malignant pleural effusion, Nonmalignant pleural effusion, Indwelling pleural catheter, Pleurodesis, survival

Hadi Vahedi

Artificial Intelligence Application in Diabetic Retinopathy Diagnosis: An Umbrella Review of Systematic Reviews

Hadi Vahedi[2], Niloofar Babazadeh[1], Mirsaeed Abdollahi[2], Navid Sobhi[2], Hamidreza Ashayeri[1], Fereshteh Farhadi[2], Mojtaba Azari[1], Mobin Mousavi[1], Ali Jafarizadeh[2]
1. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
2. Department of Ophthalmology, Nikookari Eye Center, Tabriz University of Medical Sciences, Tabriz, Iran

Diabetic retinopathy (DR) is a common microvascular complication of the eye in diabetes, with a global prevalence of 27% among individuals with diabetes. It is the leading cause of blindness in people aged 20 to 74. Early detection and treatment, often through photocoagulation, are crucial to prevent vision loss, highlighting the importance of routine DR screening for diabetic patients. Artificial intelligence (AI) simplifies DR screening by reducing costs and human involvement, providing rapid image analysis within minutes.
A systematic search was conducted to find studies on diagnosing diabetic retinopathies using AI. Our search line was divided into two parts artificial intelligence, machine learning, deep learning, and diabetic retinopathy. After determining the search keywords, we free text keywords in PubMed, Scopus, Embase, Web of Science, and IEEE Xplore. All searches were performed with no restrictions based on language or geographical area until October 2023. Exclusion criteria encompassed studies not meeting the inclusion criteria, lacking relevant outcome measures, and inadequate reporting.
The primary search identified 358 studies from respected databases. After removing the duplicate studies, they entered the screening by title, abstract, and full text. Finally, 19 studies were included in this umbrella review. Twelve studies utilized AI in only DR detection and screening. One study focused only on diabetic macular edema (DME) detection, and two studies tried to detect both DR and DME using AI. Four studies targeted DR, DME, glaucoma, and cataract in diabetic patients. four reviews only included studies leveraging deep learning methods, and the rest included both machine learning and deep learning approaches. The most commonly used neuronal networks were convolutional neural network base algorithms. Integrating AI into DR screening shows promise in early diagnosis and enhancing the efficiency of managing this sight-threatening condition.

Keywords: Artificial intelligence, Diabetic retinopathy, Systematic review, Diabetic macular edema

Hamoon Baghaei

Effects of lncRNAs on Main Cause of Colorectal Cancer : Wnt/β Catenin Signaling Pathway

Hamoon Baghaei, Ehsan hasanzadeh, Nasrin Motamed, Mahsa fereidoni, Rozhin bakhshi
Pediatric Urology and Regenerative Medicine Research Center, Gene, Cell and Tissue Research Institute, Children's Medical Center, Tehran University of Medical Sciences , Tehran, Iran

Colorectal cancer (CRC(is one if the most common and lethal cancers in the world. Various genetic and epigenetic factors play an important role in the biogenesis, development or inhibition of this type of cancer. Recently, aberrant Wnt/β-catenin signaling pathway has been reported to be strongly associated with CRC tumorigenesis, metastasis and recurrence. Long non-coding RNAs (lncRNAs) are series of transcripts with important biological functions. This type of RNAs are effective in the development or inhibition of various cancers, including colorectal cancer and Some of these RNAs are effective on the Wnt/β-catenin signaling pathway.
In this review, we examine the lncRNAs affecting colorectal cancer through Wnt/β-catenin signaling pathways.
Recent research on the role of lncRNAs in colorectal cancer that were related to the signaling pathway was reviewed, and the candidate lncRNAs were mentioned along with how they affect the signaling pathway.
This effective RNAs on CRC via the Wnt/β-catenin signaling pathway are divided into two categories: oncogenic lncRNAs & tumor suppressor lncRNAs. In this review, the main lncRNAs associated with colorectal cancer are Mentioned with their genomic location category. Also, the molecular pathway that each lncRNA affect CRC cells are investigated.
Using this effective lncRNAs as a candidate in therapeutic methods can increase survival chance of CRC patients.

Keywords: LncRNA Colorectal cancer, Signaling pathway, Gene regulation

Hanieh Kolahi Azar

Increasing Anticancer Effectiveness with Docetaxel-loaded Nanoplatforms: Drom Cancer Therapy to Regenerative Approach

Hanieh Kolahi Azar, Nima Beheshtizadeh
1. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran.
2. Department of Pathology, Tabriz University of Medical Sciences, Tabriz, Iran.
3. Tabriz USERN Office, Universal Scientific Education and Research Network (USERN), Tabriz, Iran

The distribution and effectiveness of chemotherapeutic drugs, most importantly docetaxel, a mainstay of cancer therapy, have been transformed by the junction of nanotechnology and pharmacology. Docetaxel's therapeutic potential, previously limited by low solubility and significant adverse effects, has significantly improved with its incorporation into nanoplatforms such as nanofibers and nanoparticles. Through targeted distribution, controlled release, and enhanced bioavailability, this development significantly reduces systemic toxicity and enhances patient outcomes. With methods like electrospinning to customize drug release patterns, nanofibers provide a flexible framework for the controlled release of docetaxel. Nanoparticles, on the other hand, allow precise medication delivery to tumor cells through advanced encapsulating techniques such as nanoprecipitation and emulsion, reducing injury to healthy organs. By enabling focused treatment and cellular regeneration, these nanotechnologies not only enhance the pharmacokinetic characteristics of docetaxel but also offer new paths in regenerative medicine. This narrative review emphasizes the transforming effect of docetaxel-loaded nanoplatforms in oncology and beyond, highlighting the possibilities of nanotechnology to overcome the constraints of conventional chemotherapy and open the path for next developments in drug delivery and regenerative therapies. Through these developments, nanotechnology offers a new age of precision medicine, improving the effectiveness of cancer therapies and reducing side effects.

Keywords: Cancer Therapy, Docetaxel-loaded nanoplatforms, Anticancer activity, Regenerative medicine

Helia Sharif

Stem Cell-Based Regenerative Approaches for the Treatment of CleftLip and Palate: A Comprehensive Review

Helia Sharif, Heliya Ziaei, Nima Rezaei
Universal Scientific Education and Research Network (USERN), Tehran, Iran

A common congenital craniofacial abnormality is cleft lip and/or palate (CLP), which creates challenges in eating, speaking, and hearing, and therefore psychological distress.The bone graft surgery has been known as the gold standard for treating CLP. However, this procedure may cause post-surgical complications and donor site morbidity. A promising alternative could be regenerative medicine, which employs three key principles: stem cells, growth factors, and scaffolds to promote tissue regeneration.This review aims to provide a comprehensive overview of regenerative approaches based on stem cells in CLP treatment.

The researchers conducted a thorough search of scientific literature, including both clinical studies involving human patients and in vivo studies using animal models. While the number of studies investigating the combined use of stem cells and scaffolds for CLP treatment is limited, the available evidence has shown promising results. Different types of stem cells have been used alongside various scaffold materials.

Importantly, the regenerative methods have been successfully applied to patients across a wide range of ages. The collective findings from the reviewed studies support the idea that regenerative medicine holds potential advantages over the conventional bone grafting approach and represents a promising therapeutic option for CLP.

However, the authors note that future well-designed clinical trials, exploring diverse combinations of stem cells and scaffolds, are still needed to further establish the clinical efficacy of these regenerative interventions with a larger number of patients.

Keywords: Cleft lip, Cleft palate, Regenerative medicines, Stem cells, Tissue engineering

Hooman Nekoonam

The Potentials of Artificial Intelligence in Addresing Bipolar Mental Disorder in Adolcenses

Hooman Nekoonam
Tehran University of Medical Sciences Tehran, Iran

This current review aims at discussing on how artificial intelligence can be useful in handling bipolar disorder in adolescents. This review study focuses on bipolar disorder as a complicated and frequently disabling mental disease; however, the diagnosis and management of the disorder in adolescents are further complicated by the overlap of many of the symptoms with those of other developmental and psychiatric disorders. AI has four key areas which are machine learning, natural language processing and these are promising in diagnosis, treatment and continuous monitoring of bipolar disorder. A large amount of data can be easily analyzed by AI and it can find small existing patterns and indicators that are difficult to define in conventional therapies. Furthermore, AI integrated applications can promote and optimize the therapeutic processes with the help of personalized Cognitive behavioural therapy (CBT) , mood loggers and crisis risk estimators. This review updates the literature summary, describes successful cases, and outlines ethical issues to make a coherent opinion on how AI can transform the management of adolescent bipolar disorder.

Keywords: Bipolar mental disorder, Artificial intelligence, Adolcense

Hosein Moghimi

The Effect of The Type of Coffee on Emotions: What Kind of Coffee Do You Drink?
Hosein Moghimi

The relationship between coffee taste and evoked emotions continues to be explored. But this research identified the key sensory characteristics of extracted coffee that influenced consumers' acceptance and emotions. In the studied articles, more than 8 coffee models and their roasting methods and the amount of Arabica and Robusta and tested on 100 young, middle-aged and old men and women and its effect on their mood and emotions have been investigated. The results showed that the samples show a wide range of sensory characteristics and there are big differences mainly with the characteristics of coffee identity (coffee ID), roasted, bitter taste and fullness of dark chocolate among the samples for more interest. The results showed that liking and positive emotions, such as being active, alert, awake, energetic, enthusiastic, feeling good, happy, jump start, impressed, happy, cheerful, and refreshed were driven by ID and coffee grind percentage. . Roasty, ash, pipe tobacco, bitter taste, overall sweet, balanced/ combination, fullness and persistence. Conversely, sour aromatics, sour, fruity, woody, musty, dusty, and molasses decreased liking, positive emotions, and stimulated negative emotions such as disappointment, grumpiness, and feeling unfulfilled. This information can be useful to create or change the sensory profile of extracted coffee and to increase consumer acceptance.

Keywords: Coffee, Emotions, Robusta, Arabica

Ivaylo Mourdjev

Effectiveness of Vacuum Assistef Therapy of Diabetic Ulcers Compared to Conventional Gauze Dressing

Ivaylo Mourdjev, Katya Kalinova, Nedzhat Ali, Petar Uchikov, Lubomir Paunov
Department of Special surgery, Medical University of Plovdiv,Plovdiv,Bulgaria

Diabetic ulcers are a vast expanding medical problem worldwide,due to the affection of the diabetes for the local blood supply,the immune logical status and the diabetic polyneuropathy. The beneficial effect of vacuum assisted (VAC) therapy on diabetic ulcers is a matter of fact. It is based on the improvement of local circulation, acceleration of cellular and humoral influx, as well as drainage, thus resulting in stimulation of granulation process and reduction of local bioburden. Under the locally applied forces of the centralized vaccum bandage it also results in remodeling the ulcer size and form. Thus, both treatment duration and cost are reduced.
To compare the treatment outcome, duration and overall cost of VAC therapy versus conventional gauze dressing therapy for diabetic ulcers.
The study was carried out within a research project financed by Plovdiv Medical University. A total of 38 patients with diabetic lesions were enrolled in the survey - 13 females and 25 males aged from 47 to 76 years. These included ray amputation wounds, wounds post-debridement for necrotising fasciitis, wounds post-drainage for abscess, a heel ulcer and a sole ulcer. VAC therapy was applied through a central aspiration system (wall suction) for 30 patients, via a portable device for 6 subjects, and the two methods were combined for 4 patients.
Out of the 38 patients 3 were excluded from the study due to a premature disconnection of VAC therapy. For 27 individuals definitive closure of the lesion was achieved in measurable time and for 8 – significant improvement in local state and reduction in wound size. While there was no difference in the mean duration of VAC therapy among the different modalities applied, a 3-to-5-fold reduction in the overall cost of treatment was achieved by implementation of wall suction as compared to a portable aspiration pump. The combination of the two methodologies reduces the price of the treatment course by 10% only.
VAC therapy is an useful, safe and efficacious tool for the treatment of diabetic foot infection and ulcers. The advantage of wall suction VAC therapy is the stable pressure supply and the possibility to fit the set with a large variety of commercial and non-commercial dressings which reduces substantially the overall cost of treatment thus making it more affordable. However it necessitates hospital accommodation. Portable devices do not limit the mobility of the patient, offer various operating modes and allow use in outpatient and domestic environment at the cost of a several fold price increase. Combining the two modalities has limited effect on the total treatment cost.

Keywords: Vacuum assisted therapy, Diabetic ulcer

Kamran Shirbache

Ultra-Overt Therapy: A Novel Medical Approach Centered on Patient Consciousness

Kamran Shirbache, Amirreza Liaghat, Ali shirbacheh, Hamidreza Namazi, Hamid Nasri
1. Department of Orthopedics, Hôpital Robert-Debré, Paris, France
2. Immunology from Concepts and Experiments to Translation, CNRS UMR 5164, University of Bordeaux, 33076 Bordeaux, France
3. Hospital centre of Niort, Niort, France
4. Department of Medical Ethics, School of Medicine, Medical Ethics and History of Medicine Research Center, Tehran University of Medical Science, Tehran, Iran
5. Nickan Research Institute, Isfahan, Iran

The concepts of consciousness and comprehension are fundamental distinctions within the realms of human and artificial intelligence. In clinical practice, patient awareness regarding medication and its physiological effects is crucial for determining drug efficacy and outcomes. This article introduces a novel perspective on prescription practices, termed "Ultra-Overt Therapy" (UOT). We conducted a comprehensive review of current supporting evidence, focusing on the mind-body relationship, placebo response, neuroscience, and complementary medicine.

Our findings, rooted in the mechanisms of the placebo effect, the intricacies of intersubjective therapy, the potency of interoceptive awareness, and the mind-body connections in neuroscience, highlight the role of the autonomic nervous system in manipulating blood distribution, which can affect drug delivery. Additionally, the unrecognized efficacy of many complementary medicine methods associated with consciousness and concentration, such as meditation, yoga, energy healing, and homeopathy, along with the advancements in personalized medicine, suggest that UOT holds significant theoretical promise.

To substantiate this theory, we propose three research areas: drug distribution, organ targeting, and drug-receptor interaction. Future research endeavors focusing on these areas may elucidate the global impact of UOT on medical treatment and patient care, potentially revolutionizing therapeutic approaches and dramatically improving patient outcomes.

Keywords: Mind-body medicine, Interoceptive awareness, Placebo response, Intersubjective therapy, Meaning system

Khashayar Danandeh

Efficacy and Outcomes of Salvage Therapy with Etoposide and Mitoxantrone in Refractory Acute Myeloid Leukemia: A Retrospective Cohort Study

Khashayar Danandeh, Tahereh Yavari, Mehrzad Mirzania
Sports Medicine Research Center, Neuroscience Institute, Tehran University of Medical Sciences, Tehran, Iran

Acute Myeloid Leukemia (AML) presents significant treatment challenges, particularly in refractory or relapsed (R/R) cases. This study evaluates the efficacy and outcomes of the salvage chemotherapy regimen containing etoposide 100 mg/m^2 and mitoxantrone 10 mg/m^2, both administered on days 1-5 (EM) in non-M3 AML patients.

In a retrospective cohort study, data from 2011 to 2021 were analyzed for adult non-M3 AML patients at a tertiary referral center in Tehran, Iran. Patients who underwent EM salvage chemotherapy after induction failure were included. Exclusion criteria included patients who died during induction, achieved remission with induction, or were ineligible for salvage chemotherapy.

Out of 449 non-M3 AML patients, 41 (9.1%) received the EM regimen. Of these, 19 (46.3%) showed no response, 5 (12.2%) achieved partial remission, and 17 (41.5%) attained complete remission. The median overall survival (OS) for all patients was 6 months (95% CI 2.3-9.6) with 12, 24, and 36-month OS rates of 31%, 23%, and 15%, respectively. Patients achieving CR or PR had significantly better outcomes compared to refractory patients. Patients who did not receive hematopoietic stem cell transplantation (HSCT) had a median OS of 7 months, while it was not reached for those who did undergo HSCT. At 36 months, the OS rate was significantly higher in patients who underwent HSCT than in those who did not (71.4% vs. 8.3%, p=0.001).

The EM regimen offers a potential pathway to remission for R/R non-M3 AML patients. However, the outcomes are heavily influenced by patient-specific factors and subsequent treatment strategies such as HSCT.

Keywords: Acute Myeloid Leukemia, Salvage chemotherapy, Mitoxantrone, Etoposide, Overall survival, Hematopoietic stem cell transplantation

Kiarash Saleki

In Silico Design of A Rapid Immunoassay Against Etiology of Crimean-Congo Hemorrhagic Fever (CCHF) as A Possible Candidate for The Next Pandemic

Kiarash Saleki[1,2,3], Ali Rezvanimehr[3,4], Cena Aram[4], Majid Namayandeh Jorabchi[5], Nima Rezaei[6,3]

1. Student Research Committe, Babol University of Medical Sciences, Babol, Iran.
2. USERN Office, Babol University of Medical Sciences, Babol, Iran.
3. Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran.
4. Universal Scientific Education and Research Network (USERN), Tehran, Iran.
5. Leibniz Institute for Catalysis at the University of Rostock (LIKAT) Albert-Einstein-Str. 29a 18059 Rostock, Germany
6. Department of Immunology, Tehran University of Medical Sciences, Tehran, Iran.

Crimean-Congo hemorrhagic fever (CCHF) is an acute, highly contagious and life-endangering viral infection with a case fatality rate (CFR) of up to 30%, which is a suspected etiology for next pandemic. Aims include: Targeting conserved peptide from key NP antigens on CCHFV, the interactions and structural dynamics of best-hit peptides in physiological conditons based on molecular dynamics analysis, aelecting the optimal immunogenic peptide that can activate B-cells, selecting immunogenic peptide to activate T-cells.
In-silico study of CCHFV antigen targeting: In silico targeting of novel antigens of CCHFV will be performed to target the key antigens molecules. Docking by AutoDock Vina/PatchDock will be performed. Interactions will be analyzed and verified by GROMACS through multiple steps, including minimization, NVT_EQ, NPT_EQ, MD-Run, and RMSF/RMSD/GYRATION (stability/expansion) and The Molecular Mechanics Poisson-Boltzmann Surface Area (MMPBSA)(ligand-receptor_interaction energy).
Molecular docking/MD simulation: The molecular docking of the candidate peptide with monoclonal Antibody (mAb) will carry out by cluspro that use the Ab mode in this tool. In addition, the docked complex of the best peptide was selected and simulated for 100-ns. Calculation of binding free energy binding-free energy (ΔG) calculation for the peptide of before and after the 100-ns MD simulation was accomplished by employing HawkDock web server, specifically exploiting the Molecular Mechanics/Generalized Born Surface Area (MM/GBSA). MM/GBSA approach utilizes gas-phase energy (MM), polar electrostatic solvation energy (GB), and non-polar (SA) solvation energy to estimate binding energy as well as binding affinity.
Results:The present study accomplished a rapid immunoassay peptide against CCHFV. A novel modified antibody for CCHFV Gc was developed. Specific interactions of our novel peptide were verified by numerous biophysical dynamics parameters, such as DSSP, optimal MM-GBSA binding, and H-bonds.
We designed a novel peptide for use in immunoassay against CCHFV and comprehensively studied the structural dynamics of CCHFV viral proteins.(Funded_by_National_Institute_for_Medical_Research_Development_of_Iran_(NIIMAD)_Grant_No._4021210).

Keywords: Immunoinformatics, Infectious disease, Computational Immunology, CCHFV

Kimia Kazemzadeh

The Possible Use of Arterial Spin Labeling for Predicting Brain Amyloidosis

Kimia Kazemzadeh
Network of Neurosurgery and Artificial Intelligence (NONAI), Universal Scientific Education and Research Network (USERN), Tehran, Iran

A decline in regional cerebral blood flow (rCBF) is a common neuroimaging finding in patients on the Alzheimer's dementia continuum. Based on previous literature, a higher load of amyloid beta-protein (Aβ) examined by florbetapir positron emission tomography (PET) was associated with rCBF in normally aging participants. We aimed to investigate the potential utility of Arterial spin labeling (ASL) in predicting brain amyloidosis.

A total of 140 patients, including 42 cognitively normal (CN) participants, 70 patients with mild cognitive impairment (MCI), and 27 with Alzheimer's disease (AD) were selected from the Alzheimer's Disease Neuroimaging Initiative (ADNI). Those with complete assessments of cognition, arterial spin labeling, Apolipoprotein E4 (APOE4) genotyping, Polygenic Hazard Score (PHS) calculation, and amyloidosis indices were found eligible for inclusion. The collected data was analyzed using IBM SPSS ver. 20, and data analysis was carried out using chi-square, ANOVA, and linear regression models. $P<0.05$ was statistically significant for all the tests mentioned above.

Participants were matched for demographics. Amyloid beta-protein 42 (Aβ42) and ratios, APOE4, and cognitive assessments significantly differed among groups. Four regions, including left middle-temporal, left and right parahippocampal, and right lingual showed significant CBF differences among groups ($p < 0.05$). An association between CBF and Aβ levels in each diagnostic group after adjusting the impact of age, gender, APOE4, and PHS was also reported in several brain regions.

The emerging clinical applications of ASL in assessing CBF and its relationship with amyloidosis are promising to improve our understanding of neurodegenerative diseases and may assist physicians in the early detection and monitoring of AD and MCI.

Keywords: Arterial spin labeling, Brain amyloidosis, Alzheimer's disease, ASL

Kosar Sadat Hosseini Kolbadi

Evaluating the Recurrence of Chronic Myeloid Leukemia in Iranian Patients After Treatment-Free Remission: A 10-Year Retrospective Study

Kosar Sadat Hosseini Kolbadi, seyed mohsen razavi,sina sadati,Hasan khoramian
Iran university of medical sciences, Tehran, Iran

Over the past two decades, the treatment of chronic myeloid leukemia (CML) has significantly evolved, shifting the focus from mere survival to enhancing the quality of life. Due to the side effects of tyrosine kinase inhibitors (TKIs), more patients are opting to discontinue treatment. Our study explores the recurrence rate of CML in Iranian patients after achieving treatment-free remission (TFR). Successfully stopping treatment can reduce healthcare costs, long-term complications, and even mortality.

We reviewed the medical records of Iranian CML patients who successfully discontinued TKIs and entered a treatment-free remission period. Our analysis covered data from January 2013 to December 2023. Remission was defined as maintaining BCR-ABL1 transcript levels below 0.01% on the international scale after stopping TKIs. We identified factors influencing successful TFR, including the duration of TKI therapy, the time taken to achieve a major molecular response before stopping treatment, and specific genetic markers. Developing personalized predictions for successful TFR based on these biological factors is essential for optimal treatment decisions.

Results: This 10-year study at a private facility in Tehran included 107 chronic myeloid leukemia (CML) patients, of whom 30 (28%) achieved treatment-free remission (TFR). The median age at diagnosis was 32.5 years (range: 13-75). At diagnosis, 10 patients had an enlarged spleen (>12 cm). The median time for complete blood count (CBC) normalization after starting tyrosine kinase inhibitors (TKIs) was 3.5 months (range: 1-10). The median duration of TKI therapy was 84 months (range: 36-204), and the median duration of deep molecular response (DMR) before stopping TKIs was also 84 months (range: 36-204).

The median age at TFR was 42.5 years (range: 19-80), with a median TFR duration of 21 months (range: 2-96). Most patients (86%) were initially treated with imatinib, while the rest received combinations of imatinib with nilotinib or interferon. Thirteen patients (43%) required second-line TKI treatment with nilotinib due to lack of response to the first-line TKI. Twelve patients (40%) relapsed after one TFR course. Among various factors analyzed, only the duration of DMR after treatment (p=0.02) and the use of second-line TKI (p=0.02) were significantly associated with recurrence rates.

This study offers valuable insights into the recurrence rates of chronic myeloid leukemia (CML) in Iranian patients after achieving treatment-free remission (TFR). It underscores the importance of factors such as the duration of deep molecular response (DMR) after treatment and the use of second-line tyrosine kinase inhibitors (TKIs) in predicting recurrence. These findings can help develop personalized predictions for successful TFR and support informed treatment decisions for CML patients.

Keywords: Chronic myeloid leukemia (CML), Tyrosine kinase inhibitors (TKIs), Treatment-free remission (TFR), Deep molecular response (DMR), Major molecular response (MMR), Recurrence

Kosar Zolfaghari

Network Pharmacology for Identifying Drug Repurposing Candidates in Rare Diseases

Kosar Zolfaghari
Universal Scientific Education and Research Network (USERN), Tehran, Iran

Drug development for rare diseases is hindered by the small number of patients and the lack of available medical treatments. Drug repurposing, the process of uncovering novel therapeutic uses for already approved medications, presents a promising approach to expedite drug discovery for various medical disorders. This study utilizes network pharmacology, a systems biology methodology, to identify possible options for repurposing drugs for uncommon disorders.

Our objective is to discover concealed relationships between licensed medications and less researched disorders by creating complex networks that involve diseases, drugs, and targets. Our approach combines various omics data to chart intricate biological processes thoroughly. Using network analysis, we may discover important disease modules and prioritize prospective medication repurposing candidates based on their topological significance and therapeutic relevance. By integrating data on drug safety, efficacy, and availability, we narrow down our list of candidates to increase the chances of successful clinical application. The results of our study illustrate how network pharmacology can completely transform the process of discovering drugs for rare diseases. It provides a data-driven approach that can accelerate the development of medicines that have the power to improve people's lives significantly.

Keywords: Bioinformatics, Drug Repurposing, Network pharmacology

Krasimira Nancheva-Koleva

Impact of Working Condition on $CD^{4+}CD^{161+}$ and $CD^{8+}CD^{161+}$ Subpopulation in Healthy Workers

Krasimira Nancheva-Koleva[2], Aneliya Avramova[1], Emil Slavov[1,3]
1. Department of Molecular Biology, Immunology and Medical Genetics, Faculty of Medicine, Trakia University, Stara Zagora, Bulgaria
2. Clinical Laboratory, University Hospital "Prof. Dr. Stoyan Kirkovich AD, Stara Zagora, Bulgaria
3. Medical Center SELENA-L Stara Zagora, Bulgaria

Environmental factors as potential impact on the immune system have been topic of many researches. Working conditions refer to the environment and aspects of employee's terms and conditions of employment. Hence, association between work conditions and Immune imbalance might play crucial role in many human diseases.
The present study aimed to investigate CD4+CD161+ and CD8+CD161+ subpopulation in healthy workers in the field of different surroundings.
The population study included 62 workers (mean age 47.21 ± 9.28 years) from three distinctive workplaces: kindergarten, power plant facilities and administration. CD4+CD161+ T-lymphocyte and CD8+CD161+ T-lymphocyte populations were examined by flow cytometry with a Beckman Coulter FC500 five-color flow cytometer. Vitamin D (25OH) was researched with an electrochemiluminescence method and an immunological analyzer Cobas E 411 (Roche Diagnostics GmbH).
We observed 1.6 fold lower percentage CD8+CD161+ T-lymphocyte population among workers in power plant facilities compared to the other groups ($p<0.002$). While statistical differences were not established concerning age and vitamin D status of workers in the CD8+CD161+ T-lymphocyte subpopulation. The distribution of CD4+CD161+ T-lymphocyte population was similar between the investigated groups. Our data suggested that vitamin D and age might be unassociated with CD161+ T-lymphocyte population to healthy workers.
Our preliminary results suggest that specificity of work process may affect Immune balance to varying degrees. The further researches would elucidate the role of work conditions in Immune balance.

Keywords: $CD^{4+}CD^{161+}$, $CD^{8}+CD^{161+}$ Subpopulation, Immune system, Working conditions

Laleh Shadman

Psychology with AI

Laleh Shadman
University of Tehran, Tehran, Iran

Will AI Psychologists Improve Global Mental Health?
The potential of AI to revolutionize mental healthcare is undeniable. With increased accessibility, personalized treatment plans, and potential for early intervention, AI-powered psychologists could significantly improve global mental health.
Potential Benefits:
Increased Access: AI can break down geographical and financial barriers, making mental healthcare accessible to millions.
Early Intervention: By analyzing user data, AI can identify potential mental health issues early on, allowing for timely intervention.
Personalized Care: AI can tailor treatment plans to individual needs and preferences, enhancing effectiveness.
Reduced Stigma: The anonymous nature of AI-powered therapy may encourage more people to seek help.
Potential Challenges:
Lack of Human Connection: AI cannot fully replicate the empathy and understanding provided by human therapists.
Overreliance: Excessive dependence on AI could hinder the development of coping mechanisms and interpersonal skills.
Data Privacy: Concerns about data security and misuse of personal information are paramount.
Algorithmic Bias: AI systems could perpetuate existing biases if not carefully designed and monitored.
While AI offers significant potential for improving global mental health, it's essential to view it as a tool, not a replacement for human therapists. A hybrid model combining AI and human expertise is likely to be the most effective approach. By addressing ethical concerns and ensuring responsible development, AI can become a valuable asset in the fight against mental illness. Ultimately, the impact of AI on global mental health will depend on how it is developed, implemented, and regulated.

Keywords: AI-Powered psychologists, Accessibility, Personalized care, Data privacy, Algorithmic bias

Maede Tahvilian

The Neuropharmacological Mechanisms, Molecular Targets, Therapeutic Potentials, and Clinical Viewpoint of Polydatin's Neuroprotective Role

Maede Tahvilian
Kermanshah University of Medical Science, Kermanshah, Iran

Neurodegenerative diseases (NDDs) are one of the major causes of death and disability in the human population all over the world. From a mechanistic standpoint, NDDs are caused in part by the intricacy of pathogenic pathways. Consequently, the development of innovative multi-target medicines is urgently needed to combat NDDs by simultaneously modulating dysregulated pathways. Furthermore, the inadequacy of traditional medicines as effective therapeutic agents has been attributed to their related adverse effects and lack of effectiveness. Plant secondary metabolites have been presented in prevailing papers as potentially effective multi-target therapeutics in the fight against NDDs. Polydatin is a naturally occurring phenolic chemical that may have anti-NDD effects. Phosphoinositide 3-kinases (PI3K)/protein kinase B (Akt), extracellular regulated kinase (ERK)/mitogen-activated protein kinase (MAPK), matrix metalloproteinase (MMPs), NF-E2–related factor 2 (Nrf2)/antioxidant response elements (ARE), interleukins (ILs), and phosphoinositide 3-kinases (PI3K)/protein kinase B (Akt) are among the neuroinflammatory/apoptotic/autophagy/oxidative stress signaling mediators. Polydatin may therefore be able to prevent Alzheimer's disease, Parkinson's disease, brain/spinal cord injury, ischemic stroke, and many neuronal dysfunctions. All of polydatin's neuroprotective mechanisms in different NDDs are presented in this paper. Furthermore, new polydatin administration methods with respect to enhancing its safety, solubility, bioavailability, and effectiveness are shown. Moreover, a long-lasting therapeutic concentration of polydatin in the central nervous system with minimal adverse effects is developed.

Keywords: Neurodegenerative diseases, Polydatin, Neurodegeneration

Mahsa Hosseini Kakroudi

Delirium in Patients Undergoing Valve Replacement

Mahsa Hosseini Kakroudi
Islamic Azad University, Tehran Medical Branch, Tehran, Iran

Valvular heart disease (VHD), primarily resulting from heart valve stenosis and regurgitation, often necessitates surgical or transcatheter interventions. While these procedures significantly enhance patient outcomes, they can also lead to perioperative neurocognitive disorders, including postoperative delirium (POD) and postoperative cognitive dysfunction (POCD). Recent literature reviews have predominantly focused on transcatheter aortic valve replacement (TAVR), leaving other interventions and aspects of VHD underexplored.

This literature review aims to evaluate the incidence of POD in VHD patients undergoing either surgical or transcatheter interventions, assess the impact of POD on patients' quality of life, identify associated risk factors, and explore current diagnostic and treatment options based on recent studies.

A comprehensive search of multiple databases was conducted, focusing on studies published in the last two decades that examine VHD patients undergoing either intervention. This review seeks to provide a broader perspective by including surgical valve replacements and all subgroups of VHD.

Our findings reveal a notable gap in the literature regarding POD in patients undergoing surgical interventions for VHD, as most published reviews have focused primarily on TAVR. With publishing new randomized controlled trials (RCTs) addressing surgical interventions, there is a need for more detailed studies that include diverse patient populations and intervention types. This literature review highlights the urgent necessity for comprehensive research to address postoperative delirium across all types of valve replacement procedures. Understanding the risk factors associated with POD is essential for informing clinical practices and improving outcomes in this vulnerable population. Future research should prioritize the development of standardized methodologies to better assess and mitigate the incidence of POD in patients with valvular heart disease.

Keywords: Postoperative delirium, Valvular heart disease, Valve replacement, Risk factors, Treatment

Mahsa Zargaran

Bronchiectasis in Common Variable Immunodeficiency (CVID) Patients

Mahsa Zargaran
Department of Internal Medicine, Imam Khomeini Hospital, Tehran University of Medical Sciences, Tehran, Iran

Bronchiectasis, a chronic respiratory ailment, has grown progressively widespread globally. Common Variable Immunodeficiency (CVID) has been recognized as a notable contributing factor for bronchiectasis. In order to effectively manage this condition, a thorough and focused strategy is necessary.

A systematic literature search was conducted in Web of Science, PubMed, and EMBASE from January 2000 to December 2023 using established keywords. In addition, we discovered randomized controlled trials (RCTs) by searching the Cochrane Airways Group Register of trials and online trials registries. Two reviewers autonomously retrieved and recorded data from the papers that were included, and evaluated the potential for bias in each study.

The majority of research have shown that the prevalence of bronchiectasis in individuals with CVID is 24.9%. Furthermore, bronchiectasis is the most commonly observed radiological abnormality in these patients. Also, there is a significant occurrence of bronchiectasis in the Granulomatous Lymphocytic Interstitial Lung Disease (GL-ILD) group, with a prevalence rate of 31.3%.

Research indicates that individuals diagnosed with CVID who also have bronchiectasis have insufficient forced expiratory volume in one second (FEV1). Furthermore, patients with bronchiectasis experience a higher frequency of respiratory tract infections and a diminished quality of life.

Bronchiectasis is the predominant radiological observation in individuals with CVID, resulting in a reduction in FEV1, as well as recurrent infections in the lower respiratory tract. Additionally, individuals diagnosed with bronchiectasis exhibited reduced levels of serum immunoglobulin A (IgA) and immunoglobulin M (IgM).

This study offers a fresh outlook and emphasizes the significance of early diagnosis and the need for enhancements in treatment approaches.

Keywords: Bronchiectasis, Common Variable Immunodeficiency (CVID)

Maria Orbetzova

Hashimoto Thyroiditis – Pathogenesis and Autoimmune Co-morbidities

Maria Orbetzova
Clinic/Department of Endocrinology and Metabolic Diseases, "Sv. Georgy" University Hospital, Medical Faculty, Medical University of Plovdiv, Bulgaria

Hashimoto thyroiditis (HT) is an organ-specific autoimmune disease and the most common cause of hypothyroidism in iodine sufficient areas. HT develops through a complex interaction of genetic and environmental factors which result in autoimmune destruction of the thyroid gland involving humoral and cellular immune responses. The aim is to provide a comprehensive view on pathogenesis and occurrence of polyautoimmunity in HT.
A purposeful literature review was performed. Results from a retrospective study on co-morbidities in 447 patients with HT conducted in the Clinic of Endocrinology and metabolic diseases at "Sv. Georgy" University Hospital are presented.
Genetically determined immunological susceptibility appears to interact with environmental factors (e.g. cigarette use, infection, stress, gut microbiota). Genetic susceptibility is linked to the HLA locus and other immune-related and thyroid-specific genes. Variants in genes have substantial individual effects on disease susceptibility. HLA-DR3 and HLA-DR5 are linked to HT and provide a greater risk for the disease. Polymorphism in certain alleles of CTLA-4 predispose to HT. Recent data suggest that epigenetic mechanisms might underlie genetics. HT is associated with other autoimmune disorders such as diabetes mellitus type 1, pernicious anemia, vitiligo, autoimmune adrenal insufficiency, myasthenia gravis, systemic sclerosis, Sjögren syndrome, rheumatoid arthritis, systemic lupus erythematosus. This has led to the hypothesis that the affected patients suffer from a generalized dysregulation of their immune system. Several studies show that there is familial clustering of autoimmune thyroid diseases in first-degree relatives, particularly in females. Recently, cancer therapy with immune checkpoint inhibitors have led to immune-related adverse effects, including development of HT.
Genotyping of patients with HT may have beneficial potential by enabling a personalized treatment and implementation of novel immunomodulatory therapies. HT is clinically important in the context of polyautoimmunity, and it is mandatory to screen patients for autoimmune co-morbidities.

Keywords: Hashimoto thyroiditis, Autoimmune diseases, Genetic predisposition, Polyautoimmunity, Immunotherapy

Marjan Falahati

Gray Matter Alternations in Alzheimer and Multiple Sclerosis: Review article

Marjan Falahati
Kermanshah University Of Medical Science, Faculty of pharmacy, Kermanshah, Iran

In light of new analytical approaches and results from recent longitudinal studies, we summarize structural (s)MRI findings of gray matter (GM) atrophy related to cognitive impairment in Alzheimer's disease (AD) and Multiple Sclerosis (MS).
Alzheimer disease is charachterized by loss of grey matter and most prevalent form of dementia. Although MS is classically considered a white matter disease, the involvement of gray matter in the pathogenic process has been confirmed by pathology disease.
The hippocampus-to-cortex ratio appears to be the best sMRI biomarker to discriminate between various AD subtypes, following the spatial distribution of tau pathology, and predict rate of cognitive decline. MS is clinically variable from AD, and GM atrophy progressed in MS in subcortical, cerebellar, sensorimotor, and fronto-temporo-parietal components.
New emerging analytical approaches that combine structural MRI data with clinical and other biomarker outcomes hold promise for detecting specific GM changes in the early stages of MS and preclinical AD.

Keywords: Multiple Sclerosis, Alzheimer's disease, Gray matter atrophy , Cognition , Structural magnetic resonance imaging

Maryam Sadat Fakhri Bafghi

Monogenic SLE from Genetic Etiologies to Treatment in a Prospective Era

Maryam Sadat Fakhri Bafghi, Kosar Asnaashari, Nima Rezaei
Department of Internal Medicine, Imam Khomeini Hospital Complex, Tehran University of Medical Science, Tehran, Iran

Systemic lupus erythematosus (SLE), a complex autoimmune disease, is characterized by diverse clinical manifestations. While the etiology is multifactorial, genetic predisposition plays a substantial role. Monogenic SLE, a rare, early-onset form, offers a unique opportunity to elucidate the underlying genetic mechanisms.

This review delves into the genetic underpinnings of monogenic SLE, focusing on complement pathway, interferon pathway, and self-tolerance genes. By understanding the pathophysiological mechanisms, we aim to identify potential therapeutic targets.

Methods: A comprehensive literature search was conducted to identify relevant studies on monogenic SLE and associated genes. Key articles were meticulously analyzed to extract relevant data.

Genetic defects in complement components (C1q, C1r/C1s, C2, C4), interferon pathway genes, and self-tolerance regulators have been implicated in monogenic SLE. These mutations lead to impaired immune regulation, increased inflammation, and tissue damage.

Monogenic SLE offers valuable insights into the complex pathogenesis of SLE. The identification of specific gene mutations and their associated pathways provides a foundation for developing targeted therapies. Future research should focus on elucidating the interplay between genetic and environmental factors to optimize patient care.

Keywords: Monogenic SLE, Monogenic Lupus, Complement Pathway, Interferon Pathway, Self-tolerance Pathway

Maryam Sadat Tonekaboni

Bio-Inspired Materials: Innovations for Sustainable Applications

Maryam Sadat Tonekaboni
Universal Scientific and Research Network (USERN), Tehran, Iran

Bio-inspired materials, which mimic the structure and function of natural systems, have emerged as a promising approach for developing sustainable solutions across various domains. These materials leverage the evolutionary optimized designs found in nature to create innovative products that are environmentally friendly, efficient, and resilient.

Recent advancements in bio-inspired materials have led to the development of eco-friendly cementitious composites, sustainable concretes, green pavements, and textile-reinforced mortars that utilize waste or recycled materials. These innovations not only reduce the environmental impact of construction but also improve the durability and performance of infrastructure.

Beyond construction, bio-inspired materials have found applications in areas such as water desalination, thermal management, packaging, and food production. For instance, bio-inspired adhesives inspired by the strong yet biocompatible adhesives found in nature are used for wound closure and tissue repair in surgeries. Microbial-based food production utilizing microbes to produce protein or other food components provides a more sustainable and scalable way to meet growing food demands.

Furthermore, bio-inspired sensing technologies that mimic the sophisticated sensory organs of animals have the potential to detect a wider range of stimuli with higher sensitivity, making them useful in environmental monitoring or medical applications. These advancements demonstrate the vast potential of bio-inspired materials in addressing global challenges and paving the way for a more sustainable future.

Keywords: Biological materials, Sustainability, Bioinspired materials

Marzieh Pirzadeh

The Evaluation of Autologous Conjunctival Graft Perfusion After Pterygium Surgery Using Optical Coherence Tomography Angiography (OCTA)

Marzieh Pirzadeh
Farabi Eye Hospital, Tehran University Of Medical Sciences, Tehran, Iran

To sequentially study the healing response of conjunctival autografts (CAGs)using optical coherence tomography angiography (OCTA) in patients undergoing ptrygium surgery
Seventeen eyes of seventeen patients who underwent ptrygium excision with CAG were included. OCTA was performed at 1 week, 2 weeks, and 4 weeks post-operatively. The vessels were assessed at two different depths: 1. From conjunctival epithelium to a depth of 200µm 2. From a depth of 200µm to a depth of 1000µm.
All CAGs demonstrated swelling during the first week. Intragraft hemorrhage was observed in 15 eyes (88.2%). CAG vessels showed variable dilation and tortuosity at this time. Under-perfusion of scleral bed was noted in areas that showed a gap between CAG and edges of conjunctiva. During the second week after surgery, fine vessels formed connections between CAG and conjunctiva. Early evidence of vascular remodeling of marginal corneal arcades (MCAs) were visible at this time point. At fourth post-operative week, CAG vessels were more complex and homogenous. Reconstruction of MCAs occurred in 15 patients (88.2%). Vessels of conjunctival bed were dragged toward the autograft.
OCTA of anterior segment can be used reliably for assessment of healing response following ptrygium excision with CAG. Episcleral vessels play the major role in re-vascularization of CAG. Failure of MCA reconstruction might lead to recurrence of ptrygium.

Keywords: Ptrygium, Vonjunctival autografts, Optical Coherence tomography angiography

Mehdi Pasalar

A Randomized, Double-Blind Clinical Study Examining the Impact of Ajwain on Peripheral Neuropathy in Cancer Patients

Mehdi Pasalar, Ghazaleh Heydarirad
Research Center for Traditional Medicine and History of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

Peripheral neuropathy caused by chemotherapy is a prevalent condition in cancer patients undergoing different chemotherapy regimens. This study aimed to investigate the practicality of using ajwain (Trachyspermum ammi (L.) Sprague) cream to alleviate symptoms of peripheral neuropathy induced by taxane-based chemotherapy.

This was a pilot, double-blind, randomized clinical trial conducted in Tehran from 2021 to 2022 involving patients with chemotherapy-induced peripheral neuropathy related to taxane medications. Participants were administered either ajwain cream or a placebo for a duration of four weeks and completed the Chemotherapy-Induced Peripheral Neuropathy Assessment Tool (CIPNAT) at both the beginning and conclusion of the study. Any side effects were also recorded.

Fifteen patients with breast, lung, gastrointestinal, or prostate cancer were assigned to both the drug and placebo groups. The average difference in CIPNAT scores between the groups was 0.83, indicating that the drug was statistically ineffective when compared to the placebo ($P = 0.372$). However, the safety profile at the conclusion of the trial showed encouraging results.

While the effectiveness of ajwain cream in addressing chemotherapy-induced peripheral neuropathy symptoms was not satisfactory, it is essential to conduct multicenter controlled trials with a larger sample size for a comprehensive conclusion.

Keywords: Peripheral neuropathy; Ajwain; Cancer; Palliative care; Persian medicine

Mehrnaz Olfat

On-admission Anemia and Severe Outcomes in Critically Ill Children With COVID-19: Report From a PICU in Iran

Mehrnaz Olfat, Mohammed Saad Albalaghee, Masoud Mohammadpour
Tehran University of Medical Sciences, Division of Pediatric Critical Care, Children's Medical Center, Tehran, Iran

To understand the relationship between first hemoglobin levels and disease-related severity outcomes in children with COVID-19
This retrospective study was conducted at Children's Medical Center during the COVID-19 pandemic. Patients were divided into two groups based on their first hemoglobin levels: anemic, and non-anemic.
133 patients were enrolled with mean age of 63.2 months. 58 patients had anemia for age and 75 were non-anemic. 53.5% of females and 35.6% of males were anemic (p. value: 0.04, OR: 2.06). 77.4% had significant prehospital comorbidities and six healthy patients had anemia (p. value: 0.003, OR: 0.245). 72.9% of patients survived and 27.1% died. Among expired patients, 58.3% were anemic and 41.7% were non-anemic (p. value: 0.037 and OR: 2.270). 54.9% of patients needed vasoactive agents and 42.7% underwent mechanical ventilation (P value: 0.413 and 0.155 respectively). The mean PICU and hospital stay in all patients were 6.9 and 15.7 days respectively (P value 0.077). 83.3% of non-survivors received packed call transfusion, compared with 27.8% of survivors (P value: 0.000, OR: 12.963, 95% CI: 4.853, 34.628).
the prevalence of on-admission anemia in our study was 43.6% with a female: male ratio of 1.5:1. Most patients had comorbidities and anemia was more prevalent among them. We found no correlation between hemoglobin levels and vasoactive and mechanical ventilation needs. The mortality rate in our study was 27.1% and death was seen 2.27 times more in anemic patients compared to others.

Keywords: Anemia, Children, Mortality, Intensive care unit, Hemoglobin

Melika Abrishami

Investigating Exosomethropy as a Novel Therapeutic Approach for Multiple Sclerosis

Melika Abrishami
Department of Medical Laboratory Sciences, School of Allied Medical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Multiple sclerosis (MS) is a chronic, inflammatory demyelinating disorder of the central nervous system that profoundly affects patients' quality of life. Current therapeutic strategies primarily aim to alleviate symptoms and slow disease progression, underscoring the necessity for innovative treatment modalities. Exosomethropy, which involves the therapeutic use of exosomes, has emerged as a promising avenue for MS intervention.

Exosomes are nanoscale extracellular vesicles that facilitate intercellular communication by transferring proteins, lipids, and nucleic acids. Their unique ability to traverse the blood-brain barrier, alongside their immunomodulatory properties, positions them as potential therapeutic agents in the management of MS.

This study examines the therapeutic potential of exosomethropy in MS, focusing on the mechanisms by which exosomes can mitigate inflammation, promote remyelination, and enhance neuroprotection. Preliminary evidence suggests that exosome-based therapies may significantly improve clinical outcomes by targeting both inflammatory and neurodegenerative processes inherent to MS.

Additionally, we explore strategies for engineering exosomes to augment their therapeutic efficacy, including surface modifications for enhanced targeting and the incorporation of bioactive molecules such as anti-inflammatory agents and neurotrophic factors. Challenges related to the production, purification, and delivery of exosome-based therapies are also discussed, providing a comprehensive overview of the current landscape and future directions in exosomethropy for MS treatment.

In conclusion, exosomethropy represents a promising frontier in the development of more effective therapeutic strategies for MS. Future research should prioritize the optimization of exosome properties and the execution of clinical trials to validate their safety and efficacy in MS patients.

Keywords: Multiple sclerosis, Exosomes, Remyelination, Immune modulation

Melika Alijani

Comparative Study of Almond Milk and Cow's Milk: Impact on Enamel Microhardness of primary molar after acidic challenge. An In vitro study

Melika Alijani
Department of Dentistry, Isfahan branch of Azad university, Isfahan, Iran

In developed nations, tooth decay has been reported in 60 to 90 percent of children.With increasing consumption of almond milk, Dentists should be aware of its effects. the present study aimed to compare the effect of almond milk and cow's milk on the enamel microhardness after an acid challenge.
The present study was an experimental study. 30 extracted deciduous molars were collected. The criteria for exclusion were the presence of any decay, color change, roughness, abrasion, or cracks. Initial surface microhardness of the enamel was measured on samples by the Vickers test using a universal Vickers machine (made in Iran). Then, acid was challenged on the samples. Every sample was exposed to 20 ml of citric acid with pH = 3 for 25 hours. Then, microhardness was measured for the second time. the Samples were randomly divided into 3 groups. The first group (control) was immersed in 20 ml of artificial saliva (Chekad sanat made in Iran); the second group was immersed in 20 ml of cow's milk; and the third group was immersed in 20 ml of almond milk (all by Kaleh). All groups were exposed to the respective milk three times a day for 7 days, with each exposure lasting 5 minutes in 25 ml of the milk under study. The microhardness test was repeated. Data were analyzed using paired t-test and one way analysis of variance (ANOVA).
There was an increase in enamel microhardness in the almond milk group($p = 0.002$). The increase in the enamel microhardness in the cow milk group was not significant($P = 0.205$). Conclusion:These results suggest that almond milk unlike cow's milk can increase the enamel microhardness score. more studies are needed to determine effects of almond milk.

Keywords: Cow's milk, Almond milk, Deciduous teeth, Microhardness

Miglena Milusheva

When 2 Becomes 1: Assembling Novel Drug Molecules for IBS Treatment

Miglena Milusheva
1. Department of Bioorganic Chemistry, Faculty of Pharmacy, Medical University of Plovdiv, Bulgaria
2. Department of Organic Chemistry, Faculty of Chemistry, Paisii Hilendarski University of Plovdiv, Bulgaria

Irritable bowel syndrome (IBS) is a complex gastrointestinal disorder with no definitive treatment, presenting a significant clinical challenge. Current therapy often focuses on symptom management, but new therapeutic approaches are needed. This research aims to design, synthesize, and evaluate novel hybrid molecules as drug candidates for IBS treatment, using in silico prediction, chemical synthesis techniques, and in vitro and ex vivo biological activity screening.

Our strategy focuses on the deliberate fusion of multiple pharmacophores from bioactive molecules to target the diverse mechanisms underlying IBS. Several in silico methods were used to pre-screen a library of compounds, identifying those with the highest predicted biological activity, lowest toxicity, and favorable pharmacokinetics. These computational models guide the subsequent synthesis of hybrid molecules, combining structural features of known antispasmodics and anti-inflammatory agents to maximize the therapeutic potential of drug candidates for IBS treatment. The synthesized molecules were characterized using melting point, IR, 1H-NMR, 13C-NMR, and HRMS. Next, a series of in vitro and ex vivo assays were conducted. Preliminary results reveal promising antispasmodic activity, demonstrating significant potential for relaxing smooth muscle tissue – a key to managing IBS symptoms. Additionally, some hybrids exhibited anti-inflammatory effects, further supporting their potential use in conditions like IBS, where inflammation plays a role in disease progression. Future work will include in vivo studies to confirm these findings. Our comprehensive goal is to advance these drug candidates through preclinical development, contributing to innovative therapeutic solutions for IBS and other gastrointestinal disorders.

Keywords: IBS, Hybrid molecules, In silico screening, Antispasmodic, Anti-inflammatory, Drug design

Mihaela Stoyanova

Revolutionary Approaches in IBS Treatment with Silver Nanoparticles

Mihaela Stoyanova[1], Miglena Milusheva[1,2], Vera Gledacheva[3], Iliyana Stefanova[3], Mina Todorova[1], Mina Pencheva[3], Kirila Stojnova[4], Stoyanka Nikolova[1]

1. Department of Organic Chemistry, Faculty of Chemistry, University of Plovdiv, 4000 Plovdiv, Bulgaria

2. Department of Bioorganic Chemistry, Faculty of Pharmacy, Medical University of Plovdiv, 4002 Plovdiv, Bulgaria

3. Department of Medical Physics and Biophysics, Faculty of Pharmacy, Medical University of Plovdiv, 4002 Plovdiv, Bulgaria

4. Bulgaria, The Paisii Hilendarski University of Plovdiv, Faculty of Chemistry, General and Inorganic Chemistry with Methodology of Chemistry Education

Irritable bowel syndrome (IBS) is a multifactorial disorder, with altered intestinal motility, hypersensitivity, and dysfunction of the gut-brain axis. Treatment is still difficult and depends on the symptoms. The range of therapeutic options includes both pharmaceutical treatment and non-pharmacological management, such as food and lifestyle adjustments, contingent on the prevailing symptoms, such as diarrhea, constipation, or stomach pain. Mebeverine, for example, is an antispasmodic used to treat intestinal smooth muscle spasms and intestinal functional abnormalities associated with IBS to relieve symptoms of abdominal pain. The nanoparticle system is one of the best ways to provide medication in a controlled manner in a specific area of inflammation. Silver nanoparticles (AgNPs) have been utilized as drug-delivery systems in the pharmaceutical industry. The current study aims to develop drug-loaded AgNPs incorporating mebeverine to improve the IBS treatment.

Herein, we present a green, galactose-assisted method for the rapid synthesis and stabilization of Ag NPs as a drug-delivery system. To confirm the spasmolytic effect of synthesized AgNPs, spontaneous contractions of gastric smooth muscle segments were studied in isometric conditions. The structure, size distribution, zeta potential, surface charge, and drug release of Ag NPs were discussed. In various in vitro and ex vivo models of inflammation, the nanoparticles significantly inhibited the production of pro-inflammatory cytokines and other mediators of inflammation. This activity suggests that synthesized AgNPs could be beneficial in treating chronic inflammatory conditions. The ability to modulate multiple inflammatory pathways concurrently positions these AgNPs as promising candidates for developing new anti-inflammatory drugs.

As a conclusion, Ag NPs might be a promising medication delivery system for inflammatory bowel disease treatment. Thus, encouraging outcomes highlight the need for more research and development in this field.

Keywords: Silver nanoparticles, Irritable bowel syndrome, Spasmolytic treatment, Drug delivery systems, Mebeverine

Milad Samari

Effects of Green Buildings On Social Behaviors During Pandemics

Milad Samari[1], Mehrnaz Olfat[2]
1. Civil Engineering, Architecture, and Mechanics School, Shahab Danesh University, Qom, Iran
2. Division of Pediatric Intensive Care, Department of Pediatrics, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

Many studies have proved that buildings affect influence resident's health and behavior. During a pandemic such as COVID-19, activities may shift from office work to telecommuting; therefore, people spend more time at home compared to before. Buildings promoted by green elements provide a more comfortable environment for their residents due to better air exchange and a friendly environment. On the other hand, a pandemic may lead to significant social, behavioral, and psychological disturbances in the general population such as increased violence, anxiety, and depression. In this paper, we aimed to find out how green buildings impact resident's social behavior during pandemics. Data was collected by literature review. We found that occupants of green buildings were less affected by the social consequences of the pandemic compared to conventional constructions. We suggest that the private and public sectors pay more attention to green buildings and allocate more budget to this part of construction to improve the general health of society.

Keywords: Green building, Lockdown, Pandemic, Behavior

Milena Rupcheva

Complicated Urinary Tract Infections - How Polymicrobial Are They?

Milena Rupcheva[1,2,4], Tashev R.[1,3,4], Atanasova M.[1,4], Murdjeva M.[1,2,3,5], Petrov M.[1,5]
1. Department of Medical Microbiology and Immunology "Prof. d-r Elissay Yanev", Medical University of Plovdiv
2. Laboratory of Microbiology, University Hospital St. George – Plovdiv
3. Laboratory of Clinical Immunology, University Hospital St. George – Plovdiv
4. Laboratory of Virology, University Hospital St. George – Plovdiv.
5. Research Institute at the Medical University of Plovdiv (RIMU).

Urinary tract infections (UTIs) are a significant medical issue, affecting nearly every person at least once in their lifetime. The current golden standard for aetiological diagnosis is the culturing method. However, it has limitations in fully identifying all pathogens present in the urine and usually detects only a single microorganism in culture. With the introduction of modern diagnostic techniques, increasing evidence supports the thesis that complicated UTIs are often polymicrobial. If this is true, current therapeutic approaches might fail to address all causative agents, potentially leading to recurrent infections and the development of antimicrobial resistance. To tackle this problem, novel methods of urine analysis that supplement the current gold standard should be implemented in routine clinical practice.

The purpose of this study was to assess and compare the effectiveness of several diagnostic methods in detecting the causative agents of complicated UTIs.

Material and methods: Seventy midstream urine samples from hospitalized patients with signs of UTIs were examined using standard urine culturing, biochemical identification, semi-automated and automated methods (MALDI-TOF MS and Vitek 2 Compact), and multiplex real-time PCR.

Our results confirmed the trend that standard culturing determined monomicrobial infections, mainly involving Gram-negative bacteria of the order Enterobacterales, with enterococci being the most common Gram-positive bacteria. However, when the same samples were analysed using multiplex real-time PCR, several different bacterial DNA strands were amplified, providing evidence of a possible polymicrobial community in the urine. We can speculate whether these microorganisms are live or detected by their nucleic acid as non-live forms.

The full detection of all relevant UTI microorganisms is of paramount importance for determining an appropriate therapeutic approach, preventing recurrence, and reducing antimicrobial resistance.

This study is financed by the European Union-NextGenerationEU, through the Nutional Recovery and Resilience Plan of the Republic of Bulgaria, project №BG-RRP-2.004-0007-C01 and research project № 3.4.3/15.01.2024 with topic of the research project: "Optimization of modern rapid methods for precision microbiological diagnostics and target-free antibiotic therapy for urinary tract infections".

Keywords: Urinary tract infections, Monomicrobial, Polymicrobial, Multiplex Real-time PCR

Mohammad Fayaz

Doing Functional Data Analysis in the EEGLAB Software

Mohammad Fayaz
PhD in Biostatistics, Lecturer in Statistics, ECO College of Insurance, Allameh Tabataba'i University, Tehran, Iran

The EEGLAB is a leading software in processing and analyzing experiments with the Electroencephalography (EEG) datasets. It has various functionalities in preprocessing methods like artifact detection and removal, independent component analysis (ICA), advanced statistical methods, and visualizations. In addition, users can make plug-ins and share them online. In this research, we developed a new plug-in with MATLAB programming language that works directly in EEGLAB. The plug-in name is EEGLAB-FDA and it stands for Functional Data Analysis (FDA). The FDA consists of modern statistical methods that consider curves or functions as units of analysis instead of observations. The EEG curves are an example of functional data and many research studies published FDA methodologies to work with them. This plug-in presented some of these methods directly in the EEGLAB and users can use them with a user-friendly graphical user interface (GUI). It has different menus. The functional principal component analysis (FPCA) menu has smoothing the curve options with B-Spline and Fourier basis functions and decomposed it to the eigenfunctions and scores. The output is presented as figures and tables. The scree plot for this analysis shows the fraction of variance explained (FVE) for dimensional reduction. The other menu is doing the functional canonical correlation analysis (FCCA) which estimates the FCC between any two EEG curves from different electrodes on the scalp. The outputs are cross-covariance and cross-correlation 3d plots and heatmaps. It has also another menu for descriptive statistics of the Event-Related Potential (ERP) including the smoothing with generalized cross-validation (GCV), mean and standard deviation functions. It estimates the mth order derivatives of the ERP. For example, the Phase-Plane plot shows the acceleration against velocity. The other menus are functional regressions which relate the dependent variable to independent variables that can be functions or ERPs.

Keywords: Neuroimage, EEGLAB, Plug-in, Functional data analysis (FDA), Graphical user interface (GUI)

Mohammad Hashem Hashempur

Patterns of Use and Disclosure of Complementary and Alternative Medicine Among Hypertensive Patients: An Iranian Cross-sectional Survey

Mohammad Hashem Hashempur
Research Center for Traditional Medicine and History of Medicine, Department of Persian Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

The use of complementary and alternative medicine (CAM) has become increasingly popular as a supplementary treatment option for various health conditions. This research aimed to examine the patterns of use and disclosure of CAM among individuals with hypertension in Iran.

This descriptive-analytic cross-sectional survey involved patients with hypertension attending Internal Medicine Clinics in Fars. The prevalence of CAM usage was assessed using the Persian version of the I-CAM-Q (I-CAM-IR) questionnaire.

A total of 301 participants, aged between 27 and 95 years (mean age: 61 ± 13.09 years), were enrolled in the study. Among them, 218 participants (72.4%) reported using CAM within the past year. Herbal medicine emerged as the most prevalent form of CAM, utilized by 172 individuals (57.1%), with thyme, ginger, and chamomile being the most frequently cited herbs. Users of CAM had a significantly shorter duration of hypertension compared to non-users (6.3 ± 4.9 years vs. 8.7 ± 6.7 years, $p = 0.006$). Additionally, those with prior knowledge of CAM were more likely to use these therapies than those without such knowledge (85.9% vs. 53.1%, $p < 0.001$). Notably, a substantial proportion of participants (41.8%) did not inform their healthcare providers about their CAM use, although 70.4% reported that CAM was helpful.

This study indicates a significant prevalence of CAM utilization, especially herbal treatments, among Iranian patients with hypertension. Further investigation is necessary to assess the effectiveness and safety of CAM treatments in managing hypertension.

Keywords: Complementary and alternative medicine, Hypertension, Traditional Persian medicine, Herbal remedies, Iran

Mohammad Mehdi Gravandi

Rutin-Loaded Chitosan Nanoparticles Ameliorated Freund's Adjuvant-Induced Rheumatoid Arthritis in Wistar Rats by Regulating Oxidative Stress and Inflammatory Markers

Mohammad Mehdi Gravandi, Leila Behbood, Sajad Fakhri, Amir Kiani, Mohammad Hosein Farzaei

Pharmaceutical Sciences Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

The most prevalent chronic inflammatory illness, rheumatoid arthritis (RA), primarily affects the joints and is caused by dysregulation of stromal tissue, which results in persistent inflammation and joint damage. One naturally occurring flavonoid that may have therapeutic benefits for rheumatoid illnesses and other chronic debilitating ailments is rutin. This study examined the preventive benefits of rutin nanoformulation in an animal model of Freund's complete adjuvant-induced rheumatoid arthritis (FCA). Twenty-six male rats were split into ten groups at random: normal, negative control, positive control with prednisolone 10 mg/kg, three doses of rutin (15, 30, 45 mg/kg), rutin nanoparticles (15, 30, 45 mg/kg), and nanoparticle without rutin. The experiments were conducted over a 28-day period.A variety of behavioural measures were assessed, such as the Von Frey test, hot plate test, acetone drop test, open field test, and inclined plane test. Different groups had their serum levels of glutathione (GSH), catalase, and nitric oxide as well as histological examinations assessed. Additionally, gelatin zymography was used to evaluate the activity of matrix metalloproteinase (MMP)-2 and MMP-9. Compared to the control group, the rats' period of immobility was extended by the FCA injection. In addition, rheumatoid arthritis induction led to a rise in nitric oxide and a decrease in GSH and catalase levels; however, the groups that received nanoparticles containing rutin and prednisolone experienced the opposite effects.

MMP-9 was inhibited while MMP-2 was stimulated by rutin nanoparticles. Furthermore, a major contributing factor to the alleviation of histopathological symptoms is this medication delivery mechanism for rutin. Rutin-containing nanoparticles may be a viable treatment option for rheumatoid arthritis patients, given the reduction of behavioural and tissue symptoms and the control of inflammatory cytokine levels.

Keywords: Rutin, Rheumatoid arthritis, Chitosan nanoparticles, Anti-inflammation, Freund's complete adjuvant

Mohammad Rezapour Tougheri

Therapeutic Plasma Exchange for Severe COVID-19; Retrospective Case-Cohort Study in 100 Patients

Mohammad Rezapour Tougheri[2], Behzad Einollahi[1], Amirhomayoun Atefi[3], Sina Imanizadeh[2], Alireza Bolouriyan[2], Mona Fazlikhani[2], Farzaneh Bolouki Moghaddam[2], Hassan Abolghasemi[4], Mohammad Nikpouraghdam[1], Ali Bahramifar[1], Mohammad Gholami-Fesharaki[5], Leila Khedmat[6], Parisa Kianpour[7]

1.Nephrology and Urology Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran
2. Student Research Committee (SRC), Baqiyatallah University of Medical Sciences, Tehran, Iran
3. Student Research Committee, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran
4. Applied Microbiology Research Center, Systems Biology and Poisonings Institute, Baqiyatallah University of Medical Sciences, Tehran, Iran
5. Department of Biostatistics, Faculty of Medicine, Tarbiat Modares University, Ale-Ahmad Highway,
6. Health Management Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran
7. Clinical pharmacy department,faculty of pharmacy, tehran university of medical sciences, tehran, iran

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), the virus responsible for the COVID-19 pandemic (coronavirus disease 2019), has prompted urgent efforts worldwide to develop effective therapies. The treatment of patients with COVID-19 using therapeutic plasma exchange (TPE) has shown promising results; however, additional studies are necessary to validate its efficacy. The aim of the present study was to describe patients with severe COVID-19 who received TPE as supportive/adjuvant therapy. For this, a retrospective case-cohort study was carried out, investigating 100 patients with severe COVID-19 admitted to Baqiyatallah Hospital in Tehran (Iran) between March 4 and May 20, 2020. All patients included in the study received baseline therapy for COVID-19 as well as TPE. Patients with older age, ischemic heart disease, higher systolic blood pressure, mean corpuscular volume (MCV), blood urea nitrogen (BUN), and troponin (Trop), as well as longer RR interval and lower SpO2 at admission, were more likely to die from COVID-19. In addition, the level of SpO2 was significantly lower in patients who died from COVID-19 compared to those who survived during the first seven days of hospitalization. In conclusion, the administration of TPE was associated with improved clinical outcomes in patients with COVID-19, but further research is needed to draw conclusive results.

Keywords: Severe acute respiratory syndrome, COVID-19, Therapeutic plasma exchange (TPE)

Mohammad Sedaghati Jahromi

Entrepreneurial strategies for AI startups

Mohammad Sedaghati Jahromi
M.Sc TechnoPreneurship, Entrepreneurship Faculty, University of Tehran, Tehran, Iran

The rapid evolution of artificial intelligence (AI) technologies has given rise to a unique ecosystem for startups operating in this sector. As AI continues to permeate various industries, entrepreneurs must adopt tailored strategies that not only address the intricacies of technological development but also navigate market dynamics, regulatory landscapes, and consumer expectations. This Research explores key entrepreneurial strategies for AI startups, including innovation and product development, strategic partnerships, market positioning, and ethical considerations. Through a comprehensive analysis, we aim to provide insights that can enhance the success and sustainability of AI ventures.

The main goal of the study is to analyze the relationship between entrepreneurship and artificial intelligence, providing a detailed understanding of how AI startups develop, adjust, and thrive in a fast-paced environment. This Research covers a comprehensive examination of the AI startup landscape, emphasizing strategic planning, market dynamics, and investment conditions.

It presents a deep analysis of the growth of AI startups from their beginnings to contemporary trends while exploring the influence of strategic partnerships, regulatory obstacles, and ethical issues on these emerging businesses.

The entrepreneurial landscape for AI startups is dynamic and multifaceted, requiring a thoughtful approach to strategy formulation and execution. By focusing on innovative product development, fostering strategic partnerships, effectively positioning their offerings, and adhering to ethical principles, AI entrepreneurs can enhance their chances of success in a competitive marketplace. As AI continues to evolve, the ability to adapt and innovate will be crucial for startups aspiring to make a lasting impact on society and the economy.

Keywords: Artificial Intelligence, Startup, Strategy, Challenge, Venture

Mohammad Yazdi

Exploring the Complicated Dialogue between Gut Microbiota and Immune Checkpoint Inhibition

Mohammad Yazdi[1,2], Parmida Sadat Pezeshki[1,3], Nima Rezaei[4,5]
1. School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
2. Universal Scientific Education and Research Network (USERN), Tehran, Iran
3. International Hematology/Oncology of Pediatrics Experts (IHOPE), Universal Scientific Education and Research Network (USERN), Tehran, Iran
4. Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran
5. Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

The emergence of immune checkpoint inhibitors, a subset of cancer immunotherapy, has drawn significant attention owing to its considerable advancements in treating a spectrum of cancer types. However, the divergence in treatment responses observed among patients has elicited a progressing field of investigation, exploring the determinants modulating the effectiveness of immune checkpoint inhibition. The gut microbiota emerges as a fundamental contributor, fostering a complex and multifaceted interplay with the immune system. This comprehensive review attempts to explain the biological processes by which the gut microbiota impacts cancer progression, the immune system, and its substantial role in dictating the efficacy and potential toxicities of immune checkpoint inhibitor therapy in individuals dealing with malignancies. Furthermore, it reviews the microbiota-targeting strategies aimed at enhancing the outcome of cancer immunotherapy.

Keywords: Gut microbiota, Fecal microbiota transplantation, Immune checkpoint inhibitor

Mohammadamin Balibegloo

Innovative BCI Methods for the Management of ADHD: Current Trends and Future Directions

Mohammadamin Balibegloo, Maryam Balibegloo
School of Electrical and Computer Engineering, University of Tehran, Tehran, Iran

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common mental disorders with approximately a prevalence of 3-10% in childhood. It is also associated with a higher college dropout rate, difficulty keeping a job, and self-harm and suicidal attempts during adulthood. Looking for a treatment modality distinct from pharmacological medications or behavioral therapy, brain-computer interface (BCI) is highlighted as an interdisciplinary approach emerging from the rapidly advancing field of technology.

BCI is a kind of neurofeedback technique that enables direct communication with external devices while brain activity is being monitored. By breaking down the brain signals into different frequency bands, BCI provides interpretation of brain signals, often via electroencephalography (EEG), and translates them into specific commands able to control electric devices. Different techniques of BCI in ADHD diagnosis and management, their mechanism, and pros and cons are discussed.

BCI technology can benefit ADHD management by providing real-time neurofeedback, helping patients regulate their brain activity, enhancing cognitive control, and reducing ADHD symptoms. However, lower signal resolution (as with its non-invasive nature), cost and accessibility to specialized equipment, patients' compliance, and ethical and privacy concerns regarding sensitive brain data are of main drawbacks of this method. Conducting further investigations on long-term efficacy is crucial for optimizing its benefits and integrating BCI into mainstream treatment options.

Keywords: ADHD, Attention-deficit hyperactivity disorder, Neurofeedback, BCI, Brain-computer interface

Mohammadreza Mirzaee Goodarzi

The Potentials of High-intensity Ultrasound in Therapeutic Approaches Against Pediatric Glioma

Mohammadreza Mirzaee Goodarzi
1. Tehran University of Medical Sciences, Tehran, Iran
2. Student's Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran

Central nervous system tumors are among the most common causes of death due to cancer among children and Gliomas are the most frequent CNS tumor in children. Gliomas originate from glial cells in the CNS. Gelia cells are a group of cells that participate in supporting neural cells through oxygenation, feeding, and protection. Based on the previous studies Glioma are observed in various parts of the CNS. The World Health Organization classified Gliomas into four groups(I, II, III, IV) based on their pathologic features, their tendency to cause distal metastasis, and the likelihood of tumor relapse post-treatment. Conventional therapeutic methods for Glioma consist of surgery, chemotherapy, and radiotherapy that are not reported to be efficient enough in preventing the recurrence of tumors and cause the patients to encounter serious side effects. High-intensity focused ultrasound(HIFU) is a minimally invasive medical procedure that is employed in cancer treatment. Ultrasound waves are commonly used in medical imaging modalities, however, by application of HIFU high-intensity ultrasound waves instead of constructing images, being focused to penetrate the body and target tumoral tissues. The reverse effects of therapies are minimized by the application of HIFU because there is no need for surgical incisions and targeted areas destroyed precisely, therefore, HIFU provides a shorter recovery time and reduces the risk of tumor recurrence. Recent studies highlighted the advantages of applying HIFU against Glioma in adults, however, more evidence is required to address the benefits of treating pediatric Glioma using HIFU. This review study aims to investigate the advantages and challenges of considering HIFU as a novel therapy against pediatric Glioma.

Keywords: Glioma, High-intensity focused ultrasound, Pediatric

Mojtaba Heydari

The Efficacy of Peer Education of Smartphone Use on the Function and Quality of Life of Visually Impaired Patients

Mojtaba Heydari, Milad Ahmadi, Leyla Ghaznavi, Mohammad Reza Talebneajd
Poostchi Ophthalmology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

This study examines the effectiveness of a peer education program focused on smartphone use in improving the function and quality of life of visually impaired individuals.
The intervention consisted of an eight-session peer education program on smartphone use, with each session lasting two hours over one month. Participants, who were visually impaired adults, initially received theoretical training on smartphone principles and basic operations. This phase was followed by practical, individualized training on installing and configuring essential applications, such as Voice Access Command, VoiceOver/TalkBack, and Text-to-Speech. Feedback was collected, and participant readiness was assessed before and after the practical phase. The effectiveness of the intervention was evaluated using several tools. Visual functions were assessed using the National Eye Institute Visual Functioning Questionnaire 25 (VFQ-25). Low vision symptoms were evaluated with the MREH low vision questionnaire.
The study involved 22 visually impaired adults. The VFQ-25 showed significant improvements in visual functions ($p = 0.021$). The MREH low vision questionnaire indicated a significant reduction in low vision symptoms ($p = 0.032$).
Peer education on smartphone use significantly enhances the functional capabilities and quality of life for visually impaired individuals. The structured combination of theoretical and practical training proves effective in empowering this population to utilize smartphone technology effectively.

Keywords: Low vision, Blindness, Smartphone, Education, Quality of Life, Rehabilitation

Morteza Rajabi

Epirubicin-Induced Alterations in miR-143-3p Expression in MCF-7 and MDA-MB-231 Breast Cancer Cells

Morteza Rajabi
Department of Genetics, Faculty of Basic Sciences, Central Tehran Branch, Islamic Azad University, Tehran, Iran

Breast cancer is one of the most common cancers in women and the second most common cancer in the world . The incidence of breast cancer varies greatly between different societies. For example, it is more in New Zealand and Australia than in Western Europe and South-Central Asia. In this study, we investigated the impact of epirubicin on miR-143-3p expression and its subsequent effects on MCF-7 and MDA-MB-231 breast cancer cell lines. Epirubicin, a well-established chemotherapeutic agent, has been implicated in modulating microRNA (miRNA) expression, thereby influencing cancer progression and therapeutic resistance. To assess apoptosis induction, cell cytotoxicity, flow cytometry, and Western blot analyses were performed. Epirubicin demonstrated dose-dependent cytotoxicity in both cell lines, with MCF-7 cells exhibiting higher sensitivity. Flow cytometry confirmed increased apoptosis in MDA-MB-231 cells, which it was treated with the IC50 concentration of epirubicin after 24 hours. Western blot analysis revealed upregulated Bax and downregulated Bcl-2 protein expression, indicative of apoptosis induction. Quantitative real-time PCR (qRT-PCR) analysis demonstrated a significant upregulation of miR-143-3p in MCF-7 cells, while MDA-MB-231 cells exhibited a more modest increase. In this review, some findings suggest that epirubicin differentially regulates miR-143-3p expression in breast cancer subtypes, potentially influencing the efficacy of miRNA-targeted therapies, but more studies are needed .

Keywords: miR-143-3p, Epirubicin, Breast cancer, Apoptosis, Bax, Bcl-2

Muhammad Awais Khan

Highly Efficient Ruddlesden-Popper (RP) Perovskites as Electron Selective Layers Yielding over 20% efficiency in Organic-Inorganic Perovskite Solar Cells

Muhammad Awais Khan
1. Department of Physics and Astronomy, "G.Galilei", University of Padua, Italy
2. Lulea Technical University, Lulea, Sweden

The electron transport layer (ETL) is linchpin in perovskite solar cells (PSCs). It offers potent, and discriminatory electron elicitation, minute resistivity, and lofty strength along with optimal device performance. In this study, the combined DFT and SCAPS-1D framework are used to investigate the optimized designs of CH3NH3Pb(I1-xClx)3 organic-inorganic perovskite-based solar cells. The analysis of structural stability, mechanical strength and optoelectronic traits was done by employing first-principle calculations with three different exchange-correlation functionals for A2SnO4(A= Sr, Ba) Ruddlesden-popper (RP) compounds. SCAPS-1D was used to analyze device performance by employing different ETLs in PSC architecture. The structural analysis reveal that Sr2SnO4 possesses a more stable structure in tetragonal phase with space group I4/mmm (139) than Ba2SnO4. Mechanical stability is corroborated through the reckoning of elastic constants, with Sr-based RP perovskite showing better mechanical properties as compared to Ba-based RP perovskite enunciating it auspicious for device fabrication. Electronic properties, analyzed through the band structure (BS) and density of state (DOS), confirm the semiconducting nature of both materials, with indirect band gap of 4.59 eV (Ba2SnO4) and 4.21 eV (Sr2SnO4). The optical analysis has stipulated that both materials are found to be good absorbers of ultraviolet (UV) radiation. An optimized device FTO/Sr2SnO4/MAPb(I1-xClx)3/Cu2O/Au is contemplated here with an open-circuit voltage (V_oc) of 1.257 V, a short-circuit current (J_sc) of 23.06 mA/ cm ^2, fill factors (FF) of 83.57%, and a theoretical power conversion efficiency (PCE) of 24.25%. Overall, our findings reveal that Sr2SnO4 RP material has promising and potential features as a novel ETL material for employment in organic-inorganic PSC as a source of renewable energy.

Keywords: Perovskite Solar Cell, Photovoltaics, Density Functional Theory, Optoelectronic, Electron Transport Layer Material

Nadia Rahimzadeh

Nano-messengers of Health: Exosome's Role in Bringing Science to Life

Nadia Rahimzadeh, Alireza Sharifi
student research committee, Shiraz University of Medical Sciences, Shiraz, Iran

Exosomes, tiny vesicles released by cells in our bodies, may seem like microscopic entities far removed from our daily lives. However, the role of exosomes in everyday health and well-being brings the science of these tiny messengers closer to home. Just as individuals communicate through messages, exosomes facilitate communication between cells in our bodies. Beyond their role in everyday health, exosomes have emerged as promising tools for disease treatment. In conditions like cancer, neurodegenerative diseases, and regenerative medicine, exosomes show therapeutic potential by delivering targeted treatments and promoting tissue repair. Considering the potential role of exosomes in maintaining health and treating disease, in this study we aimed to review their role in individualized medicine. Just as each person's genetic makeup is unique, the cargo carried by exosomes can reflect specific aspects of an individual's health, informing diagnostics and treatment strategies tailored to their needs. By leveraging the innate properties of exosomes for precise delivery of bioactive molecules, personalized medicine approaches can be enhanced, leading to more targeted interventions for diverse medical conditions.

Keywords: Exosome, Personalized medicine, Intercellular communication

Navid Ravan

Metaphors In Medicine: Up, Down, and Sideways

Navid Ravan[1], Hamidreza Namazi[2]
1. Pharmaceutical Sciences Research Center, The Institute of Pharmaceutical Sciences, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran
2. Medical Ethics and History of Medicine Research Center, Tehran University of Medical Sciences, Tehran, Iran

Metaphors are a part of language describing the characteristics of an object by referring to a similar object regarded as representative and symbolic. Metaphors play an important role in acquiring knowledge of nature. They also construct our medical knowledge and meanings. This article aims to review the role of metaphors in medicine.
For this purpose, we performed a meta-synthesis method. By searching comprehensive related keywords in databases like Pubmed and Scopus, we provided a list of the roles of metaphors in medicine and categorized them. Then, we portrayed their relations and pros and cons.
Our study shows that the role of metaphors in medicine can be categorized into 4 levels: 1) in research and drug development metaphors construct the values e.g. magic bullet and key-lock metaphors. 2) In the clinic metaphors bridge the gap between the patient's perception of illness and the doctor's objective view of disease. Besides, altering metaphors helps the curing process. 3) In science popularization metaphors shape the public conceptions of health, disease, and medicine. 4) In public health and policy-making, metaphors determine how the government takes policies and acts e.g. using gentle or militarized metaphors in pandemics. We recognized that although metaphors are beneficial in some cases, they can be harmful in others (e.g. by evoking medicalization). Metaphors are inevitable parts of natural language. It is important to detect them and regulate our approach toward them. Acknowledging and criticizing metaphors can enrich medical research and practice, and can improve public health policies, and medical science popularization.

Keywords: Metaphors, Medicine, Magic bullet, Public health, Gentle medicine

Nazanin Abbasi

Frequency of Anxiety, Depression and Social Support in Women with A History of Recurrent Miscarriage Referred to a Public Infertility Center in Mashhad in 2022

Nazanin Abbasi, Bita Seifi, Mohadese Ahmad Abadi
Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran.

Every year many abortions occur, which can be associated with an increase in the incidence and severity of depression, anxiety and stress.
This study was conducted with the aim of investigating the frequency of anxiety and depression and social support in women with a history of repeated abortions who referred to a government infertility center in Mashhad in 2022.
This cross-sectional study was conducted on people with a history of abortion from an infertility center. The patients were included in the study with an easy and accessible method. In this study, Zung's anxiety questionnaire, Zung's depression questionnaire and Ziment et al.'s perceived social support questionnaire were used. The obtained results were analyzed with SPSS version 16 software.
In this study, there were 67 women with an average age of 32.61±4.87 years. The frequency of depression and anxiety and social support in the population under study according to age, length of marriage, length of time since the last abortion, occupation and education had no statistically significant difference (P-Value>0.05). The number of children did not affect depression and anxiety (P-Value>0.05). But the amount of social support in women increased with the increase in the number of children (P-Value=0.039).
The results of this study showed that from 67 women who entered the study, the frequency of anxiety was 9 (13.4%) and the frequency of depression was 14 (20.9%). Women reported a moderate and high level of social support. Anxiety decreased with an increase in satisfaction with the spouse. The frequency of depression was not related to demographic variables. Also, with an increase in the number of children and satisfaction with the spouse, the score of social support increased.

Keywords: Recurrent miscarriage, Anxiety, Depression, Social support

Nazanin Zahra Keshvari

AI-Enabled Targeted Drug Delivery Systems: Neurodevelopmental Disorders, Neurocognitive Disorders, Neurodegenerative Disorders

Nazanin Zahra Keshvari[1], Seyed Ariana Feiz-Abadi[2], Maryam Nikkhah[3], Hadise Ghadiri[4], Aynaz Mahmoudi[5]

1. Department of Medical Laboratory Sciences, Allied Medical Faculty, Tehran University of Medical Sciences

2. Department of Medical Laboratory Sciences, Allied Medical Faculty, Tehran University of Medical Sciences

3. Department of Radiology, Allied Medical Faculty, Tehran University of Medical Sciences

4. Department of Health information technology, Allied Medical Faculty, Tehran University of Medical Sciences

5. Department of Health information technology, Allied Medical Faculty, Tehran University of Medical Sciences

Targeted drug delivery systems represent an advanced pharmaceutical approach, precisely directing therapeutic agents to specific anatomical sites or cellular locations within the body. These systems offer significant advantages over conventional methods, addressing challenges such as drug instability and poor absorption. Meanwhile, artificial intelligence (AI) plays a pivotal role in nanotechnology. AI tools, including deep neural networks (DNN), artificial neural networks (ANN), and DesignVR Expert, enhance drug delivery. DNNs categorize complex drugs, assessing functionality, therapeutic potential, and toxicity. ANNs predict anticancer drug synergies through back-propagation. DesignVR Expert optimizes intraperitoneal in-situ forming nanoparticles (ISNs).

Neurological Disorders are conditions that affect the nervous system and they are They are divided into three groups: neurodevelopmental disorders, neurocognitive disorders, and neurodegenerative disorders. Neurodevelopmental Disorders (NDs) influence brain function and alter neurological development, leading to difficulties cognitive functioning. Common NDs are Autism Spectrum Disorder (ASD) and Attention-Deficit/Hyperactivity Disorder (ADHD). Neurocognitive Disorders result from brain dysfunction and impact cognitive abilities such as memory and problem-solving.The main cause for these disorders are Neurodegenerative Disorders. These chronic conditions damage and destroy parts of the nervous system, especially the brain: Conditions like Alzheimer's disease and Parkinson's disease.In conclusion, the convergence of targeted drug delivery systems and AI holds immense promise for revolutionizing the treatment landscape across neurological disorders.By leveraging AI tools such as DNNs, we can optimize drug categorization and enhance drug functionality. However, challenges related to implementing nanorobots for precise drug delivery remain. As we continue to unravel the complexities of neurological disorders, interdisciplinary collaboration and cutting-edge research is required. As we look ahead, further investigations into personalized drug delivery, nanorobotics, and the integration of AI algorithms with real-time patient data will be pivotal for advancing targeted therapies in the realm of neurological disorders.

Keywords: Artificial intelligence, Drug delivery, Neurological disorders

Negin Rastegar

Characterization of Thermal Conductivity of Cellulose Acetate/nano-SiO2 Electrospun Nanofiber Composites for Energy-saving, Using an Oxygen-enriched Method

Negin Rastegar, Farideh Golbabaei, Saba Kalantary, Parvaneh Sangpour, Kamal Azam, ,Mohammad Reza Monazzam
Department of Occupational Health, Tehran University of Medical Science, Tehran, Iran

Herein, the SiO2 nanoparticles were applied to decrease the thermal conductivity of cellulose acetate (CA) nanofibers via electrospinning and the oxygen-enriched method. Hence, solutions of CA and CA/ SiO2 were made by acetone/ dimethylacetamide (2:1) with oxygen enriching and Helium gas. The nanofiber's morphology and chemical structures were studied by SEM and FTIR, respectively. Finally, the media's thermal conductivities were calculated using the two-plate Togmeter device test method based on BS 4745:2005, and the media's tensile strength features were evaluated under the ASTM D638-10 standard. According to SEM images, SiO2 nanoparticles incredibly covered the whole surfaces of CA nanofibers in the CA/ SiO2 medium in a cloud shape. FTIR vibration spectrums confirmed the siloxane bands vibrated at 475/75 cm-1 in the CA/ SiO2 mat. Moreover, the thermal conductivity of the CA and CA/ SiO2 sheets were 0.1 (W.m-1. K-1) with 0.225 ±0.005 mm thickness and 0.044 (W.m-1. K-1) with 0.461 ±2.88 mm thickness, respectively. Additionally, the CA medium had 0.5±0.28 MPa tensile stress at 2.57±1.25% tensile strain and the CA/ SiO2 membrane had 0.561±0.057 MPa at 1.81±0.939%. Hence, the CA/ SiO2 nanocomposite medium has a super low thermal conductivity with good mechanical properties. Therefore, the characterization of the thermal conductivity of cellulose Acetate/nano-SiO2 electrospun nanofiber composites for energy-saving, using an Oxygen-enriched method was completely successful.

Keywords: Thermal conductivity, Tensile strength, Cellulose acetate, SiO2, Nanofibers, Biodegradable polymer, Energy-saving

Niki Talebian

Diagnostic Value of Serum CA-125, CEA, CA 19-9, AMH, WBC Count, Platelet Count, and NLR in Endometriosis: A Case Control Study.

Niki Talebian, Behnaz Nouri, Ladan Kharaz, Mahdi Falah Tafti
1. Preventative Gynecology Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
2. Student Research Committee, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Endometriosis is among the leading causes of morbidity in the female population. Currently, the definite diagnosis of endometriosis depends on the gold-standard invasive methods. Potential biomarkers can offer non-invasive alternatives. This study was designed to investigate the utility of some hematological markers, including white blood cell (WBC) count, neutrophil to lymphocyte ratio (NLR), platelet count, cancer antigen 19-9 (CA 19-9) and 125 (CA-125), carcinoembryonic antigen (CEA), and anti Mullerian hormone (AMH) as non-invasive methods for endometriosis diagnosis.

In this case-control study performed on 346 females in which the case group consisted of 230 endometriosis patients. The data of 116 patients with benign tumors or other benign conditions were used as the control group. Receiver-operating characteristic (ROC) analysis implemented to calculate specificities and sensitivities of CA-125, CA 19-9, CEA, NLR, WBC count, PLT count, and AMH.

Significantly higher mean values were observed for CA-125, CA 19-9, WBC count, and NLR in the case group compared with the control group (p-value < 0.001). The combination of NLR and CA-125 demonstrated the highest diagnostic performance with an area under the curve (AUC) of 0.903. However, the AUC for CA-125 (0.896) was lower and the value of 12.7 IU/mL was the most appropriate cut-off point (sensitivity = 93.9%; specificity = 60.9%). The cut-off value of 35 for CA-125 was also evaluated (sensitivity = 98.3%; specificity = 61.4%). The AUC for NLR was 0.699 and the best cut-off point was 1.5 (sensitivity = 83.4%; specificity = 52.6%).

Combined measurement of CA-125 and NLR showed the highest performance in the diagnosis of endometriosis and can be considered as a diagnostic marker. However, it is necessary to conduct more research to evaluate the applicability of these biomarkers.

Keywords: CA-125, Endometriosis, Diagnosis, Biomarker, Neutrophil to lymphocyte ratio

Niloufar YazdanPanah

COVID-19 Aftermath

Niloufar YazdanPanah
1. Research Center for Immunodeficiencies, Children's Medical Center Hospital, Tehran University of Medical Sciences, Dr. Qarib St, Keshavarz Blvd, 14194, Tehran, Iran
2. Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran

Coronavirus disease 2019 (COVID-19) has affected not only individual lives but also the world and global systems, both natural and human-made. Besides millions of deaths and environmental challenges, the rapid spread of the infection and its very high socioeconomic impact have affected healthcare, economic status and wealth, and mental health across the globe. To better appreciate the pandemic's influence, multidisciplinary and interdisciplinary approaches are needed. This presentation is adopted from a work, in which world-leading scientists from different backgrounds share collectively their views about the pandemic's footprint and discuss challenges that face the international community.

Keywords: COVID-19, Aftermath, Global challenge, Mental health, Economic burden, Energy system, Medical complications, Vaccine

Nima Beheshtizadeh

Design, Manufacturing, and Performance Evaluation of Portable Hand-held 3D Bioprinter for Various Tissue Engineering Applications

Nima Beheshtizadeh
Department of Tissue Engineering, Faculty of Advanced Medical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

The ultimate goal of regenerative medicine, the restoration, reconstruction, and repair of lost and/or damaged tissue function, positively correlates with three-dimensional bioprinting, a novel technique for fabricating engineered tissues. A new trend is to move away from "in vitro bioprinting and subsequent implantation" and instead print the bioink directly into the defect. This is often called "in situ bioprinting," and it aims to get around the problems with current methods so that bioprinting can be used in clinical settings. By using an in situ bioprinting technique, a surgical team may promptly administer the therapy and manage the process in real time. Surgeons and physicians could easily use the portable hand-held bioprinters developed as a result of this technology's progressive trend. The advent of portable hand-held bioprinters has the potential to resolve the obstacles and challenges associated with statistical bioprinting. Multiple tissues, including skin, cartilage, bone, dental, and skeletal muscle, could be considered target tissues for portable handheld bioprinters. Projections suggest that these facilities could actively advance the translation of regenerative medicine science from the bench to the bedside. As a result, the treatment proceeds without delay, and any changes in the defect microenvironment over time, due to the dynamic nature of wounds or surgical resection and debridement, do not surprise the surgeon during the process. Hence, the implanted scaffold precisely aligns with the defect's shape. Moreover, in situ crosslinking strengthens the scaffold's attachment to the remaining tissue, enhancing the integration between the tissue and scaffold. Ultimately, the body, functioning as a natural bioreactor, is far more effective than in vitro culture conditions for tissue regeneration and minimizes the risk of contamination. Recently, several in situ bioprinting techniques have been documented. Researchers are currently focusing their efforts on developing automated in-situ printers and handheld printers. Studies on handheld bioprinters, a novel in situ printing technology, are currently underway. Although it shows potential, in situ bioprinting is a developing area that necessitates materials and technology with distinct qualities in comparison to traditional bioprinting. Consequently, more research is required to modify conventional bioinks and bioprinting techniques to align with this strategy.

Keywords: Tissue engineering, Regenerative medicine, 3D portable bioprinters, Handheld bioprinters

Niloofar Ziadali

Artistic Smiles: The Intersection of Aesthetics and Dentistry in Cosmetic Dentistry

Niloofar Ziadali
Universal Scientific and Research Network (USERN), Tehran, Iran

The convergence of art and dentistry is evident in the field of cosmetic dentistry, where aesthetic principles and artistic techniques are applied to enhance the appearance of a patient's smile. Cosmetic dentistry involves procedures such as teeth whitening, porcelain veneers, and dental implants, all of which require a meticulous attention to detail and a keen eye for aesthetics.
Just as an artist carefully selects colors and shapes to create a visually appealing composition, a cosmetic dentist must consider factors such as tooth color, size, shape, and alignment when designing a treatment plan. The goal is not only to restore oral health but also to create a smile that is harmonious, balanced, and natural-looking.
Artistic principles such as balance, proportion, and symmetry play a crucial role in cosmetic dentistry. Dentists use these principles to design dental restorations that blend seamlessly with the patient's natural teeth and facial features. By applying artistic techniques such as shade matching, layering, and contouring, dentists can create lifelike restorations that mimic the appearance of natural teeth.
Moreover, the use of digital technology in dentistry has further blurred the lines between art and dentistry. Computer-aided design and manufacturing (CAD/CAM) systems allow dentists to create precise and customized restorations with intricate detailing. This technology enables dentists to achieve highly aesthetic results that meet the individual needs and preferences of each patient.
In conclusion, the fusion of art and dentistry in the realm of cosmetic dentistry highlights the importance of aesthetics in oral healthcare. By embracing artistic principles and techniques, dentists can not only improve the function and health of a patient's smile but also create a beautiful and confident appearance. This synergy between art and dentistry showcases the transformative power of combining creativity and science in the pursuit of optimal oral health and beauty.

Keywords: Dentistry, Artistry, Aesthetics

Parsa Alijanizadeh

TLR4-mediated Multiepitope Chimeric Vaccine Targeting Bacterial Infections Linked to Alzheimer's Disease and Cognitive Impairment Using Advanced Immunoinformatics

Parsa Alijanizadeh[1,2], Kiarash Saleki[1,2,3]
1. Student Research Committee, Babol University of Medical Sciences, Babol, Iran
2. USERN Office, Babol University of Medical Sciences, Babol, Iran.
3. Department of e-Learning, Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran

Alzheimer's disease (AD) and cognitive impairment are complex neurological conditions that heavily impact memory, thinking, and behavior, with AD being the most common form. Infections with certain organisms and viruses, such as herpes simplex virus type 1, Chlamydia pneumonia, and Helicobacter pylori, have been documented to contribute to the pathology of AD and cognitive impairment. Additionally, recent evidence supports the role of Cytomegalovirus (CMV) in AD neuropathology and links the Hepatitis C virus (HCV) to dementia. These organisms and viruses stimulate Th1 immune responses. Therefore, we used bioinformatics reverse vaccinology (RV) techniques to redirect immune responses towards Th2 by developing an immunogenic multi-epitope vaccine.

Conserved domain epitopes from specified bacteria and viruses were identified. Bioinformatics online servers were used to predict MHC-1, MHC-2, and CTL epitopes. These epitopes, along with a TAT peptide, an adjuvant, and an IL-10 inducer, were connected using a linker. The sequence of the chimeric vaccine was prepared for the tertiary structure, which was created with MODELLER. The initial 3D model was refined using a Ramachandran plot. The vaccine and TLR-4 were docked, and GROMACS was used for the molecular dynamics (MD) simulation of the vaccine-TLR4 complex. The C-ImmSim server facilitated the immune stimulation of the chimeric vaccine. Predicting the solubility, antigenicity, and allergenicity of the structure was also necessary.

An enhanced ERRAT outcome of 82.54 for the developed model confirmed it is stable. Hence, the Ramachandran plot indicated 97.15% of the residues in the most permitted and favourable location. MD simulations displayed the docked vaccine TLR4 got a stable formation. Finally, immune response simulations showed an encouraging reaction via innate and adaptive immune systems.

We created an immunogenic vaccine against AD and cognitive impairment and verified its favourable effects via the developed Immunoinformatics technique.

Keywords: Alzheimer's disease, Cognitive impairment, Chimeric vaccine, Immunoinformatics

Ralitsa Nikolova

The Role of Gut Microbiome in Chronic Fatigue Syndrome: An Overview

Ralitsa Nikolova[1,2,4], Ivanov I.[2,3], Vaseva K.[1,2], Donchev D.[3], Bozhkov A.[6], Ivanovska M.[1,2,5], Bozhkova M.[1,2,5], Petrov S.[1,2], Kalfova T.[1,2,5], Dudova D.[1,2], Murdjeva M.[1,2,5]
1. Department of Medical Microbiology and Immunology "Prof. Elisssey Yanev"
2. Research Institute of MU-Plovdiv
3. National Center of Infectious and Parasitic Diseases, Sofia, Bulgaria
4. Laboratory of Microbiology, University Hospital "St. George"-Plovdiv
5. Laboratory of Immunology, University Hospital "St. George"-Plovdiv
6. Medical Student, MU-Plovdiv

The human gut microbiome is a complex community of microorganisms that live in the digestive tract and has received enormous interest after the development of metagenomic studies. Many hypotheses about the changes in gut microbiome composition and various human conditions such as immune-mediated disorders are increasingly reported.
AIM: To review the current state of knowledge across the specialized literature on the interplay between the gut microbiome and Chronic Fatigue Syndrome/ Myalgic encephalomyelitis (CFS/ ME).
PubMed, Scopus and Google Scholar databases were extensively searched using the following search keywords: "Chronic fatigue syndrome", "gut microbiome" and "gut-brain axis". We filtered the results to include only publications from 2019 to July 2024.
Changes in the overall composition of the gut microbiome and the ratios between various bacterial taxa have been observed compared to healthy controls. However, there is inconsistency among studies, with some reporting a general decrease in bacterial abundance in CFS/ME patients, while others report an increase. Key changes in the fecal microbiome of CFS/ME patients include a reduction in anti-inflammatory and beneficial bacteria such as Bifidobacterium and Faecalibacterium, along with an increase in pro-inflammatory species like Enterococcus and Streptococcus.
Although there is no single precise alteration of the gut microbiome in all ME/CFS patients, the changes in the microbial composition can disrupt the gut-brain axis, potentially leading to systemic inflammation, altered immune responses, and neuroinflammation, all of which are linked to the symptoms of CFS/ME.
This study was financed by the European Union-NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project № BG-RRP-2.004-0007-C03 and with the help of the National Road Map for scientific infrastructure coordinated financially by the Bulgarian Ministry of Education and Science.

Keywords: Chronic Fatigue Syndrome/ Myalgic encephalomyelitis (CFS/ME), Gut microbiome, Gut-brain axis

Reyhaneh Abdi Andarabi

Gene Therapy Innovations for Dystrophic Epidermolysis Bullosa

Reyhaneh Abdi Andarabi, Alireza Sarkar Lotfabadi, Milad Akbarzadeh
Animal models Integrated Network (AMIN), Universal Scientific and Research Network (USERN), Tehran, Iran

Epidermolysis bullosa (EB) is a rare, heterogeneous genetic dermatosis. These conditions are characterized by fragile mucocutaneous tissues and blisters that can form from minor trauma. The dermal-epidermal junction is disorganized, and blisters can occur on different layers.
Over 30 EB subtypes have been identified and divided into four categories. The skin plane of cleavage determines these categories, which indicate the molecular abnormality. The four main types of EB are simplex, junctional, dystrophic, and Kindler.
Dystrophic epidermolysis bullosa (DEB) can be further categorized into two distinct forms: dominant and recessive. Recessive DEB (RDEB) is more severe than Dominant DEB (DDEB). Blisters, inflammation, skin fibrosis, and squamous cell carcinoma are more common in RDEB patients. These factors significantly affect their daily functioning and lifespan.
DEB is caused by inherited pathogenic COL7A1 gene variants. This gene encodes type VII collagen, a vital component of anchoring fibrils that maintain epidermis-dermis adhesion. Gene therapy, cell-based therapy, protein therapy, and disease-modifying and symptomatic control agents have been developed to treat DEB. Gene therapy has advanced in recent years because it targets the root cause of a condition, offering several advantages over other methods. Targeted treatment, long-lasting effects, and reduced side effects are benefits. The success of gene therapy depends on the development of a vector that can deliver the COL7A1 gene to target cells with high gene expression. The vector should also reduce toxicity, immune-mediated reactions, and long-term correction. Unlike viral vectors, non-viral systems are less immunogenic, tumorigenic, cost-effective, and have higher loading capacity.
Hence, this review aims to explore the potential of gene therapy as an innovative treatment for DEB, targeting the underlying cause of the disease and providing enduring advantages for affected individuals.

Keywords: Epidermolysis bullosa, Gene therapy, Dystrophic

Roya Hajimalek

Brain Cancer Detection Using MRI Imaging and Artificial Intelligence: A Systematic Review

Roya Hajimalek, Sam Hajimalek
Clinical biomechanics and Ergonome research center, AJA University of medical sciences, Tehran, Iran

Brain tumors (BT) are among the most complex and challenging medical issues, as the rapid and uncontrolled growth of these tumors in the confined space of the skull exerts significant pressure on brain tissues, leading to severe and irreversible damage. Despite constituting less than 2% of all human cancers, according to the World Health Organization (WHO), they have the highest mortality rate among all cancer types. Recent advances in Magnetic Resonance Imaging (MRI) and its integration with Artificial Intelligence (AI) have created new opportunities for better and faster diagnosis of brain tumors. This study systematically examines the use of AI algorithms alongside MRI technology to enhance the process of early diagnosis of brain cancer in adults. The aim of this research is to evaluate the effectiveness and accuracy of these technologies in identifying and analyzing brain tumors, as well as to investigate how these methods can contribute to improved clinical and therapeutic outcomes.

The systematic review was performed according to the PRISMA 2020 guidelines. A literature search was conducted using PubMed, EMBASE, and Cochrane databases for all years until July 2024. Inclusion criteria were of the studies that have used MRI data and artificial intelligence for the diagnosis of brain cancer in adults. databases using a strategy that incorporated all MeSH terms and keywords related to Magnetic Resonance Imaging, Brain Cancer Artificial Intelligence. Keywords were combined using the Boolean operators "AND" and "OR" to provide an extensive list of terms for each category. Two reviewers independently assessed all titles and abstracts based on predetermined inclusion and exclusion criteria and to assess their methodological quality. Any disagreements were addressed by discussion to establish consensus.

Based on the selection criteria, 9 studies were chosen for review and analysis, and the quality of these studies and their preliminary data were extracted. The research is currently ongoing, and the final results are expected to be available by the time of the conference.

Studies have shown that artificial intelligence has been effectively utilized in the diagnosis of breast, blood, and gastrointestinal cancers. These technologies have a high potential to enhance the accuracy and speed of cancer diagnosis and can contribute to the advancement of treatment methods. It seems that by leveraging advanced AI algorithms and MRI analyses, similar results could be achieved in the detection of brain cancer.

Keywords: Brain cancer, Magnetic Resonance Imaging, artificial intelligence, and systematic review

Rozhin Bakhshi

PiRNAs; Epigenetic Factors Affecting Colorectal Cancer

Rozhin Bakhshi, Ehsan Hasanzadeh, Mahsa Azhdari, Nasrin Motamed, Hamoon Baghaei
School of medicine Islamic azad university of medical sciences najafabad

PiRNAs are a diverse group of non-coding RNAs that have received much attention in the last decade. These small RNAs play important and different roles in regulating the expression of important genes, including those effective in the cancer pathway. Colorectal cancer (CRC) is one of the most common and deadly cancers in today's society. Recently, researches have been conducted on the effect of piRNAs in colorectal cancer, which shows the high importance of the function of a number of piRNAs with diverse pathways and functions in the development or inhibition of this deadly disease. In this research, the main piRNAs related to colorectal cancer that have been identified have been investigated, and the molecular mechanisms of the effect of the two main strains, i.e. piR-823 and piR-1245, have also been described.

Keywords: PiRNA, Colorectal cancer, Epigenetic, DNMT

Sahel Noorikoloori

From Lab to Life: Targeting Cancer with Precision Nanoparticles

Sahel Noorikoloori
Department of Polymer & Color Engineering, School of Material Engineering & Advanced Processes, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

Cancer treatment has evolved significantly with the advent of nanotechnology, offering new pathways for precise and targeted therapies. This presentation will delve into the intricate world of cancer cells, examining their unique characteristics and the critical distinctions from normal cells. By understanding these differences, we can better appreciate the challenges in developing effective treatments. Central to this discussion is the role of nanocarriers in targeting cancer cells. The advancement that nano particles gained did not only hold the potential to improve patient outcomes by minimizing side effects but also embody the broader theme of translating scientific breakthroughs into life-saving therapies. The purpose of this presentation is to explore innovations and discuss how nano carriers are reshaping the future of cancer therapy.

Keywords: Nanotechnology in oncology, Cancer cell differentiation, Drug delivery systems

Sama Jabbaripour

Overutilization of Head Computed Tomography in Cases of Mild Traumatic Brain Injury: A Systematic Review and Meta-Analysis

Sama Jabbaripour, Mehdi Rezaee, Mohammad Mehdi Nasehi, Mohammad Effatpanah, Maryam Ghamkhar, Hossein Karami, Reza Mehrizi, Pegah Torabi, Leila Ghamkhar
School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Head computed tomography (CT) is the preferred imaging modality for mild traumatic brain injury (mTBI). The routine use of head CT in low-risk individuals with mild TBI offers no clinical benefit but also causes notable health and financial burden. Despite the availability of related guidelines, studies have reported considerable rate of non-indicated head CT requests. The objectives were to provide an overall estimate for the head CT overutilization rate and to identify the factors contributing to the overuse. A systematic review of PubMed, Scopus, Web of Science, and Embase databases was conducted up to November 2023, following PRISMA and MOOSE guidelines. Two reviewers independently selected eligible articles and extracted data. Quality assessment was performed using a bias risk tool, and a random-effects model was used for data synthesis. Fourteen studies, encompassing 28,612 patients, were included, with 27,809 undergoing head CT scans. Notably, 75% of the included studies exhibited a moderate to high risk of bias. The overutilization rate for pediatric and adult patients was 27% (95% CI: 5–50%) and 32% (95% CI: 21–44%), respectively. An alternative rate, focusing on low-risk pediatric patients, was 54% (95% CI: 20–89%). Overutilization rates showed no significant difference between teaching and non-teaching hospitals. Patients with mTBI from falls or assaults were less likely to receive non- indicated scans. There was no significant association between physician specialty or seniority and overuse, nor between patients' age or sex and the likelihood of receiving a non-indicated scan. Approximately one-third of head CT scans in mTBI cases are avoidable, underscoring the necessity for quality improvement programs to reduce unnecessary imaging and its associated burdens.

Keywords: Minor head injury, Computed tomography, Overuse, Emergency service

Sara Ashtari

The evaluation of clinicopathological and response to treatment in patients with toxic epidermal necrolysis in Razi and Imam Khomeini hospital complex from 2012 to 2021

Sara Ashtari
Tehran University of Medical Sciences, Tehran, Iran

Toxic epidermal necrolysis are severe acute mucocutaneous diseases. In this study, we evaluated the clinical aspects of toxic epidermal necrolysis overlap patients who admitted to our hospital from 2012 to 2021

Eleven patients diagnosed as epidermal necrolysis overlap in were included The evaluation of clinicopathological and response to treatment in patients with toxic epidermal necrolysis in Razi and Imam Khomeini hospital complex from 2012 to 2021 in this study. Clinical findings, laboratory tests and response to treatments were evaluated via electronic files.

toxic epidermal necrolysis overlap, and five had toxic epidermal necrolysis. The median period for drug usage was 10 days (2-44 days). Herpes simpleks virus IgM antibody was detected two patients. The median healing time was 38 days 26-94 days). Maculopapular eruptions and oral mucositis were seen in all patients. Vesicul or bullae, epidermal detachment and ocular involvement in 10 of patients. Wound care, H1 antihistamine and methyl prednisolon were used in all patients, intravenous immunoglobulin were used and cyclosporine . Sequel lesions developed in 2 of the patients

Anticonvulsants, antibiotics and non steroid anti-inflammatory drugs play a major role in the etiology of and toxic epidermal necrolysis. Anticonvulsants are associated with severe disease. The patients with proper wound care and treatment with immunosuppressive drugs can be recovered without or with minimal sequelae.

Keywords: Toxic epidermal necrolysis, ScoreTEN, Anticonvulsants

Sara Asl Motaleb Nejad Sarkhab

From Space to Cancer Cells: Advancements in Cancer Research Under Microgravity Conditions

Sara Asl Motaleb Nejad Sarkhab
Department of Biology, Faculty of Basic Sciences, Islamic Azad University Central Tehran Branch, Tehran, Iran

Cancer is a significant global issue, impacting millions of people across the world. Despite improvements in treatments such as surgery, chemotherapy, radiation therapy, and immunotherapy, the worldwide prevalence of cancer cases and associated deaths continues to rise. In the search for innovative ways to better understand and treat cancer, researchers have considered the unique environment of microgravity in space as a promising field of study. Microgravity is a condition where objects appear to be weightless, experienced while orbiting Earth. The International Space Station (ISS) provides this microgravity environment, making it an excellent platform for conducting scientific and medical research. It significantly impacts cellular behavior, influencing cell growth, gene expression, apoptosis, and drug resistance, providing new perspectives on cancer biology. These conditions allow researchers to study the mechanisms and pathways that regulate the growth and function of cancer cells in ways that can't be achieved on Earth. This review examines recent breakthroughs, applications, and challenges in cancer research conducted in space, discussing experiments performed on the ISS, including those using tissue chips, organoids, and other advanced models. It also explores how these studies uncover new aspects of cancer mechanisms and highlight potential therapies. The review concludes by discussing the future of cancer research in microgravity, emphasizing its potential to revolutionize cancer treatment approaches on Earth.

Keywords: Microgravity, Cancer Research, Organoids, Tissue Chips

Sara Fattahi

The Impact of Childhood Trauma, Mentalization, and Alexithymia on Depression and Suicidal Ideation in Women Experiencing Marital Infidelity Trauma

Sara Fattahi , Shohreh Babaei , Mania Naseri Manesh , Fatemeh abouzari, Saber Karami
1. BSc of Psychology, Payam Noor University, Ghazvin, Iran
2. MSc in General Psychology, West Tehran Branch of Islamic Azad University, Tehran, Iran Senior
3. MSc in Clinical Psychology, Nasser Khosrow Institute of Higher Education, Saveh
4. MSc in Clinical Psychology, Tehran Branch, Center of Islamic Azad University, Tehran, Iran
5. PhD student of general psychology, Razi University, Kermanshah, Iran.

Infidelity is a significant marital conflict associated with severe psychological issues. This study investigates the roles of childhood trauma, mentalization, and alexithymia in predicting depression and suicidal thoughts in women affected by infidelity trauma.
Using a descriptive-correlational design, the study's population comprised women experiencing infidelity trauma in Tehran in 2022. A sample of 220 women was selected through convenience sampling and completed the Childhood Trauma Questionnaire (Bernstein et al., 2003), the Mentalization Questionnaire (Fonagy et al., 2016), the Toronto Alexithymia Scale (1994), the Beck Depression Inventory (1996), and the Beck Scale for Suicide Ideation (1991). Data were analyzed using Pearson correlation and multiple regression in SPSS 24.
Significant positive correlations were found between childhood trauma, mentalization (uncertainty component), alexithymia, and both depression and suicidal thoughts ($p < 0.01$). Conversely, a significant negative correlation was observed between mentalization (certainty component) and both depression and suicidal thoughts ($p < 0.01$). Multiple regression analysis showed that childhood trauma experiences, mentalization, and alexithymia explained 76.9% of the variance in depression and 55.2% of the variance in suicidal thoughts.
The findings suggest that interventions targeting mentalization, reducing alexithymia, and trauma-informed therapy for childhood experiences can effectively mitigate depression and suicidal thoughts in women affected by marital infidelity.

Keywords: Childhood trauma experiences, Mentalization, Alexithymia, Expression, Suicidal thoughts, Marital infidelity

Sara Gholami

The Burden Associated with Iodine Deficiency in Iran from 1990 to 2019: Insights Derived from the Global Burden of Disease study

Sara Gholami
Department of Clinical Nutrition, School of Nutrition and Dietetics, Tehran University of Medical Sciences (TUMS), Tehran, Iran

Iodine is an essential micronutrient required for the synthesis of thyroid hormones. Iodine deficiency (ID) can lead to various health issues. This study presents the first comprehensive epidemiological analysis of ID in the Iranian population from 1992 to 2019.
The study utilized data from the Global Burden of Disease (GBD) study. Epidemiological indices, including prevalence, incidence, and age-standardized disability-adjusted life years (DALYs), were compared across all provinces in Iran between 1992 and 2019.
The findings indicate that Iran's age-standardized DALYs rate (ASDR) for iodine deficiency decreased from 14.76 to 5.92 over the study period. Additionally, the ASDR for iodine deficiency showed a declining trend in all provinces. The ASDR peaked in 1990 among middle-aged individuals of both sexes. However, the pattern changed later, with males and older age groups reporting a higher ASDR of iodine deficiency.
The study demonstrates a reduction in the burden of iodine deficiency disorders across different provinces, age groups, and genders in Iran. However, some provinces and population subgroups still require targeted interventions to further reduce the burden of iodine deficiency.
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The author declares no financial or ethical conflicts of interest for any of the studies described in this manuscript.

Keywords: Epidemiology, Iodine, Iodine deficiency, Micronutrient deficiency, Age-standardized disability-adjusted life years, Iran

Sepideh Radvar

The Effect of Vitamin E in Pediatrics with Non-alcoholic Fatty Liver Disease: A Systematic Review and meta-analysis

Sepideh Radvar, Ramiar Rahimi
Student Research Committee, Kurdistan University of Medical Sciences, Sanandaj, Iran

Non-alcoholic Fatty Liver Disease (NAFLD) is an increasingly prevalent condition among pediatric populations. Vitamin E, known for its antioxidant properties, has been proposed as a potential therapeutic option, but its efficacy in children with NAFLD remains controversial. Objective: To systematically review and analyze the effects of vitamin E supplementation on NAFLD in pediatric patients.

A comprehensive literature search was conducted in PubMed, Embase, Cochrane Library, and Web of Science for randomized controlled trials (RCTs) and observational studies published up to December 2023. Studies examining the effect of vitamin E on pediatric NAFLD were included. The primary outcomes were changes in liver enzymes, hepatic steatosis, and histological features. Secondary outcomes included changes in body mass index (BMI), insulin resistance, and adverse effects. The quality of evidence was assessed using the Cochrane risk-of-bias tool for RCTs and the Newcastle-Ottawa Scale for observational studies.

Eight studies (5 RCTs and 3 observational studies) met the inclusion criteria, involving 612 pediatric patients. Pooled analysis showed a significant reduction in alanine aminotransferase (ALT) levels (mean difference: -22.44 IU/L; 95% CI: -36.76 to -8.12; p=0.002) and aspartate aminotransferase (AST) levels (mean difference: -14.87 IU/L; 95% CI: -24.56 to -5.18; p=0.003) with vitamin E supplementation. Improvements in hepatic steatosis were observed in 6 out of 8 studies. However, histological improvements were inconsistent across studies. No significant changes were found in BMI or insulin resistance. Vitamin E was well-tolerated with no serious adverse effects reported.

This systematic review suggests that vitamin E supplementation may improve liver enzymes and hepatic steatosis in pediatric NAFLD patients. However, its effect on histological features remains inconclusive. Large-scale, long-term RCTs are needed to establish definitive guidelines for vitamin E use in pediatric NAFLD and to assess its long-term safety and efficacy.

Keywords: Non-alcoholic Fatty Liver Disease, NAFLD, vitamin E, pediatrics, systematic review

Keywords: NAFLD, Systematic review, Metformin

Seyed Nikan Seyed Ghiasi

Lipid Profile and Mortality in Patients with Pulmonary Thromboembolism; A Systematic Review and Meta-Analysis

Seyed Nikan Seyed Ghiasi, Neda Roshanravan, Samad Ghaffari, Saeid Ghasemnezhad Saadatlou, Sina Seifimansour, Sina Hamzezadeh, Amirreza Naseri, Amin Ghanivash, Erfan Mosharkesh, Ehsan Nasiri, Elnaz Javanshir, Erfan Banisefid
Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran.

Acute pulmonary thromboembolism (PTE) carries a significant risk of mortality for patients. This study aims to assess the predictive value of lipid profiles and history of lipid imbalances in predicting mortality among PTE patients, given the ease of access to lipid profile tests.
This study focused on clinical researches that investigated the association of lipid profiles; including triglyceride (TG), low-density lipoprotein (LDL), high-density lipoprotein (HDL) and total cholesterol as well as the history of lipid imbalances, with mortality in PTE patients. Non-English publications, reviews, editorials, and letters were excluded. Our systematic search was conducted across PubMed, Embase, Scopus, and Web of Science databases. The risk of bias was evaluated using the JBI Critical Appraisal tools, and quantitative synthesis was performed using CMA 4.
Among 3724 search results, 6 studies were included in this review. The findings indicated that higher initial serum levels of HDL, LDL, and total cholesterol were associated with lower mortality rates in patients with PTE. Dyslipidemia was also identified as a risk factor to higher mortality rates in PTE patients. Notably, the survival group showed higher levels of HDL due to meta-analysis (SDM: -0.98; 95%CI: -1.22 to -0.75; p-value0.01; I2: 0.00%; p-value for heterogeneity: 0.94).
Lipid profile is a prognostic marker for survival in PTE. Patients with elevated serum lipid levels demonstrated higher mortality rates, therefore the early prognosis of PTE may be established through the measurement of serum lipids within the first 24 hours of admission.

Keywords: pulmonary thromboembolism, Lipid profile, Prognosis, Mortality

Seyedeh Saba Sajadi Tabar

Animating Recovery: The Role of AI in Precision Physiotherapy

Seyedeh Saba Sajadi Tabar
Student of physiotherapy at Saxion University of Applied Sciences, Enschede, The Netherlands

The convergence of artificial intelligence (AI) and physiotherapy is ushering in a new era of precision medicine. This presentation explores the dynamic interplay between these fields, focusing on the practical applications of AI tools in enhancing patient care. From automating routine tasks to enabling data-driven decision-making, AI is transforming physiotherapy into a more efficient and effective discipline. We will delve into specific AI applications, such as image analysis for injury assessment, predictive modeling for treatment planning, and virtual reality-based rehabilitation guided by AI algorithms. By bridging the gap between scientific innovation and clinical practice, AI is poised to animate the recovery process for countless individuals. This presentation offers a comprehensive overview of current advancements while also speculating on future possibilities, aiming to inspire a shared vision for AI-driven physiotherapy.

Keywords: Artificial intelligence, Physiotherapy, Precision medicine, AI tools, Patient care

Shaghayegh Mohammadioun

The Age of Quantument

Shaghayegh Mohammadioun
Universal Scientific and Research Network (USERN), Tehran, Iran

Artificial intelligance has been became one of the most important issues of the 21st human being. Computer quantum is the back bone of this data. Quantum computing, with its superior computational capabilities compared to classical approaches, holds the potential to revolutionize numerous scientific domains, including doctors and pharmaceuticals. AI acts as a powerful catalyst in narrowing the gap between disease understanding and the identification of potential therapeutic agents. As can be seen, it will take the vast majority of human activities and thinking patterns. Through the studies it has shown an effective role. Thereby, Scientists would use it as a golden assist toward diagnosis, prognosis and treatment. Complex quantum will lead us to improve the result, make better decision and offer better solutions. Make clear diagnosis, Molecular design, drug delivery and drug design will be such a revolution, which will overcome those traditional therapies, that will provide amazing long-term efficacy.

Keywords: AI, Quantum, Drug design, Diagnosis, Drug delivery

Shaghayegh Mousavi

The Role of microRNAs on IBD-related Colorectal Cancer

Shaghayegh Mousavi, Bobak Moazzami
Universal Scientific Education and Research Network (USERN), Tehran, Iran

Colorectal cancer (CRC) ranks as the third most common cancer in the world with almost 900000 deaths each year. Tumor appearance and its progression is influenced by lifestyle, aging, genetic and epigenetic disorders. IBD and inflammation is also a notable known risk factor for CRC. Studies have shown that there is a higher incidence of CRC in IBD patients which indicates inflammatory mediators stimulate colon carcinogenesis. Thus, inflammatory factors like cytokines, chemokines, and micRNAs has considerable role in development of colorectal cancers. MicroRNAs (micRNAs) are a class of endogenous, non-coding single-stranded RNA molecules that regulate organic phenomenon by RNA interference processes, including mRNA chopping, mRNA deadenylation, and translation inhibition. It has been shown that aberrant expression of micRNAs has a major role in processes of cancer progression, proliferation and metastasis, and also in pathogenesis of IBD. As a promising future, controlling the expression of these cancer-associated miRNAs can be therapeutic strategy for immune related diseases and cancers. So it is important to figure out which micRNAs has the main role in this process and how they accomplish it. Therefore, in this article, we aimed to review recent finding on micRNAs role as a promising biomarker for early detection and screening of IBD-related colorectal cancer.

Keywords: Inflammatory bowel disease (IBD), microRNA (miRNA), Colorectal cancer (CRC)

Shiva Ashraf

A Review on Environmental Sustainability of Synthetic Textile Garments Compared to 3D Printed Garments

Shiva Ashraf
Industrial design, Faculty of Fine Arts, Tehran Province, Tehran, Iran

Clothing is one of the primary human needs, and the demand is met by the global production of thousands of tons of textile fbers, fabrics and garments every day. fashion industry evolves today as one the top most polluted industries in the world. Fashion has become cheap and affordable; hence, the consumption has risen to an unsustainable level. Water and energy consumption, hazardous chemical usage, resource depletion, and waste generation are among the key environmental impacts created by the fashion industry. To foster the sustainability in the fashion industry, development of new business models that minimize the environmental damage is urged. Additive manufacturing (AM) can be a solution worth exploring which is the reason it is becoming increasingly popular in many fields, with the ability to manufacture parts in wide variety of materials. 3D printing technology offers a potential paradigm shift by enabling on-demand production, reducing material waste, and allowing for greater design flexibility.
This article explores the environmental sustainability of manufactured clothing versus 3D printed clothing, examining their respective impacts. In order to make this comparison possible, polyester and polyurethane were chosen as representatives for each production category. About two-thirds of all textile fbers are synthetic, and more than half are made from oil-based polyester. Which makes Polyester clothing manufactured from (PET) a market leader. thermoplastic polyurethane (TPU) is known for its outstanding material properties like tear resistance, abrasion resistance, skin compatibility, low-temperature resistance, low long-term deformation rate, antimicrobial properties, soft elasticity, and excellent bending and tension strength. This is why TPU is a popular material for 3D printing fashion products. By highlighting the advantages and limitations of each approach and material, this research aims to provide a comparison between two models in the fashion industry and encourage the adoption of innovative solutions that align with environmental stewardship.

Keywords: Sustainability, 3D Printing, PET, TPU, Garment

Spas Kitov

Arrhythmogenic Load in Metabolic Syndrome

Spas Kitov, Maria-Florans Kitova, Lyudmila Kitova
1. Department of Internal Diseases, Section of Cardiology, Medical University of Plovdiv, Plovdiv, Bulgaria
2. Clinic of Cardiology, St. George University Hospital, Plovdiv, Bulgaria

Metabolic syndrome is characterised by multiple etiopathogenetic mechanisms for myocardial arrhythmogenesis. The observed metabolic changes – increased triglyceride levels, impaired functioning of insulin signal transduction (with or without Diabetes Mellitus), adipocyte dysfunction with enhanced secretion of proinflammatory cytokines,oxidative stress–contribute to cardiomyocyte electrophysiological remodeling and predisposition to arrhythmias. Remodeling is expressed in two aspects–enhanced activity of calcium and sodium channels and inhibition of ionic cellular unloading. The proven dominant sympathetic tone in obesity further increases ion channel activity and intracellular ion concentration.Disrupted intracellular ion homeostasis predisposes the myocardium to arrhythmias. A key element in metabolic syndrome is adipocyte dysfunction, which is expressed in increased synthesis and secretion of proinflammatory cytokines, decreased secretion of adiponectin and increased secretion of leptin. Degree of adipocyte dysfunction was assessed by the adiponectin/leptin ratio.For daily clinical practice, biomarkers have limited application due to their high cost and lack of wider availability.Early and easy electrocardiographic (Tpeak-end interval,QT dispersion and Tpeak-end /QT ratio) markers in daily clinical practice are a challenge in metabolic syndrome and their informative value. It is a scientific challenge to verify them as indicators of the presence of obstructive sleep apnea in metabolic syndrome and their correlation with arrhythmogenic load and the severity.

Keywords: Metabolic syndrome, Arrhythmias, ECG

Spaska Nacheva

Schmidt Syndrome - Autoimmune Polyglandular Syndrome Type 2: Addison's Disease with Hashimoto's Autoimmune Thyroiditis and Co-morbidity of Pernicious Anemia and Gastritis

Spaska Nacheva[1], Ivaylo Mourdjev[2], Lubomir Paunov[3], Marianna Murdjeva[4], Maria Orbetsova[1]

1. Clinic of Endocrinology and Metabolic Diseases, University hospital "St. George"-Plovdiv and Department of Endocrinology, Medical University of Plovdiv

2. Second Surgical Clinic, "St. George" University Hospital "St. George"-Plovdiv and Department of Special Surgery, Medical University of Plovdiv

3. First Surgical Clinic, University Hospital "St. George" - Plovdiv and Department of Propedeutics of Surgical Diseases, Medical University of Plovdiv

4. Laboratory of Clinical Immunology, University Hospital "St. George" - Plovdiv and Department of Medical Microbiology and Immunology, Medical University of Plovdiv

Autoimmune polyglandular syndrome type 2 (APS-2, also known as Schmidt syndrome) is characterized by Addison's disease (obligatory component) and autoimmune thyroid disease (ATD). When type 1 diabetes mellitus (DM) is added, the unfolded Schmidt-Carpenter syndrome develops. Schmidt syndrome is a rare disease, with an estimated prevalence of 1:20000, peak onset in the 3rd - 4th decade of age, and a female predominance. However, cases are becoming more common in clinical practice.

To assess the level of organ dysfunction in a patient with Schmidt syndrome and explore other endocrine and non-endocrine autoimmune disorders.

We present the case of a 36-year-old female patient with established Hashomoto thyroiditis, in whom Addison's disease was manifested and diagnosed about 20 years later. During her hospitalization in 2024, other autoimmune diseases were also proven with immunological, imaging and clinical-laboratory methods.

In our case, there is the rarer combination of Addison's disease with Hashimoto's thyroiditis (31%) , compared to Graves' disease (63%) , as well as co-morbidity with pernicious anemia (15%) and gastritis. The complaints after getting sick from COVID-19 became strongly expressed. Decreased serum and urine free cortisol levels were detected as well as, low DHEA-s concentrations, highly elevated of ACTH and classical electrolyte disturbances. A high titer of steroid 21 - hydroxylase antibodies were found, characteristic for Addison's disease, anti-partietal antibodies for pernicious anemia and anti-thyroid antibodies were detected too. In addition, anti-IA-2 antibodies were found marking higher risk for future development of autoimmune diabetes.

The presented case highlights the fact that diseases in Schmidt syndrome influence each other and often create significant diagnostic difficulties. Hypocorticism can mask the development of glucose intolerance and latent autoimmune diabetes mellitus. It is important to dynamically carry out active screening for carbohydrate, which is essential for the detection of diabetes at an early stage in order to start timely treatment.

Keywords: Autoimmune polyglandular syndrome type 2, Addison's disease, Hashimoto's thyroiditis, Pernicious anemia

Steliyan Petrov

Prognostic Insights: GRP78 Levels and CD8+ T Cell Correlations in COVID-19

Steliyan Petrov, Martina Bozhkova, Michael M. Petrov
1. Department of Medical Microbiology and Immunology - "Prof. Dr. Elissay Yanev", Medical University - Plovdiv
2. Research Institute, Medical University - Plovdiv

As the COVID-19 pandemic continues to challenge global health systems, understanding the underlying immunological and biochemical changes in affected individuals remains crucial. COVID-19 is characterized by infections to the upper and lower respiratory tract, leading to asymptomatic or diverse clinical symptoms, including cough, fever and pneumonia. GRP78, a stress response protein, has been implicated in various pathophysiological processes, including viral infections, such as SARS-CoV-2.
To evaluate the serum GRP78 levels and T cell absolute counts in COVID-19 patients.
Materials and Methods: This prospective observational study included two groups: 1) COVID-19 patients (n=78), divided into two subgroups – with pneumonia (n=36) and without pneumonia (n=42); 2) healthy individuals (n=24). Serum GRP78 levels were assessed on day 1 and day 7 after positive RT-PCR test via enzyme-linked immunosorbent assay. Patients' T cell absolute numbers were analyzed via flow cytometry.
We reported significantly increased GRP78 serum levels on day 1 (mean= 7.53 ng/ml ± 13.18) compared to day 7 (mean= 1.01 ng/ml ± 1.7), with the latter being comparable to the results in the healthy control group (mean= 0.97 ng/ml ± 0.37). A positive correlation was found between GRP78 levels and the presence of pneumonia in the COVID-19 patient group (p=0.0344). The analysis showed a strong and statistically significant (p=0.0066) positive correlation between GRP78 serum levels and CD8+ T cell numbers.
The increase in GRP78 levels due to cellular stress can play a significant role in enhancing the immune response, particularly by increasing the numbers and activity of CD8+ T cells. This relationship is critical in the context of viral infections like COVID-19 and underscores the importance of both CD8+ T cells in viral defense and GRP78 as a potential marker of immune activation and cellular stress. Understanding the mechanisms linking cellular stress and immune activation can provide valuable insights into disease pathology and potential therapeutic targets.

Keywords: GRP78, T cells, COVID-19

Tara Shahmoradi

Golden Years Blues: Neurotransmitter Dynamics in Depression and Anxiety Among Seniors

Tara Shahmoradi
Department of Biotechnology, Faculty of Basic science, Alzahra University, Tehran, Iran

According to the statistics, more than 10% of elderly people and over 30% of residential aged care facility residents have self-reported depression. According to reports, Depression is among the most common psychiatric disorders in the world, with an estimated prevalence of 280 million cases. Quite probably, this is an underestimate, as many cases go unreported. At times, older adults may mistakenly attribute the symptoms of depression to old age, ill health, or dementia. Unfortunately, some older people may also prefer not to discuss depression or feel embarrassed or even reluctant to admit that they are having problems coping. Sadly, this can lead to their not seeking help, or delaying assessment and treatment for a long time Tragically, more than 700 000 people commit suicide each year. However, the exact mechanism of depression is still unknown but studying possible neurotransmitter dynamics can lead us to temporary treatment or at least to lower suicide During the late 1960s, the serotonin hypothesis was introduced, which claimed that serotonin was the primary cause of depressive disorders. This hypothesis has, however, been criticized since recent findings have implicated other neurotransmitters such as noradrenaline, glutamate, and dopamine, and systemic factors including alterations in the limbic network and inflammatory processes in the development of these disorders. This review aims to provide information concerning the role of serotonin, cytokinin, and dopamine and how these neurotransmitters interplay in the evolution of depression in middle-aged persons.

Keywords: Depression, Anxiety, adulthood, serotonin, cytokinin

Tina Shahidi Bonjar

Advantages and Disadvantages of Using Virtual Reality in Physical and Psychological Rehabilitation of Patient with Multiple sclerosis

Tina Shahidi Bonjar, Zoha Shaka
Zahedan University of Medical Sciences, Zahedan, Iran

Multiple sclerosis (MS) is a chronic neurodegenerative disease involving central nerve system. Patient with MS (PWMS) often comorbid with somatic and psychiatric disorders including impairment in balance performance, walking ability, dual task skills, and cognitive function that affect negatively on their quality of life (QOL). In recent years, virtual reality, an advanced technology imitating the activity of real life, has been added to physical and psychological Rehabilitation methods as a non-pharmacological treatment to tackle those disorders.
Aim: we aimed to review the positive and negative effects of using VR technology in physical and cognitive rehabilitation programs of PWMS.
We performed a narrative review of the original papers available in PubMed and Scopus. The following terms have been used: ((“Rehabilitation”[Mesh] OR “Exercise Therapy”[Mesh] OR “Cognitive Training”[Mesh]) AND (“Virtual Reality”[Mesh] OR “Virtual Reality Exposure Therapy”[Mesh] OR “Exergaming”[Mesh])) AND “Multiple Sclerosis”[Mesh]. Then, added (side effects [Title/Abstract])) to search strategy.
Our findings indicate that combination of VR technology with rehabilitation programs for PWMS not only developed patient’s motor coordination, but also promoted their mental well-being. VR exercise trainings improved physical abilities, including the static and dynamic balance performance, hand movement control, and walking patterns in patients suffer from MS. Moreover, using VR environment on the psychological rehabilitation methods had positive impact on cognitive impairments, such as depression, distraction, short- and long-term memory deficit. However, in some cases cybersickness symptoms, such as nausea, and disorientation reported as side effects after VR rehabilitation therapy in PWMS. Analyzing characteristic factors of patients who respond better to VR based rehabilitations trainings indicated that the higher the patient’s disability level, the better response to treatment.

Keywords: Multiple sclerosis, Virtual relity, Rehabilitation, Advers effect

Velislava Todorova

The marvels of Leuzea: From Traditional Applications to Modern Relevance

Velislava Todorova[1,2], Stanislava Ivanova[1,2], Kalin Ivanov[1,2], Dimitar Dimitrov[3]
1. Department of Pharmacognosy and Pharmaceutical Chemistry, Faculty of Pharmacy, Medical University-Plovdiv, 4002 Plovdiv, Bulgaria
2. Research institute, Medical University-Plovdiv, 4002 Plovdiv, Bulgaria
3. Faculty of Pharmacy, Medical University-Plovdiv, 4002 Plovdiv, Bulgaria

Rhaponticum carthamoides (Wild.) Iljin (Asteraceae), also known as Maral root or Russian Leuzea, is an endemic, perennial plant that naturally grows in southern Siberia. It has been used for centuries in Russia, China, and Mongolia, with its various applications described in Eastern folk medicine. It has been utilized for treating fever, cardiovascular diseases, fatigue, kidney diseases, reproductive and sexual disorders, angina, etc. In 1969, Brekhman and Dardimov classified it as an adaptogen, which is now widely used to enhance resistance to stress such as trauma, anxiety, and fatigue.
The objectives were to provide a comprehensive overview of Leuzea's traditional uses, to summarize its biological and chemical properties, and to assess its health benefits and applications.
Leuzea extract possess numerous beneficial effects, including increased physical endurance and work capacity, anabolic, hypocholesterolemic, neuroprotective, anti-diabetic, antioxidant, and immune function enhancement, and potential improvements in cognitive function and cardiovascular health. Leuzea's active constituents, particularly ecdysteroids, have attracted attention for their potential in muscle growth and performance enhancement, making Leuzea a natural alternative to anabolic steroids. The neuroprotective and cognitive effects of this extract are currently under investigation, offering potential benefits against neurological disorders and cognitive decline. There has been an increase in the utilization of products containing R. carthamoides root extract because of the growing interest in its use in sport. Further research is essential to unlock the plant's vast potential through the interplay of traditional medicine, modern technology and its growing use.

Keywords: Rhaponticum carthamoides, Leuzea, Ecdysterone

Yashmin Afshar

Enhancing Maxillary Growth and Scar Management in Cleft Palate Repair Post-Palatoplasty: A Regenerative Medicine Perspective

Yashmin Afshar
Cancer Immunology Project (CIP), Universal Scientific Education and Research Network (USERN), Tehran, Iran

The cleft palate is a common congenital anomaly occurring in an estimated 1 birth out of every 700, affecting oral functions, maxillary growth, and aesthetics thus it is considered a pressing challenge. Early-aged palatoplasty, as a part of the routine management of the condition, aims to address these issues. Despite the beneficial results, it can lead to scarring, a major side-effect of early palatoplasty which can restrain maxillary growth in all three planes leading to malocclusions, facial asymmetry, and functional impairments.

This review is conducted to discover the capacity of regenerative medicine techniques in scar formation reduction followed by palatoplasty. The methods for both soft and hard palates are explored separately. Regenerative medicine offers biodegradable scaffolds, mesenchymal/adipose-derived stem cells, and growth factors including TGF-β and PDGF for soft palate repair. More strategies like CRISPR-Cas9 gene editing and viral/non-viral gene delivery systems are also under investigation to address genetic predispositions to fibrosis. Additionally, this review investigates the promise of 3D bioprinting technologies and smart hydrogels capable of controlled growth factor release, offering new avenues for enhancing tissue healing.

For hard palate repair, the exploration includes techniques such as bone grafts, bioengineered bone substitutes, and growth factors like BMPs and VEGF. The potential of stem cells derived from bone marrow and dental pulp is also covered. Innovative methods, such as 3D-printed bone implants and bioactive materials, are evaluated for their effectiveness in promoting bone regeneration and reducing inflammation.

Combining stem cell treatments with gene therapy, along with using exosomes, offers hopeful strategies to achieve optimized results in both soft and hard palate tissue regeneration. This review aims to highlight the recent progress and ongoing research in regenerative techniques for reducing scarring in palatoplasty, emphasizing the need for continued clinical research to optimize patient care.

Keywords: Regenerative medicine, Cleft palate, Scar reduction, Palatoplasty

Zeinab Sekhavati

Medical Illustration: One Picture Is Worth a Thousand Words

Zeinab Sekhavati
Isfahan University of Medical Science ,Isfahan, Iran

A medical illustration is an artistic visualization, executed in either a physical or digital space, that aims to present information relevant to the fields of medicine and biology. Since the era of Leonardo da Vinci and his portrayal of the human physique, there have been significant advancements in representations of the human body. Art has progressively transformed from traditional illustrations to digital imaging. Accurate and intuitive illustrations are most effective for conveying information in various disciplines rooted in medicine, such as anatomy, embryology, physiology, neuroanatomy, and all fields related to surgery or medical education. In some countries there are specialized programs in graduate schools. The accuracy of medical illustrations is crucial, especially in clinical fields closely related to anatomy, such as surgery or interventional procedures, because they are essential for providing clear guidance and explanations to both physicians and patients. In addition, with the recent advancements in Artificial Intelligence (AI), this has become an era where intricate illustrations can be created easily. Generating desired illustrations by utilizing AI to train on data related to human anatomy and various procedures is considered effective in terms of both time and cost. Various efforts involving AI-generated illustrations are being introduced. in conclusion, for the future advancement of the journal, it is suggested that professional medical journals be supported and actively used.

Keywords: Art, Medical, Illustration

Zeynab Asgari

Identification of microRNAs Involved in PI3K-AKT Signalling Pathway in HTLV-1 Associated Adults T Cell Leukemia Lymphoma (ATLL)

Zeynab Asgari, Hamidreza Mozhgani
Alborz university of medical sciences, Alborz, Iran

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.In this study, we are going to show the highly important mIRNAs in PI3K-AKT pathway that are expressed in ATLL patients.

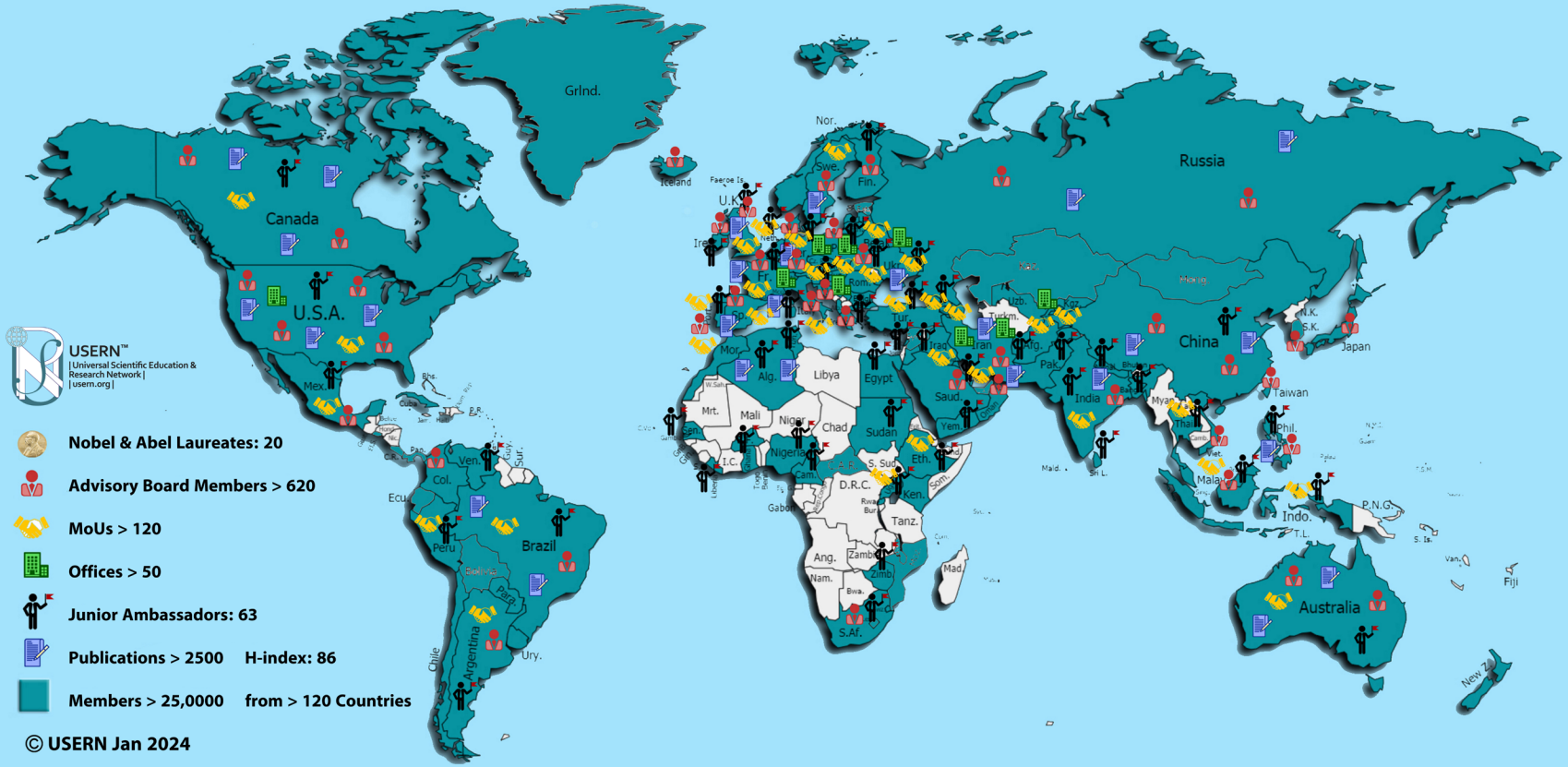
The GSE31629 dataset obtained with the GPL7731 platform. The dataset contains miRNA samples from peripheral blood mononuclear cells (PBMCs) and CD4+ T cells from 40 ATLL patients and 22 healthy donors. Adjusted p-value < 0.05 was determined as the threshold for DEM detection. Initial pathway analysis was performed using the Diana-mirPath web server .PI3K-AKT has been considered as a criterion for selecting miRNAs with a higher probability of participating in ATLL immunopathogenesis.

The effective miRs in the PI3K-AKT pathway implicated in the immunopathogenesis of HTLV-1 was let-7f-5p ,,hsa-miR-20a-5p, let-7a-5p, let-7g-5p, let-7c.

Discussion and conclusions

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: ATLL, HTLV-1, microRNA, PI3K-AKT signaling pathway, Systems virology



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