ATHENS INSTITUTE

Abstract Book

13th Annual International Conference on Pharmacy & Pharmaceutical Sciences 4-9 May 2026, Athens, Greece

Edited by
Parisa Gazerani & Olga Gkounta

2026

Abstracts
13th Annual International Conference on Pharmacy & Pharmaceutical Sciences

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(In Alphabetical Order by Author's Family Name)

Preface

This book includes the abstracts of all the papers presented at the *13th Annual International Conference on Pharmacy & Pharmaceutical Sciences* (4-9 May 2026), organized by the Athens Institute.

A full conference program can be found before the relevant abstracts. In accordance with Athens Institute's Publication Policy, the papers presented during this conference will be considered for inclusion in one of Athens Institute's many publications only after a blind peer review process.

The purpose of this abstract book is to provide members of Athens Institute and other academics around the world with a resource through which they can discover colleagues and additional research relevant to their own work. This purpose is in congruence with the overall mission of the association. Athens Institute was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world can meet to exchange ideas on their research and consider the future developments of their fields of study.

To facilitate the communication, a references section includes all the abstract books published as part of this conference (Table 1). I invite the readers to access these abstract books –these are available for free– and compare how the themes of the conference have evolved over the years. According to Athens Institute's mission, the presenters in these conferences are coming from many different countries, presenting various topics.

Table 1. *Publication of Books of Abstracts of Proceedings, 2014-2026*

Year	Papers	Countries	References
2026	28	21	Gazerani and Gkounta (2026)
2025	29	18	Gazerani and Gkounta (2025)
2024	32	19	Zahariadis and Gkounta (2024)
2023	31	16	Boutsioli and Gkounta (2023)
2022	21	11	Boutsioli and Gkounta (2022)
2021	19	9	Papanikos (2021)
2020	22	12	Papanikos (2020)
2019	27	16	Papanikos (2019)
2018	33	16	Papanikos (2018)
2017	39	17	Papanikos (2017)
2016	35	18	Papanikos (2016)
2015	37	19	Papanikos (2015)
2014	33	15	Papanikos (2014)

It is our hope that through Athens Institute's conferences and publications, Athens will become a place where academics and researchers from all over the world can regularly meet to discuss the developments of their disciplines and present their work. Since 1995, Athens Institute has organized more than 400 international conferences and has published over 200 books. Academically, the institute is organized into 7 divisions and 37 units. Each unit organizes at least one annual conference and undertakes various small and large research projects.

For each of these events, the involvement of multiple parties is crucial. I would like to thank all the participants, the members of the organizing and academic committees, and most importantly the administration staff of the Athens Institute for putting this conference and its subsequent publications together. Specific individuals are listed after the Editors' Note.

Gregory T. Papanikos
President

Editors' Note

These abstracts provide a vital means to the dissemination of scholarly inquiry in the field of Pharmacy & Pharmaceutical Sciences. The breadth and depth of research approaches and topics represented in this book underscores the diversity of the conference. Extra value on this year's edition gives the interdisciplinarity of its included abstracts; with themes on pharmacy, ethics, AI, disability, sustainability, public health, nanomedicine, education.

Athens Institute's mission is to bring together academics from all corners of the world in order to engage with each other, brainstorm, exchange ideas, be inspired by one another, and once they are back in their institutions and countries to implement what they have acquired. The 13th Annual International Conference on Pharmacy & Pharmaceutical Sciences accomplished this goal by bringing together academics and scholars from 21 different countries (Albania, Canada, China, Bulgaria, Denmark, Germany, Italy, Jordan, Kosovo, Libya, Macau, Norway, Poland, Romania, Saudi Arabia, Singapore, Spain, Sri Lanka, Switzerland, Türkiye, USA), which brought in the conference the perspectives of many different country approaches and realities in the field. To be noted is that this year's conference included a cross-cutting intellectual theme "Universities at a Crossroads: Challenges and Opportunities" that raised lots of thinking and discussion.

Publishing this book can help that spirit of engaged scholarship continue into the future. With our joint efforts, the next editions of this conference will be even better. We hope that this abstract book as a whole will be both of interest and of value to the reading audience.

Parisa Gazerani & Olga Gkounta
Editors

13th Annual International Conference on Pharmacy & Pharmaceutical Sciences, 4-9 May 2026, Athens, Greece

Organizing & Scientific Committee

All Athens Institute's conferences are organized by the Academic Council. This conference has been organized with the assistance of the following academic members of Athens Institute.

1. Dr. Gregory T. Papanikos, President, Athens Institute.
2. Dr. George Zahariadis, Director, Health & Medical Sciences Division, Athens Institute & Associate Professor, Faculty of Medicine, Memorial University of Newfoundland, Canada.
3. Dr. Ingrid Brenner, Deputy Director, Health & Medical Sciences Division, Athens Institute & Associate Professor Trent University Canada.
4. Dr. Adel Zeglam, Deputy Director, Health & Medical Sciences Division, Athens Institute and Consultant Neurodevelopment Pediatrician & Professor of Pediatric and Child Health, Tripoli University Hospital & Faculty of Medicine Tripoli University, Libya.
5. Dr. Parisa Gazerani, Head, Pharmaceutical Unit, Athens Institute & Professor, Oslo Metropolitan University, Norway.

FINAL CONFERENCE PROGRAM

13th Annual International Conference on Pharmacy & Pharmaceutical Sciences, 4-9 May 2026, Athens, Greece

PROGRAM

Monday 4 May 2026

08:30-09:15
Registration
09:15-10:00 Opening Speech and Welcoming Remarks
Speaker: Gregory T. Papanikos, President, Athens Institute & Professor (Adjunct), University of Tennessee, Knoxville, USA.

10:00-11:30 Session 1
Moderator: Lyubomira Radeva, Assistant Professor, Medical University-Sofia, Bulgaria.

1. **Hans Rudolf Pfaendler**, Professor Ludwig-Maximilians University, Germany.
   Hans-Ulrich Schmidt, Professor München Klinik gGmbH Germany.
   ***Title**: A New Strategy for Detecting Multidrug Resistance in Gram-Negative Bacteria Prior to Treatment.*
2. **Krassimira Yoncheva**, Professor, Medical University-Sofia, Bulgaria.
   ***Title**: Application of Nanoparticles in Personalized Medicine.*
3. **Greta Camilla Magnano**, Assistant Professor, University of Trieste, Italy.
   ***Title**: Development of Pediatric Buccal Films Based on Modified Starch and Hydroxyethylcellulose.*
4. **Brindusa Dragoi**, Senior Researcher, Regional Institute of Oncology Iasi, Romania.
   Rares-Ionut Stiufiuc, Professor, "Iuliu Haţieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania.
   ***Title**: Cancer Diagnosis and Treatment in the Era of Nanoscience and Nanotechnology.*

11:30-13:30 Session 2
Moderator: Greta Camilla Magnano, Assistant Professor, University of Trieste, Italy.

1. **Rozafa Koliqi**, Associate Professor, University of Prishtina "Hasan Prishtina", Kosovo.
   ***Title**: Influence of Drug Delivery System Design on Tumor Growth Inhibition in Colon Cancer: A Preclinical Quantitative Synthesis.*
2. **Zana Ibraimi**, Associate Professor, University of Prishtina "Hasan Prishtina", Kosovo.
   ***Title**: Community Pharmacists' Awareness, Attitudes, and Confidence in Addressing Opioid Abuse and Naloxone Use in Kosovo.*
3. **Ardiana Murtezani**, Associate Professor, University of Prishtina "Hasan Prishtina", Kosovo.
   ***Title**: Factors Associated with Adverse Drug Reactions among Residents in Nursing Home.*
4. **Lyubomira Radeva**, Assistant Professor, Medical University-Sofia, Bulgaria.
   Aleksandar Belchev, PhD Student, Medical University-Sofia, Bulgaria.
   Yoana Yoncheva, Student, Medical University-Sofia, Bulgaria.
   ***Title**: Polysaccharides – Promising Carriers for Development of Nanosized Drug Delivery Systems.*
5. **Razvan Ghiarasim**, Research Assistant, "Petru Poni" Institute of Macromolecular Chemistry, Romania.
   ***Title**: Precise and Reproducible Liposome Formation Using Microfluidic Technology.*
6. **Anna Lesniak**, Researcher, Medical University of Warsaw, Poland.
   ***Title**: Disulfiram Potentiates Gi/O Protein Signaling by Enhancing GDP/GTP Exchange And Suppressing Spontaneous Activity – A Potential for Repurposing for Opioid-Induced Hyperalgesia.*

13:30-14:30 Session 3 – A Symposium on "Universities at a Crossroads: Challenges and Opportunities I"
Moderator: Gregory T. Papanikos, President, Athens Institute & Professor (Adjunct), University of Tennessee, Knoxville, USA.

Speakers:

1. **Gary Comstock**, Alumni Association Distinguished Undergraduate Professor of Philosophy, North Carolina State University, USA.
   ***Title**: Teaching Americans to Think: One $4 Million Bet on Civil Discourse.*
2. **Ingrid Brenner**, Associate Professor, Trent University, Canada**.**
   ***Title**: The Effect on Budget Cuts on Education.*
3. **Athena Elafros**, Associate Professor, University of Lethbridge, Canada.
   ***Title**: Disability at a Crossroads: Access in the University.*
4. **Claudia Mitzeliotis**, Professor, Mercy University, USA.
   ***Title:** Designing A Psychiatric Nurse Practitioner Master's Degree Program.*
5. **Teodora Duarte-Quilao**, Professor, Webster Geneva Campus, Switzerland.
   ***Title:** Unfolding the Ongoing and Unending Journey of Knowing and Beyond.*

Interventions:

1. **Palle Larsen**, Senior Researcher, UCL University College, Denmark.

14:30-15:30 Lunch

15:30-17:30 Session 4
Moderator: Mahmut Kubilay Akman, Professor, Uşak University, Türkiye.

1. **Claudia Mitzeliotis**, Professor, Mercy University, USA.
   ***Title**: Evaluating the Effectiveness of Multiple Family Group Therapy in Reducing Stress among Families Coping with Autism.*
2. **Adel Zeglam,** Consultant Neurodevelopment Paediatrician and Professor, University of Tripoli, Tripoli University Hospital, Libya.
   Najah Wahra, Pharmacist, Primary Health Care Center, Tripoli, Libya.
   ***Title**: The Physician's Obligations in the Performance of His Work. A Keyhole Look at the Libyan Law on Medical Liability.*
3. **Jason Hickey**, Associate Professor, University of New Brunswick, Canada.
   Morgan Greer, Under One Sky Friendship Center, Canada.
   ***Title**: The Sakələməlsowakən Family Wellness Program: An Indigenous-Led Model of Holistic Nursing and Community Care.*
4. **Athena Elafros**, Associate Professor, University of Lethbridge, Canada.
   ***Title**: Epilepsy as Method.*
5. **Palle Larsen**, Senior Researcher, UCL University College, Denmark.
   Title: Sustainable Leadership and the Food Waste Paradox in Danish Nursing Homes: Balancing Ideals, Institutional Structures, and Everyday Practice.
6. **Elias Papadopoulos**, Medical Student, Temple University, USA.
   Simon Kanis, Graduate Student, Georgia Institute of Technology, USA.
   ***Title**: Attuning a Faster R-CNN Machine Learning Model for Breast Tumor Ultrasound Imaging.*

18:00-20:00 Session 5 – Visit Aristotle's Lyceum

It requires pre-booking

20:30-22:30 Athenian Early Evening Symposium (Sequence of Events: Ongoing Academic Discussions, Dinner, Wine and Water, Music, Dance)

Tuesday 5 May 2026

09:00-10:30 Session 6 – A Symposium on Ethics
Moderator: Morgan Greer, Under One Sky Friendship Center, Canada.

1. **Edwin-Nikko Kabigting**, Associate Professor, Adelphi University, USA.
   Teodora Duarte-Quilao, Professor, Webster Geneva Campus, Switzerland.
   Mi Jin Doe, Clinical Associate Professor, Binghamton University, USA.
   ***Title**: A Humanbecoming Perspective on Dignity.*
2. **Gary Comstock**, Alumni Association Distinguished Undergraduate Professor, North Carolina State University, USA.
   ***Title**: Critical Thinking and Civil Discourse in Democratic Cultures: ThinkArguments, an Answer to the Challenge of Scaling an Online Course for Non-Students.*
3. **David Matas**, Lawyer & International Advisory Board Member, International Coalition to End Transplant Abuse in China, Canada.
   ***Title**: Professional Ethical Standards Addressing Organ Transplant Abuse Abroad.*
4. **Aseel Al Rashdan**, Associate Professor, Jerash University, Jordan.
   ***Title**: Social Diversity and Human Social Diversity in the Workplace: A Pathway to Innovation and Institutional Justice.*

10:30-12:15 Session 7
Moderator: Parisa Gazerani, Head, Pharmaceutical Unit, Athens Institute & Professor, Department of Life Sciences and Health, Oslo Metropolitan University, Norway.

1. **Hadil Alotaibi**, Associate Professor, Princess Nourah Bint Abdulrahman University, Saudi Arabia.
   ***Title**: Nanoparticle-Enabled Layer-by-Layer Drug-Releasing Coatings to Prevent Aseptic Loosening in Uncemented Prostheses.*
2. **Hanbin Lin**, Professor, Shanghai Institute of Materia Medica, Chinese Academy of Sciences, China.
   Huijuan Zhang, Professor, Zhongshan Institute for Drug Discovery, China.
   Na Xing, Professor, Zhongshan Institute for Drug Discovery, China.
   Juanyuan Huang, Professor, Macau University of Science and Technology, Macau.
   ***Title**: The Protective Effect of XZL22 against Pathological Cardiac Hypertrophy and Its Underlying Mechanism.*
3. **Fernando Mihindukulasuriya Rohan**, Director of the Molecular Diagnostic Research Laboratory, Boys Town National Research Hospital, USA.
   Wesley Tom, Senior Research Associate, Boys Town National Research Hospital, USA.
   Nirmalee Fernando, Research Technician, Boys Town National Research Hospital, USA.
   Jayantha Gunaratne, Professor, Institute of Molecular and Cell Biology (IMCB), Agency for Science, Technology and Research (ASTAR), Singapore.
   Nishantha Nanayakkara, Consultant Nephrologist, National Hospital, Kandy, Sri Lanka.
   ***Title**: Genetic Analysis by Whole Exome Sequencing of Chronic Kidney Disease of Uncertain Etiology: A Cross-Sectional Study from Sri Lanka.*

12:15-14:00 Session 8
Moderator: Palle Larsen, Senior Researcher, UCL University College, Denmark.

1. **Parisa Gazerani**, Professor, Oslo Metropolitan University, Norway.
   Hadis Nejati, MSc, Pharmacist, Norway.
   ***Title**: ABO Blood Groups in Disease Risk and Pharmacotherapy.*
2. **Sezgin Gunes**, Professor, Ondokuz Mayıs University, Türkiye.
   Cansu Can, PhD Student, Ondokuz Mayıs University, Türkiye.
   Murat Polat, Assistant Professor, Ondokuz Mayıs University, Türkiye.
   Hilal Ay, Associate Professor, Ondokuz Mayıs University, Türkiye
   ***Title**: Salivary Microbiota Composition in Parkinson's Disease: A Pilot Study Using Nanopore Full-Length 16S rRNA Sequencing.*

3. **Valentina Mincheva**, Head, Department of Cardiology, National Multi-profile Transport Hospital Tsar Boris III, Bulgaria.
   Nikolina Koleva, Associate Professor, National Multi-profile Transport Hospital Tsar Boris III, Bulgaria.
   Ivan Gruev, Professor, National Multi-profile Transport Hospital Tsar Boris III, Bulgaria.
   ***Title**: The Role of Epicardial Adipose Tissue in the Development of Heart Failure with Preserved Ejection Fraction.*
4. **Teuta Osmani Vllasolli**, Associate Professor, University of Prishtina "Hasan Prishtina", Kosovo.
   ***Title**: Pharmacological Modulation of Neuropathic Pain with Adjunctive Graded Motor Imagery in Upper-Limb Complex Regional Pain Syndrome.*
5. **Marsida Duli,** Associate Professor, University of Medicine Tirana Albania.
   Qamil Dika, Lecturer, University of Medicine Tirana Albania.
   ***Title**: Hypertension in Young Age, Hypercalciuria and Renal Cysts as Initial Manifestations of Multiple Endocrine Neoplasia Type 1 (MEN1): Case Report.*

14:00-15:00 Session 9 – A Symposium on "Universities at a Crossroads: Challenges and Opportunities II"
Moderator: Claudia Mitzeliotis, Professor, Mercy University, USA.

Speakers:

1. **Parisa Gazerani**, Professor, Oslo Metropolitan University, Norway**.**
   ***Title**: Rethinking Universities in an Era of Complexity.*
2. **Palle Larsen**, Senior Researcher, UCL University College, Denmark.
   ***Title**: Navigating Complexity: Challenges and Opportunities for Universities in an AI-Driven Era.*
3. **Jose Manuel Castillo Lopez**, Full Professor, University of Granada, Spain.
   ***Title**: The Challenge that Artificial Intelligence Poses to Traditional Research and Teaching Objectives and Methods. The Perspective of Fraud.*

Interventions:

1. **Hans Rudolf Pfaendler**, Professor Ludwig-Maximilians University, Germany.

15:00-16:00 Lunch

16:30-19:30 Session 10
Old and New-An Educational Urban Walk

The urban walk ticket is not included as part of your registration fee. It includes transportation costs and the cost to enter the Parthenon and the other monuments on the Acropolis Hill. The urban walk tour includes the broader area of Athens. Among other sites, it includes: Zappion, Syntagma Square, Temple of Olympian Zeus, Ancient Roman Agora and on Acropolis Hill: the Propylaea, the Temple of Athena Nike, the Erechtheion, and the Parthenon. The program of the tour may be adjusted, if there is a need beyond our control. This is a private event organized by the Athens Institute exclusively for the conference participants.

20:30-22:30
An Ancient Athenian Symposium: Continuous Dialogues, Timeless Flavors (featuring authentic ancient Athenian dishes, local wine, and sweet delicacies from ancient Athens)

Wednesday 6 May 2026
An Educational Visit to Selected Islands
or Nafplio & Mycenae Visit

Thursday 7 May 2026
Visiting the Oracle of Delphi

Friday 8 May 2026
Visiting the Ancient Corinth and Cape Sounion

Saturday 9 May 2026
11:00-13:00 – The Academic Discussion continues in the downtown open agora (close to the Aristotelian Lyceum)
Refreshments are offered by the president of the Athens Institute. The purpose of this academic meeting is to engage in a comprehensive discussion regarding the future of education and research. click here for more details – *(Pre-booking is required and the event will only be held if a minimum number of participants is reached)*

Aseel Al Rashdan
Associate Professor, Jerash University, Jordan

Social Diversity and Human Social Diversity in the Workplace: A Pathway to Innovation and Institutional Justice

Social diversity in the workplace has become one of the most prominent modern trends adopted by forward-looking institutions seeking excellence and development. This study explores the concept of social diversity from a comprehensive perspective, encompassing differences among employees in terms of gender, age, culture, religion, physical and mental abilities, and socioeconomic backgrounds.

The study highlights the importance of diversity in fostering organizational creativity, promoting fairness and equity, and increasing efficiency and productivity. It also addresses the challenges associated with managing diversity, such as cultural biases and communication barriers, and proposes practical mechanisms to overcome them, including inclusive policies, staff training, and cultivating a respectful and open work environment.

The study concludes that achieving social diversity is not only an ethical and humanitarian imperative but also a fundamental pillar of institutional success and sustainability in an era of competitiveness and innovation.

Objectives

- To define social diversity and its key dimensions in the workplace.
- To highlight the benefits of diversity on innovation and institutional justice.
- To identify challenges related to managing diverse workforces.
- To propose effective strategies for promoting inclusion and equity.
- To offer practical recommendations for building diverse and sustainable work environments.

Methodology

This paper adopts a qualitative, descriptive-analytical approach. It relies on a review of existing literature, legal frameworks, and organizational reports related to social diversity in the workplace. Relevant case studies and international best practices are examined to assess the practical implications of diversity policies. The study also

analyzes challenges and strategies using a comparative perspective, drawing insights from various organizational and cultural contexts.

Hadil Alotaibi
Associate Professor, Princess Nourah Bint Abdulrahman University, Saudi Arabia

Nanoparticle-Enabled Layer-by-Layer Drug-Releasing Coatings to Prevent Aseptic Loosening in Uncemented Prostheses

Introduction: Aseptic loosening remains a leading cause of failure in uncemented prostheses and currently requires revision surgery as the only definitive treatment. Preventive strategies based on local delivery of anti-inflammatory agents from implant surfaces are promising; however, existing coating systems still show limited performance and require further optimization.

Methods: Titanium nanoparticles were used as a model for implant surfaces to develop a dexamethasone (DEX)–loaded coating fabricated through layer-by-layer (LbL) assembly. Drug loading and release behavior were characterized as a function of layer number. The biological activity of released DEX was evaluated by measuring inflammatory markers in human monocytes and macrophages, along with cytocompatibility assessments.

Results: DEX loading increased proportionally with the number of deposited layers, and the coating provided sustained drug release over several months. Released DEX significantly reduced pro-inflammatory cytokines (tumor necrosis factor-α and interleukin-6) in monocytes and macrophages, with anti-inflammatory efficacy comparable to that of free DEX at equivalent concentrations. No adverse effects on cell viability or morphology were observed. Furthermore, the coated surfaces were not inferior to medical-grade titanium in supporting osteoblast and fibroblast growth.

Conclusion: LbL-assembled DEX-loaded coatings on titanium nanoparticle model surfaces demonstrated sustained anti-inflammatory drug release, preserved cytocompatibility, and effective modulation of inflammatory responses. This platform represents a promising preventive strategy for reducing aseptic loosening in uncemented prosthetic implants.

Gary Comstock
Alumni Association Distinguished Undergraduate Professor, North Carolina State University, USA

Critical Thinking and Civil Discourse in Democratic Cultures: ThinkArguments, an Answer to the Challenge of Scaling an Online Course for Non-Students

A universal feature of cultures upholding human rights is respect for critical thinking and civil discourse. Here, I describe a quasi-randomized controlled experiment at North Carolina State University testing the effectiveness at scale of ThinkArguments, a low-cost online course designed to teach mass audiences these essential democratic practices.

While the protection of human rights and democracy requires critical thinking, 49% of university graduates lack proficiency in this area. This session will introduce thinkARGUMENTS, a low-cost, evidence-based online course designed to close this gap, and describe an experiment at NC State University to test its effectiveness. Preliminary results will be presented showing the course improves critical thinking test scores by nearly a full letter grade. Gains reached 16% when followed by a face-to-face course.

Participants will experience a short thinkARGUMENTS exercise, explore national data on critical thinking readiness, and discuss strategies for integrating scalable, high-impact interventions into their own programs. Takeaways include: a proven instructional model, ready-to-use exercises for teaching argument analysis, and a framework for combining online and in-person instruction to maximize student learning gains.

First-year students taking the $25 course in a large (n=250 students) classroom improved their critical thinking test scores by almost a full letter grade. Critical thinking among NC State Honors students:

Percentage change from beginning to end of first year
No intervention - 2
Intervention 1 thinkARGUMENTS + 6
Intervention 2 thinkARGUMENTS + one face-to-face course +16

These are significant effects in an area in which it is hard to move the needle.

The session will be interactive, designed to engage participants in analyzing both the problem of underdeveloped critical thinking (CT) skills, the challenge of delivering CT instruction at scale, and the effectiveness of the thinkARGUMENTS intervention. By the end of this

session, participants will be able to:

1. Describe the worldwide gap in critical thinking proficiency among university graduates and its implications for career readiness.
2. Analyze preliminary evidence showing the effectiveness of the thinkARGUMENTS online intervention in improving students' critical thinking skills.
3. Evaluate the benefits of combining online and face-to-face instructional approaches to achieve significant learning gains in large classrooms using an online, low-cost, course.
4. Identify practical, scalable strategies they can adapt to strengthen critical thinking instruction in their own courses and institutions.

Participants will leave with:

- A proven, scalable model showing how a $25 online intervention can significantly improve first-year students' critical thinking skills, even in large classes.
- Sample thinkARGUMENTS exercises—short, high-impact activities for analyzing and constructing arguments, ready to adapt for immediate classroom use.
- An implementation framework for blending online modules with face-to-face instruction to achieve measurable gains (between 6% and 16%) in critical thinking proficiency across diverse learning environments.

Brindusa Dragoi
Senior Researcher, Regional Institute of Oncology Iași, Romania
&
Rares-Ionut Stiufiuc
Professor, "Iuliu Haţieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania

Cancer Diagnosis and Treatment in the Era of Nanoscience and Nanotechnology

In the last more than 20 years, an increased interest in exploring the nanoscience innovations in every field of science can be noticed while nanotechnology provides solutions for problems unsolved by classical methods. They involve exploitation of matter at nanoscale aiming at improving or even creating new properties of the matter. Therefore, they work with structures, devices and system exhibiting new properties or functions as a result of the arrangement of atoms in the nanoscale range (1 – 100 nm). Both nanoscience and nanotechnology are thus growing, and our era consistently takes advantage of the benefits of nanotechnology, with products of the nanotechnology already on the market. One of the most area of interest is medicine, with promising outcomes in the cancer diagnosis and treatment. The integration of nanoscience and nanotechnology in medicine is known as *nanomedicine*, with the branch of *nano-oncology*. The interest in nano-oncology is driven by the increasing incidence of cancer, with this illness as main cause of death under 65 in Europe. Therefore, there is a global effort in advancing knowledge in nano-oncology with the purpose of finding proper solutions for precise and early diagnosis and efficient treatment with minimalized side effects. In this context, the Regional Institute of Oncology in Iasi, Romania, recently set up the Nanotechnology Laboratory (NTL) through a H2020-ERA Chairs project (www.esei-bimed.eu), which is already dedicated to contributing to cancer research by advancing nanomedicine to improve both diagnosis and treatment. NTL's scientific mission is built on three scientific topics: *(i)* development of inorganic nanoparticles that is, magnetic nanoparticles and layered double hydroxides, for photodynamic therapy, controlled delivery of chemotherapeutic drugs, and as contrast agents for MRI, *(ii)* development of lipid-based nanocarriers, that is, microemulsions and (pH-sensitive) liposomes, for drug delivery, and *(iii)* early cancer detection through combined Surface-Enhanced Raman Scattering (SERS) analysis of biological fluids. This last topic also includes development of plasmonic nanoparticles of diverse morphologies needed to fabricate

solid substrates for Raman signal enhancement. The preliminary results highlighted the potential of SERS spectroscopy in detecting disorders in cancer patient-derived blood. In the light of the achievements obtained to date, NTL represents an emerging laboratory on nano-oncology with high potential of further development.

Marsida Duli
Associate Professor, University of Medicine, Tirana (UMT), Albania
&
Qamil Dika
Associate Professor, University of Medicine, Tirana (UMT), Albania

Hypertension in Young Age, Hypercalciuria and Renal Cysts as Initial Manifestations of Multiple Endocrine Neoplasia Type 1 (MEN1): Case Report

Background: Hypertension in young ages always requires evaluation for secondary causes. Multiple Endocrine Neoplasia type 1 (MEN1) is an autosomal dominant disorder characterized by tumors of the parathyroid glands, endocrine pancreas, and pituitary gland. The most common and often earliest manifestation is primary hyperparathyroidism, which may be associated with hypercalciuria and renal complications.

Case presentation: We present the case of a 26-year-old patient who was referred for evaluation of newly diagnosed arterial hypertension. Laboratory and imaging examinations revealed hypercalciuria and the presence of small cortical cysts in the kidneys. Further biochemical investigations showed persistent hypercalcemia with elevated parathyroid hormone (PTH) levels, suggesting primary hyperparathyroidism. Given the patient's young age and systemic manifestations, evaluation for hereditary endocrine syndromes was expanded. Additional examinations and genetic testing confirmed the diagnosis of MEN1.

Discussion: In MEN1, primary hyperparathyroidism occurs in over 90% of patients and is often the first clinical manifestation. Hypercalcemia and hypercalciuria can lead to renal changes, including nephrolithiasis, nephrocalcinosis, or renal cyst formation. In addition, calcium metabolic disorders can contribute to the development or worsening of arterial hypertension.

Conclusion: This case highlights the importance of investigating secondary causes of hypertension in young patients, especially when associated with calcium metabolism disorders and renal changes. Early recognition of MEN1 is essential for the diagnosis and monitoring of other tumors associated with this syndrome, as well as for genetic counseling of at-risk family members.

Athena Elafros
Associate Professor, University of Lethbridge, Canada

Epilepsy as Method

What would it look like to conduct oral histories by, for, and with epileptics in ways that center the experiences of people with epilepsy? This is the question that our six-member research collective of epileptics and academics has sought to answer. To answer this question, we reflect upon our experiences working as a disabled collective and drawing upon "disability as method" scholarship (Schalk, 2017; Mills & Sanchez, 2023) in our working practices. In line with Schalk (2017, para 1) we "understand critical disability studies as a method, an approach, a theoretical framework and perspective—not (exclusively) a study of disabled people." In this paper, we reflect upon the practices we have adopted since we began meeting as a research circle in October 2024 for our research project *Seizures Unscripted: Oral Histories of Epilepsy in Canada and the United States*. We reflect upon how epilepsy as method is rooted in crip spacetime (Price, 2024), is collective and tentative, accessible, tenacious, and relational. We conclude by noting that epileptic experiences and knowledge have much to offer these important conversations of "disability as method."

Mihindukulasuriya Rohan Fernando
Director of the Molecular Diagnostic Research Laboratory, Boys Town National Research Hospital, USA
Wesley Tom
Senior Research Associate, Boys Town National Research Hospital, USA
Nirmalee Fernando
Research Technician, Boys Town National Research Hospital, USA
Jayantha Gunaratne
Professor, Institute of Molecular and Cell Biology (IMCB), Agency for Science, Technology and Research (ASTAR), Singapore
&
Nishantha Nanayakkara
Consultant Nephrologist, National Hospital, Kandy, Sri Lanka

Genetic Analysis by Whole Exome Sequencing of Chronic Kidney Disease of Uncertain Etiology: A Cross-Sectional Study from Sri Lanka

Background: Chronic kidney disease (CKD) is a growing global health challenge and currently the seventh leading risk factor for mortality. Over recent decades, a distinct form of chronic kidney disease of unknown etiology (CKDu) has emerged in tropical and subtropical regions, notably in Sri Lanka. Unlike traditional CKD, CKDu occurs in the absence of diabetes or hypertension and is pathologically defined by tubulointerstitial injury, tubular atrophy, interstitial inflammation, and progressive fibrosis. In Sri Lanka, CKDu exhibits focal geographic clustering, with a 15–20% prevalence among adults aged 30–60 years in the North Central Province and adjacent areas. While familial aggregation has been observed, genetic investigations remain limited compared with extensive environmental studies. This study aimed to identify genetic variants associated with CKDu in affected individuals from Sri Lanka's North Central Region using whole-exome sequencing (WES).

Methods: Ethical approval was obtained from the Institutional Review Board of the Boys Town National Research Hospital, Omaha, USA (IRB #22-13-F) and the Ethical Review Committee of the National Hospital, Kandy, Sri Lanka. Written informed consent was obtained from all participants. The cohort comprised 86 individuals (53 males, 33 females): 47 CKDu patients and 39 controls (27 from endemic and 12 from non-endemic regions). Clinical assessments included blood pressure, random blood glucose, and serum creatinine measurement.

Genomic DNA was extracted from peripheral blood, and WES was performed for all participants. Quality control and variant calling were conducted using the Senteion DNAScope pipeline (Senteion Inc., San Jose, CA). Variant annotation and interpretation followed ACMG guidelines in VarSeq v2.6.2 (Golden Helix Inc., Bozeman, MT), and phenotypic associations were assessed using the PhoRank algorithm based on Human Phenotype Ontology (HPO) terms.

Results: WES identified 171 unique variants across 121 genes. Analysis of variant prevalence revealed multiple genes associated with CKD onset. The most frequently affected genes included ATXN3, LFNG, PNLDC1, LINCO2456, HLA-DRB1, FIP1L1, RBMX, HTT, PSPH, KMT2C, FZD2, PLPP5, PROKR2, SOS1, and SMAD3. Variants in these genes were classified as pathogenic or likely pathogenic and exhibited predicted associations with chronic kidney disease, tubulointerstitial fibrosis, nephritis, and renal insufficiency (PhoRank ≥ 0.48). ATXN3 variants were the most prevalent overall, while LFNG and PNLDC1 variants were more frequent among CKDu patients. Multiple pathogenic or likely pathogenic variants were observed in many individuals, particularly among those affected by CKDu, indicating potential polygenic contributions to disease susceptibility.

Conclusions: This study identifies a set of genetic variants potentially contributing to CKDu susceptibility in Sri Lankan populations. These findings support a multifactorial disease model involving both genetic predisposition and environmental exposures unique to CKDu-endemic regions. The identified genes, several of which are linked to renal function and fibrotic pathways, represent promising targets for further investigation. Integrating genomic, environmental, and epidemiological approaches will be critical to elucidate CKDu pathogenesis and inform future diagnostic and preventive strategies.

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ABO Blood Groups in Disease Risk and Pharmacotherapy

Introduction: The ABO blood group system, historically central to transfusion and transplantation, is among the most widely studied human genetic polymorphisms. Beyond its established relevance in immunohematology, emerging research suggests that ABO blood groups may exert broader influences on human health by modulating susceptibility to chronic and infectious diseases, as well as interindividual variability in therapeutic response. Epidemiological studies have linked non-O blood groups to prothrombotic states, altered lipid metabolism, and immune system differences, while group O has been associated with reduced cardiovascular risk but increased bleeding tendency. These associations have raised interest in ABO typing as a simple, cost-effective biomarker with potential applications in disease risk stratification and personalized pharmacotherapy.

Aim: This systematic review aimed to comprehensively evaluate current evidence on the association between ABO blood groups, disease risk, and the efficacy and safety of pharmacological treatments. By synthesizing data across diverse disease categories and drug classes, the study sought to identify consistent patterns, highlight gaps in knowledge, and assess the feasibility of integrating blood type into personalized medicine strategies.

Methods: The review was conducted in accordance with PRISMA 2020 guidelines, with a protocol registered in PROSPERO to ensure transparency. A comprehensive search of major biomedical databases retrieved studies published up to 2024 that examined ABO blood groups in relation to disease outcomes or drug responses. Screening, eligibility assessment, and quality appraisal were performed independently by reviewers using the National Heart, Lung, and Blood Institute (NHLBI) quality assessment tool. Studies of varying design, including observational cohorts, case–control studies, and interventional trials, were included, and results were synthesized narratively due to heterogeneity in study design and outcome measures.

Results: The search yielded 1,173 records, of which 95 studies met the inclusion criteria following full-text review and quality assessment. Consistent epidemiological trends emerged across disease categories.

Individuals with blood group O generally showed a lower risk of cardiovascular disease, type 2 diabetes, and COVID-19, whereas non-O groups, particularly A and AB, were associated with elevated susceptibility to these conditions. Blood group A was also more frequently linked with thrombotic complications and certain cancers, while group B was associated with variable risk patterns across different populations.

Pharmacological outcomes demonstrated similarly intriguing associations. Several studies indicated that individuals with blood group O exhibited enhanced anticoagulant responses to warfarin, with implications for dosing and bleeding risk management. Reports on analgesic response suggested possible differences in opioid efficacy, although findings were inconsistent and often underpowered. Evidence regarding cancer therapeutics was heterogeneous, with some studies pointing to variable efficacy or toxicity profiles by ABO type but lacking replication in larger cohorts.

Conclusion: This systematic review supports the hypothesis that the ABO blood group may represent an accessible biomarker with potential relevance for both disease risk assessment and pharmacotherapy optimization. While recurring patterns suggest biological plausibility, the current body of evidence remains heterogeneous, with limitations in methodological quality, control of confounders, and consistency across populations. Future large-scale, longitudinal, and mechanistic studies are warranted to validate these associations and to clarify the underlying pathways linking ABO status with health outcomes. Ultimately, integration of blood group information into clinical decision-making could contribute to more precise prevention strategies and individualized treatment regimens within the framework of personalized medicine.

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Precise and Reproducible Liposome Formation Using Microfluidic Technology

Liposomes are nanoscale vesicles composed of one or more phospholipid bilayers capable of encapsulating both hydrophilic and hydrophobic molecules. Due to their biocompatibility, structural versatility, and ability to provide controlled drug release, liposomes have become important nanocarriers for drug delivery and biomedical applications. Conventional preparation methods, such as thin-film hydration, often suffer from limited control over vesicle size, broad size distributions, and poor reproducibility, while additional processing steps like extrusion or sonication may reduce lipid recovery and complicate scalability. Microfluidic technology offers an effective alternative by enabling controlled lipid self-assembly under continuous-flow conditions. In such systems, liposome formation is primarily governed by the *Total Flow Rate (TFR)* and the *Flow Rate Ratio (FRR)* between the aqueous and organic phases, parameters that influence solvent exchange and mixing efficiency. By adjusting these parameters, liposome size and dispersity can be tuned with high reproducibility. In this study, liposomes were produced using a herringbone-structured microfluidic chip that enhances mixing through chaotic advection. One lipid formulation, POPC/cholesterol, were employed to obtain both *small unilamellar vesicles (SUVs)* and *large unilamellar vesicles (LUVs)*. The same systems were used for doxorubicin (DOX) encapsulation through both passive loading and active loading using an ammonium sulfate gradient. Following microfluidic assembly, liposomes were purified by tangential flow filtration (TFF) to remove residual solvent and non-encapsulated drug. The resulting systems were characterized by dynamic light scattering (DLS), while lipid and drug contents were quantified using the Stewart assay and UV–Vis spectroscopy. Overall, the results demonstrate that microfluidic-assisted assembly represents a reproducible and tunable strategy for liposome production, with significant potential for scalable nanomedicine development.

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Salivary Microbiota Composition in Parkinson's Disease: A Pilot Study Using Nanopore Full-Length 16S rRNA Sequencing

Background: Parkinson's disease (PD) has been associated with microbial alterations along the gut-brain axis, and recent studies have extended this investigation to the oral cavity. As the gateway to the gastrointestinal tract, the oral cavity harbors bacteria that can translocate to the gut and potentially contribute to systemic inflammation and neurodegeneration. However, most oral microbiome studies in PD have employed short-read 16S sequencing, which often limits taxonomic classification to the genus level. In this pilot study, we aimed to characterize the salivary microbiota of PD patients at species-level resolution using full-length 16S nanopore sequencing.

Methods: Unstimulated saliva samples were collected from 19 PD patients and 19 controls. Full-length 16S rRNA amplicons were sequenced on the Oxford Nanopore platform and classified using the EMU algorithm against the Human Oral Microbiome Database. Alpha diversity was assessed using Chao1, Shannon, Fisher, and Inverse Simpson indices, and beta diversity using both Aitchison and Bray-Curtis distances with PERMANOVA, adjusting for age and sex as covariates. Differential abundance was evaluated using four methods (LEfSe, MaAsLin2, ANCOM-BC and ANOVA), retaining only consensus taxa.

Results: No significant differences in alpha diversity were observed between PD and control groups ($p>0.05$). Beta diversity analysis revealed a significant compositional difference between groups after adjusting for age and sex (Aitchison: $R^2=0.041$, $p=0.037$; Bray-Curtis: $R^2=0.062$, $p=0.019$), while neither age nor sex showed a significant effect. Six species were consistently less abundant in PD patients: *Prevotella melaninogenica, Peptostreptococcus stomatis*, *Lachnoanaerobaculum gingivalis*, *Hoylesella nanceiensis*, *Corynebacterium durum*, and *Catonella morbi.* Two species, *Streptococcus*

mutans and *Veillonella sp.* HMT-917, were more abundant in the PD group.

Conclusion: These findings suggest a compositional shift in the salivary microbiota of PD patients, with full-length 16S nanopore sequencing enabling species-level resolution beyond short-read approaches. However, the small sample size and cross-sectional design limit interpretation. Moreover, because all PD patients were medicated and key oral microbiome-related confounders were not assessed, it remains unclear whether the observed changes reflect disease-related or confounding effects. Future longitudinal studies are needed to assess their potential as non-invasive biomarkers for PD.

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The Sakələməlsowakən Family Wellness Program: An Indigenous-Led Model of Holistic Nursing and Community Care

Urban Indigenous families in Canada face significant health inequities rooted in colonial legacies, systemic racism, and persistent barriers to culturally safe care. In response, Under One Sky Friendship Centre (UOS) in Fredericton, New Brunswick, developed the Sakələməlsowakən ("feeling strong within yourself, your family, and your community") Family Wellness Program — a comprehensive, Indigenous-led model that integrates nursing, case management, and wellness services within a culturally grounded framework.

Launched in 2021 in response to the impacts of COVID-19, the program began with Indigenous nursing outreach, Healing Spaces mental health counselling, and weekly nurse practitioner services. It has since expanded into a multi-faceted model that includes two Registered Nurses, a Jordan's Principle Navigator, a Research and Program Facilitator, an Outreach/Community Programs Lead, four Mental Health Counsellors, and one Nurse Practitioner. Together, the team provides primary care, counselling services, crisis intervention, case management, health promotion, and community wellness initiatives, including prenatal education and the establishment of an Arctic Acres 360° Grow Dome to support food security and cultural education.

An assessment of program effectiveness was conducted in collaboration with the University of New Brunswick, using a community-based participatory action research approach to ensure Indigenous perspectives informed outcomes and indicators. Findings demonstrated that the program promoted holistic wellbeing, enhanced adherence to care, and addressed systemic and cultural barriers. Service delivery data further highlight the program's growth and impact: in the 2021/2022 fiscal year, the program offered 544 support services; in 2022/2023, this rose to 886 services; and in 2023/2024, the program delivered 1,283 services. Data analysis for 2024/2025 is underway, with early indicators suggesting an even greater increase in demand and reach.

Looking forward, the program is set to continue expand significantly with the opening of UOS's new primary health centre in 2026, which will host primary care and birthing services five days per week. This trajectory reflects a sustainable model of Indigenous-led, community-based nursing that integrates cultural knowledge, family-oriented care, and collaborative evaluation to advance equity in health service delivery.

The Sakələməlsowakən Family Wellness Program demonstrates how Indigenous leadership in nursing and community health can bridge service gaps, support family wellbeing, and inform broader policies on culturally safe, integrated care.

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Community Pharmacists' Awareness, Attitudes, and Confidence in Addressing Opioid Abuse and Naloxone Use in Kosovo

Opioid misuse represents a major public health challenge worldwide, with community pharmacists increasingly recognized as frontline healthcare professionals in harm reduction and medication safety. Community pharmacies provide accessible settings for early identification of misuse, patient counseling, and referral. Given the expanding global role of pharmacists in opioid harm reduction strategies, evaluating preparedness at the community level is critical for integrating pharmacists into national and regional response frameworks. This study evaluated the awareness, professional attitudes, and practice readiness of community pharmacists in Kosovo regarding opioid misuse and naloxone use.

A cross-sectional survey was conducted among 460 community pharmacy professionals using a structured questionnaire assessing knowledge of opioid misuse, perceptions of professional responsibility, counseling practices, and confidence in naloxone administration.

Awareness of opioid-related risks was high, with 93.5% distinguishing between misuse and abuse. Most participants (88.1%) expressed willingness to counsel at-risk individuals, and 75.8% considered community pharmacies appropriate settings for intervention. Support for prescription-only opioid dispensing was strong (93.5%). Although 81.5% were familiar with naloxone, only 43.8% reported confidence in administering it. Confidence and perceived readiness were significantly associated with years of professional experience. These findings suggest that while awareness and professional commitment

among pharmacists in Kosovo are substantial, practical confidence gaps persist, particularly regarding naloxone use and active harm reduction engagement. Structured, practice-oriented training and clearer professional guidance may strengthen pharmacists' capacity to translate knowledge into confident clinical action.

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A Humanbecoming Perspective on Dignity

There are many ethical challenges in fostering human dignity in light of the many deceptions that have arisen in healthcare situations worldwide. These challenges can be viewed in light of the ethos of Parse's humanbecoming paradigm**.** Dignity is the ethos of the humanbecoming paradigm with four explicit ethical tenets; reverence, awe, betrayal, and shame. The purpose of this presentation is to illuminate a deeper understanding of dignity to advance the science and art of nursing thereby upholding the integrity and worth of nursing. Reverence from the humanbecoming paradigm is the solemn regard for human presence which is recognizing the uniqueness of others. Awe is beholding the unexplainable mystery of human existence. Betrayal is a violation of human trust. Shame is humiliation with dishonoring human worth. These ethical tenets are foundational to addressing the ethical challenges faced by nurses and recipients of care globally. Reverence comes with an awareness of inherent differences that acknowledges the uniqueness of the individual. Betrayal surfaces with a shift in the trust-mistrust rhythm. Shame dishonors the worth of individuals. Awe may arise as a choice as individuals bear witness to the surprises and wonders of human existence. Professionals who live humanbecoming uphold the integrity of human dignity in honoring the inherent wisdom and desires of the individuals they serve. In this presentation, each ethical tenet is explored with relevant exemplars for the myriad ethical challenges that nurses and the recipients of care encounter in day to day living. Parse's ethical tenets offer a unique way for nurses to honor the recipients of care thereby valuing their dignity and worth.

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Influence of Drug Delivery System Design on Tumor Growth Inhibition in Colon Cancer: A Preclinical Quantitative Synthesis

Background: Drug delivery systems (DDS) offer a promising strategy to enhance the therapeutic index of chemotherapeutic agents in colon cancer by improving tumor targeting, circulation time, and controlled drug release. Despite extensive preclinical research, a quantitative synthesis evaluating the efficacy of DDS and the influence of design parameters remains lacking.

Methods: We conducted a systematic review and meta-analysis of preclinical in vivo studies assessing DDS-based chemotherapy in murine models of colon cancer. A comprehensive search of PubMed, EMBASE, Scopus, Google Scholar, Cochrane CENTRAL, and ClinicalTrials.gov was performed through October 15, 2025. Outcomes included tumor growth inhibition, with subgroup analyses examining the effects of DDS platform, chemotherapeutic agent, targeting strategy, ligand type, and route of administration. Risk of bias was assessed using SYRCLE's tool.

Results: Twenty-three studies comprising 25 experiments and 539 animals were included. Overall, DDS-based therapies significantly reduced tumor growth compared with controls (WMD: –557.7; 95% CI: –716.8 to –398.5; $p < 0.001$) and free-drug administration (WMD: –276.3; 95% CI: –367.6 to –185.1; $p < 0.001$). Targeted DDS demonstrated superior efficacy compared with non-targeted systems (WMD: –240.3; 95% CI: –399.4 to –81.25; $p = 0.003$). Micelle- and nanoparticle-based platforms and DDS encapsulating SN-38 or doxorubicin showed the largest tumor growth reductions. Intravenous delivery was more effective than intraperitoneal administration, and ligand-mediated targeting—particularly hyaluronic acid and aptamers—enhanced tumor specificity. Risk-of-bias assessment indicated moderate methodological quality, with variability in reporting of randomization, blinding, and sample size calculation.

Conclusions: DDS-based chemotherapy consistently improves antitumor efficacy in preclinical colon cancer models, with targeting strategy, platform type, chemotherapeutic agent, and administration route influencing outcomes. These findings support the rational design of DDS platforms and underscore their translational potential.

Rigorous preclinical study design and standardized reporting of efficacy and safety are essential to facilitate clinical translation.

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Sustainable Leadership and the Food Waste Paradox in Danish Nursing Homes: Balancing Ideals, Institutional Structures, and Everyday Practice

Food waste has become a central challenge in Danish nursing homes, reflecting broader tensions between rising demographic pressures, sustainability goals, and the realities of daily care work. This study examines how leadership styles, organisational structures, and contextual conditions influence the ability of nursing homes to work sustainably and reduce food waste. Drawing on a mixed-methods design, combining nationwide survey data with qualitative interviews, the study provides a comprehensive analysis of how leaders navigate paradoxes between care, efficiency, and sustainability.

Quantitative results show that leaders with higher seniority, stronger educational backgrounds, and close contact with practice are significantly more successful in implementing sustainable initiatives. Relationship-oriented and change-oriented leadership styles correlate positively with holistic and critical sustainability discourses, whereas task-oriented leadership shows little or no association with sustainability efforts. Leaders who exhibit scepticism toward sustainability are markedly less engaged in implementing concrete measures. These results demonstrate that sustainability work is not merely technical or administrative but deeply linked to leadership identity, organisational culture, and the ability to engage staff meaningfully.

The qualitative findings highlight the persistent food-waste paradox: while nursing homes aim to meet complex nutritional needs and deliver person-centred care, rigid procurement systems, documentation requirements, and standardised meal production often lead to overproduction and waste. Case studies show that value-based, dialogical, and practice-near leadership fosters engagement, innovation, and reductions in food waste, whereas top-down administrative leadership models tend to face resistance and achieve limited results. Staff engagement, psychological safety, and interdisciplinary collaboration are identified as central conditions for success.

The study's theoretical framework integrates paradox theory, sustainable and regenerative leadership, and organisational perspectives on New Public Management and rationalisation. These perspectives illuminate how leaders must navigate competing demands—care vs. efficiency, rules vs. flexibility, stability vs. innovation—while building

organisational coherence and collective capacity. The findings point to the need for leadership approaches that support reflection, learning, and local adaptation rather than relying solely on standardised procedures.

Overall, the study demonstrates that sustainable leadership in eldercare requires more than technical solutions: it demands relational competence, reflective capacity, and the ability to create shared meaning around sustainability. Reducing food waste thus becomes both a practical and symbolic task—an indicator of how well organisations balance resident wellbeing with responsible resource use. The study concludes by offering recommendations for practice, including systematic competence development, digital tools for monitoring and ordering, cross-sector partnerships, and leadership models that strengthen psychological safety, interdisciplinary collaboration, and organisational learning.

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Disulfiram Potentiates Gi/O Protein Signaling by Enhancing GDP/GTP Exchange and Suppressing Spontaneous Activity – A Potential for Repurposing for Opioid-Induced Hyperalgesia

Background & Aims: Opioids remain cornerstone analgesics, yet their clinical utility is limited by the development of hyperalgesia, dependence, and withdrawal. Disulfiram, an FDA-approved drug for alcohol use disorder, was previously shown to mitigate those side effects. However, the mechanistic underpinnings are currently unknown. Here, we tested the hypothesis that disulfiram modulates opioid signaling by stimulating specific $G_{i/o}$ protein activation.

Methods: The efficacy and potency of $G_{i/o}$ protein activation by disulfiram and its metabolites - diethyldithiocarbamate (DTC), S-methyl-N, N-diethylthiolcarbamate sulfone (DETC-sulfone), and S-methyl-N, N-diethylthiocarbamate sulfoxide (DETC-sulfoxide) were assessed in rat hypothalamic homogenates in the [^{35}S]GTPγS binding assay. The engagement of thiol residues was evaluated in the presence of dithiothreitol (DTT). Modulation of constitutive $G_{i/o}$ activity involving μ- and δ-opioid receptor activation was examined in the [^{35}S]GTPγS homologous displacement assay with saturating concentrations of DAMGO, deltorphin II, or morphine. Functional downstream effects were measured in the cAMP accumulation cAMP-Glo assay in SH-SY5Y cells.

Results: Only disulfiram stimulated $G_{i/o}$ protein activation by promoting GDP/GTP exchange through disulfide bond formation. Disulfiram, but not DETC-sulfone or DETC-sulfoxide, increased the number of agonist-induced $G_{i/o}$ protein activation sites, consistent with the stabilization of the GDP-bound state. Disulfiram suppressed constitutive $G_{i/o}$ activation in the presence of μ- and δ-opioid receptor agonists. In the functional assay, both disulfiram and its metabolites enhanced morphine-induced inhibition of cAMP production.

Conclusion: Disulfiram, but not its key end metabolites, enhances $G_{i/o}$ protein signaling by facilitating GDP/GTP exchange through disulfide bridge formation and attenuates constitutive $G_{i/o}$ protein activity upon μ- and δ-opioid receptor activation.

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The Protective Effect of XZL22 against Pathological Cardiac Hypertrophy and its Underlying Mechanism

Objective: Pathological cardiac hypertrophy can lead to interstitial and perivascular fibrosis as well as structural and functional changes in myocardial cells, resulting in cardiac remodeling. Heart failure and death may occur in severe cases. Therefore, preventing the occurrence and progression of cardiac hypertrophy is essential for the prevention of cardiovascular diseases. Through screening in Natural products, XZL22 was found to be able to inhibit cardiomyocyte hypertrophy. However, its underlying mechanisms remain unclear. Hence, this study aimed to investigate the pharmacological effects and mechanisms of XZL22 against cardiac hypertrophy.

Methods: A mouse model of cardiac hypertrophy was established *via* transverse aortic constriction (TAC) surgery. Different doses of XZL22 were administered and its effects were assessed through echocardiography (cardiac function), histopathological staining (HE and Masson), and analysis of hypertrophy/fibrosis markers (ANP, BNP, Collagen I/III) at the protein and mRNA levels *in vivo*. *In vitro,* angiotensin II (Ang II) was used to induce cardiomyocyte hypertrophy. Cell size was observed by fluorescent staining, and the expression levels of cell-related proteins and related mRNA were measured. Multiple indicators were used to evaluate the protective effects of XZL22 against cardiomyocyte hypertrophy in vitro and in vivo. Metabolomics was performed on the serum of mice in the Sham group, TAC group, and XZL22-H group. Network pharmacology was used to predict the targets of XZL22 and myocardial hypertrophy-related pathways. Finally, metabolomics and network pharmacology results were jointly analyzed, and molecular biology techniques were used for validation to explore the mechanism of action of XZL22 against cardiac hypertrophy.

Results: *In vivo,* XZL22 improved cardiac function and alleviated myocardial damage in hypertrophic mice. HE and Masson staining results showed that the cardiac pathology of hypertrophic mice was significantly improved, the levels of ANP, BNP, Collagen I and Collagen III were significantly decreased. *In vitro,* XZL22 decreased the surface area of cardiomyocytes and the levels of ANP and BNP. Metabolomics results showed that XZL22 plays a cardioprotective role, mainly by regulating the level of glycerophospholipid metabolites. The symptoms of cardiac hypertrophy in TAC mice were improved by regulating glutathione metabolism, arachidonic acid metabolism, glycine, serine and threonine metabolism. Network pharmacology suggested that XZL22 may improve symptoms of myocardial hypertrophy by regulating multiple signaling pathways including the PI3K/AKT signaling pathway, MAPK signaling pathway, and FoxO. Additional research has indicated that XZL22 could inhibit the secretion levels of inflammatory factors IL-1β, IL-6, TNF-α, and Western blot analysis found that XZL22 could decrease the cleaved-caspase3 level and Bax/Bcl-2 ratio, promot the phosphorylation of PI3K, AKT, and mTOR.

Conclusion: XZL22 exhibits significant anti-hypertrophic effects both *in vitro* and *in vivo*. Utilizing combined analysis and validation with metabolomics and network pharmacology, it is inferred that XZL22 may exert a certain anti-myocardial hypertrophy effect by activating the PI3K/AKT/mTOR pathway to regulate inflammation response and cellular apoptosis.

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Development of Pediatric Buccal Films Based on Modified Starch and Hydroxyethylcellulose

Buccal films are thin and flexible systems that adhere to the mucosa, enabling controlled drug release and improved compliance. Polysaccharides and starch derivatives are emerging as valuable excipients for mucoadhesive buccal films, a non-invasive alternative to oral dosage forms, particularly suitable for pediatric use. This work aimed to develop innovative buccal films for ibuprofen (IB) incorporated in a β-cyclodextrin complex, to improve solubility and loading. Films were prepared by the freeze–thaw technique using a novel combination of hydroxyethylcellulose (HEC) and Linecaps®, a pea starch derivative. The formulations showed appropriate technological characteristics, including uniform thickness, mechanical strength, drug content homogeneity, and mucoadhesion, supporting their suitability for buccal use. Drug release and permeation studies were then carried out using Franz diffusion cells with two membranes: a synthetic biomimetic barrier and *ex vivo* rabbit buccal mucosa. Comparable fluxes were obtained with both systems, indicating that the artificial membrane can serve as a reliable alternative to animal tissue for preliminary permeability testing. Sensorial analysis was performed with an electronic tongue (e-tongue). This non-destructive tool provides additional insights into sensorial attributes and may support formulation development and quality control (taste-masking). In conclusion, the combination of HEC and Linecaps® enabled the preparation of biocompatible, child-friendly buccal films using a green, solvent-free process. To our knowledge, this

is the first report of Linecaps® in combination with HEC for buccal applications. The films displayed promising technological and biopharmaceutical features, while integration of an e-tongue platform added valuable sensorial characterization. Overall, these findings support polysaccharide-based buccal films as a potential strategy for transmucosal delivery of ibuprofen.

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Professional Ethical Standards Addressing Organ Transplant Abuse Abroad

In most countries, organ transplant demand far exceeds organ donor supply. Those in need of transplants often end up waiting months and years.

China, in contrast, offers transplants on demand. Bookings for transplants can be made in advance even for vital organs - heart, liver and lungs. An independent people's tribunal concluded in 2020 that the mass killing in China of practitioners of the spiritually based set of exercises Falun Gong for their organs for transplants was certain, beyond doubt. Twelve United Nations human rights experts in 2021 found the evidence about forced organ harvesting from prisoners of conscience in China as extremely alarming, of utmost concern.

Transplant tourism into China raises ethical concerns for health professionals and institutions outside of China. Yet, professional ethical standards have, for the most part, not been adopted to address those concerns.

The Transplantation Society developed in 2006 an Ethics Committee Policy Statement on the Chinese Transplantation Program which, since October 2024, no longer appears on its website. The International Society for Heart and Lung Transplantation in 2022 developed its own ethics policy related to Chinese transplantation. These two policies relate to Chinese and foreign transplant professional interaction.

The Canadian Society of Transplantation and Canadian Society of Nephrology issued a policy statement in 2011 on Organ Trafficking and Transplant Tourism which addressed transplant tourism in the context of patient health professional interaction. Global Rights Compliance, an international legal not-for-profit in 2022 published an advisory report and guidance on mitigating human rights risks when interacting with international medical institutions and professionals in transplantation medicine.

There are only four countries in Europe - the UK, Ireland, Belgium and Italy - which have specific extra-territorial legislation addressing transplant tourism and complicity in organ transplant abuse abroad. There are nonetheless several other countries in Europe with general domestic legislation directed against organ transplant abuse which has extraterritorial effect. No country in Europe, though, has mandatory

reporting of transplant tourism by health professionals and institutions to government authorities. There has been transplant professional hesitancy in endorsing this mandatory reporting because of its adverse impact on patient professional confidentiality.

This ethical/human rights landscape relating to transplant tourism raises questions about what the proper ethical standards should be for transplant health professional and institution interaction with Chinese transplant health professionals and institutions, about health professional and institution counselling of potential transplant tourist patients into China, about medical treatment of transplant tourist patients returning from China, and about the proper transplant professional response to legislative proposals for mandatory reporting by transplant health professionals and institutions to designated government authorities on transplant tourism. The proposed presentation would address each of these questions with a European focus.

The general conclusion would be that there needs to be, for Europe, country specific ethical/ human rights standards related to each of these matters. The presentation will suggest what these standards might be.

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The Role of Epicardial Adipose Tissue in the Development of Heart Failure with Preserved Ejection Fraction

Heart failure with preserved ejection fraction (HFpEF) is an increasingly prevalent clinical condition, particularly among patients with obesity, metabolic syndrome, and type 2 diabetes mellitus. Emerging evidence highlights the role of epicardial adipose tissue (EAT) as a metabolically active and pro-inflammatory organ contributing to the pathogenesis of the disease.

Epicardial adipose tissue is located between the myocardium and the visceral layer of the pericardium, without a fascial barrier, allowing direct paracrine and vasocrine interactions with the myocardium and coronary vessels. Under physiological conditions, EAT exerts protective functions; however, in obesity, both quantitative and qualitative alterations occur, including increased volume, inflammatory cell infiltration, and enhanced secretion of pro-inflammatory cytokines.

These changes promote local inflammation, oxidative stress, myocardial fibrosis, increased ventricular stiffness, and diastolic dysfunction—the central pathophysiological mechanism in HFpEF. Increased EAT volume is associated with left ventricular hypertrophy, cardiac remodeling, and elevated filling pressures. Imaging modalities enable quantitative assessment of EAT and may provide prognostic value.

In conclusion, epicardial adipose tissue is not merely an inert fat depot but an active contributor to the development of HFpEF and represents a potential therapeutic target.

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Evaluating the Effectiveness of Multiple Family Group Therapy in Reducing Stress among Families Coping with Autism

Parents raising a child with Autism Spectrum Disorder (ASD) have higher levels of stress than other disabilities. Mothers raising a child with ASD reported less parenting competence, a decrease in marital satisfaction difficulty adapting compared to mothers of children coping with Down's Syndrome. Parents tend to isolate themselves, avoiding social contact with the outside world. There are limited services available for parents. A study was implemented using the psychoeducational model to help parents cope with ASD and evaluate the effectiveness of the model. Multiple Family Group Therapy (MFGT) is a psychoeducation model that has been seen as the most effective evidence-based practice in both clinical trials and community settings. The model is flexible, incorporating both illness information and strategies for coping. McFarlane and Lukens (2004) found the MFGT model to be the most effective of the evidence-based practice models in treating families coping with illnesses ranging from schizophrenia to cancer. The historical background of Multiple Family Group Therapy began with Peter Lacquer in 1977 was the first to discuss the importance of providing education. Multiple Family Group Therapy served as the intervention. McFarlane expanded on his concept framework and designed Multiple Family Group Therapy (MFGT). The study used this model with families coping with a child having ASD. Parents were enrolled in a 4-week program that met weekly. Both parents were required to attend the groups. The Parental Stress Index short form (PSI-SF) tool measured the outcome in relation to parental stress in raising a child with ASD. PSI-SF focuses on percentiles in the data analysis. It measures the Parental Stress Index in 3 domains: parental stress, parent-child difficulty interaction, and difficult child. Parents filled out the PSI-SF before beginning the group and at the end of the 4-week group session. A questionnaire was filled out at the completion of each group session. This was used to evaluate the group process. Parents who participated in the study expressed not feeling alone and enjoyed sharing and supporting one another. The education came from within the group, parents helping one another. The father stress index post-group went up in some cases. The outcome supported the use of MGFT to assist parents

with coping with raising a child with ASD. The study had its limitations. It is difficult to recruit families to commit to weekly sessions.

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Factors Associated with Adverse Drug Reactions among Residents in Nursing Homes

Background: Adverse drug reactions (ADRs) are a significant public health concern, especially in the elderly. Factors like multimorbidity, polypharmacy, frailty, and age-related changes in drug metabolism increase variability in drug response and adverse effects. The objective of this research is to examine the prevalence of ADRs in elderly residents of nursing homes and to identify the most significant risk factors contributing to these events.

Material and methods: This was a retrospective, cross-sectional study that reviewed the medical records of 125 residents in 2 nursing homes. The study population consisted of all residents aged 65 years or older. Resident characteristics included age, gender, clinical diagnoses, number of comorbidities, residents' functional status, and complete medication history were analyzed using general practitioner documentation in residents' records. Relevant clinical information on ADR characteristics was documented through chart review over 12 months.

Results: The study included 125 residents with a mean age of 76.52 (SD 7.83), the majority of residents were women (66%), with polypharmacy of 5 and above (48%). Overall, 10% of elderly residents took ≥ 10 medications (prescribed, or over the counter), and 38% took 5–9. In addition, the mean number of chronic comorbid conditions was approximately four. Mean Charlson comorbidity index was 1.7. Residents with higher Charlson Comorbidity Index showed increased risk of ADRs, $r = .552$, $p < .001$. We found that patients with non-ADRs used less medications ($M = 3.88$, $SD = 1.56$) compared to those with ADRs, ($M = 7.26$, $SD = 1.27$; t (123) = -6.51, $p < .001$). Cardiovascular, gastrointestinal, and anticoagulant medications were associated with ADRs. Finally, using Pearson's r correlation coefficient we found that

there is a significant positive relationship between ADRs and use of specific drug classes as well as higher polypharmacy and comorbidity.

Conclusion: This study highlights the high prevalence of ADRs among elderly patients, with a positive association with polypharmacy, comorbidities, and specific drug classes use. Targeted medication review and structured pharmacovigilance strategies in nursing homes may help reduce ADR burden in this vulnerable population.

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Pharmacological Modulation of Neuropathic Pain with Adjunctive Graded Motor Imagery in Upper-Limb Complex Regional Pain Syndrome

Background: Complex Regional Pain Syndrome (CRPS) is a chronic neuropathic pain disorder characterized by persistent pain and functional impairment of the affected limb. Peripheral and central sensitization, together with cortical reorganization, contribute to chronic pain and motor dysfunction. Pharmacological therapy targeting neuropathic pain mechanisms remains the cornerstone of CRPS management. α2δ calcium-channel ligands such as gabapentin and pregabalin reduce neuronal excitability by modulating voltage-gated calcium channels involved in central sensitization. Rehabilitation strategies addressing neuroplasticity, including Graded Motor Imagery (GMI), may further improve functional recovery. The objective was to assess the effects of pharmacological modulation of neuropathic pain using α2δ calcium-channel ligands and to evaluate whether adjunctive GMI enhances clinical and functional outcomes in patients with upper-limb CRPS.

Material and methods: A prospective controlled clinical study included 24 patients with upper-limb CRPS. Patients were allocated into two groups: standard pharmacological therapy using α2δ calcium-channel ligands (gabapentin or pregabalin) or pharmacological therapy combined with a structured GMI program consisting of laterality recognition, motor imagery, and mirror therapy. The intervention lasted six weeks. Pain intensity was assessed using the Visual Analog Scale (VAS), neuropathic pain using the DN4 questionnaire, and functional outcomes using range of motion (ROM) and the QuickDASH questionnaire at baseline and post-intervention.

Results: Both groups demonstrated reduced pain intensity after treatment. Mean VAS scores decreased from 7.2 ± 1.1 to 4.5 ± 1.3 in the

pharmacological therapy group and from 7.4 ± 1.0 to 4.1 ± 1.2 in the combined therapy group ($p > 0.05$). DN4 scores improved from 6.8 ± 1.0 to 4.9 ± 1.1 and from 6.9 ± 0.9 to 3.8 ± 1.0, respectively ($p = 0.03$). Greater functional improvement was observed in the combined group, with ROM improving by 32% compared with 18% ($p = 0.02$). QuickDASH scores improved from 61.4 ± 8.7 to 42.6 ± 7.9 and from 63.1 ± 9.1 to 31.8 ± 7.2, respectively ($p = 0.01$). A greater proportion of patients in the combined group achieved clinically meaningful functional improvement.

Conclusion: Targeted pharmacological modulation of neuropathic pain remains fundamental in the management of CRPS. Adjunctive Graded Motor Imagery may further enhance functional recovery and neuropathic pain improvement, supporting a multimodal treatment strategy integrating pharmacological therapy with targeted neurorehabilitation in patients with upper-limb CRPS.

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Attuning a Faster R-CNN Machine Learning Model for Breast Tumor Ultrasound Imaging

Purpose: Breast cancer is a leading cause of death among women globally, making early detection vital. This project develops a deep learning model to detect and classify breast tumors in ultrasound images as benign or malignant, outputting a bounding box and confidence score to support clinical decision-making.

Methods: A Faster R-CNN was fine-tuned using ResNet18, ResNet50, and MobileNet V3 backbones on a physician-annotated breast ultrasound dataset. The ultrasound images were obtained from a publicly available dataset collected in 2018 from Baheya hospital, Cairo, Egypt, consisting of 780 images in PNG format, categorized into three classes: normal, benign, and malignant. Images were preprocessed with physician-annotated bounding boxes indicating tumor presence.

The dataset was augmented using a process of resizing to 1000x900x3 pixels, normalization, rotation, and flipping. Anchor boxes were initialized via K-means. Model architecture was adjusted by adding dropout layers, frozen batch normalization, and testing varied learning rates (lr) and weight decay (wd) values to improve performance. Performance was evaluated using mAP@0.5 and classification accuracy (ACC).

Results: The best MobileNet V3 configuration (lr=1e-3, wd=5e-4, 40 epochs) achieved mAP=0.88 and ACC=0.95 but started overfitting early. The best ResNet18 results were achieved with lr=1e-4 and wd=1e-4 over 40 and 70 epochs. After adjusting the model architecture with dropout layers, new anchors, or frozen Batch Normalization layers, the ResNet18 model attained ACC values between 0.78 to 0.85 and mAP@0.5 values between 0.55 to 0.58 (Table 1). The final model reached validation accuracy of 0.71 and mAP@0.5 of 0.48.

Table 1. *Augmenting the Dataset and Changing the Architecture of the Faster R-CNN Can Generalize Better and Provide Better Performance*

Best attempts of training Faster R-CNN with backbone ResNet18 (fine-tuned)									
	Edits: (D)ata, (A)rchitecture	lr	epo	wd	mom	AP@0.5 (Benign)	AP@0.5 (Malignant)	mAP@0.5	ACC
Augmented	D	1e-4	40	1e-4	.9	0.71	0.62	0.55	0.78
Augmented, dropouts(0.5), new anchors	D, A	1e-4	40	1e-4	.9	0.70	0.63	0.55	0.82
Augmented, dropouts (0.5)	D, A	1e-4	70	1e-4	.9	0.78	0.58	0.58	0.82
Augmented and frozen Batch Norm layer	D, A	1e-4	40	1e-4	.9	0.76	0.55	0.54	0.85

Conclusion: Faster R-CNN shows promise for breast tumor detection in ultrasound images, with dropout and frozen batch normalization improving generalization. Improved performance was achieved by adjusting the learning rate and weight decay. Future work should focus on increasing performance on small tumors, integrating an FPN model, and expanding annotated training data to improve robustness across tumor sizes and morphologies.

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A New Strategy for Detecting Multidrug Resistance in Gram-Negative Bacteria Prior to Treatment

Background/Objectives: Multidrug-resistant bacteria pose a major public health problem worldwide. In particular, patients with asymptomatic colonization are at high risk of developing an infection during treatment and experiencing a fatal outcome. The detection and characterization of bacterial resistance are primarily based by antibiogram testing of isolated bacterial strains. Although antibiotic susceptibility testing provides reliable results regarding positive resistance, it is of limited use when it comes to detecting low-level resistance and/or heteroresistance, which often only become apparent during treatment when bacteria are exposed to antibiotics over an extended period of time. It therefore makes sense to screen patients using more sensitive and rapid methods, preferably before their admission to the hospital.

Methods: We present a new, cost-effective, and simple screening method for examining the colonization of patients with resistant bacteria, which facilitates the rejection or selection of beta-lactam antibiotics for treatment in the event of infection. Based on bacteria from primary culture plates, the new enzyme based *in vitro* methods, i.e., the CarbaLux fluorescence and the nitrocefin tests use the highly sensitive substrates carbapenem F and nitrocefin with and without beta-lactamase inhibitors.

Results: Unlike growth-based assays, which take one to two days to completion, the new enzymatic tests deliver results within minutes. They can detect and independently identify carbapenemases, cephalosporinases, the overproduction of AmpC beta-lactamases, and distinguish AmpC beta-lactamases from extended beta-lactamases (ESBL) in Gram-negative bacteria.

Conclusions: The rapid results enable the targeted initiation of treatment for infected patients with appropriate beta-lactam antibiotics or combinations with beta-lactamase inhibitors. Early knowledge of the patient's colonization makes it possible to assess the risk of medical interventions and reduce empirical treatments. Furthermore, clinicians are encouraged to distinguish between patients who are easy to treat and those at high risk, and to categorize them accordingly, which can

significantly reduce the workload, hygiene-related expenses, administrative burdens, and hospital costs.

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Polysaccharides - Promising Carriers for Development of Nanosized Drug Delivery Systems

Nowadays, nanotechnology is an increasingly applied in the development of drug delivery systems approach. This is attributed to the undeniable advantages of nanoparticles, including the ability to enhance the water solubility of hydrophobic compounds, improve stability, and provide targeted delivery of the loaded drugs. Such capabilities lead to improved absorption at the desired site of action and enhanced pharmacological effects. However, it is essential to consider the risk of toxicity associated with the application of nanoparticles. Thus, biopolymers are significantly appropriate as carriers for the development of nanosized drug delivery systems. For example, polysaccharides are a class of biopolymers, commonly utilized for the preparation of hydrophilic nanoparticles. This is due to their favorable characteristics, such as biodegradability, biocompatibility, low toxicity, non-immunogenicity, and easy availability. Furthermore, polysaccharides can be chemically modified to achieve specific properties for use in various application areas. Owing to the presence of specific functional groups in their structure and depending on their characteristics polysaccharides could form nanoaggregates under mild conditions. Moreover, some of the polysaccharides also exhibit intrinsic pharmacological activities. For instance, antibacterial potential was registered for the polysaccharides pectin, chitosan, and dextran, antioxidant activity was reported for pectin and dextran, and anticancer effect was observed for pectin. Therefore, there is a variety of examples of nanoparticles produced from these three polysaccharides, resulting in enhanced pharmacological effects and application of the loaded active substances.

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Application of Nanoparticles in Personalized Medicine

The personalized medicine aims to provide the right therapy for the right patient, which either could improve the therapeutic outcome or reduces side effects. One of the strategies to achieve personalized treatment is related to development of nanosized drug delivery systems that deliver the loaded drug in a precise dose depending on the specific biological characteristics of the patient's disease. The nanoparticles could be designed to respond to genetic, phenotypic, and environmental factors of a patient. For instance, the nanoparticles could be functionalized with targeting ligands aiming to deliver drugs, proteins, antibodies or gene editing tools to specific cells. The targeting ability leads to higher efficacy of the therapy and reduction of the systemic toxicity. This approach is intensively studied in the field of cancer treatment since it allows the delivery of the cytotoxic drugs to the cancer cells overexpressing certain receptors but not to the healthy cells. Typical targeting ligands are folic acid, peptides (e.g., arginine-glycine-aspartic acid tripeptide), proteins, vitamins, etc. Furthermore, the nanoparticles can deliver nucleic acids to specific tissues to correct underlying genetic mutations. Biomimetic nanoparticles are new type of nanoparticles that consist of synthetic cores and coating layer composed from natural cell membrane. The advantage of these nanoparticles is the precise recognition of the nanoparticles from the same cells in in vivo conditions. Thus, the biomimetic coating avoids the rapid clearance of the nanoparticles by the immune system and ensures the active targeting to the diseased cells.

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The Physician's Obligations in the Performance of his Work: A Keyhole Look at the Libyan Law on Medical Liability

Background: Patients must be able to trust doctors with their lives and well-being; to justify that trust, we as a profession have a duty to maintain a good standard of practice and care to show respect for human life. Medical liability will result from any professional error arising from the practice of a medical activity that causes harm to others and the occurrence of damage is a presumption of fault or breach of the obligation.

Aims: To have a keyhole look at the Libyan law on Medical Liability and discuss few medico-legal cases.

Methods: The National Council for the Determination of Medical Liability (NCDML) affiliated to Ministry of Health is the official body responsible for determining the extent to which medical responsibility is established. (Law number 17 of 1986).Examples of some medico legal cases will be presented where medical issues intersect with legal considerations often involving the interpretation and application of laws and regulations in the context of healthcare.

Results: The term "malpractice" within the medical community describes acts of negligence, deviation, incompetence, or professional errors that result in harm to the consumer (patient) due to actions that do not adhere to standards.

The Ministry of Health and the suppliers, manufactures, distributors and users are jointly liable for damages resulting from the use of medical tools, devices and medicines.

Conclusion: Changes in the medico-legal landscape and increased litigation have made doctors cautious about the amount, quality, and type of treatment they provide. Defensive medicine occurs when doctors order tests, procedures, visits, or avoid high-risk patients or procedures primarily to reduce their exposure to malpractice. Positive Defensive Medicine occurs when Extra tests or procedures are ordered to reduce malpractice liability. Avoiding certain patients or procedures is referred to as Negative Defensive Medicine.

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