Wisdom Conferences

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WORLD CONFERENCE ON PLANT SCIENCE AND SUSTAINABLE AGRICULTURE

Theme: Advancing Plant Science, Sustainable Agriculture & Smart Farming Technologies for Global Food Security

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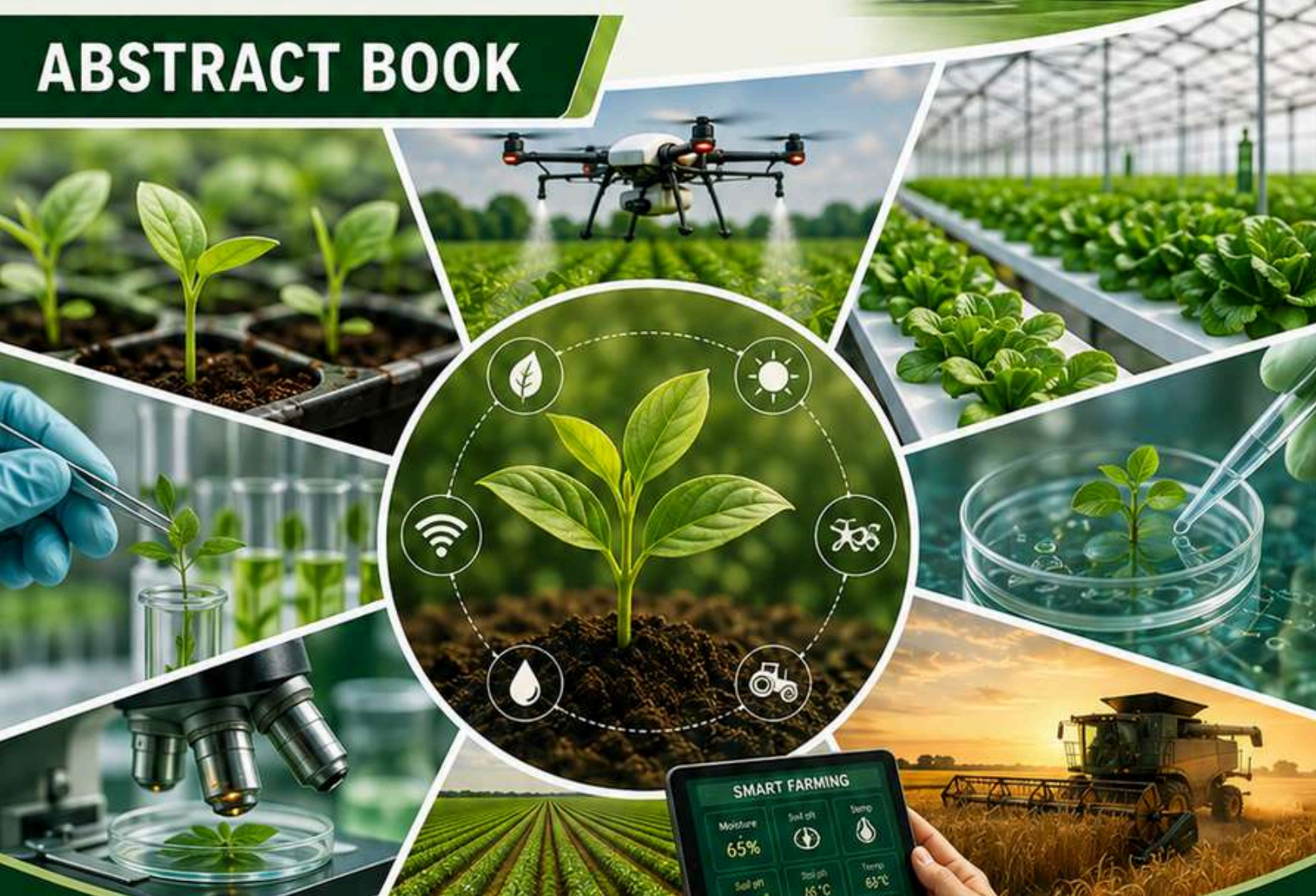
ABSTRACT BOOK



Organizing Committee Member

Role of Biomathematics in Stem Cell and Generative Medicine

Nawal H.Siddig
Princess Nourah Bint Abdulrahman University, Sudan

Abstract:

Role of Biomathematics in Generative Medicine Abstract Biomathematics plays a transformative role in the advancement of generative medicine by offering a quantitative framework to simulate, modeling , predict, and manipulate complex biological systems in the real world. Generative medicine, which focuses on creating personalized and regenerative healthcare solutions, requires deep understanding insights into cellular dynamics, genetic pathways, and system-level interactions. Biomathematical models construction enable the simulation of these intricate biological processes, allowing researchers and clinicians to explore therapeutic scenarios before clinical implementation. One of the primary validation of biomathematics to generative medicine is in the modeling of stem cell behavior and tissue regeneration. The modeling of stem cell function and tissue regeneration is one of biomathematics' main contributions to generative medicine. To help design successful regenerative therapies, researchers can forecast how stem cells will proliferate, differentiate, and react to varied stimuli using mathematical models, stochastic techniques , and agent-based simulations like software and AI tools. In addition, biomathematics makes it easier to incorporate omics data —genomics, proteomics, and metabolomics—into computer models that can reveal hidden trends and guide individualized therapy regimens based on each patient's own biological profile. Furthermore, dynamic models of organ function and disease progression can be created using systems biology techniques aided by biomathematics. The time and expense of medical research and development can be greatly decreased by using these models as a basis for studying the effects of gene treatments and pharmaceutical interventions in silico. By determining the best intervention tactics catered to the demands of each patient, optimization approaches like control theory and machine learning algorithms based on mathematical logic further improve therapy efficacy. Mathematical tools such as sensitivity analysis and parameter estimation contribute to refining these models, ensuring they accurately reflect biological reality. As healthcare systems increasingly adopt data-driven approaches, biomathematics serves as a crucial enabler of personalized care, improving outcomes while reducing unnecessary interventions. The interdisciplinary nature of this field, blending mathematics, biology, computer science, and clinical research, underscores its importance in shaping the future of medicine. With ongoing developments in computational power and mathematical methods, the potential applications of biomathematics in generative medicine are bound to expand, reinforcing its status as a cornerstone of next-generation medical innovation.

Biography:

Dr. Nawal H. Siddig is an Assistant Professor of Applied Mathematics (Biomathematics) at Princess Nourah bint Abdurrahman University, where she contributes extensively to teaching, research, and academic leadership. She serves as an electronic course designer for Math100 and Math312 on the FutureLearn platform and plays an active role as a student advisor and supervisor for numerous undergraduate graduation projects. Her academic service includes membership in departmental committees, coordination of mathematical courses, and contributions as a strategic content expert for electronic mathematics curricula. She is also a committee member of the actuarial mathematics program and the initiator of a Master's program in Biomathematics. Her research focuses on biomathematics and mathematical modeling in biosciences, with applications in epidemiology, physiology, and medicine. She has published multiple papers in peer-reviewed and indexed journals. Dr. Siddig is a Fellow of the Higher Education Academy (FHEA), UK, and a member of the Organization for Women in Science for the Developing World (OWSD), the Saudi Association for Applied Sciences, and the Association for Women in Mathematics (AWM).

Morphological and Biochemical Profiling of Endophytic Bacteria from Justicia adhatoda Leaves

Rajosik Bose
Central Ayurveda Research Institute, India

Abstract:

Medicinal plants are prospective hosts for beneficial microorganisms including bacteria, fungi and yeast. Till date, the plant growth promoting properties of endophytes have been extensively studied for their application in the agriculture, but very few studies have been conducted on the medicinal plants to explore the role of the endophytes in their medicinal importance. Moreover, studies on endophytes of medicinal plants have majorly focused on fungi, not bacteria, though endophytic bacteria are the most potential source of bio-active compounds. The leaves of Justicia adhatoda are routinely used for respiratory health due to its bronchodilator and expectorant properties. In the present study, leaves of Justicia adhatoda of two locations of Kolkata, India were collected, endophytes were isolated and characterized for morphological and biochemical features. Seven and nine different endophytic bacterial isolates were screened from plants of two locations respectively. The characterization of bacterial isolates was done by morphological and biochemical methods according to Bergey's manual of systematic Bacteriology. This investigation revealed that leaf isolates of both locations were majorly Gram-positive cocci and many of them are endospore forming. They invariably utilized glucose and mannitol as their carbon source, but did not use lactose or citrate at all. None of them were sulphate-reducing in nature. Few isolates were capable of producing phosphatase and few produced urease; sometimes same isolate produced both, indicating their role in phosphate solubilization. The isolates were stress tolerant as all of them produced catalase and withstood up to 7.5% NaCl. Collectively, this study showed that the leaves of Justicia adhatoda, harbor bacterial endophytes which were similar in pattern in different locations and their stress-tolerance and phosphate solubilization nature suggest to utilize them further as potential source of novel bio-active metabolites and prospective bio-fertilizers.

Biography:

Mr. Rajosik Bose is a Junior Research Fellow in the Department of Pathology, Biochemistry and Microbiology at the Central Ayurveda Research Institute, Ministry of Ayush, Kolkata, West Bengal, India. His research expertise encompasses microbiology, molecular biology, biochemical assays, microbial culture handling, and allied laboratory techniques. His primary research focuses on understanding the functional diversity of endophytic bacteria and their symbiotic interactions with medicinal and agricultural plants, with the goal of developing sustainable agricultural technologies, enhancing crop resilience, advancing bioremediation strategies, and discovering novel bioactive compounds with therapeutic potential. has authored several peer-reviewed publications in reputed international journals, contributing significantly to the fields of environmental microbiology, plant–microbe interactions, natural product research, and medicinal plant science. His recent work has explored the therapeutic mechanisms of bacterial endophytes in medicinal plants, their applications in crop improvement and stress management, and the phytopharmacognostical characterization and antimicrobial potential of Himalayan medicinal plant species. Through his interdisciplinary research, he continues to contribute to advancing microbiological and biotechnological innovations that support sustainable agriculture, environmental health, and natural product-based therapeutics.

Development of Cyperus Rotundus Cellulose Nanofibers Reinforced Polylactic Acid Nanocomposites for Biomedical Applications

Priya S.A
Nesamony Memorial Christian College, India

Abstract:

Poly(lactic acid) (PLA) is a biodegradable, biocompatible polymer with great potential in biomedical applications. However, its clinical performance is limited by its poor mechanical properties, slow degradation rate and lack of intrinsic bioactivity. The present study reports on the development of Poly-lactic acid (PLA) nanocomposites reinforced with cellulose nanofibers (CNFs) extracted from Cyperus rotundus for biomedical applications. The PLA matrix was modified with the plasticizer castor oil to increase its flexibility. Morphological analysis by SEM showed a uniform dispersion of CNFs at lower filler loadings. XRD confirmed the crystalline nature of the extracted CNFs with an average crystallite size of about 26 nm. The mechanical properties were significantly enhanced by the presence of CNFs. The tensile strength and Young's modulus were increased by 97.1% and 113.9% compared to neat PLA, respectively. The nanocomposites degraded faster in alkaline medium than in acidic medium due to enhanced hydrolytic cleavage of the PLA matrix. Antibacterial studies showed concentration dependent inhibition against Staphylococcus aureus and Pseudomonas aeruginosa. Hemolysis assays revealed better hemocompatibility with less damage to red blood cells than neat PLA. MTT assays with peripheral blood mononuclear cells confirmed low cytotoxicity and good biocompatibility. The synergistic enhancements of mechanical properties, biodegradation behaviour, antibacterial activity, hemocompatibility and cytocompatibility indicate that these nanocomposites are promising multifunctional biomaterials for wound healing, tissue engineering, biodegradable implants and other regenerative medicine applications.

Biography:

Ms. Priya S.A. was a Research Scholar in the Department of Chemistry at Nesamony Memorial Christian College, Marthandam, Tamil Nadu, India, affiliated with Manonmaniam Sundaranar University, Tirunelveli. She earned her B.Sc. and M.Sc. degrees in Chemistry from Manonmaniam Sundaranar University and has submitted her Ph.D. thesis in Chemistry at the same university. Her doctoral research focused on Natural Fiber Reinforced Polylactic Acid-Based Polymer Nanocomposites, with particular emphasis on sustainable biomaterials for biomedical applications. She is currently working as an Assistant Professor in the Department of Chemistry at Immanuel Arasar J.J. College of Engineering, Tamil Nadu, India. Her research interests include bio-based polymers, polymer composites, nanotechnology, biomaterials, pharmaceutical science, and sustainable materials. She has authored 8 research publications in national and international peer-reviewed journals and has presented her research at several national and international conferences. She also serves as a reviewer for the Journal of Biomaterials Science, Polymer Edition (Taylor & Francis). Her research is focused on developing environmentally friendly polymer composites with enhanced antimicrobial, biocompatible, and tissue engineering properties for biomedical applications. In addition to her research activities, she is passionate about teaching Chemistry and promoting innovation in sustainable materials for healthcare and advanced engineering applications.

Safety and Quality of Traditional Medicine with special reference to Herbal Medicines

Mohammad Kamil
Lotus Holistic Health Institute, UAE

Abstract:

D*espite recent developments in antibiotics and newer synthetic drugs, a vast majority of people depend on traditional medicines for their primary healthcare needs, and it can be safely presumed that a major part of traditional therapy involves the use of plant extracts or their active principles. In recent years, with ever-growing commercialization in the field of herbal medicines, there has been an instant demand for quality control of the drugs used in this system. The studies on the identity, purity, and quality of genuine drugs will enhance information in checking the adulteration. The present talk incorporates studies from the birth of the plant to its clinical application, which is a dire need for all concerned to know agricultural, field collection, laboratory, and manufacturing practices, and the possible intentional adulterations. Most modern instrumentation used for quality control will be discussed with special reference to T. L. C & GC/MS. Different stages, i.e., Quality Control Studies of Raw medicinal plants, Controlled Studies on Method of Processing, Quality Control Studies of Finished Herbal Medicines, and Standardization Procedures at each stage from the birth of the medicinal plant up to clinical application for herbal medicine have been described. An emphasis has been placed on the protocols that are required for the Registration of Herbal Medicines.*

Biography:

Mr. Mohammad Kamil is one of the leading academicians and scientists in the fields of medicinal plants research, traditional medicine, natural products , phyto pharmaceutical chemistry, and plant sciences. Dr. Kamil is a recipient of UAE Golden Visa for 10 years 2021-2031 in Talented Person Category. Presently he is working as Director General, Lotus Holistic Healthcare Institute, Abu Dhabi, UAE since 2021; Secretary General & Head, Scientific Committee for Sheikh Zayed International TCAM Awards and Organizing Secretary TCIM conference 2024& 2026. He is a recipient of many prestigious honours & awards viz Young Scientist's Award,India(1998); Common Wealth Award-London(1992); Convention Award of Chemical Society-India(1993); Hakim Ajmal Khan Shield (CCRUM-Govt. of India at Grant Medical College, Bombay 1992); Academic Grant from Association of Common Wealth Universities –London(1992); Academic Exchange Fellowship from Association of Common Wealth Universities –London(1993); Acted as an expert on the panel of Union Public Service Commission (UPSC), India,2000. ; Man of the year 2002, ABI, USA and recently Sheikh Zayed International Award in 2020 among few. Associated with the World Health Organization (WHO) in the revision of the Benchmark for International Standards of Unani Medicine Terminology and Training of Unani Medicine, as its drafting expert and their subsequent reviews (2020-2022). He had been invited as an advisor for the WHO-10-year Traditional Medicine strategy (1925-34) at a meeting held in October 2024 in Riyadh, Saudi Arabia. Member, Traditional Complementary Integrative Healthcare(TCIH)2022-WHO -till date. His dedication and passion for advancing science is remarkable. His scholarly contributions include more than 850 publications and conferences , seven books, and six book chapters,. He has supervised 35 Ph.D. and more than 60 M.Phil./Intern/M.S. scholars, having widely cited more than 10,000 times/places, out of which 824 alone in Academia . significantly contributing to capacity building in science and healthcare.

Hybrid Incentives for Mitigating Agricultural Emissions in South Africa: Evidence-Based Strategies for Reconciling Environmental and Economic Sustainability

Lindiwe Hayo
Niigata University, Japan

Abstract:

Sustainable agricultural practices offer significant mitigation potential, yet their impact is constrained by systemic exclusion from carbon pricing due to measurement, reporting, and verification (MRV) barriers. This study synthesizes evidence from market-based and non-market strategies to propose a hybrid framework that addresses MRV capacity gaps while promoting smallholder inclusivity. Employing thematic analysis of 65 studies (2001–2025) and case studies from Kenya, Ethiopia, and Mexico, the study identifies a structural tension. Results show that market mechanisms offer scalable finance but exclude agriculture because of high transaction costs and Tier 3 verification requirements. Non-market interventions, however, achieve documented reductions (13.34 MtCO2e) through Conservation Agriculture but lack financial sustainability and broader adoption. To overcome these limitations, the study proposes the Hybrid Incentives Distribution Framework, featuring a "Receive-As-You-Earn" (RAYE) mechanism. This model conditions government support (fiscal transfers, technical extension, infrastructure) on advancing MRV capacity from Tier 1 to Tier 3, thereby creating a bridge to formal carbon markets. This sequenced approach reconciles verification rigor with accessibility, unlocking South Africa's 6.34% sectoral mitigation potential through combined land-based sequestration (4.90%) and technological decarbonization (1.44%). The framework provides an evidence-based pathway to align agricultural climate action with national targets while securing vital rural livelihood co-benefits. Taken together, these results not only establish pyrazole-based derivatives as potent antimicrobial scaffolds but also pave the way for their further exploration in preclinical models.5 Their remarkable binding affinity, excellent drug-likeness, and broad-spectrum activity position them as strong contenders in the global fight against multidrug-resistant pathogens.

Biography:

Dr. Lindiwe Hayo is a Sustainability Researcher and Trade and Industry Advisor currently serving at the Department of Trade, Industry and Competition (the dtic), South Africa. She holds a PhD from Niigata University, Japan, where her research focused on climate-smart agriculture, greenhouse gas mitigation, and evidence-based strategies for sustainable agricultural transformation. Her work explores carbon pricing, hybrid incentive mechanisms, and policy solutions that support climate action while promoting farmer adoption. Dr Hayo has published research on agricultural sustainability and is passionate about bridging research, policy, and practice to inform resilient, inclusive, and sustainable development. She brings an interdisciplinary perspective to advancing climate policy and sustainable food systems.

Concept of Intermediate State of Health (Neither Healthy Nor ill): In Traditional Medicine

Ishrat Rasool
National Research Institute of Unani Medicine, India

Abstract:

The conventional dichotomy of health and disease has long shaped medical thought; however, the concept of an intermediate state of health, first articulated by Jalinoos (Galen), challenges this binary framework. Galen described a transitional state in which an individual is neither in complete health nor overtly diseased, yet possesses an increased susceptibility to illness. Although the World Health Organization broadened the definition of health in 1948, this intermediate state remains largely overlooked in contemporary medical discourse. This presentation revisits Galen's concept through a narrative review of classical Unani literature and contemporary biomedical evidence. Relevant literature was retrieved from classical Unani texts and electronic databases, including PubMed, MEDLINE, and Google Scholar, to examine the conceptual foundations and present-day relevance of this overlooked health state. The review demonstrates that several modern clinical entities, including prediabetes, prehypertension, metabolic syndrome, frailty, and other subclinical conditions, closely parallel Galen's description of the intermediate state of health. Recognizing this continuum between health and disease provides an opportunity for earlier risk identification, preventive interventions, and personalized healthcare. Reintroducing the concept of the intermediate state into modern clinical practice offers a valuable framework for shifting healthcare from a predominantly disease-oriented model toward one that prioritizes prevention, early intervention, and preservation of health. Integrating this classical insight with contemporary medicine may strengthen preventive strategies and contribute to a more comprehensive understanding of health across the entire disease continuum.

Biography:

Dr. Ishrat Rasool, M.D. (Unani), is a physician, researcher, and medical writer specializing in Mahiyat-ul-Amraz (Unani Pathology). She completed her M.D. from the National Institute of Unani Medicine (NIUM), Bengaluru. Her research interests include Unani pathology, integrative medicine, hepatology, dyslipidemia, Hijamah (wet cupping), clinical biochemistry, and evidence-based traditional medicine. She has authored and co-authored peer-reviewed publications and is dedicated to advancing scientific research and interdisciplinary integration of Unani medicine with contemporary healthcare.

A Longitudinal Qualitative Study Exploring the Expectations and Experiences of Individuals Receivinga Hematopoietic Stem Cell Transplant (HSCT) as a Treatment for Multiple Sclerosis (MS)

Colette Edwards
Sheffield HallamUniversity, UK

Abstract:

A longitudinal qualitative study applying interpretative phenomenological analysis (IPA)[1] was conducted with patients receiving HSCT treatment for MS[2], to reveal the significance and meaningof this treatment assumed for individuals, whilstalso exploring their experiences of the treatment and recovery process.The study followed10 participants over 12 months, conducting semi-structured interviews at four temporal points. In-addition participants were asked to participate in a creative art task (Fig 1. KAWA river model)[3 4] as a reflective tool to recall experiences of living with MS, and their recovery following HSCT treatment. Findings: participants decision to receive HSCT treatment was ultimately to halt disease progression, expressing HSCT treatment as the 'dam before the waterfall'. Individuals attitude was found to be influential, with participants sharing traits of positivity, self- determination, and being 'strong' to endure the treatment challenges with the conviction that they were being proactive and 'taking back control' of their condition. This related to participants desire and hope to maintain engagement in societal roles and meaningful occupation in their present and future life. Participants experiences of HSCT, were mainly positive. In recovery participants experienced fatigue, with variable severity, where pacing strategies were necessary to resume previous roles and activities. Most participants had relief from some of theirprior MS symptoms,with no relapse activity 12 months post-transplant. All participants stated they did not regret the decision to receive HSCT, experiencing greater freedom living daily life without the fear of MS. Participants discovered inner resilience through their treatment journey.

Biography:

Ms. Colette Edwards SROT MSc AdvancedHE Fellow, is a seniorlecturer in occupational therapy, at Sheffield Hallam University, England. With expertise in neurological rehabilitation, they have contributed to the recovery of individuals living with acquired brain injury, including individuals with MS for over twenty years. Their research interests include neurological, cognitive and vocational rehabilitation. This qualitative primaryresearch study was conducted as a requirement for their doctorate in philosophy study programme, where findings will be shared from their completed thesis. Colette is also a service user living with RRMS who received HSCT treatment in 2016.

Analysis of Cell free circulating mitochondrial DNA-DAMPs in Sepsis patients

Aleem Ahmed Khan
Deccan College of Medical Sciences, India

Abstract:

Background:Sepsis is associated with high morbidity and mortality and remains a major clinical challenge due to difficulties in predicting disease severity and patient outcomes. Cell-free mitochondrial DNA (mtDNA) has recently gained attention as a potential mediator in sepsis pathogenesis, functioning as a damage-associated molecular pattern (DAMP) that amplifies systemic inflammation. This study aimed to evaluate circulating cell-free mtDNA levels as predictors of disease severity and mortality, and to examine their correlation with established clinical markers. Methods:This prospective study included a total of 150 participants, comprising 50 healthy controls and 100 patients, of whom 50 were diagnosed with sepsis and 50 with septic shock. Plasma cell-free mtDNA levels were quantified using real-time quantitative polymerase chain reaction (RT-qPCR). Receiver operating characteristic (ROC) curve analysis was performed to assess the predictive value of cell-free mtDNA for 28-day mortality. Additionally, correlations were analyzed between cell-free mtDNA levels and clinical markers, including C-reactive protein (CRP), Sequential Organ Failure Assessment (SOFA) score, Acute Physiology and Chronic Health Evaluation (APACHE II) score, procalcitonin (PCT), neutrophil-to-lymphocyte ratio (NLR), and lactate. Results:Cell-free mtDNA levels were significantly elevated in patients with sepsis and septic shock compared to healthy controls, with markedly higher levels observed in septic shock patients than in those with sepsis. Non-survivors demonstrated significantly increased cell-free mtDNA levels compared to survivors in both sepsis and septic shock groups. Furthermore, cell-free mtDNA showed strong predictive performance for 28-day mortality, with an area under the curve (AUC) of 0.865, outperforming conventional clinical markers such as CRP, SOFA score, PCT, NLR, and lactate. Correlation analysis revealed a positive association between cell-free mtDNA levels and CRP, followed by SOFA score, NLR, and PCT. Conclusion: Elevated circulating cell-free mtDNA levels are strongly associated with increased disease severity and mortality in patients with sepsis and septic shock. These findings suggest that cell-free mtDNA may serve as a promising molecular biomarker for predicting clinical outcomes and could potentially be integrated into future sepsis management strategies. Further studies are warranted to validate its clinical utility.

Biography:

Dr. Aleem Ahmed Khan is a distinguished Scientist and the current Head of the Central Research Laboratory at the Owaisi Hospital and Research Centre, Deccan College of Medical Sciences in Kanchanbagh, India. He has established himself as a leading figure in the fields of molecular biology and regenerative medicine. With extensive expertise in hepatology and stem cell research, Dr. Khan has contributed significantly to the understanding and treatment of complex liver disorders. Throughout his prolific career, he has focused on bridging the gap between laboratory innovation and clinical application. His primary research interests include cell-based therapies, molecular diagnostics, and the pathophysiology of liver cirrhosis. Dr. Khan's work is characterized by a commitment to advancing medical biotechnology in India, evidenced by his leadership in various high-impact research projects and his dedication to mentoring the next generation of scientists. He maintains an active global presence in the scientific community, as reflected by his ORCID profile (0000-0001-7075-9037), and continues to pioneer diagnostic advancements that improve patient outcomes in the region and beyond.

Colchicine as an Anti-Inflammatory Agent Improving Cancer Prognosis: A Therapeutic Repurposing Perspective

Shlomo Z. Ben-Sasson
Institute of Electrical and Electronics Engineers, USA

Abstract:

Colchicine is emerging as a promising candidate for therapeutic repurposing in oncology due to its broad spectrum of biological activities and well-established clinical safety profile. Its multifaceted mechanisms of action include the inhibition of inflammation, angiogenesis, cytoskeletal dynamics, and autophagy, which may help suppress tumor progression while also reducing the cardiovascular complications frequently associated with cancer and its treatments. Colchicine exerts its effects by binding to tubulin, thereby disrupting microtubule formation and inhibiting essential cellular processes such as cancer cell replication, migration, and endothelial cell proliferation, ultimately limiting tumor growth and blood vessel formation. Additionally, colchicine inhibits activation of the NLRP3 inflammasome, reducing the production of interleukin-1 (IL-1), a key mediator of inflammation implicated in cancer development and progression. Experimental studies have further demonstrated that colchicine can directly inhibit the proliferation of cancer cells, induce apoptosis, and delay metastatic spread. Owing to its long history of clinical use, oral administration, affordability, and favorable safety profile, colchicine represents an attractive adjunct to conventional anticancer therapies. Its potential to enhance treatment efficacy while minimizing systemic toxicity and addressing treatment-related comorbidities warrants further evaluation through well-designed prospective clinical trials.

Biography:

Prof. Shlomo Z. Ben-Sasson is Professor Emeritus in the Department of Immunology at the Hebrew University–Hadassah Medical School, Jerusalem, Israel. He earned his Ph.D. in Immunology from the Hebrew University and has over five decades of experience in immunological research and academic medicine. Throughout his distinguished career, he has served in various academic positions at Hebrew University, including Professor of Immunology, and held research appointments at leading institutions such as the National Institutes of Health (NIH), Bethesda, and Harvard Medical School. His work and international collaborations have significantly contributed to advances in the field of immunology.

Evaluation of Serum Afamin and Oxidative Stress Biomarkers in Polycystic Ovarian Syndrome Overweight Women

Sara Sardar Hamad
Koya University, Iraq

Abstract:

Afamin is a human vitamin E-binding glycoprotein that plays an essential role in protection against oxidative damage and disease. This study was conducted at Shahid Doctor Khalid Hospital in the Koya-Erbil Governorate. A total of 120 women, aged 16 to 45 years, were enrolled comprising 90 overweight patients with polycystic ovary syndrome (PCOS) and 30 healthy participants without PCOS. The results showed that body mass index (BMI) was significantly higher in patients with PCOS compared to healthy participants, indicating that women with PCOS tend to be overweight. Severe acne, hirsutism and amenorrhea were markedly more prevalent in the PCOS group. This study clearly demonstrates that serum levels of Afamin, and 8-hydroxy-deoxyguanosine (8- OHdG) were significantly elevated in overweight patients with PCOS as compared to healthy individuals. In contrast, serum levels of vitamin E and glutathione peroxidase (GSH-PX) were significantly decreased in overweight patients with PCOS than in the control groups. Significant positive correlations were observed between BMI and Afamin, vitamin E and GSH-PX in overweight patients with PCOS, whereas a significant negative correlation was found between BMI with 8-OHdG. The mean levels of serum Total-Cholesterol (T-Chol), Triglyceride (TG), Low density lipoprotein (LDL), Very low density lipoprotein (VLDL) and Atherogenic index of plasma (AIP) are significantly increased in overweight patients with PCOS as compared to healthy groups, while the mean level of serum High density lipoprotein (HDL) was significantly decreased in overweight patients with PCOS as compared to healthy groups. Our study indicates a novel association between increased Afamin and 8-OHdG as a biomarker of oxidative stress resulting from the nucleoside or nucleotide pool in high BMI patients with PCOS. Elevated AIP levels and dyslipidemia identified as a useful biomarkers for predicting future cardiovascular disease (CVD) risk.

Biography:

Ms. Sara Sardar work as Assistant Lecturer at the Department of Chemistry, in the Faculty of Science and Health at Koya University, Kurdistan Region of Iraq. She received her B.Sc. in Chemistry at Koya University in 2013. She completed her MSc. in Biochemistry at Salahaddin University (Kurdistan Region of Iraq) in 2019. Now she is a PhD student in Clinical Biochemistry at Koya University, Kurdistan Region of Iraq. Her research focuses on [Clnical Biochemistry, Endocrinology and Biostatistics]. Her work has been published in leading journals such as [Steroids journal, Middle East Fertility Society Journal and ARO-The Scientific Journal of Koya University].

Molecular Signaling between Primary Tumor and Secondary Tumor through Tyrosine Kinase

Ayah Ghazi Abdo Al-Qasrawi
Yarmouk University, Jordan

Abstract:

Despite major advances in tumor cell biology, metastatic disease remains the principal cause of nearly 90% of cancer-related deaths. While the literature characterizes the pre-metastatic niche through processes such as angiogenesis and immune suppression, the molecular basis of organ-specific metastasis—the non-random spread of cancer—remains poorly understood. Traditional models focus on vascular or lymphatic dissemination; however, evidence suggests that biochemical communication between primary tumors and distant tissues is crucial for the selective colonization of metastases. This hypothesis proposes a novel molecular mechanism to explain organ-specific metastasis, mediated by tyrosine kinase (TK) signaling. We hypothesize that primary tumors secrete specific tyrosine kinase proteins in exosomes that interact with overexpressed receptors in secondary organs. This targeted signaling creates a molecular "pre-metastatic niche," facilitating organ-specific metastasis beyond passive vascular models. Uncovering this signaling axis is essential for better understanding cancer pathophysiology and for developing more targeted therapeutic approaches. Clinical successes demonstrate the therapeutic relevance of TK pathways in managing organ-specific metastases. These include the CNS-penetrant EGFR inhibitor osimertinib in non–small cell lung cancer, the dabrafenib–trametinib combination in BRAF V600 mutant melanoma, and the HER2-targeted regimen incorporating tucatinib for metastatic breast cancers.

Biography:

Dr. Ayah Al-Qasrawi is a medical graduate from Yarmouk University with clinical training in anesthesia and intensive care medicine, followed by experience as a general practitioner and a pediatric resident. Her clinical background has provided her with a strong foundation in human physiology, acute patient care, and clinical decision making. Her primary academic interest lies in understanding disease at the molecular and mechanistic level, with a focus on bridging the gap between molecular biology, pathophysiology, and clinical practice. She is particularly interested in translational research that converts biomedical discoveries into clinically meaningful interventions that improve patient outcomes. Dr. Al-Qasrawi has published two hypothesis-driven papers in Elsevier journals. Her work includes exploring diabetic ketoacidosis beyond the traditional hyperglycemic model, with a proposed role for PDK4 dysregulation, as well as investigating molecular signaling pathways between primary and secondary tumors, focusing on tyrosine kinase–mediated mechanisms. Through her combined clinical and research experience, she aims to develop as a translational researcher integrating molecular insights with clinical medicine, particularly in complex and systemic diseases.

How do Bacterial Endophytes Enhance the Therapeutic Potential of Medicinal Plants? A Comprehensive Review

Susmita Roy
Central Ayurveda Research Institute, India

Abstract:

E*ndophytes are endosymbiotic group of microbes including bacteria, fungus, actinomycetes and mycoplasma. Till date, the plant growth promoting properties of endophytes have been extensively studied for their application in the agriculture, but very few studies have been conducted on the medicinal plants to explore the role of the endophytes in their medicinal importance. Moreover, studies on endophytes of medicinal plants have majorly focussed on fungi, not bacteria. India, being a biodiversity hotspot, harbors a plethora of plants, routinely used for drug development and disease cure, especially in Indian traditional medicine. Ayurveda is an ancient approach of treatment in Indian traditional medicine and among the ~540 medicinal plants discussed in Ayurvedic Pharmacopeia of India; only 81 plants have reports on endophytic bacteria. This review has included those 81 plants and few of their closely related species to discuss about the role of their endophytes in aiding in their medicinal importance. This review has aimed to focus the range of endophyte bacteria isolated from those medicinal plants along with their growth promotion abilities and role in drug development. It has been found that the endophyte bacteria either residing within the host plant or being bio-inoculated in another closely related plant can generate either antimicrobial compound against phytopathogens or activate host pathways to produce biologically active compounds or promotes only plant growth. Collectively, this review discusses about excellent prospects of endophytes in developing new and effective compounds of medicinal importance, with a major emphasis on plants depicted in the Indian Traditional medicine.*

Biography:

Dr. Susmita Roy is a Research Officer (Microbiology) at the Central Ayurveda Research Institute (CARI), Kolkata, under the Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, Government of India. She earned her Ph.D. in Microbiology from the University of Calcutta and has extensive research experience across leading research institutions in India, including the Indian Institute of Chemical Biology (IICB), Maulana Abul Kalam Azad University of Technology, and the German Leprosy and TB Relief Association. Her research focuses on antimicrobial drug development and endophyte studies, with active involvement as Principal Investigator and Co-Investigator in several government-funded research projects. Dr. Roy has authored 19 research papers in national and international peer-reviewed journals and has presented 16 abstracts at scientific conferences, reflecting her significant contributions to microbiology and biomedical research.

Brain Functional Changes Following Acupuncture in Parkinson's Disease: A Systematic Review of fMRI-Based Randomized Controlled Trials

Catarina Isabel Ramos Pereira
ICBAS – Abel Salazar Institute for Biomedical Sciences, Portugal

Abstract:

Parkinson Disease (PD) is the second most prevalent degenerative neurological disorders, with its occurrence expected to increase twofold in the coming years. At present even with the best medical care, patients often see a decline in their physical abilities, daily tasks, engagement in activities and mobility. FMRI enables researchers to investigate changes in brain activity and functional connectivity associated with both the disease process and therapeutic interventions. Recently, it was reported that acupuncture can modulate neural activity patterns in PD, detectable by fMRI. Background/Objectives: To systematically evaluate the therapeutic effect of acupuncture in Parkinson disease (PD) in RCTs by Functional MRI. Methods: A comprehensive literature search was conducted from March through April 2025 using the following electronic databases: EMBASE, Medline, PubMed, Science Direct, The Cochrane Library, Cochrane Central Register of Controlled Trials (Central) and Scielo. Search terms used were based on the combination of 3 broad topics: Parkinson's, Functional Magnetic Resonance, and Acupuncture. The search excluded papers published before 2019. The quality of the included RCTs was assessed using the Cochrane risk of bias tool. The selection and analysis of the articles was conducted by two blinding authors through Rayyan application. Results: Consistent patterns of brain modulation and clinically relevant outcomes were found by fMRI outputs. Results from different studies evidence that acupuncture can modulated motor and cognitive brain networks in Parkinson's disease, with associated improvements in motor function, gait, and pain. Conclusions: Acupuncture shows promise as a neuromodulatory adjunct in Parkinson's disease, warranting larger controlled trials

Biography:

Mr. Catarina Ramos Pereira is a Physiotherapist, Traditional Chinese Medicine (TCM) practitioner, and CEO of Centro Medular – Integrative Medicine Clinic in Porto, Portugal. She is currently completing her PhD in Biomedical Sciences at the Instituto de Ciências Biomédicas Abel Salazar (ICBAS), University of Porto, where her research focuses on the application of acupuncture and integrative medicine in Parkinson's disease. Her research combines clinical neuroscience, functional assessment, and evidence-based complementary medicine, with particular emphasis on the mechanisms underlying acupuncture and its effects on motor and non-motor symptoms in Parkinson's disease. She is the author and co-author of several peer-reviewed publications in international journals, including systematic reviews and randomized controlled trials investigating acupuncture interventions in Parkinson's disease. Alongside her academic career, Catarina integrates clinical practice with scientific research, promoting evidence-based integrative healthcare. Her research interests include Parkinson's disease, neurorehabilitation, functional neuroimaging, acupuncture, Traditional Chinese Medicine, and translational research in integrative medicine.

Soy Isoflavone Ameliorates Gut-Brain Axis Dysfunction Via ER-B Activation and B-Glucuronidase Modulation in Estrogen-Deficient Rats

Rishabh Chaudhary
Maharishi Markandeshwar (Deemed to be University), India

Abstract:

The Gut-brain axis (GBA) plays a crucial role in neuroendocrine homeostasis, and its dysregulation due to estrogen deficiency is associated with cognitive decline, mood disorders, and gut microbiome disturbances in postmenopausal women. The gut microbiome involved in estrogen metabolism, known as the estrobolome, regulates β-glucuronidase activity, which influences estrogen reactivation and systemic availability. Reduced estrobolome function and altered β-glucuronidase activity in postmenopause may exacerbate GBA dysfunction. Thus, strategies that modulate the estrobolome and enhance β-glucuronidase may be beneficial in improving postmenopausal GBA dysfunction. With this background, our study aims to determine the effect of soy isoflavone (SIF) on GBA dysfunction in estrogen-deficient rats. To induce GBA dysfunction, rats were first bilaterally ovariectomized (OVX) and, after one week, treated with SIF (40 and 80 mg/kg)/17β-estradiol (17βE2) for 28 days. In OVX rats, one-month administration of SIF maintained estrogen receptor-β (ER-β) expression over estrogen receptor-α (ER-α), preserved gut eubiosis by modulating the estrobolome, and increased β-glucuronidase enzyme and GUSB gene levels. Additionally, SIF also restores physiological and neurobehavioral parameters. In addition to this, SIF regulates mucosal integrity, tight junction genes, inflammatory markers, oxidative stress, monoamine neurotransmission, hypothalamic-pituitary axis regulation, and apoptosis. Comparative profiling of SIF with 17βE2 shows that 17βE2 improves gut and brain health, while preserving serum estradiol levels and uterine horn weight. This may enhance the feminizing side effects of 17βE2. However, SIF did not show any uterotrophic effect. SIF at doses of 40 and 80 mg/kg may offer a safer alternative to 17βE2 for managing GBA dysfunction in postmenopausal women.

Biography:

Dr. Rishabh Chaudhary is an Assistant Professor in the Department of Pharmacology at M.M. College of Pharmacy, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India. His research focuses on preclinical pharmacology, neuropharmacology, pain & inflammation, metabolic disorders and the development of plant/food-based therapeutics for postmenopausal complications. His research primarily focuses on the postmenopausal gut–brain axis, the gut–metabolic axis, chronic pain and inflammation, Alzheimer's disease, and the elucidation of the molecular mechanisms underlying the therapeutic effects of drugs in postmenopausal disorders. Dr. Chaudhary has authored more than 35 research publications in peer-reviewed international journals and has presented his work at several national and international scientific conferences. His research integrates pharmacological, biochemical, molecular, and microbiological approaches to identify novel therapeutic strategies targeting oxidative stress, inflammatory signaling pathways, and gut microbiota dysbiosis in postmenopausal complications. He has also contributed to externally funded research projects and actively mentors undergraduate and postgraduate pharmacy students. His current interests include translational pharmacology, nutraceuticals, phytopharmacology, precision medicine, and the application of natural bioactive compounds for the prevention and treatment of postmenopausal brain, gut, and metabolic disorders.

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Determination of the Types and Concentrations of Cytokinins on the Reduction of Hyperhydricity in Potato In Vitro Culture

Maia Kukhaleishvili
Georgian Technical University, Georgia

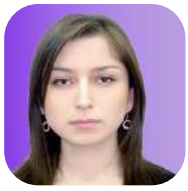
Abstract:

The disruption of tissue structure in hyperhydric plants is caused by physiological processes: the course of photosynthesis in in vitro culture. High humidity, insufficient lighting, excess sugar in the nutrient medium, as well as excess or low concentrations of phytohormones. This often leads to anatomical, physiological and morphological disorders in the plant, which are mainly reflected in the leaves, although it can also be reflected in the stems and roots. The aim of the study was to determine the type and best concentrations of cytokinins: 6- Benzylaminopurine (BA) and Thidiazuron that affect the degree of hyperhydricity in potato variety "Sante". The effect of different concentrations (MS + 0.5 mg/l; MS +1.5 mg/l; MS +2.5 mg/l) of cytokinins BA and TDZ on the proliferation of potato axillary shoots was studied. after 21 day of explanttaion , the length of the shoots, the number of shoots and leaves were determined. As a result of the studies, it was found that hyperhydrosis can be eliminated by adding 1.5 mg/l of BA to the basal medium and after 21 day of explantation in vitro potato variety "Sante" had a straight, strong stem with 8-10 rnodes and 15-20 green leaves. The addition of different concentrations of TDZ to the MS medium resulted in hyperhydration-related disorders, which were mainly reflected in the leaves. It is noteworthy that the addition of BA to the MS medium , both at low concentrations (0.5 mg/L) and at high concentrations (2.5 mg/L), caused hyperhydration, which was manifested in impaired shoot proliferation (short plants).

Biography:

Ms. Maia Kukhaleishvili is the Director of Biotechnology Center, She has completed Agricultural Institute, Specialty-Agronomy, she has completed her PhD in Ecology in 2015. She has published 25 full papers in rated journals. She was a presenter in many international biotechnology scientific conference in abroad. She has participated in training course about innovative technology in Italy (2015) and France (2016). She participated as a trainer in the organization "M-B-C Georgia" founded by ANPARD and Project EPI on the topic "Production, storage and fertilization of vegetable crops in open field". She was a principal investigator the project "Selection high- productivity clones adapted to Georgian potato regions and production of in vitro virus free potato seeds." founded by Shota Rustaveli National Science Foundation in Georgia. Maia was a principal investigator two projects founded by American organization "UMCOR" and "CEAR" and the project "Conservation of in vitro virus free potato collection resistant for Pathogenic Diseases in Georgia's potato Regions"

The Effect of Synthetic Auxins on Morphological parameters of Potato in In Vitro Variety „Sante”



Iveta Megrelishvili
Georgian Technical University, Georgia

Abstract:

Phytohormones can control all stages of plant ontogenesis, cell division and elongation, which underlie all processes of growth and morphogenesis, the complete absence of phytohormones is lethal to plants. In tissue culture, auxin is mainly used to form a full-fledged stem, but at the same time it is used to activate root development together with cytokinin. The aim of the study was to study the effect of different types of synthesized auxins NAA (1-Naphthaleneacetic acid), Indoleacetic acid (IAA) and Indole-3-butyric acid (IBA) on the in vitro morphological parameters of the potato variety "Sante". Murashige-Skoog (MS) medium + 1.5 mg/l concentration of all three types of synthetic auxins was used for assessment of in vitro developmnet of potato variety „Sante”. The best results were shown by MS+ 1.5 mg/L NAA when it ensured the rooting and growth of potato plant microcuttings after 18 day of explanation. During this period, the regenerative plants had a well-developed, bushy and branched root system. In addition, root formation was accompanied by correlated growth and development of the green part of the root, in some cases even the initiation of growth of axillary dormant buds. In case of 1.5 mg/L of IAA + MS medium, the weak root system developed, which could not ensure the full formation of other in vitro vegetative organs. The addition of. MS + 1. 5 mg/l IBA led to the development of a stronger root system, but at the same time, after 11 day of incubation explant in phytotrone, an abnormal elongation of the stem and internodes of the potato plant was observed. Thus, among the synthetic auxin derivatives, the addition of the plant growth regulator MS+ m1.5 mg/l was the best for the development of a strong root system of the potato variety "Sante".

Biography:

Ms. Iveta Megrelishvili She has completed her Ph.D. in Biochemistry in 2008. She has published several full papers in rated journals including grapevine viral and phytoplasma infections. She was a presenter in an international scientific conference in abroad. She participated as key personnel in some scientific projects. She was a principal investigator for the project “in vitro walnuts propagation” funded by SRNSFG. Iveta was a coordinator in two current projects regarding the study of grapevine phytoplasma and hazelnuts bacterial diseases in Georgia. She is the principal investigator in the project” Study of grapevine viral and phytoplasma diseases in Georgia”. Since 2009 she has been working in the virology laboratory of LEPL Scientific Research Center of Agriculture (SRCA), leading to improve laboratory ability and study of plant diseases using the Real-Time PCR method. Under his guidance, the laboratory's base was composed of a molecular laboratory (Scientific equipment as well as methodology).

The Effect of Lighting on Potato in vitro Micropropagation Potential

Ekaterine Bulauri
Georgian Technical University, Georgia

Abstract:

For successful cultivation of tissues and cells, it is necessary to maintain regulated conditions (temperature, light duration, photoperiod, humidity) in the phytotron. In order to maximize the potential of potato micropropagation, the influence LED yellow light, on the in vitro growth and development of the potato variety "Nevsky" has been studied. Different LED yellow light 2000-3000lux, 4000-5000lux and 5000-6000 lux was used for in vitro potatao regeneration under regulated phytotron condiotion (16/8h, 26 ±1^{0}C, 75-80 % humidity). Murashige and skoog(MS) medium was used for in vitro potato propagation. The light intensity of 4000-5000 lux was found to be useful for the development of microshoots of the potato variety "Nevsky". Adventitious bud induction and apical bud dominance were correlated. The plants had bright green leaves, 7-8 nodes, strong stem and well developed roots. Low light levels of 2000-3000 lux caused a slowdown in the initiation and induction of additional buds, while 5000-6000 lux of light somewhat inhibited the apical dominance of the main shoot and activated axillary branching. In addition, during in vitro cultivation of potatoes under high light, the leaves turned yellow, the stem was elongated and weak. Thus, the high potential for in vitro mass micropropagation of the potato variety "Nevsky" was demonstrated in a phytotron under conditions of 4000-5000 lux of illumination, 26 ±1^{0}C temperature, and a 16/8 hour photoperiod.

Biography:

Ms. Ekaterine Bulaurihas completed Ivane Javakhishvili Tbilisi State University, Specialty-Chemistry, she has completed her Master (MS) in Environmental protection and Ecology in 2011. She has published 7 full papers in rated journals in biotechnology field. She participated in international biotechnology scientific conference in Alicante Spain (2016); Berlin, Germany (2017); Paris, France (2018). Istanbul, Turkey (2018), Vienna, Austria (2019), Istanbul, Turkey (2021), Barcelona,Spain (2022). She participated as key personnel some scientific projects. Since 2006 she has been working in GTU Biotechnology center in the field of plants tissue culture and plants viral infection.

Analysis of the Impactof Violence and Aggression from Elderly Patientson Care Teams in Long-Term Geriatric Units at the Psychiatric Hospital

Natalia Shpak-Deschamps
Psychiatric Hospitalof Rennes, France

Abstract:

Background and Aims: The objective of this study was to assess the level of violence in the long-term psychogeriatric unit and its impact on the care teams and to proposeways to improve the working conditions of staff in these units. Methods: The geriatric unit of the Rennes Psychiatric Hospital comprises 120 beds in the nursing home and 80 long-term inpatient beds. Average age 77.4 years, 96 men and 104 women, diagnoses: dementia with behavioral disorders of all etiologies (26%), psychotic disorder (55.5%), mood disorders (11.5%), intellectual disability (7%). The authors assessed reports of violence from September 1, 2024, to September 1, 2025. The teams respondedto a questionnaire on workingconditions and attendeda discussion group with a psychologist. Results: The teams reported 80 incidents relatedto violence and aggression: indecentexposure, physical assault with or without bodily harm, death threats, threats with a weapon, physical threats, verbal threats, insults, and discriminatory remarks. 10% of cases were assessed as serious, 88% as significant, and 2% as minor. 31% of the injuries were accompanied by pain and requiring medical attention. In 73% of cases, intervention of staff and support teamstook place. 32 members of the care team responded to the questionnaire. The discussion group with a psychologist was perceived as useful and as a sign of institutional attention to the teams and their work-related suffering. Conclusions: Aggression and violence are frequent in the long-term geriatric departments of the psychiatric hospital. The authors point out the need for specific trainingfor care teamsand propose implementing regularpractice analysis sessions,as well as dedicated institutional time for teams and management to discuss their difficulties.

Biography:

Ms. Natalia Shpak Deschamps is a geriatrician with extensive clinical, academic, and forensic expertise in the field of geriatrics and gerontology. Since 2011, she has served as Head of the Gerontology Department at the Psychiatric Hospital in Renens, France, where she oversees the care and management of elderly patients with complex medical and neuropsychiatric conditions. She is an active member of the French Society of Geriatrics and Gerontology, contributing to the advancement of elderly care through research, clinical practice, and professional collaboration. Her academic work focuses on the non-pharmacological management of behavioral and psychological symptoms of dementia, pain assessment in non-communicative individuals, mild cognitive impairment (MCI), suicide in older adults, and palliative care for patients with behavioral disorders. In addition to her clinical and research responsibilities, she serves as a court-appointed expert in geriatrics, aging, and palliative care, providing specialized evaluations in legal settings, and through her multidisciplinary expertise and contributions, she continues to play an important role in improving geriatric healthcare practices and advancing the understanding of aging-related conditions.

Allostatic Load, Sleep Patterns, and Genetic Susceptibility In Relation to Severe Mental Illness: A Prospective Cohort Study

Louisa Esi Mackay
Xuzhou Medical University, China

Abstract:

Background: Serious Mental Illness (SMI) encompasses a category of mental, behavioral, or emotional disorders that cause substantial functional impairment and interfere with major life activities, including chronic conditions such as schizophrenia, bipolar disorder, non-organic psychoses, and personality disorders; compared with the general population, individuals with SMI exhibit significantly elevated risks of metabolic disorders, cardiovascular diseases, and suicide. Allostatic load (AL), on the other hand, quantifies the cumulative physiological burden resulting from chronic adversity exposure and sustained stress. Previous studies have linked elevated AL to diverse adverse mental and physical health outcomes, including depression, anxiety, and suicidal behaviors. Sleep, as a modifiable lifestyle factor, is also closely associated with SMI: meta-analytic evidence confirms that sleep disorders (e.g., insomnia, poor sleep quality) significantly elevate AL, indicating that sleep disturbances exacerbate chronic physiological stress and accelerate multi-system physiological dysregulation. In parallel, growing evidence suggests that genetic susceptibility may interact with lifestyle behaviors to shape outcomes, such as depression and dementia, yet the extent to which AL and sleep patterns modify the effect of genetic susceptibility on schizophrenia and bipolar disorder remains underexplored. Objectives: This study comprehensively assessed the independent and joint associations of AL and sleep patterns with the incidence of schizophrenia and bipolar disorder. Specifically, it investigated the interrelationships among polygenic risk scores (PRS), AL/sleep patterns, and schizophrenia/bipolar disorder, thereby examining the connections between AL, sleep patterns, genetic susceptibility, and SMI. Methods: The study included 304,884 (schizophrenia) and 304,335 (bipolar disorder) participants from the UK Biobank free of SMI at baseline. AL was measured using 10 biomarkers of the metabolic, cardiovascular, and inflammatory systems. Sleep patterns were derived from five sleep behaviors. Cox models were used to examine the independent and joint effects between AL, sleep patterns, genetic susceptibility, and SMI incidence. Results: After a median 13.7-year follow-up, 220 schizophrenia and 460 bipolar disorder cases were identified. High AL was significantly associated with increased SMI risk, while unhealthy sleep patterns significantly increased the risk of bipolar disorder. Participants with high AL and unhealthy sleep had the highest risk (schizophrenia: HR = 2.44, 95% CI: 1.01–5.88; bipolar disorder: HR = 6.94, 95% CI: 4.22–11.22). Genetic high-risk individuals with high AL (schizophrenia: HR = 5.11, 95% CI: 2.80–9.34; bipolar disorder: HR = 5.07, 95% CI: 3.20–8.02) or unhealthy sleep (schizophrenia: HR = 6.61, 95% CI: 2.60–16.84; bipolar disorder: HR = 11.19, 95% CI: 5.85–21.40) showed elevated susceptibility. AL and genetic risk had an additive interaction effect on the risk of schizophrenia. In the subgroup analyses, schizophrenia risks were comparable between genders in the high AL. In contrast, females exhibited significantly higher incident risks of bipolar disorder than males within the high AL, with a similar gender disparity observed in the unhealthy sleep pattern

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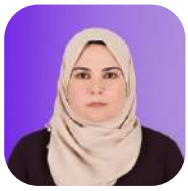
Conclusions: High AL and unhealthy sleep are associated with increased SMI risk and amplify genetic susceptibility. Adhering to a low AL and healthy sleep pattern will significantly reduce the risk of SMI, which would counteract the harmful effects of susceptibility gene components. Integrating interventions to reduce AL and optimize sleep patterns into public health practice may have potential implications for SMI prevention.

Biography:

Ms. Louisa Esi Mackay is currently pursuing a Doctorate in Epidemiology and Health Statistics at the School of Public Health, Xuzhou Medical University in China. Her main research interests are in adolescent mental health and behavior. Utilizing large public databases, imaging, and genetic instruments, she explores the mechanisms and pathology of adolescent behavior and mental health. With expertise in epidemiology and statistics, she has contributed significantly by publishing about 10 research papers as both the first and co-author in high-impact SCI journals such as Annals of General Psychiatry and Epidemiology and Psychiatric Sciences. Her research has been presented at multiple conferences in China and abroad and has won best presenter, best poster, and excellent paper awards.

Assessment of the Efficacy and Safety of Low-Dose Radiotherapy for Knee Osteoarthritis in Breast Cancer Survivors: A Comparative Clinical and Cytogenetic Study



Manal R. Mohammed
National Center for Radiation Research and Technology, Egypt

Abstract:

Background: Knee osteoarthritis (KOA) is one of the leading causes of chronic pain and disability worldwide. Breast cancer survivors frequently experience musculoskeletal complications that negatively affect their quality of life, while treatment options remain limited. Low-dose radiotherapy (LDRT) has recently gained attention because of its anti-inflammatory and immunomodulatory properties; however, evidence regarding its clinical efficacy and biological safety in breast cancer survivors is limited. Objective: This study evaluated the efficacy and cytogenetic safety of two LDRT fractionation schedules in female breast cancer survivors suffering from grade II–III knee osteoarthritis. Methods: Twenty female breast cancer survivors (45–65 years) diagnosed with knee osteoarthritis were enrolled and allocated into two treatment groups. Group I received localized external beam irradiation of 0.5 Gy three times weekly for two weeks, while Group II received the same dose twice weekly for three weeks. Clinical efficacy was assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and erythrocyte sedimentation rate (ESR). Safety was evaluated using micronucleus and alkaline comet assays to determine cytogenetic damage. Magnetic resonance imaging (MRI) was performed before and after treatment to evaluate cartilage thickness and joint morphology. Statistical analysis was performed using SPSS version 20 with significance set at $p < 0.05$. Results: Both treatment regimens produced significant improvements in WOMAC scores, indicating substantial reductions in pain and stiffness together with improved physical function. ESR demonstrated a reduction after treatment, with statistically significant improvement observed in the twice-weekly regimen. MRI findings revealed increased cartilage thickness and improved joint morphology in both groups without significant progression of joint effusion. Cytogenetic assessment demonstrated that the twice-weekly regimen maintained minimal DNA damage, whereas the more intensive three-times-weekly schedule resulted in a significant increase in micronucleus frequency and comet assay parameters, indicating greater genotoxic stress. Overall, the lower-frequency fractionation schedule achieved comparable clinical benefits while exhibiting a more favorable biological safety profile. Conclusion: Low-dose radiotherapy is an effective therapeutic option for relieving symptoms and improving joint function in breast cancer survivors with knee osteoarthritis. Although both irradiation schedules produced meaningful clinical improvement, administration of 0.5 Gy twice weekly over three weeks demonstrated superior cytogenetic safety while maintaining comparable therapeutic efficacy. These findings support the use of optimized LDRT fractionation schedules as a promising non-invasive treatment strategy for knee osteoarthritis in selected cancer survivors and warrant validation through larger randomized clinical trials.

Biography:

Dr. Manal R. Mohammed is an Assistant Professor in the Radiation Biology Department at the National Center for Radiation Research and Technology (NCRRT), Egyptian Atomic Energy Authority (EAEA), Cairo, Egypt. Her research focuses on radiation biology, cytogenetics, biodosimetry, radioprotection, oxidative stress, and the therapeutic applications of low-dose ionizing radiation. She has authored numerous peer-reviewed publications in international journals covering radiation-induced biological effects, cytogenetic biomarkers, radioprotective natural products, and translational radiation medicine. Her recent work has expanded into clinical applications of low-dose radiotherapy for inflammatory and degenerative diseases, particularly knee osteoarthritis in breast cancer survivors. Dr. Mohammed is also actively involved in establishing molecular biodosimetry capabilities and developing statistical support for biomedical research through the Statistical Analysis Unit at NCRRT. Her current interests include precision radiation medicine, biomarkers of radiation exposure, radiation-induced immune modulation, and translational research aimed at improving patient outcomes through evidence-based radiobiological approaches.

Novel Anti-Antimicrobial-Resistant (AMR) Agents Approach Using Stingless Bee Therapeutic Biomaterials

Patricia Vit
University of the Andes, Venezuela

Abstract:

Screening anti-AMR synergism of stingless bee nest materials with antibiotics deserves an academic effort on this potential solution to reduce and overcome antimicrobial resistance. Antibiotic resistance (AMR) is a critical challenge of public health involving humans, animals, and the environment. Bacterial pathogens of clinical and public health importance are termed susceptible-drug-resistant, multidrug-resistant (MDR), extensively drug-resistant (XDR), and pan drug resistant (PDR). The World Health Organization identified twelve antibiotic-resistant bacteria last year to direct research into preventing and controlling AMR. The One Health approach on antimicrobial resistance (AMR) encompasses more than just antibiotic treatments. This includes methods to reduce antimicrobial resistance (AMR), employing nanotechnology to combat bacterial infections, silver emulsions, bacteriophages, marine goods, algae, plant extracts, and insect-derived products for entomotherapy, with a special emphasis on stingless bees (SBs) meliponitherapy. With 605 pantropical species, stingless bees (Hymenoptera, Apidae, Meliponini) represent a biodiverse resource. After proving that Tetragonisca angustula pot-pollen ethanolic extract works in concert with amikacin, a semi-synthetic antibiotic of the aminoglycoside class, and meropenem, a synthetic antibiotic of the carbapenem class, against six XDR gram-negative bacteria, we suggest screening stingless bee nest materials. Anti-antimicrobial-resistant (anti-AMR) agents may undergo a paradigm shift as a result of this study. Antibiotic adjuvants, resistance breakers, antibiotic potentiators, or chemosensitizers are substances that reverse AMR. These substances have varying levels of antimicrobial action, but when combined with an antibiotic, they may increase the antibiotic's effectiveness, and the synergistic effect can be measured. Biomaterials from stingless bees from Brazil, Malaysia, Mexico, Tanzania, Thailand, and Venezuela were examined in order to look into potential future developments for worldwide AMR. In order to clarify the microbial origin of putative active biomolecules, microbial relationships with stingless bees become crucial. The biodiverse stingless bee is a fresh research target that contributes to the medical and therapeutic anti-AMR picture globally. This book outlines our current understanding of SB anti-AMR potential as a non-pharmacological substitute for synthetic sources of the most potent macromolecules found in stingless bee nests. A scientific foundation for doing additional research and surveys on the crucial public health issue presented by AMR is provided by updated data, recommendations, and references. We emphasize how critical it is to work together to find a way to lessen the effects of AMR and stop deadly situations. We are able to start a systematic screening of stingles bee pot-honey, pot-pollen, and propolis because of our knowledge of stingless bees and a traditional in vitro bacterial pathogen challenge of their nest materials alone or in combination with synthetic or semi-synthetic antibiotics. The potential of global initiatives om the anti-antibiotic-resistant role of stingless bee nest materials and their synergism with conventional antibiotics needs joined experts in meliponine chemical composition, bioactivity, and microbiology, as well as a group of medical professionals and melittologists to mitigate AMR.

Biography:

Ms. Patricia Vit is Emerita Professor at Universidad de Los Andes, Mérida, Venezuela. Her Research Laboratory Apitherapy and Bioactivity (APIBA) is affiliated to the Food Science Department, Faculty of Pharmacy and Bioanalysis (1985-2013). Chair of Food Technology, author and editor of Food Science and Food Technology books. Mujeres en Ciencia, Health Science Award ACFIMAN, 2023. Honorary Associate at the Sydney Medical School – Medical Sciences, The University of Sydney, Australia (2011–2019) after a Research Fellowship by Endeavour Awards. Prometeo Researcher at Universidad Tecnica de Machala, Ecuador (2014–2015). Investigates chemical composition, sensory properties, and bioactivity of tropical pot-honey produced by Meliponini. Biological, medicinal, and economical importance of pot-honey and pot-pollen processed by stingless bees in cerumen pots became two books published by Springer, Vit P, Pedro SRM, Roubik DW, editors: Pot-Honey. A Legacy of Stingless Bees, 654 pp (2013) and Pot-Pollen in Stingless Bee Melittology, 481 pp (2018). Later, the building materials by Vit P, Bankova V, Popova M, Roubik DW, editors. Stingless Bee Nest Cerumen and Propolis, Springer Nature (2024) Vol 1 535 pp, Vol 2 501 pp. Vit et al., editors; Editorial APIBA-ULA; Mérida, Venezuela: Proceedings of the International Symposium on Stingless Bees 2024 ISSB Mérida, Venezuela, and 2026 ISSB IBRA Webinar. Ongoing Springer Nature (2026) book Stingless Bee Therapeutic Biomaterials. Novel Anti-Antimicrobial-Resistant (AMR) Agents. Emerita Council Member (June 2023-2026). CTN Productos provenientes de abejas Technical Committee of Standards for Bee Products, NTE INEN, Quito, Ecuador (since July, 2026). Her h-index is 37.

Evolution of the AGMK1-9T7 GLI1+ Progenitor Cells to Become Tumor Cells and Potentially Cancer-Stem Cells

Andrew M. Lewis
Duke University, USA

Abstract:

We have investigated the expression of selected genes and miRNAs that have been found to be associated with human cancer-stem cells for their involvement in the neoplastic evolution of our AGMK1-9T7 cell line from a non-tumorigenic status at passage (p)13 to a tumorigenic/metastatic status at p40 to p43. Among these genes are CD90, CD44, CD24, PODXL, ALDH1A, ALDHA2, and ALDHA3 genes, as well as 17 other genes and 38 miRNAs. While CD90 and CD24 were not expressed by any passages of AGMK1-9T7 cells, CD44 was expressed in cells at p13, p23, p33, and p43. The expression of PODXL was first detected as weakly expressed at p33 but was highly expressed by p43. Of the 17 genes that have been associated with human cancer-stem-cell functions that we examined across this spectrum of neoplasia, 5 were up-regulated >log2 fold and 8 were down-regulated >log2 fold. The expression of the ALDH1A genes, which have been associated with cancer-stem cells, was investigated by the ALDEFLUOR assay in AGMK1-9T7 cells from p13 to p43. Using RT-qPCR, the ALDH1A2 gene was found to be up-regulated in cells from p13 to p43. Twenty-seven of the 38 miRNAs reported to be associated with human cancer-stem cells were expressed by the AGMK1-9T7 cells at different passages with the highest level of expression at p43. From these data, we propose that the AGMK1-9T7 cells are evolving from their non-tumorigenic state to become tumor cells and potentially cancer-stem cells by p43. I will suggest that this in vitro system might provide a model to investigate the role of these processes in neoplastic development in humans.

Biography:

Ms.Andrew Lewis is a Principal Investigator in the Laboratory of DNA Viruses. He received his M.D. degree from Duke University in 1961 and worked as a scientist at the National Institute of Allergy and Infectious Diseases from 1963 to 1994. His work at the NIH focused on virology, the discovery of non-defective adenovirus-SV40 hybrids, and the ability of DNA viruses such as SV40 to induce neoplastic transformation of cells in tissue culture and cause tumors in rodents. Due to the concerns over the possible risks associated with the non-defective adeno-SV40 hybrid viruses, he was an active participant in the Asilomar Conference in 1975 that focused on the possible risks posed by laboratory experimentation involving recombinant DNA.He joined CBER, FDA in the Division of Viral Products in 1995 to focus on safety issues associated with the use of transformed cells as cell substrates for vaccine manufacture. At CBER, Dr. Lewis first worked on the possible association between SV40 contamination of early polio vaccines and subsequent tumor development in humans, which had implications for the safety of continuous cell lines for viral vaccine manufacture. He became Chief of the Laboratory or DNA Viruses in the late 1990s. He and others initiated a program to study the tumorigenic potential of transformed cells used during the production of new vaccines. These data were presented at the FDA advisory committee meeting in 2000. This committee encouraged Dr. Lewis and his lab to pursue this project further to identify and characterize the basic biological processes that allow VERO cells to develop the capacity to form tumors. The lab has continued these studies for the past 20 years and has developed what may represent a hypothetical model of neoplasia in tissue culture.

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Applications of Information Theory in Data Analytics for Healthcare: Turning Clinical Data into Actionable Insights

Ashok Kumar
Chitkara University, India

Abstract:

The exponential growth of healthcare data — spanning electronic health records (EHR), medical imaging, genomics, and wearable Internet of Medical Things (IoMT) devices — demands principled mathematical frameworks capable of extracting meaningful clinical insights from high dimensional, heterogeneous datasets. This paper examines the application of information-theoretic methods to healthcare data analytics, with particular focus on their role in feature selection, disease classification, and clinical decision support. Core concepts reviewed include Shannon Entropy, Mutual Information (MI), KL Divergence, and Information Gain, each providing a quantitative lens through which the relevance, redundancy, and uncertainty of clinical variables may be assessed. These tools are applied across a structured six-stage analytics pipeline — encompassing entropy-based data preprocessing, MI guided feature selection, machine learning model training, and information-theoretic performance validation — culminating in evidence-backed clinical decision support at the point of care. Empirical evidence highlights the significant impact of these methods: entropy- and information-gain-based feature selection achieves 99.41% accuracy in breast cancer classification (Sharma & Mishra, 2021); the Joint Mutual Information Maximisation (JMIM) criterion yields approximately 6% relative error reduction over competing methods across 11 benchmark datasets (Bennasar et al., 2015); and the DISR criterion successfully discriminates cancer subtypes across 11 microarray classification tasks (Meyer et al., 2008). Applications span oncology, medical imaging, genomics, precision medicine, and neurology. Emerging trends explored include entropy-based Explainable AI (XAI) for transparent diagnostic decisions, MI-based federated learning for privacy-preserving distributed model training, deep learning integration via cross-entropy and KL divergence loss functions, digital twin modelling of patient-specific physiological systems, and MI-driven genotype–phenotype association mapping for personalized treatment. Open challenges — including high-dimensional MI estimation, missing and noisy clinical data, interpretability, computational efficiency, and the absence of standardized benchmarks — are identified alongside future directions: hybrid AI and information-theoretic pipelines, real-time entropy-based ICU patient monitoring, causal inference via MI, and the development of standardized evaluation protocols for healthcare machine learning.

Biography:

Dr. Ashok Kumar is a Professor and Assistant Dean (Applied Sciences) at Chitkara University, Himachal Pradesh, with more than 17 years of experience in teaching, research, and academic administration. He holds a Ph.D. in Mathematics and has developed expertise in information theory, data mining, engineering education, and applied mathematics. His research focuses on applying entropy and information-theoretic measures to feature selection, data analytics, and healthcare systems, contributing to advancements in these interdisciplinary fields. He has published numerous research articles in reputed international journals and actively serves the scholarly community as a reviewer and editorial board member. In addition to his research contributions, he is dedicated to curriculum development, academic leadership, and the mentoring of faculty members and students. He actively promotes interdisciplinary collaboration to strengthen research and educational outcomes. His current interests include artificial intelligence in education, disaster risk reduction, and the development of sustainable, technology-driven solutions that address real-world challenges while fostering innovation, academic excellence, and societal impact.

A Traditional Medicinal Approach to the Global Antimicrobial Resistance (AMR) Crisis: Influence of Functional Components of Fermented Biomaterials of the Meliponine Nest

Flor D. Mora
University of the Andes, Venezuela

Abstract:

Antimicrobial resistance (AMR) represents one of the most critical public health challenges of our time, involving humans, animals, and the environment. The World Health Organization has identified twelve priority antibiotic-resistant bacteria to direct research into prevention and control strategies. The One Health approach to AMR encompasses diverse interventions beyond conventional antibiotics, including nanotechnology, bacteriophages, marine products, plant extracts, and insect-derived therapeutics, with particular emphasis on stingless bee (SB) meliponitherapy. With 605 pantropical species, stingless bees (Hymenoptera, Apidae, Meliponini) represent a remarkably biodiverse resource that has been integral to traditional medicine across tropical cultures for centuries. Indigenous communities have long used stingless bee honey, pollen, and propolis to treat infections, wounds, and inflammatory conditions. Recent scientific evidence demonstrates that ethanolic extracts of Tetragonisca angustula pot-pollen exhibit synergistic activity when combined with amikacin (aminoglycoside class) and meropenem (carbapenem class) against six XDR Gram-negative bacteria, providing strong justification for systematic screening of stingless bee nest materials. Antibiotic adjuvants, resistance breakers, potentiators, or chemosensitizers are substances that reverse AMR. While these compounds may possess limited antimicrobial activity alone, they can significantly increase antibiotic effectiveness when combined, producing measurable synergistic effects. This study examines stingless bee biomaterials from Brazil, Malaysia, Mexico, Tanzania, Thailand, and Venezuela to investigate global applications for AMR mitigation. Understanding microbial relationships within stingless bee nests is crucial, as nest-associated microbiomes function as natural "biofactories" producing bioactive macromolecules. The biodiverse stingless bee emerges as a promising research target contributing to the global therapeutic anti-AMR landscape, effectively bridging traditional ethnomedicinal knowledge with modern pharmacological science. This abstract outlines our current understanding of stingless bee anti-AMR potential as a complementary adjuvant to synthetic antibiotics. We provide a scientific foundation for additional research on this critical public health issue through updated data, recommendations, and references. Our established knowledge of stingless bees enables systematic screening of pot-honey, pot-pollen, and propolis through traditional in vitro bacterial pathogen challenges—testing nest materials alone or in combination with synthetic or semi-synthetic antibiotics. The success of global initiatives examining the anti-AMR role of stingless bee nest materials requires interdisciplinary collaboration. We emphasize the urgent need for coordinated efforts to mitigate AMR impacts, prevent deadly outcomes, and translate traditional knowledge into evidence-based therapeutic strategies. This research signals a potential paradigm shift in anti-AMR agent development—moving beyond synthetic discovery toward systematic exploration of traditional biomaterials that offer sustainable, accessible, and culturally appropriate solutions to the global AMR crisis.

Biography:

Dr. Flor D. Mora V. is a Pharmacognosist with a Ph.D. from the University of Mississippi (2005) and a Bachelor's in Pharmacy from Universidad de Los Andes (ULA), Venezuela (1991). She currently serves as a Titular Professor at ULA's School of Pharmacy, where she has been a faculty member since 1992, holding various leadership positions including Department Head of Pharmacognosy and Organic Medicaments. Additionally, she works as a Cosmetic Producer at DLOAL ScientificCosmetic and previously served as Farmacéutico Regente at Drogueria Medifar Salud. Dr. Mora's research focuses on natural products, essential oils, pharmacognosy, and antimicrobial activity. She has led multiple funded projects investigating phytochemistry, anti-inflammatory activity, and biological activities of Venezuelan plant species. Her research extends to stingless bee products, larvicidal activity against agricultural pests and disease vectors, and natural alternatives for pharmaceutical applications. Dr. Mora has published numerous peer-reviewed articles in prestigious journals including Natural Product Communications, Planta Medica, and Emirate Journal of Food and Agriculture. She maintains active professional affiliations with ASOVAC, SILAE, COLFARVE, and holds PEI/FONACIT research incentives at Level A2.

Integrative Morphological and Molecular Phylogenetic Assessment of Bulbophyllum (Orchidaceae) from Northeast India

Sohini Deb
North-Eastern Hill University, India

Abstract:

Bulbophyllum is a large and highly diverse genus of Orchidaceae, comprising over 2,000 species distributed predominantly in tropical and subtropical regions. Although India harbours a large number of species of the genus, it has remained highly unexplored. Investigations in the Northeast Indian region have revealed an abundance of Bulbophyllum species. Owing to extensive morphological diversity, convergent evolution and overlapping diagnostic characters, species delimitation and sectional classification within the genus remain challenging. Although several taxonomic revisions have been undertaken, phylogenetic information for many Indian Bulbophyllum species, particularly those occurring in Northeast India, is still limited. Therefore, in this study, we have attempted to investigate the taxonomic relationships among 20 Bulbophyllum species from Northeast India, using an integrated morphological and molecular approach. Thirty diagnostic morphological characters encompassing both vegetative and reproductive traits were selected from published taxonomic literature and scored for all species. The resulting data matrix was subjected to UPGMA cluster analysis to evaluate patterns of morphological similarity among taxa. The complete nuclear ITS region (ITS1, 5.8S, ITS2) and the non-coding psbA-trnH intergenic spacer of plastid DNA were used to resolve the phylogeny of Bulbophyllum species of Northeast India. The morphological and molecular datasets were used individually as well as in combination. nrITS showed better resolving ability with higher bootstrap values than psbA-trnH marker. Phylogenetic trees generated from the combined parsimony analysis of morphological and molecular dataset proved most appropriate for resolving the phylogeny among the sections. The morphology-based dendrogram grouped species largely according to their overall phenetic affinities, while phylogenetic analyses based on nrITS and psbA–trnH provided improved resolution of evolutionary relationships. A few revisions of the sections were suggested. B. reptans was found to be more suitable in the section Reptantia, than Racemosae. The three species, viz. B. odoratissimum, B. trichoceohalum and B. cauliflorum were found to be more appropriate in the section Desmosanthes. The findings contribute to a better understanding of evolutionary relationships within this taxonomically complex genus and provide valuable baseline information for future systematic studies, conservation planning, and orchid biodiversity research. Taxonomic key of the 20 Bulbophyllum species has also been established to facilitate accurate identification.

Biography:

Ms. Sohini Deb has recently submitted her Ph.D. in Biotechnology at North-Eastern Hill University (NEHU), Shillong, Meghalaya, India. She is a researcher specializing in orchid biotechnology with experience in molecular phylogeny, cytogenetics and plant tissue culture. Her research interests include molecular biology and gene editing studies. She has authored 10 research papers in peer-reviewed journals and has presented her work at several national and international conferences and seminars.

Piperazine Derivatives and Bioactive Compounds from Red Seaweed Haloplegma Duperreyi: A Novel Source for Inhibition of Hiv-I

Nagaraj Subramani
University of Madras, India

Abstract:

The bioprospecting of marine organisms for biotechnological applications has gained considerable interest in recent years. Given the increasing demand for sustainable bioactive compounds, this study aims to fill the gap by providing a comprehensive analysis of compounds present in red seaweed Haloplegma duperreyi Montague 1842, making it the first to utilize this particular seaweed species for its bioactive potential against Type 1- Human Immunodeficiency Virus. This study exhibited promising results, where the methanolic extract showed the highest HIV-1 inhibition of 89.13 % at a concentration of 100 µ g/mL with an IC 50 value of 8.405 g/mL. Further fractionation yielded 12 distinct fractions, with PF3 demonstrating highest anti-HIV-1 activity, achieving 90.67 % inhibition and an IC µ 50 values of 5.557 µ g/mL, which is close to the efficacy of positive control, zidovudine (AZT). Characterization of PF3 using FTIR, NMR, and GC-MS identified key functional groups such as N–H, C=O, C–N, and C–Br, indicative of piperazine derivatives, known for their diverse antiviral properties. The study calculated the therapeutic index (TI) for both the methanolic extract and PF3 fraction, with values of approximately 23 and 31, respectively, indicating a favourable safety profile for further studies. These findings highlight the potential of PF3 as a novel anti-HIV-1 agent, necessitating further isolation and structural elucidation of active compounds. This is the first report of anti-HIV-1 activity from Haloplegma duperreyi, highlighting marine-derived natural products as promising candidates for new anti-HIV therapies. This study contributes significantly to the field of marine natural product-based antiviral research, emphasizing the importance of marine biodiversity and its contributions to the blue economy.

Biography:

Dr. Nagaraj Subramani is an Assistant Professor since 2014 at the Centre for Advanced Studies in Botany, University of Madras, Guindy Campus, Chennai, and currently serves as the Course Coordinator for the Postgraduate Programme. He has been a dedicated researcher and educator, specializing in the Taxonomy, Diversity and Biotechnology of Microalgae. A distinguished expert in Phycological Research, Dr. Nagaraj has over 80 publications in reputed international journals, an H-index of 18, and around 1100 citations. He has successfully completed several major research projects funded by DST-SERB, MoEF&CC, DBT-BUILDER, and UGC, in addition to receiving the UGC-BSR Start-up Grant and Dr. D.S.Kothari Postdoctoral Fellowship. His work also includes the submission of 12 microalgae gene sequences to GenBank. Dr. Nagaraj has organized national and international conferences, served as resource person, delivered invited talks, and actively promoted research collaborations most notably establishing an MoU with Bayier Extracts Pvt. Ltd., Bangalore. His contributions have earned him several honours including the INSA Visiting Scientist Fellowship, DST Young Scientist Award, SERB International Visiting Scientist Award (University of Szczecin, Poland). He has been elected as a Fellow of Bose Science Society (FBSS-2022) and the Academy of Sciences, Chennai (FASCh-2024). He is actively involved in scientific societies, serving as Joint Secretary of the Phycological Society of India and Vice-President of the Microbiologists Society of India, Tamil Nadu Chapter. Under his mentorship, four Ph.D. scholars and one Postdoctoral Fellow have completed their work, with four more scholars currently pursuing research under his guidance.

The Future of Organoids Engineering: Biomaterials, Mechanobiology, and Personalized Therapeutics

Zarif Bin Akhtar
Institute of Electrical and Electronics Engineers, USA

Abstract:

Organoid engineering has emerged as one of the most promising frontiers in biomedical engineering, regenerative medicine, and precision healthcare. These three-dimensional (3D) in vitro tissue models faithfully recapitulate key structural and functional characteristics of native human organs, providing transformative platforms for disease modeling, drug discovery, and personalized therapeutic development. By bridging the gap between conventional two dimensional cell cultures and in vivo biological systems, organoids are reshaping the landscape of translational biomedical research. This presentation explores recent advances in organoid engineering through the integration of intelligent biomaterials, mechanobiology, stem cell technologies, organoids-on-a-chip, and artificial intelligence (AI). Special emphasis will be placed on how responsive biomaterials and mechanical microenvironments regulate cellular behavior, tissue morphogenesis, and organoid maturation. Furthermore, the session highlights the growing role of AI and Generative AI in predictive modeling, automated optimization of culture conditions, bio-fabrication, and data-driven decision-making to enhance reproducibility and accelerate personalized medicine. Current challenges including scalability, biological variability, standardization, and regulatory acceptance will also be discussed alongside emerging solutions involving smart biomaterials, microfluidic systems, and computational modeling. Finally, the presentation outlines future research directions toward AI-enabled bioengineering platforms, human-on-chip technologies, and precision regenerative medicine, illustrating how interdisciplinary convergence between engineering, biology, and computational sciences is poised to revolutionize next-generation healthcare.

Biography:

Mr. Zarif Bin Akhtar is a researcher specializing in Artificial Intelligence (AI), Biomedical Engineering (BME), Cognitive Computing and Computational Science. His work explores the intersection of AI, biomedical engineering, with machine learning and deep learning, focusing on innovations in computing, engineering, and medical informatics. With numerous publications in AI-driven healthcare, cybersecurity, and deep learning, he contributes to advancing intelligent systems for medical applications. He has reviewed for prestigious journals and actively participates in various interdisciplinary research. His expertise extends to machine learning, big data analytics, and biomedical signal processing, shaping the future of AI-powered medical solutions.

From Traditional Medicine to Precision Oncology: In Silico Discovery of Panax ginseng-Derived Bioactive Peptides Targeting Breast Cancer Carcinogenesis

Elisee Libert Embolo Enyegue
Institute of Medical Research and Medicinal Plants Studies , Cameroon

Abstract:

Background:Breast cancer remains a major global public health challenge and represents a growing burden in sub-Saharan Africa, where limitations in early diagnosis, access to targeted therapies, treatment infrastructure, and therapeutic affordability contribute to poor clinical outcomes. Although surgery, chemotherapy, radiotherapy, hormonal therapy, and targeted therapies have significantly improved breast cancer management, treatment resistance, toxicity, non-selectivity, and adverse effects continue to justify the search for novel therapeutic agents. Natural products used in traditional medicine constitute an important source of biologically active molecules and may provide new candidates for precision oncology. Panax ginseng, a medicinal plant widely used in traditional medicine, contains proteins and peptides with potentially relevant biological activities. This study investigated the Panax ginseng proteome to identify bioactive peptides capable of interacting with molecular targets involved in breast cancer carcinogenesis using an integrated in silico approach. Methods: Breast cancer-associated genes were identified from available scientific data, followed by molecular network analyses to characterize major transcription factors, kinases, and protein-protein interactions involved in breast carcinogenesis. The eXpression2Kinases platform and STRING database were used to investigate regulatory and protein interaction networks. Protein sequences derived from the Panax ginseng proteome were subjected to simulated enzymatic hydrolysis using trypsin, pepsin, and chymotrypsin. Generated peptides were subsequently screened according to predicted bioactivity and molecular target probability. Pharmacokinetic and physicochemical characteristics were assessed using in silico ADME prediction, while allergenicity was evaluated computationally. Selected non-allergenic peptides were further investigated through molecular docking to determine their interactions and binding affinities with cancer-related molecular targets. Results: A total of 156 genes potentially involved in breast cancer carcinogenesis were identified. Network analysis highlighted 10 major kinases, including CDK1, CDK4, CDK2, CSNK2A1, GSK3B, HIPK2, MAPK14 and MAPK1, and 10 transcription factors, including TRIM28, CHD1, SOX2, NANOG, TCF7L2, TCF3, CTCF, SUZ12 and NFE2L2. Protein-protein interaction analysis further revealed several interconnected molecular clusters associated with apoptosis, cell proliferation, growth-factor signalling, Wnt signalling, DNA repair and other cancer-related pathways. Simulated enzymatic hydrolysis generated 1,324 peptides, of which 19 peptides fulfilled the initial bioactivity selection criteria. Eight selected peptides demonstrated particularly promising profiles for further investigation. These included AIF, AIN, APQVAVL, EIL, IAK, PSIPK, PVGF and SDTEL. Several peptides showed predicted interactions with proteins implicated in breast cancer biology, including inhibitor of apoptosis protein 3 (XIAP), angiotensin-converting enzyme, cyclooxygenase-2, HLA class I histocompatibility antigen A-3, HMG-CoA reductase, cathepsins, neurokinin-1 receptor, lipoxin A4 receptor and caspase-8.

Molecular docking demonstrated favourable binding energies, generally ≤ −5.0 kcal/mol, with some interactions reaching approximately −10 kcal/mol. PVGF, for example, displayed strong predicted binding affinities reaching approximately −9.1 kcal/mol against selected molecular targets, while IAK showed an interaction reaching −10 kcal/mol. These molecular interactions suggest that Panax ginseng-derived peptides could potentially influence pathways involved in apoptosis, inflammation, immune regulation, tumour proliferation, invasion and metastasis. Conclusion: This study provides a molecular bridge between traditional medicinal knowledge and modern precision oncology by demonstrating that the Panax ginseng proteome represents a potential reservoir of bioactive peptides capable of interacting with key molecular components of breast cancer carcinogenesis. Among the candidates identified, AIF, AIN, APQVAVL, EIL, IAK, PSIPK, PVGF and SDTEL appear particularly promising for further investigation. However, these findings are based primarily on computational predictions and should not be interpreted as evidence of clinical efficacy. Experimental validation using in vitro and in vivo models is required to confirm their anticancer mechanisms, pharmacological properties, safety and therapeutic potential. Integrating traditional medicine, proteomics, bioinformatics and molecular oncology may provide an innovative pathway for identifying new therapeutic candidates, particularly for cancer management in resource-limited settings.

Biography:

Mr. Elisée Libert Embolo Enyegue, Ph.D., is a Research Associate at the Ministry of Scientific Research and Innovation of Cameroon and works at the Institute of Medical Research and Medicinal Plants Studies (IMPM), Research Centre for Health and Priority Diseases. He serves as Deputy Head of the Pathological Anatomy and Cytology Laboratory and holds a Ph.D. in Molecular and Cellular Biology from the University of Douala. His research focuses on molecular epidemiology, cancer biology, human papillomavirus, molecular genetics, cytopathology, natural bioactive compounds, and One Health approaches. His scientific work has particularly addressed cervical and breast cancers, HPV-associated carcinogenesis, cancer biomarkers, epigenetic mechanisms, and the identification of natural bioactive peptides with potential anticancer properties. He has contributed to several peer-reviewed publications in oncology, molecular biology, infectious diseases, and public health. He also teaches molecular biology, genetics, biochemistry, cytopathology, and related biomedical sciences in several Cameroonian universities. He is a member of the European Society for Medical Oncology (ESMO).

Serum miR-27a Reduction and FOXO3 Elevation in Elderly Patients with Severe Pneumonia Complicated with ARDS: Association with Disease Severity and Prognosis

Geping Qu
Department of Respiratory and Critical Care Medicine, China

Objective: To clarify the expression of microRNA-27a (miR-27a) and forkhead box protein O3 (FOXO3) in elderly patients with severe pneumonia complicated with acute respiratory distress syndrome (ARDS), and evaluate their relationship with disease severity and prognosis. Methods: A total of 189 elderly patients with severe pneumonia were retrospectively analyzed, including 114 with ARDS (Group A) and 75 without ARDS (Group B). Seventy healthy individuals served as controls. Group A was further divided into mild (n=28), moderate (n=36), and severe (n=50) subgroups based on oxygenation index, and into survival (n=79) and death (n=35) subgroups based on 28-day outcome. Serum miR-27a and FOXO3 mRNA were measured by qRT-PCR. Their correlations with oxygenation index and prognosis were analyzed using Pearson, Spearman, logistic regression, and ROC curve methods. Results: Serum miR-27a levels decreased and FOXO3 mRNA levels increased progressively from controls to Group B and Group A ($F=77.352$, 62.956, $P<0.001$). Within Group A, miR-27a declined and FOXO3 rose stepwise with increasing ARDS severity ($F=83.597$, 111.834, $P<0.001$). MiR-27a was negatively correlated with FOXO3 ($r=-0.624$, $P<0.001$), positively with oxygenation index ($r=0.635$, $P<0.001$), while FOXO3 showed the opposite pattern ($r=-0.672$, $P<0.001$). The 28-day mortality was 30.7%. Logistic regression identified age, prolonged ventilation, and high FOXO3 as risk factors, while higher oxygenation index and elevated miR-27a were protective. The AUCs for mortality prediction were 0.775 (miR-27a), 0.781 (FOXO3), and 0.867 (combined). Conclusion: Reduced miR-27a and elevated FOXO3 are characteristic of elderly patients with severe pneumonia and ARDS, closely linked to disease severity and prognosis. Combined detection improves predictive accuracy, supporting their potential as biomarkers for survival evaluation.

Biography:

Mr. Geping Qu is an Associate Chief Physician and Associate Professor at the Department of Pulmonary and Critical Care Medicine, The Second Medical Center of the Chinese PLA General Hospital, Beijing, China. With expertise in respiratory infections, respiratory critical care, and lung cancer, he has contributed significantly to publishing multiple SCI-indexed research articles and leading several government-funded research projects. His research interests include managing critically ill respiratory patients infected with multidrug-resistant pathogens.

Anticancer Potential of Searsia rhemanniana: Tissue-Specific Effects in HeLa cells

Dijeng Euginiah Rampana-Moleleki
Central University of Technology, South Africa

Abstract:

The search for novel anticancer agents from naturalsources remains a critical area of research, particularly in the context of improving selectivity and reducing toxicity. This study investigated the cytotoxic effectsof plant extractson HeLa cervical cancer cells,with emphasis on the influence of extraction solvent polarity and plant tissue type. Crude extracts were prepared using solvents of varyingpolarity, including dichloromethane (DCM), methanol, and water, from different plant parts such as bark, root, and leaves. Cytotoxicactivity was assessed using standard in vitro assays, and selectivity indices were determined to evaluate the preferential toxicity toward cancer cells. The findings revealed that both solvent polarity and plant tissue significantly influenced cytotoxic outcomes. Among the extracts tested,DCM fractions consistently exhibited the most potent anticancer activity, particularly those derived from bark and root tissues.These extracts demonstrated low IC_{50} values, indicating strong cytotoxic potency, along with reliable dose– response relationships and high selectivity indices. Such results suggest the presence of lipophilic bioactive secondary metabolites with a strong affinity for cancer cells. In contrast, aqueous and methanolic extracts showed minimal to no cytotoxic activity, highlighting the limited efficiency of polarsolvents in extracting compounds with anticancer properties in this context. Notably, the DCM bark extract exhibited the highest selectivity index, underscoring its potential therapeutic relevance. Overall, the study identifies DCM extracts, particularly from bark and root, as promising sources of anticancer agents. These findings warrant further investigation into the isolation, purification, and structural characterization of the active compounds, as well as studies to elucidate their mechanisms of action. This work contributes to the growing body of evidence supporting plant-derived compounds as viable candidates in anticancer drug discovery.

Biography:

Ms. D.E. Rampana-Moleleki is a lecturer and researcher at the Central University of Technology in Bloemfontein, South Africa. She is part of the research team at the same university, within the Centrefor Quality Health and Living (CQHL). At present, she is working on her PhD at the same institution. She has authoredresearch papers in SCI(E) journals, making a substantial impacton her discipline. Her researchinterests are centeredon clinical chemistry, cancer biology, and naturalproduct pharmacology. She focuses on investigating the anticancer potential of indigenous medicinal plants. Her work aims to elucidate underlying biochemical mechanisms and contribute to the development of cost effective, plant based therapeutic strategies relevant to resource limited healthcare settings.

Advances in Gastroretentive Drug Delivery Systems: Current Trends, Therapeutic Applications, and Future Perspectives

Jitendra Gupta
GLA University, India

Abstract:

Gastroretentive drug delivery systems (GRDDS) have emerged as an advanced oral drug delivery system design to prolong gastric residence time, thereby enhancing the bioavailability, therapeutic efficacy, and patient compliance of drugs with narrow absorption windows, poor intestinal stability, or localized gastric action. Recent advancements in GRDDS encompass floating, mucoadhesive, expandable, high-density, porous hydrogel, raft-forming, and magnetic drug delivery systems, each offering distinct mechanisms to improve gastric retention and controlled drug release. These technologies have demonstrated significant potential in the management ofdisorders, including peptic ulcer, gastroesophageal reflux disease (GERD), and Helicobacter pylori infection, while also enhancing the delivery of antibiotics, antidiabetic, anticancer, proteins, peptides, and other biopharmaceuticals. The integration of novel polymers, nanotechnology, smart biomaterials, and computational formulation approaches has further expanded the therapeutic applicability and precision of GRDDS. Despite these advances, several challenges remain, including interpatient variability in gastric physiology, formulation reproducibility, scalable manufacturing, and achieving of sustain release. Ongoing research is focused on the development of stimuli-responsive materials, personalized gastroretentive formulations, hybrid delivery platforms, and advanced manufacturing technologies to overcome these challenges. This review comprehensively summarizes recent progress in GRDDS, highlighting current formulation strategies, therapeutic applications, emerging technologies, existing challenges, and future perspectives. Overall, GRDDS play a promising platform for improving oral drug delivery and clinical outcomes, with substantial potential to transform the treatment of both gastric and systemic diseases through innovative and patient-centric drug delivery approaches.

Biography:

Dr. Jitendra Gupta completed his M. Pharm. from Dr. APJ Abdul Kalam Technical University (Formerly U.P.T.U.) in 2006 and a Doctor of Philosophy (PhD) from the National Institute of Medical Science, Jaipur, in 2015. He has served as Associate Professor in Institute of Pharmaceutical Research, GLA University (NAAC A Grade), Mathura since 2006. He was awarded "The Shikshak Gaurav RatnaAward 2023" and "Shikshak Sri Award 2018" by "The First Vice President" of the Nepal Government @ Krishna Menan Bhawan, New Delhi. He is "Ambassador" of Bentham Science in 2020 and invited for Guest lecture, The M.S. University, Baroda (Gov. University). He is also called as invited speaker in National/International conference/Seminar/FDP/workshop. He has served as an Editorial Board Member and Reviewer of International/National Journals indexing in SCI, SCOPUS. He also has Young Scientist Award, Innovative Researcher Award, Eminent Teacher Award, Best Students PhD award, Best paper publication, Best paper presentation and Best poster presentation award and also Fellow member of FRSH, FICPHS. He has over 125 publications (index in SCI/Scopus and impact factor more than 10), and over 112 posters/abstracts at national and international Conference. He also has 5 patents granted and 13 patents published. He also graduated more than 17 postgraduate students and sixty-nine undergraduate students as a supervisor. He guided 4 Ph.D scholars. His research interests include nanotechnology, microtechnology, nano-micelles micellar solubilization technique), solid dispersion, transdermal patch etc; Standardization of polyherbal formulations; Medicinal plants and their role in Health and Disease Management, Molecular Mechanisms and Antioxidants, Anti-diarrhoeal, Wound healing, Antitussive, Cough suppressant, Antimicrobial, Anti-ischemic and also isolations and identification of phytochemicals from local natural resources.

Oligocarrageenan (OC) Kappa Increased Hormones Levels That Stimulate Growth and Defense Agaisnt Pathogens in Arabidopsis Thaliana, Mainly ABA Inducing Drought Tolerance

Alejandra Moenne Munoz
University of Santiago, Chile

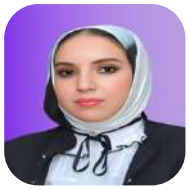
Abstract:

We recently began using the model plant Arabidopsis thaliana to analyze the effects of oligo-carrageenan (OC), derived from carrageenans of marine red algae, at a concentration of 1 mg mL^{-1} on plant growth. A transcriptomic analysis showed that OC kappa stimulates the growth of A. thaliana by increasing the expression of genes involved in photosynthesis and photosystems repair, carbon (C), nitrogen (N) and sulfur (S) assimilation, cell wall synthesis and elongation, as well as auxin, gibberellins and brassinosteroid responsive proteins. A second analysis performed by qRT-PCR confirmed the increased expression of transcripts encoding enzymes involved in C, N and S assimilation, enzymes required for gibberellins and brassinosteroids biosynthesis and proteins regulating cell division. We further analyzed phytohormone levels associated with growth and found that auxins, gibberellins, cytokinins, and brassinosteroids were increased. In addition, phytohormones involved in pathogen defense, such as jasmonates, salicylates and ethylene were also elevated. Interestingly, the level of abscisic acid (ABA) was also increased, suggesting that drought tolerance may be enhanced in A. thaliana. Preliminary results indicate that plants treated with OC kappa and irrigated at 25% of field capacity showed a 50% increase in growth compared to untrated control plants. This work was funded by Fondecyt grant 1230087 to A.M.

Biography:

Prof. Alejandra Moenne Munoz was born in Concepción, Chile, in 1961. She attended the French Alliance of Chile School in Concepción, Chile. She studied Biochemistry at the University of Concepción, Chile (1979–1983), and completed her undergraduate thesis at the Pontifical Catholic University of Chile in Santiago under the supervision of Prof. Paulina Bull (1984). She earned her doctoral degree at the Commissariat de l'Énergie Atomique in Saclay, Paris, France, under the supervision of Prof. André Sentenac (1985–1989), followed by postdoctoral research at the Pontifical Catholic University of Chile under the supervision of Prof. Xavier Jordana (1990–1995). She joined the University of Santiago as an Assistant Professor in 1995, became an Associate Professor in 2002, and was promoted to Full Professor in 2012. In 2019, she joined Ecofos to develop natural plant biostimulants and biopesticides based on oligo-carrageenans and oligo-ulvans. In 2021, she and her team published the annotated genome of the marine alga Ulva compressa. They recently discovered that U. compressa accumulates copper as insoluble particles of copper sulfide rather than bound to glutathione, phytochelatins, or metallothioneins. Her future research will focus on studying protein persulfidation in U. compressa treated with copper, cadmium, or zinc due to the production of H_2S, in collaboration with Prof. Francisco José Corpas (Spain), and identifying heavy metal transporters activated in U. compressa treated with copper, cadmium, or zinc in collaboration with Prof. David Mendoza-Cózatl (USA).

Artificial Intelligence for Discovering Natural Anticancer Compounds



Hend Gamal
University of Mansoura, Egypt

Abstract:

Chemoresistance and cancer metastases are the main causes of cancer-related death. The majority of current treatment options rely on single-target medications, which frequently do not show long-lasting remission of the disease development because of the intricacy of metastasis and resistance mechanisms. Over the past 40 years, natural products (NPs) have contributed to around 50% of FDA-approved medications, making them a fundamental component of pharmaceutical innovation. However, biodiversity limitations, time-consuming isolation procedures, and low hit rates in high-throughput screening are some of the major obstacles that classical NP drug discovery must overcome. These obstacles frequently cause development timetables to be extended to 10–15 years, with costs per medicine surpassing $2 billion. Vinca alkaloids, taxanes, and camptothecins are only a few examples of the groundbreaking treatments they have produced throughout the years. These substances, which are produced from microorganisms, plants, and marine organisms, work through a variety of mechanisms, such as suppression of tumor vasculature, activation of programmed cell death, topoisomerase inhibition, and microtubule destabilization. Using machine learning (ML), deep learning (DL), and generative models (Gen. AI) to accelerate these processes, artificial intelligence (AI) emerges as a disruptive force. AI creates new NP-inspired scaffolding, enables virtual screening of large chemical libraries, and predicts molecular interactions with previously unheard-of accuracy, potentially cutting discovery time by up to 70%. In addition to meeting unmet medical needs, this multidisciplinary approach supports global sustainability objectives and has the potential to raise success rates from less than 1% in conventional pipelines to more than 10%. To conclude, AI suggests reviving NP medication innovation and promoting creative, environmentally friendly treatments. By screening complicated phytochemicals and marine extracts using machine learning, quantitative structure-activity relationships (QSAR), and molecular docking, it expedites the search for natural anticancer agents. The highly complex structural complexity of natural products, the lack of labelled bioactivity data in the past, and the reduced generalizability of AI models initially trained on synthetic drug libraries present major obstacles to the process, even though these fundamental techniques allow virtual high-throughput screening and accurately predict how a natural molecule binds to cancer cell proteins. Advanced deep learning models, such as Graph Neural Networks (GNNs), are used to map the complicated atomic bonds of plant molecules in order to get over these restrictions. In order to uncover new bioactive molecules, researchers use these sophisticated designs to delve into enormous natural treasure troves, focusing on medicinal plants and marine animals. Ultimately, these complex processes are incorporated into specialized software programs like SwissTargetPrediction and ProTox-II, which smoothly automate toxicity profiling and target identification to expedite the drug development process.

Biography:

Ms. Hend Gamal, PhD is a scientist specializing in Cancer Biology, Bio-Nanotechnology, Molecular Oncology, and Precision Medicine. She received her Ph.D. in Bio-Nanotechnology (Cancer Biology) from the Faculty of Science, Mansoura University in collaboration with the National Institute of Laser Enhanced Sciences (NILES), Cairo University, Egypt. Her research focuses on cancer therapeutics, nanomedicine, molecular biomarkers, immuno-oncology, bioinformatics, and the integration of artificial intelligence into biomedical research. Dr. Gamal has authored and co-authored peer-reviewed publications in cancer biology, nanotechnology, and AI-assisted drug discovery and has contributed to international book chapters in oncology. She serves as an academic advisor, instructor, mentor, guest editor, editorial board member, and peer reviewer for several international journals, actively supporting scientific publishing and research quality. Her scientific contributions have been recognized through several international awards and nominations, including the Young Scientist Award from the International Research Awards on Oncology and Cancer Research. She has received more than 30 international conference invitations as a speaker or participant in oncology, artificial intelligence, nanotechnology, and translational medicine. Dr. Gamal is passionate about scientific communication, mentoring early-career researchers, and advancing precision oncology through interdisciplinary research and innovative technologies.

From Farm to Public Health: Natural Alternatives to Antibiotics in Animal Production

Gabriel Lucas Peretti
State University of Santa Catarina, Brazil

Abstract:

The use of antibiotics was a milestone in the history of medicine and animal production. Since their discovery, these drugs have revolutionized the way we deal with infectious diseases and allowed extraordinary gains in zootechnical efficiency. However, the same practice that brought so many benefits has created a global challenge: antimicrobial resistance. For decades, antibiotics were used not only to treat diseases but also as growth promoters, that is, in subtherapeutic doses administered continuously to food-producing animals to promote weight gain and improve feed conversion. While this practice was efficient from a productive point of view, it exerts intense selective pressure on microbial populations, eliminating sensitive bacteria and allowing the survival and multiplication of resistant strains. These bacteria can also transfer their resistance genes to other species, including clinically relevant pathogens, creating a cycle that is difficult to break. The World Health Organization warns that, if urgent measures are not taken, antimicrobial resistance may become the leading cause of death by 2050, even surpassing cancer, with projections of up to ten million deaths annually. Beyond the mortality toll, there will be severe economic repercussions, longer hospital stays, increased treatment costs, and the loss of effectiveness of antibiotics that today represent the last line of defense against severe infections. In animal production, the impact is equally concerning: resistant microorganisms such as Escherichia coli, Salmonella, and Campylobacter can circulate among animals, food, humans, and the environment, posing a threat that transcends borders. In this context, removing antibiotic growth promoters from animal production is not just an option, but a necessity. The central issue, however, is not simply banning or restricting them, but finding safe, effective, and economically viable alternatives that allow productivity to be maintained without compromising public health. This is where natural products come into play. Several classes of natural compounds have been studied and applied with good results. Phytogenics, such as essential oils of oregano, thyme, garlic, and cinnamon, have antimicrobial, antioxidant, and anti-inflammatory properties, in addition to stimulating digestion and improving nutrient utilization. Organic acids reduce the pH of the gastrointestinal tract, creating a hostile environment for pathogenic bacteria while favoring mineral absorption. Probiotics, live microorganisms that provide health benefits when administered in adequate amounts, help balance the intestinal microbiota, compete with undesirable microorganisms, and stimulate the immune system. Prebiotics, such as mannan oligosaccharides and fructooligosaccharides, act as selective substrates for beneficial bacteria, strengthening them and contributing to a healthy microbiota. There are also antimicrobial peptides and immunomodulators, which act directly against microorganisms and enhance the animals' natural defense system. It is important to highlight that none of these alternatives alone can fully replace antibiotic growth promoters. The most promising path lies in the combination of different strategies, together with good management practices, proper biosecurity, and balanced nutrition. This integrated approach not only maintains productivity but also promotes intestinal health, animal welfare, and a reduced risk of disease. The impact of this substitution goes far beyond animal production. It must be understood through the lens of One Health, a concept that recognizes the interdependence of human, animal, and environmental health.

By removing growth-promoting antibiotics from the production chain and replacing them with natural alternatives, we decrease selective pressure on microbial populations, reduce soil and water contamination by antibiotic residues, and prevent the dissemination of resistant bacteria through the food chain. This means safer food for consumers, preservation of the effectiveness of antimicrobials in human medicine, and a more balanced environment. Antimicrobial resistance, in addition to being a silent crisis, may be linked to the emergence or worsening of pandemics. Generally, when we think of pandemics, we think of viruses, as in the case of COVID-19. However, bacterial resistance can contribute to vulnerability scenarios that exacerbate the effects of new epidemics. First, intensive livestock farming can act as a reservoir of resistance genes, circulating among animals, humans, and the environment. In a highly globalized world, these genes can spread quickly. Second, infections caused by multidrug-resistant bacteria may spread in large-scale outbreaks similar to pandemics, with the added severity of limited therapeutic options. Third, antimicrobial resistance worsens viral pandemics, since patients with respiratory infections caused by viruses such as influenza or coronaviruses often develop secondary bacterial infections. If those bacteria are resistant, treatment is limited, and mortality tends to be higher. Therefore, while antimicrobial resistance is not directly responsible for the emergence of viral pandemics, it creates an extremely favorable environment for large-scale health crises to have even more severe consequences. The next pandemic may not be solely viral but bacterial, or it may involve a combination of emerging viruses and resistant bacteria, creating an unprecedented challenge for health systems. Thus, replacing antibiotic growth promoters with natural products in animal production should not be seen only as a technological or regulatory change but as an essential global public health measure. It is an investment with broad repercussions: it ensures animal welfare and productivity, protects consumers, preserves the effectiveness of antimicrobials, and reduces the risks of future health catastrophes. Each animal raised without antibiotic growth promoters represents not just a zootechnical advance but a victory for public health and a contribution to a more sustainable future. The antimicrobial resistance crisis is an urgent and undeniable reality. However, it is also an opportunity for innovation and international cooperation. By integrating science, public policy, producer awareness, and consumer demand, it is possible to move toward a safer, more responsible model aligned with the principles of One Health. More than ever, it is important to understand that what happens in the field does not remain confined there: it reverberates in hospitals, cities, and across the planet. The future of human health and animal production go hand in hand, and the choices we make today will determine the quality of life for future generations.

Biography:

Ms. Gabriel Lucas Peretti holds a degree in Animal Science from the University of Western Santa Catarina (UNOESC, 2022), a Master's degree in Animal Health and Production from the same institution, and is currently a PhD candidate in Animal Science at the State University of Santa Catarina (UDESC). Throughout his academic career, he worked as a CAPES/PROSUC fellow in research projects focused on poultry health and zootechnical performance, developing studies that address nutrition, health, and animal welfare in intensive production systems. His research focuses on natural alternatives to antimicrobials, such as silymarin, in addition to physicochemical analyses of feed and studies on productivity and health in broiler chickens. He has experience in national and international scientific events, presenting research and contributing to the publication of scientific articles and book chapters on antimicrobial resistance, phytogenics, and sustainable animal production. His career combines solid practical and scientific experience, with an emphasis on developing innovative solutions that promote feed efficiency, sustainability, and improved production conditions, establishing himself as a researcher committed to advancing alternatives that address current challenges in animal science and animal health.

Ayurvedic "Bhasms" As Ethno-Nanomedicine

Sabu Thomas
Mahatma Gandhi University, India

Abstract:

Nanoscience and nanotechnology are considered to be the one of the biggest technological innovations since the industrial revolution. This new technology promises to reengineer the man made world, molecule by molecule, sparking a wave of novel revolutionary commercial products from machines to medicine. The origin of nanoscience and nanotechnology is often attributed to a concept and novel ideas proposed by the Nobel laureate Richard P. Feynman. The word nano derived from the greek word means dwarf. A nanometer is one billionth of a meter or length of 10 hydrogen atoms placed side by side or 1/80000 of thickness of human hair. The particle size of nanoparticles (NP) in medicine ranges from 5 nm -100 nm. These are produced by various chemical or physical processes and have specific properties. Traditional medicine systems such as Ayurveda and Unani can serve as an excellent template for the development of nanomedicine for human theragnostics. Recent studies show that traditional medicines such as Ayurvedic Bhasms may hold strong relevance in the emerging era of nanomedicine. There is an urgent need of amalgamation of traditional medicine systems involving Ayurvedic Bhasms, with the evolving field of metal-based nanomedicine. Recent reports also support the view that Ayurvedic Bhasms as nanomedicine resemble nanocrystalline materials and are similar in their physico-chemical properties. The studies show that the Bhasms can be employed for targeted drug delivery as they are non-toxic, biocompatible, and non-antigenic in nature.

Biography:

Prof. (Dr.) Sabu Thomas, D.Sc., Ph.D., FRSC, FEurASc, is a globally recognized scientist, academic leader, and pioneer in the fields of polymer science, nanotechnology, and advanced materials. He currently serves as the Chairman of the Trivandrum Engineering Science & Technology Research Park (TrEST Research Park). Previously, he served with distinction as the Vice Chancellor of Mahatma Gandhi University, Kottayam, Kerala, India, where he played a transformative role in advancing research, innovation, and international collaboration. Prof. Thomas is the Director of the School of Energy Materials, the School of Nanoscience and Nanotechnology, and the International and Inter-University Centre for Nanoscience and Nanotechnology at Mahatma Gandhi University. He also served as the former Director of the School of Chemical Sciences and is the Founder of the School of Polymer Science and Technology, one of India's leading centers for polymer research. With an outstanding career spanning several decades, Prof. Thomas has made pioneering contributions to polymer composites, nanocomposites, sustainable materials, and energy-related research. A Fellow of the Royal Society of Chemistry (FRSC) and the European Academy of Sciences (FEurASc), he has received numerous national and international honors for his exceptional scientific achievements. Through his leadership, extensive research contributions, and commitment to academic excellence, Prof. Thomas has significantly influenced the global scientific community and continues to inspire researchers and students worldwide.

Erica Melipona favosa (Fabricius, 1798) Pot-Honey from Paraguana Peninsula, Venezuela. Volatile Profile and Preliminary Microbiome

Patricia Vit
University of the Andes, Venezuela

Abstract:

The Neotropical meliponine Erica Melipona favosa (Fabricius, 1798) is renowned for its unique volatile profile, exquisite fermented medicinal honey with a fruity-floral scent, and recent testing as a therapeutic synergistic agent in addition to antibiotics used to combat antimicrobial resistance (AMR). Volatile organic compounds (VOCs) serving as acidifiers, have been extended to cellular targets as growth factors, and may have positive effects on the gastrointestinal system as antibiotics. Therefore, the volatile spectrum of M. favosa pot-honey was elucidated. More research has been done on the gut microbiota of eusocial corbiculate bees than on stingless nest materials. Stingless bees are linked to host-specific microorganisms that have roles in food processing, pathogen defense, host health, life cycle, and social immunity of the meliponine colony. More than 95% of Apis mellifera guts consistently exhibit conserved ancient associations of obligatory symbionts, such as the bacteria Gilliamella and Snodgrassella, although guts of Melipona species do not. Scientific investigation is warranted on this change in microbial makeup. The 605 species of stingless bees found worldwide envision microbiological biodiversity, nest functions, and uses in human health and biotechnology. JMF Camargo at Universidade de São Paulo, Ribeirão Preto, SP, Brazil, identified dried specimens of the stingless bee. Using a sterile 10 mL syringe, the M. favosa matured pot-honey was suctioned out of sealed honey pots and frozen. Head Space - Solid Phase Microextraction/Gas Chromatography - Mass Spectrometry (HS-SPME/GC-MS) measurements were performed in three replicates of 1 g of M. favosa pot-honey weighed in a 20 mL glass vial. Then, 100 µL of a 0.5 mg/L 2-octanol aqueous solution was added as an internal standard to estimate VOC concentrations (ng/g pot-honey). Linear retention indices (LRI) were verified with the literature and mass spectra were validated with the standard NIST/EPA/NIH (NIST 14) and Wiley 7th Mass Spectral Libraries in order to determine VOCs. Following the injection of a C7–C30 n-alkane series (Supelco), LRI was established using the same chromatographic conditions. Concentrations of each VOC were assigned. VOCs were organized in chemical classes, and their percentages were annotated. For the microbiome, 10 g of pot-honey and 20 g of PCR water were dissolved in a 50 mL Falcon centrifuge tube. Two centrifugations were performed at 3500 rpm for 15 minutes at 25°C, using a modified method for melissopalynology to remove soluble particles. DNA was taken out of the pellet using a NucleoSpin Macherey Nagel Qiagen food kit. The Earth Microbiome Project (EMP) primers for fungi, the ribosomal internal transcribed spacer 1 (ITS1) region was amplified. For bacterial EMP 515F designed and modified primers, the 16S ribosomal RNA (rRNA) gene was amplified. Libraries were prepared using forward and reverse primers, comprising Illumina adapter sequences, quality-checked, and sent to the University of California, Riverside Genomics Core Facility for sequencing. DADA2 was used to analyze and cluster amplicon sequences. The amptk taxonomy program was used to assign taxa to fungus using the UNITE TS database and bacteria using the RDP database.

Eight chemical classes were identified in the 63 VOCs of M. favosa pot-honey: 14 Aliphatic acids, 13 Alcohols, 6 Aldehydes, 10 Esters, 7 Ketones, 2 Monoterpenes, 4 Oxides, and 7 Unknowns. The following dominance characterized the volatile spectrum 55.74% Oxides, 18.71% Aliphatic acids, 10.34% Alcohols, 9.76% Aldehydes, 1,86% Esters, 1.74% Ketones, 1.52% Unknowns, and 0.33% Monoterpenes. The major VOCs concentrations (ng/g M. favosa pot-honey) were cis-linalool oxide (462.83 ± 44.34), and Acetic acid (160.88 ± 1.81), and Ethanol (60.36 ± 0.48). The 16S rRNA for bacteria and the ITS1 region for fungi amplicon sequencing variations (ASV) microbiome makeup were as follows: 1. Eighty percent of the bacteria belonged to an unknown genus of the Lactobacillaceae family, followed by Lactobacillus (11.8%), Dysgonomonas (1.4%), Haemophilus (1.0%), and Comamonas (0.6%). 2. The yeast Debaryomyces (37%); and the predominant molds Aspergillus (20%), Cephalosporium (18%), Penicillium (12%), Meyerozyma (5%), Wallemia (4%), and 2% of Cladosporium, Geotrichum, Rhodotorula, Yarrowia, and Zygosaccharomyces. The plants that stingless bees visit, the microbes associated with them, and chemical changes are the multifaceted sources of the volatile organic compounds (VOCs). For instance, yeasts produce ethanol, while acetic acid bacteria produce acetic acid. Phenylacetic acid derived from plants condenses with yeast-produced ethanol and ethyl acetate to generate benzeneacetic acid ethyl ester, also referred to as ethyl phenylacetate. Aromatic herbs, flowers, fruits, nectar, and woodlands belonging to the Apiaceae, Lamiaceae, Lauraceae, and Rutaceae families produce the monoterpene linalool; cis-linalool oxide and trans-linalool oxide were produced when linalool in flowers and essential oils of herbs and spices underwent oxidation. A bouquet of olfactory attributes of the 63 VOCs of M. favosa pot-honey were featured by apple peel, bready, citrusy, earthy, fermented, floral, freshly cut grass, fruity, herbal, pungent cheesy, rancid, smoky, winey, and woody. The conservation of the microbiome in exposed stingless bees and medical advancements involving potential macromolecules of microbial origin depend on host-microbe symbiosis. The majority of fungal and bacterial taxa are thought to be a part of the natural and healthy ecosystem that includes the fermentation of the Melipona favosa pot-honey. The research of the microbiome of stingless bee honey is an emerging field. Preserving stingless bees implies conserving the entire web of interactions that generate this rich volatile profile.

Biography:

Ms. Patricia Vit is Emerita Professor at Universidad de Los Andes, Mérida, Venezuela. Her Research Laboratory Apitherapy and Bioactivity (APIBA) is affiliated to the Food Science Department, Faculty of Pharmacy and Bioanalysis. Chair of Food Technology, author and editor of Food Science and Food Technology books. Mujeres en Ciencia, Health Science Award ACFIMAN, 2023. Honorary Associate at the Sydney Medical School – Medical Sciences, The University of Sydney, Australia (2011–2019) after a Research Fellowship by Endeavour Awards. Prometeo Researcher at Universidad Tecnica de Machala, Ecuador (2014–2015). Investigates chemical composition, sensory properties, and bioactivity of tropical pot-honey produced by Meliponini. Biological, medicinal, and economical importance of pot-honey and pot-pollen processed by stingless bees in cerumen pots became two books published by Springer, Vit P, Pedro SRM, Roubik DW, editors: Pot-Honey. A Legacy of Stingless Bees, 654 pp (2013) and Pot-Pollen in Stingless Bee Melittology, 481 pp (2018). Later, the building materials by Vit P, Bankova V, Popova M, Roubik DW, editors. Stingless Bee Nest Cerumen and Propolis, Springer Nature (2024) Vol 1 535 pp, Vol 2 501 pp. Vit et al., editors; Editorial APIBA-ULA; Mérida, Venezuela: Proceedings of the International Symposium on Stingless Bees 2024 ISSB Mérida, Venezuela, and 2026 ISSB IBRA Webinar. Ongoing Springer Nature (2026) book Stingless Bee Therapeutic Biomaterials. Novel Anti-Antimicrobial-Resistant (AMR) Agents. Emerita Council Member (June 2023-2026). CTN Productos provenientes de abejas Bee Products, NTE INEN, Quito, Ecuador (since July, 2026). Her h-index is 37.

Evolution of the AGMK1-9T7 GLI1+ Progenitor Cells to become Tumor Cells and Potentially Cancer-Stem Cells

Andrew M. Lewis
Duke University, USA

Abstract:

We have investigated the expression of selected genes and miRNAs that have been found to be associated with human cancer-stem cells for their involvement in the neoplastic evolution of our AGMK1-9T7 cell line from a non-tumorigenic status at passage (p)13 to a tumorigenic/metastatic status at p40 to p43. Among these genes are CD90, CD44, CD24, PODXL, ALDH1A, ALDHA2, and ALDHA3 genes, as well as 17 other genes and 38 miRNAs. While CD90 and CD24 were not expressed by any passages of AGMK1-9T7 cells, CD44 was expressed in cells at p13, p23, p33, and p43. The expression of PODXL was first detected as weakly expressed at p33 but was highly expressed by p43. Of the 17 genes that have been associated with human cancer-stem-cell functions that we examined across this spectrum of neoplasia, 5 were up-regulated >log2 fold and 8 were down-regulated >log2 fold. The expression of the ALDH1A genes, which have been associated with cancer-stem cells, was investigated by the ALDEFLUOR assay in AGMK1-9T7 cells from p13 to p43. Using RT-qPCR, the ALDH1A2 gene was found to be up-regulated in cells from p13 to p43. Twenty-seven of the 38 miRNAs reported to be associated with human cancer-stem cells were expressed by the AGMK1-9T7 cells at different passages with the highest level of expression at p43. From these data, we propose that the AGMK1-9T7 cells are evolving from their non-tumorigenic state to become tumor cells and potentially cancer-stem cells by p43. I will suggest that this in vitro system might provide a model to investigate the role of these processes in neoplastic development in humans.

Biography:

Mr. Andrew Lewis is a Principal Investigator in the Laboratory of DNA Viruses. He received his M.D. degree from Duke University in 1961 and worked as a scientist at the National Institute of Allergy and Infectious Diseases from 1963 to 1994. His work at the NIH focused on virology, the discovery of non-defective adenovirus-SV40 hybrids, and the ability of DNA viruses such as SV40 to induce neoplastic transformation of cells in tissue culture and cause tumors in rodents. Due to the concerns over the possible risks associated with the non-defective adeno-SV40 hybrid viruses, he was an active participant in the Asilomar Conference in 1975 that focused on the possible risks posed by laboratory experimentation involving recombinant DNA.He joined CBER, FDA in the Division of Viral Products in 1995 to focus on safety issues associated with the use of transformed cells as cell substrates for vaccine manufacture. At CBER, Dr. Lewis first worked on the possible association between SV40 contamination of early polio vaccines and subsequent tumor development in humans, which had implications for the safety of continuous cell lines for viral vaccine manufacture. He became Chief of the Laboratory or DNA Viruses in the late 1990s. He and others initiated a program to study the tumorigenic potential of transformed cells used during the production of new vaccines. These data were presented at the FDA advisory committee meeting in 2000. This committee encouraged Dr. Lewis and his lab to pursue this project further to identify and characterize the basic biological processes that allow VERO cells to develop the capacity to form tumors. The lab has continued these studies for the past 20 years and has developed what may represent a hypothetical model of neoplasia in tissue culture.

A New Perspective on Exercise During Pregnancy

Deepak Sehgal
Shiv Nadar University, India

Abstract:

Polyprotein processing is a complicated but important strategy used by viruses. It allows them to optimize their small genomes and save energy. Viruses achieve this by using a single translation to produce multiple proteins. Rather than making each protein separately, many RNA viruses produce a single large polyprotein. This polyprotein is later cleaved into several proteins and enzymes. These are produced in a specific order based on their function. This process ensures coordinated expression of viral proteins and preserves strict stoichiometry (Kräusslich & Wimmer, 1988). Still, polyprotein processing remains enigmatic in many viruses, despite decades of research. The temporal order of cleavage, the structural context, and the relationships between viral-host proteins determine critical factors such as entry, exit, replication efficiency, pathogenicity, and immune escape (Racaniello, 2001). Recent evidence shows that polyprotein intermediates can serve as important enzymes or proteins required for viral replication (Hagemeijer et al., 2012). In SARS-CoV-2, the viral genome encodes two open reading frames, ORF1a and ORF1ab. These translate into polyproteins pp1a and ppb. These precursors then undergo a regulated proteolytic process, mediated by viral proteases: the papain-like protease (PLPro) and the main protease (Mpro) (Zhou et al., 2020; Hilgenfeld, 2014). Cleavage of the polyprotein releases multiple non-structural proteins (NSPs) and structural proteins. These proteins associate with membrane receptors for entry and form a replication–transcription complex (Snijder et al., 2016). Our approach is to understand the probable cleavage sites of the viral proteases PlPro and MPro. These proteases cleave the polyprotein into smaller, functional subunits, influencing replicase assembly and RNA synthesis. We used recombinant protein expression, a mutation strategy, and spike–receptor interactions. We observed that certain polyprotein intermediates are required to retain functionality and stabilise multiprotein complexes during the early stages of infection. Disruption of the precise timing of cleavage led to reduced replicase efficiency. This suggests that proteolysis is coupled to structural reorganisation and function. These data show that polyprotein processing in SARS-CoV-2 is a sophisticated regulatory mechanism rather than a simple proteolytic cascade. In our previous studies, we showed that a complex process occurs in Hepatitis E virus (HEV). Processing of the ORF1 polyprotein remains an enigma (Pudupakam et al., 2009; Emerson et al., 2004). Unlike many other positive-sense RNA viruses, evidence of cleavage products has been inconsistent across experimental systems. The ORF1 polyprotein contains predicted enzymatic domains, including a methyltransferase, a papain-like cysteine protease, a helicase, and an RNA-dependent RNA polymerase (RdRp) (Ansari et al., 2000). Our work has addressed both the presence and biochemical characterisation of these domains. We used heterologous expression systems and enzymatic assays. We found that the methyltransferase and RdRp domains display intrinsic catalytic activity when expressed independently. We also studied the cysteine protease domain for self-processing capability. Mutational analysis showed that specific amino acids are critical for catalytic activity. However, incomplete fragmentation of ORF1 suggests that processing is limited or regulated, possibly by host cofactors or intracellular membranes (Montpellier et al., 2018). We propose that in HEV, structural and conformational stability may be more important than proteolytic processing. Domain availability within the intact or partially processed polyprotein may regulate enzymatic activation

The helicase domain, for instance, appears to function efficiently, suggesting cooperativity. These observations help clarify the conflicting reports about the extent of HEV polyprotein cleavage. Instead of viewing the ORF1 product as either fully processed or entirely uncleaved, our data suggest a hybrid model. Selective processing and conformational rearrangements seem to govern the formation of the replication complex. In Hepatitis B virus (HBV), replication involves reverse transcription of a pregenomic RNA intermediate. Multifunctional polyproteins also play roles in viral maturation (Seeger & Mason, 2015). The polymerase protein of HBV integrates reverse transcriptase, RNase H, and terminal protein domains within a single polypeptide (Wang & Seeger, 1993). Though processing is less prominent here than in positive-sense RNA viruses, multifunctional precursors remain important for viral efficiency. Comparing HBV and RNA viruses highlights a unifying principle: viral genomes favour multifunctional proteins to economise genetic information and preserve diversity (Bartenschlager & Lohmann, 2000). A common fact emerges across these viral systems. Polyprotein processing integrates virus entry with viral and host membrane interaction, host factor recruitment, and replication complex assembly. Protease activity is modulated by subcellular polyprotein localisation, folding, and possibly post-translational modifications. In SARS-CoV-2, virus entry involves interaction between the S protein and the ACE2 receptor on the host cell membrane. Cleavage events are closely linked to the formation of replication organelles. In HEV, membrane association may influence domain accessibility and catalytic activation, though this remains to be seen. These observations show that polyprotein proteolysis occurs with membrane–protease interactions, not in isolation. Our investigations of SARS-CoV-2, HEV, and HBV suggest that polyprotein processing is a temporal and adaptable regulatory network. Polyprotein intermediates may form transient complexes that coordinate enzymatic cascades. Even small mutations in viral protease activity can impair viral replication. This underscores the immunologic and therapeutic importance of targeting these processes. Viral proteases remain top antiviral targets, as demonstrated by the successful protease inhibitors identified in our studies on HEV and SARS-CoV-2. In conclusion, polyprotein processing is an economical solution to the virus's energy and space constraints. It works within a regulatory system that connects structural organisation, enzymatic activation, and host interactions. Our research on domains such as the methyltransferase, RNA-dependent RNA polymerase, cysteine protease, and helicase of HEV, and comparisons with domains in SARS-CoV-2 and HBV, addresses this longstanding virological puzzle. Continued biochemical, structural, and functional studies will further show how viruses use polyprotein architecture to optimise efficiency and flexibility. This will ultimately guide rational antiviral design.

Biography:

Proff. Deepak Sehgal is a distinguished academic scientist with over 35 years of experience in molecular virology, recombinant protein expression, translational biotechnology, and computational drug discovery. He served as Professor and Head of the Department of Life Sciences at Shiv Nadar University, where he provided academic leadership, established the department, recruited faculty, supervised graduate research, and guided research funding and policy initiatives. Previously, he held key research and leadership positions at Panacea Biotec, the International Centre for Genetic Engineering and Biotechnology (ICGEB), and the Indian Institute of Science (IISc), making significant contributions to biosimilar development, hepatitis E virus diagnostics and vaccine research, hepatitis B virus studies, and baculovirus expression systems. His research expertise includes protein expression and purification, structural bioinformatics, molecular docking, virtual screening, and computational approaches for drug discovery and repurposing. He also founded BacMan Biotech, a consultancy focused on baculovirus-based protein production for therapeutic and vaccine applications. Throughout his career, he has authored numerous peer-reviewed publications, supervised doctoral research, and fostered strong collaborations between academia and industry.

Development of Nanocomposite Coatings for Solid-phase Microextraction of Essential Oil from Dracocephalum Moldavica L

Marzieh Babashpour-Asl
Department of Horticultural Science, Mar.C., Islamic Azad University, Maragheh
Iran

Abstract:

Dracocephalum moldavica L. (commonly known as Moldavian balm) is an aromatic medicinal plant belonging to the Lamiaceae family. Recent phytochemical and pharmacological studies have highlighted its rich essential oil composition and potential therapeutic applications, including antioxidant, antimicrobial, and anti-inflammatory properties. The essential oil of D. moldavica is characterized by high contents of oxygenated monoterpenes such as citronellal, geranial, and neral, which contribute significantly to its biological activities. The aim of this study was to develop a highly sensitive solid-phase microextraction (SPME) method using a novel polythiophene/SBA-15 nanocomposite fiber coating for the extraction and analysis of the essential oil of D. moldavica. For comparative purposes, the essential oil was also isolated from ground leaves via conventional hydrodistillation using distilled water. A total of 41 compounds were identified using both hydrodistillation and SPME coupled with gas chromatography/mass spectrometry (GC/MS). Key extraction parameters, including extraction temperature, extraction time, sample amount, and water content were systematically optimized to maximize extraction efficiency. For the first time, a highly sensitive SPME method based on a polythiophene/SBA-15 nanocomposite fiber was developed for the profiling of D. moldavica essential oil. The proposed method demonstrated excellent repeatability, high sensitivity, strong extraction capacity, high selectivity, low detection limits, and the significant advantage of being solvent-free. The results confirm that the synthesized nanocomposite fiber is a promising sorbent for the efficient extraction of volatile compounds from complex botanical matrices.

Biography:

Ms. Marzieh Babashpour-Asl is an Associate Professor at the Department of Horticultural Science, Islamic Azad University, Maragheh Branch, East Azerbaijan, Maragheh, Iran. With expertise in the study of medicinal plants, she has contributed significantly to the development and optimization of extraction methods for secondary metabolites, as well as the phytochemical profiling and evaluation of antioxidant properties of native medicinal flora. Her research interests include the isolation and identification of bioactive compounds from medicinal plants, comparative analysis of extraction techniques.

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