

2nd

International Conference on Biotechnology and Biomedical Research

09th-10th April, 2025
Manila, Philippines

ICBBR-2025



Organized by



IFERP Life Sciences - Formerly BioLeagues and Association of Pharmaceutical Research (APR)

2nd International Conference on Biotechnology and Biomedical
Research (ICBBR-2025)

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Conference Theme



Advancing Biomedical Innovations for Global Health



Preface

We cordially invite you to attend the 2nd International Conference on Biotechnology and Biomedical Research (ICBBR-2025) on 09th-10th April 2025. The main objective of ICBBR-2025 is to provide a platform for researchers, students, academicians as well as industrial professionals from all over the world to present their research results and development activities in relevant fields of Biotechnology and Biomedical Research. This conference will provide opportunities for the delegates to exchange new ideas and experience face to face, to establish business or research relationship and to find global partners for future collaboration.

These proceedings collect the up-to-date, comprehensive and worldwide state-of-art knowledge on cutting edge development of academia as well as industries. All accepted papers were subjected to strict peer-reviewing by a panel of expert referees. The papers have been selected for these proceedings because of their quality and the relevance to the conference. We hope these proceedings will not only provide the readers a broad overview of the latest research results but also will provide the readers a valuable summary and reference in these fields.

The conference is supported by many universities, research institutes and colleges. Many professors played an important role in the successful holding of the conference, so we would like to take this opportunity to express our sincere gratitude and highest respects to them. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in there view process, and to the authors for contributing their research result to the conference.

Since February 2025, the Organizing Committees have received more than 50 manuscript papers, and the papers cover all the aspects in Biotechnology and Biomedical Research. Finally, after review, about 03+ papers were included to the proceedings of ICBBR-2025.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of ICBBR-2025. We would like to thank the keynote and individual speakers and all participating authors for their hard work and time. We also sincerely appreciate the work by the technical program committee and all reviewers, whose contributions made this conference possible. We would like to extend our thanks to all the referees for their constructive comments on all papers; especially, we would like to thank to organizing committee for their hard work.

About ICBBR

The 2nd International Conference on Biotechnology and Biomedical Research (ICBBR-2025), themed "Advancing Biomedical Innovations for Global Health," will be held on April 9th and 10th, 2025, in Manila, Philippines. Organized by IFERP Life sciences-Formerly Bioleagues And Association of Pharmaceutical Research (APR), the conference aims to bring together leading scientists, researchers, healthcare professionals, and industry experts to explore groundbreaking advancements in biotechnology and biomedical research. Attendees will engage in discussions on innovative solutions to global health challenges, exchange knowledge, and collaborate on future research and development efforts aimed at improving healthcare and advancing global health systems.

Scope of the Conference:

2nd International Conference on Biotechnology and Biomedical Research (ICBBR-2025) covers a wide range of topics at the intersection of biotechnology and global health. The conference invites discussions on, but is not limited to:

- **Biomedical Innovations:** Explore cutting-edge technologies and innovations in biomedicine that aim to improve global health outcomes.
- **Drug Development and Biopharmaceuticals:** Address advancements in drug discovery, vaccine development, and biopharmaceutical production.
- **Genomics and Precision Medicine:** Discuss the role of genomics in personalized medicine and its potential to revolutionize patient care.
- **Sustainable Healthcare:** Examine sustainable practices in healthcare systems using biotechnology.
- **Global Health Challenges:** Explore biotechnological solutions to address urgent global health issues like infectious diseases, non-communicable diseases, and healthcare access.

Benefits of Conference:

- TCurrently, multidisciplinary research has become the most viable and efficient way to solve the problem. In this era of rapidly changing society, many kinds of socio-economic problems, related to other disciplines such as politics, anthropology, psychology, have arisen which require a holistic approach to find their solution.
- When we speak of a multidisciplinary, transdisciplinary or interdisciplinary research team, we imply collaboration between people from different disciplines. Thus, the concept of a multidisciplinary research team can be considered as a subset of the concept of collaborative research.

Objective of the ICBBR:

The 2nd International Conference on Biotechnology and Biomedical Research (ICBBR-2025), themed "Advancing Biomedical Innovations for Global Health," aims to foster a dynamic platform for the exchange of ideas and innovations in biotechnology and biomedical sciences. Organized by IFERP Life sciences-Formerly Bioleagues And Association of Pharmaceutical Research (APR), this conference will bring together leading scientists, researchers, healthcare professionals, and industry experts to discuss cutting-edge advancements in biomedical research and their impact on global health. Scheduled for April 9th and 10th, 2025, in Manila, Philippines, ICBBR-2025 seeks to promote interdisciplinary collaboration, inspire innovative solutions, and address pressing healthcare challenges to enhance patient outcomes and global health sustainability.

About IFERP Life Sciences

IFERP Life Science is a globally recognized professional association meant for research, innovation and development in the field of life sciences and medical sciences. It serves to propel and fuel all innovative works of research with immense potential in the fields of Healthcare, Life Sciences, Pharmaceutical Sciences, Medical Sciences, Food & Nutrition, Environmental Science, Oncology, Cardiology, Nursing, Microbiology, Physiotherapy, Dentistry and many more. IFERP Life Science has been directly responsible for a significant amount of the revolutionary developments that have taken place in these fields over the past few decades.

About BioLEAGUES:

Under the Technoarete Group, the non-profit professional organisation known as BioLEAGUES functions. It is a globally recognized professional organisation in the field of medicine, life sciences, and healthcare that unites, supports, promotes and helps the scientific community in a variety of ways, igniting and advancing all cutting-edge works of research with tremendous potential. In this capacity, BioLEAGUES has played a major role in many of the ground-breaking advancements that have occurred in these domains over the past few decades. In addition to pushing the limits of innovation and discovery across various disciplines, BioLEAGUES has established programs to support development so that the rate of advancement doesn't just increase continuously but also stays steady over time.

A genuinely global organisation in every sense of the word, BioLEAGUES was founded in 2000 and has its headquarters in Chennai, India. With more than 8000 members, comprising executives from businesses, academia, policy makers, and representatives from other sectors, and 12,000 student members, BioLEAGUES has committed itself to fostering innovation, growth, and progress in all parts of medicine, life sciences, healthcare, and associated fields.

Objective of IFERP Life Sciences - Formerly BioLeagues:

The major objective of IFERP Life Sciences - Formerly BioLeagues is to create a better tomorrow by organizing conferences and scientific events and to create a community for sharing and gaining knowledge in the field of Medical Science, Pharmaceutical Science, Life Science, BioLogical Science & Health Care

- To provide a world class platform to researchers, academicians and professionals to share their research findings by organizing International Conferences, Webinars.
- To encourage researchers to identify significant research issues in identified areas, in the field of Medical Science, Pharmaceutical Science, Life Science, BioLogical Science & Health Care.
- To form partnerships with Universities/Institutions to identify researchers and innovators at grassroot level and to bring them to a global platform.
- To help dissemination of their work through publications in a journal or in the form of conference proceedings or books.
- To help them in getting feedback on their research work for improving the same and making them more relevant and meaningful, through collective efforts.
- To use the research output of the conference in the curriculum for the benefits of the students.
- To create a network which will help grow a better tomorrow with the help of advanced technology and achievable sustainable development.

Director's Message, IFERP



Mr. A. Siddh Kumar Chhajer

Managing Director & Founder, IFERP
Technoarete Group, India

On behalf of IFERP & the organizing Committee, I express my hearty gratitude to the Participants, Keynote Speakers, Delegates, Reviewers and Researchers.

The goal of the 2nd International Conference on Biotechnology and Biomedical Research (ICBBR-2025) is to provide knowledge enrichment and innovative technical exchange between international researchers or scholars and practitioners from the academia and industries in various fields of academics. This conference creates solutions in different ways and to share innovative ideas in the field of Biotechnology and Biomedical Research. ICBBR 2025 provides a world class stage to the Researchers, Professionals, Scientists, Academicians, and students to engage in very challenging conversations, assess the current body of research and determine knowledge and capability gaps.

ICBBR 2025 will explore the new horizons of innovations from distinguished researchers, scientists and eminent authors in academia and industry working for the advancements in Generic and Pedagogical Research Evolutions in Biotechnology and Biomedical Research from all over the world. ICBBR 2025 hopes to set the perfect platform for participants to establish careers as successful and globally renowned specialists in various fields of Academics.

CEO's Message, IFERP



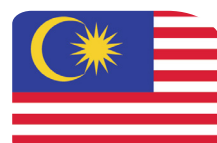
Mr. Rudra Bhanu Satpathy

Founder & Chief Executive Officer, IFERP
Technoarete Group, India

IFERP is hosting the 2nd International Conference on Biotechnology and Biomedical Research (ICBBR-2025) this year in month of April. The main objective of ICBBR-2025 is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points, and experience enormous growth and development as a professional. There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts. Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader.

I express my hearty gratitude to all my Colleagues, Staffs, Professors, Reviewers and Members of organizing committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to make this conference successful.

Keynote Speaker



Dr. Rameshkumar Santhanam

Senior Lecturer
Faculty of Science and Marine Environment
Universiti Malaysia Terengganu, Malaysia

Dr. Rameshkumar Santhanam is a Senior Lecturer at the Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, Malaysia. Since joining the university in December 2018, he has been actively engaged in research and teaching, specializing in natural product-based drug discovery and cell signaling, with a particular focus on photoaging, functional foods, and anti-cancer research.

Dr. Rameshkumar earned his Bachelor of Technology (B.Tech) in Biotechnology from Anna University, India, followed by a Postgraduate Diploma in Clinical Research from the Institute of Clinical Research, India. He later obtained his Ph.D. in Medical Biotechnology from Universiti Putra Malaysia in 2017. His academic journey has been enriched by a diverse professional background, including a Postdoctoral Researcher position at Tianjin University, China (2017–2018), and a Clinical Research Coordinator role at ACEER, India (2010–2012). These experiences have provided him with a comprehensive understanding of biomedical research and its translational applications.

With a strong research track record, Dr. Rameshkumar has published 54 research articles in high-impact international journals, accumulating 1,134 citations and achieving an h-index of 19 (Scopus). Beyond publications, he has also filed one patent, two copyrights, and one trademark, and authored two book chapters, further demonstrating his expertise in biotechnology and natural product pharmacology. Dr. Rameshkumar's research focuses on deciphering cell signaling pathways and exploring the therapeutic potential of bioactive compounds derived from natural sources. His work aims to bridge the gap between fundamental biological research and the development of innovative therapeutic strategies.

As a distinguished speaker and researcher, Dr. Rameshkumar is dedicated to advancing scientific knowledge and fostering interdisciplinary collaborations in biotechnology, biomedical sciences, and drug discovery.

Keynote Speaker

**Dr. Erwin M. Faller**

Academic Director
Holy Child Central Colleges Inc
Philippines

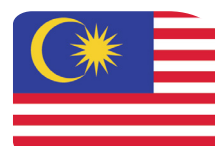
Dr. Erwin Faller is a Dean of the College of Allied Health Sciences of Holy Child Central Colleges Inc., Philippines. He was the former Director of Internationalization and Linkages and a Professor in the School of Allied Health Sciences-Pharmacy Department in San Pedro College, Davao City, Philippines. He is a Visiting Professor in Bournemouth University, United Kingdom and a fellow of the US-ASEAN University Connection Initiative in Washington DC, A White House Initiative of the United States Department. A Technical Panel Member of the National Review Committee on Internationalization Program (iNRC) and coordinating the Innovation Laboratory for Global Education (iLAB) of the Commission on Higher Education (CHED). He is an active officer since 2022 of the National Research Council of the Philippines Pharmaceutical Division IV, Philippine Pharmacists Association Section Representative on Pharmaceutical Sciences and Research, President of the Philippine Pharmacists Association-Davao City Chapter and Committee Officer of the Virtual Exchange Coalition. He earned his double PhD in Educational Leadership and PhD in Pharmacy in the University of the Immaculate Conception, Philippines and a Fellow in the Royal Institute of Pharmacists in Singapore. He was a recipient of different International academic scholarships including the Ludwig- Maximilian Universitat (LMU), Germany on Health Education funded by the German Academic Exchange Service (DAAD) and the University of Brescia, School of Medicine on Global Health, Italy and Prince of Songkla University Government Scholarship on Medicinal Plants.

His exemplary leadership pioneered the establishment of COIL and Global Mobility programs in his former institution that led recognition in the 1st Philippine Higher Education Internationalization Award and Internationalization Champions of Nation-building and Sustainability (ICONS) Internationalization Awards by the Commission on Higher Education. He pioneered the International COIL Conferences in the Philippines that influences ASEAN Universities and beyond. He is instrumental in expanding the COIL pedagogy throughout the Philippines through the CHED Innovation Laboratory.

He was a speaker and trainer of different local, national and international seminars and conferences. He is multi-awarded professor including the Bagong Bayani (National Hero) Award for Outstanding Employee 2018 given by the Philippine Government for his

exemplary contribution in the international community, UIC Exemplary Alumni 2024, SPC Most Published Research 2024 and the Philippine Pharmacists Association-UNILAB Top Outstanding Pharmacist in Research 2022. A recipient of different research grants including the Toyota Foundation Japan Fund, Indonesian Ministry of Research, Technology, Higher Education and United Kingdom Global Challenge Research Fund and others. He is also an editorial board member of twenty (20) reputable index journals, reviewer of twenty-five (25) ISI- SCOPUS and Index Journals. He has published more than 200 articles with more than 600 citations in high impact journals, scientific peer-reviewed journals and abstracts in conferences, columnist in Online newspapers- Davao Today and Palawan Daily Newspaper and published thirteen (13) books.

Keynote Speaker



Mr. Por Choo Shiuan

Deputy Dean
Faculty of Pharmaceutical Sciences
UCSI University, Malaysia

Keynote Speaker



Dr. Sadia Sultan

Head of Biotransformation Research Group
(EKReNeU Health and Wellness)
Faculty of Pharmacy
Universiti Teknologi MARA, Malaysia

Dr Sadia Sultan is an Associate Professor of Pharmaceutical Chemistry in the Department of Pharmacology and Chemistry at the Faculty of Pharmacy University Technology MARA UiTM Malaysia. She is heading the Biotransformation Research Group under Research Nexus UiTM (ReNeU), and Health & Wellness (HW). Five (5) Ph. D. and six (7) master's students have already graduated under her supervision. Currently, she is supervising 2 Ph. D students. She has more than 18 years of Experience in the field of Natural Product Research.

Her areas of Expertise include:

- Biotransformation of exogenous substrates using microorganisms and plant tissue culture techniques.
- Exploring bioactive secondary metabolites from Plant, Soil, and Marine Endophytic fungi. (Using Dereplication and OSMAC Approach).
- Modern NMR spectroscopic approaches in the Elucidation of Secondary Metabolites.
- Biological screening using antimicrobial assays.
- Mechanistic studies to understand metastasis breast cancer: towards the effects of microbial derivatives of Steroids & Terpenes using MDA-MB-231 CELLS INDUCED XENOGRAPH MODEL.

She is the author of two e-books and two chapters including Polyesters, Molecular Modeling, Pharmaceutical Chemistry I and II, and Workbook of Pharmaceutical Chemistry II (Pearson, iTech-ISBN). She has over 70 research publications in top international journals (Q1, Q2) including high-impact factor journals like Pharmaceuticals (MDPI), European Journal of Medicinal Chemistry, European Journal of Pharmaceutical Chemistry, Journal of Steroids, Tetrahedron Letters, Bioorganic and Medicinal Chemistry, Journal of Molecules with cumulative impact factor of over 200 and 1500 citations, with h index 23 (Google scholar). Apart from that she is also

an editor of the book Fungal Pathogenicity. Her current research is based on the utilization of modern NMR spectroscopic approaches in the Elucidation of Secondary Metabolites, Biotransformation of Exogenous Substrates, and Synthesis and Characterization of Bioactive Medicinal derivatives using Combinatorial Chemistry. For her research works she has been awarded several national grants as a principal investigator including e Science (Ministry of Science and Technology-MOSTI), FRGS, ERGS, PSI, DANA Fund, REI etc. Her research findings are also recognized at several conferences, competitions, and exhibitions and have been awarded with several awards like best poster awards, IITEX 2014, iidex gold, iidex silver, iidex bronze awards. Recently she is awarded with Vice Chancellor for her best performance from Vice-chancellor of UiTM. Her favorite activity is working alongside postgraduates and undergraduates in the laboratory on research problems involving natural product isolation and identification. When not in the lab and office, she likes to cook and spend time with her daughters and husband.

Keynote Speaker



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ABSTRACTS



Enhanced Immunogenicity of the Trimeric Form of the Recombinant Ectodomain of Rabies Virus Glycoprotein

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Abstract:

Rabies is a deadly yet preventable virus, with vaccines administered before or after exposure to a rabid animal. Current vaccines use inactivated viruses, are costly, require multiple doses, and the concerns about safety can arise, particularly for immunocompromised individuals. An alternative approach is developing a subunit vaccine based on the rabies virus glycoprotein G (RABV-G) using recombinant expression systems, which offer high protein yields and a proven safety profile. This study focuses on developing candidate subunit vaccines utilizing the extracellular domain of RABV-G either as a monomer (rRABV-GE) or in a trimeric form with a human collagen XVIII trimerization domain (rRABV-G-XVIII). The vaccines' immunogenicity and efficacy were evaluated in 6–9-week-old female CD-1 mice. Results revealed that rRABV-G-XVIII outperformed rRABV-GE in both antibody response and protection. It induced high levels of neutralizing antibodies with strong avidity and successfully protected all mice against a lethal rabies challenge. Consequently rRABV-G-XVIII is a promising vaccine candidate that overcomes the limitations of currently used vaccines.

UV-Radiations, Producer of Vitamin D in Mushrooms: A Review

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Abstract:

Vitamin D deficiency is prevalent across the world and linked to numerous diseases, for instance, arthritis, osteomalacia, diabetes, cancer, and autoimmune diseases. Sunlight is the natural source of vitamin D produced in the skin through UV radiation. Mushrooms are a natural source of vitamin D as they are rich in ergosterol. When mushrooms are exposed to UV irradiation, there is a conversion of ergosterol to vitamin D₂. Mushrooms contain vitamin D₂ in more concentration, D₃, and D₄ in lesser amounts. This review intends to focus on the content of dietary forms of vitamin D produced through various types of UV light at different intensities. For the enhancement of the efficacy and consumption of mushrooms, this context has focused on the sources, stability, health benefits, and bioavailability of mushrooms. The study focused on acquiring different species of mushrooms rich in dietary vitamin D, which are converted from ergosterol by UV irradiations.

Keywords:

Mushrooms, UV-Radiation, Vitamin D, Osteomalacia, Ergosterol.

Optimizing Pulmonary Rehabilitation: A Comparative Analysis of Delivery Methods in Chronic Respiratory Disease

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Abstract:

Pulmonary rehabilitation (PR) is well-established in improving quality of life (QoL) in chronic obstructive pulmonary disease (COPD) patients, yet its impact on other chronic respiratory diseases (CRD) remains less explored. This single-centre randomized controlled trial (RCT) evaluated changes in dyspnea (Modified Borg Scale) and QoL (St. George's Respiratory Questionnaire) in CRD patients following a 6-week structured PR program. A total of 88 patients enrolled, with 13 dropping out, predominantly interstitial lung disease (ILD) patients discontinuing institution-based PR. Seventy-five patients (45 males, 30 females) with obstructive airway disease (29) and restrictive lung disease (31) completed the program, delivered via institution-based PR (35), home-based PR (20), and telerehabilitation (20). Patients demonstrated improved HRQoL, with a mean difference (MD) of -5.6 in both physical and mental health components. Subgroup analysis revealed superior outcomes in supervised institution-based PRP (-9.3 ± 12.6 in OAD vs. -2.1 ± 11.9 in ILD) and telerehabilitation (-7.3 ± 12.2 vs. -3.9 ± 10.26) compared to home-based PR (-1 ± 8.22 vs. 4 ± 14.8). Among LTOT users, telerehabilitation significantly reduced dyspnea at six weeks compared to other modalities ($P < .05$). This study underscores the need for structured PR programs, early HRQoL screening, and follow-up for effective CRD management.

Keywords:

Pulmonary Rehabilitation, Chronic Respiratory Disease, COPD, ILD, Quality of Life, Telerehabilitation, Dyspnea.

Study on Vulvovaginal Candidiasis Prevalence in Semi-Urban North India

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Abstract:

Objective: Present study was intended to investigate the vulvovaginal candidiasis prevalence, distribution, and associated risk factors in women.

Methods: This one-month cross-sectional study included women aged 18–55 presenting with vaginal discharge and itching. Data on age, parity, risk factors, and contraceptive pills/device use were collected. High vaginal swabs underwent microscopy and culture. Candida-positive cases were identified and analyzed.

Results: The samples of over 380 high vaginal swabs revealed a high prevalence of VVC among women aged 36–45 and multiparous individuals. *Candida albicans* accounted for over 75% of cases, while non-*albicans Candida* species comprised more than 20%.

Conclusions: Current study concludes vulvovaginal candidiasis is highly prevalent in reproductive-age women; hence, routine high vaginal swab culture is recommended for timely diagnosis in cases of discharge and itching.

Keywords:

Vaginal swab, Vaginal Candidiasis, *Candida albicans*, Prevalence.

Unveiling Urinary Metabolites as Potential Biomarkers for Seronegative Rheumatoid Arthritis Using Mass Spectrometry

Koteswari Peddi

Department of Biotechnology, GITAM School of Science, GITAM (Deemed to be University), Rushikonda, Visakhapatnam, India

Abstract:

Objective: Seronegative rheumatoid arthritis (negRA) is characterized as RA in which there are no circulating autoantibodies, including anti-citrullinated protein antibodies or rheumatoid factor antibodies. Diagnosing seronegative RA early can be challenging. In the present study, we explored urine metabolic profiles of seronegative RA.

Methods: We analyzed urine samples from 35 negRA patients and 25 healthy controls (HC) by applying untargeted metabolomic analysis. Metabolomic profiles were assessed using LC-QTOF-MS and GC-MS methods. We constructed a machine learning-based multivariate classification model, identified discriminating metabolites, and examined the relationships between metabolomic profiles and clinical variables.

Results: The urine metabolome profile of seronegative RA was distinguishable from HC. We identified the most significant differences in a panel of seven urine metabolites in the discovery cohort.

Conclusion: We developed a model based on urine metabolic markers that may be useful for diagnosis. Our findings suggest that comprehensive, integrative urine metabolomic profiling is an efficient system biology method for finding indicators that help diagnose seronegative RA.

Proteomic Profiling of a Marine Bacterium for Effective Bioremediation of Textile Effluents

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Abstract:

Synthetic dyes are ubiquitously employed in diverse industrial sectors including textiles, leather, pharmaceuticals, paper, cosmetics, and food. The discharge of effluents from textile manufacturing is of serious concern, as the coloured wastewater significantly degrades water quality which not only poses serious environmental risks but also raises health concerns. Microbial remediation is increasingly regarded as a sustainable approach to mitigate the environmental pollution caused by azo dyes. In this context, the current study focuses on a Gram-negative bacterium, *Shewanella* spp. NIO_14d, isolated from an estuarine habitat. This bacterium demonstrated a rapid and efficient ability to decolorize three azo dyes: Reactive Black 5, Reactive Green 19, and Reactive Red 120. The bacterium achieved decolorization rates of over 98% at a dye concentration of 100 mgL⁻¹. *Shewanella* spp. NIO_14d also demonstrated robust decolorization capabilities for dye mixtures, facilitated by the presence of electron donors such as succinate and pyruvate. It maintained high decolorization efficiency at high sodium chloride concentrations as well as in the presence of various heavy metals. Further investigations through expressional proteomic analysis identified significant alterations in protein expression by the isolate during the decolorization process with many proteins found to be notably up-regulated. These included proteins associated with cellular energy metabolism and oxido-reduction pathways. The up-regulation of these proteins suggests their potential roles in the dye decolorization process. This comprehensive understanding of protein dynamics during dye decolorization provides valuable insights into effective bioremediation strategies for the treatment of dye-laden wastewater, highlighting the potential of microbial processes in environmental pollution control.

Keywords:

Azo dye, Bioremediation, Decolorization, Proteomics, Wastewater.

Antibacterial and Antibiofilm Activity of Diosgenin and its Mechanistic Insight against Multi-Drug Resistance Pathogens

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Abstract:

Multi-drug-resistant bacterial infections pose a significant threat to global health. The spread of antibiotic resistance is aggravated by certain bacterial populations' ability to develop persister cells, which show tolerance to various antibiotics. Additionally, biofilm formation shields bacteria from both the immune system and antibiotic penetration, leading to treatment failures and recurrent infections. Plant-derived natural compounds have gained considerable attention for their potential role in combating antibiotic resistance. This study aimed to evaluate the antimicrobial activity, mode of action, and antibiofilm properties of diosgenin against foodborne pathogens, including *Bacillus cereus*, *Klebsiella pneumoniae*, and *Streptococcus pyogenes*. The minimal inhibitory concentrations (MIC) of diosgenin were determined to be 0.25 mg/ml for *K. pneumoniae* and 0.5 mg/ml for *B. cereus* and *S. pyogenes*. Time-kill analysis demonstrated the bactericidal effect of diosgenin at these MIC and half MIC values. Protein leakage, nucleic acid leakage, and propidium iodide membrane permeability assays revealed that treatment with diosgenin at different MIC values caused membrane damage. Additionally, diosgenin showed significant potency in inhibiting biofilm formation. Scanning electron microscopy further confirmed bacterial cell membrane deformation and the loss of intracellular contents. Overall, this research suggests that diosgenin could be a promising agent for managing drug-resistant infections. The findings indicate that diosgenin disrupts cellular membranes, potentially reducing the likelihood of bacteria developing resistance to this mechanism. Consequently, diosgenin could be considered a novel antibacterial compound or an effective adjuvant to enhance the efficacy of existing antibiotics.

Keywords:

Diosgenin, Antibiofilm, Antibacterial, Antibiotic resistance, Persister cells, Propidium iodide.

Formulation and Evaluation of Bioactive Wound Dressing for Burn Wound Healing

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Abstract:

Burn wounds are injuries caused by fire, heat, electric shock, and similar sources. Current wound dressings, typically made from synthetic materials, often lead to scarring, slow healing, and high costs. This study focuses on developing, characterizing, and evaluating a more effective wound dressing for burn treatment. The wound dressing was formulated with curcumin-piperine- β -cyclodextrin inclusion complexes (IC) along with marine collagen peptides embedded in flaxseed-chitosan based film. β -cyclodextrin(β CD) IC's of curcumin and piperine were made to enhance bioavailability of curcumin. Various analyses confirmed the presence and stability of the curcumin- β CD IC and collagen peptides within the dressing. FTIR, UV scan, XRD, and SEM verified their composition, while TGA indicated stability up to 120°C. The dressing had a pH of 4.7, a thickness of 80 μ m, and demonstrated strong antimicrobial activity, with an average inhibition zone of 1.6 cm. MTT assays and hemolysis tests showed that the dressing is non-toxic, with 100% cell viability at the highest concentration (2.5 cm/ml) and minimal RBC lysis of only 3.95%. In vivo tests on male albino Wistar rats with deep partial-thickness burn wounds revealed significant wound healing. By day 33, the wound size reduced to 0.2 cm in the test group, compared to the positive control (cuticell TM C) (0.4cm) and untreated control (0.9cm). Histopathological analysis with H&E and Masson Trichrome staining showed improved skin regeneration, with extensive collagen deposition and blood vessel formation in the treated group. Overall, the formulated dressing exhibited excellent physiological, pharmacological, and biocompatibility properties, making it a promising, cost-effective, and eco-friendly solution for faster burn wound healing.

Keywords:

Wound Dressing, Bandage, Curcumin, Peptide Mixture, Burn Wound Healing.

Synthesis and Functionalization of Gold Nanorods (GNRS) for Capturing Circulating Tumor Cells

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Abstract:

The isolation of diverse sample of circulating tumor cells (CTC) can be either obtained as active or passive manner. While passive approaches manage cells via channel architectures, intrinsic hydrodynamic forces, and steric hindrances, active methods use external fields like electric, magnetic, acoustic, and optical to push cells for separation. However, processing complex biological materials, such as whole blood with unusual cells, makes separation with a single module microfluidic device difficult. In recent years, hybrid microfluidics devices with both passive and active components have gained popularity as a method for label-free enrichment of circulating tumor cells due to their many advantages, such as high sensitivity and high efficiency multi-target cell processing. The goal of this study was to create a near-infrared (NIR) light-responsive substrate by combining a thermos-responsive film with a microchannel of varying lengths in order to accomplish extremely efficient targeted capture and biocompatible site-release of CTCs. Pre-synthesized photothermal agent gold nanorods (GNRs) was integrated into biodegradable. Later, nano-film was fixed to chip. To improve capture efficiency receptors molecule folic acid (FA) for cancer cells were adsorbed using a straightforward dipping technique respectively for GNR Film. Temperature-responsive film quickly changes its conformation upon NIR irradiation at 37°C or higher, enabling either site-specific release of individual CTCs through NIR-mediated photothermal activation of embedded GNRs or bulk recovery of trapped CTCs at physiological temperature. This hybrid microfluidic NIR-responsive platform not only provides a robust and flexible route toward tailored anticancer therapies, but it also excels in the collection and site-release of CTCs with excellent survivability.

Keywords:

Hybrid Microfluidics, Nano Film, CTC, Gold Nanorods (GNRs), Near Infrared Irradiation (NIR).

Enhancing Wellness through Effective Breathing

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Abstract:

Belly breathing, or diaphragmatic breathing, is a technique known to offer significant mental and physical health benefits by promoting deeper and more effective lung expansion. However, many individuals find it challenging to consistently practice belly breathing due to difficulty in distinguishing it from chest breathing. Current medical and fitness devices are limited in their ability to differentiate between these two breathing patterns, lacking the capability to provide real-time feedback on the quality of breathing. This project addresses this gap by developing a novel device that measures and visually displays the extent of chest versus belly breathing, enabling users to monitor and improve their technique. The real-time feedback provided by this device has the potential to enhance users' awareness and mastery of belly breathing, fostering better health outcomes and making this beneficial practice more accessible to a wider audience.

Keywords:

Belly Breathing, Diaphragmatic Breathing, Chest Breathing, Wellness, Effective Breathing.

Evaluation of Immunomodulatory Activity of Cow Urine Distillate Using Stimulated PBMC Cells

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Abstract:

Ayurveda medicine's traditional remedy, cow urine distillate (CUD), is thought to have a number of medicinal benefits, including immunomodulatory effects. In order to confirm its possible involvement in immunosuppression, this study examines its effects on immune cells.

The objective of this study was to assess the immunomodulatory properties of CUD on stimulated peripheral blood mononuclear cells (PBMCs) in order to comprehend any possible immunosuppressive effects of the drug. This study aimed to investigate the immunomodulatory effects of CUD on LPS-stimulated PBMCs and evaluate the viability and activity of the cells using XTT and ADA assays.

The cells were stimulated and then exposed to different concentrations of CUD. The XTT assay, which measures metabolic activity, and the ADA assay, which measures adenosine deaminase activity as a measure of immune cell function, was used to evaluate the viability and activity of the cells. According to our findings, LPS-stimulated PBMCs are significantly immunosuppressed by high concentrations of CUD. The XTT assay showed that as CUD concentrations increased, cell viability decreased in a dose-dependent manner. The ADA test also revealed decreased enzymatic activity, supporting CUD's immunosuppressive characteristics. More applications of CUD have been demonstrated across a variety of domains, such as the therapy of autoimmune disorders, inflammatory diseases, allergic reactions, and recoveries following surgery.

Keywords:

Ayurveda Medicine, Cow Urine Distillate (CUD), Peripheral Blood Mononuclear Cells (PBMCs).

Novel Synthetic Carbazate Derivatives with Promising Antifungal Potential against Superbug *Candida auris* of Pharmacological Interest

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Abstract:

Candida auris which is considered as a super bug is becoming rising obstacle in front of efficient therapeutics due to inherent drug resistance and misidentification from closely related species. The antifungal resistance exhibited by *C. auris* emphasizes the urgent need for the development of innovative therapeutic strategies. Therefore, the antifungal mechanism of two synthetic carbazate derivatives (C4 and C13) were elucidated in *C. auris*. We observed that both compounds display synergistic activities with known antifungal drugs. Mechanistic insights reveal changes in polysaccharide composition (chitin, glucan and mannan) of the cell wall in *C. auris* in the presence of C4 and C13. Additionally, we found that vacuolar homeostasis was disrupted as revealed by abrogated morphology and acidification. Furthermore, C4 and C13 leads to oxidative stress and DNA damage followed by dysfunctional mitochondria. Lastly, the in-vivo antifungal potential of the carbazate derivatives was demonstrated in *Caenorhabditis elegans* nematode model showing enhanced survival upon *C. auris* infection. Together, the present study offers the potential of synthetic carbazate derivatives as a promising scaffold for developing new antifungal drugs. The biological targets revealed may further help in rational design of carbazate derivatives with enhanced potency to treat *C. auris* infections.

Keywords:

Candida, MDR, cell wall, vacuoles, mitochondria, Oxidative stress, *C. elegans*.

***Garcinia indica* (kokum) Mediated Green Synthesis and Characterization of Silver Nanoparticles and Their Effectiveness against Acne-Causing Bacteria**

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Abstract:

Green synthesis of silver nanoparticles (AgNPs) is an emerging field in nanomedicine due to its environment-friendly nature, low toxicity, feasibility, long-term viability, and sustainability. *Garcinia indica* (kokum), belonging to the Clusiaceae (mangosteen) family is a therapeutic plant indigenous to the Western Ghats of India. In this study, AgNPs were synthesized using aqueous *Garcinia indica* leaf extracts as the reducing and capping agents. The AgNPs were characterized by UV-visible absorption spectroscopy, Fourier Transform Infrared (FTIR) spectroscopy, Field Emission Scanning Electron Microscope (FE-SEM) imaging, and Energy dispersive X-ray Diffraction (XRD) analyses. The AgNPs demonstrated both antioxidant and antibacterial properties attributed to the presence of flavonoids and saponins. The antibacterial activity of the AgNPs alone and in combination with ampicillin, chloramphenicol, and rifampicin against acne-causing bacteria revealed a synergistic effect of the AgNPs with all tested antibiotics. The green route synthesized AgNPs from *Garcinia indica* leaf extracts thus demonstrated promising antioxidant and antibacterial properties which can be further developed for commercial biomedical applications.

Keywords:

Garcinia indica, Silver Nanoparticles, Green Synthesis, Antibacterial, Antioxidant.

Machine Learning-Based Prediction of Lung Cancer using Biomarker Data

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Abstract:

Background and Aims: The incidence of lung cancer is increasing globally, and early screening remains challenging due to cost and under-utilization. To identify individuals who may benefit from early screening, we aimed to develop a prediction model using machine learning and literature review-based biomarker data.

Methods: Curated biomarkers' concentration values, for lung cancer and healthy controls derived from literature were used in the study. The concentration values for 4 different biomarkers in non-invasively collected samples of were considered to generate a hypothetical dataset. Machine learning approach was used to develop a predictive model for lung cancer diagnosis. Four models including logistic regression (LR), support vector machine (SVM), k-nearest neighbours (KNN), and Naïve Bayes (NB) were used in the study. The four prediction models were compared based on model performance metrics, such as the area under the receiver operating characteristic curve (AUC), accuracy, sensitivity, and, specificity.

Results: Two models, namely, SVM and NB had good AUC scores. In the training dataset, SVM, and NB, exhibited AUCs of 1. While the accuracy and sensitivity were highest (0.99 and 0.98 respectively), only for NB. In the test dataset, also, SVM, and NB, exhibited AUCs of 1. The accuracy and sensitivity were highest (0.98 and 0.97 respectively), only for NB.

Conclusion: The study compared the performances of four models including LR, SVM, KNN, and NB, for the prediction of lung cancer using biomarker data. This predictive model will be a great tool for early screening of lung cancer. Further development of other models is needed, followed by validation in primary-care setting, before clinical application.

Keywords:

Lung Cancer, Machine Learning, Biomarkers, Non-Invasive Tool, Prediction Models.

Diabetes Biomarker Detection Using Graphene: Ab-initio Analysis

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Abstract:

Diabetes is a widespread health concern that necessitates the development of efficient diagnostic tools. Traditional diagnostic methods which are often invasive and can be inconvenient, leading to a growing interest in non-invasive alternatives. One promising approach involves the detection of Volatile Organic Compounds (VOCs) such as isoprene and acetone in exhaled breath, which have been identified as potential biomarkers for diabetes. In this study, we investigated the potential of pristine graphene and N-doped graphene as biosensors for detecting isoprene and acetone, important biomarkers for diabetes. Using Density Functional Theory (DFT), we examined the electronic band structure, density of states, conductance analysis, adsorption energy and recovery time of pristine and N-doped graphene nanosheet. The adsorption energy indicate that N-doped graphene has a relatively better interaction with both the biomarkers, compared to its pristine counterpart, and show physisorption. Both pristine and N-doped graphene surfaces exhibit rapid recovery time, making them suitable for real-time sensing applications. Among them, pristine graphene demonstrates superior performance, positioning it as a promising candidate for the development of biosensors for diabetes detection.

Keywords:

DFT, VOCs, Biomarker, Non-invasive, Graphene.

