Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES)

March 12-13, 2026

SOUVENIR & ABSTRACTS

ORGANIZED BY

सीएसआईआर-भारतीय विषविज्ञान अनुसंधान संस्थान, लखनऊ
CSIR-INDIAN INSTITUTE OF TOXICOLOGY RESEARCH, Lucknow
लखनऊ, भारत | LUCKNOW, INDIA

AMITY UNIVERSITY
LUCKNOW CAMPUS

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Lucknow Chapter
Headquarters: Mysuru (www.afsti.org)

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About WARM

The WARM (Women in Academia, Research, and Management) platform was established by CSIR-IITR in December 2022 to celebrate and commemorate the contributions of women in science, technology, engineering, and management. CSIR-IITR continues its commitment to encouraging women in all fields of science, engineering and management and organized three editions of the conference under the WARM platform in 2023, 2024 and 2025. These three national editions of the WARM conferences brought together national leaders, academicians, and policymakers on one platform to discuss potential policy leads and inspire young enthusiasts for their futures.

About WARM-WISHES 2026

The fourth edition of the WARM conference, WARM-WISHES 2026 (Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety), is being organized by Amity University Lucknow and CSIR-IITR. The conference will focus on empowering successful women-led initiatives and health. The main focus of the conference is to inspire the inclusion of women and girls in research and academia. This year's theme emphasises research advancements, emerging trends, and the significant contributions of women scientists and technologists in environmental sciences and related fields. It is a unique platform for women entrepreneurs, students, and technologists, offering informative sessions, valuable networking opportunities, and opportunities to connect with established professionals and peers, fostering meaningful collaborations. WARM-WISHES 2026 is being organised in association with AFSTI Lucknow Chapter and the Association of Toxicologists and Risk Assessors (ASTRA) Lucknow.

About CSIR-IITR

CSIR-Indian Institute of Toxicology Research (CSIR-IITR), Lucknow, a constituent laboratory of Council of Scientific & Industrial Research (CSIR), was established on November 4, 1965. It is the only institute of toxicology in the country, contributing to cutting-edge research and innovation in toxicology, with the motto: “Safety to Environment and Health and Service to Industry”. CSIR-IITR has world-class infrastructure and human resources in toxicology and provides a one-stop solution to address environmental and health issues. The institute has contributed to the knowledge base in toxicology by publishing >3800 research articles and to technology development (25 national and international patents). The six decades of contributions in the field of toxicology have globally positioned SAIR among the top five in Food, Industrial, and Nanomaterial toxicology.

About Amity University Lucknow

Amity University Lucknow Campus (AULC) is a constituent unit of Amity University, Uttar Pradesh (AUUP). Established in 2004, the campus was founded with the objective of imparting research and innovation driven education in the region. The Lucknow Campus is spread over 40 acres and features a hi-tech infrastructure with state-of-the-art facilities. The campus comprises 17 institutions offering over 64 academic programs and caters to more than 7,000 students. It is supported by over 300 faculty members and nearly 400 staff members. The university houses 200 advanced laboratories across various disciplines and a well-stocked library with more than 76,000 books, 13,700 e books and along with over 7,000 journals and reference materials. The campus is centrally air-conditioned and equipped with amphitheater-style classrooms, as well as on-campus hostel facilities accommodating over 2,000 students. Amity University Uttar Pradesh, Lucknow Campus is part of India's leading educational group, with a legacy of excellence in education spanning over two decades. The Amity Group's campuses are spread across 2,000 acres and include 12 world-class universities, 28 schools and preschools, over 150 top-ranked institutions, and 10 overseas campuses located in London, New York, Singapore, Mauritius, Dubai, Abu Dhabi, Sharjah, Muscat, South Africa, Amsterdam, Tashkent. The Group is home to approximately 250,000 students pursuing more than 300 programs across over 70 diverse disciplines, ranging from preschool to doctoral studies. Built on a strong foundation of academic excellence, AULC embodies the qualities that have established Amity institutions as world-class over the past two decades. The university has instituted global standards in education, training, and research through world-class infrastructure and modern teaching methodologies, with a mission to develop future leaders for the corporate world. It strives to blend modernity with tradition in shaping each of its students.

About AFSTI

The Association of Food Scientists and Technologists (India), established in 1957, is one of the largest professional organizations, with around 4000 WARM-WISHES 2026 members - food scientists and technologists, across the globe. The major objective of AFST(I) is to stimulate and advance knowledgebase on various aspects of Food Science and Technology. The association serve the community for healthy & safe food and also promote & recognizes talent and excellence in the profession of Food Science and Technology by conferring various Awards and Fellowship. A local chapter, AFST (I) Lucknow Chapter, situated at CSIR-IITR, Lucknow has opened on December 20, 2022 with Lucknow regional members to support and strengthen the goals of the association on food safety & security through various activities

About ASTRA

The Association of Toxicologists and Risk Assessors (ASTRA) is a professional organization dedicated to advancing the fields of toxicology and risk assessment. ASTRA promotes scientific excellence, ethical practices, and evidence-based decision-making in toxicological research and risk evaluation. ASTRA collaborates with academic institutions, research organizations, and government bodies to develop and implement best practices in animal welfare. It also provides training and education on ethical research methodologies.

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शुभकामना संदेश

वार्म–विशेज 2026 के उद्घाटन पर मैं गर्व और उत्साह से उपस्थित हूँ, जिसका सह–आयोजन सीएसआईआर–आईआईटीआर और एमिटी विश्वविद्यालय, लखनऊ द्वारा किया जा रहा हैं। यह सम्मेलन महिलाओं के सशक्तिकरण, समावेशन और परिवर्तन का उत्सव है, जो विज्ञान, प्रौद्योगिकी, अभियांत्रिकी एवं प्रबंधन में उनके योगदान को सम्मानित करता है तथा सतत स्वास्थ्य व सुरक्षा के लिए के लिए बढ़ावा देता है। सीएसआईआर–आईआईटीआर पिछले 60 वर्षो से पर्यावरण–स्वास्थ्य सुरक्षा में अग्रणी रहा है, और वैज्ञानिक उत्कृष्टता को आगे बढ़ा रहा है।

दोनों संस्थानों ने WARM मंच के माध्यम से इस नई शुरूआत कर महिलाओं के लिए समाज और विज्ञान में समानता को मजबूत किया है। **वार्म–विशेज़ 2026: वर्क–लाइफ इनिशिएटिव्स फॉर सस्टेनेबल हेल्थ एंड एम्पावरिंग सेफ्टी** यह मंच इस परंपरा को आगे बढ़ाता है, और अनुसंधान, अकादमिक क्षेत्र तथा उद्यमिता में महिलाओं के लिए संतुलित जीवन, सुदृढ़ स्वास्थ्य रणनीतियों और सुरक्षा संबंधी नवाचारों को प्रोत्साहित करता है। WARM-WISHES 2026 कार्य–जीवन संतुलन, स्वास्थ्य रणनीतियों और सुरक्षा नवाचारों पर केंद्रित हैं। दो दिनों में विद्वान, वैज्ञानिक एवं उद्यमी ज्ञान साझा करेंगे, युवाओं को मार्गदर्शन देंगे तथा महिला स्टार्टअप्स के लिए नेटवर्किंग का मंच बनेगा।

इसके आयोजकों तथा प्रतिभागियों को इसकी सफलता की हार्दिक शुभकामनाएँ।

11.03.2026

आवास–3, विक्रमादित्य मार्ग, लखनऊ–226001
निवास कैम्प कार्यालय– 4/ए, करियप्पा मार्ग, बालूगंज, आगरा–282001

सत्यमेव जयते

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सचिव, वैज्ञानिक और औद्योगिक अनुसंधान विभाग
महानिदेशक, वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
Dr. (Mrs.) N. Kalaiselvi
Secretary, DSIR and Director General, CSIR

सीएसआईआर
CSIR
भारत का नवाचार इंजन
The Innovation Engine of India

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वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
Government of India
Ministry of Science and Technology
Department of Scientific & Industrial Research
Council of Scientific & Industrial Research

Message

I am delighted to learn that CSIR-Indian Institute of Toxicology Research, Lucknow, in collaboration with Amity University, Lucknow, is organizing a two-day conference on "**Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)**", from March 12th-13th, 2026. The conference theme is both timely and forward-looking.

Women scientists across the globe are shaping transformative research in diverse fields, advancing knowledge, and inspiring future generations. Their contributions strengthen scientific discovery and reinforce the importance of diversity and inclusion in building robust innovation ecosystems. India continues to witness a steady rise in the number of women leaders driving research excellence and contributing to national development.

WARM-WISHES 2026 highlights research advancements and emerging trends in environmental sciences and celebrates the achievements of women scientists and technologists. It creates an excellent platform to encourage women, inspire young aspirants toward holistic leadership, foster inclusive excellence, and strengthen institutional cultures that support sustainable growth.

I extend my best wishes for a highly successful and impactful event.

March 05, 2026
New Delhi

N. Kalaiselvi
(N. Kalaiselvi)

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FOUNDER PRESIDENT'S MESSAGE

It is a matter of great pride that Amity University Uttar Pradesh (AUUP), Lucknow Campus, is organizing the **4th edition of Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026) Conference** on Thursday, 12th March and Friday, 13th March, 2026 in collaboration with CSIR-Indian Institute of Toxicology Research, Lucknow.

In the astonishing development and remarkable progress which has taken place in all fields and areas including science, technology, engineering, academics, innovations, agriculture, entrepreneurship and many others, the significant contribution of women has not only ensured a cohesive, sustainable and inclusive progress but also led to effective solutions for global challenges. In India, their contribution cannot be emphasized enough as they are successfully leading many organisations, critical for the growth and development of the country.

I warmly welcome the distinguished academicians, scientists, industry leaders, entrepreneurs, and young researchers who are participating in this conference. Their collective expertise and exchange of ideas will be highly inspiring, motivating and enriching for brilliant students, research scholars, Ph.D scholars, faculty members and other worthy participants and ignite in them, innovative ideas that translate into technologies and innovations for societal benefit. The conference will provide a platform for forging bonds and mutual cooperation, undertaking joint research projects and joint publications, for achieving long-term goals and contacts for mutual benefits.

My appreciation to Dr. Bhaskar Narayan Ji, Conference Chairperson & Director, CSIR-Indian Institute of Toxicology Research, Lucknow for the valuable collaboration to organize the conference.

I compliment Prof. (Dr.) Anil Vashisht, Conference Chairperson & Pro Vice Chancellor, AUUP, Lucknow campus, all members of the organizing committee including Prof (Dr). Rajesh K Tiwari, Dean (Academics) & Director, Amity Institute of Biotechnology, Prof (Dr). Mala Trivedi, Officiating Head, Department of Research & Publication and Prof (Dr). Aditi Singh, Professor, Amity Institute of Biotechnology, AUUP, Lucknow Campus as well as dedicated faculty members, Ph.D scholars, brilliant students and staff, for meticulously planning the event.

The most strategic and unparalleled leadership of Dr. Aseem Chauhan Ji, Resp. Chairman, AUUP, Lucknow campus & Addl. President, Ritnand Balved Education Foundation (RBEF), would lead to outcome based and result oriented success of the Conference. The best wishes from our most visionary and exemplary leader, Dr. Atul Chauhan Ji, Hon'ble Chancellor, AUUP & President, RBEF, would always be there for a fruitful, meaningful, and successful event.

I warmly welcome all participants and hope they have a memorable and enriching experience that not only contributes to the goals of **WARM-WISHES 2026** but also leave a profound impact on the fellow participants.

(Dr. Ashok K. Chauhan)
Founder President
Ritnand Balved Education Foundation (RBEF)
(The Foundation of Amity Universities, Institutions &
Amity International Schools)

सीएसआईआर-भारतीय विषविज्ञान अनुसंधान संस्थान
CSIR-INDIAN INSTITUTE OF TOXICOLOGY RESEARCH
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डॉ. भास्कर नारायण एमएफएससी, पीएचडी
Dr. Bhaskar Narayan MFSc, PhD
एफएसएबी, एफएफएसटी, एफएनएबी, एफएसएफटी, एफएनएएस
FSAB, FAFST, FNAB, FSFT, FNAAS
निदेशक
Director

Message

Women in Academia, Research and Management for Work-Life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026) represents a significant milestone in our continuing commitment to advancing women's leadership in academia, research, and management. It is a matter of pride that CSIR-IITR, in association with Amity University Lucknow, and the Lucknow Chapter of Association of Food Scientists & Technologists-India (AFSTI-Lucknow), the Association of Toxicologists and Risk Assessors (ASTRA), Lucknow, is organizing this important initiative on March 12–13, 2026.

Women contribute profoundly to scientific advancement, policy development, and institutional growth. However, challenges related to work-life balance, sustainability of health, and work place safety can affect career progression and long-term engagement. Addressing these dimensions is vital for building resilient research ecosystems.

The objective of WARM-WISHES 2026 is to create enabling platforms for mentorship, networking, and capacity-building that empower women at all stages of their professional journey. By bringing together leaders, researchers, entrepreneurs, and young scholars, the conference will catalyze meaningful discussions on inclusive growth, sustainable health, and safe research environments. As the host institution of the WARM initiative, CSIR-IITR remains committed to promoting inclusive research environments that support women's leadership and well-being.

I am confident that WARM-WISHES 2026 will inspire collaboration and reinforce our shared commitment to equity and excellence in science. I extend my sincere best wishes for its grand success.

Wishing the best to the women who inspire, innovate and improve life !!

(Bhaskar Narayan)
Director, CSIR-Indian Institute of Toxicology Research (IITR), Lucknow

Message From The Pro Vice Chancellor

It gives me great pleasure to extend my best wishes for the conference *"Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)"*, being organized jointly by Amity University Lucknow Campus and CSIR–Indian Institute of Toxicology Research, Lucknow. We are indeed delighted and proud to be hosting this important edition of the conference in collaboration with such a prestigious research institution.

The WARM initiative has evolved into a significant platform dedicated to recognizing the achievements, leadership, and transformative contributions of women in research, science and technology, healthcare, and management. Its genesis lies in the collective realization that inclusive scientific progress and sustainable development require active participation, encouragement, and recognition of women scholars, researchers, and professionals. Conferences such as WARM-WISHES play a vital role in creating that enabling ecosystem by fostering dialogue, mentorship, and collaboration.

At Amity University Lucknow Campus, we remain deeply committed to promoting research excellence, innovation, interdisciplinary collaboration, and inclusive academic growth. Our focus on advanced research infrastructure, industry partnerships, entrepreneurship development, and global academic linkages ensures that both faculty and students - particularly women researchers - have opportunities to excel, lead, and innovate. We strongly believe that diversity in thought and participation strengthens scientific advancement and societal impact.

Our collaboration with CSIR-IITR, a leading institute in toxicology, environmental health, and translational research, adds tremendous academic and scientific value to this conference. Together, we aim to create a meaningful platform for knowledge exchange, policy discussions, networking, and recognition of women-led initiatives that contribute to sustainable health, safety, and societal well-being.

I am confident that WARM-WISHES 2026 will inspire participants, stimulate innovative ideas, and strengthen collaborations across academia, research organizations, industry, and policy sectors. I congratulate the organizers for their dedicated efforts and extend my best wishes to all delegates for a highly successful and enriching conference.

Prof (Dr) Anil Vashisht
Pro Vice Chancellor
Amity University Uttar Pradesh, Lucknow Campus

Message From Deputy Pro Vice Chancellor

Wg. Cdr. Prof. (Dr.) Anil Kumar
Dy Pro VC & Director, Amity School of Engineering
& Technology, Amity University Uttar Pradesh,
Lucknow Campus

It is with great pleasure I extend my warm greetings and best wishes for the International conference **"Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)"**, being organized by Amity University Lucknow in collaboration with CSIR-Indian Institute of Toxicology Research, Lucknow. Scheduled for **March 12–13, 2026**, this significant initiative reflects a strong commitment to recognizing and celebrating the invaluable contributions of women in academia, research, leadership, and management. Our country has great tradition of women leaders having transformed the course of modern history and as we march towards becoming a developed nation (Viksit Bharat) there is requirement to redefine recognize and celebrate the achievement of our women in all fields of national growth. The International Conference would prove to be a catalyst in this direction.

Amity has consistently placed research, innovation, and academic excellence at the core of its mission. Through interdisciplinary research, strong industry linkages, and technology-driven initiatives, the University continues to foster an ecosystem that empowers scholars—particularly women—to contribute meaningfully to knowledge creation and societal development. The collaboration with CSIR-IITR, a premier institution renowned for its pioneering work in toxicology, environmental health, and translational research, further strengthens the scientific foundation of this conference.

Today, women are playing a pivotal role in advancing innovation, strengthening research ecosystems, and contributing significantly to sustainable health and safety. Platforms such as WARM-WISHES provide an important opportunity not only to acknowledge these achievements but also to inspire future generations to pursue excellence in academia, research, and leadership.

I am confident that this conference will stimulate meaningful dialogue, foster new collaborations, and generate impactful ideas that will benefit both the scientific community and society at large.

I extend my best wishes to the organizers, participants, and all stakeholders for a highly successful and inspiring event.

Wg. Cdr. Prof. (Dr.) Anil Kumar

Message by Dean Research (Science & Technology) AUUP Lucknow Campus

It is a matter of great pleasure that Amity University Lucknow Campus, is organizing **a conference, "**Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)", jointly with CSIR–Indian Institute of Toxicology Research, on March12–13,2026.

CSIR-IITR where I developed my Scientific carrier, whose Motto, " Safety to environment and health and service to industry" At Amity University I was able to develop international collaborations. Amity University's Motto "where modernity blends with education.

I am sure that this conference will facilitate productive discussions, encourage collaborations, and generate ideas that benefit both society and the scientific community. I extend my best wishes to the organizers and participants for a successful and inspiring event.

I am also sure that the Conference will provide an excellent opportunity to highlight and discuss the problems and develop new opportunities.

I congratulate the organizers for taking remarkable initiatives of hosting Conference on such a burning topic.

I extend my best wishes to the organizers and all the participants and wish the conference a great success.

Qamar Rahman.

Qamar Rahman
Ph.D, D.Sc (hc), FNASc, FST
Distinguished Professor & Dean Research (S & T)
Principal Advisor to Founder President (International Alliances)
Amity University, India
Visiting Prof. Rostock University, Germany
Research Prof. University of Louisiana, Lafayette. USA
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MESSAGE

Prof. (Dr) Rajesh K. Tiwari
Director, AIB & Dean, Academics,
Amity University Uttar Pradesh, Lucknow Campus

It gives me great pleasure to extend a warm and cordial welcome to all distinguished delegates, researchers, academicians, professionals, and students who have gathered to participate in the National Conference on **"Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)"**, jointly organized by Amity University Uttar Pradesh, Lucknow Campus, and CSIR–Indian Institute of Toxicology Research, Lucknow.

The **WARM platform** has grown into a significant forum dedicated to recognizing the achievements, leadership, and transformative contributions of women in all walks of life including academia, research, science, technology, healthcare, and management.

This conference aims to foster meaningful discussions on work-life balance, sustainable health practices, and women's safety, while also highlighting the importance of preventive healthcare and health awareness. Through the exchange of experience and knowledge, research findings, and practical experiences, participants will be able to explore strategies that promote health education, strengthen preventive interventions, and empower women to make informed decisions regarding their well-being.

I extend my heartfelt congratulations to the organizing teams and my best wishes to all participants for a highly engaging, productive, and enriching conference experience.

Prof. (Dr) Rajesh K. Tiwari

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वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

डॉ. राधा रंगराजन
निदेशक
Dr. Radha Rangarajan
Director

Message

It gives me immense pleasure to extend my warm greetings and heartfelt congratulations on the occasion of **WARM-WISHES 2026** being organized on March 12-13, 2026 at **CSIR-IITR, Lucknow in collaboration with Amity University, Lucknow**.

WARM-WISHES 2026 stands as a powerful testament to the continued commitment of CSIR-IITR in celebrating the achievements, resilience, and leadership of women across academia, research, innovation, and management. This thoughtful initiative goes beyond acknowledging achievements, it actively nurtures an enabling ecosystem where aspirations are supported, diversity is respected, and equal opportunities are fostered.

In an era defined by rapid scientific transformation and global challenges, the role of women in shaping research advancements and emerging trends in health, environmental sustainability, and regulatory sciences has never been more crucial. Women scientists, entrepreneurs, and technologists are spearheading translational innovations that bridge laboratories to livelihoods, policies to practice, and ideas to impactful solutions. Their contributions are strengthening the foundations of sustainable health systems and safe technological growth.

This conference provides a vibrant platform for dialogue, collaboration, and mentorship. It will undoubtedly foster meaningful discussions on work-life integration, institutional support mechanisms, leadership pathways, and strategies to ensure safety and inclusivity in professional environments. Such conversations are vital for creating resilient institutions that value both excellence and empathy.

I am confident that **WARM-WISHES 2026** will inspire young researchers, empower emerging leaders, and reinforce the collective vision of building a scientific community where talent flourishes without barriers. Let this gathering spark new collaborations, innovative ideas, and enduring partnerships that advance science and society alike.

I commend the organizing committee for their dedication and foresight in conceptualizing this significant event. Wishing all participants for engaging deliberations and a highly successful conference.

With warm regards and best wishes for **WARM-WISHES 2026**.

Radha Rangarajan

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Rana Pratap Marg, Lucknow - 226001, U.P., India

डॉ. अजित कुमार शासनी
निदेशक
Dr. Ajit Kumar Shasany
Director

Message

I am happy to note that CSIR-Indian Institute of Toxicology Research, Lucknow, in collaboration with Amity University, Lucknow, is organizing **"Women in Academia, Research and Management for Work-Life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)"** from **March 12-13, 2026,** with a focus on empowering women in academia, research, and management.

In the domains of plant sciences, biodiversity conservation, and environmental sustainability, women researchers have played a transformative role. Their contributions strengthen agricultural innovation, ecological resilience, and sustainable health frameworks. Ensuring that training, research opportunities, and institutional support systems are accessible and inclusive is essential to advancing both scientific excellence and societal well-being.

WARM-WISHES 2026 provides an important platform to promote innovative research approaches, facilitate knowledge exchange, and showcase successful institutional and entrepreneurial models led by women. By fostering mentorship, collaboration, and interdisciplinary dialogue, the conference will further encourage young women and girls to pursue careers in research and higher education.

I commend the organizers for this forward-looking initiative and extend my best wishes for a meaningful and successful conference.

Date: 03.03.2026

(Ajit Kumar Shasany)

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CSIR-Central Institute of Medicinal and Aromatic Plants
(Council of Scientific & Industrial Research)
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डॉ. ज़बीर अहमद
निदेशक
Dr. Zabeer Ahmed
Director

MESSAGE

I am pleased to learn that **CSIR-Indian Institute of Toxicology Research, Lucknow** and **Amity University, Lucknow** are organizing a two-day event on **"Women in Academia, Research and Management for Work-Life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)"** to celebrate and strengthen the role of women in academia, research, and management, with a focus on sustainable health and empowering safety.

Women have contributed immensely to plant and environmental sciences, natural products research, agricultural biotechnology, and knowledge translation. Their leadership has significantly enriched academia, industry, and community-based applications that promote health and environmental sustainability. These domains require continued emphasis on balanced skill-building, professional networking, and institutional support mechanisms.

The thematic tracks of WARM-WISHES 2026: TEST-STEM (Translating & Empowering Successful Transformation in Science, Technology, Engineering and Management), HER Journey (Health, Environment & Regulatory), SHE (Showcasing Her Entrepreneurship), and WIIN (Women-led Inclusive Innovative Networking), reflect a progressive vision that integrates scientific transformation, health and regulatory awareness, entrepreneurship, and collaborative engagement. Such initiatives are essential to nurturing national growth and progressing inclusive research environments.

WARM-WISHES 2026 provides a valuable platform for dialogue, mentorship, and interdisciplinary exchange that will inspire the next generation of women leaders in science and management. I extend my sincere congratulations to the organizers and wish the conference every success.

Dated: 2nd March, 2026

(Zabeer Ahmed)

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Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES)

Message

On the occasion of WARM-WISHES 2026, we are honored to present the fourth edition of the WARM Conference, organized by CSIR-Indian Institute of Toxicology Research in collaboration with Amity University, Lucknow, the Lucknow Chapter of the Association of Food Scientists & Technologists-India (AFSTI-Lucknow), and the Association of Toxicologists and Risk Assessors (ASTRA), Lucknow, from 12th–13th March 2026. Building on the success of the previous three editions, we bring this milestone with great enthusiasm and commitment.

Through this platform, we aim to strengthen institutional frameworks that foster mentorship, safety and work-life balance, all of which are essential to sustaining excellence in healthcare education and research. The conference themes and panels are carefully curated to reflect the multidimensional progress of women in science, entrepreneurship, and leadership. The main focus of WARM conferences is to provide meaningful opportunities for dialogue, collaboration, and networking, and we hope to inspire young scholars and professionals to pursue innovation with purpose.

We warmly invite all delegates, speakers, and participants to join us in making this fourth edition a truly transformative milestone. We look forward to welcoming you.

Dr. Smriti Priya
Convenor, WARM-WISHES
CSIR-IITR, Lucknow

Dr. Aruna Satish
Convenor, WARM-WISHES
CSIR-IITR, Lucknow

Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES)

MESSAGE FROM THE CONVENERS OF WARM-WISHES 2026

It is a matter of great pleasure and enthusiasm for us, as a Convener, to extend a warm welcome to all delegates, speakers, collaborators, and participants to the conference **"Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES 2026)"**, being organized by Amity University Lucknow in collaboration with CSIR–Indian Institute of Toxicology Research. Scheduled for March 12–13, 2026, the conference represents a meaningful step toward recognizing and strengthening the role of women in academia, research, leadership, and sustainable development.

WARM-WISHES 2026 has been conceptualized as a dynamic platform to deliberate upon work–life integration, sustainable health frameworks, institutional safety, and leadership pathways for women professionals. Amity University Lucknow has consistently promoted academic excellence, interdisciplinary innovation, and industry–academia collaboration. Our partnership with CSIR–IITR, an esteemed national institute renowned for its contributions to toxicology, environmental health, and translational science, adds significant depth and scientific rigor to this initiative.

Through keynote addresses, technical sessions, and collaborative discussions, we aim to create an environment that not only celebrates achievements but also identifies practical solutions and policy directions for strengthening women's participation in research and management. We envision this conference as a catalyst for new partnerships, impactful research networks, and sustainable institutional practices.

We sincerely thank our distinguished speakers, organizing committee members, collaborators, and participants for their valuable support and engagement. We look forward to two days of enriching deliberations and meaningful outcomes that will contribute to a safer, healthier, and more equitable academic landscape.

With best wishes for a successful and inspiring conference.

Prof (Dr). Mala Trivedi
Amity University Lucknow Campus

Prof (Dr). Aditi
Amity University Lucknow Campus

Women in Academia, Research and Management for Work-life Initiatives for Sustainable Health & Empowering Safety (WARM-WISHES)

TECHNICAL PROGRAM

Venue: Auditorium Block, Amity University Uttar Pradesh, Lucknow Campus

Day 1: Thursday, March 12, 2026	
Registration Venue: Auditorium Block, Amity University Uttar Pradesh, Lucknow Campus	9:30 – 10:00 am
Inauguration, Venue: Auditorium	**10:00 – 11:30 am**
Networking Tea / Coffee Break	11:30 – 12:00 noon
Panel Discussion - 1: Academia **G**overnment **I**ndustry **L**eadership (**AGILE**) **Panelists:** Prof. (Dr.) Qamar Rahman (Amity University), Dr. Poonam Kakkar (CSIR-IITR- Rtd), Ms. Shipra Pathak (Global Water Mission), Ms. Namrata Dubey (Kenvue), Dr. Mala Tandon (Amity University) **Moderator:** Prof. (Dr.) S. Z. H. Zaidi, Amity University Venue: Multipurpose Hall	12:00 – 01:00 pm
LUNCH	01:00 – 02:00 pm
Session-1, March 12, 2026 **Theme: HER (Health, Environment & Regulatory) Journey in Science** Venue: Multipurpose Hall	
Chairpersons: Prof. (Dr.) Qamar Rahman & Dr. Poonam Kakkar **Rapporteur:** Dr. K. K. Singh (Amity University)	
Invited talk – 1 Prof. (Dr.) Nuzhat Husain, HOD, Dept. of Pathology, RMLIMS **Title:** Screening for Cancer of the Uterine Cervix in Women: Methods, Achievable Objectives, and the Environment	02:00 – 02:20 pm
Invited talk – 2 Dr. Ruchi Gupta, Professor, SGPGI **Title:** Creating awareness for thalassemia and hemoglobinopathies in India- a step forward to reduce the disease burden	02.20 – 02.40 pm

Invited talk – 3 Prof. (Dr.) Amita Kannaujia HOD, Dept. of Zoology Lucknow University **Title:** Lifestyle for environment and women	02.40 – 03.00 pm
Session-2, March 12, 2026 **Theme: SHE (Showcasing Her Entrepreneurship)** **Venue:** Multipurpose Hall	
Chairpersons: Prof. (Dr.) Asita Kulshreshtha & Prof. (Dr.) Aditi Singh **Rapporteur:** Dr. Sachin Kumar (Amity University)	
Invited talk – 4 Dr. Shipra Rastogi, Director & Founder, Cellure Bioscience Pvt Ltd **Title:** Beyond the Lab: Building careers that solve real health problems	03.00 – 03.20 pm
Invited talk – 5 Dr. Tuba Siddiqui, Director & Founder, Humany Eco Innovations Pvt Ltd **Title:** Reality vs Fantasy: Five myths of the startup journey	03.20 – 03.40 pm
Invited talk – 6 Ms. Namrata Dubey, Associate Manager, Regulatory Affairs, Kenvue **Title:** From Awareness to Action: Regulatory Overview of India's Menstrual Health Landscape	03.40 – 04.00 pm
POSTER SESSION -I (PP No. 1-50) Venue: Backside of the Auditorium	04.00 – 05.00 pm
Networking Tea / Coffee Break	05.00 pm onwards
Day 2: Friday, March 13, 2026	
Session-3, March 13, 2026 **Theme: TEST-STEM (Transforming & Empowering For Successful Translation in Science, Technology, Engineering & Management)** Venue: Multipurpose Hall	
Chairpersons: Dr Rachana Kumar & Prof. (Dr.) Mala Trivedi **Rapporteur:** Dr. Satendra Kumar Mishra	
Invited talk – 1 Dr. Tabli Ghosh, Assistant Professor, Department of Food Engineering & Technology, Tezpur University, Tezpur **Title:** Transforming agro-resources into dietary fibre complexes for sustainable health and food safety	09.30 – 09.50 am
Invited talk – 2 Dr. Suchi Srivastava, Principal Scientist, CSIR-NBRI **Title:** Pathogen-Biocontrol interaction: from mechanistic understanding to field application	09.50 – 10.10 am
Invited talk – 3 Dr. Zainab Siddiqui, Center for Disease Mapping and Therapeutic Research, Era University, Lucknow **Title:** Marine-derived compounds targeting oncogenic miR-21: A novel approach in bladder cancer management	10.10 – 10.30 am

Invited talk – 4 Dr. Anjali Trivedi, Scientist E, BSIP Lucknow **Title:** Women in Science Driving Biodiversity Conservation for a Sustainable Future	10:30 – 10:50 am
Invited talk – 5 Ms Suneeta Airen, Consulting Editor, Hindustan Times **Title:** Media, Women Empowerment, and Environment	10:50 – 11:10 am
TEA BREAK	11:10 – 11:30 am
Panel Discussion 2: Dissemination of **E**ducational, **S**cience based **I**nformation **Re**levant to **S**ociety **(DESIReS)** **Panelists:** Ms. Suneeta Airen (Hindustan Times), Ms. Sumona Pandey (Akashvani Lucknow), Dr. Anjali Trivedi, (BSIP, Lucknow), Prof. (Dr.) Lakshami Bala, (BBDU, Lucknow), Prof. (Dr.) Shalini Singh Visen (Amity University) **Moderator:** Dr. R. K. Singh (Amity University) **Venue:** Multipurpose Hall	11:30 – 12:30 pm
ORAL PRESENTATIONS by Selected Participants (Parallel sessions if required)	12:30 – 01:30 pm
LUNCH	01:30 – 02:15 pm
POSTER SESSION-II (PP No. 51-100) (Venue: Backside of the auditorium)	02:15 – 03:30 pm
Panel Discussion 3: Government, **R**esearch, **A**cademia & **I**ndustry **N**etworking **(GRAIN) – Parallel Session** **Panelists:** Dr. Madhurima Pradhan (Lucknow University-Rtd), Dr. Shefali Mohan Bahadur (Prof. & Corporate Trainer), Dr. Shalini Agarwal (BBAU, Lucknow), Dr. Kumkum Ray (Amity University), Dr. Manju Agrawal (Amity University) **Moderator:** Dr. Brijesh Khandelwal (Amity University)	02:30 – 03:30 pm
Valedictory, Venue: Auditorium	**03:30 – 05:00 pm**
Networking Tea / Coffee	05.00 pm onwards

Distinguished Session Chairperson and Panelists

Prof. (Dr.) Qamar Rahman
Distinguished Professor & Dean Research (S & T) Amity University Uttar Pradesh, Lucknow Campus

Dr. Poonam Kakkar
Chief Scientist (Retd.)
Regulatory Toxicology
CSIR-Indian Institute of Toxicology Research

Ms. Shipra Pathak
Water Woman, Ambassador, Glojal (Global Water Mission)

Ms. Namrata Dubey
Associate Manager, Regulatory Affairs, Kenvue

Ms. Sunita Airen
Consulting Editor & Former Executive Editor, Hindustan Times

Ms. Sumona Pandey
Head of Programme, Akashvani Lucknow

Dr. Anjali Trivedi
Senior Scientist, Quaternary Paleoclimate Department, BSIP Lucknow

Dr. Madhurima Pradhan
Former Head & Professor (retd.), Department of Psychology, University of Lucknow

Dr. Shefali Mohan Bahadur
Professor & Corporate Trainer

Dr. Shalini Agarwal
Professor & Head Department of Human Development and Family Studies, BBAU, Lucknow

Prof. Laxmi Bala
BBD University

Prof. (Dr.) Asita Kulshreshtha
Director, Amity School of Applied Sciences, Amity University Uttar Pradesh, Lucknow Campus

Prof. (Dr.) Aditi Singh
Professor, Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus

Prof. (Dr.) Mala Trivedi
Professor, Amity Institute of Biotechnology & Head, Department of Research & Publication (Offg.), Amity University Uttar Pradesh, Lucknow Campus

Invited Speakers' Abstracts

IL-01

Screening for Cancer of the Uterine Cervix in Women: Methods, Achievable Objectives, and the Environment

Nuzhat Husain
Professor and Head, Department of Pathology
Officer In-charge, State Referral Centre for Laboratory Investigations
Ex-Director and Dean, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India

Cervical cancer remains one of the few cancers that is both easily preventable and highly treatable. Yet, it continues to be the **fourth most common cancer among women globally**, with **662,301 new cases and 348,874 deaths reported in 2022** . Nearly **90% of cervical cancer deaths in 2018 occurred in low- and middle-income countries**, reflecting disparities in screening access and timely treatment. India alone reported **127,526 new cases and 79,906 deaths in 2022 (Globocan)** .

Etiology and Pathogenesis: Human Papillomavirus (HPV) is the primary causative agent of cervical cancer. Integration of viral oncogenes into the host genome leads to deregulated expression, chromosomal instability, and progression from pre-cancerous lesions to invasive carcinoma. Over **90% of cervical cancers are caused by high-risk HPV (hr-HPV) types**, making exposure to hr-HPV the most significant risk factor . In India, **HPV 16 and 18 account for over 80% of cervical cancers and 63% of high-grade lesions**, a proportion higher than the global average.

Approximately **90% of invasive cervical cancers are squamous cell carcinomas**, while **10–12% are adenocarcinomas**. The transition from normal epithelium to pre-neoplastic lesions and ultimately invasive cancer typically spans **10–20 years**, offering a substantial window for early detection and intervention.

Current Screening Landscape in India: The National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD) recommends **Visual Inspection with Acetic Acid (VIA)** for women aged 30–65 years. However, due to limited logistics, inadequate diagnostic and treatment capacity, and insufficiently trained personnel, **screening coverage remains as low as 1%**, with poor follow-up of screen-positive women.

While countries with timely diagnosis and high-quality treatment report **five-year survival rates exceeding 80%**, India's survival rate remains **51%**, largely due to late-stage presentation.

WHO Recommendations and Global Strategy: World Health Organization recommends **hr-HPV DNA testing as the primary screening method**, given its superior sensitivity and long-term protective value. HPV DNA–based screening has demonstrated a significantly greater impact on reducing cervical cancer morbidity and mortality compared to VIA.

WHO's global elimination strategy calls for:

- **70%** of women to be screened with a high-performance test
- **90%** of screen-positive women to receive appropriate treatment
- Expansion of **self-sampling** to improve coverage and acceptability

Our Implementation Experience: We have evaluated HPV DNA testing within a comprehensive diagnostic and management continuum for cervical cancer. This initiative involved collaboration between:

- Dr. Ram Manohar Lohia Institute of Medical Sciences (RMLIMS)
- Kalyan Singh Super Specialty Cancer Institute (KSSSCI)

- District- and state-level government stakeholders
- Funding and program support from JHPIEGO, India

Major challenges include:

- Reaching adequate numbers of eligible women
- Ensuring compliance with testing
- Initiating timely treatment for screen-positive individuals

Self-collection for primary hr-HPV screening has shown promise in overcoming barriers related to discomfort, stigma, and logistical constraints—particularly relevant in the Indian context.

About HPV: HPV is a common sexually transmitted infection, with most women acquiring it shortly after sexual debut. The virus infects skin and mucosal surfaces, including the cervix. **Virtually all cervical cancers (99%) are linked to genital HPV infection**, especially hr-HPV types. The International Agency for Research on Cancer (IARC) identifies **14 hr-HPV types** (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68) as oncogenic .

Testing Platforms and Environmental Considerations: Multiple HPV DNA testing platforms are available and will be discussed in the talk. Our population-based results using self-collected samples have been encouraging. The presentation will also highlight:

- Environmental and socio-cultural factors influencing cervical cancer risk
- Their impact on morbidity and mortality in India
- Strategies for prevention, screening, and programmatic strengthening

About Speaker

Prof. Nuzhat Husain is Professor and Head of the Department of Pathology at the Ram Manohar Lohia Institute of Medical Sciences (RMLIMS), Lucknow. She has also served as Dean Academics for over seven years and has previously held the position of Director of the institute. Her areas of expertise include neuroathology, oncopathology, and molecular pathology.

An eminent pathologist and academic leader, she has published more than 350 research papers, led several funded research projects, and supervised numerous PhD and postgraduate theses. She is currently the President of the International Association of Pathologists – Indian Division.

Prof. Nuzhat Husain
Professor and Head
Department of Pathology
Ram Manohar Lohia Institute of Medical Sciences (RMLIMS), Lucknow

IL-02

Creating awareness for thalassemia and hemoglobinopathies in India- a step forward to reduce the disease burden

Ruchi Gupta
Professor, Department of Hematology,
Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, India

Thalassemia and other hemoglobinopathies represent a major public health challenge in India. It is estimated that approximately 3–4% of the Indian population are carriers of Beta Thalassemia, which translates to nearly 30–40 million carriers nationwide. Due to the largely unrecognized carrier status among parents, an estimated 10,000–15,000 children are born each year with severe thalassemia disorders. These conditions, particularly Beta Thalassemia and Sickle Cell Disease, contribute significantly to morbidity, mortality, and long-term healthcare costs.

Since these disorders follow an autosomal recessive inheritance pattern, effective prevention largely depends on early identification of carriers and increased public awareness. Creating awareness about thalassemia and other hemoglobinopathies is therefore a crucial step toward reducing the disease burden in India. Public health education can help communities understand the genetic basis of these disorders, the importance of premarital and antenatal screening, and the availability of preventive diagnostic approaches. Community-based awareness campaigns, educational programs in schools and colleges, and media outreach can play an important role in disseminating accurate information and reducing the stigma associated with genetic diseases.

Simple and cost-effective investigations such as complete blood count, supplemented with confirmatory tests like Hemoglobin Electrophoresis and High Performance Liquid Chromatography (HPLC) for Hemoglobin, can facilitate early identification of carriers. When combined with genetic counseling and prenatal diagnostic services, these strategies can substantially reduce the likelihood of affected births. Integrating such screening and awareness programs into existing public health systems, particularly in high-prevalence regions, can further enhance accessibility and effectiveness. National initiatives such as the National Sickle Cell Anaemia Elimination Mission also aim to promote early detection, improve disease management, and strengthen preventive strategies.

In conclusion, it is important to generate awareness and remove stigma associate with these diseases. A coordinated effort by clinicians, pediatricians, and pathologists is essential to strengthen early detection and prevention thereby reducing the burden of thalassemia and other severe hemoglobinopathies in India.

About Speaker

Dr. Ruchi Gupta is Professor in the Department of Hematology (Laboratory) at Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow. She is a distinguished hematopathologist with extensive expertise in hemoglobinopathies, anemia, coagulation disorders, flow cytometry, and hematological malignancies such as acute myeloid leukemia (AML) and myelodysplastic syndromes (MDS). With a strong academic and research background, Dr. Gupta has contributed significantly to the field of laboratory hematology and clinical diagnostics. She has authored more than 100 publications in national and international peer-reviewed journals and has contributed 14 book chapters, reflecting her active engagement in advancing hematology research and education.

Dr. Ruchi Gupta
Professor
Department of Hematology
Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow

IL-03

Lifestyle for Environment and Women

Dr Amita Kannaujia

Head, Department of Zoology, Lucknow University, Lucknow India

Life style for Environment (LiFE),Mission LiFE was introduced by Prime Minister Narendra Modi at the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow on November 1, 2021. It is a global mass movement designed to nudge individuals towards mindful and deliberate consumption, rather than destructive, "use-and-dispose" habits.

.It is all about Green Practice among the masses. Green initiatives require money and time but Green practices need changes in lifestyle. Daily practices concerning to food security, water conservation, Green jobs, anti-plastic campaign, Energy conservation and Millets promotion make a positive impact on environment .The role of women in daily Lifestyle foremost and can not be neglected

About Speaker

Prof. Amita Kanaujia is a distinguished Professor in the Department of Zoology at the University of Lucknow, Lucknow, India, with a robust academic foundation including a Ph.D. from Maharani Laxmi Bai Medical College, Jhansi (2007) on the seroprevalence of HIV infection and immune system studies in high- and low-risk groups in Uttar Pradesh, an M.Sc. in Zoology (Parasitology) and B.Sc. in Zoology, Botany & Chemistry from the University of Lucknow (1994 and 1992, respectively), and CSIR-NET qualification in Life Sciences (1997). Her professional journey spans over two decades, including her current role as Professor since 2013, Associate Professor at the same institution (2007–2013), and earlier positions as Assistant Professor at Bipin Bihari P.G. College (2001–2007) and Bundelkhand University (2000–2001). Specializing in parasitology, immunology, biodiversity, wildlife conservation, and avian ecology, she has supervised 8 Ph.D. scholars (2 completed, others ongoing or submitted), authored numerous research papers in national and international journals on biodiversity, avifauna, and conservation, and served as Principal Investigator/Co-Investigator on multiple UGC- and Uttar Pradesh State Biodiversity Board-funded projects. Her accolades include Fellowships from the Zoological Society of India, Indian Academy of Environmental Sciences, and Indian Academy of Science & Nature, the Congress of Zoology Medal (2009), and several Best Poster Awards at national conferences.

Dr Amita Kannaujia
Head, Department of Zoology,
Lucknow University, Lucknow India

IL-04

Beyond the Lab: Building Careers that Solve Real Health Problems

Dr. Shipra Rastogi

Director & Founder Cellure Bioscience Pvt Ltd Lucknow, Uttar Pradesh

Science careers are often seen as limited to labs and research. This talk shares how a journey that began in academic research evolved into working on real healthcare solutions for conditions like atopic dermatitis, psoriasis, fungal infections, acne, and other infectious and inflammatory skin disorders.

It highlights how combining scientific knowledge with skills such as communication, strategy, and collaboration can turn textbook biology into real-world impact. The session also introduces students to diverse career paths beyond traditional roles, including drug development, digital health, and biotech innovation. The aim is to encourage students to see science not just as a field of study, but as a way to solve real health problems.

About Speaker

Dr. Shipra Rastogi is a pharmaceutical scientist and entrepreneur with over 20 years of experience working in dermatology, immunology, and aesthetic health. She holds a Ph.D. in Biochemistry/Toxicology and an MBA in Health Sector Strategy, and her work focuses on turning scientific research into practical healthcare solutions. Her areas of interest include inflammatory and infectious dermatological disorders, along with technologies that support skin repair and regeneration. Throughout her career, Dr. Rastogi has contributed to the development and launch of innovative products and has worked with leading global healthcare companies such as Galderma, Bausch Health, Leo Pharma, Valeant and Eli Lilly through strategic collaborations. She is also a mentor and advisor to emerging biotech start-ups and is passionate about encouraging students and young scientists to explore careers in research, innovation, and entrepreneurship.

Dr. Shipra Rastogi
Pharmaceutical Scientist and Entrepreneur

IL-05

Reality vs Fantasy: Five Myths of the Startup Journey

Tuba Siddiqui

Director & Founder, Soil Concepts, Humany Eco Innovations Pvt Ltd, Lucknow, Uttar Pradesh

Entrepreneurship is often portrayed as a glamorous journey of rapid success, funding milestones, and visible achievements. However, the lived reality is far more nuanced—marked by uncertainty, resource constraints, slow progress, self-doubt, and continuous learning.

In this talk, I will discuss five common myths associated with the startup journey and contrast them with the ground realities experienced by founders, particularly women navigating professional ambitions alongside personal responsibilities. Through honest reflections and practical insights, the talk aims to provide a realistic yet encouraging perspective for students, researchers, and aspiring entrepreneurs.

About Speaker

Ms. Tuba Siddiqui is a Lucknow-based biotechnologist and alumna of Integral University and the Goldman Sachs 10K Women Program at IIM Bangalore. She is the founder of Soil Concept, a brand focused on sustainable personal care products as natural alternatives to chemical-based daily-use items.

She has received several recognitions including the 1000 Women Faces of Asia Award (2021) and was acknowledged during the G20 Summit in Lucknow. A Shark Tank India Season 2 finalist, she has also been honored by Shri Yogi Adityanath and former Rajasthan CM Vasundhara Raje. Her work has been featured in leading media platforms such as *YourStory, Aaj Tak, Amar Ujala,* and *Harper's Bazaar*. She also developed "Garden of Health" and "Fresh Herbs on my Plate" to promote medicinal plants and herbs for healthy Living.

Ms. Tuba Siddiqui
Biotechnologist and Alumna of Integral University

IL-06

Regulatory Overview of India's Menstrual Health Landscape

Vikas Talwar*, Namrata Dubey**

*Director Regulatory Affairs – Kenvue, India

**Associate Manager Regulatory Affairs - Kenvue, India

Menstrual health is a pressing public health issue in India, affecting millions of women and girls across socioeconomic strata. Despite increased awareness of menstrual health, significant barriers remain, including inadequate access to hygiene products, high infection rates, and considerable school absenteeism among menstruators. These challenges not only impact individual dignity but also have broader economic implications, particularly for women from lower-income backgrounds who may face financial hardship due to missed workdays. The introduction of the Bureau of Indian Standards (BIS) 5405 standard has been a positive step toward ensuring the safety and quality of menstrual products, yet the recent judgement of the Hon`ble Supreme Court highlight the need for continued advocacy and comprehensive policy development for ensuring availability, accessibility and affordability of scientific & safe products like sanitary napkins across the country.

Innovative menstrual products have become available, offering greater comfort and convenience, but accessibility issues still persist, with many women unable to afford these solutions especially in the remote & village areas due to multiple socio-economic factors. Efforts to engage men in conversations about menstruation are equally essential for normalizing discussions and reducing stigma/taboo associated with this subject. In addition to this, corporate social responsibility (CSR) initiatives that promote girl child education and community awareness are crucial in addressing menstrual health challenges. As India navigates the complexities of menstrual health, it is imperative to advocate for sustainable and accessible solutions that empower women and girls, fostering a more equitable society and thereby contribute towards making India developed by 2047.

About Speaker

Namrata Dubey is currently serving as the Associate Manager of Regulatory Affairs for India and APAC Feminine Care with Kenvue India (formerly Johnson & Johnson). With nearly 12 years of experience in regulatory affairs, Namrata has successfully navigated diverse portfolios across three key franchises: Self-Care, Essential Health, Skin Health & Beauty.

In her current role, Namrata leads the Regulatory Affairs team for Essential Health and Skin Health brands, collaborating closely with business leaders, partners, and technical functions across India and the Asia Pacific region. Additionally, Namrata is an active member of several internal forums and contributes to the India Country Management Team as well as the Asia Pacific Regulatory Affairs Leadership Team.

Before joining Kenvue/J&J, Namrata held positions in Regulatory Affairs at Abbott Healthcare Pvt. Ltd., Consumer Care Division of Merck Sharp & Dohme (MSD), and Bayer Healthcare, where she managed various product categories, including Drugs, OTC, and Cosmetics within the India and APAC regions.

Namrata holds a Master's degree in Biotechnology from Mumbai University. She resides in Mumbai with her family and enjoys reading, exploring astrology, listening to music, and traveling during her leisure time.

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IL-07

Transforming Agro-Resources into Dietary Fibre Complexes for Sustainable Health and Food Safety

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In the current century, the research and development sector has emerged a focus on zero waste or waste minimization to align with the sustainable development goals (SDGs). The sustainable utilization of agro-industrial waste and transformation of underutilized resources into value-added products have gained increasing attention for sustainable health and food safety. Among available waste, agricultural processing wastes such as cassava waste, orange peel, bamboo wastes, banana peel and others are extensively used for developing biopolymeric materials, specifically cellulose and its nanostructured materials. Bhimkol (*Musa balbisiana*), a type of seeded banana found in the northeastern to southern India, produces peel that is a rich source of dietary fibre (DF) and can be utilized for various food applications. The ultrasonic assisted extraction (UAE) process was optimized to extract DF from bhimkol peel powder (BPP). The highest DF extraction yield (49.58 ± 0.88%) was obtained under optimized conditions of 60 min extraction time, a solvent/solid ratio of 30 ml/g, and a temperature of 40 °C. The extracted DF was further modified using ultrasonication (probe) modification (UM), enzymatic modification (EM), and hybrid modification (HM), which combined both UM and EM. Response surface methodology (RSM) was used to optimize the modification processes, yielding maximum modified DF (MDF) values of 96.92 ± 0.11% and 97.60 ± 0.76% for UM and EM, respectively. Among the treatments HM produced the highest soluble dietary fiber (SDF) content (19.31 ± 0.36 g/100 g), total dietary fiber (TDF) content of 88.01 ± 0.11 g/100 g, along with improved thermal, water holding capacity, and structural properties. In addition, anthocyanin was extracted from red cabbage (*Brassica oleracea L.*) using ultrasonic extraction, achieving the highest yield (1480.04 ± 0.58 mg/100g) at 40 min, 30 °C, and 95 % ethanol. An anthocyanin-MDF (ADF) complex was then developed and incorporated into edible wrapper. The resulting wrappers were exhibited improved physicochemical, barrier, functional, mechanical, and optical properties, highlighting their potential as an active packaging material.

Further, cassava (*Manihot esculenta*) is a versatile and widely consumed root vegetable found in various regions globally. Cassava processing industry generates substantial quantities of cassava peel, an important agro-industrial waste material which can be valorized as a sustainable source for the fabrication of nanocellulosic materials used for the development of multifunctional nanocomposite films. The development of multifunctional film using cellulose nanofiber (CNF) functionalized with olive oil can be used as a cling wrapper and as freshness indicator films, to monitor the freshness of chicken meat. In this research work, initially cellulose was extracted through a pretreatment process and subsequently converted into CNF *via* sulfuric acid hydrolysis. The field emission scanning electron microscopy confirmed the formation of nanofiber with diameters ranging from 25.9–50.0 nm. Further, CNF was incorporated into pullulan/pectin and pullulan/pectin/olive oil matrices to fabricate nanocomposite films. The developed nanocomposite films exhibited enhanced barrier, optical and mechanical properties. When applied as cling wrappers, these films effectively preserved chicken meat quality, reducing weight loss from unwrapped product to wrapped products, acceptable hardness and suppressing mesophilic and psychrophilic bacterial growth over 10 days. To address the need for intelligent packaging, freshness indicator films were further developed by incorporating anthocyanin-rich hibiscus extract (AHE) and tea tree oil-loaded Pickering emulsions stabilized by cassava peel-based CNF into pectin/pullulan matrices. These films demonstrated improved mechanical properties and strong antioxidant activity (43.52±0.23%).

Additionally, ammonia vapor sensitivity test showed prominent colorimetric changes (ΔE > 53), confirming their real-time freshness monitoring capability. Overall, this study highlights cassava peel valorization for developing sustainable CNF-based cling wrappers and freshness indicators, advancing smart packaging sensor systems.

Keywords: dietary fiber, nanocellulose, modified dietary fiber, anthocyanin, ADF complex, edible wrapper, physicochemical, and functional properties

About Speaker

Dr. Tabli Ghosh is an Assistant Professor in the Department of Food Engineering and Technology at Tezpur University, Assam, India. She obtained her Ph.D. from IIT Guwahati as a DST INSPIRE Fellow and was a Gold Medallist in both her B.Tech. and M.Tech. from Tezpur University. A recipient of the Young Researcher Award (2023) from the Asian Polymer Association, she has published over 90 research articles and book chapters and authored four books with Springer Nature and Elsevier. Her research interests broadly span food engineering, polymer-based materials, and emerging technologies for food and material applications.

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IL-08

Pathogen-Biocontrol Interaction: From Mechanistic Understanding to Field Application

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Plants are constantly exposed to wide variety of phytopathogens, resulting in substantial global losses. Conventional control methods mainly depend on fumigants and chemical pesticides, which are posing risks to human health, disrupting the soil microbial community and ecosystem balance and fostering pathogen resistance. The use of biocontrol agents (BCAs) is emerging as preferred approach over agrochemicals for managing plant diseases. Bacterial genera *viz*. *Bacillus, Pseudomonas, Streptomyces*, and *Paenibacillus* have shown efficacy against different pathogens by colonizing rhizosphere, facilitating nutrient cycling and promoting plant growth. Their interaction with plant and pathogen triggers complex molecular cascade that activates plant innate immunity against biotic stresses. Multi-tiered validation from *in vitro* screenings to real-field trials justifies biological control agents (BCAs) as a sustainable and environment friendly alternative for managing plant diseases. My work focuses on biological control of sheath blight in rice and fusarium wilt in chickpea to confirm their practical applicability as biopesticide after rigorous testing and regulatory clearance.

About Speaker

Dr. Suchi Srivastava is a Senior Principal Scientist at the Division of Microbial Technology, CSIR–National Botanical Research Institute (NBRI), Lucknow. Her research focuses on plant–microbe interactions and microbial approaches for mitigating environmental stresses in crops. She has received several recognitions, including the NESA Award (2026), and has published extensively in reputed international journals.

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IL-09

Marine-derived Compounds Targeting Oncogenic miR-21: A Novel Approach in Bladder Cancer Management

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Objectives: Bladder cancer (BC) is ranked 9th globally (GLOBOCAN 2022), with high recurrence rate. MicroRNAs (miRs) are key regulators of tumor progression and represent promising prognostic biomarkers and therapeutic targets. This study aimed to evaluate the prognostic significance of miRs in BC recurrence and survival and to explore marine-derived compounds as potential inhibitors of the oncogenic miR-21-5p. **Methods:** miRNA expression was quantified by real-time quantitative PCR. Selected marine-derived compounds were screened against miR-21-5p using molecular docking (AutoDock-4), followed by 100 ns molecular dynamics (MD) simulations (GROMACS 2023.3) to assess binding stability. **Results:** Patients were followed for up to 60 months to evaluate recurrence-free survival (RFS) and overall survival (OS). Multivariate analysis identified tumor grade and lymph node positivity as independent predictors of OS, while tumor grade, metastasis, diabetes, miR-21-5p, and miR-145-5p independently predicted poor RFS. Docking showed the strongest affinities for Alisiaquinone C–miR-21-5p (−12.3 ± 0.3) and Ascomindone D–miR-21-5p (−11.7 ± 0.3), with interactions localized to the miR-21-5p seed and loop regions and stabilized by multiple hydrogen bonds and electrostatic contacts. MD simulations revealed that Alisiaquinone C formed the most stable complex, showing low RMSD (1.0–1.4 nm), low residue fluctuations (RMSF ~0.6-1.0 nm), stable radius of gyration (~2.8–3.0 nm), persistent hydrogen bonds (1-2 H bonds), and reduced solvent-accessible surface area. **Conclusions:** Targeting miR-21-5p with marine-derived compounds provides a dual prognostic and therapeutic approach for personalized bladder cancer care.

About Speaker

Dr. Zainab Siddiqui is an Assistant Professor at the Center for Disease Mapping and Therapeutic Research, Era University, Lucknow. She completed her Ph.D. in Biotechnology from Dr. A.P.J. Abdul Kalam Technical University, Lucknow, and holds M.Sc. and B.Sc. degrees in Biosciences from Jamia Millia Islamia, New Delhi. With over a decade of research experience in molecular oncology and translational biomedical research, her work focuses on cancer biomarkers, cancer stem cells, and AI-driven approaches for precision oncology and disease mechanism mapping.

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IL-10

Women in Science Driving Biodiversity Conservation for a Sustainable Future

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Biodiversity loss, driven by climate change, land-use transformation, and anthropogenic pressures, poses a major challenge to ecosystem stability and sustainable development. Women scientists are increasingly contributing to biodiversity research through interdisciplinary approaches that integrate ecology, conservation biology, climate science, and technological innovations. Their work spans biodiversity assessment, ecosystem monitoring, species distribution modelling, palaeoecological reconstruction, and community-based conservation strategies. By combining advanced analytical tools with traditional ecological knowledge and participatory research frameworks, women researchers are facilitating evidence-based conservation planning and adaptive ecosystem management. This presentation highlights the expanding role of women scientists in generating critical data, developing predictive models, and translating scientific knowledge into policy-relevant strategies for biodiversity conservation. Strengthening gender-inclusive scientific leadership and fostering collaborative research networks are essential for advancing innovative solutions to biodiversity loss and ensuring resilient ecosystems that support sustainable futures for both human societies and natural environments.

About Speaker

Dr. Anjali Trivedi is a Senior Scientist in the Quaternary Paleoclimate Department at the Birbal Sahni Institute of Palaeosciences (BSIP), Lucknow. Her research focuses on palaeoecology, palaeoclimatology, and vegetation dynamics, particularly reconstructing past climate and environmental changes using pollen records, ecological modelling, and palaeoenvironmental datasets from the Indian subcontinent.

She holds a Ph.D. in Botany from the University of Lucknow and has extensive international research experience, including fellowships at the Institute of Botany, Chinese Academy of Sciences, Beijing. Dr. Trivedi has made significant contributions to understanding Holocene climate variability, monsoon dynamics, and human–environment interactions, with numerous research publications in reputed national and international journals.

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IL-11

Media, Women Empowerment and Environment

Suneeta Airen
Consulting Editor & Former Executive Editor, Hindustan Times

About Speaker

Ms. Sunita Airen is an author, senior journalist, and former Executive Editor of Hindustan Times, Ms. Sunita Airen currently serves as its Consulting Editor. With an illustrious career spanning over four decades in journalism, she has made significant contributions to Indian media through her insightful writing, editorial leadership, and commitment to responsible journalism. She holds the distinction of being the first woman editor in North India, breaking barriers and paving the way for greater representation of women in media leadership.

A respected voice in public discourse, she is also a TEDx speaker, known for her engaging talks on media, society, and contemporary issues. Beyond journalism, she is an accomplished author and avid traveler, having journeyed across numerous countries and cultures, experiences that enrich her perspectives and writing. Her career reflects a rare blend of editorial excellence, storytelling, and a lifelong dedication to documenting social change.

Ms. Sunita Airen
Author & Consulting Editor
Senior journalist and former Executive Editor of Hindustan Times

FACULTY ABSTRACT

FA:01

Co-Designing Workplace Nutrition Interventions through Community Participation: A CBPR Model in Chapra, Bihar

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Women who work in semi-urban areas often have difficulty obtaining adequate nutrition due to their occupations, limited time, and limited access to healthy foods while at work. Conventional top-down nutrition programs often overlook workplace-specific and contextual barriers, thereby undermining their effectiveness and sustainability. Community-Based Participatory Research (CBPR) offers a collaborative framework that promotes shared decision-making and community ownership in the development of treatments. To assess dietary practices, nutritional health, and occupational fatigue among working women in Chapra, Bihar; to identify workplace-related barriers to healthy eating; and to cooperatively design and implement participatory nutrition programs tailored to their needs. The research employed a Community-Based Participatory Research (CBPR) technique with 50 women from educational institutions in Chapra, Bihar. The initial assessment included a 24-hour dietary recall, a Dietary Diversity Score (DDS), a Body Mass Index (BMI), and an Occupational Fatigue Scale. We used focus group discussions and ranking exercises to gather qualitative data on factors that make it hard for people to eat healthy foods at work, such as skipping meals, not having enough time, and not having access to nutritious foods. The group came up with low-cost, balanced meal plans, iron-rich recipe tweaks, and "Nutrition Circles" where people could support each other based on what everyone said. The intervention lasted 10 weeks. We employed paired statistical analysis and a thematic examination to see how the intervention worked. There were considerable improvements after the intervention. The average Dietary Diversity Score rose from 4.2 ± 1.1 to 6.1 ± 1.0 ($p < 0.001$). The number of those who ate iron-rich meals at least four times a week rose from 34% (17 out of 50) to 70% (35 out of 50). The ratings for occupational fatigue decreased substantially, from 37.8 ± 6.2 to 29.5 ± 5.6 ($p < 0.001$). The intervention increased the percentage of people who regularly ate lunch at work from 48% (24 out of 50) to 84% (42 out of 50). Participants also said that Nutrition Circles enhanced their awareness of nutrition, improved their self-esteem, and increased their peer support. CBPR-based workplace nutrition treatments significantly enhanced dietary diversity, reduced occupational fatigue, and improved nutritional self-care practices among working women in a semi-urban setting. The participatory method fostered ownership and sustainable success, offering a Home Science-based framework for health promotion in institutions, applicable for repeated usage.

Keywords: Community-Based Participatory Research, Nutrition at Work, Dietary Diversity, Occupational Fatigue, Working Women

FA:02

Immune stimulant effects of mitochondria-targeting-nutrients of microalgae *Synechocystis povodsoi :* An *In-silico* study

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This study evaluates the immune stimulant effects of mitochondria-targeting-nutrients found in microalgae *Synechocystis povodsoi* (*S. povodsoi*) via an in-silico model. The micro algae were isolated from the samples obtained from the coastal belt of Odisha, India and were extracted with 90% v/v ethanol to obtain ESP (Ethanol extract of *Synechocystis povodsoi*). Preliminary phytochemical analysis was performed with ESP to locate the common secondary metabolites present in this marine micro algae. In-vitro antioxidant assays were performed to find the antioxidant potential of the micro algal extract. *In-silico* study was performed using MAESTRO ELEMENTS 6.1 against STING, SOCS-3, SIRT1 and PGC1-α proteins of selected secondary metabolites found in *S. povodsoi* as per COCONUT database to find out the mitochondrial functional relevance. ESP was found to be rich in carotenoids, lipids PUFAs, polyphenols and cholorophylls. *S. povodsoi* extracts demonstrated profound antioxidant capacity with IC_{50} value [205 (±) 0.2] in DPPH assay. ESP was also found to have a comparable quantity of total phenolic content [(38.26 mg gallic acid equivalent/g of extract weight (mg GAE/g EW)]. ESP was found to have a good number of carotenoids as they are crucial for quenching reactive oxygen species (ROS), particularly singlet oxygen, which are produced during photosynthesis depicting its potent antioxidant effect. The *in-silico* study depicted that the secondary metabolites in ESP – *Bartoloside* (−7.50) is the strongest binding among all STING ligands. The highly negative score suggests strong affinity, likely due to bartoloside's bulky glycolipid structure allowing multiple hydrogen bonds and hydrophobic contacts within the STING binding pocket. This indicates strong immunomodulatory potential since STING activation regulates innate immune signaling and interferon responses *S. povodsoi* exhibits promising therapeutic potential as a marine bioresource for alleviating immune dysfunction, supporting its development as a nutraceutical or adjunct intervention targeting mitochondrial health, oxidative balance, and immune restoration.

Keywords: *S. povodsoi*, Immunostimulant, Antioxidant, Mitochondria

FA:03

From Advocacy to Authority: Women's Role in Health Policy and Regulation

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Women have increasingly become influential change agents in health systems, with some shifting from grassroots activism to policy formulation and regulation. Women leaders around the world have made remarkable contributions to the development and regulation of health policy. For example, Gro Harlem Brundtland, the former Director-General of the World Health Organization, has been instrumental in integrating equity and global health security issues into health policy formulations. In India, women policymakers and scientists have made remarkable contributions to health regulation, especially regarding maternal health regulation, vaccination policy, and reproductive health legislation. Examples of these leaders include Soumya Swaminathan, the former Chief Scientist of the World Health Organization, who has been instrumental in developing evidence-based global health policy. Women leaders in regulation ensure that organizations operate with ethical integrity, transparency, and inclusiveness. Their activism has resulted in the development of robust health regulations addressing maternal mortality, cervical cancer control, and access to essential medicines. Women's activism has bridged the policy-action gap through grassroots health networks that ensure health awareness programs are developed to address community health issues. However, despite these developments, women are still underrepresented in senior regulatory roles. Mentorship, leadership training, and institutional changes may help increase women's involvement in regulatory roles. Women's empowerment in health policy and regulatory systems will not only enhance good governance but will also help build resilient health systems.

Keywords: Women's Empowerment, Health Policy, Regulatory Governance, Gender Equity, Public Health Leadership

FA: 04

Promoting Sustainable Health and Safety: Work–Life Balance Initiatives for Women in Academia, Research and Management

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Women working in academia, research and management often face multiple responsibilities that require balancing professional commitment with personal and family roles. The increasing participation of women in higher education institutions and research organizations has highlighted the importance of effective work life balance initiative that supports their well being productivity and career advancement. This study explores the role of institutional work life balance policies in promoting sustainable health safety empowerment among women professionals in academic and research environments. It examines key initiatives such as flexible working hours, remote work options, childcare support, wellness programs and gender sensitive workplace policies that contribute to improving the physical, mental and emotional well being of women employees. The paper further investigates how supportive organizational culture and leadership practices can reduce workplace stress, prevent burn out and create safer and more inclusive environments for women in decision making and managing roles by analyzing existing literature and institutional practices. The study highlights the relationship between work life balance strategies and sustainable professional development for women in academia and research management. The finding suggests that comprehensive work life initiatives not only enhance employee satisfaction and health outcome but also strengthen organizational productivity innovation and gender equality promoting such policies and therefore essential for building resilient academic institutions that empower women while ensuring safe, healthy and sustainable working environments.

Keywords: Work life balance, Women in academia, Sustainable health, Workplace safety, Gender empowerment, Higher education management

FA: 05

Neuroinflammatory Mechanisms in Mood Disorders Among Women

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Women often exhibit a higher prevalence of depression, anxiety, stress-related disorders, and autoimmune conditions as compared to men, yet the biological mechanisms behind them are not fully understood. Growing evidence suggests that neuroinflammation plays a central role in the pathophysiology of these disorders and is shaped by interactions between sex hormones, immune activation, and neural circuit regulation. Throughout a woman's life, fluctuations in estrogen and progesterone levels are observed, such as those during puberty, menstrual cycle, pregnancy, postpartum, and perimenopause. They create heightened sensitivity in key brain regions such as the amygdala, hippocampus, and prefrontal cortex, and also modulate immune signaling within the central nervous system. Several sex-stratified analyses revealed elevated levels of pro-inflammatory cytokines such as tumor necrosis factor (TNF-α), C-reactive protein (CRP), and interleukin-6 (IL-6) in females with Major Depressive Disorder. These cytokines can disrupt neurotransmitter systems, particularly the serotonergic and dopaminergic pathways, which are critical for mood regulation. Microglia regulate neuronal cell death and synaptic interactions, and upon activation, they release reactive oxygen species and pro-inflammatory cytokines, which disrupt synaptic plasticity and neurotransmitter balance. It also alters the glutamatergic transmission and reduces brain-derived neurotrophic factor (BDNF) expression. Collectively, these mechanisms can cause impaired hippocampal neurogenesis, cognitive dysfunction, and emotional instability. Dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis also amplifies stress reactivity and autonomic imbalance, which can increase the risk for mood and anxiety disorders in women. In conclusion, understanding neuroinflammation as a sex-specific process offers a transformative approach for improving the diagnosis, prevention, and treatment of psychiatric disorders in women.

Keywords: Neuroinflammation, Mood disorders, HPA axis, BDNF, Microglial activation, Pro-inflammatory cytokines

FA: 06

Women as Change-Makers: Showcasing Her Entrepreneurial Vision

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Women in academia are increasingly expanding their roles beyond teaching and research into leadership, innovation, and entrepreneurial engagement. However, balancing research productivity, administrative responsibilities, work–life integration, and institutional safety remains a significant challenge. Recognizing women as entrepreneurial change-makers is essential for fostering sustainable and inclusive academic ecosystems. This study explores how women in academia demonstrate entrepreneurial vision in research, management, and institutional development while promoting sustainable health, safety, and work life initiatives. The research adopts a qualitative and exploratory approach, drawing on case studies, policy analysis, and secondary literature related to women's leadership in higher education. Narratives of academic women leaders and institutional best practices were examined to identify entrepreneurial strategies embedded within academic environments. Findings indicate that women academicians act as institutional innovators by initiating interdisciplinary collaborations, launching community-engaged projects, promoting mental wellness programs, and implementing gender-sensitive safety frameworks. Entrepreneurial thinking was reflected in resource mobilization, mentorship networks, digital initiatives, and inclusive leadership models that support both productivity and well-being. Women as change-makers are redefining academic culture through entrepreneurial vision that integrates scholarship, management, and social responsibility. Supporting such leadership through policy reforms and institutional recognition can strengthen sustainable health systems, safe workplaces, and equitable opportunities in academia.

Keywords: Women in Academia, Entrepreneurial Leadership, Work–Life Balance, Sustainable Health, Institutional Safety, Research Management, Gender Equity

FA:07

Combined In-Silico and In-Vitro study of hsa-miR-877 and Its Regulatory Network in Oral Cancer

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MicroRNAs (miRNAs) are major post-transcriptional regulators of gene expression being involved in cancer initiation and progression. The present study aimed to investigate the functional significance of hsa-miR-877 in oral cancer by employing an integrated in-silico and in-vitro strategy. Target prediction with miRDB and interaction network analysis in Cytoscape revealed ten hub genes that may be targeted by hsa-miR-877: AMPD3, SCN1A, IGF2BP2, GRIA3, ATP2B4, TCF7L2, SNTA1, ADAMTS9, STAG2 and CAMK1D. Functional enrichment analysis based on KEGG2026 demonstrated significant associations with cardiomyopathy, aldosterone synthesis and secretion, dopaminergic synapse activity, cAMP signalling pathway and calcium signalling pathway as well as multiple cancer-related pathways, indicating that hsa-miR-877 may be involved in the regulation of a wide range of regulatory networks relevant to tumorigenesis and cellular signalling. Survival analysis by GEPIA2 indicated that these hub genes were involved in multiple cancer-related processes, but a summary expression signature of them was not strongly related with patient survival. Non-significant trends towards improved disease-free survival (HR = 0.88, p = 0.46) and overall survival (HR = 0.86, p = 0.28), were found within the high-expression group suggesting modest independent prognostic significance. This was experimentally validated in an independent set of peripheral samples (n = 10) from oral cancer patients against healthy controls (n = 10) by expression profiling. Quantitative analysis confirmed that, the expression levels of hsa-miR-877 was significantly lower in cancer patients that those controls (relative fold change 0.07, p > 0.05). All in all, integrated analysis suggests a potential regulator role of hsa-miR-877 in oncogenesis and cellular signalling pathways. While there is suggestive computational evidence, the non-significant differential expression in clinical samples highlights the necessity of further validation. Further investigation with larger cohorts will be necessary to demonstrate the biomarker or therapeutic value of hsa-miR-877 in oral cancer.

Keywords: Oral Cancer, hsa-miR-877, Expression, Target genes, Survival

FA:08

In-Silico Screening and Identification of Ferroptosis Related Genes in Relapsed Acute Lymphoblastic Leukemia

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Acute Lymphoblastic Leukemia (ALL) is the most common pediatric hematological malignancy, and disease relapse remains a major cause of treatment failure and mortality. Emerging evidence suggests that evasion of ferroptosis may contribute to cancer therapy resistance. Ferroptosis is a regulated form of cell death driven by lipid peroxidation and its role in relapsed ALL remains poorly defined. Differential gene expression analysis was performed between relapse and diagnostic ALL samples using the GEO dataset GSE28460. 407 ferroptosis related genes were downloaded from the FerrDb. This included 169 drivers, 221 suppressors and 17 markers of ferroptosis. The identified DEGs were intersected with the ferroptosis dataset with the purpose of obtaining the key ferroptosis related differentially expressed genes (FRGs). 28 FRGs were identified, and their biological functions were explored using the DAVID tool. Functional enrichment analyses were conducted using KEGG pathway and Gene Ontology (GO) databases. Functional enrichment analysis revealed significant involvement in oxidative stress response, iron metabolism, cell cycle regulation, DNA damage repair, inflammatory signaling, and metabolic reprogramming pathways KEGG pathway enrichment analysis demonstrated significant involvement of FOXO signaling, cell cycle regulation, iron metabolism, and inflammatory signaling pathways, highlighting coordinated dysregulation of oxidative stress adaptation and proliferative programs in relapsed ALL. These results indicate shifts in lipid metabolism and iron homeostasis together with ferroptosis escape in ALL relapse. This ferroptosis-linked gene signature provides mechanistic insight into relapse biology and highlights potential therapeutic targets to restore ferroptosis sensitivity.

Keywords: ALL relapse, GEO2R, Ferroptosis, Pathway enrichment

FA: 09

Work-Life Balance Strategies Among Women Faculty in Higher Education: A Conceptual Review and Framework

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Higher education institutions are increasingly recognized as demanding work environments where faculty members must excel in teaching, research, administration, and community engagement. Female faculty often face a dual burden of professional duties and domestic responsibilities shaped by entrenched socio-cultural expectations. Despite increasing representation of women in academia, their retention, career progression, and well-being remain constrained by persistent work-life imbalance. This paper conceptually examines the work-life balance challenges faced by women faculty in higher education institutions and synthesizes existing literature on strategies adopted to address them. It also proposes an integrative conceptual framework linking work-life balance strategies with outcomes such as job satisfaction, career sustainability, and psychological well-being. The study adopts a conceptual and literature review approach using peer-reviewed journal articles, policy documents, and institutional reports published between 2000 and 2024. Thematic synthesis was applied to identify recurring patterns, gaps, and theoretical perspectives across global and Indian academic contexts. The review is informed by established frameworks including Border Theory, Role Conflict Theory, Spillover Theory, and the Conservation of Resources Theory. Findings indicate that women faculty encounter multiple challenges such as role overload, invisible academic labor, maternity-related career penalties, limited mentoring opportunities, and gender-biased workload distribution. Individual strategies including time management, boundary setting, psychological detachment, and social support networks help mitigate stress. At the institutional level, flexible work arrangements, gender-sensitive leadership, mentoring systems, parental leave policies, and faculty wellness programs are key facilitators of work-life balance. In India, patriarchal norms, regional disparities, and weak policy implementation further shape women's experiences. The paper proposes a two-dimensional conceptual framework integrating individual and institutional factors influencing work-life balance strategies, with job satisfaction, career growth, and well-being as outcomes. It emphasizes the moderating role of organizational culture and social support. The study calls for holistic institutional reforms promoting equity, sustainability, and empowerment in academic workplaces.

Keywords: Work-Life Balance, Women Faculty, Higher Education, Career Sustainability, Gender Equity, Institutional Strategies, Conceptual Framework, Indian Academia

FA: 10

Health Concerns of Chikankari Woman Artisans

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Ethnic Embroidery is a traditional craft of decorating fabric or garments with needles and colorful thread, often enhanced with elements like beads, pearls, sequins, zardozi work and metal strips. Interestingly, the core stitches of Chikankari such as chain stitch, running stitch, satin stitch, buttonhole stitch, and cross stitch have remained fundamental for centuries and have been appreciated in the global arena. In fact, it's a wearer's delight when it comes to dressing for an occasion. In India, Chikan work, fondly called Lucknow Chikan, is a prominent embroidery tradition with over 400 years of history. The embroidery, known as Chikankari, is admired for its delicate and elegant designs that enhance the overall look of the garments. Although “Chikan” means embroidery, the craft includes about 36 different basic stitches. Traditionally, chikankari is done with white thread on white muslin. Now it has evolved to include various types of fabrics, different shades of colors, and decorative elements like pearls, mirrors, and mukaish work. Chikankari is mainly practiced by women in Lucknow and is deeply rooted in local household culture. The process is highly labor-intensive and can take months or even years to complete a single piece. Historically, Muslim women adopted this craft as a source of income, passing the skill down through generations. Many women artisans work from home or small workshops, and the craft often supports their families. The problems of the female artisans in this unorganized sector are extremely pathetic, as they work at low wages with no guarantee and lack job security. The artisans have no social benefits, long working hours, and poor working and living conditions. Chikankari women artisans also have faced lots of issues like poor working conditions and exploitation by middlemen, who provide them work. Unfortunately, apart from the everyday problems brought on by poverty, they also suffer with serious health issues for which they have no money for treatment. These issues were highlighted by filmmaker Muzaffar Ali in his 1986 film “Anjuman”, which portrays the socio-economic struggles of female Chikankari workers in Lucknow.

Keywords: Artisans, Chikankari Embroidery, Exploitation, Garments, Health, Income

FA: 11

Empowering Women in STEM: Challenges, Opportunities, and the Path Forward

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Women's participation in Science, Technology, Engineering, and Mathematics (STEM) has become an important topic in discussions about gender equality and sustainable development. Although women have made significant progress in education and professional fields, their representation in STEM disciplines remains comparatively low across many parts of the world. Social stereotypes, lack of role models, gender bias in workplaces, and limited access to resources often discourage girls and women from pursuing careers in science and technology. These barriers begin at an early stage of education and continue throughout higher education and professional careers. Promoting women in STEM is essential not only for gender equality but also for innovation and economic growth. When women participate in scientific research, technological development, and engineering fields, they bring diverse perspectives that contribute to creative problem-solving and inclusive development. Governments, educational institutions, and international organizations have started various initiatives to encourage girls to study STEM subjects, provide scholarships, mentorship programs, and create supportive learning environments. In the Indian context, programs such as digital literacy campaigns, STEM scholarships, and skill-based education initiatives are helping to improve women's participation in scientific fields. However, challenges such as gender stereotypes, limited infrastructure in rural areas, and unequal opportunities still exist. Addressing these issues requires strong policy support, gender-sensitive education systems, and increased awareness about the importance of women's contributions to science and technology. Encouraging women and girls to pursue STEM education and careers will not only empower them socially and economically but also contribute to national development and global scientific progress. Therefore, creating inclusive and supportive systems is essential for building a more balanced and innovative future.

Keywords: Women in STEM, Gender Equality, Science Education, Women Empowerment, Innovation

FA: 12

Gendered Spaces of Knowledge: Women in the Political Academia of Ancient India

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The intellectual traditions of Ancient India have largely been represented through male philosophers, scholars, and lawgivers, creating the impression that academic and political spaces were exclusively male domains. However, a closer reading of ancient texts reveals that women were not entirely absent from the production and dissemination of knowledge. This paper examines the presence and participation of women within the intellectual traditions of Ancient India, with particular attention to their engagement in philosophical and scholarly discourses that intersected with political thought. By analysing references from Vedic and Upanishadic literature, as well as early Buddhist and Jain sources, the study highlights the contributions of women such as Gargi Vachaknavi, Maitreyi, and several female seers (rishikas) whose intellectual interventions demonstrate women's engagement with complex philosophical inquiries. The paper conceptualizes ancient academic institutions and discursive spaces such as gurukuls, royal assemblies, and philosophical debates as gendered spaces of knowledge, structured largely by patriarchal norms yet not entirely closed to women. While access to formal learning and participation in scholarly debates remained limited and exceptional for women, textual evidence indicates that certain women scholars actively engaged in discussions concerning metaphysics, ethics, and the nature of knowledge discourses that formed the normative foundations of early political thought, particularly around ideas of dharma, cosmic order (rita), and social responsibility. By revisiting these narratives, the study argues that women's intellectual presence, although marginal and often underrepresented in historical documentation, contributed to the broader knowledge traditions that shaped ancient Indian political and social thought. Through a critical re-examination of these gendered knowledge spaces, the paper seeks to reconstruct a more inclusive understanding of the intellectual history of Ancient India and highlight women's often overlooked role in its academic and political discourses.

Keywords: Women, Ancient India, Political, Knowledge

FA: 13

Empowering Women in Academia and Research through Work–Life Initiatives for Sustainable Health and Safe Work Environments

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The increased participation of women in academia and research AHS significantly contributed to knowledge creation, innovation and institutional development. However, women professionals often face challenges in balancing academic responsibilities, commitments in research, roles of administration and personal life obligations. These challenges may affect their well being both physical and mental, career growth and productivity. This paper examines the role of work life initiatives in empowering women in academia and research while promoting sustainable health and a work environment that is considered safe. It highlights the importance of institutional support systems such as flexible hours of work, policies of maternal leave, childcare facilities, mentor-ship programs and wellness initiatives that help women effectively manage professional and personal responsibilities. The study also explores how work policies that are gender sensitive, supportive leadership and organizational culture that is inclusive can contribute to improving workplace safety, reducing the stress and preventing professional burnout among women academicians and researchers. By reviewing the literature that exists and the best practices in higher education institutions, the paper emphasizes the need for sustainable work - life strategies that address both health and safety concerns while enabling women to achieve professional excellence. The research emphasizes that empowering women through policies that are supportive, not only enhances individual well-being and job satisfaction but also strengthens institutional productivity, diversity and innovation. The study concludes that adopting comprehensive work-life initiatives is important in creating an equitable, safe and sustainable academic environment where women can thrive as educators, researchers and thus leaders.

Keywords: Women empowerment, Academia, Work-life Initiatives, Sustainable Health, Workplace Safety, Research Professionals

FA: 14

Translational Computational Metagenomics and Multi-Omics Integration for Sustainable Biotechnological Innovation

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Advances in high-throughput sequencing and multi-omics technologies have transformed life sciences by generating unprecedented volumes of biological data. Computational metagenomics has emerged as a powerful approach to decipher complex microbial communities and their functional potential. However, translating large-scale omics data into scalable solutions for healthcare, agriculture, and environmental sustainability requires integrative bioinformatics frameworks combined with engineering-driven innovation. This study aims to develop and demonstrate an integrated computational pipeline that leverages metagenomics, multi-omics data integration, and systems biology approaches to identify functional microbial traits. A comprehensive workflow was established incorporating quality assessment, assembly, taxonomic profiling, and functional annotation of metagenomic datasets. Multi-omics layers including metatranscriptomics and metabolomics were integrated using systems biology tools and machine learning algorithms to enhance functional prediction accuracy. Genome-scale metabolic models were reconstructed to analyse pathway dynamics and identify key regulatory and biosynthetic targets. Computational findings were aligned with experimental validation strategies to ensure translational relevance and reproducibility. Integrated analysis revealed functionally enriched microbial consortia exhibiting enhanced biosynthetic capacity and stress-resilient traits. Metabolic modeling identified critical pathways for optimized production of bioactive compounds and value-added metabolites. Multi-omics integration significantly improved predictive precision for functional gene clusters and potential therapeutic or agricultural targets. The computational-to-experimental pipeline reduced resource expenditure while increasing efficiency, scalability, and reproducibility in microbial engineering strategies. The integration of computational metagenomics, systems bioinformatics, and metabolic engineering provides a robust translational framework for sustainable innovation. By bridging large-scale biological data with practical biotechnological applications, this approach strengthens interdisciplinary research capacity and supports impactful solutions in health, agriculture, and environmental management.

Keywords: Computational Metagenomics, Bioinformatics, Metabolic Modeling, Microbial Engineering, Translational Research

FA: 15

Work–Life Integration and Research Excellence: Harmonizing Academic Output and Personal Duties

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Work–life integration continues to be a vital factor influencing career advancement and research output for women in academia. Although there is a rise in female representation in higher education, gaps remain in research productivity, leadership positions, grant funding, and tenure progression. These disparities are frequently shaped by unequal caregiving duties, societal norms, and organizational frameworks that poorly facilitate adaptable career routes. This review investigates the interactive connection between work–life integration and research quality, highlighting how nurturing academic environments can improve both individual wellness and academic success. Utilizing empirical studies, analyses of institutional policies, and international higher education reports, the paper explores significant structural obstacles such as inflexible tenure timelines, restricted parental leave, implicit biases in performance assessments, and uneven allocation of service and administrative responsibilities. It further emphasizes effective institutional approaches like adaptable promotion standards, frameworks for remote research collaboration, mentorship networks, childcare assistance programs, and gender-responsive funding policies. The different reviews indicate that work–life integration is not just a personal adjustment but a collective obligation that necessitates changes in policy and shifts in culture within academic institutions. Data shows that universities implementing inclusive policies experience better faculty retention, increased research productivity, and enhanced diversity in leadership. Additionally, creating an atmosphere that appreciates well-being in tandem with productivity enhances lasting academic success and creativity. The review promotes new measures of research achievement that recognize various career paths and phases of life. Through fostering equity-oriented institutional changes, academia can develop a robust and inclusive research environment in which female scholars can excel in their careers while fulfilling personal obligations.

Keywords: Integration of work and life, Female scholars, Research efficiency, Gender fairness, Leadership in academia, Reform in institutional policies

FA: 16

Women in Architecture Academia: Work–Life Balance for Sustainable Well-being and Safety

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The increasing participation of women in higher education has strengthened academic and research environments; however, maintaining a balanced integration of professional and personal responsibilities remains a continuing concern. In architecture academia, work extends beyond conventional classroom teaching to include studio-based pedagogy, research supervision, administrative coordination, professional engagement, and field-based academic activities. These multidimensional responsibilities require significant time commitment and intellectual engagement, often creating challenges in sustaining well-being and ensuring a safe and supportive professional environment for women academicians. As architecture education increasingly emphasizes interdisciplinary collaboration, research productivity, and leadership participation, it becomes essential to examine institutional frameworks that support the work–life balance of women professionals in academic institutions. This study explores the role of work–life balance initiatives in enhancing the well-being, professional engagement, and safety of women in architecture academia. It aims to understand how supportive institutional environments can empower women faculty while enabling them to perform effectively in teaching, research, and administrative responsibilities. The focus is on identifying academic structures and policy measures that promote inclusive participation and sustainable professional development within architecture schools. The analysis is based on a qualitative review of academic practices, institutional observations, and scholarly discussions on gender participation and work–life balance in higher education. Particular attention is given to responsibilities undertaken by women in architecture institutions, including design studio teaching, research guidance, project coordination, and fieldwork such as site visits and urban surveys. The study also examines initiatives like flexible scheduling, hybrid teaching, mentorship networks, wellness programs, and gender-sensitive workplace policies that support work–life integration. Findings indicate that institutions promoting inclusive policies and supportive environments enhance the productivity, confidence, and career progression of women academicians. Flexible academic structures, equitable administrative responsibilities, digital collaboration tools, and mentorship opportunities help reduce stress and improve professional satisfaction. Additionally, safety-oriented mechanisms such as secure campuses, structured fieldwork protocols, and responsive grievance systems are vital for creating a sustainable and inclusive academic ecosystem.

Keywords: Women in Architecture Academia; Work–Life Balance; Sustainable Well-being; Gender-Inclusive Academic Environment; Women Leadership in Architecture; Safety

FA: 17

Integrating Health, Environment, and Regulatory Governance within the Framework of International Law

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The growing interdependence between environmental sustainability and human health has significantly reshaped contemporary international legal discourse. Environmental challenges such as climate change, pollution, biodiversity loss, and transboundary ecological harm pose direct and indirect threats to global public health. Consequently, international legal regimes increasingly recognize that effective environmental governance is integral to safeguarding human well-being. Foundational instruments such as the Stockholm Declaration, the Rio Declaration on Environment and Development, and the Paris Agreement demonstrate a normative shift toward integrating environmental protection with health-centred regulatory frameworks. Within this evolving paradigm, the **HER (Health–Environment–Regulatory) Journey** represents a conceptual model highlighting the interconnected role of environmental governance, public health protection, and regulatory mechanisms within international law.

This study aims to critically examine how international legal frameworks address the nexus between environmental protection, public health, and regulatory governance. It further evaluates the role of international environmental norms and regulatory cooperation in addressing emerging global environmental health risks.

The research adopts a **doctrinal and analytical research methodology**, examining international conventions, environmental treaties, institutional frameworks, and relevant jurisprudence. It further undertakes a comparative assessment of regulatory principles such as the **precautionary principle, sustainable development, and intergenerational equity** to evaluate their role in shaping state responsibilities and environmental governance practices.

The study demonstrates that contemporary international environmental law increasingly adopts **health-centred regulatory approaches**, strengthening the normative relationship between ecological protection and human well-being. Regulatory mechanisms such as environmental impact assessments, compliance monitoring, and multilateral environmental agreements facilitate coordinated global responses to environmental health challenges. Additionally, international institutions such as the World Health Organization and the United Nations Environment Programme play a pivotal role in harmonizing environmental standards and promoting cooperative governance frameworks.

The HER Journey illustrates the emergence of an **integrated international regulatory paradigm** linking environmental sustainability with the protection of human health. Strengthening regulatory cooperation, institutional coordination, and effective implementation of international environmental commitments will be essential for addressing contemporary global ecological challenges while ensuring long-term public health security.

Keywords: International Environmental Law; Health Governance; Environmental Regulation; Sustainable Development; Global Environmental Governance

FA: 18

Strengthening Environmental and Public Health Governance through Alternative Dispute Resolution under the Arbitration and Conciliation Act, 1996

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The relationship between environmental protection, public health, and regulatory governance has emerged as a critical area of legal scholarship in the contemporary era. Rapid industrialization, environmental degradation, and climate-related challenges have intensified disputes concerning pollution, ecological damage, and their direct impact on public health. These conflicts often involve diverse stakeholders including industries, regulatory bodies, and affected communities. In India, the right to a clean and healthy environment has been recognized as an integral component of the right to life under Article 21 of the Constitution of India, while environmental protection has also been emphasized through Article 48A of the Constitution of India and the fundamental duty under Article 51A(g) of the Constitution of India. Despite the development of environmental jurisprudence through courts and specialized institutions such as the National Green Tribunal, traditional litigation often faces procedural delays and technical complexities. In this context, Alternative Dispute Resolution (ADR) mechanisms under the Arbitration and Conciliation Act, 1996 offer a complementary framework for resolving environmental and public health disputes through flexible, efficient, and participatory processes.

This paper seeks to examine the role of ADR mechanisms, particularly arbitration and conciliation under the Arbitration and Conciliation Act, 1996, in resolving disputes relating to environmental protection and public health within the conceptual framework of HER—Health, Environment, and Regulatory Journey. The study also aims to explore how ADR processes can enhance access to justice, promote participatory decision-making, and address environmental conflicts in a gender-sensitive manner.

The study adopts a doctrinal and analytical research methodology, focusing on statutory interpretation, judicial precedents, and policy analysis. The research examines provisions of the Arbitration and Conciliation Act, 1996 alongside environmental regulatory mechanisms and landmark judicial decisions such as M.C. Mehta v. Union of India and Vellore Citizens Welfare Forum v. Union of India, which have significantly shaped India's environmental jurisprudence. The role of ADR in complementing existing environmental dispute resolution mechanisms is critically analysed.

The analysis demonstrates that ADR mechanisms provide significant advantages in addressing environmental and public health disputes through cost-effective, time-efficient, and technically informed procedures. Arbitration and conciliation facilitate collaborative engagement among stakeholders and encourage sustainable settlement outcomes. ADR forums also allow the inclusion of subject-matter experts and community participation, which is particularly important in complex environmental disputes affecting vulnerable populations, including women and marginalized communities.

This framework highlights the need for integrated governance mechanisms that connect environmental sustainability, public health protection, and regulatory innovation. ADR mechanisms under the Arbitration and Conciliation Act, 1996 can significantly strengthen environmental dispute resolution by promoting efficiency, inclusivity, and participatory governance. Institutionalizing ADR within environmental regulatory systems can complement judicial mechanisms, enhance access to justice, and contribute to sustainable environmental management and improved public health outcomes.

Keywords: Alternative Dispute Resolution, Arbitration and Conciliation Act 1996, Environmental Governance, Public Health Law, Environmental Justice, Sustainable Development

Graphical Abstract Idea

Environmental Pollution & Health Risks

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Constitutional Environmental Rights (Art. 21, 48A, 51A(g))

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Environmental Disputes (Industries – Communities – Regulators)

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ADR Mechanisms under Arbitration & Conciliation Act, 1996

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Collaborative & Gender-Sensitive Environmental Governance

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Sustainable Health and Environmental Protection (HER Framework)

FA: 19

Women in indian entrepreneurship and innovation; Issues & challenges

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In the present scenario women are dominating the field of innovation, technology, science and entrepreneurship but even today there exists a significant gap before females can achieve parity with men. The present paper attempts to trace the historical role of women in entrepreneurship through review literature survey and the challenges to female participation in the field of innovation in STEM (Science, Technology, Engineering and Mathematics) fields in India in the emerging economic scenario. In the present study the survey revolves around a round table discussion with the recognized and distinguished women academicians, entrepreneurs and scientists as well with respect to the barriers and challenges to the participation of women in the field of Indian entrepreneurship and innovation and the ways in which it could be facilitated.

The study is more important in advanced contemporary society where the majority of the dominant fields be it innovation, technology, entrepreneurship, science and many other fields are exclusively being dominated by women as a current initiative taken the Indian Government. The lower is the participation of women in innovation and technology the larger it has socio-economic implications. Studies reflect that around 90% of the women spend an additional income attained on human resources for the families only. Health, education, nutrition are in all included in and this ratio is very low as compared to men. If the proportion of women be more in entrepreneurship and as innovators it will directly impact the families, communities and society at large positively.

Keywords: Entrepreneurship, Innovation, Science, Technology, Women Entrepreneurship, Gender, Commercialization.

FA: 20

The Persistence Gap: Women in STEM across Academia, Industry, and Entrepreneurship

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The underrepresentation of women in STEM has historically been framed by the "leaky pipeline" metaphor—a linear narrative suggesting that attrition is the primary obstacle to gender parity. While useful for visualizing decline, this framework often obscures the complex, structural, and cultural barriers that systematically impede women's progress. It also fails to account for the non-linear career paths, sector-specific dynamics, and intersectional realities that shape women's experiences in the modern knowledge economy. This paper moves beyond the pipeline metaphor to conduct a multi-sectorial analysis of the structural barriers affecting women's participation. It examines the critical junctures of career progression across three interconnected domains: academic research, the corporate STEM workforce, and the entrepreneurial/innovation sector. The study investigates why educational gains—including rising rates of female STEM graduates—consistently fail to translate into equitable representation in leadership, high-growth industries, and emerging technologies.

This review synthesizes data from major global indices, national labour force surveys, and industry-specific workforce reports. It employs a comparative framework to analyse representation at key career stages, while also examining the impact of workplace culture, policy interventions, technological shifts (such as automation and AI), and socio-economic factors like caregiving responsibilities and safety nets.

The data reveals a persistent "graduation paradox": while women have achieved significant gains in STEM education globally—in some regions reaching or exceeding parity at the graduate level—this progress is systematically eroded at subsequent career stages. This erosion is not a passive "leak" but the result of active structural "sieves," including:

In Academia: A sharp drop-off between doctoral completion and senior faculty positions, driven by factors such as biased hiring practices, lack of mentorship, and the "publish or perish" culture clashing with caregiving timelines.

In Corporate STEM: Deep sectorial segregation, with women concentrated in health and life sciences while remaining significantly underrepresented in engineering, physics, and heavy industries. Even in growth sectors like Artificial Intelligence, women hold a minority of roles—particularly in research—creating a "design gap" that risks embedding gender bias into future technologies.

In Entrepreneurship: A paradox of flexibility versus uncertainty. While self-employment offers autonomy, women entrepreneurs often face wider pay gaps and lack access to the safety nets (paid leave, benefits) and funding mechanisms designed for traditional business structures. The challenge of gender equity in STEM is not merely a problem of "supply" or passive "leakage." It is a systemic issue rooted in the design of institutions, workplace cultures, and economic policies. Addressing it requires moving beyond plugging leaks to fundamentally redesigning the structures that create friction and exclusion. Effective interventions must be intersectional, sector-specific, and targeted at the critical junctures where women's progress is systematically derailed.

Keywords: Gender Equity, Structural Barriers, STEM Workforce, Academic Research, Corporate Sector, Entrepreneurship, Artificial Intelligence, Science Policy, Leaky Pipeline.

FA: 21

Targeting Cancer Hallmarks Through Phytochemicals: In Silico Docking Study of Natural Compounds as Inhibitors of Key Oncoproteins

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Cancer continues to be a primary cause of disease and mortality globally, imposing a substantial burden on healthcare systems worldwide. In 2020, cancer was responsible for over 19.3 million new cases and 10 million deaths per year. Despite progress in traditional therapy, some limits endure, such as drug resistance, toxicity, and recurrence. In recent years, phytochemicals from medicinal plants have received significant interest as possible in anticancer medicines owing to their structural variety, biological efficacy, and very low toxicity. The research tried to assess the anticancer efficacy of specific phytochemicals derived from five traditionally utilised medicinal plants: *Curcuma longa* (turmeric), *Azadirachta indica* (neem), *Allium sativum* (garlic), *Solanum lycopersicum* (tomato), and *Withania somnifera* (ashwagandha) against critical oncogenic protein targets through a structure-based molecular docking methodology. A preliminary selection of over 60 phytochemicals was found via a comprehensive literature review and corroborated using the IMPPAT 2.0 database. The three-dimensional ligand structures were sourced from the PubChem database, whilst the crystal structures of the proteins KRAS, EGFR, HER2, HRAS, and CTNNB1 were acquired from the RCSB Protein Data Bank. Molecular docking simulations were performed using the CB-Dock2 platform, which combines cavity detection with the AutoDock Vina scoring algorithm to forecast ligand–protein binding affinity. Azadiradione from *Azadirachta indica* had the greatest binding affinity for KRAS, with a Vina score of –15.3 kcal/mol, indicating a very stable association inside the protein's active region. Other significant chemicals were Nicotiflorin (–10.9 kcal/mol) targeting KRAS, Sitoindosidelx (–10.7 kcal/mol) interacting with EGFR, and Bisdemethoxycurcumin (–9.4 kcal/mol) binding to HRAS. Carotenoid substances derived from *Solanum lycopersicum*, including beta-carotene, isotretinoin, and zeaxanthin, had notable interactions with HER2. The results indicate that phytochemicals derived from medicinal plants, including neem, ashwagandha, and turmeric, have significant anticancer potential and may act as lead molecules for future drug development.

Keywords: Phytochemicals, Molecular Docking, Anticancer Activity, Oncogenic Proteins

FA: 22

Engineering Next-Generation Photobioreactors: Design Optimization, Biofilm Dynamics, and Techno-Economic Perspectives

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The engineering of next-generation photobioreactors (PBRs) is increasingly centered on optimizing design architecture, light utilization, biofilm stability, and process economics to enable scalable and sustainable microalgal bioprocessing. Recent advancements integrate computational fluid dynamics (CFD), three-dimensional modelling, and hyperspectral light simulations to refine reactor geometry, internal illumination strategies, and photon distribution efficiency prior to scale-up. Contemporary systems span open raceway ponds, closed tubular and flat-panel PBRs, stirred-tank and bubble column reactors, as well as hybrid configurations tailored for carbon capture, wastewater remediation, biofuel production, and high-value metabolite synthesis.

Innovations in mixing and mass transfer, including 3D-printed paddlewheel mechanisms and membrane-assisted gas delivery modules, have significantly enhanced CO sequestration, CH oxidation, and oxygen evolution rates. The integration of membrane photobioreactors (MPBRs) and dialysis bag-based systems has improved biomass purity, nutrient removal efficiency, and dissolved organic carbon control in wastewater-fed cultures. Solid-state and hydrogel-based PBRs demonstrate reduced water demand and elevated lipid productivity in species such as Chlorella vulgaris, highlighting the potential of immobilized and biofilm-driven cultivation strategies.

Emerging research further emphasizes microalgae–bacteria consortia, particularly methanotroph-associated biofilms, to enhance carbon fixation and metabolic synergy in enclosed systems. Real-time fluorescence spectroscopy and sensor-integrated monitoring platforms are enabling dynamic assessment of physiological status and early detection of harmful algal blooms. Collectively, these developments underscore a paradigm shift toward data-driven design, biofilm engineering, energy-efficient operation, and techno-economic viability, accelerating the transition of phototrophic bioprocesses from laboratory innovation to industrial implementation within a circular bioeconomy framework.

Keywords: Photobioreactor engineering; Biofilm dynamics; Computational modelling; Carbon capture; Microalgal bioprocessing; Techno-economic analysis.

FA:23

Iron oxide nanoparticles: opening new avenues in agricultural research

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Nanotechnology is increasingly being explored in modern agriculture, offering a powerful means to enhance food production and efficiency as the world's population grows rapidly. Metal and metal oxide nanoparticles are attracting attention for their beneficial effects on plant growth and development. Among the metal-oxide nanoparticles, iron oxide nanoparticles (Fe2O3 NPs) show significant potential to support essential biological functions in plants, including critical processes such as photosynthesis, nitrogen metabolism, and respiration, as well as stomatal closure regulation and the production of genetic material. The biocompatible, magnetically responsive iron oxide nanoparticles are rapidly absorbed by roots and leaves and are conveyed by conducting cells, often accumulating in younger shoots and roots. Once inside the plant, these nanoentities can enhance nutrient delivery, stress tolerance, and disease resistance. However, their toxic effects on plant systems have also been reported to depend on size, concentration, and exposure duration. High doses of iron oxide nanoparticles often suppress key growth indicators, such as plant height and chlorophyll production. Addressing this challenge requires a deeper mechanistic understanding of nanoparticle-soil dynamics. Additionally, the shift toward precision agriculture—utilizing real-time sensors to monitor plant health—will be vital for managing the transition from experimental application to safe, large-scale agricultural use.

Keywords: Nanoagriculture; Iron oxide nanoparticles; Photosynthesis; Toxicity

ABSTRACT ORAL PRESENTATIONS

OP:01

Health Literacy and Vaccine Hesitancy: Insights into Cervical Cancer Prevention among Emerging Adults

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Cervical cancer remains one of the most preventable yet prevalent cancers among women worldwide, particularly in developing countries. Persistent infection with Human Papillomavirus (HPV) is the primary cause, and prevention is achievable through regular screening and HPV vaccination. Despite the availability of these measures, uptake remains suboptimal, often due to limited health literacy and vaccine hesitancy. Emerging adults constitute a crucial target group, as awareness and preventive action during this period can substantially reduce future disease burden. This cross-sectional survey assessed health literacy, awareness, attitudes, and vaccine hesitancy related to cervical cancer prevention among emerging adults aged 18–30 years. A structured, self-administered questionnaire collected data on demographics, knowledge of cervical cancer and its risk factors, screening awareness, HPV vaccination knowledge, trust in health information, and preventive intentions. Descriptive and inferential statistical analyses were conducted to explore associations between health literacy and preventive behaviours. Findings revealed moderate general awareness but significant gaps in knowledge regarding screening guidelines and vaccine safety. Vaccine hesitancy was primarily driven by concerns about side effects, misinformation, sociocultural influences, and limited trust in health information sources. Higher health literacy was positively associated with favourable attitudes toward HPV vaccination and stronger intention to undergo screening. Existing research often evaluates awareness or vaccine acceptance independently, with limited examination of how health literacy influences vaccine hesitancy and preventive behaviours among emerging adults. Evidence is also scarce regarding the combined impact of misinformation, sociocultural factors, and digital health literacy on cervical cancer prevention practices in this population.

Keywords: Health Literacy, Vaccine Hesitancy, Cervical Cancer Prevention, HPV Vaccination, Emerging Adults

OP-02

Preclinical Evaluation of Human Defensin-5 as A Therapeutic Agent against *E. Coli* Induced Catheter Associated Urinary Tract Infection in Female SD Rats

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Urinary tract infections (UTIs) refer to the infection of the urinary system including kidney and bladder, affecting approximately 150 million individuals per year, having clinical indices like cystitis, prostatitis, pyelonephritis, urosepsis, and catheter-associated UTIs (CAUTIs) leading to considerable morbidity particularly amongst women as well as elderly people. The existing treatment approaches against UTIs are associated to severe side effects and antimicrobial resistance. Human defensin-5 (HD-5) is an important component of the innate defense mechanism in the urinary tract. The aim of our study was to evaluate the antimicrobial potential of intravesically administered HD-5 against uropathogenic *Escherichia coli* (UPEC) in rat cystitis model. To the best of our knowledge, this is the first study to demonstrate the therapeutic role of exogenous HD-5, particularly at the target site, in UTIs. We evaluated the antimicrobial activity of HD-5 using electron microscopy and membrane permeabilization assays, followed by *in vivo* investigation of its therapeutic potential through intravesical administration in an experimental rat UTI model against UPEC. With an MIC of 60 µg/mL against UPEC, HD-5 exerted antimicrobial activity primarily by disrupting membrane integrity, leading to blebbing, release of extracellular contents, and ultimately whole-cell lysis. The intravesical administration of HD-5 demonstrated 54% and 50% reduction in UPEC load in bladder and urine, along with improvement in the blood parameters towards normal range. The histoarchitectural studies revealed that HD-5 effectively restored bladder tissue integrity, recovered infection-induced alterations in the uroepithelium and reduced neutrophilic infiltration. These findings highlight the anti-inflammatory cum immunomodulatory duality of HD-5. The efficacy of the tested therapeutic agents was found to be in the order of intravesical-HD-5> oral-Ciprofloxacin> intravesical-Ciprofloxacin> oral-HD-5. Interestingly, intravesical dosing of HD-5 was found to be overall effective, highlighting its novelty to be used as an efficient therapeutic agent for UTI management in clinical settings. It can be a promising candidate for catheter coating applications aimed at preventing CAUTIs.

Keywords: Human defensin-5, Uropathogenic *E. coli*, Intravesical therapy, Oral delivery, Urinary tract infections, Anti-microbial peptides

OP: 03

IL12β+1188 A>C (rs3212227) Polymorphism and Oral Cancer Susceptibility: A Case–Control Study

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Oral cancer being a heterogenous malignancy arises in multiple anatomical sites of the head and neck region, including lips, buccal mucosa, palate and salivary glands, continues to be associated with high morbidity and mortality. Chronic inflammation is a key contributor to the oral tumour microenvironment, promoting genetic instability and tumour progression. Interleukin-12 (IL-12) is a crucial pro-inflammatory cytokine that bridges innate and adaptive immunity. The IL-12β (p40) subunit, encoded by the IL12β gene, plays a vital role in Th1 immune responses, cytotoxic T-cell activation, and interferon-γ production. Functional polymorphisms in the IL12β gene may influence cytokine expression and alter host immune responses, thereby modulating cancer susceptibility. This study aimed to investigate the association of IL12β gene polymorphism with the risk of oral cancer. Single nucleotide polymorphism IL12β gene was genotyped in oral cancer patients (n=45) and healthy controls (n=50) by PCR-RFLP method. Chi-square test and strength of associations were estimated by odds ratio with 95% confidence intervals. Genotype frequency distribution among oral cancer patients revealed that the wild-type homozygous AA genotype was most prevalent in patients with oral cancer, followed by the heterozygous AC genotype and the mutant CC genotype. The AC genotype demonstrated a protective association compared with the AA genotype *($p < 0.003$ in Chisquare test)*. The CC genotype did not show a statistically significant association with oral cancer (OR = 0.47, 95% CI: 0.16–1.38). This study on IL12β +1188 A>C (rs3212227) polymorphism suggests that the AC heterozygous genotype has a protective effect on oral cancer but the mutant CC was not significantly associated with the risk of oral cancer. Further research needs to be performed on a greater number of samples.

Keywords: Oral cancer, IL-12β, rs3212227, polymorphism, PCR-RFLP, inflammation

OP: 04

Assessing Time-Dependent Senescence and Fibrotic Changes in the Bleomycin-Induced Model of Pulmonary Fibrosis

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Pulmonary fibrosis (PF) is a progressive interstitial lung disease marked by excessive extracellular matrix (ECM) accumulation, alveolar epithelial damage, and irreversible architectural distortion. Emerging evidence indicates that cellular senescence is a critical driver of fibrotic progression. Senescent cells accumulate following injury and promote chronic inflammation and myofibroblast activation through the senescence-associated secretory phenotype (SASP), comprising pro-inflammatory cytokines, profibrotic growth factors, and matrix-remodeling enzymes. Bleomycin (BLM) is widely used to model experimental pulmonary fibrosis by inducing oxidative stress, DNA damage, and premature senescence. This study aimed to elucidate the mechanistic contribution of cellular senescence to BLM-induced pulmonary fibrosis using complementary in vitro and in vivo models. We specifically evaluated time-dependent fibrotic remodeling and senescence-associated molecular alterations. In vitro studies were performed using A549 cells treated with BLM. Cell viability was assessed by MTT assay, while senescence induction was quantified using SA-β-galactosidase staining. Protein expression of senescence markers (p16^INK4a^, p21^CIP1/WAF1^, p53) and fibrotic markers (TGF-β1, α-SMA) was analyzed by western blotting. For in vivo validation, C57BL/6 mice received a single intratracheal dose of BLM (2.5 U/kg) and were sacrificed on days 7, 14, and 21. Disease progression was assessed *via* body weight monitoring, lung index calculation, histopathological examination, SA-β-gal staining, and molecular analysis. BLM significantly reduced A549 cell viability and increased SA-β-gal positivity, accompanied by marked upregulation of p16, p21, p53, TGF-β1, and α-SMA. In vivo, BLM-treated mice exhibited progressive weight loss, elevated lung index, enhanced collagen deposition, and a time-dependent increase in senescence and fibrotic markers, with maximal severity at day 21. BLM induces robust, time-dependent cellular senescence and fibrotic remodeling both in vitro and in vivo, validating this model for mechanistic investigations and the development of targeted anti-fibrotic and senotherapeutic interventions.

Keywords: Bleomycin, Pulmonary fibrosis, Cellular senescence, Senescence-associated secretory phenotype

OP: 05

Irisin Ameliorates Impaired Spermatogenesis in Chronic Stress as Mediated Through Activation of Antioxidant Pathways, Stabilization of Ectoplasmic Specialization and Metabolomic Reprogramming

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Chronic stress is a significant contributor to male reproductive dysfunction; however, the mechanisms linking stress exposure to testicular injury and the development of effective therapeutic interventions remain inadequately defined. Irisin, a metabolically active myokine with cytoprotective properties, has emerged as a potential candidate for mitigating stress-induced reproductive impairment. To investigate the protective effects of irisin against chronic unpredictable stress (CUS)-induced testicular dysfunction in adult male rats. Adult male rats were randomly divided into four groups: control, irisin alone, CUS, and CUS + irisin. Reproductive evaluation included sperm count, viability, morphology, and DNA chromatin integrity, along with measurement of serum corticosterone, irisin, luteinizing hormone, follicle-stimulating hormone, and testosterone. Histological assessment using hematoxylin and eosin staining examined seminiferous tubular structure, tubular diameter, and Johnsen's score. Western blotting was performed to analyze blood–testis barrier tight junction (occludin, claudin, ZO-1) and adherens junction (N-cadherin, β-catenin) proteins, as well as FAK and Akt/mTOR signaling pathways. Inflammatory (NF-κB) and antioxidant (Nrf2/HO-1) markers were assessed. Testicular metabolomic profiling evaluated stress-induced metabolic alterations and the therapeutic impact of irisin. CUS significantly increased corticosterone and reduced body and reproductive organ weights, sperm parameters, and chromatin integrity. Hormonal levels of irisin, luteinizing hormone, follicle-stimulating hormone, and testosterone were markedly decreased. Histology showed seminiferous degeneration, reduced Johnsen's scores, and lower epididymal sperm density. Molecular analyses revealed NF-κB activation, suppression of Nrf2/HO-1 signaling, and disruption of junctional proteins. Metabolomics indicated impaired glycolysis and tricarboxylic acid cycle activity. Irisin treatment reversed these alterations, restoring antioxidant capacity, junctional stability, metabolic balance, and hormonal homeostasis. Irisin effectively protects against CUS-induced testicular dysfunction by alleviating metabolic, inflammatory, and structural disturbances, thereby preserving spermatogenesis and overall testicular function.

Keywords: Irisin, Blood-testis barrier, Spermatogenesis, Chronic unpredictable stress, Antioxidants, Metabolites

OP: 06

Comparative Evaluation of Wintergreen Oil and Leaf Extracts for Antibacterial Potential: An *In-Silico* Approach

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The regions of North-East India are known for its diverse medicinal and aromatic plants that are traditionally used by local tribal communities. Among these, *Gaultheria fragrantissima*, commonly known as Indian Wintergreen and belonging to family Ericaceae, holds significant biological and pharmaceutical properties. The essential oil of *G. fragrantissima*, commonly known as oil of wintergreen and is rich in a major volatile compound called methyl salicylate, widely utilized in traditional medicines and ethnobotanical practices and is known to possess antibacterial, antifungal properties. Also, the leaf extracts of Indian Wintergreen showed the potential in alleviating the microbial growth that has tend to exhibit resistance to antibiotics. The chemical profiling of oil and extracts has revealed several phytocomponents that are efficient as antibacterial therapeutics. In extension of the present research, this study aimed to disclose the propensity of essential oil and leaf extract through in silico analyses to evaluate the anti-bacterial activity of this plant. For in silico study, the gram-negative bacterial strain *Pseudomonas aeruginosa* (MTCC 1263) was selected for the target protein i.e., Outer Membrane Protein A (Omp A) and molecular docking was performed to evaluate interactions between the identified phytocompounds and target receptor. The results of in silico analyses suggested that the antibacterial efficacy of crude leaf extracts was higher as compared to that of solely volatile fraction in the oil.

Keywords: *Gaultheria fragrantissima*, Wintergreen oil, Crude extracts, Antibacterial activity, in silico analysis, *Pseudomonas aeruginosa*.

OP: 07

Substituted Chromone-Based Flavone Scaffolds: Potent TNF-α and IL-6 Inhibitors in Rheumatoid Arthritis Models

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Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disorder characterized by persistent synovial inflammation, cartilage degradation, and progressive joint damage. Although conventional disease-modifying anti-rheumatic drugs provide symptomatic relief, their long-term use is often associated with systemic toxicity, poor oral bioavailability, and variable therapeutic response. Flavones, a class of naturally occurring polyphenolic compounds, have attracted significant attention due to their potent anti-inflammatory and immunomodulatory properties. However, their clinical application is limited by low solubility and rapid metabolism, necessitating rational structural optimization and advanced delivery approaches. The present study explores the rational design, synthesis, and biological evaluation of novel substituted chromone-based flavone derivatives from previous work as a potent inhibitors of TNF-α and IL-6 in RA models. A series of flavone analogs were synthesized by Sartape, A. S *et al* 2015 via Baker-Venkataraman rearrangement, incorporating hydroxyl, methoxy, and halogen substituents at key positions (C-2', C-5, and C-7) on the chromone ring to optimize lipophilicity and binding affinity. Structural elucidation of the synthesized molecules were confirmed by NMR, HRMS, and X-ray crystallography. *In vitro* anti-inflammatory activity was assessed using lipopolysaccharide (LPS)-stimulated RAW 264.7 macrophages, revealing IC50 values of 2.1–5.8 μM for TNF-α suppression and 3.4–7.2 μM for IL-6 inhibition, surpassing reference inhibitor dexamethasone (IC50 >10 μM). Molecular docking simulations against TNF-α (PDB: 2AZ5) and IL-6/IL-6R complex (PDB: 1P9M) demonstrated stable binding energies (ΔG = -9.2 to -11.5 kcal/mol), driven by hydrogen bonding with catalytic residues like Arg132 and Tyr81. In collagen-induced arthritis (CIA) mouse models, lead compound 7-hydroxy-3-(4-fluorophenyl)-2-phenylchromen-4-one (dose: 20 mg/kg, i.p.) significantly ameliorated disease severity ($p<0.01$), reducing paw edema by 62% and serum cytokine levels by 55–70% compared to vehicle controls. Histopathology confirmed reduced synovial hyperplasia and cartilage erosion. These scaffolds exhibit favorable ADMET profiles, including high oral bioavailability (>70%) and low cytotoxicity (CC50 >100 μM in HEK-293 cells). These findings underscore substituted chromone-based flavones as viable candidates for RA therapy, warranting further preclinical optimization for clinical translation.

Keywords: Flavonoid derivatives; flavone, rheumatoid arthritis, molecular docking

OP: 08

Proteomic Characterization and Antibacterial Synergy of ASEC2201 Coliphage-Derived Proteins Against Multidrug-Resistant *Escherichia coli*

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The rapid emergence of multidrug-resistant (MDR) *Escherichia coli* necessitates alternative antibacterial strategies beyond conventional antibiotics. This study aimed to characterize the proteomic profile of coliphage ASEC2201 and evaluate the antibacterial and synergistic potential of its phage-derived protein fraction against resistant *E. coli*. Phage proteins were extracted from high-titre ASEC2201 lysates and analyzed using SDS-PAGE and two-dimensional gel electrophoresis (2D-PAGE). Antibacterial activity was assessed by microbroth dilution to determine minimum inhibitory concentration (MIC), followed by time–kill kinetics to evaluate bactericidal dynamics. Synergistic interactions with cefadroxil, cefepime, and imipenem–cilastatin were examined using disc diffusion assays. Proteomic analysis revealed distinct structural and lytic protein bands within the 20–66 kDa range. 2D-PAGE demonstrated broad isoelectric point distribution (pI 3–10), with lytic proteins predominantly localized in the basic region. The protein fraction exhibited clear antibacterial activity, achieving complete growth inhibition at an MIC of 0.841 mg/mL. Time–kill assays demonstrated concentration-dependent bactericidal activity, with 2× and 4× MIC producing >3 log reductions in viable counts within 12 hours. Combination assays significantly enhanced β-lactam efficacy, increasing zones of inhibition by approximately 18–35% compared to antibiotic monotherapy. These findings demonstrate that ASEC2201-derived proteins possess potent intrinsic antibacterial activity and significantly potentiate conventional antibiotics, supporting their potential as novel antibacterial agents and antibiotic adjuvants against MDR *E. coli*.

Keywords: ASEC2201, Coliphage proteins, MDR *E. coli*, MIC, Time–kill kinetics, Phage–antibiotic synergy, β-lactam enhancement

OP: 09

Integrated In Silico and In Vitro Evaluation of *Matricaria chamomila* Phytochemicals Against Methicillin-Resistant *Staphylococcus aureus*

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The rapid emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) has created an urgent need for alternative antimicrobial strategies. Medicinal plants remain a valuable source of bioactive compounds, and *Matricaria chamomila* is widely recognized for its therapeutic and antimicrobial properties. This study integrates computational screening and experimental validation to evaluate the anti-staphylococcal potential of *M. chamomila* phytochemicals and solvent extracts. In the in silico study, major phytochemicals of *M. chamomila*, including chamazulene, levomenol, carvacrol, and isophytol, were docked against six essential MRSA target proteins involved in DNA replication, folate metabolism, and cell wall biosynthesis. Molecular docking revealed moderate to strong binding affinities, particularly for chamazulene (−8.1 kcal/mol), levomenol (−8.7 kcal/mol), and isophytol (−9.2 kcal/mol) against dihydrofolate reductase (PDB ID: 3SRQ), suggesting potential interference with critical bacterial pathways. For in vitro validation, 1 g of dried *M. chamomila* powder was extracted separately in ethanol, methanol, ethyl acetate, chloroform, and acetone (9 mL each). Antibacterial activity was assessed using the agar well diffusion method against methicillin-sensitive *S. aureus* (MSSA) and MRSA. Against MSSA, inhibition zones of 8 mm (ethanol), 15 mm (methanol), 20 mm (ethyl acetate), no activity (chloroform), and 8 mm (acetone) were observed, with the ethyl acetate extract showing the highest activity. However, none of the extracts exhibited measurable inhibition against MRSA. The findings demonstrate that while *M. chamomila* phytochemicals exhibit promising in silico interactions with essential MRSA proteins, crude extracts are effective only against MSSA under tested conditions. Further bioassay-guided fractionation, MIC determination, and synergistic evaluation are required to enhance anti-MRSA efficacy and validate therapeutic potential.

Keywords: MRSA, *Matricaria chamomila*, Phytochemicals, Molecular docking, Agar well diffusion, Medicinal plants, Antimicrobial resistance.

OP: 10

Caffeic Acid Protects Against Stress Associated Colonic Inflammation by Suppressing Inflammatory Signaling and Preserving Gut Barrier Integrity

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Chronic stress significantly contributes to the development of colonic inflammation by sustaining HPA axis stimulation, increasing oxidative damage, weakening intestinal epithelial defenses, and disturbing immune homeostasis through gut-brain communication pathways. Nevertheless, there is still a lack of well-established treatment approaches specifically targeting the post-stress phase. This study was designed to evaluate the therapeutic and protective effects of caffeic acid (CA) in a preclinical model of chronic stress-associated colonic inflammation. Chronic unpredictable stress (CUS) was experimentally induced in male Sprague-Dawley rats to mimic prolonged psychological stress conditions, and the ability of CA to attenuate stress-mediated inflammatory, oxidative, and tissue damage responses in the colon was systematically assessed. The investigation aimed to explore whether CA could serve as a potential post-stress intervention for preventing or reducing colonic inflammatory alterations. Animals were subjected to CUS for 14 weeks, and CA (50 mg/kg, p.o) was administered during the final four weeks as a therapeutic intervention. Subjects were then euthanised and respective samples were collected for further investigations. CUS exposure increased serum corticosterone and TNF-α, reduced body weight gain, and increased the colon index. It also caused anxiety- and depression-like behaviour, seen as reduced open arm time, lower centre exploration, and reduced sucrose preference. These changes improved after CA treatment. CUS caused marked oxidative damage in the colon, with increased malondialdehyde, nitrite, and reactive oxygen species, along with decreased GSH and SOD activity. CA reduced oxidative injury and improved antioxidant capacity. Histological findings in the CUS group included epithelial damage, shorter crypts, thicker mucosa, goblet cell loss, and higher mast cell infiltration, while CA helped maintain normal mucosal structure and mucus barrier. At the molecular level, CUS lowered tight junction proteins (ZO-1, occludin, claudin-1) and increased PAR-2, IL-6, IL-1β, and NF-κB activity. CA treatment restored tight junction protein levels and reduced inflammatory signalling. Overall, these results indicate that CA effectively reduces already established stress-induced colonic inflammation by targeting multiple interconnected pathways, including oxidative stress, excessive HPA axis activation, mast cell dependent PAR-2 signalling, and NF-κB mediated inflammatory responses. Through these combined effects, CA helps maintain epithelial barrier function within the gut brain axis. These findings suggest that CA has strong potential as a natural therapeutic option for managing stress-related colonic inflammatory conditions.

Keywords: Chronic unpredictable stress; Caffeic acid; Colon inflammation; Tight junction proteins; NF-κB; PAR-2; Oxidative stress; Gut-brain axis

OP: 11

Empathy in Married Women Caregivers: A Comparative Analysis Across Psychiatric, Medical, and Non-Caregiver Groups

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Caregiving is a challenging role that impacts the emotional well-being of women, however it remains the most neglected area in clinical and social research. The present study aims to examine and compare the empathy among three various groups of married women: psychiatric patient caregivers, medical patient caregivers and non-caregiving women. Purposive sampling was used to assess 389 married women (mean age 40.5). The sample comprises psychiatric caregivers (n = 122), medical caregivers (n = 137), and non-caregiving women (n = 130). To collect desired response for empathy Toronto empathy questionnaire developed by Spreng et al. (2009) was used. Data was analyzed using descriptive statistics and one way ANOVA. One way ANOVA represents high significant results (F (2, 386) = 89.986, p = .00), which denotes significant differences in empathy scores across three groups. Descriptive statistics reveal that non caregiver women's empathy level was highest (M = 56.54), followed by medical caregivers (M = 44.05) and psychiatric caregivers respectively (M = 43.92). The findings emphasized that women who were actively involved in caregiving, especially for psychiatric patients, demonstrated low empathy among all the groups. This can be due to the absence of adequate amount of societal and institutional support systems for female caregivers. Psychiatric patient caregivers in particular face severe stigma, isolation and high levels of exhaustion and burden with no societal support. While medical caregivers experience only partial support structure. These results highlight the urgent need for the intervention such as social support programs for caregivers and policy level initiatives that acknowledges the unseen burden carried by women caregivers in Indian society.

Keywords: Empathy, Caregiver Burden, Married Women Caregivers, Psychiatric Caregiving

OP:12

Network-Based Identification of Shared Immune-Metabolic-Stress Signalling Axes in Polycystic Ovary Syndrome and Depression

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Women with Polycystic Ovary Syndrome (PCOS) have a higher risk of developing depression as they share common metabolic, inflammatory, and neuroendocrine disturbances. However, despite growing evidence of overlap, the mechanistic basis linking these disorders remains unclear. This study employs an integrative systems biology framework, combined with AI-assisted gene prioritization, to identify shared regulatory mechanisms linking PCOS and depression. Disease-associated gene sets for PCOS and depression were curated from GeneCards and MalaCards databases using relevance-based filtering criteria. Pathway enrichment analysis of the overlapping genes was performed using KEGG and Reactome databases, followed by cross-database intersection to identify convergent signalling cascades. A high-confidence protein-protein interaction (PPI) network (STRING confidence score ≥ 0.9) was constructed to assess functional connectivity between the shared genes. Network enrichment analysis demonstrated significant non-random organization (PPI enrichment $p < 1x10^{-14}$). Key regulatory genes were prioritized using an AI-based weighted model, ranking pathway recurrence, enrichment strength, and network centrality measures, which identified PI3K-AKT and MAPK signalling pathways as dominant shared axes between PCOS and depression. Centrality-based AI prioritization ranked AKT1 as the primary regulatory hub gene, followed by IGF1 and INSR, which highlights insulin signalling dysregulation as a primary shared metabolic mechanism. Additional prioritized nodes include MAP2K1, EGFR, TP53, and VEGFA, which were associated with inflammation, chronic stress response, and neurovascular remodelling. Together, these findings support a shared immune-metabolic-stress signalling framework linking PCOS and depression.

Keywords: Polycystic Ovary Syndrome, Depression, Network Analysis, Pathway Enrichment, AI-Based Gene Prioritization, Protein-Protein Interaction

OP: 13

Prevalence and Lifestyle Determinants of Polycystic Ovary Syndrome: A Cross-Sectional Study

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Polycystic Ovary Syndrome (PCOS) is a multifactorial endocrine disorder with wide-ranging reproductive and metabolic consequences in women of reproductive age. This cross-sectional survey-based study investigated the prevalence of PCOS and its association with modifiable lifestyle determinants among young women in North India. Structured questionnaires capturing menstrual history, hyperandrogenic symptoms, dietary patterns, physical activity, sleep quality, and self-perceived stress levels were administered to 231 female participants, predominantly aged 18–26 years. A clinician-confirmed PCOS diagnosis was reported by 26.0% of participants. Menstrual irregularities were identified in 59.7% of respondents, with 12.6% reporting prolonged or entirely unpredictable cycles exceeding 35 days. Hyperandrogenic manifestations were present in 65.8% of participants; persistent acne (34.2%), hair thinning (32.0%), unexplained weight gain (21.2%), and excess facial or body hair (20.3%) were the most frequently reported features. Sedentary behavior was prevalent in 44.2% of the cohort, while 48.9% reported sleep durations consistently below the recommended seven-hour threshold. Elevated perceived stress (grade 4–5 on a 5-point scale) was recorded in 36.8% of respondents, and frequent junk food or sugary beverage consumption was noted across a substantial proportion of the sample. Among women with confirmed PCOS, a disproportionately higher prevalence of lifestyle risk factors was observed: elevated stress (56.7%), inadequate sleep (50.0%), and physical inactivity (41.7%). A family history of Type 2 Diabetes Mellitus was present in 23.4% of participants, reflecting a shared metabolic susceptibility. Premenstrual mood disturbances, including irritability, anxiety, and sadness, were nearly universal, affecting 94.8% of respondents. These findings highlight a clinically meaningful convergence of modifiable lifestyle risk factors with PCOS symptom burden. Targeted interventions emphasizing dietary improvement, structured physical activity, stress reduction, and sleep hygiene are warranted to reduce PCOS prevalence and its long-term cardiometabolic sequelae in young women.

Keywords: Polycystic Ovary Syndrome (PCOS); Menstrual Irregularities; Lifestyle Factors; Hyperandrogenism; Metabolic Risk; Reproductive Health; Young Women

OP:14

In-silico Identification of Novel Herbal Inhibitors; Targeting the NLRP12 Inflammasome in Cancer Microenvironments

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The NLRP12 inflammasome is structurally unique, has pro-tumorigenic properties and modulates the pathways of chronic inflammation and severe hypoxia thus, making it a strategic therapeutic target. In this study, drug screening and in-silico analysis was done using natural compounds and their effectiveness against NLRP12 was assessed, in order to develop novel, non-toxic, cancer therapy. 20 bioactive compounds from various plants like *Murraya koenigii* (Curry leaves), *Terminalia bellerica* (Baheda), and *Capraria biflora* (Goatweed) amongst others were selected based on their prominence and data from previous research works. In order to determine the drug-likeness of these 20 compounds SwissADME was used to predict the ADME parameters of each compound. Post-analysis, 11 compounds from the initial 20 exhibited 0 or 1 Lipinski violations and were hence shortlisted. Further, the crystal structure of the NLRP12 protein having a resolution below 2.0Å was retrieved from RCSB PDB (PDB ID: 4XHS) and was refined using PyMOL for forthcoming computational analysis. The shortlisted compounds were then analyzed further by docking them against NLRP12 using PyRx (AutoDock Vina). All 11 compounds showed good binding energy/affinity with NLRP12. The most notable ones include Nimbidiol (*Azadirachta indica*) -10.4 (kcal/mol), Corylifol (*Psoralea corylifolia*) -10.4 (kcal/mol), Mahanimbine (*Murraya koenigii*) -10.2 (kcal/mol), and Bellericagenin A (*Terminalia bellerica*) -10.2 (kcal/mol). This study effectively concludes that the 11 natural bioactive compounds chosen, demonstrate promising drug leads against the NLRP12 inflammasome. BIOVIA Discovery Studio visualization was undertaken to obtain high resolution images of the receptor-ligand interactions.

Keywords: NLRP12, In-silico, Lipinski, Natural bioactive compounds, Drug leads.

OP: 15

Correlation Between the Subscales of Academic Self-Concept and the Academic Procrastination Among Young Females

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Academic self-concept reflects students' perceptions of their own abilities and competence, influencing confidence, engagement, and goal-directed behaviors. Academic procrastination, conversely, represents the tendency to delay academic tasks, which often undermines performance and increases stress. The primary objective of this research was to study the correlation between two sub scales of academic self-concept and the Academic Procrastination among young females. The two subscales, also the two variables thus studied, were academic confidence and academic effort. The study utilized Academic Self-concept Scale by Liu and Wang (2005) and Academic Procrastination Scale by McCloskey (2010) to collect responses from 100 young females currently studying in grade 12, under-graduation and post-graduation. These females were from 18 years to 25 years of age, and they were selected conveniently to use quantitative correlation research design. The respondents were approached personally, for them to fill out the questionnaires. The females who were able to read, write and understand English and who gave their consent were selected to respond to the questionnaires. First hypothesis formulated was H1) There will be no significant correlation between Academic confidence (ACS) and Academic Procrastination (AP) among young females the second being, H2) There will be no significant correlation between Academic effort (ACS) and Academic Procrastination (AP) among young females. According to the result, no significant difference was found between Academic Confidence (AC) and Academic Procrastination (AP) rendering the first hypothesis accepted at 0.43 level. The second hypothesis was also accepted at 0.36 level because no significant difference was found between academic effort and academic procrastination. While these results contrast with several studies in the literature that noted an inverse relationship such as those by Rao et al. (2023) and Saha et al. (2024) but these results align closely with Bhati et al. (2024), who found no significant correlation between academic procrastination and academic performance in their study.

Keywords: Self-concept, Academic Procrastination, Academic confidence, Academic effort, Competence

OP: 16

Integrating Work–Life Balance Initiatives and Institutional Safety Policies to Promote Sustainable Health and Empowerment of Women in Academia

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Women in academia often have to do a lot of different things, like teach, do research, handle administrative work, and take care of their families. Taking care of these interwoven duties can make it hard to keep a good work-life balance, which can affect one's health, mental health, and professional growth. In this context, it is important to combine work-life balance programs with solid safety policies at schools in order to make the academic atmosphere fair and supportive. The study looked at ways to improve women's health and empowerment in higher education through things like flexible and non-traditional work schedules, parental leave, counselling support, and gender-sensitive workplace practices. It also looked at how important a strong institutional safety framework is for creating a culture of respect, dignity, and protection in schools. This framework should include clear anti-harassment regulations, safe ways to report problems, and programs to raise awareness and train people. The results show that workplace policies that foster a supportive work environment, along with good safety measures, can greatly lower stress at work, make people happier with their jobs, and get more women involved in decision-making and leadership roles. The study shows that schools and universities need to make regulations that are all-encompassing and take into account both the professional and personal aspects of women's lives. These kinds of programs can help make things more fair for men and women, help people build long-term careers, and make the academic world more welcoming.

Keywords: Women in Academia, Work–Life Balance, Women's Well-being, Higher Education, Gender Equity, Institutional Safety Policies, Anti-Harassment Framework, Women's Empowerment, Academic Leadership

OP: 17

Comparative Evaluation of Natural and Chemical Meat Tenderizers: A Biochemical and Structural Assessment

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Tenderization significantly influences the sensory quality and market value of red meat products. The present study aimed to comparatively evaluate the effects of selected natural and chemical tenderizers—papaya extract, ginger extract, pear extract, honey, apple cider vinegar, baking soda, and pink salt on lamb muscle using biochemical and structural analyses. Uniform lamb samples were marinated under controlled conditions and assessed for fiber disruption using light microscopy, enzymatic proteolysis index, total soluble protein content, texture profile analysis (TPA), and SDS-PAGE protein profiling. Light microscopic examination revealed pronounced myofibrillar fragmentation and connective tissue disruption in samples treated with papaya and ginger extracts, whereas moderate structural loosening was observed in pear and vinegar treatments. Baking soda and salt showed minimal fiber degradation, primarily affecting muscle swelling. Enzymatic Proteolysis Index indicated significantly higher tyrosine release in papaya- and ginger-treated groups, reflecting enhanced proteolytic activity. Correspondingly, total soluble protein concentration increased markedly in enzymatic treatments, suggesting extensive myofibrillar protein breakdown. Texture Profile Analysis demonstrated a substantial reduction in hardness and chewiness in papaya-treated samples, followed by ginger and pear groups. Acidic and alkaline treatments showed moderate improvement in tenderness, while honey and salt produced comparatively mild effects. SDS-PAGE profiling revealed degradation of major myofibrillar proteins, including myosin heavy chain and troponin-T, particularly in papaya and ginger treatments, supporting biochemical evidence of proteolysis. Overall, natural plant-derived proteases exhibited superior tenderizing efficiency compared to chemical treatments. The study highlights the effectiveness of enzymatic tenderization in improving meat texture through targeted protein degradation and structural modification, supporting the application of natural processing aids in modern meat biotechnology.

Keywords: Lamb meat, Tenderization, Papaya extract, Ginger extract, Enzymatic proteolysis index, Texture Profile Analysis, SDS-PAGE, Light microscopy, Myofibrillar protein degradation, Natural food processing.

OP: 18

Integrative Network Pharmacology and Structure-Based Molecular Docking for the Computational Identification of CHEK2-Targeting Phytochemicals in Triple-Negative Breast Cancer

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Breast cancer remains one of the leading causes of cancer-related mortality worldwide, necessitating the identification of novel therapeutic targets and safer bioactive compounds. In the present study, a network pharmacology and in-silico molecular docking approach was employed to identify potential phytochemical inhibitors targeting key hub genes involved in breast cancer progression. Protein–protein interaction (PPI) network analysis was performed, and hub genes were identified using multiple centrality parameters. Among the prioritized targets, CHEK2 (Checkpoint Kinase 2), a critical regulator of DNA damage response and cell cycle control, was selected for further investigation. Five bioactive phytochemicals Curcumin, Piperine, Cinnamaldehyde, 6-Gingerol, and Allicin were selected based on literature evidence and drug-likeness screening. Drug-likeness properties were evaluated using SwissADME, confirming compliance with Lipinski's rule of five. Toxicity profiling was performed using ProTox-II, where Curcumin and Cinnamaldehyde exhibited relatively higher LD50 values (2000 mg/kg and 1850 mg/kg, respectively), indicating favorable safety profiles. Molecular docking was conducted using the DockThor web server against the crystal structure of CHEK2 (PDB ID: 2CN8). Among the tested compounds, Curcumin demonstrated the highest binding affinity (–9.387 kcal/mol), followed by Piperine (–8.847 kcal/mol), Cinnamaldehyde (–8.12 kcal/mol), 6-Gingerol (–7.933 kcal/mol), and Allicin (–7.855 kcal/mol). The strong binding interaction of Curcumin within the active site of CHEK2 suggests its potential as a promising inhibitor. In conclusion, Curcumin exhibited the most favorable combination of binding affinity, drug-likeness, and toxicity profile, highlighting it as a potential lead compound for targeting CHEK2 in breast cancer. Further in-vitro and in-vivo studies are recommended to validate these findings.

Keywords: Network Pharmacology; Molecular Docking; CHEK2; Triple-Negative Breast Cancer; Phytochemicals; In-Silico Drug Discovery

OP: 19

Machine Learning–Powered Log Intelligence System

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Modern banking applications handle millions of user interactions every single day from fake login attempts and fraud fund. Each of these actions leaves behind a trace in the form of a log entry. While these logs contain a wealth of information about how the system was used for a particular task at a specific moment, the huge volume of data generated makes it practically impossible for security teams to monitor them manually. A single missed anomaly, an unusual login pattern, a unusual sequence of API requests, or an unexpected administrative action can lead to serious consequences such as financial fraud, unauthorized account access, or a full- scale data breach for a large-scale enterprise. This paper presents the idea and implementation of a real-time log anomaly detection system built especially for banking applications. The core idea is that the system continuously and regularly monitors incoming log data, learns what normal activity looks like, and immediately raises an alert whenever something unusual is detected. Rather than relying on fixed, hand-written rules (sometimes even outdated) that can only catch known threats, the proposed system uses machine learning to identify previously or even at first time unseen patterns of malicious behaviour. A user dashboard is also built that can show real time anomalies detected by the system. This study compares and evaluates multiple machine learning models including Long Short-Term Memory networks (LSTM) and transformers, evaluating each approach's ability to detect anomalies accurately. The dataset used in this system is the publicly available HDFS (Hadoop Distributed File System), collected from the Loghub repository. Among the methods used in the work, transformers proved to be more effective due to their self-attention mechanism, it turned out to be more accurate in learning long and complex log patterns. LSTM which is accurate for smaller lengths of log sequence. The overall system demonstrates that machine learning can serve as a practical, scalable, and more intelligent alternative to conventional log monitoring tools in the financial sector, the one that adapts to new threats rather than waiting for rules to be manually updated from time to time.

Keywords: Self attention mechanism, Transformers, LSTM, Intelligence System

OP: 20

Chebulinic acid attenuates senile osteoporosis via modulating Keap- Nrf2 signaling

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Senile osteoporosis is a form of age-related bone loss where bone resorption (by osteoclasts) exceeds bone formation (by osteoblasts) after the age of 60. Oxidative stress is a major driver of this imbalance. Chebulinic acid (CA) is a hydrolysable tannin, related to polyphenol family which allows to scavenge reactive oxygen species, chelate metal ions and modulate redoxsensitive signalling pathways. This study aims to elucidate the underlying mechanism of CA in mitigating D- Galactose(DGal) induced senescent condition in bone niche. We hypothesise that osteoblast from early senescence by counteracting the free radicals and activating the cellular antioxidant signalling. Our findings may thus provide novel insights into prevention and treatment of age-related osteoporosis. Osteoblast cells isolated from 1- to 2-day-old pups calvariae and treatment of D- Gal(250Mm) was given followed by chebulinic acid(10Nm) for 48 hour to induce oxidative stress and evaluate the protective effect of CA. ALP activity was measured at 405nm to evaluate osteoblast differentiation. Osteoblast cell viability was measured using MTT reagent. To evaluate the mineralization potential, bone marrow cells (BMCs) from femur bone of Balb/C mice were isolated and cultured in 10% α-MEM containing dexamethasone (100 nM) for 21 days and fixed with 4% formaldehyde and stained with Alizarin Red S to visualize calcium rich deposits. Gene expression and protein expression of osteogenic markers were analysed by qPCR and western blotting. Intracellular reactive oxygen species (ROS) levels were detected using DCFDA. Bone microarchitecture and histological studies were performed on bone samples to evaluate healing. Chebulinic acid attenuates D-Gal induced osteoblast dysfunction by restoring the osteogenic marker levels and mineralization state which is lost in D-Gal induced condition. CA mitigates D-Gal induced oxidative stress by counteracting free radicals and activating NRF2 singalling.CA activates Wnt β-catenin signalling by restoring Wnt3a, β-catenin, LRP6, Frizzled4. D-Gal pushes osteoblast to early apoptosis, which is rescued by CA. CA prevents bone loss in D-Gal treated mice. Chebulinic acid shows significant potential as an osteoprotective agent in the context of agerelated bone loss by maintaining osteoblast homeostasis, guarding against oxidative stress and enabling protection against cellular senescence. Our study implicates the use of CA as potential therapeutic targets for senile osteoporosis.

Keywords: Osteoporosis, Keap- Nrf2 signaling, Chebulinic acid

OP: 21

Therapeutic effect of Vedic Chant and Indian Classical Raag on Anxiety of Female Students

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To assess the therapeutic effect of Vedic Chant and Indian Classical Raag on Anxiety of Female University Students. Randomized controlled trial. Higher Educational Institutions.

Female University students with moderate to severe anxiety on STAI were randomized to one of three treatments.

Vedic chant music, Indian Classical Raaga, Control with Tanpura

STAI (Spielberger's State–Trait Anxiety Inventory).

The results showed that both Vedic chant music and Indian Classical Raag were more effective in reducing the anxiety of female university students in comparison to the control group. Indian Classical Raag was found to be more effective than Vedic chant music in reducing the of anxiety of female students from the Higher Educational Institutions.

The results of the study show that Indian Classical Raag and Vedic Chants both can yield positive results in reducing the anxiety of females. These music interventions can be used as additional therapeutic techniques for reducing anxiety of females along with other treatment methods.

Keywords: Anxiety, Indian Classical Raag, Intervention, Vedic Chants.

ABSTRACT POSTER PRESENTATIONS

PP:01

Molecular and Functional Insights into the ADIPOR1 Gene in Metabolic Regulation

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The adiponectin receptor 1 (ADIPOR1) gene encodes a transmembrane protein that plays a pivotal role in maintaining metabolic homeostasis. ADIPOR1 primarily mediates the biological effects of adiponectin, an adipokine involved in regulating glucose uptake, fatty acid oxidation, insulin sensitivity, and energy balance. The receptor is highly expressed in skeletal muscle and various metabolically active tissues, where it activates key signaling pathways such as AMP-activated protein kinase (AMPK) and peroxisome proliferator-activated receptor-α (PPAR-α). Through these pathways, ADIPOR1 contributes to improved insulin responsiveness and reduced lipid accumulation. Genetic variations in the ADIPOR1 gene have been increasingly associated with metabolic disorders including obesity, type 2 diabetes mellitus, insulin resistance, and cardiovascular complications. Non-synonymous single nucleotide polymorphisms (nsSNPs) within ADIPOR1 may alter protein conformation, stability, or receptor–ligand interactions, thereby impairing downstream signaling. Advances in computational biology have enabled the identification and functional prediction of potentially deleterious ADIPOR1 variants using in silico tools that assess evolutionary conservation, pathogenicity, and structural impact. Structural studies indicate that ADIPOR1 possesses a unique seven-transmembrane domain architecture distinct from classical G-protein-coupled receptors, suggesting specialized signaling mechanisms. Disruption of conserved residues within these domains can significantly affect receptor activity and metabolic signaling efficiency. Moreover, pharmacological agonists such as AdipoRON have highlighted ADIPOR1 as a promising therapeutic target for metabolic diseases. Overall, the ADIPOR1 gene represents a critical molecular link between adipokine signaling and metabolic regulation. Continued exploration of its genetic variants and molecular mechanisms may provide valuable insights for precision medicine approaches and the development of targeted therapies for metabolic disorders.

Keywords: ADIPOR1, Adiponectin signaling, Metabolic regulation, Insulin sensitivity, Genetic variants

PP: 02

Exploring Anti-Ferroptotic Potential of Calotropis gigantea Compounds Against GPX4 in EBV-Associated Lymphoma

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Epstein-Barr Virus (EBV)-positive diffuse large B-Cell Lymphoma (DLBCL) poses significant treatment challenges due to its resistance to conventional therapies and its aggressive clinical behavior. The presence of EBV within malignant B cells contributes to tumor progression, immune evasion, and poor therapeutic response, making the identification of novel molecular targets essential for improved treatment strategies. Glutathione Peroxidase 4 (GPX4), a key antioxidant enzyme that protects cells from lipid peroxidation and prevents ferroptotic cell death, is frequently overexpressed in several cancers, including EBV-associated lymphomas. Because GPX4 plays a crucial role in maintaining redox balance and cell survival, its inhibition has emerged as a promising therapeutic strategy for inducing ferroptosis in cancer cells. This study explores the GPX4-inhibitory potential of four phytochemicals such as Calotropin, Calactin, Uscharidin, and Giganticine sourced from *Calotropis gigantea,* a medicinal plant known for its diverse bioactive compounds. Computational molecular docking analysis revealed strong binding affinities of these compounds toward the GPX4 enzyme. Among them, calotropin (−8.6 kcal/mol) and uscharidin (−8.6 kcal/mol) demonstrated the most stable interactions with the active site residues of GPX4 through hydrogen bonding, hydrophobic interactions, and van der Waals forces, indicating their potential to inhibit the enzyme effectively. Furthermore, *in silico* ADME (Absorption, Distribution, Metabolism, and Excretion) predictions confirmed favorable pharmacokinetic properties, including good oral bioavailability, high gastrointestinal absorption, and the absence of major toxicity concerns. These pharmacological characteristics highlight the drug-like potential of these phytochemicals. Overall, the findings suggest that bioactive compounds from *Calotropis gigantea* may serve as promising structural scaffolds for the development of GPX4-targeted therapeutics aimed at inducing ferroptosis in EBV-associated DLBCL, thereby opening new avenues for anticancer drug discovery.

Keywords: *Calotropis gigantea*, GPX4 inhibition, EBV-positive DLBCL, Calotropin, Uscharidin, Ferroptosis.

PP:03

Evaluating the Therapeutic Potential of *Nyctanthes arbor-tristis* in Combating Urogenital Pathogens and Oxidative Stress

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Urogenital infections and oxidative stress are major contributors to reproductive morbidity among women, often leading to discomfort, recurrent infections, and long-term complications. The present investigation evaluates the therapeutic potential of *Nyctanthes arbor-tristis* (night-flowering jasmine) in combating common urogenital pathogens and oxidative stress. Leaf extracts were prepared using methanolic solvents and subjected to preliminary phytochemical screening to identify bioactive constituents such as flavonoids, phenolics etc. Antimicrobial activity was assessed against selected urogenital pathogens, including *Escherichia coli* and *Pseudomonas aeruginosa*, using agar well diffusion and minimum inhibitory concentration (MIC) assays. Antioxidant capacity was determined through DPPH radical scavenging assay, and total phenolic content estimation. The extracts demonstrated concentration-dependent inhibition of microbial growth and significant free radical scavenging activity compared to standard controls. The combined antimicrobial and antioxidant effects suggest that *Nyctanthes arbor-tristis* may help reduce pathogen load while mitigating oxidative damage in urogenital tissues. These findings highlight its potential as a natural therapeutic agent for managing infections and oxidative stress-related complications in women. Further in vitro and in vivo studies are warranted to elucidate its molecular mechanisms and clinical applicability.

Keywords: *Nyctanthes arbor-tristis*, Urogenital pathogens, Antimicrobial activity, Antioxidant activity, Women's health, Phytochemical analysis

PP: 04

Waste Biomass Valorization for Sustainable Bioethanol Production via Microbial Fermentation

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Microbial fermentation of waste-derived substrates offers an environmentally sustainable biotechnological route for bioethanol production while addressing waste management challenges and reducing dependence on fossil fuels. In this study, agricultural and biodegradable waste materials were evaluated as potential feedstocks for ethanol production using *Saccharomyces cerevisiae*. Sugarcane bagasse, paper bag waste, and biodegradable plastic were selected to assess their feasibility as lignocellulosic substrates. Sugarcane bagasse underwent physical pretreatment involving separation into outer dried cut pieces and inner dried ground fractions, followed by sieving to obtain fine powder and coarse residues. Chemical pretreatment was performed using 1% and 3% sulfuric acid hydrolysis to release fermentable sugars. The hydrolysates were adjusted to pH 5.5 and sterilized prior to inoculation. Fermentation was initiated by inoculating *S. cerevisiae* into the prepared feedstock media and monitored over 96 hours at 24-hour intervals. During fermentation, sugar concentration, protein content and ethanol produced was determined using the DNS method, Lowry method, and dichromate spectrometry method respectively The highest ethanol yield (8.18 mg/ml) was obtained from the inner fraction of sugarcane bagasse, followed by the inner fine fraction (7.49 mg/ml) and the outer fraction (5.41 mg/ml). Paper bag waste and biodegradable plastic also demonstrated ethanol production potential, although yields were comparatively lower. The findings indicate that sugarcane bagasse, particularly in fine powder form, is a highly efficient substrate for bioethanol production. The study highlights the importance of appropriate physical and chemical pretreatment of lignocellulosic biomass to enhance fermentable sugar release and ethanol yield. Overall, waste-derived substrates present a promising and sustainable resource for bioethanol production, contributing to renewable energy generation and environmental sustainability.

Keywords: Bioethanol production, *Saccharomyces cerevisiae,* Fermentation, Acid hydrolysis, Ethanol yield

PP:05

Isolation and Characterization of Cellulose-Degrading Soil Bacteria for Sustainable Biodegradation of Sanitary Waste

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The accumulation of cellulose-based sanitary waste poses an environmental challenge due to slow degradation under landfill conditions. Although cellulose is biodegradable, efficient decomposition requires cellulolytic microorganisms capable of producing cellulase enzymes. This study aimed to isolate and characterize cellulose-degrading soil bacteria and evaluate their enzymatic potential for sustainable biodegradation of cellulose-based tampon waste. Soil samples were serially diluted and spread plated on Carboxymethyl Cellulose (CMC) agar, followed by incubation at 37°C for 72 hours. Primary screening was performed using the 0.1% Congo red staining method with NaCl destaining; clear halo zones indicated cellulose hydrolysis. Prominent colonies were selected for secondary screening. Quantitative cellulase activity was determined by growing isolates in CMC broth and measuring reducing sugar release using the DNS (3,5-dinitrosalicylic acid) method at 540 nm. Morphological and biochemical characterization included Gram staining, catalase, oxidase, and IMViC tests. Four cellulolytic isolates designated T1, T2, T3, and T4 were obtained. Congo red assay confirmed cellulose degradation through distinct hydrolysis zones. DNS assay revealed varying cellulase activity, with absorbance values at 540 nm recorded as: T1 = 0.42, T2 = 0.68, T3 = 0.91, and T4 = 0.55, corresponding to estimated reducing sugar release of 0.38, 0.62, 0.86, and 0.49 mg/mL glucose equivalents, respectively. Isolate T3 exhibited the highest cellulase activity. Morphological observations revealed circular, cream to off-white colonies with smooth margins. Gram staining showed T1 and T3 as Gram-positive rods, while T2 and T4 were Gram-negative rods. Biochemical tests indicated all isolates were catalase positive; T2 and T4 were oxidase positive. IMViC tests indicated that the isolates represent diverse cellulolytic bacterial groups with potential environmental applications. Efficient cellulose-degrading bacteria were successfully isolated from soil. Among them, isolate T3 demonstrated superior cellulase production, indicating strong potential for accelerating biodegradation of cellulose-based sanitary waste like tampons. These findings support the development of microbial strategies for sustainable sanitary waste management and environmental protection.

Keywords: Cellulase activity, DNS assay, CMC agar, Sanitary waste biodegradation, Soil bacteria, Sustainable waste management

PP: 06

Premenstrual Dysphoric Disorder: An Invisible Barrier to Women's Professional Well-being

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Premenstrual Dysphoric Disorder (PMDD) is a severe, cyclic mood disorder affecting approximately 3-8% of women of reproductive age. Although it is recognized within psychiatric classifications, its broader impact on women's daily lives has not received adequate attention. PMDD is characterized by intense mod shift, irritability, anxiety, cognitive difficulties and seen functional impairment during the luteal phase of the menstrual cycle. Research suggests that these symptoms are not caused by abnormal hormone levels, but rather by heightened neurological sensitivity to normal hormonal changes. In professional environments that value emotional regulation, good productivity and leadership stability, such cyclical symptoms may create hidden challenges. Women experiencing PMDD may struggle with concentration, interpersonal interactions, confidence and stress management during symptomatic phases. Due to continuing stigma around menstrual health, these difficulties often remain unspoken and unsupported. PMDD has minor but significant effects on long-term professional development and workplace engagement, beyond clinical symptoms. While internally coping with emotional swings and low energy levels, women continue fulfilling their responsibilities. This often leads to presenteeism, where individuals are physically present at work but not functioning at their usual capacity. Menstrual mental health is rarely discussed openly that is why women may hesitate to seek understanding or flexibility from employers or colleagues. With time, this silent coping can affect confidence, interpersonal dynamics and willingness to take on leadership or other roles during vulnerable periods. To recognize these realities, it does not imply reduced competence. Instead, it highlights the importance of supportive organizational cultures that understands biological diversity as part of normal human functioning. This review explores the biological mechanisms, psychological effects, occupational implications of PMDD, arguing that it should be understood not only as a clinical condition but also as an overlooked workplace concern. Promoting gender sensitive work environments, long-term well-being and fair professional advancement all depends on including menstrual health in workplace policies.

Keywords: Premenstrual Dysphoric Disorder (PMDD), Menstrual mental health, Occupational health, Workplace productivity, Gender equity, Neurobiological sensitivity

PP: 07

Predictive Modeling in Bioremediation: Machine Learning Approaches for Efficient Production of Dye-Degrading Proteins

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Industrialization has led to the extensive release of synthetic dyes into aquatic environments, posing severe ecological and human health risks due to their persistence, toxicity, and resistance to conventional treatment methods. Bioremediation, which utilizes living organisms or their enzymatic systems to degrade pollutants, has emerged as an environmentally sustainable approach for the treatment of dye-contaminated effluents. In particular, microbial enzymes capable of degrading complex dye molecules have gained considerable attention for their potential in eco-friendly wastewater remediation. However, traditional methods of enzyme discovery and optimization remain time-consuming and labour-intensive. Recent advances in biotechnology combined with computational sciences have enabled the application of machine learning (ML) techniques for predictive modelling and rational enzyme design, significantly accelerating the development of dye-degrading biocatalysts. This review examines the emerging role of machine learning in the prediction, engineering, and microbial synthesis of dye-degrading proteins used in bioremediation systems. Initially, the study provides an overview of dye pollution and its environmental consequences, highlighting the importance of microbial enzymes such as laccases, peroxidases, and azoreductases in dye degradation pathways. The discussion then focuses on how ML-based predictive models can facilitate rapid identification of potential enzyme candidates, predict enzyme-substrate interactions, and optimize catalytic performance. Computational tools integrating genomic, proteomic, and metabolomic datasets enable efficient screening of microbial strains and support the rational engineering of enzymes with improved degradation efficiency. Furthermore, the review outlines the advantages of ML-assisted strategies in enzyme discovery, including improved prediction of enzyme activity, enhanced catalytic efficiency through protein engineering, and optimization of microbial host systems for large-scale enzyme production. These approaches have the potential to transform conventional trial-and-error methodologies into more precise and data-driven strategies. Several recent case studies are also highlighted to demonstrate how ML-guided modelling has successfully predicted dye degradation pathways and improved microbial performance in wastewater treatment systems. Despite advances, integrating machine learning into bioremediation faces challenges such as limited high-quality datasets, algorithm selection, and model interpretability. Addressing these issues is crucial to fully utilize ML-based predictive modeling. The convergence of machine learning and microbial biotechnology offers promising opportunities for discovering dye-degrading proteins and developing sustainable strategies to reduce industrial dye pollution.

Keywords: Bioremediation, Machine Learning, Predictive Modelling, Dye-Degrading Enzymes, Microbial Biotechnology

PP: 08

Early Onset Puberty in Girls: Causes, Risk Factors and Management of Precocious Puberty

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Early menstruation and breast development are the most common manifestations of early onset puberty, sometimes referred to as precocious puberty, in females. It is defined by the appearance of secondary sexual characteristics before the age of eight. The condition is increasingly reported worldwide and may lead to significant physical, psychological, and social consequences, including reduced final adult height, body image concerns, and a higher risk of anxiety and depression. Precocious puberty is broadly classified into two types: central precocious puberty (CPP) and peripheral precocious puberty. CPP results from early activation of the hypothalamic–pituitary–gonadal axis and is more common in girls. Although most cases are idiopathic, CPP may also occur due to central nervous system lesions, infections, previous brain radiation, or genetic variations affecting pubertal timing. Peripheral precocious puberty occurs due to excess production of sex steroids independent of gonadotropin-releasing hormone (GnRH). Causes include ovarian cysts or tumors secreting estrogen, adrenal disorders such as congenital adrenal hyperplasia, severe primary hypothyroidism, McCune Albright syndrome, and exposure to exogenous estrogens or endocrine-disrupting chemicals. Recent studies suggest that modifiable risk factors such as childhood obesity, high-calorie and high-protein diets, physical inactivity, sleep deprivation, and environmental endocrine disruptors may contribute to early pubertal onset in girls. Psychological stress and a family history of early menarche have also been associated with earlier puberty, indicating a complex interaction of genetic, metabolic, and environmental influences. Diagnosis requires comprehensive clinical evaluation including growth pattern assessment, Tanner staging, and laboratory tests such as basal and stimulated gonadotropins and estradiol levels. Imaging investigations including brain MRI, pelvic ultrasonography, and bone age radiography are also important to distinguish between central and peripheral forms. Although puberty cannot be reversed, medical treatments can effectively slow its progression. GnRH analogues are the standard therapy for CPP, while peripheral cases are managed by treating the underlying cause. Lifestyle modification, psychological support, and family counseling are essential to reduce long-term physical and psychosocial consequences.

Keywords: Early puberty in girls, Precocious puberty, Central precocious puberty, Childhood obesity, GnRH analogue therapy.

PP: 09

Representation of Women in Media & Pop Culture

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Representation of women in media and popular culture plays a critical role in shaping societal norms, gender identities, and perceptions of authority and competence. Despite constituting approximately half of the global population, women account for only one in four individuals seen, heard, or quoted in global media (2025), indicating persistent structural inequality. Historically, portrayals have relied on reductive archetypes such as the "damsel in distress," the self-sacrificing caregiver, the hyper-sexualized subject of the male gaze, and tokenistic models of empowerment, reinforcing traditional gender hierarchies and limiting the multidimensional representation of women. The study evaluates the historical evolution, contemporary patterns, and psychological implications of women's representation in media, with particular attention to structural disparities and intersectional dimensions of gender portrayal. A qualitative and quantitative synthesis approach was employed, integrating secondary industry data on media participation with theoretical analysis grounded in feminist media theory and intersectionality. Content trends across news, film, and digital platforms were examined to assess patterns of visibility, stereotyping, and leadership representation. Findings indicate that women occupy fewer than 30% of film speaking roles, comprise approximately 26% of news subjects, and hold only 21% of directing and producing positions. Although portrayals have diversified from domestic confinement to professional and digitally visible identities, numerical growth remains slow. Increased visibility has not consistently translated into narrative authority or decision-making power. Evidence further suggests that stereotypical and objectified portrayals negatively influence self-concept and career aspirations, while diverse and authoritative representations enhance self-efficacy. Achieving equitable representation requires structural reform within media institutions, inclusive storytelling practices, and strengthened media literacy. Authentic representation is essential for promoting gender equity, democratic participation, and long-term social progress.

Keywords: Gender Representation; Feminist Media Theory; Intersectionality; Gender Equity

PP: 10

Balancing Motherhood and Career: Identity Reconstruction and Self-Worth in Postpartum Working Women

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Becoming a mother is a profound transition that three shapes of women's psychological landscape, daily habits, and her sense of self. This developmental shift, often call “matrescence,”involves a total reorganization of a woman's identity and role in society. For women who manage both a career and a household, this transition is particularly complex. It requires the difficult task of merging a long health professional identity with a new, demanding maternal identity. This study reviews current academic literature to understand how this process affects a women's self-worth and her perception of her own competence. Research shows that matrescence is not just a social change, but a biological one involving neurological restructuring that prepares a women for caregiving. However, when these women return to the workforce, they often face “identity discontinuity.” This is the feeling that their “old self.”the independent, high achieving professional has been replaced by a version of themselves that feels less capable or distracted. These feelings are often made worse by external factors such as the maternal wall. This term refers to the unconscious bias where colleagues and managers assume that a mother is less committed to her job. Then she was before having a child. Furthermore, these identity-related and structural challenges may influence women's reproductive decisions, contributing to declining birth rates observed in many societies. When motherhood is associated with identity loss, reduced career progression, and inadequate institutional support, women may delay or avoid having children. Thus, supporting maternal identity reconstruction is not only essential for individual psychological well-being and career sustainability but also has broader implications for workforce retention and demographic stability. The findings of this review suggest that a women's self-worth during the postpartum period is highly fragile. It is influenced by maternal guilt, societal pressure to be a perfect mother and the stress of role conflict. However, the data also highlights a solution institutional support when workplace offers, flexible schedule, gradual return to work plan and a culture that validates a mother's dual role, women report, significantly, higher self-esteem and better mental health. Ultimately, this paper argues that helping women rebuild their identities is essential for keeping talented women in the work force and ensuring their long-term career success.

Keywords: Postpartum Women, Identity Reconstruction, Self-worth, Working Mothers, Matrescence.

PP: 11

OvaLume-X: A Multi-Axis Systems Biology Framework for Quantifying Ovarian Biological Acceleration and Reproductive Resilience

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Ovarian aging is conventionally assessed using chronological age and Anti-Müllerian Hormone (AMH); however, these static indicators do not capture systemic metabolic and environmental stressors that influence ovarian physiology. Growing evidence indicates that insulin resistance, chronic low-grade inflammation, oxidative stress, and disruption of the hypothalamic pituitary ovarian (HPO axis dysregulation) collectively impair follicle development and accelerate ovarian functional decline. These biological pathways interact in a non-linear and potentially synergistic manner, amplifying ovarian vulnerability beyond the effect of isolated biomarkers. Despite this, current assessment strategies lack an integrative framework capable of quantifying cumulative and interacting systemic stress effects on ovarian functional aging. The study proposes a multi-axis computational systems biology modelling framework designed to estimate ovarian biological acceleration and reproductive resilience through structured stress-pathway integration. The framework incorporates a Cumulative Load Index derived from age-adjusted AMH percentile and selected metabolic and inflammatory parameters; a Coupling Interaction Index modeling non-linear amplification between insulin resistance, inflammatory activity, oxidative stress, and neuroendocrine instability; and a destabilization threshold module to identify modeled early-warning zones of reproductive vulnerability. A recovery plasticity component further simulates projected changes in functional stability following targeted modulation of systemic stress markers. Ovarian Biological Age is computed by integrating ovarian reserve status with systemic stress interaction coefficients to estimate relative acceleration compared with chronological age. Model-based simulations indicate that increased metabolic-inflammatory coupling is associated with greater projected ovarian biological acceleration, whereas simulated improvements in insulin sensitivity and inflammatory burden reduce interaction intensity and improve projected reproductive stability indices. This framework can also provide actionable insights to users, indicating which lifestyle or clinical interventions such as metabolic optimization, anti-inflammatory strategies, or hormonal monitoring-could improve ovarian health and slow biological aging. This systems-level framework shifts reproductive health assessment from isolated biomarker interpretation toward predictive resilience-based stratification and offers a translational platform for early identification of ovarian vulnerability within contemporary metabolic and environmental contexts.

Keywords: Ovarian aging, Reproductive resilience, Systems biology modeling, Insulin resistance, Chronic inflammation, Oxidative stress, HPO axis dysregulation, Biological age estimation

PP:12

The Digital Biorefinery: Advancing Circular Biomass Valorization through AI Integration

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The transition toward a circular bioeconomy necessitates integrated systems capable of converting heterogeneous biomass into high-value bioproducts while maintaining process efficiency and energy sustainability. Conventional biorefineries, however, face persistent challenges related to feedstock variability, inefficient resource recovery and limited real-time process monitoring. This review proposes a digitally enabled biorefinery framework that integrates macroalgae-based biomass valorization with Microbial Fuel Cell (MFC) technology and Artificial Intelligence driven process control to enhance operational stability and resource circularity. This integration seeks to overcome the kinetic limitations often associated with multi-stage biological conversions. The proposed system utilizes macroalgae as a renewable feedstock undergoing enzymatic hydrolysis followed by microbial fermentation to produce L-lactic acid, a precursor for biodegradable polymers. Residual effluents generated during fermentation are redirected to MFC units, where electroactive microorganisms facilitate simultaneous wastewater treatment, low-voltage bioelectricity generation and hydrogen recovery. The biochemical oxygen demand (BOD) reduction within the MFC further optimizes the environmental footprint of the entire process chain. To address biological and operational variability, Artificial Neural Networks (ANNs) are implemented to interpret real-time electrical output signals from the MFCs. By utilizing backpropagation algorithms, the ANN can effectively map non-linear relationships between microbial metabolic flux and voltage fluctuations. These signals serve as indirect indicators of effluent composition and metabolic activity, enabling predictive modeling of upstream fermentation performance. Simulation-based assessments suggest that AI-mediated feedback regulation can potentially improve substrate utilization efficiency, stabilize metabolite yields and reduce process downtime under fluctuating feedstock conditions. By establishing a closed-loop control architecture, the system enhances resilience against biomass heterogeneity and improves overall energy recovery. This digitally integrated biorefinery model demonstrates how the convergence of biological processing, electrochemical energy recovery and machine learning can strengthen circular biomass valorization. Furthermore, the synergy between these technologies provides a scalable blueprint for carbon-neutral industrial manufacturing. The framework aligns with multiple United Nations Sustainable Development Goals, particularly those related to clean energy, responsible production and climate action. Large-scale implementation will require high-resolution datasets, standardized signal calibration and foundational computational infrastructure to effectively manage biological complexity.

Keywords: Circular bioeconomy, Microbial Fuel Cells, Macroalgae Biorefinery, Artificial Neural Networks (ANN)

PP: 13

NRF2 : A Master Regulator of Anti-oxidant Responses in Cancer

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Nuclear factor erythroid 2-related factor 2 (NRF2) is a stress-inducible transcription factor that orchestrates cellular antioxidant and cytoprotective responses. Under homeostatic conditions, NRF2 is negatively regulated by Kelch-like ECH-associated protein 1 (KEAP1), which targets it for ubiquitination and proteasomal degradation, thereby maintaining minimal basal activity. Upon oxidative or electrophilic stress, NRF2 dissociates from KEAP1, translocates to the nucleus, and binds antioxidant response elements (AREs) to induce genes responsible for detoxification and redox equilibrium. This review aims to examine the regulatory mechanisms controlling NRF2 activity, its physiological significance in redox maintenance, and its contrasting roles in cancer development and therapy resistance. A comprehensive analysis of peer-reviewed literature was performed using databases including PubMed, Scopus, and Web of Science. Studies addressing NRF2 signaling pathways, KEAP1 alterations, molecular crosstalk with oncogenic networks, and pharmacological targeting approaches were systematically evaluated to integrate current perspectives on NRF2 in oncology. Short-term activation of NRF2 protects normal cells against oxidative DNA damage and inflammatory stress, thereby suppressing tumor initiation. Conversely, sustained or constitutive activation—frequently arising from mutations in NRF2 or KEAP1 or persistent oncogenic stimulation—confers adaptive advantages to malignant cells. Aberrant NRF2 signaling drives metabolic remodeling, stimulates proliferation, inhibits apoptosis, enhances angiogenesis, and promotes resistance to chemotherapy, radiotherapy, and ferroptosis. Increased NRF2 expression is consistently associated with unfavorable prognosis and aggressive tumor characteristics across diverse cancer types. NRF2 exhibits context-dependent functions in cancer, operating as both a cytoprotective factor and a facilitator of tumor progression. Therapeutic modulation of the NRF2–KEAP1 pathway holds clinical promise but requires carefully tailored strategies to achieve effective and selective anticancer outcomes.

Keywords: NRF2, KEAP1, Oxidative stress, Cancer progression, Chemoresistance.

PP: 14

Ecotoxicological Impact and Biodegradation of Monocrotophos on Soil Microbial Communities

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Monocrotophos is an organophosphorus insecticide widely used in agriculture but known for its neurotoxic effects due to inhibition of acetylcholinesterase. While it plays an important role in pest control, its persistence in soil may adversely affect soil microbial communities and associated biogeochemical processes. The present study investigates the impact of monocrotophos on soil microflora and evaluates the biodegradation potential of indigenous bacteria isolated from rice field soil. Paddy field soil samples were enriched with 500 ppm monocrotophos for 15 days using enrichment culture technique to promote the growth of pesticide-tolerant microorganisms. Serial dilution method was employed to isolate dominant bacterial colonies, which were characterized based on morphological and biochemical properties. Biodegradation studies were conducted using a flask culture method with 10 mL pesticide solution under controlled laboratory conditions. Observations indicated that selected bacterial isolates demonstrated tolerance and degradation ability against monocrotophos. The results suggest that although monocrotophos may exert initial toxic stress on soil microbial populations, certain indigenous bacteria possess adaptive mechanisms that contribute to its degradation. This study highlights both the ecological risk of monocrotophos and the potential role of soil microorganisms in natural bioremediation processes.

Keywords: Monocrotophos; Soil microflora; Biodegradation; Organophosphorus pesticide; Enrichment culture; Bioremediation.

PP: 15

Phage-Derived Proteins φAciK1 and φAciK2 Target Polymicrobial Biofilms Associated with Persistent Infections

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Persistent urinary tract infections (UTIs) are significantly more common in females, with studies showing they occur at least four times more frequently in women than men. Polymicrobial biofilms are increasingly recognized as a major contributor to persistent infections, like urinary tract infections, vulvovaginal candidiasis, and device-associated infections. These biofilms enhance antimicrobial resistance, promote chronic inflammation, and complicate clinical management. Among key pathogens, *Acinetobacter baumannii* and *Escherichia coli* frequently coexist with the opportunistic fungus *Candida albicans*, forming resilient polymicrobial communities. The present study investigated biofilm formation dynamics and evaluated the antibiofilm potential of phage-derived proteins φAciK1 and φAciK2 isolated from *A. baumannii* bacteriophages. Mono-species biofilms of *A. baumannii*, *E. coli*, and *C. albicans*, along with a polymicrobial consortium (*A. baumannii* + *E. coli* + *C. albicans*), were established under static conditions. Crystal violet staining demonstrated maximum biomass accumulation in the polymicrobial model, indicating synergistic interactions and enhanced extracellular matrix production. Phage-derived proteins φAciK1 and φAciK2 were purified and quantified by Bradford assay, yielding concentrations of 114 µg/mL and 121 µg/mL, respectively. SDS–PAGE profiling revealed multiple protein bands ranging from ~84 kDa to 25 kDa, suggesting the presence of lytic enzymes and associated structural components. Antibiofilm evaluation showed significant disruption of *A. baumannii* biofilms and moderate reduction in *E. coli*. No reduction was observed in *C. albicans*, while the polymicrobial biofilm exhibited only slight reduction, indicating protective interspecies interactions within the matrix. This study highlights the clinical relevance of polymicrobial biofilms in women's health and demonstrates the potential of phage-derived proteins as targeted antibiofilm agents. However, the resilience of mixed-species biofilms underscores the need for integrated therapeutic strategies to effectively manage chronic polymicrobial infections.

Keywords: Women's health, Urinary tract infections, Polymicrobial biofilm, Phage-derived proteins, Antibiofilm therapy, *Acinetobacter baumannii*, *Escherichia coli*, *Candida albicans*

PP: 16

Optimizing Micronutrient Delivery: ZnO-Induced Growth Modulation in *Nigella sativa* and *Trigonella foenum-graecum*

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Micronutrient dynamics critically influence seed germination and early plant establishment. Among essential trace elements, zinc plays a regulatory role in enzymatic activation, hormone synthesis, and root differentiation. However, its growth-promoting potential is highly concentration dependent, shifting from stimulation to toxicity beyond optimal levels. Understanding this balance is key to developing sustainable micronutrient-based growth strategies. Optimizing micronutrient supplementation is essential for improving early plant development. This study evaluated the concentration-dependent effects of ZnO suspension (0, 2, 5, and 10 mg/mL) on seed germination and seedling growth of *Nigella sativa* and *Trigonella foenum-graecum* under controlled conditions over one week. Moderate ZnO exposure (5 mg/mL) enhanced germination, root elongation, and seedling vigor compared to control, while 2 mg/mL showed slight stimulation. In contrast, 10 mg/mL reduced germination and inhibited root development, indicating phytotoxicity. *Nigella* displayed slower but clearer responsiveness, whereas *Trigonella* showed consistent germination with concentration dependent root variation. The results demonstrate a hormetic(biphasic) growth response, emphasizing the need for precise ZnO concentration optimization to maximize plant growth while avoiding toxicity. The above study indicates the role of zinc oxide nanoparticles in promoting plant germination and growth.

Keywords: Zinc oxide (ZnO), Concentration-dependent response, Hormetic effect, Seed germination, Seedling vigor

PP: 17

The Ferroptosis-Inflammation Axis in Metabolic Disorders: Mechanistic Insights into β-Cell Failure and Insulin Resistance

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Ferroptosis, an iron-dependent form of regulated cell death that is mediated by lipid peroxidation, is a key Pathological in metabolic inflammation. The Review focused on the bidirectional circuitries between ferroptotic cell death and chronic low-grade inflammation, especially in the context of Type 2 Diabetes and obesity. In the metabolic environment, iron overload due to excess nutrients makes pancreatic β-cells, which are naturally deficient in antioxidant mechanisms, highly vulnerable to ferroptotic cell death. This iron-induced lipid toxicity leads to direct β-cell death, resulting in a drastic reduction in insulin secretion and worsening hyperglycaemia. Concurrently, ferroptotic cell death in adipocytes leads to the secretion of damage-associated molecular patterns (DAMPs) and oxidized lipid mediators, which in turn trigger the polarization of infiltrating macrophages to a pro-inflammatory M1 phenotype. The subsequent chronic secretion of cytokines, such as TNF-α and IL-6, directly impairs systemic insulin signalling pathways, initiating a vicious cycle of metabolic dysfunction. The ferroptosis-inflammation axis holds a promising therapeutic strategy. With the use of GPX4 stabilizers and iron modulation, it is now possible to reverse β-cell function and resist chronic insulin resistance in metabolic disorders.

Keywords: Ferroptosis, β-cell Dysfunction, Insulin Resistance, Lipid Peroxidation, Diabetes.

PP:18

Exploring Dairy-Derived Probiotics: Microbiological, Biochemical and Functional Profiling of Indigenous Lactic Acid Bacteria Isolates

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Probiotic microorganisms, particularly lactic acid bacteria (LAB), play a crucial role in promoting gut health and food fermentation. The present study aimed to isolate, characterize, and evaluate potential probiotic strains from milk and fermented milk samples based on morphological, biochemical, and functional properties. Five isolates (M1–M5) were obtained using selective media including MRS and M17 agar supplemented with milk or fermented milk. Preliminary identification was based on colony morphology, Gram staining, catalase reaction, spore formation, and growth at different temperatures (15°C and 45°C). Biochemical characterization included carbohydrate fermentation, citrate utilization, and exopolysaccharide (EPS) production. Functional probiotic attributes were assessed through hemolytic activity, acid tolerance (pH 3.0, 2 h), bile salt tolerance (0.3%), and antibiotic susceptibility testing using commonly prescribed antibiotics. All isolates were Gram-positive, catalase-negative, non-spore-forming, and non-hemolytic, indicating safety for probiotic application. Bacilli-shaped isolates (M1–M3) were consistent with the *Lactobacillus* group, while cocci-shaped isolates (M4–M5) were suggestive of *Lactococcus* or *Leuconostoc*. EPS production ranged from 95.3–117.3 mg/L, with M2 exhibiting the highest yield. Acid tolerance analysis showed high survival rates for M1 (81.7%), M2 (76.0%), and M3 (84.5%), whereas M4 and M5 demonstrated significantly lower survival. Similarly, bile salt tolerance was highest in M3 (85.3%) and lowest in M5 (0.01%). Antibiotic susceptibility patterns indicated general sensitivity to erythromycin, clindamycin, cephalothin, and oxytetracycline, with resistance observed against ofloxacin and co-trimoxazole in most isolates. Among the tested strains, M1, M2, and particularly M3 exhibited superior probiotic characteristics, including strong acid and bile tolerance, safety profile, and antibiotic sensitivity. These isolates demonstrate potential for application in functional foods and probiotic formulations.

Keywords: Probiotics, Lactic acid bacteria, Acid tolerance, Bile salt tolerance, Exopolysaccharide production, Antibiotic susceptibility, Dairy isolates.

PP: 19

Amenorrhea: Types, Causes, and Treatment

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Amenorrhea is a condition defined by the absence of menstrual periods and is commonly associated with disturbances in the hypothalamic–pituitary–ovarian (HPO) axis. Such disruptions interfere with the normal functioning of key hormonal receptors, including Estrogen Receptor alpha (ESR1), Progesterone Receptor (PGR), and Follicle Stimulating Hormone Receptor (FSHR), all of which are essential for maintaining reproductive health and regulating the menstrual cycle. The present work reviews general information, causes, and their treatment (both conventional and non-conventional). Three-dimensional structures of ESR1, PGR, and FSHR will be retrieved from the RCSB Protein Data Bank and prepared for docking. Selected phytochemicals with phytoestrogenic and hormone-modulating properties, such as Quercetin, Genistein, Diosgenin, Apigenin, and Vitexin will be retrieved from PubChem and optimized through energy minimization before docking analysis. Molecular docking using AutoDock Vina will be conducted to evaluate binding affinity, interaction stability, and hydrogen bonding patterns between the ligands and target receptors. Standard pharmaceutical drugs will be used as reference controls for comparison. Furthermore, pharmacokinetic and toxicity properties will be predicted using SwissADME, pkCSM, and admetSAR to assess drug-likeness, absorption, metabolic interactions, and potential toxicity risks. The objective of this research is to identify promising natural compounds that demonstrate strong receptor interactions and favorable ADMET characteristics. This computational framework may provide a foundation for future experimental validation and the development of safer therapeutic options for hormonal regulation in amenorrhea.

Keywords: Amenorrhea, HPO axis, ESR1, PGR, FSHR, Phytochemicals, Molecular Docking, AutoDock Vina, ADMET, Bioinformatics, Hormonal Regulation.

PP: 20

In Silico Molecular Docking Analysis of Plant-Derived Phytochemicals Targeting ECM Remodelling and Angiogenic Proteins in Varicose Vein Pathophysiology

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Varicose veins are a prevalent manifestation of chronic venous insufficiency characterized by venous dilation, extracellular matrix (ECM) remodelling, endothelial dysfunction, and loss of vascular elasticity. Matrix degradation and abnormal angiogenesis play pivotal roles in disease progression, making proteins involved in ECM turnover and vascular remodelling attractive therapeutic targets. In this study, an *in silico* molecular docking approach was employed to evaluate the binding affinity of selected phytochemicals retrieved from PubChem against key proteins implicated in varicose vein pathophysiology: matrix metalloproteinases MMP-9 and MMP-2, vascular endothelial growth factor VEGF-A, and elastin. Overexpression of MMP-2 and MMP-9 contributes to ECM degradation and venous wall weakening, while elevated VEGF promotes pathological angiogenesis and inflammation; elastin disorganization reduces venous elasticity and structural integrity. Six bioactive phytochemicals—quercetin, diosmin, aescin, curcumin, resveratrol, and asiaticoside were selected based on reported antioxidant, anti-inflammatory, and vasoprotective properties. Ligand structures were energy-minimized and docked into the active sites of the target proteins using molecular docking software, and binding affinities were evaluated through scoring functions and interaction profiling. The docking analysis demonstrated strong binding interactions of flavonoids and triterpenoid saponins with catalytic residues of MMPs, suggesting potential inhibition of ECM degradation. Polyphenols such as quercetin, curcumin, and resveratrol exhibited stable hydrogen bonding and hydrophobic interactions within VEGF-A binding domains, indicating possible anti-angiogenic activity. Asiaticoside and aescin showed favourable interactions with elastin-associated domains, implying a role in preserving vascular elasticity. These findings suggest that selected phytochemicals may modulate multiple molecular targets involved in varicose vein progression through inhibition of matrix degradation, suppression of aberrant angiogenesis, and stabilization of venous wall structure. This multi-target docking study provides a computational basis for future in vitro, in vivo, and clinical investigations exploring plant-derived therapeutics for the management and prevention of varicose veins.

Keywords: Varicose veins, Molecular docking, Matrix metalloproteinases, Phytochemicals, Extracellular matrix degradation

PP: 21

Molecular and Structural Insights into MECP2 Dysfunction in Rett Syndrome

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Rett syndrome is a rare X-linked dominant neurodevelopmental disorder predominantly affecting females, with an incidence of approximately 1 in 10,000 live female births. It is primarily caused by pathogenic variants in the MECP2 gene located on chromosome Xp28, which encodes methyl-CpG-binding protein 2 (MeCP2), a crucial epigenetic regulator in the central nervous system. Clinically, Rett syndrome presents after a period of normal early development, followed by regression between 6–18 months of age, loss of acquired motor and language skills, hand stereotypies, seizures, intellectual disability, and autonomic dysfunction. This study aims to analyze the structural, genomic, and functional characteristics of MeCP2 and correlate molecular alterations with the clinical manifestations of Rett syndrome. A literature-based genomic and molecular analysis was performed using published mutation databases and structural studies of MeCP2. The genomic organization of MECP2 was examined to identify mutation types and hotspots. Structural domain analysis focused on the Methyl-CpG Binding Domain (MBD) and Transcriptional Repression Domain (TRD). Functional insights were derived from neuronal and animal model studies evaluating transcriptional regulation and synaptic development. Common mutations include missense, nonsense, frameshift, and deletions, particularly within the MBD and TRD domains. These alterations impair binding to methylated DNA and disrupt transcriptional control, leading to widespread gene expression abnormalities. Functionally, MeCP2 deficiency results in impaired neuronal maturation, altered synaptic plasticity, and disrupted neural circuitry. Genotype–phenotype variability is influenced by mutation type and X-chromosome inactivation patterns. Rett syndrome exemplifies an epigenetic neurodevelopmental disorder in which structural and genomic defects in MECP2 lead to progressive neurological dysfunction. Integrating clinical and molecular understanding is essential for improving diagnostic precision and advancing targeted therapeutic strategies.

Keywords: Rett Syndrome; MECP2; Mecp2 Protein; Epigenetics; Neurodevelopmental disorder

PP: 22

Computational Identification of FOXO3a Modulators for Drug Repurposing in Myositis

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Myositis is an autoimmune inflammatory myopathy characterized by chronic muscle inflammation, progressive muscle weakness, and immune-mediated muscle fiber damage. Dysregulation of the Forkhead box O3a (FOXO3a) transcription factor plays a critical role in muscle atrophy by activating ubiquitin–proteasome pathway genes such as atrogin-1 and MuRF1, contributing to muscle protein degradation. Therefore, FOXO3a represents a promising therapeutic target for the management of inflammatory myositis. In the present study, an in silico drug repurposing approach was employed to identify potential FOXO3a inhibitors. The crystal structure of human FOXO3a (PDB ID: 2UZK) was retrieved from the Protein Data Bank and prepared for docking analysis. A curated library of FDA-approved drugs was screened using AutoDock Vina implemented in PyRx. Tofacitinib, an FDA-approved Janus kinase (JAK) inhibitor currently used in autoimmune and inflammatory disorders, was selected as the reference drug. Tofacitinib was chosen due to its established immunomodulatory efficacy in inflammatory myopathies and its role in suppressing the JAK–STAT signaling pathway, which indirectly influences FOXO-mediated inflammatory and atrophic responses. Using Tofacitinib as a benchmark allowed comparison of binding affinities and identification of compounds with potentially superior FOXO3a inhibitory capacity. Docking analysis revealed several ligands with strong binding affinities toward FOXO3a, including Darifenacin (–8.0 kcal/mol), Tadalafil (–7.9 kcal/mol), Mefloquine (–7.6 kcal/mol), Palonosetron (–7.5 kcal/mol), Lumateperone (–7.3 kcal/mol), Trametinib (–7.2 kcal/mol), and Ketotifen (–7.2 kcal/mol), which demonstrated favorable interaction patterns within the predicted binding pocket. Notably, some compounds exhibited stronger binding energies than the reference drug, suggesting potential direct inhibitory effects on FOXO3a. These findings indicate that selected FDA-approved drugs may serve as promising candidates for repurposing in myositis through FOXO3a modulation. Further validation using molecular dynamics simulations, toxicity profiling, and experimental studies is necessary to confirm their therapeutic potential.

Keywords: Myositis, FOXO3a, In-silico screening, FDA-approved drugs, Repurposing

PP:23

In Silico Identification of Repurposed PPARγ Ligands for The Management of Inflammatory Disease: Myositis

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Myositis, an autoimmune disorder characterized by chronic muscle inflammation, suffers from limited therapeutic options, necessitating exploration of drug repurposing strategies. This study employs structure-based virtual screening to identify FDA-approved drugs as potential Peroxisome Proliferator-Activated Receptor gamma (PPARγ) agonists for myositis management, leveraging the receptor's established anti-inflammatory properties through reduced pro-inflammatory cytokine production (TNF-α, IL-6). The human PPARγ ligand-binding domain (PDB ID: 3PRG; resolution 2.90 Å) was prepared by removing water molecules, heteroatoms, and non-functional chains, followed by addition of polar hydrogens using PyMOL. A repurposed ligand library of 36 FDA-approved drugs was constructed through SwissSimilarity analysis using pioglitazone as the reference, including thiazolidinediones (pioglitazone, rosiglitazone, troglitazone), NSAIDs (indomethacin, acemetacin), antibiotics (fluoroquinolones, penicillins), cardiovascular drugs (telmisartan, valsartan, enalapril), and other therapeutic classes. Molecular docking was performed using PyRx with AutoDock Vina, with pioglitazone (-8.9 kcal/mol) serving as the reference standard. Systematic virtual screening identified several compounds with superior binding affinities: Tolvaptan (-10.5 kcal/mol), Carindacillin (-9.6 kcal/mol), Telmisartan (-9.5 kcal/mol), Tirbanibulin (-9.5 kcal/mol), and Indomethacin (-9.1 kcal/mol). Notably, multiple fluoroquinolone antibiotics including Ofloxacin (-8.9 kcal/mol) and Levofloxacin (-8.7 kcal/mol) demonstrated comparable binding to the reference drug. All docking results were systematically compiled for comparative evaluation. These findings suggest that several FDA-approved drugs from diverse therapeutic classes may serve as promising PPARγ agonists for repurposing in inflammatory myositis. Further toxicity prediction and molecular dynamics simulations are warranted to validate their safety and therapeutic potential.

Keywords: Myositis, PPARγ, Drug repurposing, In-silico screening, FDA-approved drugs, Molecular docking

PP:24

A Survey on Human Insulin Affordability and Promising Entrepreneurial Venture Opportunity

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As of 2026, the affordability of insulin in India is a deep-seated socio-economic crisis, where an unskilled worker needs to spend as much as nine days of his or her monthly wages to get a standardized monthly dose of insulin analogs. This systemic disparity is fueled by a retail markup that can go as high as 12 times the original cost of production, which is largely driven by aggressive corporate Research and Development Tax recoveries. To overcome these challenges, a multi-pillar entrepreneurial approach is proposed, which revolves around a proprietary soluble production patent. By sidestepping as much as 40% of the original high-cost downstream purification requirements and utilizing the 10,000 crore Biopharma SHAKTI sovereign wealth fund to largely offset clinical trial costs, a new player in the market can help create a revolutionary 65% to 80% reduction in final retail prices. A parallel strategic digital innovation is aimed at the democratization of technology through the replacement of costly, proprietary smart pens with more affordable, Bluetooth-enabled modular and retrofittable smart caps. These universal sensors are equipped with essential clinical functionalities such as automatic dose recording, real-time insulin on board (IOB) tracking, and strict cold-chain temperature tracking. These functionalities are most necessary in the case of the diverse and extreme climate of the Indian environment, where thermal degradation is always a concern, but are made available at a cost that is only a fraction of the original hardware costs. Moreover, with the integration of this solution with the already established Jan Aushadhi government network, the model can overcome a significant amount of traditional marketing and pharmaceutical medical representative costs. This paradigm shift in strategy focuses on the measurement of Time-in-Range (TIR) metabolic values as the key performance indicator for gaining trust in the medical community. With this paradigm shift from hardware sales to data- driven health outcomes, this model ensures the provision of high-quality insulin while simultaneously closing the trust gap that has existed within the institution for a long period of time. In conclusion, this integrated model seeks to turn insulin from a high-margin product into a public health utility. With the focus on technological efficiency and government-backed logistics, we can overcome predatory pricing and ensure that metabolic stability is no longer a luxury that the diabetic population of India cannot afford.

Keywords: Insulin analogs, Recombinant insulin production, Biopharmaceutical manufacturing, Biosimilar insulin development, Glycemic control, Time-in-Range (TIR), Smart insulin delivery systems.

PP: 25

An LC-Qtof-MS Based Method for Detection and Quantification of Ricinine in Castor Oil

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Ricinine, a toxic alkaloid present in Ricinus communis, is widely recognized as a biomarker of castor-associated toxicity. Although castor oil is extensively used in food, pharmaceutical, and cosmetic applications, limited data exist regarding the occurrence of ricinine in commercial castor oil and validated analytical methods for its detection. The absence of regulatory surveillance raises significant food safety concerns. The present study aimed to develop and validate a sensitive and reliable LC-qToF-MS method for the detection and quantification of ricinine in castor oil and to assess its occurrence in commercially available samples. An optimized liquid chromatography-quadrupole time-of-flight mass spectrometry (LC-qToF-MS) method was developed using electrospray ionization in positive mode. Chromatographic separation was achieved on a C18 column under gradient elution. The method was validated as per ICH Q2 (R2) guidelines for linearity, sensitivity, selectivity, precision, accuracy, and recovery. Real sample analysis was performed on seventeen commercially available castor oil samples. Principal component analysis (PCA) was conducted to evaluate contamination patterns. Additionally, the influence of extraction methods (cold-pressed, traditional hot extraction, and hexane extraction) on ricinine levels was investigated. The method demonstrated excellent linearity over 1-1000 ppb ($R^2 = 0.9976$), with limits of detection and quantification of 0.51 ppb and 1.58 ppb, respectively. Recovery ranged from 99.78-103.45%, confirming accuracy. Ricinine was detected in all analyzed commercial samples, with concentrations ranging from 2.91 ± 0.28 to 128.18 ± 0.36 ppm. PCA revealed distinct clustering of highly contaminated samples. Cold-pressed oil exhibited the highest ricinine levels, while hexane extraction showed significantly lower contamination. This study provides the first validated LC-qToF-MS method for ricinine quantification in castor oil and reveals widespread contamination in commercial samples. The findings highlight the urgent need for regulatory limits and routine monitoring to ensure consumer safety.

Keywords: Ricinine, Castor oil, Food safety, LC-qToF-MS, Principal component analysis (PCA), Analytical methods

PP:26

Effect of Polyethylene Glycol on α-Synuclein Aggregation and Nucleation

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Polyethylene glycol (PEG) is a neutral, hydrophilic polymer widely used to mimic the densely crowded intracellular environment due to its effect on protein folding dynamics. Previous studies have demonstrated that PEG accelerates aggregations and amyloid fibril formations of α-synuclein, a key pathological hallmark of Parkinson's disease (PD), beyond simple excluded volume effects by increasing effective protein-protein interaction and promoting nucleation. Although the effect of PEG on α-synuclein aggregation has been extensively investigated, the influence of PEG chain length remains unclear. The present study investigates the effects of PEG 400, PEG 6000, and PEG 8000 at concentrations (6.25, 12.5, 25, 50, 100, and 200 mg/mL) to evaluate chain length and concentration-dependent effects on α-synuclein. Aggregation kinetics were monitored using Thioflavin T (ThT) fluorescence assays, secondary structural transitions were analyzed by far-UV circular dichroism (CD) spectroscopy, and fibrillar morphology was examined using transmission electron microscopy (TEM). PEG induced pronounced secondary structural alterations and enhanced β-sheet formation in a concentration and chain length-dependent manner, as evidenced by significant shortening of the lag phase and increased ThT fluorescence intensity.CD analysis revealed structural rearrangements characterized by increased minimum near 222nm, indicative of β-sheet-rich conformations. TEM analysis confirmed the formation of dense and elongated fibrillar networks with PEG, in contrast to relatively shorter fibrils observed in α-synuclein alone. Notably, at 200 mg/mL, aggregation was reduced, likely due to increased solution viscosity restricting molecular diffusion and limiting nucleation and elongation processes. Collectively, these findings demonstrate that PEG chain length and concentration critically regulate α-synuclein kinetics and fibril morphology, providing mechanistic insight into polymer-mediated modulation of aggregation processes relevant to Parkinsonian pathology.

Keywords: PEG-mediated macromolecular crowding, α-synuclein aggregation kinetics, Polymer chain length effects, Amyloid fibril formation, β-sheet structural transition, Parkinson's disease pathology, Protein–protein interaction modulation

PP:27

Rapid Colorimetric Detection of Corticosteroid Adulteration in Dietary Supplements

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Dietary supplements, known for their nutritional support and performance enhancement, are widely used by the public, including the elderly, women, children, and athletes. However, they are reported to be adulterated with synthetic corticosteroids like prednisolone, which lead to severe health risks such as osteoporosis, metabolic disorders, and cardiovascular complications. Hence, they are completely banned by FSSAI (Food Safety and Standards Authority of India) and WADA (World Anti-Doping Agency). The established methods for detecting corticosteroids, such as HPLC, TLC, and immunochromatography, are time-consuming and require trained personnel. Thus, there is a need to develop rapid, sensitive, and point-of-care detection methods for corticosteroids. In the present study, a recognition chemistry was developed that reacted specifically with corticosteroids to produce a stable chromogenic product that had maximum absorbance at 410 nm. The recognition chemistry was optimized and tested for selectivity against common supplement constituents such as proteins and vitamins. Validation was performed using various commercially available dietary supplements. The developed detection method exhibited linearity of (R^2 0.995) across 0.016-0.5% (w/v). The limit of detection (LOD) and limit of quantification (LOQ) was 0.04% (w/v) and 0.13%(w/v), respectively. It demonstrated high selectivity and sensitivity with minimal matrix interference. In conclusion, the developed method provides a quick, cost-effective, and user-friendly alternative for on-site screening of corticosteroids, enhancing food safety, quality control, and regulatory compliance in the dietary supplement industry.

Keywords: Chromogenic sensor, Adulteration, Corticosteroid, Dietary supplements, Food safety.

PP:28

Colours to Dye For: Molecular-Level *In Silico* Insights into Chitosan-Driven Dye Remediation

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Water pollution remains a critical environmental challenge, driven by the continuous release of contaminants such as chlorophenols, dioxins, and industrial dyes. Dyes, in particular, pose significant risks due to their chemical stability and resistance to traditional biodegradation. Among various remediation strategies, adsorption is prioritized as a highly effective, low-cost, and operationally simple method. While biopolymers are promising adsorbents, current research often relies on empirical structural modifications, leaving a significant gap in the mechanistic understanding of how their functional groups interact electronically with dye molecules. This study highlights the necessity of transitioning from trial-and-error experimentation to rational adsorbent design by integrating computational chemistry with experimental data. By employing robust frameworks including Density Functional Theory (DFT), Non-Covalent Interaction (NCI) analysis, Quantum Theory of Atoms in Molecules (QTAIM), and interaction energy calculations researchers can gain molecular-level insights into the stability and electronic nature of dye biopolymer complexes. Integrating these computational approaches allows for the prediction of adsorption potential and the identification of key binding sites, providing a systematic pathway for developing high- capacity, sustainable biopolymer-based materials for efficient dye remediation.

Keywords: Dyes, Adsorption, Density Functional Theory, Non-Covalent Interaction, Quantum Theory of Atoms in Molecules (QTAIM)

PP:29

B-Thalassemia – Current Challenges and Emerging Therapeutic Strategies

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Thalassemia is an inherited blood disorder, occurring due to the mutations in α or β globin genes of hemoglobin. Depending upon the number of defective genes, α or β-thalassemia disorder is present, wherein β-thalassemia is highly prevalent and fatal. β-thalassemia patients lose the ability to produce hemoglobin resulting in reduced oxygen-carrying capacity in red blood cells. This condition is medically treated with regular blood transfusions to the patients from early childhood. Despite therapeutic benefits, repeated transfusions result in adverse effects such as iron accumulation in vital organs. The appropriate chelation therapy is used to facilitate removal of excess iron from the body preventing life threatening complications. The Allogeneic hematopoietic stem cell transplantation (HSCT) is found to have curative potential but is limited due to donor availability and many complications. Several novel therapeutic approaches are being developed such as gene therapy (Beti-cell and Exa-cell), CRISPR/Cas9 genome editing. These approaches are expected to have promising outcomes and less complications. In addition, computational approaches help discover microRNAs, novel therapeutic targets and candidate molecules to prevent the iron overload related disorders. Gene expression modulation is performed with the help of computational docking strategies. Many polyphenolic compounds and propolis- derived molecules are also being explored to modulate genes resulting in iron imbalance. The emerging molecular therapies targeting the iron pathway along with the microRNA- based and *in-silico* approaches aim to restore healthy iron pathways. Integration of the optimized iron chelation with novel targeted therapies may improve and reduce the lifelong disease burden.

Keywords: Thalassemia, Chelation Therapy, Gene Therapy, Genome Editing, MicroRNAs.

PP: 30

Endocrine-Disrupting Chemicals and Microbial Biotransformation: Implications for Women's Health from Scientific Understanding to Women-Led Solutions

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Endocrine Disrupting Chemicals (EDCs) are environmental pollutants capable of interfering with hormonal signalling pathways in humans and wildlife. These compounds are commonly present in plastics (bisphenol A), pesticides, industrial effluents, cosmetics, and personal care products, resulting in chronic low-level exposure. Women are particularly vulnerable due to the complex hormonal regulation involved in reproductive health, pregnancy, metabolic balance, and neuroendocrine function influencing mental health. Increasing industrialization and environmental contamination have raised concerns regarding the long-term implications of EDC exposure on women's health and sustainable well-being. This review-based study aims to examine the impact of endocrine disrupting chemicals on women's health, highlight the role of microbial biotransformation as a sustainable remediation strategy, and explore women-led scientific and entrepreneurial initiatives addressing environmental toxicology challenges. A structured literature review was conducted using peer-reviewed scientific databases. Relevant articles focusing on endocrine disruptors, reproductive toxicology, microbial degradation pathways, and women-led environmental innovations were analyzed. Comparative evaluation of regulatory frameworks and sustainability models was also included. The review indicates strong associations between chronic EDC exposure and disorders such as polycystic ovarian syndrome (PCOS), increased breast cancer risk, infertility, thyroid dysfunction, and metabolic syndrome, as well as emerging evidence linking endocrine disruption to mood disorders, anxiety, and neuroendocrine-related psychological disturbances. Microbial biotransformation mechanisms demonstrate promising potential in degrading certain EDCs through enzymatic pathways, offering eco-friendly remediation solutions. Additionally, emerging women-led startups in green chemistry and sustainable product development contribute to safer alternatives and awareness generation. However, regulatory implementation and public awareness remain inconsistent. Environmental endocrine disruptors pose significant risks to women's hormonal, reproductive and mental health. Integrating scientific research, microbial remediation strategies, and women-driven innovation networks can promote safer ecosystems and sustainable public health. Strengthening interdisciplinary collaboration and gender-inclusive regulatory policies is essential for translating research into actionable impact.

Keywords: Endocrine-Disrupting Chemicals, Women's Reproductive and Neuroendocrine Health, Microbial Biotransformation, Environmental Toxicology, Sustainable Remediation

PP:31

Development of a Sensor-Based Smart Wearable Device for Real-Time Women Safety Monitoring and Alert System

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Women's safety has become a major global concern due to the increasing number of harassment, assault, and violence cases, particularly in public and isolated environments. Despite the availability of mobile-based safety applications and traditional self-defense tools, these solutions often fail to provide immediate assistance during emergency situations because they require manual access and may not be readily accessible. The need for a reliable, easily accessible, and real-time safety system is essential to empower women and enhance their personal security. The objective of this research is to develop a sensor-based smart wearable device that provides real-time safety monitoring and instant emergency alert functionality. The proposed system aims to ensure immediate response, continuous accessibility, and improved personal safety using wearable and Internet of Things (IoT) technology. The proposed system integrates multiple components including sensors, a microcontroller, Global Positioning System (GPS) module, panic button, and wireless communication module. The wearable device is designed in the form of a compact bracelet that can be easily worn by the user. When the panic button is activated, the microcontroller processes the signal and retrieves the user's real-time location through the GPS module. This information is then transmitted to pre-registered emergency contacts via wireless communication. The system ensures fast, reliable, and continuous safety monitoring. The proposed wearable device provides rapid emergency alert transmission and accurate real-time location tracking. The wearable design ensures immediate accessibility during critical situations, reducing response time and increasing the chances of timely assistance. The system demonstrates improved reliability, efficiency, and usability compared to conventional safety solutions. This research demonstrates that sensor-based wearable technology can provide effective and practical solutions for enhancing women's safety. The integration of real-time monitoring and emergency alert functionality improves personal security and empowers women. The proposed system contributes toward creating safer environments and supports sustainable safety and empowerment initiatives.

Keywords: Women Safety, Smart Wearable Device, Emergency Alert System, GPS Tracking, Internet of Things (IoT), Real-Time Monitoring

PP:32

From Lab to Likes to Leadership: Social Media as a Catalyst for Women-Led Student Entrepreneurship in STEM

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Although women's participation in STEM education has increased, their representation in entrepreneurship remains limited due to barriers such as funding gaps, restricted visibility, and mentorship constraints. Social media platforms are emerging as alternative ecosystems that reduce entry barriers and enable women to build professional identity and economic independence. This study explores how social media can function as a catalyst for transforming academic knowledge into sustainable entrepreneurial ventures among women students in STEM. A conceptual and exploratory approach was adopted through literature review and observation of emerging women-led student ventures. A structured framework, termed the Social-Academic Entrepreneurship Model (SAEM), was developed to map the progression from academic expertise to content creation, digital branding, monetization, and venture sustainability. The proposed model identifies five interconnected stages: knowledge foundation, strategic content creation, audience trust-building, digital branding, and revenue generation. Findings suggest that social media enhances visibility, fosters community engagement, supports flexible work-life integration, and enables leadership development among women students. Social media serves as a democratizing digital incubator that empowers women in STEM to convert knowledge into influence and income. Integrating digital literacy with academic training may strengthen inclusive and sustainable women-led entrepreneurial ecosystems.

Keywords: Women in STEM, Social Media Entrepreneurship, Student Ventures, Digital Branding, Empowerment

PP: 33

Nickel Nanoparticle-Loaded Antifungal Nail Lacquer: Formulation, Physicochemical Characterization and *In Vitro* Activity Against *Candida albicans*

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Fungal nail infections caused by opportunistic yeasts such as *Candida albicans* present therapeutic challenges due to limited penetration of topical agents through the dense keratinized nail paint and the increasing prevalence of antifungal resistance. The present study aimed to develop and evaluate a nickel nanoparticle (Ni-NP) incorporated antifungal nail lacquer for enhanced topical delivery and improved antifungal efficacy. Nickel nanoparticles were synthesized and uniformly dispersed into a nitrocellulose-based nail lacquer system containing suitable solvents, plasticizers and stabilizing agents to ensure film-forming ability and formulation stability. The formulated nail lacquer was subjected to physicochemical evaluation including visual homogeneity, viscosity, spreadability, drying time, film thickness, adhesion, flexibility and non- volatile content to assess stability, usability and application performance. The antifungal activity of Ni-NPs was first evaluated in vitro against *C. albicans* using the broth microdilution method to determine the minimum inhibitory concentration (MIC). The antifungal efficacy of the Ni-NP nail lacquer was subsequently assessed using an agar well diffusion assay and compared with the base formulation and standard antifungal control. Results indicated that the Ni-NP nail lacquer possessed desirable physicochemical properties, forming a smooth, adherent and flexible film with acceptable drying time and stability. The nanoparticle incorporated formulation exhibited significant antifungal activity against *C. albicans*, demonstrating greater growth inhibition compared to the lacquer base, thereby confirming the antifungal contribution of the incorporated nanoparticles. This study suggests that Ni-NP-based nail lacquer represents a promising topical antifungal formulation approach, offering improved surface retention, enhanced antifungal performance and convenient patient application. The formulation may provide a useful platform for localized antifungal therapy and further translational development in antifungal nail care products.

Keywords: Nickel nanoparticles (Ni-NPs), Antifungal nail lacquer, *Candida albicans,* Physicochemical evaluation, Minimum inhibitory concentration, Topical drug delivery

PP: 34

In Silico Evaluation of Phytochemicals Acting on PPARγ in Metabolic Inflammation: Myositis

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Metabolic inflammation in myositis is closely associated with dysregulation of Peroxisome Proliferator-Activated Receptor gamma (PPARγ), a nuclear receptor involved in lipid metabolism and immune response regulation. The present study aimed to identify potential phytochemical modulators of PPARγ using a structure-based in silico molecular docking approach. The crystal structure of human PPARγ (PDB ID: 1PRG) was retrieved from the Protein Data Bank and prepared using PyMOL by removing heteroatoms and optimizing the receptor structure. A curated library of selected phytochemicals was prepared and energy-minimized prior to docking. Molecular docking was performed using PyRx integrated with AutoDock Vina to calculate binding affinity scores and predict ligand–receptor interactions. Binding energies were compared with the reference compound quercetin to evaluate relative binding efficiency. The top 10 phytochemicals demonstrating the most favourable binding energies were Luteolin (−9.3 kcal/mol), Baicalein (−9.3 kcal/mol), Fisetin (−9.1 kcal/mol), Apigenin (−9.0 kcal/mol), Hispidulin (−9.0 kcal/mol), Coumestrol (−9.0 kcal/mol), Gossypetin (−8.9 kcal/mol), Galangin (−8.9 kcal/mol), Quercetagetin (−8.8 kcal/mol), and Myricetin (−8.7 kcal/mol). Two-dimensional interaction analysis was conducted to evaluate hydrogen bonding and hydrophobic contacts within the PPARγ active site, revealing interaction patterns comparable to the reference ligand. Overall, the findings suggest that these flavonoid-based phytochemicals exhibit strong predicted affinity toward PPARγ and may serve as promising candidates for modulating metabolic inflammation in myositis. Further molecular dynamics simulations and experimental validation are recommended to confirm their therapeutic potential

Keywords: Myositis, PPARγ, Phytochemicals, Virtual screening, Molecular docking

PP:35

Educational Insights on Women's Role in Safe, Sustainable Tourism for Societal good in Uttar Pradesh

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Uttar Pradesh (UP), with its diverse heritage sites (such as Ayodhya, Agra, Prayagraj) and natural assets (such as Dudhwa National Park, Nawabganj Bird Sanctuary wetlands), promoting tourism as a tool of socio-economic development through niche products such as eco-tourism, rural tourism and homestays to foster local employment and preserve culture, along with ensuring sustainability. The Uttar Pradesh Tourism policy 2022 focuses on strengthening women involvement into Tourism workforce through skill training, safety and community led entrepreneurship (e.g. Tharu Tribal crafts and Homestays). Key guiding principles include Suraksha & Sanrachna, Swachhta, Sahyog and empowering women to work as owner rather than just workers to promote social welfare. Schemes like UPSRLM, empowers women through Self Help Groups (SHGs) to lead safe and sustainable tourism. Initiatives like rural homestays and community-led eco-tourism make women hosts, guides, craft producers, and entrepreneurs. These efforts improve safety, shifting gender norms in public spaces and contribute to the common good. Educational programs in tourism and environmental management also enable women, connecting academic learning to on- the-ground empowerment. This study aims to provide educational insights into women's significant contributions to safe, sustainable tourism in Uttar Pradesh. This study analyses how focused training, policy support, and leadership roles in homestays, guiding, and community initiatives promote economic empowerment, environmental conservation, cultural preservation, and improved societal safety and well-being. The research employs a mixed-methods approach, which includes secondary data analysis from government sources (Uttar Pradesh Tourism Policy 2022, UPSRLM reports, MoUs for rural tourism development), case studies of women-led models (e.g., homestays in heritage/rural areas, Tharu eco-tourism in Balrampur, SHG-driven hospitality). Qualitative thematic analysis of SHG initiatives and educational interventions evaluates empowerment impacts on safety and sustainability. Women's participation significantly enhances results: In the past decade, UPSRLM mission helped 1.38 lakh women, supported by 840 village organizations in Varanasi to become economically independent through SHG linked homestays and guiding. Women entrepreneurs reporting improved livelihoods through hospitality training, guiding, and ODOP-linked crafts sales. Recognition of villages like Karikot (Bahraich) for 2025 ICRT responsible tourism and community models empowering marginalized groups. Education, gender-responsive policies, skill training, and collaboration promote growth, equity, and resilient communities.

Keywords: Women's empowerment, Sustainable Tourism, Safe Tourism, Rural Homestays, Uttar Pradesh, Gender Inclusion

PP: 36

A Mechanistic Insight into Alcohol Induced Cancer Risk

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Alcohol consumption is a well-established and preventable cause of cancer, which contributes significantly to the global cancer burden. It is causally associated with malignancies of various parts like oral cavity, pharynx, larynx, esophagus, liver, colorectum, and female breast, with growing evidence for pancreatic and gastric cancers. Cancer risk increases in a dose-dependent manner, and even low levels of alcohol intake have been shown to elevate the risk for certain types of cancers, particularly breast cancer. Due to intake of alcohol, carcinogenesis of multiple interconnected biological mechanisms is promoted. The body converts ethanol into acetaldehyde, which can damage DNA and interfere with its repair. When alcohol is metabolized in the body, it also generates reactive oxygen species which is harmful, leading to genomic instability and oxidative stress. It also induces inflammation which disrupts one-carbon metabolism and alters DNA methylation, which in turn also affects hormonal regulation, including increased estrogen levels. Carcinogenesis is also promoted by alcohol by forming DNA-protein cross-linking and inducing certain chromosomal aberrations which contributes to genomic instability. This enhances the cell proliferation to compensate for tissue injury which is caused by alcohol intake increasing the chances of replication error. Additionally, alcohol disrupts the gut microbiome composition which leads to increased production of carcinogenic metabolites and inflammation, this supports tumor development. Strengthening awareness against alcohol induced cancer and implementing effective alcohol reduction strategies remain critical and crucial steps toward reducing the global burden of alcohol-attributable cancers.

Keywords: Alcohol, Cancer, Genomic instability, Oxidative stress, Inflammation

PP: 37

Molecular Mechanisms of Air Pollution–Induced Reproductive Toxicity: Oxidative Stress, Endocrine Disruption and Epigenetic Alterations

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Declining fertility rates and increasing reproductive disorders have raised concerns about the role of environmental exposures in human health. Among these, ambient air pollution has emerged as a critical yet often underestimated contributor to reproductive impairment. Pollutants such as particulate matter (PM2.5), polycyclic aromatic hydrocarbons (PAHs), nitrogen oxides, and heavy metals are now recognized not only for their respiratory effects but also for their capacity to disrupt reproductive function in both males and females. This systematic review synthesizes recent evidence (2015–2025) to explore the molecular pathways through which air pollution influences reproductive health, focusing on oxidative stress, endocrine disruption, and epigenetic alterations. A structured search of PubMed and Scopus databases was conducted to identify mechanistic human and animal studies examining these pathways. Current findings indicate that exposure to air pollutants triggers excessive production of reactive oxygen species (ROS), leading to mitochondrial dysfunction, lipid peroxidation, and DNA damage in sperm cells, as well as impaired oocyte quality and follicular injury. In addition, several pollutants act as endocrine disruptors, interfering with the hypothalamic–pituitary–gonadal axis and altering levels of key reproductive hormones such as testosterone, estrogen, and progesterone. Emerging research further highlights epigenetic changes, including altered DNA methylation patterns and microRNA expression in germ cells and placental tissues, suggesting possible long-term and even transgenerational effects. Together, the evidence supports a multifaceted mechanistic model in which oxidative damage, hormonal imbalance, and epigenetic reprogramming collectively contribute to reproductive toxicity following air pollution exposure. While the data are compelling, significant gaps remain in long-term human studies and sex-specific mechanistic understanding. Addressing these gaps is essential for developing targeted prevention strategies and safeguarding future generations from the risk of environmental exposure on reproductive toxicity.

Keywords: Air pollution; Reproductive toxicity; Oxidative stress; Endocrine disruption; Epigenetic changes

PP: 38

Organic Pollutant Information System: A Virtual repository against Organic pollutants and their impact on Human Health

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Organic pollutants constitute a significant class of xenobiotic compounds that pose long-term ecological and public health challenges due to their persistence, volatility, lipophilicity, and toxicodynamic properties. Among them, Volatile Organic Compounds (VOCs) and Persistent Organic Pollutants (POPs) are extensively documented for their roles in oxidative stress induction, endocrine disruption, genotoxicity, and chronic inflammatory responses. Although toxicological data are available across regulatory databases and scientific literature, there remains a lack of an integrated, systematically structured platform that consolidates pollutant-specific molecular and health-related information in a coherent digital framework. The present work introduces the Organic Pollutant Information System (OPIS), a virtual repository designed to categorize and organize critical data on selected VOCs and POPs with relevance to human health. The repository compiles pollutant-specific descriptors including chemical classification, IUPAC nomenclature, molecular formula, emission sources, exposure pathways, short-term toxicity profiles, and long-term pathological implications. Data curation was guided by internationally recognized environmental and toxicological sources to ensure scientific reliability. The system architecture emphasizes structured data presentation and user interactivity, enabling efficient retrieval and comparative analysis of pollutant characteristics. By integrating toxicological insights with a functional digital interface, OPIS contributes toward improved scientific communication and accessibility of environmental health information. This initiative highlights the potential of computationally organized repositories in supporting environmental risk assessment, academic learning, and evidence-based awareness regarding pollutant-induced health outcomes.

Keywords: Organic pollutants, Volatile Organic Compounds (VOCs), Persistent Organic Pollutants (POPs), Environmental toxicology, Bioaccumulation, Digital knowledge repository

PP: 39

Antibiotic-Resistant Oral Microbiome and Its Role in Oral Squamous Cell Carcinoma

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Oral squamous cell carcinoma (OSCC) is one of the most common cancers of the oral cavity and continues to cause significant morbidity and mortality worldwide. Although advances in surgery, radiotherapy, and chemotherapy have improved patient care, overall survival rates have not increased dramatically. This suggests that OSCC is influenced by more than just the traditionally known risk factors such as tobacco use, alcohol consumption, and human papillomavirus (HPV) infection. In recent years, researchers have started to explore the possible role of the oral microbiome in the development and progression of this disease. The oral cavity contains a diverse community of microorganisms that normally live in balance with the host. This balance helps maintain immune stability and protects the oral epithelium. However, when this microbial equilibrium is disturbed a condition known as dysbiosis, it can lead to chronic inflammation, disruption of the epithelial barrier, and metabolic changes. These alterations may create a favorable environment for cancer development. At the same time, antibiotic resistance among oral bacteria has become an increasing concern. The overuse and misuse of antibiotics in healthcare settings have encouraged the growth of resistant strains. These bacteria can persist in the oral cavity, form strong biofilms, and promote long-term inflammation. As a result, microbial imbalance and antibiotic resistance are now seen as closely connected processes that may together influence carcinogenesis. By examining microbial shifts, possible biological mechanisms, and the impact of antibiotic exposure, it highlights the need to better understand these interactions. Such knowledge may support improved prevention strategies and more personalized approaches to OSCC management.

Keywords: OSCC, Oral Microbiome, Antibiotic Resistance, Dysbiosis, Inflammation

PP: 40

Plant-Derived Secondary Metabolites as Prospective Antimicrobial Agents

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The accelerating emergence of antimicrobial resistance (AMR) has significantly reduced the therapeutic effectiveness of conventional synthetic antibiotics, posing a major threat to global public health. The limited discovery of novel antibiotic classes, coupled with the rapid adaptability of pathogenic microorganisms to single-target drugs, necessitates exploration of alternative bioactive reservoirs. Plant-derived secondary metabolites, particularly phenolic compounds, flavonoids, alkaloids, and other pigmented phytochemicals, represent a structurally diverse group of naturally evolved defense molecules with documented antimicrobial potential. This analytical review examines the correlation between specific classes of plant secondary metabolites and their antimicrobial mechanisms, with emphasis on their translational potential in pharmaceutical and clinical applications, including advantages related to multi-target action, toxicity profiles, and resistance modulation. A comparative literature-based methodology was employed, reviewing peer-reviewed studies reporting antimicrobial activity of plant pigments and secondary metabolites against clinically relevant bacterial and fungal pathogens. Mechanistic patterns analyzed include membrane disruption, enzyme inhibition, oxidative stress induction, and interference with nucleic acid synthesis, alongside available toxicological and resistance-related findings. The reviewed evidence indicates that phenolic and flavonoid compounds demonstrate broad-spectrum antimicrobial activity through multi-target mechanisms that may reduce selection pressure associated with single-target antibiotics. Several studies report comparatively lower cytotoxicity toward mammalian cells at effective concentrations, suggesting therapeutic feasibility. Overall, plant-derived secondary metabolites represent a strategically valuable and chemically diverse reservoir for resistance-aware antimicrobial development, and integrating phytochemical profiling with mechanistic evaluation may advance next-generation therapeutic strategies in infectious disease management.

Keywords: Antimicrobial resistance; Plant secondary metabolites; Phenolic compounds; Phytochemicals; Drug discovery

PP: 41

The Effect of Maternal Exposure to Air Pollutants and Heavy Metals during Pregnancy on the Risk of Neurological Disorders

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Exposure to airborne heavy metals is an important environmental health concern, particularly for pregnant women living in highly polluted regions. Toxic metals such as lead (Pb), cadmium (Cd), mercury (Hg), and arsenic (As) are common components of particulate air pollution and can cross the placental barrier during pregnancy, directly affecting fetal development. These metals enter the maternal bloodstream through inhalation and are transported to the fetus via the placenta, where they induce oxidative stress, disrupt neuronal signaling, and interfere with normal brain development. Prenatal exposure to heavy metals has been associated with impaired cognitive function, developmental delays, and increased risk of neurological disorders in early childhood. In India, rapid urbanization, vehicular emissions, industrial activities, and biomass burning contribute significantly to airborne heavy metal contamination, increasing exposure risks among pregnant women. Understanding the relationship between maternal exposure and neurological outcomes is important for developing preventive strategies and improving maternal and child health. Reduction of heavy metal exposure during pregnancy through environmental monitoring and public health awareness may help lower the risk of neurodevelopmental disorders and support healthier child development.

Keywords: Air pollution, Heavy metals, Prenatal exposure, Neurodevelopment, Maternal health, Neurological disorders

PP: 42

HER - Health, Environment & Regulatory Journey

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The interconnected relationship between health, environment, and regulatory frameworks has become increasingly critical in addressing global sustainability challenges. The concept of HER – Health, Environment & Regulatory Journey emphasizes the integrated approach required to protect human health while preserving environmental integrity through effective policies and governance. Rapid industrialization, urbanization, and climate change have significantly impacted public health, leading to rising cases of pollution-related diseases, resource depletion, and ecological imbalance. Environmental factors such as air and water pollution, hazardous chemicals, and waste mismanagement directly influence community health outcomes. Regulatory bodies, including organizations such as the World Health Organization and the United Nations Environment Programme, play a crucial role in establishing guidelines, safety standards, and environmental protection laws to mitigate these risks. National policies further translate these global frameworks into actionable strategies. This conference presentation explores the journey from environmental exposure to health impact and the regulatory mechanisms designed to ensure sustainable development. It highlights the importance of interdisciplinary collaboration, scientific research, risk assessment, and evidence-based policymaking in achieving long-term environmental and public health security. The HER framework ultimately promotes a balanced pathway toward healthier communities and a sustainable future.

Keywords: Environmental Health, Toxicology, Public Health, Risk Assessment, Sustainable development

PP: 43

From Vedic Scholars to Contemporary Researchers: Women's Evolving Participation in Indian Academia

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The history of women's participation in Indian knowledge traditions is marked by shifts, interruptions, and gradual re-emergence rather than a simple story of progress. Early textual traditions indicate that women were present in philosophical and intellectual discussions, suggesting that access to knowledge was not always entirely closed to them. However, over time social stratification, institutional consolidation of education, and rigid gender norms reduced women's participation in formal learning spaces. During the medieval period, their intellectual engagement largely moved away from organized academic structures and found expression in devotional, literary, or courtly domains. The colonial period introduced modern universities and formal educational systems. While reform movements advocated women's education, these efforts were uneven and often limited to certain classes and regions. Many women who pursued higher education, including those who studied abroad, returned to face professional restrictions and social resistance. Access to degrees did not necessarily guarantee equal professional opportunities. After independence, constitutional guarantees and the expansion of public universities significantly increased women's enrolment in higher education. Nevertheless, social expectations, domestic responsibilities, and institutional hierarchies continued to influence their academic journeys. In contemporary India, women are visibly present across diverse disciplines including sciences, medicine, literature, economics, technology, and policy research. Their contributions are evident in space research, medical innovation, advanced academic studies, and global scholarship. Recognition through national and international awards reflects this growing presence. This study traces historical transitions in women's engagement with education and research in India to examine whether present-day visibility reflects structural transformation or continued negotiation with institutional frameworks. Based on a review of historical records, academic studies, policy documents, and institutional data, the analysis shows that women's participation in Indian academia has grown substantially. However, leadership positions, funding authority, and institutional decision-making still reflect uneven representation, indicating that structural equity remains an ongoing challenge.

Keywords: Women in Academic, Indian Education History, Gender and Research, Higher Education, Academic Leadership, Contemporary India

PP: 44

Integrative Reverse Vaccinology-based designing of the Multi-epitope-based vaccine candidates against *Pseudomonas aeruginosa*

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Pseudomonas aeruginosa has emerged as one of the most clinically consequential pathogens of the modern era. The development of a targeted, broadly protective vaccine represents not merely an attractive alternative but a genuine clinical necessity. This study pursued that objective through a reverse vaccinology framework applied systematically to the *P. aeruginosa* proteome. Protein sequences were retrieved from UniProt and initially screened for antigenicity, followed by subcellular localisation analysis to prioritize outer membrane and surface-exposed proteins. Candidate proteins were selected against stringent criteria including surface accessibility, high immunogenic potential, and the absence of significant sequence homology with human proteins. Based on high antigenicity and favourable localisation characteristics, Porin D was selected as the final vaccine target. From this filtered protein set, CTL (MHC class I) and HTL (MHC class II) epitopes were predicted using IEDB analysis tools, while linear B-cell epitopes were identified using the BepiPred server. Following comprehensive screening, 15 CTL epitopes, 15 HTL epitopes, and 7 B-cell epitopes were shortlisted. Breadth of protection was a central consideration throughout. Epitope selection was deliberately weighted toward peptides exhibiting high binding affinity across a diverse range of MHC class I and class II alleles. Subsequent population coverage analysis using the IEDB Population Coverage tool confirmed that the resulting construct holds broad theoretical protective potential across geographically and genetically diverse populations. The multi-epitope vaccine construct was rationally designed by assembling the top-ranked CTL, HTL, and B-cell epitopes using suitable linkers to enhance epitope processing and immune presentation. An adjuvant sequence was incorporated at the N-terminus via an EAAAK linker to strengthen immunogenicity, while AAY, GPGPG, and KK linkers were employed to connect CTL, HTL, and B-cell epitopes, respectively. The vaccine candidate described here is computationally derived and requires experimental validation.

Keywords: *Pseudomonas aeruginosa*, Reverse vaccinology, Multi-epitope vaccine, Porin D, Antigenicity, Population coverage analysis

PP: 45

Advances in Nanocomposites Material Based Approaches for Combating *ESKAPE Pathogens* Biofilms

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The highly organized microbial colonies known as biofilms are encased in a matrix of extracellular polymeric substance (EPS) that they create on their own. This matrix offers remarkable defense against both host immune responses and drugs. These robust structures pose a serious threat to contemporary healthcare systems because they are linked to persistent nosocomial illnesses, implant associated infections, and chronic wounds. Due to improved resistance mechanisms, altered metabolic states of resident bacteria, and reduced drug penetration, conventional antimicrobial therapies frequently fail to remove mature biofilms. Therefore, novel compositions that can efficiently disrupt and eradicate existing biofilms are desperately needed. The creation of multifunctional antibiofilm formulations based on metal integrated nanocomposites, biopolymeric matrices, and metal organic structures is the main goal of this study, because of their inherent antibacterial qualities, biocompatibility, and biodegradability, biopolymers like chitosan are promising scaffolds. Strong electrostatic interactions with negatively charged bacterial cell membranes and EPS components are made possible by their cationic functional groups, which increase biofilm penetration. Crosslinking techniques facilitate the regulated release of active substances and enhance structural integrity. By producing reactive oxygen species, destabilizing membranes, and interfering with quorum sensing pathways, transition metals like copper and cobalt improve antibiofilm performance. Furthermore, carbon supports made from biomass increase contact-mediated antibacterial actions by improving the dispersion of active species and contributing a large surface area. Mechanistically, these modified components impair membrane integrity, cause oxidative stress, interfere with microbial communication, and disturb EPS construction. In addition to increasing therapeutic efficacy, the synergistic combination of bioactive ligands or conventional antibiotics may also slow the emergence of resistance. When taken as a whole, these cutting-edge materials show great promise for clinical application in the treatment of persistent infections linked to biofilms. Metal–organic frameworks (MOFs) are promising antibiofilm materials with high surface area and tunable porosity. They disrupt bacterial membranes physically and release metal ions that generate reactive oxygen species and metabolic toxicity. This combined mechanical damage and metal-mediated cytotoxicity enhance biofilm penetration, effectively eradicating mature biofilms and combating resistant infections.

Keywords: Biofilm eradication, Antibiofilm nanocomposites, Metal–organic frameworks (MOFs)

PP: 46

Induction of Biofilm Formation in ESKAPE Pathogens and Strategic Approaches for Its Eradication: Emphasis on Environmental Strains

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Biofilm formation represents one of the most critical survival strategies employed by ESKAPE pathogens *Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Enterobacter* spp. contributing significantly to antimicrobial resistance, persistence, and treatment failure. While biofilm biology has been extensively studied in clinical isolates, comparatively less attention has been given to environmental and food-derived strains that may serve as reservoirs for virulence traits and resistance determinants. Environmental isolates, particularly food-associated *Staphylococcus aureus*, are frequently exposed to fluctuating nutrient conditions, desiccation stress, surface interactions, and temperature variations. These ecological pressures may modulate regulatory networks governing extracellular polymeric substance (EPS) production and surface adhesion, potentially influencing biofilm phenotype. Understanding the induction dynamics of biofilm formation in such strains is essential for bridging the gap between environmental persistence and clinical pathogenicity. This work presents a conceptual framework for the systematic induction of biofilm formation in environmental ESKAPE pathogens using environmentally relevant stress models, including nutrient supplementation and limitation, surface conditioning and temperature shifts. In parallel, emerging biofilm eradication strategies such as nanocomposites, green-synthesized metallic nanoparticles, and metal–organic frameworks (MOFs), offer promising anti-biofilm potential through enhanced surface penetration, reactive oxygen species generation, controlled drug release, and targeted disruption of extracellular polymeric substances.

Keywords: ESKAPE pathogens, Biofilm induction, Antimicrobial resistance, EPS, Nanoparticles.

PP: 47

Balancing the Polarities for Women Professionals in Higher Education: A Review

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Women working in higher education have made remarkable changes to societal norms over the decades, yet they continue to face new challenges that arise from balancing professional as well as cultural responsibilities. In India especially, social expectations strongly associate women with caregiving and household duties. Academic institutions, while increasingly welcoming to women, still largely operate within rigid, traditionally male-centered structures. Research shows that gender bias still affects workplaces. These opposing pulls create what can be understood as "polarities" i.e., competing demands that women are expected to manage simultaneously, often without adequate support. This review aims to identify and understand the key polarities that women professionals in higher education face, particularly around work-life balance, culturally rooted gender expectations, and the need for greater institutional flexibility, while exploring how recognizing these challenges can lead to more supportive academic environments. This review follows a narrative review approach, drawing on existing papers, research articles, and reports related to women in the workplace and in academic settings. Theoretical frameworks including gender schema theory, socialization theory, and structural theory were used to contextualize the findings and draw meaningful connections. Three central polarities were identified through the review. First, work-life balance remains a significant concern, as demanding academic workloads often extend into personal time, making it difficult for women to meet both professional goals and home responsibilities. Second, the relative inflexibility of many academic institutions, including fixed schedules and limited support systems, does not always align with the needs of working women. Third, Leadership goals and gender stereotypes often make it hard for women to get higher leadership positions as assertiveness, authority and confidence are seen as masculine traits, which in women can be seen as aggressive by society. Balancing these polarities through meaningful measures can make a significant difference. Despite the challenges, there is growing awareness and momentum toward building more inclusive academic spaces for women. With the right institutional reforms- such as flexible work policies, reduced unnecessary workloads, mentorship opportunities, and a cultural shift in how caregiving responsibilities are shared- higher education can become a space where women truly thrive. Supporting women in academia is not just a matter of fairness; it is an investment in a stronger, more diverse, and more effective education system for everyone.

Keywords: Work-Life Balance, Gender Equity, Institutional Rigidity, Cultural Expectations, Women in Higher Education, Leadership roles.

PP: 48

Work–Life Balance and Women's Empowerment in Private Universities: Ensuring Sustainable Health and Workplace Safety

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Women in private universities contribute significantly as faculty members, researchers, and administrators. However, they often face difficulties in balancing academic responsibilities and personal life. High work pressure, research expectations, administrative duties, and family responsibilities can lead to stress and health problems. In private institutions, performance-based systems may further increase professional pressure. Therefore, ensuring work–life balance and workplace safety is essential for women's empowerment and long-term well-being. The objective of this study is to examine how work–life balance initiatives in private universities support women's empowerment. It also aims to understand the role of institutional policies in promoting sustainable health, job satisfaction, and workplace safety. The study follows a descriptive research design. It uses both primary and secondary data. Primary information is collected through informal discussions and questionnaires with women faculty and staff members. Secondary data is collected from academic articles, policy documents, and reports on gender equality in higher education. The findings show that flexible working hours, maternity benefits, childcare support, mental health assistance, and effective grievance redressal systems positively impact women's productivity and confidence. Institutions that implement gender-sensitive and safety-oriented policies create a supportive work environment. The study concludes that strong work–life balance policies are necessary for sustainable health and workplace safety. Private universities must adopt inclusive and supportive practices to empower women and strengthen institutional growth.

Keywords: Work–Life Balance, Women's Empowerment, Occupational Health, Gender Equity, Workplace Well-being

PP:49

Epigenetic Regulation of Ferroptosis in Polycystic Ovary Syndrome: Emerging Molecular Insights

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Polycystic ovary syndrome (PCOS) is a complex endocrine–metabolic disorder characterized by hyperandrogenism, ovulatory dysfunction, insulin resistance, and chronic low-grade inflammation. Although genetic predisposition contributes to disease susceptibility, accumulating evidence suggests that epigenetic modifications play a critical role in modulating gene expression in PCOS without altering the underlying DNA sequence. DNA methylation, histone modifications, and microRNA dysregulation have been implicated in abnormal steroidogenesis, impaired insulin signaling, and disrupted folliculogenesis. Concurrently, ferroptosis, an iron-dependent, lipid peroxidation-driven form of regulated cell death, has emerged as a potential contributor to ovarian dysfunction. Increased oxidative stress, altered iron metabolism, and reduced antioxidant defense mechanisms observed in PCOS create a cellular environment conducive to ferroptotic damage, particularly within granulosa cells essential for follicular maturation. Recent studies suggest that epigenetic alterations may influence the expression of key ferroptosis-regulating genes, including GPX4, SLC7A11, and iron-handling proteins, thereby enhancing cellular susceptibility to oxidative injury. This integrated perspective proposes that epigenetic dysregulation may serve as an upstream mechanism that sensitizes ovarian tissue to ferroptosis, linking metabolic stress and reproductive dysfunction in PCOS. Understanding this epigenetic–ferroptotic interplay may provide novel insights into disease pathogenesis and identify potential biomarkers and therapeutic targets. This review synthesizes current evidence on epigenetic mechanisms and ferroptotic signaling in PCOS and highlights future research directions to clarify their mechanistic crosstalk.

Keywords : Polycystic Ovary Syndrome, Epigenetics, Ferroptosis, Oxidative Stress, Granulosa Cells

PP:50

Study on Simplicial Complex and Their Real Life Applications

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This work provides a comprehensive overview of the study on simplicial complexes and their real-life applications. Simplicial complexes form one of the most fundamental structures in algebraic topology. They offer an efficient method to represent geometric structures in a systematic way. The complex objects are a combination of various simplex: vertices (0-simplex), edges (1-simplex), triangles (2-simplex), and higher dimensional simplices (n-simplex). This work also involves theoretical explanation of the foundational concepts of the simplicial complex including linear and geometric independence, and simplices. The main objective of this study is to develop an understanding of the concept of the simplicial complexes, and show how simplicial complexes are used to model real world objects. We discuss the formal definitions of geometric structures, their properties, and learn different methods to represent real life objects using mathematical tools. Multiple examples have been given throughout the paper to explain the concepts more clearly and to verify if our objects fit the set of rules of a simplicial complex. We have also discussed the orientation of the complexes and the boundary operator for algebraic structures. Several examples are given to clearly demonstrate how the boundary of a simplex and chains are obtained, including verification of the fundamental property that applying the boundary operator twice yields zero. The definition and properties of simplicial maps and the concept of Euler characteristics is explored to further strengthen the structural complexity of the given object. The study establishes a coherent progression from basic vector independence to the algebraic treatment of simplicial complexes, and also reveals that the simplicial complexes function as both geometric and algebraic tools which exhibit efficiency and have multiple applications. Complex structures can be understood through their basic components by combining theoretical principles with examples and their real-world applications. The use of simplicial complexes provides mathematicians with an effective and an efficient way to understand theoretical mathematics using real world modelling and structural analysis.

Keywords: Simplicial Complex, Simplex, Linear Independence, Geometric Independence, Boundary Operator, p-Chains

PP:51

Integrated Transcriptomic and Network-Based Identification of Key Genes Involved in Endometriosis Pathogenesis

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Endometriosis is a chronic gynecological disorder characterized by the ectopic growth of endometrial tissue, leading to pelvic pain, inflammation, and infertility. Despite its high prevalence, the molecular mechanisms underlying disease progression remain incompletely understood. The present study employed an integrated in-silico bioinformatics approach to identify differentially expressed genes (DEGs), hub genes, and key biological pathways associated with endometriosis. Gene expression dataset GSE11691 was retrieved and analyzed using GEO2R to compare normal endometrium with endometriotic tissue. Significant DEGs were identified using an adjusted p-value < 0.05. A volcano plot revealed numerous significantly upregulated and downregulated genes. Protein–protein interaction (PPI) networks were constructed using STRING and visualized in Cytoscape to explore functional relationships among DEGs. Network topology analysis using cytoHubba identified major hub genes, while MCODE detected highly interconnected clusters representing core functional modules. Functional enrichment and pathway analyses were performed using ClueGO+CluePedia, Enrichr, and KEGG to determine the biological significance of the identified genes. The analysis revealed several key hub genes, including PECAM1, CXCL12, FLT1, CCR1, CSF1, CCL19, and SDC1, which are primarily involved in immune regulation, angiogenesis, and cell adhesion. Functional enrichment demonstrated significant involvement in inflammatory response, cytokine signaling, leukocyte migration, MAPK signaling cascade, and immune system activation. Pathway analysis indicated strong associations with immune-inflammatory disorders and autoimmune-related pathways, suggesting shared pathogenic mechanisms. Overall, this integrated bioinformatics study highlights immune dysregulation, chronic inflammation, and angiogenesis as central mechanisms in endometriosis progression. The identified hub genes may serve as potential biomarkers and therapeutic targets, providing a foundation for future experimental validation and targeted drug development.

Keywords: Endometriosis, Bioinformatics, Hub genes, Protein–protein interaction, Inflammation, Angiogenesis

PP: 52

Epigenetic Regulation in Non-Tobacco Chewers Oral Squamous Cell Carcinoma

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Oral squamous cell carcinoma (OSCC) has traditionally been associated with tobacco; however, recent years have seen a significant and worrying rise in its incidence among young individuals with no history of tobacco use. These tumours often lack the classical mutational signatures driven by carcinogens, suggesting the role of alternative molecular mechanisms in disease progression. DNA methylation, an important epigenetic modification that regulates gene expression, has emerged as an early, stable, and potentially reversible event in oral carcinogenesis; however, its specific role in OSCC developing in young non-tobacco users has not been comprehensively consolidated. This review critically integrates current evidence on DNA methylation alterations associated with young non-tobacco-related OSCC. Accumulating data indicate recurrent promoter hypermethylation of tumour suppressor genes involved in cell cycle regulation, apoptosis, DNA repair, and cell adhesion, along with widespread epigenome-wide methylation reprogramming that appears independent of tobacco exposure. Importantly, methylation alterations have also been detected in histologically normal adjacent mucosa and salivary DNA, supporting the concept of epigenetic field cancerization as an early event in tumour development. The available studies and evidences suggest that epigenetic dysregulation may represent as a primary driving force in oral carcinogenesis among young non-tobacco exposed users rather than a secondary consequence of environmental carcinogens. By emphasizing the absence of age and exposure-specific epigenetic integration in existing literature, this critical analysis highlights the necessity for well-powered, age-stratified epigenome-wide studies along with longitudinal analyses. A more refined insight into DNA methylation signatures in this specific patient population could aid in the development of non-invasive diagnostic biomarkers, enhance risk stratification, and create new opportunities for epigenetically targeted therapeutic interventions in young-onset OSCC.

Keywords: Oral squamous cell carcinoma; DNA Methylation; Non tobacco chewers; Biomarkers

PP: 53

Leaching of Solar Panel Components and Its Impact on Freshwater Biodiversity

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Solar photovoltaic (PV) technology has become one of the most important pillars of the global renewable energy transition. Around the world, expanding solar installations have helped lower greenhouse gas emissions and reduce dependence on fossil fuels. While this shift is essential for addressing climate change, true sustainability requires looking beyond energy generation to consider the full life cycle of solar panels including what happens when they reach the end of their usable life. Most solar panels are designed to last between 20 and 30 years. As early generations of installations begin to age, a substantial increase in photovoltaic waste is expected in the coming decades. PV modules are made up of semiconductor layers, soldering materials, and conductive elements, some of which may contain trace amounts of potentially hazardous metals such as cadmium (Cd), lead (Pb), chromium (Cr), nickel (Ni), and silver (Ag). Under conditions such as mechanical breakage, long-term weathering, landfill disposal, flooding, or informal recycling practices, these substances can leach out and enter surrounding environments, including freshwater systems. Climate change may intensify this problem. Extreme rainfall events and flooding can increase the movement of contaminants from disposal sites into rivers, lakes, and groundwater. Research shows that the release of metals from solar panels depends on several factors, including panel composition, degree of aging, pH levels, temperature, and hydrological conditions. Once these contaminants enter aquatic ecosystems, they may affect a wide range of organisms. Studies indicate that exposure can lead to oxidative stress, developmental abnormalities, reproductive toxicity, and behavioral changes in algae, zooplankton, benthic invertebrates, fish, and amphibians. Because many heavy metals are persistent and capable of bioaccumulating, there is also concern about their potential to move through aquatic food webs via biomagnification, potentially impacting higher trophic levels. It is important to note that intact and properly managed solar panels pose minimal immediate environmental risk. However, the growing volume of solar waste, combined with climate-driven extreme weather events, may increase the likelihood of contaminant release and exposure. This review emphasizes the importance of incorporating freshwater ecotoxicological risk assessments into solar life-cycle sustainability frameworks. Ensuring responsible end-of-life management will help guarantee that the transition to renewable energy protects not only the climate but also the health and integrity of aquatic ecosystems.

Keywords: Photovoltaic waste; Freshwater ecotoxicology; Heavy metal leaching; Aquatic biodiversity; Bioaccumulation; Renewable energy sustainability

PP:54

Lactobacillus-Mediated Modulation of Pesticide Toxicity in *Caenorhabditis elegans*

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Imidacloprid is a common broad-spectrum neonicotinoid insecticide designed to mimic nicotine. It is a potent neurotoxin that acts on the central nervous system by binding nicotinic acetylcholine receptors (nAChRs). It is commonly used as a systemic insecticide in agriculture and industry to control biting and sucking insect pests. Reports indicate that it causes neurotoxicity in both target (insect) and non- target organisms, raising serious concerns about its broader ecological effects. Therefore, this study was designed to (i) investigate the toxicological and behavioral effects of imidacloprid exposure on non- target organisms and (ii) assess the protective role of *Lactobacillus* supplementation against imidacloprid-induced toxicity. The research was conducted using *Caenorhabditis elegans*, a robust model organism with a short life cycle and conserved stress response and metabolic pathways similar to humans, making it an ideal in vivo model for studying toxicity and its mitigation. For the analysis, the wild-type N2 strain (obtained from the Caenorhabditis Genetic Center, USA) was employed. *C. elegans* were maintained on the standard NGM (nematode growth medium) plates at 20°C. To determine the impact of imidacloprid, age-synchronized N2 worms were exposed to imidacloprid (5ppm and 50ppm concentrations) on NGM throughout their developmental phase (larva to adult). The endpoints assessed are survival, growth, locomotory behaviour, reproduction, lifespan, and reactive oxygen species (ROS) generation. To determine the protective role of Lactobacillus spp., the conventional laboratory food source, *Escherichia coli* (OP50), was replaced with *Lactobacillus plantarum* or *Lactobacillus paraplantarum*, and endpoints were determined. Our results indicate that at the exposure concentrations, imidacloprid did not affect the survival, growth, or locomotory behaviour of worms. However, it significantly increased the ROS production and adversely affected worm reproduction and lifespan. *Lactobacillus* supplementation reduced ROS generation and improved lifespan. Overall, our results demonstrate that supplementation with the probiotic species *L. plantarum* or *L. paraplantarum* can be an effective strategy for mitigating imidacloprid-induced stress.

Keywords: *Caenorhabditis elegans*, Imidacloprid, Neonicotinoids, *Escherichia coli, Lactobacillus plantarum, Lactobacillus paraplantarum.*

PP: 55

Microplastics in the Food Chain: A Growing Threat to Women's Reproductive Health and Sustainable Solutions

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Microplastics, defined as plastic particles smaller than 5 mm, have become widespread environmental contaminants present in water, soil, air, and the human food chain. They have been detected in seafood, salt, drinking water, fruits, and even in human blood and placental tissues, raising serious public health concerns. Beyond causing physical cellular stress, microplastics can act as carriers for toxic additives and adsorbed pollutants such as bisphenol A (BPA), phthalates, heavy metals, and persistent organic pollutants. Growing scientific evidence indicates that chronic exposure to these contaminants may disrupt endocrine signaling, induce oxidative stress, and impair reproductive functions. Women's reproductive health appears particularly vulnerable to microplastic-associated toxicity. Emerging studies suggest potential links between microplastic exposure and hormonal imbalance, inflammatory responses, reduced ovarian reserve, and adverse pregnancy outcomes. The ability of microplastics and their associated endocrine-disrupting chemicals to bioaccumulate in adipose and reproductive tissues raises concerns about long-term fertility trends, maternal health, and possible transgenerational effects. These risks may be amplified in regions with inadequate plastic waste management and high environmental exposure. Biotechnology provides promising and sustainable solutions to address this growing threat. Innovations such as microbial and enzymatic degradation of plastics, biosorption techniques, nano-biosensors for rapid detection of contaminants in food products, and the development of biodegradable bioplastics offer potential strategies to reduce microplastic pollution. Integrating molecular toxicology with environmental monitoring and stronger regulatory frameworks can further improve risk assessment and guide effective public health policies. Microplastics in the food chain represent a silent yet escalating crisis. Protecting women's reproductive health requires urgent interdisciplinary efforts that combine scientific innovation, sustainable practices, and increased public awareness. Reducing plastic pollution today is essential not only for environmental protection but also for safeguarding reproductive health and the well-being of future generations.

Keywords: Microplastics, Women's Reproductive Health, Endocrine Disruption, Biodegradation, Sustainable Biotechnology, Public Health.

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Gene Therapy Approaches for the Treatment of HPV-Induced Cervical Carcinoma

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Cervical carcinoma remains one of the most common malignancies affecting women worldwide, particularly in developing countries. Persistent infection with high-risk Human Papillomavirus (HPV), especially HPV-16 and HPV-18, is the primary etiological factor responsible for the development of this cancer. Viral oncogenes such as E6 and E7 disrupt key tumor suppressor pathways by inactivating proteins including p53 and retinoblastoma (Rb), leading to uncontrolled cell proliferation and malignant transformation. Although conventional treatments such as surgery, chemotherapy, and radiotherapy have improved patient survival, these approaches often cause significant side effects and may not be effective in advanced or recurrent cases. Therefore, innovative therapeutic strategies such as gene therapy are being explored to provide more targeted and efficient treatment options. Gene therapy involves the introduction, modification, or silencing of specific genes in order to correct or counteract the molecular abnormalities responsible for disease. In the context of HPV-induced cervical carcinoma, gene therapy strategies mainly focus on inhibiting viral oncogenes, restoring tumor suppressor gene function, and enhancing the immune response against cancer cells. Techniques such as RNA interference (RNAi), CRISPR-based gene editing, and viral vector-mediated gene delivery have shown promising results in experimental studies. These approaches can selectively target HPV-infected cells, reduce tumor growth, and induce apoptosis in cancerous tissues. Additionally, gene-based immunotherapies are being investigated to stimulate the body's immune system to recognize and destroy infected or transformed cells. Despite encouraging progress, challenges such as efficient gene delivery, safety concerns, and long-term therapeutic stability remain important considerations. Continued research and clinical trials are necessary to optimize these technologies and translate them into effective clinical applications. Overall, gene therapy represents a promising and evolving strategy that could significantly improve the treatment and management of HPV-associated cervical carcinoma in the future.

Keywords: Gene therapy, Cervical carcinoma, Human papillomavirus (HPV), Viral oncogenes, CRISPR gene editing, Targeted cancer therapy

PP: 57

Green Relief: Assessing the Effectiveness of Natural Supplements in Managing Menstrual Pain

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For many, the monthly arrival of menstrual cramps is far more than a minor inconvenience it is a quiet, recurring disruption that can put life on hold. For a long time, the only real answer has been a quick reach for a bottle of synthetic painkillers like ibuprofen. But lately, there is a growing feeling that we should be asking more of our medicine. This paper looks at the HER (Health & Environment) journey, exploring whether we can find a kinder way to heal through the GRAIN initiative an approach that looks to the earth's plants and minerals instead of a laboratory. By gathering and analyzing current research, this study dives into the story of two natural helpers: ginger and magnesium. It explains how these aren't just "home remedies," but powerful tools that speak the body's language. Ginger helps quiet the internal chemicals that cause painful contractions, while magnesium helps tight, stressed muscles finally relax. What the data shows is heartening: for most people with mild-to-moderate pain, these natural choices can work just as well as a pill, but without the upset stomach or the "chemical hangover" that often follows. Choosing this path also offers a beautiful "Green" . Because these remedies are grown in the soil and not made in a factory, they don't leave behind the chemical waste or water pollution that mass-produced drugs do. Ultimately, this research shows that taking care of ourselves and taking care of the planet can be the same thing. It's a "win-win" that proves the most effective path to feeling better is often the most mindful one.

Keywords: Ginger, Menstrual cramps, Green, Natural plant-based remedies

PP: 58

Fungal–Bacterial Synergistic Interactions in Polymicrobial Infections: Implications for Biofilm Development and Antibiotic Response

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Polymicrobial interactions between filamentous fungi and pathogenic bacteria play a crucial role in chronic and recurrent infections affecting skin, wounds, and the urogenital tract. Such infections are particularly significant in women, where persistent microbial communities contribute to recurrent urinary tract infections, postpartum wound infections, and device-associated infections. Filamentous molds such as *Rhizopus* spp. and *Aspergillus* spp. may coexist with bacterial pathogens including *Staphylococcus aureus* and *Klebsiella pneumoniae*, potentially altering microbial virulence, biofilm formation, and treatment outcomes. Understanding these interactions may support improved management of recurrent infections and antimicrobial resistance impacting women's health. Dual Culture Interaction Assays were performed on SDA plates by inoculating fungal plugs centrally followed by radial streaking of bacterial cultures. Fungal Filtrate Antibacterial Assays were conducted using sterile culture filtrates in agar well diffusion. Biofilm Formation & Disruption Assays were performed in 96-well microtiter plates using crystal violet staining. Microscopic Interaction Studies assessed bacterial adherence to fungal hyphae using Gram staining. Antimicrobial Susceptibility Modification was evaluated using Kirby–Bauer disk diffusion in the presence of fungal filtrates. Dual culture assays showed dense bacterial growth near fungal colonies, particularly with *Aspergillus*, indicating synergistic association. Fungal filtrate assays demonstrated mild antibacterial activity, with inhibition zones of 8 mm against *S. aureus* and 6 mm against *K. pneumoniae* for *Aspergillus* filtrate, while *Rhizopus filtrate* showed negligible inhibition (≤3 mm). Biofilm assays revealed increased biofilm biomass in co-culture conditions: OD570 increased from 0.62 (bacteria alone) to 1.08 *Aspergillus* co-culture) and 0.94 (*Rhizopus* co-culture). Microscopic analysis confirmed bacterial adherence and microcolony formation along fungal hyphae. Antibiotic susceptibility testing showed reduced zones of inhibition; ciprofloxacin activity against *S. aureus* decreased from 28 mm (control) to 20 mm in presence of fungal filtrate. *Rhizopus* and *Aspergillus* enhance bacterial persistence through biofilm promotion, hyphal adherence, and reduced antibiotic susceptibility. These synergistic interactions may contribute to recurrent and device-associated infections in women, including urinary tract and postoperative infections. Understanding fungal–bacterial cooperation can guide targeted antimicrobial strategies, improve infection control, and support better clinical outcomes in women's healthcare.

Keywords: Polymicrobial interaction, *Rhizopus*, *Aspergillus*, Biofilm enhancement, Antimicrobial resistance, Fungal–bacterial synergy

PP: 59

Stability Profiling of *Escherichia coli* induced Colicin and Its Mitigation Using Cranberry and Fenugreek Extracts

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Colicins are proteinaceous bacteriocins produced by *Escherichia coli* that inhibit closely related bacterial strains and play an important role in microbial competition and ecological balance. Studying their stability and natural mitigation is valuable for antimicrobial research and microbial control strategies. Plant-derived bioactives from cranberry and fenugreek are known to disrupt bacterial proteins and virulence factors. This study aimed to isolate and screen colicin-producing *E. coli* and evaluate the stability and mitigation of colicin activity using cranberry and fenugreek extracts. Colicin production was induced in *E. coli* using fluoroquinolone stress (levofloxacin and ciprofloxacin). Activity was screened using a spot-on-lawn assay. Cells were lysed via combined sonication, lysozyme treatment, and TCA–acetone precipitation. Protein concentration was determined by the Bradford assay, and protein profiling was performed using SDS-PAGE. Stability was assessed across pH 4–8, temperature range 4–60 °C, and protease sensitivity using trypsin. Methanolic extracts of cranberry (*Vaccinium macrocarpon*) and fenugreek (*Trigonella foenum-graecum*) were prepared to evaluate mitigation of colicin activity. Fluoroquinolone treatment successfully induced colicin production, evidenced by clear inhibition zones in the spot-on-lawn assay. Bradford analysis showed colicin protein concentrations of 1.055 mg/mL and 1.043 mg/mL in replicate samples. Colicin retained activity at pH 5, 6, and 7, showed minimal activity at pH 8, and remained active at 25 °C and 45 °C, indicating moderate environmental stability. No inhibitory activity was observed following trypsin digestion, confirming the proteinaceous nature of colicin. Treatment with cranberry and fenugreek extracts resulted in a noticeable reduction in inhibition zones and decreased protein concentration, suggesting suppression or degradation of colicin activity. The study confirms successful induction, stability profiling, and protein nature of colicin produced by *E. coli*. Cranberry and fenugreek extracts demonstrated significant mitigation of colicin activity, highlighting their potential as natural modulators of bacteriocin-mediated microbial interactions.

Keywords: Colicin, *E. coli*, Bacteriocin, Protein stability, Cranberry extract, Fenugreek extract, Antimicrobial activity

PP: 60

The Population Coverage Analysis and Construction of a Potential Multiepitope Vaccine Candidate Against *Mycoplasma pneumoniae*

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Mycoplasma pneumoniae is a major cause of atypical community-acquired pneumonia, predominantly affecting children and young adults, yet no licensed vaccine is currently available. This study presents the In silico construction and population coverage analysis of a multi-epitope subunit vaccine candidate derived exclusively from the M129 strain of M. pneumoniae. Twenty protein sequences of *Mycoplasma pneumoniae* M129 strain were retrieved from uniProt and initially screened for antigenicity using VaxiJen v2.0 server with a threshold score >0.4. Subcellular localization was predicted using TMHMM server to identify surface-exposed antigens. On the basis of highest antigenicity score and extracellular localization, the P1 adhesin protein was selected as the target antigen. CTL epitopes (MHC class I) and HTL epitopes (MHC class II) were predicted using IEDB tools, while linear B-cell epitopes were identified using BepiPred server. All predicted epitopes were subjected to rigorous secondary screening for antigenicity (VaxiJen v2.0), non-allergenicity (AllerTop 2.0), and non-toxicity (ToxinPred). After screening, 15 CTL epitopes, 15 HTL epitopes, and 5 B-cell epitopes were shortlisted. Population coverage analysis of the shortlisted epitopes was performed using the IEDB Population Coverage tool, which demonstrated broad coverage across diverse global populations and major ethnic groups. A multi-epitope vaccine construct was then manually assembled by fusing the top 5 CTL epitopes, 5 HTL epitopes, and 2 B-cell epitopes. The Beta defensin sequence was incorporated as an adjuvant at the N-terminus using EAAAK linker, while the epitopes were joined with GPGPG, AAY, and KK linkers to facilitate proper processing and presentation. The final vaccine candidate is designed to induce robust humoral and cellular immune responses with wide population coverage. This construct represents a promising, safe, and cost-effective prophylactic approach against M. pneumoniae infection. Further in vitro and in vivo validation is required to confirm its immunogenicity and protective potential.

Keywords: *Mycoplasma pneumoniae,* Vaccine, IEDB, Antigenicity, Population coverage

PP: 61

Biosynthesis of Silver Nanoparticles Using Pineapple Peel Extract: Effective Antimicrobial Action against *Propionibacterium acnes*

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Green synthesis of metal nanoparticles has emerged as a sustainable alternative to conventional chemical methods that involve toxic reagents and high energy consumption. This study investigates the green synthesis of silver nanoparticles (AgNPs) using pineapple peel waste extract and evaluates their antimicrobial potential. Pineapple peel, an abundant agro-industrial waste, is rich in bioactive compounds such as phenolics, flavonoids, ascorbic acid, and enzymes that act as natural reducing and stabilizing agents during nanoparticle formation. Utilizing such waste material not only reduces environmental pollution but also promotes value-added applications in nanobiotechnology. In the methodology, fresh pineapple peels were washed, dried, and subjected to aqueous extraction. The filtered extract was mixed with silver nitrate (AgNO) solution under controlled conditions. A visible color change from pale yellow to brown indicated the formation of AgNPs due to surface plasmon resonance. The synthesized nanoparticles were characterized using UV–Visible spectroscopy, confirming nanoparticle formation through a characteristic absorption peak around 420 nm. For antimicrobial activity, we isolated the organism from skin acne lesion. By culture and microscopy, it was presumed to be *Propionibacterium acnes.* The antimicrobial activity of the synthesized AgNPs was assessed using the agar well diffusion method against the isolated bacteria. Zones of inhibition were measured to determine antibacterial efficacy. We have demonstrated successful synthesis of stable silver nanoparticles using pineapple peel extract. The AgNPs exhibited significant antimicrobial activity against the tested bacterial strain, i.e. *Propionibacterium acnes* in a dose dependent manner. The antimicrobial mechanism is attributed to the ability of AgNPs to disrupt bacterial cell membranes and interfere with cellular metabolism. This creative work establishes a link between waste valorization, nanotechnology, and dermatological therapy, demonstrating how fruit waste can be transformed into an innovative, eco-friendly solution for a prevalent skin condition.

Keywords: Nanoparticles, AgNPs, Biosynthesis, Antibacterial potential, *P. acnes*

PP: 62

Synergistic Antibacterial Activity of *Calotropis gigantea*–Derived Metal Nanoparticles with Bacteriophage derived Proteins for Topical Management of Women-Associated Bacterial Skin Infections

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Bacterial skin and mucocutaneous infections represent a significant concern in women's health, particularly those caused by opportunistic pathogens such as *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Streptococcus agalactiae*. These microorganisms are frequently associated with skin infections, wound contamination, folliculitis, and genital or urinary tract–related dermatological complications. The increasing emergence of antimicrobial resistance and the limitations of conventional antibiotics have encouraged the exploration of alternative and more effective therapeutic strategies. In this context, the integration of nanotechnology with bacteriophage-derived antimicrobial systems has gained considerable attention. This review explores the synergistic antimicrobial potential of metal nanoparticles synthesized using extracts of *Calotropis gigantea* in combination with bacteriophage-derived proteins, particularly *Endolysin* and *Holin*. Green synthesis of metal nanoparticles using *Calotropis gigantea* provides an eco-friendly and biologically compatible approach in which plant phytochemicals such as flavonoids, alkaloids, terpenoids, and phenolic compounds act as reducing and stabilizing agents. These nanoparticles exhibit strong antimicrobial properties due to their ability to disrupt bacterial membranes, generate reactive oxygen species, and interfere with essential cellular processes. Bacteriophage-derived proteins, including endolysin and holin, function as natural antibacterial agents capable of degrading bacterial cell walls and facilitating cell lysis. When combined with plant-mediated metal nanoparticles, these proteins may exhibit enhanced antimicrobial activity through a nano–phage synergistic mechanism. Metal nanoparticles can increase membrane permeability and weaken bacterial structural integrity, thereby improving the access and efficiency of endolysin-mediated peptidoglycan degradation. Holin proteins further support this process by forming pores in bacterial membranes, promoting effective lysis of pathogenic cells. Incorporating *Calotropis gigantea* derived nanoparticles with phage proteins into topical formulations such as ointments, creams, or lotions may offer a promising approach for treating bacterial skin infections in women. These nano–phage hybrids could enhance antimicrobial activity, provide targeted effects, and reduce resistance development, representing a novel strategy for advanced dermatological therapeutics.

Keywords: *Calotropis gigantea*, Metal nanoparticles, Endolysin, Holin, Bacteriophage proteins, Nano–phage synergy, Bacterial skin infections, Women's health, Topical nanomedicine.

PP: 63

Re-Evaluating Clinical Reference Intervals: Addressing Sex-Specific Variability in Laboratory Medicine

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Clinical reference intervals are the foundation of laboratory medicine. They are used as standards to differentiate between physiological and pathological conditions. However, most of the reference values have traditionally been derived from male-dominated populations. Females have different physiology compared to males. Females have variations in physiology compared to males because of the hormonal fluctuations during the menstrual cycle, pregnancy, and menopause. There are also variations in gene expression and immunity. Despite these physiological variations, standardized values have been used until now. These values are not validated, and there is little emphasis on this issue. This review aims to reveal the extent of female physiological variations in the derivation of reference values. It also evaluates the potential implications of using sex-neutral laboratory values or thresholds. The analysis reveals that there already exist certain variations in the biomarkers that have been used. For example, the baseline values of high-sensitivity cardiac troponins have consistently lower values in females compared to males. However, the use of gender-neutral parameters for diagnosis delays the detection of myocardial damage in females. In addition, changes in hormone levels of estrogen and progesterone have an impact on thyroid-stimulating hormone, cortisol, hemoglobin, and inflammatory markers. Moreover, variations in immune genes have different effects on females compared to males. However, there exist certain limitations in the values that do not take into account physiological states like the menstrual cycle and pregnancy status in the routine interval calculations. The continued use of gender-invariant values in diagnostic procedures in the field of medicine is a structural problem. The absence of proper consideration of variations in hormone levels in females in the formulation of laboratory values may lead to a lack of diagnostic accuracy. The formulation of rigorously validated values that take into account both genders will be a major step towards the improvement of diagnostic accuracy in the field of medicine.

Keywords: Medicine, Reference range, Physiology, Biomarkers, Diagnosis, Troponin, Hormones

PP: 64

Impact of Microplastics on Women's Reproductive Health

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Microplastics, defined as plastic particles smaller than 5 mm, have emerged as pervasive environmental contaminants detected in food, drinking water, air, soil and a wide range of consumer products. Increasing evidence indicates that human exposure occurs primarily through ingestion, inhalation, and dermal contact, raising concerns about their potential health impacts. In particular, women's reproductive health may be vulnerable to microplastic exposure due to the capacity of these particles to accumulate in various organs, including reproductive tissues . Recent studies suggest that microplastics and their associated chemical additives can disrupt endocrine signaling pathways, leading to hormonal imbalances that may influence menstrual cycles, fertility, and pregnancy outcomes. Moreover, plastic-associated contaminants and adsorbed environmental pollutants can induce oxidative stress and inflammatory responses in reproductive tissues, potentially impairing ovarian function and follicular development. Experimental and epidemiological evidence also indicates that exposure to microplastics may reduce conception rates, alter hormone levels, and trigger cellular apoptosis within ovarian cells. Notably, the recent detection of microplastics in human placental tissues has raised additional concerns regarding potential implications for fetal development and pregnancy health. Collectively, these findings highlight microplastic pollution as an emerging public health concern and underscore the need for further research to clarify exposure pathways, biological mechanisms, and long-term reproductive effects. Improved monitoring and preventive strategies are essential to reduce exposure and protect women's reproductive health.

Keywords: Microplastic, Environmental pollution, Women, Reproductive health

PP: 65

Virtual Screening and Computational Identification of Ferroportin (SLC40A1) Inhibitors - Daphnoretin, Alisol- A in EBV Positive DLBCL

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Diffuse large B cell lymphoma (DLBCL) is known for its unique molecular characteristics and resistance to standard treatments. Ferroptosis which is a regulated form of cell death caused by iron dependent lipid peroxidation, is emerging as a promising strategy for innovative cancer therapies. The solute carrier family 40 member (SLC40A1), also referred to as ferroportin, functions as a major iron transporter responsible for controlling intracellular iron levels. This protein may play a central role in the ferroptosis mechanism. In the present study, structure based virtual screening along with molecular docking techniques was done. A refined collection of phytochemicals and compounds from the DrugBank database was screened against the active binding site of SLC40A1 using AutoDock Vina alongside CB Dock. The top performing ligands were identified based on their binding affinities, molecular interactions, and pharmacokinetic profiles. Structure based virtual screening and molecular docking was performed to identify potential inhibitors of SLC40A1 from natural phytochemicals and FDA approved drugs. Docking simulations were performed using a high resolution SLC40A1 structure, followed by ADMET and drug likeness analysis to predict pharmacokinetic suitability. Among the screened compounds, Daphnoretin , a natural phytochemical, exhibited the most favorable binding affinity of −8.9 kcal/mol, forming multiple stable hydrogen bonds and hydrophobic interactions within the active site. Alisol A, The results suggested that Alisol A showed favorable binding interactions with the target protein -8.6kcal/mol, indicating its potential as a promising bioactive compound. Both compounds displayed desirable pharmacokinetic properties, low predicted toxicity, and non BBB permeability, making them promising candidates for ferroptosis based therapy in EBV+ DLBCL. These findings suggest that natural compounds such as Daphnoretrin and Alisol- A could serve as potential lead molecules for future drug development targeting ferroptosis pathways.

Keywords: EBV positive DLBCL, SLC40A1, Ferroptosis, Drug discovery

PP: 66

Bridging Ethnographic Data and Structure-Based Drug Design: An *In-Silico* Evaluation of Rosmarinic Acid as a High-Affinity Inhibitor of Staphylococcus aureus DNA Gyrase B

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The growing rate of multidrug-resistant *Staphylococcus aureus* (Strain N315) has heightened the search of phytochemical inhibitors of essential bacterial enzymes worldwide. One of the main targets in contemporary pharmacology is the inhibition of DNA Gyrase, which is a severe Type II topoisomerase needed to conduct ATP-dependent DNA supercoiling, replication, and transcription. Rosmarinic acid (CID: 5281792) is also a notable phenolic secondary metabolite that is widely prevalent within various botanical families. Most often referred to as Rosmarinus officinalis (Rosemary), it is an essential bioactive resource in Ocimum basilicum (Basil), Mentha spicata (Spearmint), and Salvia officinalis (Sage). This paper gives a significant in-silico confirmation of antimicrobial properties of Rosmarinic acid against the crystal structure of DNA Gyrase B subunit (PDB ID: 2XCT). This was computationally prepared to achieve structural integrity and optimum protonation of the macromolecule and then automated blind docking analysis was carried out to determine possible binding points throughout the protein surface. Computational analysis was able to find a high-affinity binding site in Cavity C3 (Volume: 2959 A3; Center Coordinates: 23, 31, -1), which gave an outstanding top Vina score of -8.8 kcal/mol. Such a stable ligand-protein complex indicates that Rosmarinic acid is a strong competitive inhibitor of bacterial replication because it stabilized the enzyme and DNA interaction. Thermodynamic favorability of such interaction, represented by the strongly negative binding energy, indicates an existence of theoretically potent inhibitors in Rosmarinic acid. These observations are successful in filling the gap between historical accounts of ethnographic data about plants, and contemporary structure- based drug designing. This study, by clarifying the molecular mechanism of this polyphenolic compound, provides a solid basis in the creation of Rosmarinic acid rich botanical extracts as non-synthetic sustainable alternatives in the current development of antimicrobials.

Keywords: Rosmarinic Acid, DNA Gyrase, PDB ID 2XCT, Binding Affinity, Molecular Docking, Antimicrobial.

PP: 67

Microbiota-Epigenetic Interactions in Polycystic Ovary Syndrome: Exploring a Mechanistic Axis in Metabolic Dysregulation

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Polycystic Ovary Syndrome (PCOS) is one of the most prevalent endocrine disorders affecting women of reproductive age and is frequently associated with metabolic disturbances such as insulin resistance, chronic inflammation, and hormonal imbalance. Although the etiology of PCOS is multifactorial, recent research highlights the potential role of gut microbiota and epigenetic regulation in influencing disease development and progression. This review explores the emerging interaction between gut microbial composition and epigenetic mechanisms that may contribute to metabolic dysregulation in PCOS. A structured literature review was conducted using scientific databases including PubMed and Google Scholar to identify peer-reviewed studies examining relationships among gut microbiota, epigenetic modifications, and metabolic pathways relevant to PCOS. Studies published within the past decade focusing on microbial metabolites, DNA methylation, histone modifications, and their influence on metabolic signalling pathways were analyzed to synthesize current evidence. Accumulating evidence suggests that alterations in gut microbial diversity, commonly referred to as dysbiosis, may influence host metabolic processes through the production of microbial metabolites such as short-chain fatty acids. These metabolites are known to interact with epigenetic regulatory enzymes, including histone deacetylases, thereby influencing gene expression patterns involved in insulin signalling, inflammatory responses, and hormonal regulation. Such epigenetic modifications may contribute to the metabolic and endocrine disturbances observed in PCOS. This review proposes a conceptual framework describing a microbiota–epigenetic axis that links dietary and microbial factors with metabolic dysregulation in PCOS. Understanding this interaction may provide new insights into the underlying mechanisms of the disorder and highlight potential preventive strategies focusing on dietary modulation, microbiota balance, and lifestyle interventions. Further experimental and clinical research is required to validate these mechanistic links and explore their therapeutic implications in the management of PCOS.

Keywords: Polycystic Ovary Syndrome, Gut microbiota, Epigenetics, Metabolic Dysregulation, Insulin signalling, Short-chain fatty acids (SCFAs)

PP: 68

Epigenetic Effects of Environmental Exposure on Women's Health

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Epigenetics refers to heritable changes in gene expression that occur without alterations in the DNA sequence. Growing evidence indicates that environmental exposures play a crucial role in shaping the female epigenome and influencing women's health outcomes. Factors such as air pollution, endocrine-disrupting chemicals, heavy metals, psychological stress, and nutritional imbalances can induce epigenetic modifications, including DNA methylation, histone modification, and regulation through non-coding RNAs. These alterations affect gene expression in both somatic and germline tissues, particularly during sensitive developmental windows such as preconception, pregnancy, and early life. Environmental contaminants, including bisphenols, phthalates, pesticides, polychlorinated biphenyls (PCBs), and per- and polyfluoroalkyl substances (PFAS), have been associated with epigenetic dysregulation linked to reproductive and metabolic disorders in women, including infertility, menstrual irregularities, polycystic ovary syndrome (PCOS), endometriosis, and premature ovarian insufficiency. Additionally, exposure to fine particulate air pollutants can alter transcriptomic profiles and influence cellular pathways related to oxidative phosphorylation, immune regulation, and telomere maintenance in a sex-specific manner. Nutritional factors, particularly methyl-donor nutrients such as folate, also contribute to epigenetic programming during development. Furthermore, chronic psychological stress may modify epigenetic regulation of genes involved in the hypothalamic–pituitary–adrenal axis, affecting mental, reproductive, and long-term metabolic health. Understanding the interaction between environmental exposures and epigenetic mechanisms is essential for improving women's health research and developing preventive public health strategies.

Keywords: Epigenetics, Women's health, Environmental exposure, Endocrine-disrupting chemicals, DNA methylation, PCOS, Reproductive health, Air pollution, Environmental toxicology

PP: 69

Biotechnological Advances in Breast Cancer Biomarkers

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The real bottleneck in treating breast cancer has always been time. We know that if we catch it early, the survival rate is nearly 100%, but our traditional tools like mammography aren't foolproof. They often struggle with dense breast tissue, which can lead to a lot of "wait and see" anxiety for patients. This is where the transition to molecular biotechnology becomes a literal lifesaver. We're moving past just looking for physical masses and starting to track "biomarkers"—biological red flags like mutated DNA or specific proteins. It's a shift from reactive medicine to proactive detection at the microscopic level. I wanted to dig into how these biotech breakthroughs are actually being used to make screening safer and more accurate. My main focus here is: Evaluating how biomarkers act as a high-tech early warning system., Looking at the move toward Liquid Biopsies to replace invasive procedures., Seeing how AI and Biosensors are being integrated to ensure we aren't just "over-treating" patients, but providing precision care. After looking into the recent literature, a few specific technologies really stand out as game-changers: The Blood-Based Revolution (ctDNA): One of the most promising areas is the use of Circulating Tumor DNA (ctDNA). Tumors shed tiny bits of their genetic code into the bloodstream. By using high-sensitivity sequencing, we can find these fragments and identify mutations like *PIK3CA* or *BRCA1* through a simple blood draw. It's a huge win for patient safety because it cuts out the need for painful needle biopsies in the early diagnostic stages. Handheld Biosensors: I found it fascinating that we're now seeing the development of "Point-of-Care" devices. These use gold nanoparticles to detect markers like HER2 almost instantly. It's basically taking the complexity of a massive lab and shrinking it down to a device that could work in a local clinic, which is massive for reaching women in underserved areas. AI and Radiomics: We're also seeing a big push in pairing biotech with Machine Learning. AI can sift through "Radiomics" data basically complex patterns in medical images to spot subtle changes that a human radiologist might miss. What's interesting here is that it helps reduce "false positives," meaning fewer women have to go through the trauma of unnecessary surgeries. It's clear that the future of oncology isn't just about "bigger" machines, but "smarter" science. By leaning into Precision Oncology, we're finally moving toward a model where the treatment is as unique as the patient's own DNA. These biotechnological advances don't just improve the odds of survival; they protect a woman's quality of life by making the entire diagnostic process less invasive and much more reliable. We're getting to a point where we can stop cancer before it even has a chance to start.

Keywords: Molecular Biomarkers, Liquid Biopsy, ctDNA, Precision Oncology, Women's Health Safety, Early Detection

PP: 70

Hormonal Transition During Perimenopause and Menopause: Molecular Mechanisms, Systemic Effects, and Cancer Risk in Women Above 40

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The transition from reproductive life to menopause represents a critical biological phase in women above 40 years of age. Perimenopause and menopause are characterized by progressive ovarian follicle depletion, leading to significant fluctuations and eventual decline in estrogen and progesterone levels. These hormonal alterations disrupt the hypothalamic–pituitary–ovarian axis, resulting in irregular menstrual cycles, vasomotor symptoms, mood instability, and sleep disturbances. Beyond symptomatic changes, the decline in estrogen signaling has profound systemic consequences, influencing metabolic regulation, bone remodeling, and cardiovascular health. Reduced estrogen levels contribute to increased insulin resistance, central adiposity, and decreased bone mineral density, thereby elevating the risk of osteoporosis and cardiovascular disease. At the molecular level, menopause is associated with cellular senescence, increased oxidative stress, mitochondrial dysfunction, and altered gene expression patterns. Advances in biotechnology, including transcriptomics, proteomics, and hormone-based biomarker analysis, have provided deeper insight into the mechanisms underlying ovarian aging and systemic physiological decline. Importantly, prolonged exposure to endogenous or exogenous estrogens, particularly in hormone replacement therapy (HRT), has been linked to altered signal estrogen receptor (ER) signaling, which may increase the risk of breast cancer and endometrial cancer in susceptible individuals. Understanding these pathways is crucial for improving cancer awareness, early screening, and personalized therapeutic strategies. This review highlights the interconnected endocrine, molecular, and systemic changes occurring during menopausal transition and emphasizes the importance of integrating biotechnological approaches in research and preventive healthcare. A comprehensive understanding of hormonal dynamics, molecular mechanisms, and cancer risk assessment can support the development of targeted interventions, improve quality of life, and promote healthy aging in women above 40 years of age.

Keywords: Menopause, HRT, EG, Ovarian follicle depletion ,Osteoporosis, Metabolic regulation

PP: 71

Stabilizing Sensitive Skin in Women: Targeting Barrier Disruption and Neuro-Immune Dysregulation through Postbiotic-Based Minimalism

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Sensitive skin is increasingly recognized as a condition driven by an exaggerated neuro-immune response to normally non-irritating stimuli. Clinically, it manifests as burning, stinging, erythema, and discomfort following exposure to environmental, cosmetic, or chemical triggers. Sensitive skin reflects underlying physiological dysregulation that disturbs cutaneous homeostasis, not just cosmetic overuse. Skin sensitivity is associated with epidermal barrier disruption, leading to increased trans epidermal water loss (TEWL), which allows penetration of irritants. This barrier impairment is accompanied by activation of pro-inflammatory cytokine pathways, including mediators such as IL-1α and TNF-α. Microbiome imbalance (dysbiosis) further destabilizes skin defenses. Alongside, neurogenic responses mediated through sensory receptors such as TRPV1 amplify skin reactivity and elevate inflammatory responses. Postbiotics, defined as bioactive metabolites derived from beneficial microorganisms, represent an emerging strategy for restoring skin homeostasis through multiple biological pathways. These compounds can strengthen the epidermal barrier by enhancing lipid synthesis and tight-junction integrity, thereby reducing TEWL. Additionally, postbiotics modulate inflammatory signalling by regulating cytokine activity. They promote microbiome balance by supporting beneficial microbial communities, and attenuate neurogenic hypersensitivity by stabilizing skin–nerve interactions. Existing examples, such as Lactobacillus ferment lysates, Bifida ferment lysate, and other microbial metabolites, have demonstrated potential in improving barrier function and reducing skin sensitivity. Clinically, postbiotic-based interventions offer the potential to shift sensitive-skin management from reactive, multi-product symptom control toward simplified, low-irritation, long-term stabilization strategies. By targeting the root dysfunctions, including barrier disruption, inflammatory signalling, dysbiosis, and neuro-hyperreactivity, postbiotics may reduce the need for frequent product switching and complex skincare routines. Future approaches aim at precision microbiome modulation, targeted postbiotic formulations, and personalized dermatological therapies that could further expand their potential in promoting stable and resilient skin.

Keywords: Sensitive skin, Cytokine pathways, Microbiome, Trans epidermal water loss (TEWL), Postbiotics

PP: 72

Microalgal Astaxanthin: A Green and Effective Substitute of Synthetic Astaxanthin for Therapeutic Applications

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The growing demand for sustainable and safe bioactive compounds has accelerated efforts to replace chemically synthesized astaxanthin with naturally derived alternatives. Microalgal astaxanthin, a potential antioxidant produced by *Haematococcus pluvialis*, has emerged as a superior and environmentally sustainable substitute. Its unique molecular structure enables it to neutralize reactive oxygen species (ROS) across lipid bilayers, reducing oxidative stress implicated in numerous diseases. In cardiovascular health, astaxanthin mitigates atherosclerosis, hypertension, and dyslipidaemia by modulating redox balance, inhibiting NF-κB pathways, and improving lipid metabolism. For metabolic disorders, it lowers hyperglycaemia, enhances insulin sensitivity, and elevates adiponectin levels, as evidenced in clinical trials where 8 mg/day supplementation over 8 weeks significantly improved glucose control. Anticancer properties arise from its anti-proliferative effects, inducing apoptosis in tumor cells via Nrf2/Keap1 activation and suppressing inflammation. Neurological benefits include neuroprotection against Parkinson's, Alzheimer's, and age-related macular degeneration by crossing the blood-brain barrier to combat oxidative damage and amyloid aggregation. Astaxanthin also shields skin from UV-induced photoaging, reduces wrinkles, and supports wound healing through anti-inflammatory and collagen-boosting mechanisms. Its anti-inflammatory actions, via TLR4/MyD88 and MAPK inhibition, alleviate acute lung injury, sepsis, and arthritis. Additional applications encompass anti-obesity effects by regulating adipogenesis, gastroprotection, and antimicrobial activity. Despite challenges like high production costs, microalgal astaxanthin outperforms synthetic forms in bioavailability and safety, positioning it as a valuable nutraceutical for preventive medicine. Ongoing research into genetic engineering and scalable algal production promises broader therapeutic adoption, fostering sustainable health solutions.

Keywords: Microalgae, Astaxanthin, Antioxidant, Therapeutics

PP: 73

Organizational Climate, Occupational Stress and Psychological Well-Being Among Female Faculties in India: A Systematic Literature Review

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Work-related stress among female faculties in India's higher education institutions is a growing concern. It is closely connected to the organizational climate in which they work, and it has a strong impact on their mental health and overall psychological well- being. The objective of this systematic review is to bring together existing empirical studies to understand the complex relationship between organizational climate, occupational stress and psychological well-being among female academicians in Indian higher education. It further seeks to understand in which aspects of organizational climate the female faculties are facing problems, along with major occupational stressors and strategies required to improve their psychological well-being and overall job satisfaction. The methodology involved systematic review of peer-reviewed articles focusing on these variables within a specific demographic and geographical context from 2014 to 2025. Studies were screened and analysed to identify recurring themes related to climate dimensions, stress experience and well-being outcomes among female faculty members. Key results indicate that organizational climate shapes how occupational stress is experienced. A supportive, fair and inclusive work environment with transparent communication, participative leadership, adequate resources reduce stress and foster psychological well-being. Conversely, negative organizational climates are marked by authoritarian leadership, poor communication, lack of transparency, limited participation in decision making and gender inequalities increases occupational stress. Occupational stressors faced by female faculties include heavy workload, research pressure, and administrative burdens. These challenges are further intensified by technostress from digital systems and disparity between rural and metropolitan institutions in terms of infrastructure and opportunities. In conclusion, organizational climate is a pivotal determinant of occupational stress and psychological well-being among female faculty in India. Targeted intervention strategies that include both institutional support and individual coping are required. Implementing flexible work policies, supportive leadership, counselling services and work redistribution can help create a healthier work environment. Addressing systematic gender inequalities and fostering a culture of fairness, respect and psychological safety are important for enhancing the well being and professional longevity of female academics.

Keywords: Organizational Climate; Occupational Stress; Psychological Well-being; Female faculties; Higher Education

PP: 74

Determinants of Entrepreneurial Self-Efficacy Among Women: A Systematic Literature Review

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The involvement of women in entrepreneurship is important for economic developmental. But some obstacles stop them from moving forward. A key psychological factor in this context is entrepreneurial self-efficacy (ESE). ESE is defined as an individual's belief in their ability to successfully perform entrepreneurial tasks. ESE has been identified as a significant predictor of entrepreneurial intentions. However, consistent research in this shows that women tend to report lower levels of ESE compared to men. This challenge is often linked with internal and contextual influences including nature of social support available to women, gender norms, access to education and training, and societal attitudes towards women entrepreneurs. The primary objective is to identify and analyse the key determinants of women's entrepreneurial self-efficacy and confidence This review tries to determine the part of gender conceptions and societal comprehensions on ESE, the part of social support, the part of entrepreneurial coaching and education and other individual characteristics that either boost or hamper women's ESE to start businesses. This systematic literature review concentrates specifically on women entrepreneurs, focusing on studies that explore their self-efficacy, confidence, entrepreneurial intentions, and related factors. The selection criteria were set on studies that dealt with woman entrepreneurs only. The findings highlight several critical determinants of women's entrepreneurial confidence. Women's ESE is weakened by the idea that they're less innovative due to gender- grounded societal comprehensions. Social support, institutional support and mentorship support maximizes entrepreneurial intentions and performance in the harsh terrain. Entrepreneurial interventions, through entrepreneurial education and coaching, are proved to be fruitful in enhancing ESE leading to business growth. The review emphasizes the importance of introducing effective interventions to reduce the harmful impact of gender stereotypes and to create supportive conditions that will enhance women's entrepreneurship.

Keywords: Female Entrepreneurship, Entrepreneurial Self-Efficacy, Gender Stereotypes, Social Support, Entrepreneurial Coaching, Entrepreneurial Intentions.

PP: 75

Innovative Eco-Friendly Teaching Kits: Navigating Health, Environment, and Regulatory Challenges

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The increasing global emphasis on sustainability has significantly influenced the educational sector, driving the development of innovative eco-friendly teaching kits aimed at reducing environmental footprints while ensuring health and safety for users. These kits are designed not only to provide effective learning tools but also to address the pressing need for sustainable practices within educational environments. This study investigates the multifaceted challenges encountered in the creation and deployment of eco-friendly teaching kits, focusing on the critical balance between environmental sustainability, health considerations, and adherence to regulatory frameworks. The objective of this study was to comprehensively analyse these intersecting factors and propose actionable strategies to facilitate the broader adoption of such kits in diverse educational settings. A rigorous mixed-methods approach was adopted, encompassing a detailed review of current eco-friendly materials and technologies, qualitative interviews with key stakeholders, including educators, manufacturers, and regulatory authorities, and in-depth case studies of existing teaching kit implementations. This methodology allows for a holistic understanding of the practical, technical, and regulatory issues involved. The findings reveal that integrating biodegradable, recyclable, and non-toxic materials significantly reduces waste generation and exposure to harmful chemicals, thereby enhancing both environmental and user health outcomes. However, the study identifies persistent challenges, such as navigating complex and often fragmented regulatory landscapes that vary across geographical regions, complicating compliance efforts and delaying market entry. Moreover, maintaining cost-effectiveness while ensuring high-quality and safe educational products remains a critical concern for both manufacturers and institutions. This research underscores the essential role of ongoing collaboration among educators, product developers, policymakers, and regulatory bodies to drive innovation that aligns with evolving health and environmental standards. This study advocates for the establishment of standardised guidelines and certification processes to streamline compliance and foster trust among users. In conclusion, eco-friendly teaching kits hold substantial promise for advancing sustainable education by minimising ecological impact and promoting health-conscious learning. Nevertheless, their successful widespread adoption hinges on overcoming regulatory barriers, enhancing material innovation, and fostering cooperative frameworks that support sustainable educational tools on a large scale.

Keywords: Eco-friendly teaching kits, Sustainability, Health safety, Environmental impact, Regulatory compliance, Educational innovation

PP: 76

Intergenerational Communication Patterns and Dynamics in Parent-Child Relationships

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Transparency between parents and their children fosters healthy, productive relationships, with parental supervision playing a key role in a happy family environment. Intergenerational communication significantly shapes these relationships by linking past, present, and future through norms and communication styles passed down generations. This review consolidates studies on Intergenerational communication patterns frequency, content, style and dynamics such as emotional and power-related processes within parent–child relationships. It emphasizes the emotional and mental health outcomes of these interactions, aligning with the HER theme by underscoring communication's role in family well-being and psychological health. A comprehensive review of peer-reviewed articles from 2018 to 2024 was conducted via Google Scholar. Out of 20 papers identified, 10 relevant studies were selected for thematic analysis focusing on communication, emotional interactions, parental expectations, and family conflicts. Findings indicate that communication marked by openness, empathy, and support correlates with stronger emotional bonds, effective conflict resolution, and improved mental health between parents and children. In contrast, controlling, emotionally dismissive, or power-imbalanced communication leads to relational stress and poorer psychological outcomes. Empathy and mutual respect emerge as critical factors influencing relationship quality. This review highlights the significant influence of Intergenerational communication patterns and dynamics on the emotional well-being and quality of relationships between parents and their children. Communication that is supportive and empathetic fosters stronger emotional connections and enhances psychological health, while power imbalances and ineffective communication can lead to relational stress. By employing evidence-based strategies to improve Intergenerational communication, family well-being can be bolstered, and mental health can be supported throughout life.

Keywords: Intergenerational communication, Parent-child relationships, Emotional health, Communication patterns, Communication dynamics

PP: 77

Women as Architects of Safe Digital Childhood: A Health and Regulatory Analysis of Maternal Digital Parenting

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The digital era has profoundly reshaped childhood, how children interact, learn, and grow within technology-mediated environments, introducing both opportunities and risks. Mothers, as primary caregivers, often assume the central role in guiding children's digital engagement, balancing health concerns with regulatory demands. Maternal digital parenting thus emerges as a critical determinant of safe digital childhoods. This review paper aims to analyse maternal digital parenting practices through a health and regulatory lens, exploring how women act as architects of safe digital environments for children. It seeks to identify the intersection between maternal strategies, child health outcomes, and compliance with digital safety regulations. This review aligns with the HER theme highlighting "women health. A narrative review approach was adopted, synthesizing peer-reviewed literature, policy documents, and public health reports published over the five years. Sources were examined to evaluate maternal roles in digital monitoring, regulation of screen time, promotion of digital literacy, and interpretation of regulatory frameworks related to online safety and child protection. A total number of 20 papers were extracted from databases of which 10 were found relevant and hence chosen to be part of this review. Findings reveal that mothers consistently serve as proactive mediators of digital exposure, implementing strategies to mitigate risks such as cyberbullying, excessive screen use, and privacy breaches. Maternal practices align closely with public health priorities, including mental well-being, physical activity, and sleep hygiene. Furthermore, mothers often translate regulatory guidelines into household rules, bridging gaps between policy and practice. Women, particularly mothers, are pivotal in shaping safe digital childhoods. Their dual role safeguarding health and interpreting regulatory frameworks positions them as architects of digital parenting. Strengthening maternal digital literacy and embedding gender-sensitive perspectives in policy design can enhance child protection, foster balanced technology use, and ensure healthier digital futures.

Keywords: Digital parenting, Maternal digital parenting, Cyber safety, Safe digital childhood, Regulatory policy, Health and technology.

PP: 78

Microbiome-Targeted Therapies for Ameliorating Alzheimer's Disease-Associated Cognitive Impairment

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Neurodegenerative diseases may be mostly caused by disruptions along the brain-gut-microbiota axis. The most common cause of dementia, Alzheimer's disease (AD), is typified by a progressive loss of cognitive function linked to the development of neurofibrillary tangles and amyloid beta (Aβ) plaques. The introduction of high-throughput "omics" technology has advanced our understanding of the gut microbiota in human health and illness, particularly the neurodegenerative diseases like AD. Via the gut-brain axis, the central nervous system and the gastrointestinal tract frequently exchange information and regulate one another. Restoring a healthy gut microbiota may slow or even reverse the symptoms and course of AD, as a substantial amount of research has shown a tight relationship between the gut microbiota and AD development. Therefore, altering the gut microbiota has emerged as a new paradigm for the treatment of AD, and recent research has concentrated on creating possible new approaches to the disease's prevention and/or treatment. In this review, we summarise the link and causal relationship between gut dysbiosis and AD, how gut microbiota contributes to the progression of AD, and the achievements and difficulties of applying available gut microbiome-targeted therapies (such as probiotics, prebiotics, synbiotics, postbiotics, and faecal microbiota transplantation) in preclinical and clinical intervention studies of AD for prevention and/or treatment. We conclude by talking about the field's future directions.

Keywords: Neurodegenerative disorders, Alzheimer's disease, Gut microbiome, Therapies

PP: 79

Nanoparticles as Emerging Therapeutic Platforms for Psoriasis Treatment

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Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by excessive keratinocyte proliferation, immune dysregulation, and persistent inflammation. It imposes a considerable physical and psychological burden on affected individuals. Conventional therapies such as topical agents, systemic drugs, and biologics are often associated with limitations including poor skin penetration, systemic side effects, frequent dosing, and reduced patient compliance. Recent advances in nanotechnology have introduced nanoparticle-based drug delivery systems as a promising strategy to overcome these challenges. This work aims to highlight the potential of nanoparticles as an advanced therapeutic platform for psoriasis management, focusing on enhanced drug delivery, improved therapeutic efficacy, and reduced adverse effects. This study is based on a systematic evaluation of published scientific literature related to nanoparticle-based drug delivery systems for psoriasis treatment. Peer-reviewed research articles and clinical reports were identified using relevant keywords such as psoriasis, nanoparticles, nanotechnology, and topical drug delivery. The selected studies were analyzed to assess different nanoparticle systems, including polymeric, lipid-based, and metallic nanoparticles, with respect to their formulation approaches, skin penetration mechanisms, therapeutic performance, and safety profiles. The analyzed studies show that nanoparticle-based drug delivery systems enhance drug solubility, stability, and retention in psoriatic skin. Lipid-based nanoparticles improve skin penetration, while polymeric nanoparticles enable sustained drug release. Some nanoparticles also exhibit anti-inflammatory and antioxidant properties, resulting in improved efficacy and safety compared to conventional dosage forms. Nanoparticles represent a promising and versatile approach for the treatment of psoriasis by addressing the major limitations of traditional therapies. Their ability to deliver drugs in a targeted and controlled manner may lead to improved clinical outcomes and patient compliance.

Keywords: Psoriasis, Nanoparticles, Drug delivery systems, Nanotechnology, Topical therapy

PP: 80

Triazole-Based Scaffolds in Anti-Diabetic Drug Discovery: A Comprehensive Review of Design, Synthesis, and Biological Insights

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Type 2 diabetes mellitus (T2DM) affects over 460 million people globally, driven by insulin resistance and hyperglycemia. 1,2,3-Triazole scaffolds offer unique bioisosteric properties, including metabolic stability and hydrogen bonding, positioning them as versatile cores for anti-diabetic drug discovery targeting α-glucosidase, aldose reductase, and PPARγ pathways. This review aims to systematically evaluate the design strategies, synthetic routes, and biological profiles of triazole-based derivatives, highlighting structure-activity relationships (SAR) and therapeutic potential for T2DM management. A comprehensive literature survey was conducted across PubMed, Scopus, and Web of Science (2015–2026), focusing on CuAAC/RuAAC click chemistry, multicomponent syntheses, and hybrid triazole constructs. SAR trends were analyzed from *in vitro/in vivo* studies, emphasizing IC50 values, glucose-lowering efficacy, and ADMET profiles. Key parameters included enzyme inhibition potency, cellular glucose uptake, and diabetic animal model outcomes. Over 150 triazole derivatives were reviewed, with CuAAC yielding 1,4-regioisomers in >90% efficiency. SAR indicated electron-withdrawing substituents enhancing α-glucosidase IC50 (1–15 μM, outperforming acarbose). Hybrids with thiazolidinediones showed 30–45% blood glucose reduction in STZ-rat models, alongside improved lipid profiles and β-cell preservation. PPARγ agonists among 1,5-triazoles promoted GLUT4 translocation in adipocytes. Challenges include hepatotoxicity risks and suboptimal hERG liability, addressable via N-glycosylation. Triazoles rival clinical agents in potency but excel in synthetic accessibility, advocating hybrid designs for next-generation T2DM therapeutics.

Keywords: Diabetes mellitus, Triazole, α-Glucosidase, Molecular docking, *In-silico*

PP: 81

In Silico Characterization of Enzyme–Dye Interactions for Biodegradation of Industrial Textile Dyes

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Synthetic dyes used in industrial processes, especially in the textile sector, are a significant source of environmental pollution due to their high stability and resistance to natural degradation. Among these, industrial yellow and red dyes are widely produced and discharged into water bodies, posing serious ecological and health concerns. These dyes often persist in aquatic environments, reducing light penetration, affecting photosynthetic activity of aquatic plants, and generating toxic by-products that may harm aquatic organisms and human health. As a result, the development of efficient and environmentally friendly methods for dye removal has become an important area of environmental biotechnology research. The present study explores the biodegradation potential of industrial yellow and red dyes using a bacterial strain through an in silico approach. Computational analysis was performed to understand the interaction between dye molecules and bacterial enzymes that are known to participate in dye degradation. Structural information of the target enzymes was analyzed, and molecular docking studies were conducted to evaluate the binding affinity and interaction patterns between the dyes and the active sites of the enzymes. Such computational approaches help predict how effectively microbial enzymes can interact with and potentially transform complex dye molecules. The molecular docking was performed against the bacteria *Morganella morganii* strain GAESHAL01 isolated in our laboratory, which showed the highest docking vina score of −8.4 with yellow textile dye. The results indicated potential interactions between the dye molecules and enzyme binding pockets, suggesting the capability of the bacterial strain to initiate the degradation of these complex compounds through enzymatic activity. The findings of this study highlight the importance of computational tools in predicting enzyme–substrate interactions and provide insights into the potential role of bacterial strains in the biodegradation of industrial dyes. This work offers a theoretical basis for future laboratory-based studies and supports the development of environmentally sustainable strategies for treating dye-contaminated wastewater.

Keywords: Dyes, Yellow dye, Red dye, Bacteria, biodegradation, molecular docking

PP: 82

Heavy Metal Contamination in Urban Surface Water Bodies of Lucknow: Implications for Environmental Health and Regulatory Monitoring

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Rapid urbanization and industrial development have significantly influenced the quality of freshwater resources in many developing cities. Urban surface water bodies often receive untreated domestic wastewater, industrial effluents, and storm water runoff, which may introduce toxic heavy metals into aquatic environments. These metals are persistent, non-biodegradable, and capable of accumulating in sediments and living organisms, thereby posing serious environmental and public health concerns. In cities such as Lucknow, where lakes, ponds, and drainage channels support multiple domestic and ecological functions, continuous monitoring of heavy metal contamination is essential for effective environmental management and regulatory planning. The objective of the present study was to evaluate the concentration and distribution of selected heavy metals in urban surface water bodies of Lucknow and examine their potential implications for environmental health and regulatory monitoring. Water samples were collected from representative sampling sites across different locations of the city. Physicochemical parameters including pH, electrical conductivity, and total dissolved solids were analysed following standard water quality assessment procedures. Heavy metals such as iron (Fe), manganese (Mn), lead (Pb), and cadmium (Cd) were determined using established spectrophotometric analytical methods after appropriate sample preparation and digestion. The results indicated measurable concentrations of several heavy metals in the studied water bodies, reflecting the influence of urban runoff, domestic wastewater discharge, and localized anthropogenic activities. Iron and manganese showed relatively higher concentrations at certain sites, possibly due to both natural geological sources and human-induced inputs. Although some parameters remained within permissible limits, elevated concentrations at specific locations indicate potential ecological stress and long-term health risks if contamination continues. The study emphasizes the importance of regular monitoring and regulatory oversight of urban water bodies to ensure environmental protection and public health safety.

Keywords: Heavy metals, Surface water, Urban pollution, Environmental health, Water quality monitoring

PP: 83

The "Smart Strip" Innovation: Translating CRISPR-Cas12a Technology into a LowCost Paper Diagnostic for Rapid Detection of Food-borne Pathogens

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Rapid and accurate detection of food-borne pathogens remains a major public health challenge, particularly in resource-limited settings lacking adequate diagnostic infrastructure. In India, food-borne illnesses pose a persistent risk due to vast supply chains and decentralized monitoring. Traditional methods like microbial culture require 48–72 hours for confirmation, delaying timely intervention. Although molecular techniques such as PCR offer higher accuracy, they require costly equipment, technical expertise, and reliable electricity, limiting their widespread use in many regions. These logistical barriers prevent real-time safety monitoring in local markets and street-food hubs. This study introduces the "Smart Strip," a translational biotechnology innovation designed to bridge the gap between high-end genomic research and grassroots food safety monitoring. The primary objective of this project is to develop and evaluate a portable, paper-based diagnostic platform utilizing the "collateral cleavage" activity of the CRISPR-Cas12a system. This project aligns with the TEST-STEM mission of WARM-WISHES 2026 by transforming a laboratory-scale molecular tool into a commercially viable, user-friendly device. The methodology involves the integration of Recombinase Polymerase Amplification (RPA) with CRISPR-based detection to create a "one-pot" diagnostic reaction. Unlike PCR, RPA is an isothermal technique that amplifies target pathogen DNA at a constant temperature (approximately 37-42°C), eliminating the need for complex laboratory equipment. Once the Cas12a-crRNA complex identifies specific genetic markers of pathogens such as Salmonella typhimurium or Escherichia coli, it triggers a non-specific cleavage of labelled single-stranded DNA (ssDNA) reporters. This molecular trigger is then visualized on a cellulose-based lateral flow assay (LFA) strip, producing a colorimetric result similar to a home pregnancy test. Preliminary conceptual modelling indicates that the Smart Strip can achieve a limit of detection (LoD) comparable to traditional PCR, identifying as few as 10-50 copies of a target gene. The device provides a visible "Yes/No" readout in under 40 minutes, which is readable by the naked eye without specialized imaging software. The use of lyophilized (freeze-dried) reagents ensures biochemical stability of the strips under varying environmental temperatures common in Lucknow, reducing dependence on cold-chain logistics. The Smart Strip offers a scalable solution for food safety by translating CRISPR-Cas12a technology into a paper-based format. This innovation supports science-driven management and safety initiatives. Although challenges remain in large-scale manufacturing and reagent stability standardization, the proposed roadmap advances proactive food safety and empowers women in STEM to contribute to sustainable health and a secure food economy.

Keywords: CRISPR-Cas12a, Food Safety, Translational Biotechnology, Point-of-Care Diagnostics, TEST-STEM, Isothermal Amplification.

PP: 84

HDAC2 Proteins as Potential Regulatory Targets in Cancer: Insights from Biocomputational Approaches

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Epigenetic modifications, which regulate gene activity without altering the underlying DNA sequence, involve heritable yet reversible changes in histones or DNA. Among these, histone deacetylases (HDACs) function as key transcriptional regulators by removing acetyl groups from acetyl-lysine residues, thereby influencing gene expression and chromatin organization. In particular, this study focuses on the role of HDAC2 in cancer progression and evaluates its potential as a therapeutic target for cancer treatment and future drug development. The primary objective was to identify potential lead compounds with strong binding affinity toward the target protein through molecular docking simulations using the PyRx platform. These findings contribute to the ongoing efforts to discover innovative therapeutic strategies aimed at improving cancer treatment and patient outcomes. The 3D structure of HDAC2 (Histone Deacetylase 2) was retrieved from the Protein Data Bank (PDB) and analyzed using PyMOL. Structural refinement was performed by removing unnecessary chains to ensure clarity and accuracy for subsequent analyses. FDA-approved drugs were obtained from the DrugBank database and evaluated using the SwissSimilarity tool to determine structural similarity with the target molecule based on four parameters: FP2, Pharmacophore, ECFP4, and MHFP6. This screening process resulted in the selection of 50 compounds for further evaluation. Molecular docking studies were then performed using PyRx for preliminary screening. The results revealed several compounds with significant binding affinity toward HDAC2. Among these, Fentanyl Hydrochloride, Ropivacaine, Fentanyl, Felbinac, Belinostat, and Panobinostat demonstrated particularly strong interactions with the target protein, highlighting their potential as promising candidates for further investigation in cancer therapeutics.

Keywords: chromatin, cancer, drug target, HDAC, epigenetics, FDA -approved.

PP: 85

Silent Indoor Threats: Impact of indoor air pollution on women's reproductive health

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Indoor air pollution is a significant yet underrated environmental health risk concern that particularly affects women in developing countries. Household activities such as cooking and heating frequently rely on the combustion of solid fuels, including biomass and coal, which generate a complex mixture of indoor pollutants. Common indoor pollutants include particulate matter (PM2.5 and PM10), volatile organic compounds, carbon monoxide, nitrogen dioxide, tobacco smoke, and emissions from biomass fuels originating from cooking, heating, cleaning products, building materials, and poor ventilation. These pollutants pose serious reproductive health hazards in women as they are exposed to indoor environments and are directly involved in domestic activities. Emerging evidence indicates that exposure to indoor air pollutants can disrupt endocrine regulation, induce oxidative stress, and trigger chronic inflammatory responses, thereby impairing normal reproductive physiology. Such biological perturbations have been associated with a range of adverse reproductive outcomes, including menstrual irregularities, reduced fertility, polycystic ovarian syndrome (PCOS), spontaneous abortions, and pregnancy-related complications. Women of reproductive age are especially vulnerable due to sustained exposure to household emissions and limited access to clean cooking technologies in many regions. Mitigating indoor air pollution through clean energy adoption, improved household ventilation, and increased awareness is crucial for protecting women's reproductive health and achieving broader environmental health goals.

Keywords: Indoor air pollution, Reproductive health, Endocrine disruption, Solid fuels

PP: 86

AI-Driven Hyperspectral Morphotoxic Profiling of Opportunistic Pathogens in Mixed Biofilm Contaminations

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The health care, environmental, and industrial infrastructures encounter challenging issues when dealing with biofilm forming opportunistic pathogens because of their persistence, antimicrobial resistance, and the capacity to coexist in a complex mixed microbial composition. Fast and non-invasion methods of detecting microbial content in biofilms are hence key towards successful monitoring and control. This paper suggests a hyperspectral morphotoxic profiling workflow that uses artificial intelligence and is applicable to analyzing mixed biofilm contaminations of opportunistic pathogens. The method combines hyperspectral imaging and artificial intelligence to identify and make sense of spectral-morphological features of microbial biofilms. The first stage entails the hyperspectral image data acquisition and preprocessing to eliminate noise and standardize spectral content, and the second stage is the dimensionality reduction to retain the most informative spectral data and reduce the complexity of the data. They then train a convolutional neural network to be able to learn discriminative spatial and spectral patterns related to the structures of microbial biofilms and presence of the pathogen in the processed images. The trained model is tested on the basis of automatic delivery of microbial signatures in intricate biofilm settings. To ensure ease of application and illustrate practicality, a simple web based interface will be built with flask framework where one will be able to upload images and get instant AI based predictions through an interactive solution. The current framework of hyperspectral imaging, artificial intelligence, and web-based implementation with a focus on microbial profiling in only a few seconds is discussed as a potential option, and hyperspectral imaging could be used in the context of environmental toxicology, monitoring infections, water quality assessment, and managing biofilm in industries.

Keywords: Artificial Intelligence, Hyperspectral Imaging, Microbial Biofilms, Opportunistic Pathogens, Morphotoxic Profiling, Deep Learning, Convolutional Neural Networks

PP: 87

Antibacterial Properties of Red Colour Producing Plant- *Rubia Cordifolia*

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Colours from biotic and abiotic source has great influence on living being. The seven colour of VIBGYOR translated itself into different forms for benefit of flora and fauna on our earth. One of this is, seven colours produced by different plants. Indian Madder, -*Rubia cordifolia* (Manjistha), having rich history in traditional medicine and producing red colour natural dye. Madder is renowned for its blood-purifying, anti-inflammatory, and antioxidant properties, this herb has been used to treat skin disorders, detoxify the body, and support liver function. Its deep red roots contain a complex blend of bioactive compounds that not only impart potent healing benefits but also serve as a natural colouring agent. We have procured this dye of *Rubia cordifolia* from AMA Herbal Laboratories Pvt. Ltd, Lucknow. This was dissolved in three solvent -water, methanol and ethanol. This dissolved content was studied against *E. coli* K2 strain and calculated as Zone of Inhibition (ZOI). Gentamicin sulphate is taken as positive control. Result showed significant antibacterial effect, by its all solvent, but most with ethanolic solution. Result showed that more systematic antibacterial work is required, and to identify purest antibacterial compound from its dye. There is also great need to understand different biological significance of colours on life at biosphere.

Keywords: *Rubia cordifolia*, VIBGYOR, Antibacterial, *E.coli*

PP: 88

Women in Science and Healthcare: Promoting Sustainable Health and Empowerment through STEM Participation

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Women play a crucial role in the development of society, particularly in the fields of science, healthcare, and research. Despite significant progress in recent years women are still underrepresented in many STEM (Science, Technology, Engineering and Mathematics) sectors. Increasing women's participation in academia and research can lead to sustainable development, improved healthcare system, and innovative solutions to global challenges. Empowering women in Science not only promotes gender equality but also enhances social and economic growth. In developing countries like India, promoting women's involvement in STEM education and research is essential for creating a balanced and inclusive scientific community. The primary objective of this study is to highlight the importance of women's participation in STEM fields and it's impact on sustainable health and social development. It also aims to examine how empowering women in academia and research can contribute to innovative healthcare solutions and improved work - life balance. The findings suggest that increased participation of women in STEM leads to improved research diversity, better healthcare solutions, and stronger innovation in scientific fields. Women researchers have played a significant role in areas such as biotechnology, medical research, and public health. The study also indicates that supportive policies, Duy opportunities, and mentorship programs significantly enhance women's participation in scientific careers. Promoting women's participation in STEM and healthcare research is essential for achieving sustainable development and social progress. Encouraging women in academia and providing equal opportunities can lead to transformative innovations in healthcare and science. Policies supporting education, leadership, and work - life balance are necessary to empower women and strengthen their role in shaping sustainable future.

Keywords: Women, STEM, Healthcare, Science, Sustainability, Empowerment

PP: 89

Molecular Characterization and Expression Analysis of NCR Genes in Chickpea Nodules: A Step Toward Enhancing Legume Nitrogen Fixation

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Leguminous plants employ unique genetic mechanisms to regulate symbiotic nitrogen fixation, one of which involves nodule-specific cysteine-rich (NCR) peptides. While NCR gene families are well characterized in model legumes like Medicago truncatula, little is known about their expression in chickpea (Cicer arietinum), a major food legume of South Asia. In this study, we profiled the expression of chickpea NCR genes across different tissues and cultivars to identify candidates critical for nodulation. A total of 33 CaNCR genes were screened, of which 25 produced specific amplicons (150–200 bp). High-quality RNA was isolated from roots, nodules, stems, petioles, and leaves, followed by cDNA synthesis and quantitative PCR (qPCR). Expression analysis revealed that among the tested genes (CaNCR09, CaNCR14, and CaNCR57), only CaNCR57 was expressed in nodule tissues of cultivars DCP92-3 and HC5, with a Cq value of 12.53. The housekeeping gene CAC (clathrin adaptor complex) showed stable expression across all tissues, validating normalization. CaNCR09 and CaNCR14 did not exhibit detectable expression under the tested conditions. These results suggest that CaNCR57 may play a specific role in symbiotic interactions in chickpea. Our findings provide preliminary evidence for NCR gene functionality in chickpea and highlight the need for broader expression studies under varying biotic and abiotic conditions. This work sets a foundation for genetic improvement of chickpea nodulation efficiency using molecular and synthetic biology approaches.

Keywords: Leguminous plants, symbiotic, nodulation, cDNA, housekeeping gene

PP: 90

Nanoparticle-Mediated Oxidative Stress in Bacterial Systems: Role of Iron Oxide Nanoparticles

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Nanotechnology has emerged as an important field with wide applications in medicine, biotechnology, agriculture, and environmental science. Among various nanomaterials, iron oxide nanoparticles have gained significant attention due to their unique physicochemical properties such as high surface area, magnetic characteristics, chemical stability, and strong biological activity. These properties enable iron oxide nanoparticles to interact efficiently with microbial cells and influence their physiological processes. One of the most important mechanisms responsible for the antimicrobial activity of nanoparticles is the induction of oxidative stress within bacterial systems.

When nanoparticles come into contact with bacterial cells, they may adhere to the cell surface or penetrate the cell membrane depending on their size and surface characteristics. Such interactions can lead to the generation of reactive oxygen species (ROS), including superoxide radicals, hydroxyl radicals, and hydrogen peroxide. The excessive accumulation of these reactive molecules disrupts the cellular redox balance and results in oxidative stress within bacterial cells, significantly affecting the structural integrity and functional components of microbial cells.

Reactive oxygen species generated in the presence of iron oxide nanoparticles can damage essential biomolecules such as lipids, proteins, and nucleic acids. Lipid peroxidation of the bacterial membrane leads to loss of membrane integrity and increased permeability, causing leakage of intracellular contents. Proteins and enzymes may undergo oxidative modifications that alter their structure and impair metabolic activities, while oxidative damage to DNA can interfere with replication and transcription processes, ultimately affecting bacterial survival and cellular function. Bacterial species such as Escherichia coli and Staphylococcus aureus have shown susceptibility to oxidative stress induced by iron oxide nanoparticles. The extent of oxidative damage in bacteria depends on several factors including nanoparticle size, concentration, surface charge, and environmental conditions. Smaller nanoparticles often exhibit higher reactivity and a greater ability to generate reactive oxygen species due to their larger surface area. Iron oxide nanoparticles therefore represent promising candidates for applications in antimicrobial therapy, biotechnology, and environmental management.

Keywords: Oxidative stress, Iron oxide nanoparticle, reactive oxygen species (ROS), nanoparticle–bacteria interaction, lipid peroxidation, microbial inhibition.

PP: 91

Comparative Analysis of Nickel and Cobalt Toxicity in Selected Bacterial Species

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Heavy metals are persistent environmental contaminants that can significantly influence microbial growth and physiological processes. Although certain metals such as nickel and cobalt are required in trace amounts for normal biological functions, elevated concentrations may interfere with cellular metabolism and lead to toxic effects. Evaluating microbial responses to these metals is therefore important for understanding their biological impact and potential antimicrobial properties. In the present study, the inhibitory effects of two heavy metal salts, nickel sulphate hexahydrate and cobalt chloride hexahydrate, were examined using two bacterial species, *Escherichia coli* and *Staphylococcus aureus.* Bacterial cultures were exposed to varying concentrations of the selected metal salts ranging from 25 µM to 100 µM. The influence of metal exposure on bacterial growth was assessed through minimum inhibitory concentration determination and antimicrobial susceptibility testing. The results demonstrated a concentration-dependent reduction in bacterial growth with increasing metal concentrations. Percentage inhibition analysis showed growth reduction ranging approximately from 4% to 71%, depending on the concentration of the metal salt and the bacterial species tested. Antimicrobial susceptibility testing further supported these findings, as larger zones of inhibition were observed at higher metal concentrations. Differences in the degree of inhibition between the two organisms suggest variations in their tolerance and adaptive responses to metal-induced stress. Overall, the findings highlight the and emphasize the usefulness of microbial systems as models for evaluating heavy metal toxicity and their potential antimicrobial relevance.

Keywords: Heavy metal toxicity, Nickel, Cobalt, *Escherichia coli*, *Staphylococcus aureus*, MIC, bacterial growth inhibition.

PP: 92

Democratizing Precision Oncology: A Biopython-Based Open-Source Pipeline for Identifying Regional BRCA1/2 Mutational Clusters in North Indian Women

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Breast cancer is an alarming disease in India, often manifesting at a younger age in comparison to the western population. Driven by lack of high-throughput diagnostic software, states like UP witness high mortality despite improved primary care facilities. Open-source Python libraries like Biopython enable local researchers to carry out high-depth genetic audit of publicly received datasets. The objective of this study is to present a low-cost, open-source approach to identify pathogenic BRCA variants in North Indian women, for early detection in cases having high genetic possibility of occurrence of disease. We analyzed raw NCBI GEO datasets and created a visual sequence alignment plot to identify regional mutational clusters. Genomic datasets were retrieved from NCBI GEO (Indian hereditary breast cancer cohorts, e.g. GSE120083 or GSE103771 datasets). Analysis was carried out using Biopython library. Bio.Entrez was used to fetch reference BRCA1/2 sequences and Bio.Align was used for Multiple Sequence Alignment. ClustalW was used as a wrapper to run reference Multiple Squence Alignment against patient FASTQ files, using the GRCh38 human genome as reference. The final code was used to create a custom alignment plot to identify conservation scores and point mutations. The pipeline has identified recurrent non-synonymous SNPs in RING and BRCT domains of BRCA1. The founder mutation 185delAG was more prevalent and region-specific variants unique to the UP sub-cohort were also identified. Sequence alignment plots have evidenced mutational clusters that are known to have aggressive, early-onset phenotypes. The integration of Biopython with NCBI GEO datasets provides female bioinformaticians in India a way to independently lead precision medicine initiatives and democratize genomics for development of population-specific screening panels for women, ones belonging to Northern regions of the Indian subcontinent in this case, but can be replicated worldwide.

Keywords: Breast Cancer Detection, Biopython Pipeline, Pathogenic BRCA variants, ClustalW Multiple Sequence Alignment, Non-synonymous SNPs

PP: 93

Understanding Impulsivity and Criminal Propensity in Emerging Adulthood: A Narrative Review for Preventive Awareness in Higher Education

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Emerging adulthood represents a developmental stage marked by increasing independence, evolving social roles, and exposure to new environmental and interpersonal influences. For many college students, this transition also involves navigating situations that require greater behavioural control and responsible decision-making. Psychological characteristics play a significant role in shaping how individuals respond to such situations. Among these characteristics, impulsivity often described as a tendency to act quickly without adequate forethought has frequently been associated with risk-taking and rule-violating behaviour. Understanding how impulsivity relates to criminal propensity may therefore provide valuable insight into behavioural tendencies among young adults.

The present paper adopts a narrative review approach to examine existing research exploring the relationship between impulsivity and criminal propensity among emerging adults. Relevant literature was identified through academic databases and peer-reviewed psychological journals focusing on impulsivity, behavioural regulation, and youth deviance. The review attempts to bring together key empirical findings and theoretical perspectives in order to understand how impulsive traits may influence behavioural outcomes during this stage of development.

Across the studies reviewed, evidence generally suggests that higher levels of impulsivity are associated with an increased likelihood of behaviours such as aggression, rule-breaking, and other forms of risk-taking. At the same time, the literature indicates that contextual influences including peer environments, emotional stress, and situational pressures can shape how impulsive tendencies are expressed. Some studies further highlight that supportive social contexts and effective coping mechanisms may help reduce the behavioural risks associated with impulsivity.

Overall, the findings suggest that impulsivity can function as an important psychological factor in understanding behavioural vulnerability during emerging adulthood. These insights may contribute to the development of educational and counselling initiatives that encourage emotional regulation, responsible decision-making, and healthier behavioural patterns among college students.

Keywords: Impulsivity, Criminal Propensity, Narrative Review, Emerging Adulthood, College Students

PP: 94

Clean hydrogen energy and women's health: A pathway to sustainable and inclusive development

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Access to clean energy is closely linked with public health, environmental sustainability, and social equity. In many developing regions, women are disproportionately affected by traditional energy practices such as the use of biomass fuels for cooking and heating. Prolonged exposure to indoor air pollution from firewood, coal, and kerosene contributes to respiratory diseases, cardiovascular problems, and adverse pregnancy outcomes, making women's health a critical concern in the energy–health nexus. Transitioning to clean energy technologies offers a powerful pathway to address these challenges while promoting sustainable development. Hydrogen energy has emerged as a promising clean energy carrier capable of supporting low-carbon energy systems. When produced through renewable resources such as solar and wind-powered electrolysis, hydrogen becomes a green and sustainable fuel with water as its only combustion by-product. Integrating hydrogen-based energy solutions in domestic, transportation, and industrial sectors can significantly reduce harmful emissions and improve air quality, thereby indirectly contributing to better health outcomes for women and families.

Beyond environmental benefits, the hydrogen economy also offers opportunities for women's participation in science, research, entrepreneurship, and energy management. Encouraging women's involvement in hydrogen research, clean energy innovation, and policy development can foster inclusive growth while strengthening sustainable energy transitions. Capacity building, education, and supportive institutional frameworks are essential to empower women to actively contribute to this emerging sector. Thus, clean hydrogen energy not only supports climate and sustainability goals but also plays an important role in safeguarding women's health and promoting gender-inclusive development for a resilient and sustainable future.

Keywords: Women Health, Nanomaterials, Energy Security.

PP: 95

To study on characterizations of Hermitian matrices and their applications

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This project is based on the paper "Some New Characterizations of Hermitian Matrix and Their Applications" by Yongge Tian. The main objective of this work is to study and analyze several new equivalent conditions that characterize Hermitian and skew-Hermitian matrices using matrix equalities involving a matrix A and its conjugate transpose A .

The paper introduces a variety of novel matrix identities and establishes their equivalence to the Hermitian or skew-Hermitian nature of matrices. These characterizations are derived using fundamental concepts such as matrix decomposition, Moore–Penrose inverse, and properties of positive semi-definite matrices. The results provide deeper insight into the structural behavior of matrices and offer new ways to verify whether a given matrix is Hermitian.

Furthermore, the study demonstrates that these results remain valid for real matrices by replacing the conjugate transpose with the usual transpose. The results are also extendable to more general algebraic systems, such as rings with -involution, where similar properties can be defined. However, it is observed that classical matrix tools may not always be applicable in such general settings, and hence alternative algebraic methods are required. In addition to theoretical developments, the paper discusses various applications of these characterizations in simplifying matrix expressions, solving matrix equations, and analyzing linear transformations. These results contribute significantly to matrix theory and provide useful tools for further research in linear algebra and its applications.

Keywords: Determinant, Generalized Inverse, Hermitian Matrix, Matrix Decomposition, Matrix Equality

PP: 96

How Hospitality industry can improve the deteriorating health of females

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Women are progressing rapidly both socially and economically in current generation the is a long way to go. According to the data provided by national family health survey, rural women are likely to face health problems which may lead to maternal mortality, malnutrition, and reproductive health problems like PCOD(Polycystic Ovarian Disease) and PCOS (Polycystic Ovary Syndrom) are in large numbers. Many women specially in rural areas do not get proper nutrition and are treated as burden. This may lead to deteriorating their health specially during pregnancy which can also lead to birth of malnutrition babies (Narayan, Jitendra, Denny John, and Nirupama Ramadas, 2019). The female health protection goes far beyond scope of medical problem and requires corresponding management decision-making and inter-departmental measures on legal and financial support of motherhood and childhood (Sadykov, R. M., and N. L. Bolshakova, 2022). Hospitality industry can take a step to solve this program along with local government in many ways such as some healthy meal or snacks can be made and distributed to women daily to cover the nutritional imbalance in them. Government has launched several schemes such as mission Saksham Anganwadi and poshan 2.0 which helps distributing of micronutrient fortified food and energy dense food to pregnant women and lactating mothers (Akham, Pardita, and Li Liang, 2024). Hospitality industry can help government in providing this fortified energy rich food to the government and non-governmental organizations to help protect the health of women ,and certain campaigns in collaboration of government and other private hospitality organizations awareness programs can be held which aware the women how food can play a good role in females health and what are some power food which has to be consumed for making the health conditions better of a women.

Keywords- Women, Hospitality Industry, Malnutrition, Maternal Mortality, Reproductive Health Problems, PCOD and PCOS.

PP: 97

From Molecules to Mind: Women's Contributions to Neurobiochemistry and Mental Health Research

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Neurobiochemistry is the branch of neuroscience and biochemistry focused on the molecular, and chemical processes of the nervous system. It studies substances within neurons, to understand signalling and the underlying mechanisms of brain function and psychiatric disorders such as Depression, Anxiety Disorders, and Schizophrenia. In this evolving field, women researchers have played an increasingly important role in advancing scientific knowledge and promoting innovative approaches, including pioneering work by researchers such as Rita Levi-Montalcini, who identified nerve growth factors critical to neuronal development, and Candace Pert, whose research advanced the understanding of neurochemical receptors. Their contributions have supported the development of new perspectives in neurochemical research, has helped bring greater attention to diverse research perspectives and emerging areas within mental health science.

The objective of this study is to explore the advancements in neurobiochemistry related to mental health, highlighting the contributions of women researchers in shaping the understanding of neuronal signalling, neurochemical mechanisms, and the development of innovative approaches to studying psychiatric disorders.

Researchers have contributed significantly by advancing experimental methods, clinical studies, and conceptual frameworks. Notable contributions include the discovery of Nerve Growth Factor by Rita Levi-Montalcini, which revealed how neurons grow, survive, and form functional networks, providing the foundation for understanding neural development and repair, this research has led to potential treatments for diseases like Alzheimer's, ocular diseases. the elucidation of Opioid Receptor function by Candace Pert, which uncovered how neurochemical signalling mediates emotion, motivation, and pain responses, offering insights into the biochemical basis of behaviour and mental health disorders. Her work demonstrated that these receptors are not just for external drugs but for internal chemical messengers, which she later termed "molecules of emotion".

The contributions of women researchers have been pivotal in neurobiochemistry, with discoveries like Nerve Growth Factor and Opioid Receptors revealing essential mechanisms of neuronal development, neurochemical signalling, and behaviour. These insights have advanced understanding of psychiatric disorders, informed innovative research strategies, and highlighted the importance of diverse perspectives in shaping the evolution of mental health and neuroscience studies.

Keywords: Neurobiochemistry, Mental Health, Neurotransmitters, Psychiatric Disorders, Neurochemical Signalling, Nerve Growth Factor, Opioid Receptor

PP: 98

In Silico Evaluation of Phytochemicals Modulating FOXO3a in Myositis Related Metabolic Disorders

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Myositis is an inflammatory muscle disorder characterized by metabolic imbalance, progressive muscle degeneration, and disrupted cellular homeostasis. A key molecular regulator implicated in these pathological processes is Forkhead box O3a (FOXO3a), a transcription factor that controls genes associated with muscle atrophy, apoptosis, and energy metabolism. Aberrant activation of FOXO3a accelerates muscle protein degradation and metabolic stress, thereby aggravating disease progression. Thus, targeting FOXO3a represents a promising therapeutic strategy for managing myositis-associated metabolic dysfunction. In the present study, a computational screening approach was employed to evaluate selected phytochemicals as potential FOXO3a modulators. The three-dimensional structure of the FOXO3a Forkhead DNA-binding domain (PDB ID: 2K86) was retrieved from the Protein Data Bank and prepared for docking using standard optimization procedures. A phytochemical library was constructed based on SwissSimilarity predictions and literature evidence, with resveratrol serving as the reference compound. Molecular docking was performed using AutoDock Vina integrated within the PyRx platform to assess binding affinity and interaction stability. Docking results revealed that Rutin exhibited the strongest binding affinity toward FOXO3a (−7.0 kcal/mol), followed by Genistein (−6.5 kcal/mol). Quercetin, Luteolin, Rhamnetin, and Myricetin showed comparable affinities (−6.4 kcal/mol), while Isoquercetin and Morin demonstrated slightly lower yet significant binding energies (−6.3 kcal/mol). These compounds formed stable interactions within the FOXO3a DNA-binding domain, suggesting their potential to modulate FOXO3a-mediated transcriptional activity. Furthermore, ADMET properties predicted using pkCSM and admetSAR indicated favorable pharmacokinetic profiles, including acceptable gastrointestinal absorption, minimal cytochrome P450 inhibition, and low predicted toxicity for most leading compounds. Overall, this in silico analysis identifies promising phytochemical candidates targeting FOXO3a and provides a basis for subsequent molecular dynamics simulations and experimental validation to confirm their therapeutic potential in myositis.

Keywords: Myositis, FOXO3a, Phytochemicals, Virtual screening, Molecular docking

PP: 99

Intelligent nanobots: Real-time framework for molecular pollution detection and health risk mitigation

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Nanobots are microscopic devices designed at the nanoscale that can perform specific tasks. Nanobots are pioneering a new era in environmental cleanup, showcasing exceptional adaptability and precision. Their tiny structures can reach places inaccessible to traditional methods, detecting and detoxifying hazardous waste at the molecular level by targeting specific contaminants. Agricultural runoff containing fertilizers and pesticides, sewage discharge, plastic micro-particles, and oil spills are major sources of water pollution. These pollutants introduce harmful substances such as heavy metals and toxic chemicals into aquatic ecosystems. As a result, serious environmental problems occur, including eutrophication that leads to algal blooms. This process reduces the dissolved oxygen level in water, which can cause fish deaths and disturb the natural balance of aquatic life. Self-propelled, programmable micro-nano scale synthetic robots are a promising alternative way to improve water monitoring and remediation by overcoming diffusion-limited reactions and promoting interaction with target pollutants. Their ability to detect, monitor, and treat problems at the molecular level highlights their significance in developing sustainable solutions for pollution control and disease management in the future.

This technological leap not only enhances the efficiency of cleanup, but also fosters a sustainable approach to environmental conservation, heralding a future with NanoBots could play a pivotal role in the global environment management strategy.

Keywords: Nanobots, Pollution Control, Disease Detection, Environmental Monitoring, Targeted Drug Delivery.

PP: 100

Epigenetic Regulation of Glioblastoma through HDAC1 Inhibition: Phytochemical-Based In silico Therapeutics

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One of the most aggressive, malignant primary brain tumor, targeting the central nervous system, especially the glial cells, is Glioblastoma. GBM (Glioblastoma) is characterized by rapid proliferation of tumor cells causing tumor progression, diffuse invasion, and profound genetic and epigenetic dysregulation. Research proves that among various molecular regulators participating in glioblastoma occurrence, HDAc1 (Histone Deacetylase 1) is a key player for causing epigenetic regulation, chromatin remodelling, tumor progression and treatment resistance. There are many synthetic compounds in the market which have shown promising results in inhibiting HDAC1 activity but their toxicity levels are high and specificity is low compared to naturally occurring bioactive plant compounds. Therefore, phytochemicals and algal compounds are better alternatives than synthetic compounds. In the present study, the computational approach has been applied to investigate the potential of bioactive compounds against cancer targeting HDAC1 protein. The target protein, HDAC1 was downloaded from Protein Data Bank (PDB), PDB ID: 4BKX, followed by visualisation and refinement of the protein's active site using Discovery Studio. Phytochemicals of medicinal plants were referred from IMPPAT (Indian Medicinal Plants, Phytochemistry and Therapeutics) database and their respective 3D and SDF formats were downloaded from PubChem. The virtual screening of ligands was performed using PyRx software, followed by toxicity check using ADMET and docking using Autodock vina. Results have proven Quercetin, a flavonoid to have the lowest binding energy of -9.2 kJ/mol and the highest binding affinity of 18.7 kcal/mol upon docking with HDAC1 protein. Quercetin is an antioxidant, anti-inflammatory and also has anti-cancer properties. Several plant species, including *Abelmoschus esculentus* (quercetin-enriched fruit), *Azadirachta indica* (quercetin-rich leaves and flowers), and *Basella alba* and *Lycium barbarum* (quercetin-abundant roots and seeds), exhibit potential therapeutic relevance due to their quercetin content, which may contribute to the inhibition of histone deacetylase 1 (HDAC1) activity in glioblastoma. Although this approach is beneficial in many ways but some challenges such as delivery efficiency across blood- brain barrier, binding specificity and off- target effects need to be addressed.

Keywords: Glioblastoma**,** Histone Deacetylase 1, Epigenetic dysregulation**,** Phytochemical, Algal bioactive compounds**,** Chromatin remodeling**,** Tumor suppressor gene

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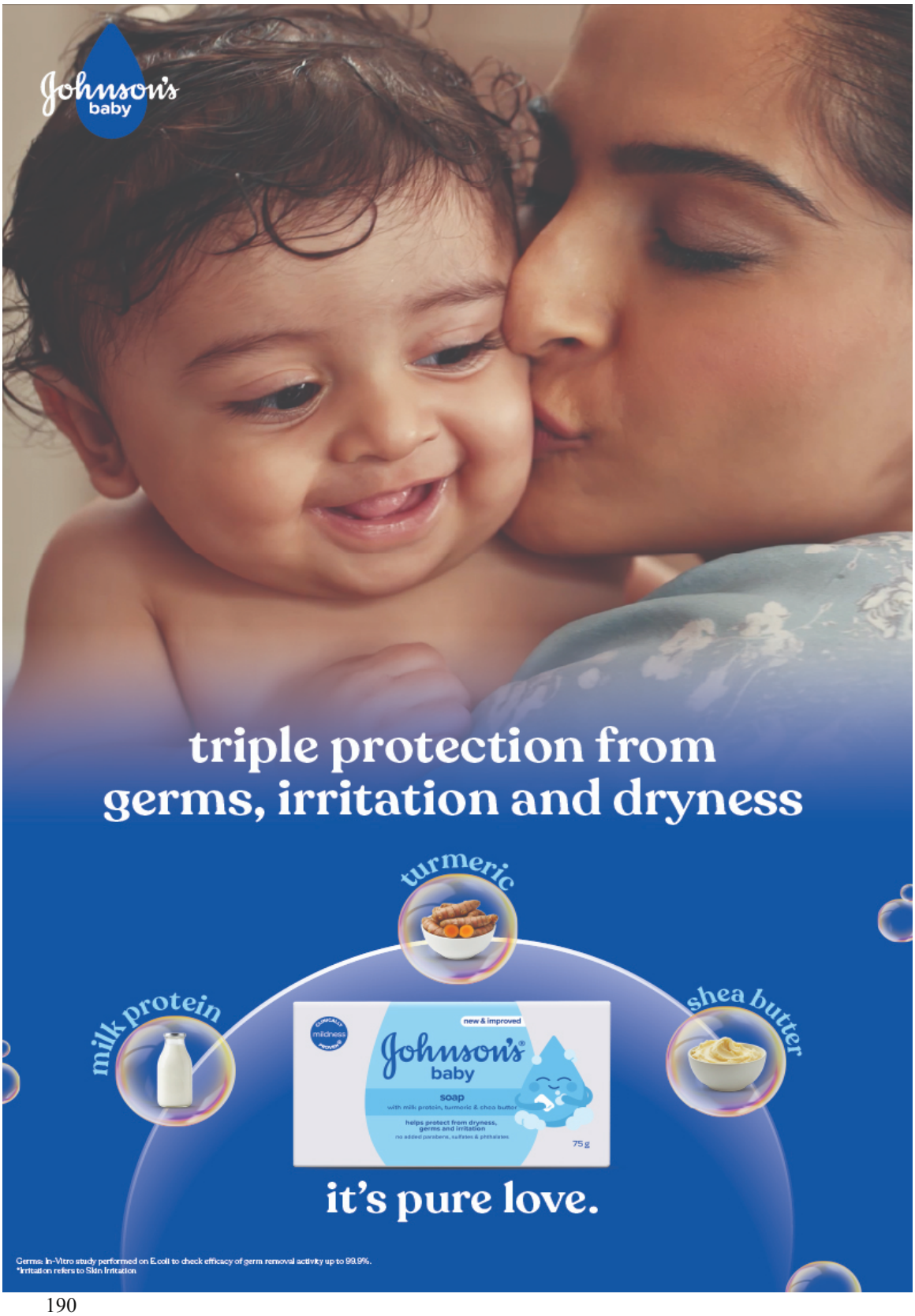
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*Irritation refers to Skin Irritation

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