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ABOUT THE CONFERENCE

The understanding of various biological processes demands an integrative approach. The recent advances in functional genomics have helped in unraveling the pathology and physiology of complex diseases such as cancer, neurodegenerative disorders, autoimmune and other metabolism-related diseases/syndromes. This has led to the formation of complex systems that provide a conceptual framework and effective tools to study the features from molecules to organisms (vice-versa). The researches on various animal models are repeated to provide knowledge to be transferred at some level for the betterment of humankind. The continuous effort to characterize a single molecule, cell and organism has further enhanced to study the stochastic and dynamic nature of various biological interactions. The conference will provide a discussion platform for new approaches and challenges in the field. The present conference aims to provide knowledge and to focus on the importance of an interdisciplinary approach in getting novel insights into their related research area, having an innovative framework. The present conference will also merge various scientific communities and will be helpful in establishing an interdisciplinary multiscale approach.

National Conference

On

"Advances in Biological Sciences: Molecules to Organisms"

28/12/24 to 29/12/24

Organized by

Department of Zoology

Aligarh Muslim University, Aligarh-202002, India

AQUA BRIDGE GROUP

ABOUT US

Aqua Bridge Group, headquartered in the vibrant UAE, stands at the forefront of transforming the aquaculture and fisheries sectors, offering holistic solutions and cutting-edge marine environment management services. Grounded in an unwavering commitment to excellence, our group comprises diverse companies, each specializing in distinct facets of these industries, harmonizing to deliver unmatched expertise.

Our distinctive strength lies in seamlessly integrating in-house knowledge spanning in aquaculture, fisheries, and environmental sciences. This interdisciplinary approach empowers us to navigate the intricacies of the industry, from conducting meticulous planning and feasibility studies to spearheading the development and operation of innovative aquaculture projects. Furthermore, we play an active role in shaping fisheries policies that champion sustainable management practices.

Established under the visionary leadership of H.H. Sheikh Ahmad Bin Manna al Maktoum and guided by the strategic foresight of our esteemed CEO, Mr. Mohammad Tabish, Aqua Bridge Group is unwaveringly dedicated to achieving optimal results responsibly. Upholding the highest standards, we implement Best Aquaculture Practices throughout the value chain, ensuring both environmental and social responsibility while optimizing cost and benefit performance.

With a team of seasoned experts drawn from the region, Aqua Bridge Group stands as a beacon of excellence. Our commitment to measurable outcomes sets us apart, emphasizing our dedication to responsible business practices within the dynamic aquaculture and fisheries sector.

Leveraging proven emerging technologies mirroring the profiles of the Mediterranean and GCC regions, we have streamlined the exploitation of oceans. Envisioning a dynamic future for the GCC, Aqua Bridge Group actively engages with Middle East stakeholders, fostering innovation and technological development for prospective entrepreneurs and investors.

Our unwavering commitment is unmistakable in our dedication to combining investments in research and innovation around bioresources, signaling our determination to contribute significantly to the sustainable growth of the aquaculture and fisheries industries. Aqua Bridge Group extends a heartfelt invitation for collaboration, aiming to shape a brighter, more sustainable future not only for the region but also beyond its borders.

Acknowledgments

Financial assistance from the Department of Biotechnology (DBT), New Delhi; Scientific and Engineering Research Board (SERB), New Delhi; Council of Scientific and Industrial Research (CSIR), New Delhi; Department of Atomic Energy (DAE), Board of Research in Nuclear Sciences (BRNS), Trombay, Mumbai; Aligarh Muslim University (AMU), Aligarh, UP, India is gratefully acknowledged.

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National Conference

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Department of Zoology
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Prof. Naima Khatoon
Vice Chancellor, AMU

Patron
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Dean, Faculty of Life Sciences, AMU

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Department of Zoology, AMU

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Prof. Qudsia Tahseen FNASc, FASc, FNA
Department of Zoology, AMU

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Prof. Yasir Hasan Siddique
Department of Zoology, AMU

ALIGARH MUSLIM UNIVERSITY

Aligarh - 202 002, UP., India.
A Central University (NAAC ACCREDITED "A+" GRADE)

PROF. NAIMA KHATOON
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November 27, 2024

Message

I am pleased to learn that the Department of Zoology at Aligarh Muslim University is organising a National Conference titled *"Advances in Biological Sciences: Molecular to Organisms."*

The Department of Zoology, with its illustrious history spanning several decades, has consistently contributed to advancing biological sciences through its pioneering research, dedicated faculty, and remarkable alumni. Its contributions to addressing environmental and ecological concerns and promoting understanding of biological systems have been invaluable.

This conference reflects the Department's commitment to cutting-edge research and intellectual exchange among researchers, academicians, and students.

The thematic focus of this seminar, which encompasses diverse topics such as the utilisation of agricultural by-products in sustainable aquafeeds, aquatic ecology, carcinogenicity, cytogenetics, environmental toxicology and climate change, functional ecology, toxicology, systematics, nanomedicine and nanotoxicology, molecular mutagenesis, and genotoxicity, is immensely crucial for the contemporary world of living beings. The Conferences have also addressed the dynamic and interdisciplinary nature of biological sciences today. It is a commendable effort to address some of the most pressing challenges of our times while exploring new horizons in the field.

I wish the organising team, participants, and contributors great success and fruitful deliberations. I am confident that this conference will provide new insights and collaborations that further enrich the scientific horizons and research possibilities for the students and faculty members in the Department.

Prof. Naima Khatoon

ALIGARH MUSLIM UNIVERSITY, ALIGARH-202002, INDIA
FACULTY OF LIFE SCIENCES

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Dated: December 17, 2024

MESSAGE

I am pleased to write that the Department of Zoology is organizing a **National Conference** on the theme *"Advances in Biological Sciences: Molecules to Organisms"*. I congratulate the organizers for planning a Conference on a topic of great significance for basic research and human health.

The field of biological sciences has witnessed remarkable advances, spanning from the cellular and molecular level to the complexity of whole organisms. At the molecular level, breakthroughs in genomics, proteomics, and molecular biology have elicited the intricate mechanisms of life, enabling precision medicine and innovative therapies. For instance, CRISPR-Cas9 technology has revolutionized genetic engineering, offering the ability to edit genes with unprecedented accuracy. Meanwhile, systems biology and bioinformatics have integrated molecular data to provide insights into cellular processes and disease pathways. At the organismal level, developmental biology, neuroscience, and ecology studies have deepened our understanding of growth, behaviour, and interactions within ecosystems. These advances collectively bridge gaps between molecular foundations and the functioning of entire organisms, paving the way for transformative applications in healthcare, agriculture, and environmental sustainability.

I am sure the conference will give the scientists, researchers and scholars a good opportunity to interact with and exchange knowledge on the many relevant topics under the theme.

I wish the conference a great success.

With best wishes,

(Prof. NAFEES A. KHAN)

जंतु विज्ञान विभाग, अलीगढ़ मुस्लिम विश्वविद्यालय, अलीगढ़-202002
شعبہ علم الحیوانیات، علی گڑھ مسلم یونیورسٹی ، علی گڑھ
DEPARTMENT OF ZOOLOGY, ALIGARH MUSLIM UNIVERSITY
ALIGARH-202002 INDIA

डॉ. मुख्तार अहमद खान
प्रोफेसर एवं विभागाध्यक्ष

Dr. Mukhtar Ahmad Khan
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MESSAGE

I am pleased to extend my heartiest wishes for organizing the **National Conference on** *"Advances in Biological Sciences: Molecules to Organisms"*. Exploring the interaction among molecules and their impact on organism has paved the way for biotechnology. It has also helped in understanding the influence of drugs and chemicals on human life.

Recent advances in biological sciences have bridged gaps from molecular mechanisms to organismal complexity, offering profound insights into life's intricacies. At the molecular level, breakthroughs in genomics, proteomics, and CRISPR-based gene editing have revolutionized our ability to decode and manipulate genetic information. On a cellular scale, single-cell technologies illuminate how individual cells contribute to tissue and organ function. At the organismal level, studies on developmental biology, systems biology, and bioinformatics reveal how molecular and cellular dynamics shape behavior, adaptation, and evolution. Together, these strides pave the way for transformative applications in medicine, agriculture, and environmental conservation.

I am sure, the conference will give the scientists, researchers and scholars a good opportunity to interact and exchange knowledge on the many relevant topics to be covered under the theme.

With best wishes,

(Prof. Mukhtar A. Khan)
Organizing Chairman

Qudsia Tahseen, Professor
PhD, FASc, FNASc, FNA

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Aligarh Muslim University,
Aligarh-202002, India
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Message

It gives me immense pleasure to comprehend that the Department of Zoology, Aligarh Muslim University, is organizing a National Conference on "Advances in Biological Sciences: Molecules to Organisms." The field of biological sciences spanning from the molecular to the organismal level, has undergone transformative advancements that have revolutionized our understanding of life. At the molecular level, breakthroughs in genomics, proteomics, and metabolomics have unveiled intricate mechanisms of gene expression, protein interactions, and metabolic pathways shedding light on cellular functions and disease processes. Cutting-edge tools like CRISPR-Cas9 have enabled precise gene editing, paving the way for innovative therapies for genetic disorders. Similarly, single-cell sequencing has revealed the vast diversity of cell types within organisms and their critical roles in health and disease. On the organismal front, systems biology has integrated complex datasets to model interactions within tissues and organs, driving discoveries in developmental biology, neuroscience, and immunology. Moreover, the evo-devo-eco approach, which explores the intersections of evolutionary biology, developmental processes, and ecological contexts, has provided profound insights into the adaptation and complexity of life forms. This interdisciplinary perspective enriches our understanding of how organisms evolve, develop, and interact with their environments. Furthermore, synthetic biology, at the intersection of molecular and organismal sciences, is addressing pressing challenges in medicine, agriculture, and environmental sustainability. All these advancements can transform healthcare and environmental protection.

I am confident that the enlightening talks and discussions by distinguished experts at this conference will inspire and motivate budding researchers and students. I sincerely appreciate the dedication and tireless efforts of the organizing team and many others who have made this event a reality. Wishing the conference immense success and a fruitful exchange of knowledge.

(Prof. Qudsia Tahseen)

NATIONAL CONFERENCE
on
"Advances in Biological Sciences: Molecules to Organisms"
28/12/24 to 29/12/24
DEPARTMENT OF ZOOLOGY, ALIGARH MUSLIM UNIVERSITY
ALIGARH, UP – 202002, INDIA

MESSAGE

It is indeed a great pleasure to Organize National Conference on *"Advances in Biological Sciences: Molecules to Organisms"* in the month of **December 2024** from **28/12/24 to 29/12/24.** I extend my heartiest thanks to the Honorable Vice-Chancellor, Prof. Naima Khatoon for her encouraging gesture and academic patronization. I also warmly welcome all participants from places near and far off.

Systems biology and computational modeling now integrate molecular data to predict and manipulate organismal outcomes, paving the way for innovations in medicine, agriculture, and environmental conservation. This holistic approach underscores the unity of life, highlighting the seamless transition from molecular intricacies to the dynamic complexity of living organisms.

The conference will emphasize the application of basic research and its application to protect human health and the environment. I hope there will be critical scientific deliberation from the eminent Scientists. The conference will help in understanding the epigenetic changes and quantitative measurements of environmental or occupational exposures. The conference aims to provide a platform for the participants to discuss the advances and exchange ideas in the field of biological sciences.

Once again, I am very positive and expect the conference to be a grand success.

With best wishes,

Yasir Hasan

Prof. Yasir Hasan Siddique
Organizing Secretary

Prof. Yasir Hasan Siddique
Organizing Secretary
Department of Zoology, Aligarh Muslim University, Aligarh, UP-202002 (INDIA)

ABOUT THE CONFERENCE

The understanding of various biological processes demand an integrative approach. The recent advances in functional genomics have helped in unraveling the pathology and physiology of complex diseases such as cancer, neurodegenerative disorders, autoimmune and other metabolism-related diseases/syndrome. This has led to the formation of complex systems that provide a conceptual framework and effective tools to study the features from molecules to organisms (vice-versa). The researches on various animal models are repeated to provide knowledge to be transferred at some level for the betterment of humankind. The continuous effort to characterize a single molecule, cell and organism has further enhanced to study the stochastic and dynamic nature of various biological interactions. The conference will provide a discussion platform for new approaches and challenges in the field. The aim of the present conference is to provide knowledge and to focus on the importance of an interdisciplinary approach in getting novel insights into their related research area/ having an innovative framework. The present conference will also merge various scientific communities and will be helpful in establishing an interdisciplinary multiscale approach.

ALIGARH MUSLIM UNIVERSITY

Aligarh Muslim University (AMU) is situated at a distance of 130 km South-East of Delhi. It is well connected by Delhi-Kolkata Railway line and National Highway 91. It occupies a unique position among Universities and Institutions of higher learning in the country. It was established in 1920 and evolved out of the Mohammedan Anglo-Oriental college (MAO) which was set up in the 1877 by the great visionary and social reformer, Sir Syed Ahmed Khan. Since very inception, it has kept its door open to the members of all communities and from all corners of the country and the world. AMU is the realization of the broad, far-reaching and realistic goals of visionaries of the Aligarh movement. AMU is spread over 467.6 hectares in the city of Aligarh, and offers more than 300 courses in the traditional and modern branches of education. It draws students from all states of India and from different countries. In some courses, seats are reserved for students from SAARC and Commonwealth Countries. The university is open to all irrespective of caste, creed, religion and gender. AMU has more than 30000 students, 1400 teachers and about 6000 non-teaching staff. The university comprises of a wide spectrum of academic disciplines and now has 13 faculties comprising 107 departments of studies, 7 colleges, 19 centres, 3 institutes, 2 polytechnics, 10 schools and 3 off-campus AMU centres. A special feature of the university is its residential character with most of the students residing within the campus. There are 19 halls of residence for students with 80 hostels. AMU has regularly been ranked among the top Indian Universities in recent years.

DEPARTMENT OF ZOOLOGY

The Department of Zoology was established as a constituent section of the MAO College in 1906. It was upgraded as an independent unit in 1922 with Dr. M. Sharif as its first Head. Prof. Mohammad Babar Mirza joined the Department as Head in January 1930 and molded the destiny of the Department during the long thirty years of his tenure. The Faculty members of the Department are actively involved in various research areas such as Human Genetics, Genetic Toxicology, Hepatology and Proteomics, Cancer, Stem cells, Neuropharmacology, Behaviour and Cognitive Sciences, Fish Nutrition and Feed Technology, Fishery Science, Fish Biology, Limnology, Aquatic Toxicology, Ecophysiology, Phytoremediation, Mycoremediation, Insect and Nematode Diversity and Ecology, Integrated Pest Management, Behaviour and Physiology of insects and nematodes, Molecular and Biochemical aspects of Malaria, Leishmaniasis, Toxoplasmosis, Immunology and Immunodiagnosis of Protozoan and Helminth Parasites.

ORGANIZING COMMITTEE MEMBERS

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Ms. Sana Naz

Keynote Lectures

Worming Through Time: The Evolutionary Journey of Nematodes

Qudsia Tahseen FNASc, FASc, FNA

Department of Zoology, Aligarh Muslim University

Nematodes, the most abundant and diverse organisms on Earth, with a history spanning over 500 million years are resilient creatures that thrive in nearly every habitat, from the depths of the ocean to soil as well as in plants and animals. Their versatility and hardy nature exemplify the intricate relationships between organisms and their environments, reinforcing the need for continued exploration of these remarkable organisms. While many of them remained free-living, others transitioned to parasitic lifestyles with shifts involving complex evolutionary adaptations, specialized feeding structures, and biochemical pathways for host manipulation. The free-living groups enhance soil fertility and nutrient availability by breaking organic material and regulating microbial populations. Horizontal gene transfer played a pivotal role in the evolution of parasitism, with nematodes acquiring genes from bacteria and fungi to enhance their ability to degrade host tissues. The transition to parasitism allowed nematodes to exploit a stable nutrient source and diversify into new ecological niches. Their success is reflected in their broad taxonomic range and ecological impact. Through polyphenism few of the lineages produced multiple phenotypes, preserving genetic diversity while minimizing the risk of maladaptation in changing environments. The integrated insights from developmental biology, genomics, and evolutionary ecology may further unravel the untold mysteries of nematode evolution.

Molecular Characterization of Cancer : Prospects of precision medicine in India

Bushra Ateeq FNASc, FASc, FNA

Professor and Joy Gill Chair, Senior Fellow, DBT/Wellcome Trust India Alliance, Department of Biological Sciences & Bioengineering, The Mehta Family Centre for Engineering in Medicine, Centre of Excellence for Cancer-Gangwal School of Medical Sciences and Technology, Indian Institute of Technology Kanpur, Kanpur, 208016, U.P., India

ABSTRACT

Prostate cancer is a heterogeneous disease, which exhibits genetic and epigenetic heterogeneity both at the intertumoral and intratumoral levels, posing clinical challenges. Hence, identifying molecular signatures of this disease allows their categorization into subtypes, and understanding the molecular underpinnings of these diverse cancer subtypes allows targeted treatment. Over the years, my group's efforts have been focused on the identification of the key genetic or epigenetic alterations that are involved in prostate cancer progression. Our goal is to translate the mechanistic understanding of these tumor-specific alterations to decipher emergent properties of cancer such as drug resistance, immune evasion, and metastases. In my talk, I will share the inroads that my group has made into the molecular understanding of mainly two specific molecular subtypes of prostate cancer, that are prevalent in India and worldwide. I will elaborate on how our studies have helped in the identification of actionable genetic alterations or molecular pathways that paved the way for precision therapeutic interventions. Finally, I will also touch on our ongoing efforts focused on the exploration of the mutational landscape of Indian prostate cancer patients, which would be instrumental in understanding the disease pathobiology and would offer novel strategies for therapeutic intervention.

Plenary Talks

Recent advances in 2D and 3D cultures of human brain cells as models to study neural toxicity

Pankaj Seth FNASc, FIANS, FAMS

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ABSTRACT

Central Nervous System (CNS) infections are rare but can lead to life threatening or life crippling outcomes in humans. Several neurotropic viruses have been implicated in post infection consequences culminating into neurocognitive and motor deficits as well as neurodevelopmental disorders. Although various model systems have been employed to investigate neuro-infections, human-based cell culture systems (2D and 3D models) have gathered highest priorities over others due to their effectiveness in depicting diseases and their physiological relevance. Notably, our laboratory has successfully developed and consistently utilizes a well characterized primary cultures of human neural stem cells (hNSCs) to delve into the viral neuropathogenesis induced by both HIV-1, Zika virus and their proteins, which we have extended to study the SARS-CoV2 induced brain fog. We derive human neurons, and glial cells from hNSCs. We have also established co-cultures of neurons and astrocytes, as well as blood brain barrier (BBB) models. Recent advances in 2D and 3D cultures systems have enabled neuroscientists to gather novel insights into the cellular and molecular mechanisms of neural toxicity and their consequences on human brain cells. We will discuss how HIV-1 Tat protein as well as Zika viral proteins affect neuron-glia crosstalk and affect the BBB integrity. This work is supported by extramural grant from Department of Biotechnology, New Delhi, India.

Statin treatment attenuates colorectal tumorigenesis by reversing the expression profile of SATB family proteins

Sanjeev Galande FNASc, FASc, FNA

Center of Excellence in Epigenetics, Department of Life Sciences, Shiv Nadar Institution of Eminence, Delhi-NCR

ABSTRACT

Statin family of drugs has been widely used for treating hypercholesterolemia. In the past few years, reports have suggested it's anti-tumor effects as well, where it was shown that statin treatment prevented the tumor growth. However, evidence for any direct mechanism via which statins could prevent tumorigenesis specifically in solid tumors is lacking. We have been interested in the mechanisms and pathways responsible for colorectal cancer and also in searching for potential therapeutic targets. Here, using a multi-pronged approach we studied the effects of statins both in-cellulo and in-vivo. Through the integrative analysis of our transcriptomics, proteomics and lipidomics data, we demonstrate that statins downregulate tumor promoting pathways including Wnt/β-catenin signaling. We delineated the effect of statins on Wnt/β-catenin signaling pathway, it's major molecular players including β-catenin, and the chromatin organizer proteins. The chromatin organizer SATB1 is significantly downregulated at protein level upon statin treatment, which seems to be critical for abrogation of tumor progression. This reduction is reversed on mevalonate supplementation and is consistent in spheroids as well as ectopically induced sub-cutaneous tumors in mice. Statin treatment seems to act via altering the postulated balance between SATB1/SATB2 protein levels, essential for tumorigenesis. A phase-II clinical trial demonstrated significantly reduced and sparse tumor in the biopsies from post-statin treated CRC patients. Furthermore, immunohistochemical analysis of these biopsy specimens corroborated the differential expression of SATB1/SATB2 in pre- and post-statin treatment conditions. Collectively, we propose a molecular mechanism for how statins affect tumor progression, paving the way for repurposing statins for CRC therapy.

Invited Talks

Discovery of small molecule Adiponectin Receptor agonists for first-in-class therapy against metabolic diseases/disorders

Shamima Khatoon, Nabanita Das, Sourav Chattopadhyay, Amit Joharapurkar, Abhinav Singh, Vishal Patel, Abhishek Nirwan, Akhilesh Kumar, Madhav Nilakanth Mugale, Durga Prasad Mishra, Jagavelu Kumaravelu, Rajdeep Guha, Mukul Rameshchandra Jain, Naibedya Chattopadhyay and Sabyasachi Sanyal

CSIR-Central Drug Research Institute PCS-111, Jankipuram,
Extension, Lucknow - 226031, India

ABSTRACT

Adiponectin is an anti-inflammatory cytokine that is primarily synthesized and secreted by the adipose tissue. Recently, skeletal muscle has also been shown to be a source of adiponectin. Adiponectin is one of the most abundant systemic biomolecules and its systemic depletion is clinically associated with a plethora of metabolic diseases including insulin-resistance, type 2 diabetes, obesity, atherosclerosis, and Metabolic Dysfunction-associated Steatotic Liver Disease (MASLD/NAFLD). Adiponectin exerts its metabolically beneficial effects primarily through the plasma membrane-bound adiponectin receptors -1 and 2 (AdipoR1/AdipoR2). While AdipoR1 is ubiquitously present in the body with a particularly high expression in skeletal muscle, AdipoR2 expression, although wide spread, is most high in the liver. The hall-mark of adiponectin signaling events are rapid and transient activations of AMPK, p38MAPK and AKT, and induction of the expressions of its typical metabolic target genes including PPARα, PGC-1α, Glut4 (skeletal muscle), CD36, and Sirt1. Although initially AdipoR1 and R2 were thought to act through distinct mechanisms, we and others have shown that both receptors are capable of eliciting a wide range of overlapping responses. Adiponectin signalling targets three major facets of the whole body metabolism--inflammation, chronic oxidative stress, and mitochondrial activity and biogenesis-- and disruptions in these are associated with all metabolic disorders including cancers. Despite a large body of preclinical and clinical evidences linking adiponectin depletion with metabolic dysfunctions, a therapeutic adiponectin supplementation; however, is not possible owing to its structural and functional complexities. Small-molecule AdipoR agonists therefore appear as attractive therapeutic options for metabolic disorders including NAFLD. For a decade our group has attempted the discovery of small-molecule AdipoR regulators, and have discovered a number of molecules with such activity. This study focuses on the discovery of the dietary isoflavone apigenin-6-C-glucoside (ACG; isovitexin) as a novel specific orally-available agonist for the liver-rich AdipoR isoform, AdipoR2. ACG activated AdipoR2 at a pharmacologically relevant EC50 of 384pM with >10000X preference over AdipoR1. ACG ameliorated lipotoxicity in vitro and in rodent models of MASLD by activating AMPK, and p38MAPK, causing favorable modulation of hepatic inflammation, oxidative stress, mitochondrial dysfunction, de novo lipogenesis, and fatty acid β-oxidation which were attenuated by AdipoR2-depletion or AMPK /p38MAPK inhibition. ACG also inhibited the activation of hepatic stellate cells; a key component of hepatic fibrosis. Together, our study demonstrates a proof-of-concept for AdipoR2 as a first-in-class therapeutic target for MASLD and provides new insights for the generation of translation-worthy pharmacological agents.

Developing combinatorial therapeutic drug target(s) for human neurodegenerative disorders: lessons from Drosophila disease models

Surajit Sarkar

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ABSTRACT

Human neuronal tauopathies such as Alzheimer's, Parkinson's, Pick's disease(s) etc. are a group of neurodegenerative disorders characterized by abnormal tau hyperphosphorylation resulting in the formation of toxic paired helical filaments (PHFs) and neurofibrillary tangles (NFTs) in specific areas of the brain. Despite several attempts, the definite cause of these disorders remains elusive, mainly because of complex disease traits and limitations associated with human genetics. We have reported earlier that tissue-specific downregulation of dmyc (a Drosophila homologue of cmyc proto-oncogene) constrains NFTs-mediated tau pathogenesis. Further, to unravel the mechanistic insights, our findings suggest a vital role of gsk3β in conferring the dmyc-mediated rescue against tauopathies. We noted that an adequate expression level of shaggy is essential for maintaining the rescue efficacy of dmyc against tauopathy. It was further observed that shaggy works downstream of dmyc to control the phosphorylation status of tau during the disease pathogenesis. We propose that dmyc-mediated rescue of human neuronal tauopathies functions via gsk3β (a potent tau phosphorylating kinase). For the first time, our study provides novel molecular insights about the role of gsk3β in tau etiology which will help in developing combinatorial drug(s) against the devastating human neurodegenerative tauopathies.

Role of gut microflora in male fertility and reproductive toxicity

Asthika Sachan and Ravi Ram Kristipati

Embryotoxicology Laboratory, Systems Toxicology Group (FEST), CSIR-Indian Institute of Toxicology Research, 31 MG Marg, Lucknow, 226001. India. Academy of Scientific and Innovative Research, Ghaziabad. Email: raviram@iitr.res.in

ABSTRACT

Infertility is currently a major global public health issue affecting one in six people worldwide. Alarmingly, sperm counts are decreasing rapidly across the globe, yet the causes remain largely unknown. In addition to genetics, reduced male fertility can be significantly attributed to exposure to chemicals in both occupational and household environments. Of late, gut microbiome has emerged as the crucial determinant of health and a few studies have implicated gut microbiome in male fertility. However, the significance of the gut microbiome to male reproductive toxicity is less appreciated. Therefore, in the present study, the influence of gut microbiome on semen quality parameters and male reproductive toxicity has been assessed using Drosophila as a model. Exposure to the known reproductive toxicant Di-butyl phthalate led to gut dysbiosis by affecting molecules that maintain the homeostasis of the gut microbiome. Interestingly, altered gut microbiome led to altered semen quality, resulting in reduced fertility. The presentation will discuss these findings in the context of the gut microbiome-xenobiotic interplay in male reproductive toxicity.

In vitro toxicity evaluation of transition metal (zirconium oxide) nanoparticles

Alok K. Pandey

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ABSTRACT
Zirconium oxide (Zirconia) nanoparticles are used in various industrial and biomedical applications such as dental implants, thermal barrier sprays, and fuel cells. The interaction of nanoparticles with the environment and humans is inevitable. Despite the enormous application potential of these nanoparticles, there are still some gaps in the literature regarding potential toxicological mechanisms, environmental effects, and the genotoxicity of Zirconia nanoparticles. Zirconia nanoparticles used in the study were less than 40nm and tested on V-79 cells. Zirconia nanoparticles showed significant internalization in cells at 100 µg/mL and 150 µg/mL concentrations. Zirconia nanoparticles showed low cytotoxicity and were found to generate ROS in V-79 cells. In alkaline comet assay, Zirconia nanoparticles (10µg/mL, 50µg/mL, and 100µg/mL) exposed cells exhibited significant DNA strand breaks, while the neutral comet assay, which was used for double-strand breaks assessment, only revealed significant damage at 100 µg/mL. Chromosomal aberration induced by Zirconia nanoparticles mainly resulted in the generation of gaps, few fragments and breaks which signifies the low clastogenic activity of these nanoparticles in the V-79 cell line. In MN assay, Zirconia nanoparticles resulted in no significant micronuclei induction at any given concentration. In the HPRT mutation assay, the particle shows a dose-dependent increase in the mutant frequency. The above result shows the genotoxic and mutational potential of Zirconia nanoparticles tested on V-79 cells. It is evident that Zirconia nanoparticles cause dose-dependent cytotoxicity and genotoxicity but still, more studies are needed to evaluate the clastogenic potential and the possible mechanism involved.

Developmental exposure to new-generation herbicides and impact on fat metabolism: a study in *Caenorhabditis elegans*

Aruna Satish

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ABSTRACT
The new generation herbicides, namely, triketone, are enzyme inhibitors of 4-hydroxyphenylpyruvate dioxygenase (HPPD). They disrupt the conversion of tyrosine to homogentisic acid (HGA), a precursor for plastoquinone and α-tocopherol. Since the tyrosine metabolism pathway is conserved in all aerobic organisms, the impact of commercially used β-triketone must be addressed. In this context, investigating the effect of β-triketones on the tyrosine metabolism pathway in *C. elegans* revealed similarities to those in mammalian models. In addition, the impact of β-triketone herbicide on the fatty acid metabolism pathway and the fat content of the exposed worms will be discussed.

Expression of Long Noncoding RNAs and Aging

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ABSTRACT

Aging is manifested as decline of almost all physiological functions of sexually reproducing diploid organisms (e.g., mammals) after attaining reproductive maturity or adulthood. It slowly progresses to attain old age, and culminates in end-of-life. Aging is not a disease but old organisms are more susceptible to disease causing factors due to genomic changes, lower immunity, declined homeodynamics of physiology, accumulation of more old cells in tissues and organs as well as less number and efficiency of stem cells to regain normal functions. One of the initial causes of aging could be metabolic shifts leading to genomic alterations, which results into cellular damage. The human population of the world is going to attain from 11% to 22% of old people above the age of 65 years by the year 2050. India is already having more than 100 millions of such old people and it is increasing day by day. This demographic shift is putting pressure on biological, medical, socio-psychological, cultural, political and legal complexities on our society. Therefore "Biology of Aging" or "Biogerontology" has become an important discipline for study, research and applications for human life. The main aim of Biogerontology is to extend the health-span of life along with increasing longevity of organisms, i.e., add life to years than adding years to life. Before attempting to achieve this, we need to understand the basic biology of aging.

We have focused our recent research on long noncoding RNAs (lncRNAs), which are regulators of almost all cellular processes like chromatin organization, gene expression, RNA-regulations, translation & its regulation and various RNA-protein mediated functions. Here we describe expression of two lncRNAs: LINC-RBE (long intergenic noncoding-rat brain expressed) and LINC-RSAS (long intergenic repeat rich sense antisense), their age-related expressions in the brain and testes showing an increase in expression from immature-young (4-weeks) to reproductively mature or adult (16- & 44-weeks) and a decline in expression from adult to nearly-old (70-weeks) rats. LINC-RBE is expressed as a sense and LINC-RSAS as sense and antisense transcripts in the tissues. Out of the cortex, hippocampus and cerebellum regions of the rat brain, maximum age-related decrease was observed in the Dentate Gyrus (DG) of the hippocampus. The two important functions of the DG are adult neurogenesis and learning & memory, which decrease during aging. We observed that expression of LINC-RBE and LINC-RSAS are induced by Retinoic Acid (RA), a metabolite of Vitamin A in the hippocampal neurons isolated from the adult rat brain and cultured in vitro. This involved transcriptional and post-transcriptional mechanisms by RA in LINC-RBE and LINC-RSAS, respectively. Further, we observed that LINC-RBE and LINC-RSAS, when transfected and expressed in human neuroblastoma cells, regulated expression of genes for adult neurogenesis and learning & memory functions. RA induced differentiation of these cells into neuronal cells. The lncRNA + RA differentially regulated such genes suggesting their role in such brain functions. The two lncRNAs differentially regulated these genes suggesting different mechanisms of action. The lncRNAs caused DNA breakage, inhibited cell proliferation and induced apoptosis in these cells. Similarly, in the testes of the rat, the lncRNAs followed cell type-specific and age-related expression patterns revealing their functional significance in the Leydig cells, Pachytene cells and Sertoli cells- the three primarily important cells for spermatogenesis, production of testosterone & haploid male gametes and generation of genetic variation in the mammalian species.

Our results suggest that LINC-RBE and LINC-RSAS RNAs are important determinants of neuronal functions in the brain and male reproductive functions in the testes during aging of the rat. The declined expression of these lncRNAs may be linked to diminishing functions of these tissues & organs of the rat in the old age. Further study will reveal the physiological significance of these lncRNAs and their role in aging.

Applications of Nanotechnology in Health Research: Challenges and Perspectives

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ABSTRACT

Nanotechnology is altering the way we view health research in that it offers new methods ofdiagnosis, treatment and management of diseases. It is predicted that the field of health care will benefit greatly from the advances in targeted drug delivery, nanoscale imaging, and the use of biosensors which have improved treatment outcome with minimal side effects. However, challenges such as safety concerns, high costs, and scalability issues slow mass use of these technologies. In developing countries such as India, nanotechnology has made remarkable progress, especially in the fields of cancer treatment and diagnostics. Here, nanoparticles have enhanced drug delivery while minimizing side effects. However, significant challenges persist, including issues related to toxicity, regulatory hurdles, and affordability. It needs strong regulatory frameworks, inter-disciplinary collaborations, and cost-reduction strategies to overcome these challenges. Organisations like Indian Council of Medical Research are actively engaged in developing affordable nanotechnology-based health care solutions. Coordinated efforts from researchers, policymakers, and the industry would revolutionize health research with promising solutions for resource-poor settings.

Understanding the role of Ochratoxin A-induced exosomes in kidney toxicity

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ABSTRACT

Ochratoxin A (OTA) mycotoxin is produced naturally as a secondary metabolite by certain Aspergillus and Penicillium fungi species. OTA contamination in various food commodities is a cause of concern due to associated health effects. Accumulating evidence suggests that OTA can inhibit protein synthesis and ATP production and induce oxidative stress in the kidney, which is believed to be a possible alternations responsible for OTA-caused kidney toxicity. However, in-depth mechanisms and insights involved in OTA-induced kidney toxicity have not been explored yet. Recent research findings suggest that exosomes, nano-sized membrane-bound vesicles (30-200nM), play an essential role in the pathophysiology of various diseases. A higher number of exosomes is secreted by the diseased cells and taken up by the neighboring recipient cells. Deferentially higher cargo (lipids, RNA, and proteins) containing exosomes significantly contribute to disease initiation and progression. Besides these, very recently, few studies have shown the adverse effect of exosomes in chemical-induced toxicity. In this study, we are interested in delineating the role of exosomes in OTA, mycotoxin-induced renal toxicity, or fibrosis-like changes using in vitro and in vivo experimental approaches. Our results showed that low-dose chronic exposure of OTA to NRK52E cells caused increased cell proliferation, anchorage-independent growth, and wound healing capabilities, which suggest that normal cells have acquired cancer-like properties. Moreover, OTA-transformed NRK52E cells release a higher number of exosomes in the culture media compared to untreated cells. Furthermore, interestingly, exogenous exposure of OTA-induced exosomes to rats caused increased expression of kidney injury markers (β-microglobulin, calbindin, clusterin, TIMP-1/2, cystatin-C) in the urine as well as kidney tissues. In addition, significant alteration in kidney tissues, such as loss of brush border, epithelial degeneration, and collagen deposition, was also noticed in histology analysis of kidney tissue of treated rats. Our data suggest that OTA-induced exosomes mediate kidney toxicity. However, detailed mechanistic insights need to be explored further.

Developmental and neurological effects of arsenic on *Drosophila melanogaster*

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ABSTRACT
Millions of people in developing countries are affected by arsenic (As) toxicity and its prevalence. Arsenic's detrimental effects on humans have been amplified by an unacceptable level of exposure to food and drinking water, the ongoing rise in industrial usage, and several other occupational conditions. Due to increased cellular absorption and the ability to cross the blood–brain barrier (BBB), inorganic arsenic (iAs) is extremely hazardous to living organisms in its trivalent form. Arsenic toxicity damages an organism's tissues and organs, resulting in skin cancer, circulatory system abnormalities, and central nervous system disorders. A competent model system is required to investigate the acute effects of arsenic on the brain, cognition ability, and to assess any behavioral impairment. Drosophila melanogaster (common fruit fly or vinegar fly), with its short generation time, genomic similarities with humans, and its availability for robust behavioral paradigms, may be considered an ideal alternative model for studying arsenic toxicity. The present study helps to understand the toxic effects of acute arsenic treatment on the behavior, cognition, and development of Drosophila in a dose and time-dependent manner. We found that the exposure of fruit flies to arsenic significantly affected their life span, pupae size, locomotor abilities, cognitive functions, and neurobehavioral impairment. Hence, providing a better understanding of how arsenic toxicity affects the brain leading to acute behavioral disorders and neurological alterations, this study will lead to a better understanding of the mechanisms and reversal of the ill-effects.

Istradefyllenie is a new adjunctive therapy with Ldopa in adult patients suffering from Parkinson's Disease

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ABSTRACT
Parkinson's Disease (PD) is the second most prevalent neurodegenerative disorder, principally caused by the degeneration of dopaminergic neurons in the substantia nigra of the midbrain. The primary challenge in creating neuroprotective medicines is the insufficient knowledge of the key biochemical pathways that trigger neurodegeneration. Levodopa (L-Dopa) is the most successful medicine that has been used for over 40 years; it serves as a dopamine precursor and is often administered with different adjuvant therapies. Istradefylline is the first adenosine receptor antagonist approved for the treatment of Parkinson's disease. Istradefylline is a novel supplementary medicine launched in 2013 to accompany levodopa and carbidopa in the treatment of "OFF" episodes in adult patients with Parkinson's disease. OFF time refers to the period when a patient's Parkinson's disease treatments are ineffective, resulting in exacerbated symptoms of the condition. Istradefylline is a nondopaminergic agent that functions via the antagonism of adenosine A2A receptors. Therefore, the administration of istradefylline in PD patients is expected to alter their behavior and reduce the neurotoxicity caused by human alpha synuclein expression in their brains.

Oral Presentations

OP-1

Effect of chlorhexidine mouthwash by Comparative assessment of the 8-OHdG levels, a marker of oxidative stress (DNA damage) in patients undergoing fixed orthodontic mechanotherapy

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ABSTRACT

Purpose of the study: To assess the level of 8-OHdG, a marker of oxidative stress (DNA damage) caused by chlorhexidine mouthwash

Details of the participants: Randomized control clinical trial was conducted in 40 patients age group of 13-35 years, with permanent dentition, Subjects with no previous history of orthodontic treatment. Exclusion Criteria includes subjects allergic to artificial jewellery, smokers, alcoholics and habit of tobacco chewing, and any other debilitating diseases, subjects with amalgam fillings and other metal restorations anywhere in the oral cavity.

Measurements: Comparative assessment of 8-hydroxy 2-deoxyguanosine (8-OHdG) levels

Methods: Random assignment of the 40 patients into two groups of 20 patients each

Group A (Experimental Group)- Oral hygiene maintained by oral prophylaxis and chlorhexidine mouthwash (0.2%) were prescribed for 2 weeks

Group B (Control Group) were only on mechanical plaque control only (Oral prophylaxis only).

Subjects were assessed by salivary 8-OHdG levels using competitive ELISA method at following time points;

T0: Just before start of the orthodontic treatment.,

T1: 2 weeks after start of the orthodontic treatment.,

T2: 6 weeks after start of the orthodontic treatment.,

T3: 12 weeks after start of the orthodontic treatment.

Main Findings: Peak values of 8-OHdG levels in both the groups were seen at time point T1.

Conclusion: There was significant increase of 8-OHdG levels in patients who were on Oral prophylaxis and using chlorhexidine mouthwash (0.2%) Showing oxidative stress (DNA damage).

OP-2

In vitro anthelmintic activity of *Azadirachta indica* leaf extract on *Fasciola gigantica*

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ABSTRACT

Fasciolosis, a parasitic disease caused by *Fasciola hepatica* and *Fasciola gigantica,* affecting livestock worldwide, and resulting in significant economic losses. Although various anthelmintic drugs are available, controlling the disease remains difficult due to the increasing resistance to commonly used anthelminthic drugs such as triclabendazole. Therefore, there is a need to develop new control strategies. Medicinal plants are gaining attention as promising alternatives because of their effectiveness, low toxicity and environmental friendliness. The present study focused on evaluating the antiparasitic effects of *Azadirachta indica* leaf extract on *F. gigantica,* collected from the infected buffalo. *A. indica,* widely known as neem, has been used in traditional medicine for centuries due to its diverse biological properties. To assess the in vitro impact of A. indica on adult F. gigantica, 10 worms were incubated in triplicate in 10 ml of RPMI-1640 culture medium containing different concentrations of *A. indica* leaf extract (1, 2 and 4 mg/ml) for 12 hours at 37ºC, while a control group was maintained in the same media without the extract. The effects of the leaf extract were evaluated through SEM and histological analyses. The results showed that neem extract significantly impaired worm motility and caused tegumental damage, sloughing of the basal lamina, swollen sensory papillae with blebs, leaving pits in the basal lamina that developed into lesions exposing the basement membrane at 12 hours. Histological analysis revealed progressive degeneration in both reproductive and somatic tissues. These results indicate that *A. indica* possess significant anthelmintic activity and could be developed into anthelmintic treatments for future in vivo testing.

OP-3

Understanding Sambar Deer and Ageratina adenophora interaction at Ranikhet region, Kumaon Himalayas, Uttarakhand, India

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ABSTRACT

The invasion of non-native plant species has emerged as a critical challenge for biodiversity conservation, especially in sensitive ecosystems like Himalayas. Ageratina adenophora (Crofton weed), a highly invasive plant has been reported to induce organ-selective toxicity across different mammalian species such as horses, goats, sheep, and rats etc. This study investigates the relationship between the presence of A. adenophora and the habitat use of vulnerable Sambar (Rusa unicolor) in the Ranikhet region of Kumaon Himalayas, Uttarakhand. Sampling was done during 2022-24 across the study site. A total of 120 circular plots (10m radius) were laid between elevations 1100-2100m asl to record the presence or absence of A. adenophora and indirect signs of Sambar during summer and winter seasons. Chi-Square test was performed to evaluate the association between A. adenophora and Sambar signs. Results revealed that A. adenophora was present in 40% of the plots (48/120), while Sambar signs were detected in 22 and 32 plots during summer and winter seasons, respectively. However, the statistical analysis indicates no significant relationship between the presence of A. adenophora and Sambar signs in either season. These findings suggest that while A. adenophora is prevalent in the study area, its presence does not appear to directly impact the seasonal occurrence of Sambar. It highlights the need for further investigations into the indirect effects of invasive species on food availability and habitat quality for large herbivores in Himalayan ecosystems. Understanding such interactions is crucial for formulating effective management strategies for invasive species and conserving native biodiversity.

OP-4

Effect of fenugreek on the Drosophila expressing human Aβ-42 in the neurons

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ABSTRACT

Much emphasis has been given on the biological activities of Fenugreek against various diseased conditions. This study investigated the effect of fenugreek leaf extract on behavioural and cognitive function of transgenic Drosophila expressing human Aβ-42 in the neurons herein referred as Alzheimer's disease model flies (AD flies). AD flies were exposed to four different doses of fenugreek leaf extract (FE) containing i.e., 0.005, 0.010, 0.015 and 0.02 g/ml for 30 days. Thereafter behavioural and cognitive assessment was done using climbing ability, activity pattern, aversive phototaxis and odour choice indexes. Life span of different groups of flies was also recorded. Effect of FE on the oxidative stress markers, acetylcholinesterase, monoamine oxidase (MAO) and caspase 3 and 9 activities were determined. The deposition of Aβ-42 aggregates in the brain tissue of flies were studied by performing immunostaining. Also, the metabolic profile of different group of flies were studied by performing LC-MS/MS. Compared with control flies, 22 selected metabolites were found to be upregulated and downregulated among transgenic AD flies and FE exposed AD flies compared to control. The results of the present study demonstrate the neuroprotective role of fenugreek extract which could be used to treat Alzheimer's disease. The AD flies exposed to FE showed a dose dependent delay in the loss of climbing ability, activity and cognitive impairments. A significant dose dependent increase in the life span was also observed in the AD flies exposed to FE. A significant dose dependent reduction in the oxidative stress, acetylcholinesterase, monoamine oxidase, and caspase-3&9 activities was also observed. The results obtained from the immunostaining suggests the reduction in the formation of Aβ-42 aggregates which was also confirmed by the docking studies which shows the energetically favoured interaction useful for inhibiting the acetylcholinesterase and Aβ-42 aggregates.

OP-5

Unlocking Forensic Clues from some Necrophagous Species: Carcass Decomposition and Insect Succession

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ABSTRACT

Necrophagous insects play a significant role in carcass decomposition, contributing to nutrient recycling and ecosystem functioning. This study focuses on the successional patterns of insect colonization on decomposing remains, with particular emphasis on species from Diptera and Coleoptera at different stages of decay. These predictable patterns of succession provide valuable information for estimating the post-mortem interval (PMI). Furthermore, the research explores how environmental factors, such as temperature, rainfall, and carcass size, influence decomposition rates and insect development. By integrating ecological and forensic perspectives, this work emphasizes the importance of necrophagous insects in understanding decomposition processes and their applications in forensic science.

OP-6

Fructosylated insulin AGEs represent neoepitopes recognized by IgG from T2DM patients; a multi-spectroscopic and ELISA-based Study

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ABSTRACT

Introduction: T2DM, or non-insulin-dependent diabetes mellitus (NIDD), is characterized by persistent hyperglycemia and dysregulation of insulin receptors. It is one of the most prevalent diseases of the 21st century and is predicted to affect 693 million individuals by 2045. Insulin is the central hormone that regulates glucose homeostasis. Under hyperglycemic conditions, the presence of GLUT-2 may facilitate fructose transport in beta-pancreatic cells, suggesting possible glycation of insulin in the early stages. This raises concerns and requires a deeper understanding of fructosylated insulin.

Objectives: 1. To quantify the structural alterations induced by fructose on the insulin molecule.
2. To identify the presence of anti-fructosylated-insulin IgG in T2DM patients.

Methodology: Structural alterations in the insulin molecule were analyzed through spectroscopy, electrophoresis, electron microscopy, and molecular docking. ELISAs were used to identify the antibody specificity of IgG isolated from the peripheral blood of T2DM patients.

Results: Fructosylation-induced unfolding of insulin, increased oxidative stress, and AGEs. Reduced free lysine and arginine residues along with the formation of fructosamine. Fructosylation reduced the percentage of the secondary alpha-helical structure. This was strongly identified by IgGs isolated from T2DM patients.

Conclusion: Fructosylated insulin AGEs cause oxidative damage by contributing to the formation of insoluble aggregates, which can accumulate in diabetic patients, aggravating insulin resistance and chronic complications.

OP-7

Effect of apigenin against Bis(2-ethylhexyl) phthalate induced toxicity in *Drosophila melanogaster*

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ABSTRACT

Bis(2-ethylhexyl) phthalate (DEHP), a common plasticizer, is a pervasive environmental pollutant with toxicological effects, including endocrine disruption and oxidative damage. Despite regulatory restrictions, human exposure to DEHP remains widespread, necessitating effective therapeutic interventions. In the present study apigenin at the final concentration of 20, 40, 60, and 80 μM was mixed in the diet along with 0.02 M of Bis(2-ethylhexyl) phthalate, and the third instar larvae were allowed to feed on it for 24 hrs. This study investigates the protective role of apigenin, a natural flavonoid with antioxidative and anti-inflammatory properties, against DEHP-induced toxicity in third-instar larvae of Drosophila melanogaster. Using metabolomic techniques and biochemical analyses, we evaluated the impact of apigenin on oxidative stress, enzymatic activity, tissue damage, Hsp 70 expression, and metabolic profiles in larvae exposed to DEHP. Our results revealed that DEHP exposure significantly altered oxidative stress markers, decreased glutathione (GSH) levels and increased activities of caspase-3, caspase-9, superoxide dismutase (SOD), and catalase (CAT). DEHP exposure also elevated lipid peroxidation (TBARS), protein carbonylation (PC), and DNA damage, indicating extensive oxidative damage. Metabolomic analysis revealed significant alterations in key metabolites, such as phthalic acid, Glucose-1-phosphate, carnitine, glutathione, cytosine, kynurenic acid, acetylcholine, and phenylalanine. Notably, apigenin significantly improved DEHP-induced alterations in acetylcholinesterase (AChE) and δ-aminolevulinic acid dehydratase (ALA-D) activities, highlighting its potential to alleviate neurotoxicity. Additionally, apigenin reduced tissue and DNA damage caused by DEHP. This study demonstrates apigenin as a protective agent against DEHP-induced toxicity by ameliorating oxidative stress and restoring metabolic balance.

OP-8

Replacement of Fishmeal with Soybean meal with a view to formulate cost effective feeds for fingerling *Labeo rohita*

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ABSTRACT

The demand for animal protein is growing rapidly due to population growth and is expected to increase approximately to 52% by 2050. Aquaculture is one of the most efficient sources of protein production, and it is considered to play a vital role in meeting this demand. However, the expansion of aquaculture has its own challenges, particularly the rising demand for fishmeal (FM) which has a high-quality protein, excellent digestibility, palatability and have balanced amino acid profile and is one of the important component of fish feeds. Fishmeal, while highly effective, has become a significant bottleneck for sustainable aquaculture because of its limited availability and rising costs. Due to these challenges, there is dire need to explore alternative protein sources to maintain sustainable aquaculture growth. Plantbased ingredients, especially oilseed meals and by-products, have emerged as strong candidates to replace fishmeal. They are abundant, cost-effective, and nutritionally potent, making them a logical choice to replace fishmeal. India, with its rich agricultural base, produces a variety of oilseed meals, including groundnut meals, soybean meals, and sesame meals. Among these, soybean meal stands out as a particularly promising option. Known for its high protein (35-50%), soybean meal is also rich in essential amino acids like lysine, tryptophan, and threonine. To evaluate the nutritional efficacy of soybean and to evaluate the effects of replacing fish meal (FM) protein with soybean meal (SBM) protein in the diets of fingerling Labeo rohita (average weight: 2.58 ± 0.04 g, length: 6.0 ± 0.2 cm) an 8-week feeding trial was conducted. Six experimental diets containing 35% crude protein and 18.35 kJ g^{-1} gross energy were prepared by progressively substituting FM with SBM protein at levels of 0%, 20%, 40%, 60%, 80%, and 100%. These diets were fed to triplicate groups of fish to apparent satiation. Results indicated that live weight gain, specific growth rate, feed conversion ratio, protein efficiency ratio and protein retention efficiency were not significantly ($p>0.05$) affected by replacement of FM by SBM up to 60%. Additionally, no significant changes ($p>0.05$) were observed in carcass composition, protein and moisture content remaining stable up to this substitution level. Hematological parameters did not show any significant ($p>0.05$) variation until the 60% replacement threshold, after which they declined ($p<0.05$). These findings suggest that FM can be replaced by SBM protein up to 60% in the diets of fingerling Labeo rohita without compromising growth performance, carcass quality and health status of fish. This substitution could enable the formulation of nutritionally balanced and cost-effective commercial feeds for the intensive culture of Labeo rohita fingerling.

OP-9

Evaluation of micronucleus prevalence in buccal epithelial cells of patients with oral submucous fibrosis (OSF) using acridine orange fluorescent staining

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ABSTRACT

Oral submucous fibrosis (OSMF) is a collagen-related disease seen in betel quid chewers and smokers. It is a high-risk precancerous condition in which the connective tissue fibers of the lamina propria and deeper mucosa become stiff, resulting in limited mouth opening. Severely affected patients experience symptoms such as difficulty chewing, swallowing, and speaking. In the present study 60 individuals were gutkha chewers and 30 were OSMF patients (chewing gutkha along with smoking) and 60 individuals were taken as controls. A significant increase in the frequency of micronuclei was observed in OSMF patients as compared to gutkha chewers and controls. Acridine orange is used to observe micronucleus present in the buccal epithelial cells. It has been determined that smoking and chewing gutkha together increase the risk of OSMF, making them more harmful to human health.

OP-10

Protective role of Lupeol against multiple adverse effects of Cancer drug Sorafenib: A study in Preclinical Models

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ABSTRACT

Aim: Sorafenib, an approved drug used in clinics to treat multiple cancers, causes a variety of side effects, resulting which resulted in frequent medication discontinuation. Lupeol, a triterpene, ameliorates the toxicities of multiple chemicals and reportedly increases the efficacy of multiple drugs in laboratory conditions. Therefore, our research aimed to see if lupeol could mitigate the toxicities caused by Sorafenib.

Methods: Using both in vitro and in vivo models, we investigated DNA interaction, cytokine levels, LFT/RFT, oxidant/antioxidant state, and their effects on genetic, cellular, and histopathological changes to test our hypothesis.

Results: Reactive oxygen and nitrogen species (ROS/RNS), liver and renal function marker enzymes, serum cytokines (IL-6, TNF-α, IL-1β), macromolecular damages (protein, lipid, and DNA), and antioxidant enzymes (SOD, CAT, TrxR, GPx, GST) were significantly elevated in the Sorafenib-treated group. In addition, p53 and BAX levels were elevated. Cytoarchitectural damages were also observed in kidney and liver tissues. Mixing Lupeol with Sorafenib significantly reduces the various hazardous effects as observed by different experiments.

Conclusion: Our findings suggest that Lupeol, in combination with Sorafenib, reduces ROS/RNS-induced macromolecular damage. The interesting results of this study need further thorough preclinical and clinical investigations.

OP-11

Industrial Waste and Remediation An effective strategy to remediate nickel oxide nanoparticles using a macrofungus, *Pleurotus fossulataus*

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ABSTRACT

Nowadays, nickel oxide nanoparticles are in massive demands because of their use in different sectors. These nanoparticles may discharge into aquatic environment from various industries and cause destructive impact on aquatic animals. Thus, an effective method is needed to remove these nanoparticles from contaminated water. Hence, the purpose of this study was to bioremediate nickel oxide nanoparticles using a macrofungus, Pleurotus fossulatus, and to investigate its effect on fungal physiology. For this reason, fungal spawns were inoculated in malt dextrose agar media comprising of various concentrations of nickel oxide nanoparticles (24 mg/l, 48 mg/l, and 100 mg/l) as well as control group (containing no nickel oxide nanoparticles) and left to grow for 20 days. Collected fungal mycelia as well as media at different time intervals (5th day, 10th day, 15th day, and 20th day) were evaluated for Ni concentration and various biochemical parameters. Maximum Ni removal efficiency of P. fossulatus from media was found in 48 mg/l (66.98%) followed by 24 mg/l (60.83%) and 100 mg/l (18.03%), respectively. Elevated level of metallothionein, lipid peroxidation, various antioxidant enzymes activities (superoxide dismutase, catalase, glutathione s transferase, glutathione reductase), activity of ligninolytic enzymes (laccase, lignin peroxidase, manganese peroxidase), and FTIR spectral shift were also reported in mycelia cultured in malt dextrose agar media comprising of nickel oxide nanoparticles. This study suggests that P. fossulatus has great efficacy to remediate nanoparticles from contaminated water and it can be used as potential agent in wastewater treatment plants by different industries.

OP-12

A meta-analysis and survey on the prevalence of *Toxoplasma gondii* infection in cats *(Felis catus)*

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ABSTRACT

Toxoplasma gondii is a common protozoan parasite, infecting felines as its definitive host. The potential risk of zoonotic infection necessitates an assessment of infection rate and risk factor in cats. The aim of this study was to determine the infection rate of *T. gondii* in the cats of Aligarh region and to perform a meta-analysis of similar studies. A total of 105 samples of cat faeces were collected from areas around the Aligarh Muslim University campus and were investigated using flotation method for *T. gondii* oocysts. Oocyst number per mL of sample was counted using haemocytometer. For the meta-analysis, studies published on the prevalence of *T. gondii* in cats were identified on various databases and relevant data was extracted from the 10 included studies. An infection rate of 55.2% was observed in this survey and per ml of oocyst count was 11,547±8902.4 and 29,531±29,072 in domestic and semi-domestic cats respectively (p=0.01). The pooled prevalence of Toxoplasma was found to be 0.28 (95% CI: 0.11-0.45, p=7.707 × 10-06). Older cats of Indian breed with outdoor access and contact with other cats, consuming raw meat and scavenged food, and without clinical care were at significant risk of infection. Further, lack of awareness of zoonosis and litter management by pet owners were also significant risk factors. 66 (62.85%) pet owners surveyed were at high risk of zoonosis. Preventative measures, accessible veterinary care and awareness programs must be employed to prevent zoonosis.

OP-13

Unraveling the Mechanism of Cimetidine-Mediated Amyloid Inhibition: A Spectroscopic and Microscopic Perspective

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ABSTRACT

Neurodegenerative diseases, such as Alzheimer's and Parkinson's, are characterized by the pathological accumulation of amyloid aggregates resulting from protein misfolding. While current treatments primarily alleviate symptoms, they fail to prevent disease onset. In this landscape, repurposing existing drugs emerges as a promising therapeutic strategy.Our study explores the potential of the antihistamine drug Cimetidine as an amyloid inhibitor, employing a range of spectroscopic and microscopic techniques to assess its effects on alpha-synuclein and human insulin amyloid formation. The Thioflavin T (ThT) assay revealed a dose-dependent suppression of amyloid formation with increasing concentrations of Cimetidine. Importantly, the drug preserved the helical structure of proteins without inducing significant changes in their secondary structure. Confocal microscopy corroborated these findings, showing markedly fewer fibrils in samples treated with Cimetidine.Remarkably, Cimetidine not only hindered amyloid formation but also interacted with pre-existing fibrils, leading to their disintegration. Complementary analyses, including ThT assays, circular dichroism, and dynamic light scattering, demonstrated the transformation of fibrils into smaller, less harmful aggregates upon treatment with Cimetidine.These findings underscore the potential of Cimetidine as a novel therapeutic candidate for Parkinson's disease. By showcasing its ability to mitigate amyloid aggregation and promote fibril disassembly, this study paves the way for deeper investigations and innovative therapeutic approaches, highlighting Cimetidine's promising role in combating neurodegenerative disorders.

OP-14

Defensive Tactics of Drosophila against Parasitoid Wasps

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ABSTRACT

Parasitoid wasps exert strong selective pressure on their hosts, driving the evolution of diverse defense strategies. Drosophila, a widely studied model organism, hosts a wide range of parasites, including parasitoid wasps, and has evolved immune and behavioral mechanisms to mitigate the risk of parasitization. These defenses range from avoidance and evasion to post-infection immune responses, such as melanotic encapsulation. In response, parasitoid wasps have developed countermeasures, contributing to an ongoing arms race between host and parasite. The dynamic interplay between host defense mechanisms and parasitoid counteroffensive strategies, particularly in response to newly evolved host defenses, offers a compelling study area within host-parasitoid systems. The Drosophila model, instrumental in biomedical research, also provides an ecologically relevant framework for investigating these interactions. The review highlights pre-infection behavioral defenses, where Drosophila larvae and adults exhibit threat detection, avoidance, and escape behaviors. These proactive strategies emphasize the importance of early defensive measures in reducing parasitoid success. Post-infection defenses, such as dietary self-medication, also contribute to host survival, although the full spectrum of behavioral modifications remains to be explored. The article also explores the molecular and neuronal circuit mechanisms that underlie these behaviors, using Drosophila as an ecologically relevant model for studying host-parasitoid interactions.

OP-15

Exploring the Role of Gut Microbiome Dysbiosis in Modulating Chemotherapy Efficacy and Resistance in Colorectal Cancer Patients: A Metagenomics Approach

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ABSTRACT

The gut microbiome is critical in colorectal cancer (CRC) progression and treatment outcomes. Growing evidence suggests that gut dysbiosis can influence the efficacy and resistance to chemotherapy. This study will use a metagenomics-based approach to explore the relationship between gut microbial composition and chemotherapy response in CRC patients. The gut aspirate samples and fecal samples will be collected endoscopically from CRC patients at baseline and after completing a chemotherapy regimen. Shotgun metagenomic sequencing will profile microbial communities and predict functional pathways. Patient outcomes, including tumor regression, progression-free survival, and treatment-related side effects, will be correlated with microbial data to identify potential biomarkers. The expected results are anticipated to reveal significant differences in microbial diversity and composition between patients who respond favorably to chemotherapy and those who exhibit resistance. It is hypothesized that key taxa, such as Bacteroides and Prevotella, will be enriched in responders. At the same time, non-responders are expected to have higher levels of pro-inflammatory bacteria such as Fusobacterium nucleatum. Functional analysis is predicted to highlight distinct shifts in microbial metabolic pathways, particularly those associated with drug metabolism and immune modulation. The findings will suggest that gut dysbiosis may impact chemotherapy efficacy through microbial-mediated mechanisms. Identifying microbial biomarkers associated with treatment outcomes will allow personalizing CRC therapy by modulating the gut microbiome with probiotics, prebiotics, or dietary interventions. This study highlights the potential of leveraging metagenomics to unravel the complex interplay between the gut microbiome and cancer therapeutics, paving the way for microbiome-based precision oncology in CRC management.

OP-16

Natural Antioxidant Lycopene Acting as a Potent Chemotherapeutic Adjunct by Targeting Apoptosis in Human Cervical Cancer Cells

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ABSTRACT

The induction of apoptosis in target cells is thought to be a key mechanism for most anti-tumor therapies, including chemotherapy, radiation, and immunotherapy. There is a continued need for new prototypes – new templates to use in the design of potential chemotherapeutic agents. To some extent, natural products are providing such templates. Studies have revealed that consumption of fresh vegetables and fruits may reduce the development of cancer risk by inducing apoptosis in neoplastic cells but not in normal cells. Among the executioner caspases, Caspase-3 is known to be the key caspase and its initiation is facilitated by initiator caspases like caspase-8, caspase- 9, or caspase-10. Hallmark of apoptosis is the activation of the caspase-3 pathway and it is linked with the activation of the death cascade and thus playing a crucial role in the entry of the cell into the signaling pathway leading towards apoptosis. The mentioned study investigated the induction of apoptosis in human cervical cancer HeLa cells and human cervical mononuclear cells by Lycopene, as revealed by caspase-3 and caspase-9 activity assays. The results revealed that Lycopene significantly induced apoptosis in cervical cancer HeLa cells and in monocytes in a time-dependent manner. The outcomes revealed that lycopene effectively increases the caspase-3 and caspase-9 activities after 24 hr, 48 hr and 72 hr. So, it can be concluded that Lycopene is involved in the in vitro activation of caspase-3 and caspase-9, leading to programmed cell death (apoptosis) in cervical cancer cells.

OP-17

Rho/ROCK signaling plays a crucial role in enhancing the Zearalenone-induced endometrial cancer cell migration and invasion

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ABSTRACT

Zearalenone (ZEA) is a naturally occurring mycoestrogen known for mimicking estrogen-like effects and has been associated with reproductive disorders and endometrial cancer (EC). ZEA has been detected in the serum and endometrial tissues of individuals facing reproductive issues and in children with precocious puberty. However, the specific mechanisms by which ZEA affects endometrial health are poorly understood. In an in vivo experiment, CD-1 female mice were given two doses of ZEA over 90 days. The analysis showed that ZEA exposure led to alterations in the body-to-organ weight ratio of the uterus. At the same time, immunohistochemical and histological evaluations indicated hyperplasia and increased gland density within the endometrium. Markers of proliferation, such as proliferative cell nuclear antigen PCNA and Ki-67, along with inflammatory cytokines (IL-6, IL-8, and IFN-γ), were elevated. These findings suggest a connection between ZEA exposure and induced inflammation and proliferation in the endometrium. Additionally, in in vitro experiments, Ishikawa cells were utilized to assess the effects of ZEA on cell migration and invasion. Treatment with low proliferative concentrations of ZEA (5, 25, and 125nM) for 48h resulted in notable morphological changes, including the formation of stress fibers and filopodia, as well as enhanced migration and invasive capabilities through extracellular matrix-coated membranes, particularly at the treatment of 25nM. ZEA exposure also activated the Rho-GTPase signaling pathway, leading to increased expression of mediators such as RhoA, ROCK1+2, and PMLC/MLC. The application of inhibitors targeting ER-α and ROCK was shown to mitigate these effects. These studies show that ZEA contributes to endometrial toxicity and inflammation while promoting cancer cell migration and invasion via Rho/ROCK signaling pathways. This underscores its potential role as an endocrine disruptor affecting reproductive health.

OP-18

Gut Metabolites Profiling: Metabolomics Based Approach to Unravel Compounds Affecting Esophageal Carcinoma.

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ABSTRACT

The correlation between gut microbiota and esophageal cancer has evolved as a novel research area with short chain fatty acids (butyrate, propionate, and acetate) being identified as a key microbial metabolites influencing oncogenesis. These metabolites are produced by bacterial fermentation of dietary fibers, playing critical role in regulating inflammation, cell differentiation, apoptosis, and immune responses. Cancer cell growth and metastasis is suppressed by these metabolites by regulation of cancer-specific signaling pathways or oncogene or tumor- suppressor gene expression. Using metabolomics approach this study focuses on exploring the dysregulation of short chain fatty acids in esophageal cancer patient (alteration of these metabolite profile in gut aspirate) and intervention of probiotics on this dysregulation. Advanced techniques like gas chromatography-mass spectrometry and 1H nuclear magnetic resonance will be used to study the perturbations associated with esophageal cancer. The identified metabolites will be analyzed on the basis of their mass to charge (m\z) ratio using these techniques. It is expected that patients with esophageal squamous cell carcinoma will have reduced butyrate levels contributing to disrupted histone deacetylase inhibition, altered gene expression and the tumor progression promotion and patients with esophageal adenocarcinoma will also have reduced level of short chain fatty acids which may contribute to chronic inflammation and epithelial damage in these patients. The expected results will highlight the dual role of microbial dysbiosis-mediated short chain fatty acids in carcinogenesis.

OP-19

Assessment of Physico-chemical and biological Properties of soil of dumping site of Madhya Pradesh (Sagar), India

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ABSTRACT

Solid waste management in proximity to disposal sites presents a significant contemporary environmental challenge. While extracellular enzyme activity serves as a potentially sensitive indicator of soil quality, the long-term effects of waste disposal on these microbial processes remain poorly understood. This study investigates the impacts of waste disposal on soil properties in Sagar, Madhya Pradesh, with a particular focus on the activity of extracellular enzymes and their variation across soil aggregates. Soil samples were collected from five distinct locations at a municipal dumping site in Sagar: (A) the top of the waste pile, (B) the bottom of the waste pile, (C) an area adjacent to brick-making activity, (D) an area bordering agricultural fields, and (E) a control site consisting of garden soil. A systematic sampling approach was employed using a soil digger, and samples were analyzed using standard laboratory techniques. Results indicate that the presence of various pollutants in the soil significantly reduced bacterial populations and the activity of key extracellular enzymes, including urease, dehydrogenase, phosphatase, and β-glucosidase. These effects were particularly pronounced in soils with higher acidity levels. The study highlights the detrimental impacts of waste disposal on soil microbial health, with potential consequences for crop productivity and overall soil quality in areas surrounding dumping sites.

OP-20

THE Y CHROMOSOME'S DECLINE: A Glimpse into our Future

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ABSTRACT

Chromosomes, thread-like structures within the nucleus, carry genetic information encoded in DNA. Humans inherit 23 pairs of chromosomes: 22 pairs of autosomes and one pair of sex chromosomes. The sex chromosomes, XX for females and XY for males, determine biological sex. The Y chromosome, with its crucial SRY gene, initiates male development. However, the Y chromosome has been steadily declining over millions of years, losing genetic material due to its unique mode of inheritance. This degeneration raises concerns about its potential disappearance within the next 11 million years. Despite this alarming trend, there is hope. Two rodent species have successfully evolved without a Y chromosome, suggesting that alternative sex-determining systems can emerge. This presentation will delve into the Y chromosome's evolutionary journey, its current state, and its potential future. By exploring the implications of its decline and the possibility of alternative sex-determining mechanisms, I aim to shed light on the fascinating and uncertain future of human genetics.

OP-21

Quantitative Analysis and Evaluation of Antioxidant Activity of Medicinal Plant *Moringa Oleifera L.*

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ABSTRACT

The medicinal plant *Moringa Oleifera L.* leaf methanol extract was analyzed for its total polyphenol content, total saponin content, total phlobatannin content and total flavonoid content. Four in-vitro antioxidant assays [2,2-diphenyl-1-picrylhydrazyl (DPPH), ferric reducing antioxidant power (FRAP), metal chelating activity, and total antioxidant capacity(TAC). were done to measure the reducing power and the scavenging ability of the extract. The antioxidant analysis indicated that IC 50 and percentage (%) inhibition were dose-dependent and showed the highest antioxidant activity (7.05 ±0.2 µg/mL) for metal chelating ferrous ion activity followed by 2.54 ± 0.01 µg/mL for FRAP, 3.90 ± 0.02 µg/mL for DPPH, and 1.50 ± 0.02 µg/mL for TAC. Thus the methanol extract of Moringa oleifera leaf has great potential as natural therapy, anti-oxidant source, and for the conservation of raw and processed foods.

OP-22

Effect of different food plants and seasons on the parameters of Eri silkworm *Philosamia ricini Donovan*

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ABSTRACT

The larvae of eri silkworm *Philosamia ricini* were reared on the leaves of three different food plants *Ricinus communis L., Heteropanax fragrans, Manihot esculenta* (Caster, Kesseru and Tapioca) in three different rearing seasons viz Monsoon, Autumn and Spring to check appropriate choice of the food plants. During the study caster leaves (Ricinus communis) was found best in term of different parameters viz nutritive values of leaves, larval weight, effective rate of rearing (ERR), cocoon weight, shell weight, pupal weight, fecundity hatching etc larval duration was found shorter in Caster than Kesseru and tapioca food plants. The present study is an attempt to evaluate the crop performance of eri silkworm during three different seasons viz, (I) Monsoon, (II) Autumn (III) Spring in relation to three major food plants Caster, Kesseru and Tapioca. The caster food plant and autumn season were found best among three different rearing seasons.

OP-23

Unlocking the Potential of new Copper (II) Flufenamate Complex in Targeting Protein Aggregation: A Novel Approach for Amyloid-Related Diseases

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ABSTRACT

The use of transition metal complexes has emerged as a novel therapeutic strategy for protein misfolding disorders (PMDs), with significant focus on Alzheimer's disease. However, research into the role of metal complexes in other PMDs, such as systemic amyloidosis, remains limited. This study investigated the effects of an ionic copper(II) complex, formed by flufenamate and bis–DACH moiety ligands, on the aggregation of human lysozyme (HL) at physiological conditions. The Cu(II) complex demonstrated significant inhibition of HL aggregation, modulating the formation of fibrils through non-covalent electrostatic interactions. ThT kinetics reveal that in the presence of Cu(II), HL aggregates undergo a unique formation pathway, characterized by a burst phase and the development of mature fibrils. These fibrils are more curved and elongated compared to those formed without the Cu(II) complex. At 250 μM, complete inhibition of fibril formation is observed, accompanied by an extended lag phase. The haemolytic assay also shows a reduction in erythrocyte lysis, demonstrating the protective role of the complex against cytotoxicity. These findings suggest that the copper(II) flufenamate complex holds potential as a therapeutic agent for amyloid-related diseases, including Alzheimer's disease, and offers valuable insights into novel treatment strategies. Future investigations are needed to elucidate the underlying mechanisms and assess its efficacy in in vivo models.

OP-24

Harnessing the Bioindicator Potential of Nematode Communities: Comparative Study of Natural and Anthropogenically Disturbed Habitats

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ABSTRACT

Nematodes, the most abundant form of metazoans, form one of the crucial components of the soil biodiversity and most reliable soil bioindicators inhabiting all habitats. Due to their range in sensitivity to pollutants and environmental disturbances they offer valuable insights of soil health. Here in this study, we tried to harness the bioindicator potential of nematode communities in examining the extent of the anthropogenic activities. Soil samples were collected from natural habitat, aquatic habitat and different anthropogenically disturbed habitats (EN, MT, PI, SM). In anthropogenically disturbed habitats, there was a distinguished reduction in total abundance and abundance of omnivores and predators. Similarly, CP3 & CP4 abundance also decreased in disturbed habitats. The diversity and generic richness significantly reduced in these disturbed environments. MI and SI decreased in disturbed habitats and showed considerable variations among these disturbed habitats. In contrast, EI increased in disturbed habitats and showed expected higher value in EN. Certain nematode genera showed specificity or elevated abundance in particular habitats. In EN habitats, genera such as Panagrolaimus, Metarhabditis, Fictor, and Mononchoides. In MT habitats, Pseudoacrobeles, Acrobeloides. In PI habitats, Eucephalobus, Poikilolaimus. In SM habitats, Pelodera, Cephalobus were the dominant genera. These nematodes serve as bioindicators for their respective habitats. Overall, this study revealed that nematode communities can be utilized as bioindicators to identify various pollution sources.

OP-25

Salinity Tolerance In Different Channid Species

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ABSTRACT

The water salinity represents a major abiotic factor which affects distribution of all the aquatic organisms, including fish. Increasing salinity is regarded as a critical environmental problem in rivers and wetlands among all inhabited continents. The increase of normal salinity levels emerges as a major problem for aquaculturists because it leads to stress in fish, which causes low growth and lesser production. Hence, the determination of salinity threshold levels and the optimal requirements of salt contents in the cultured fishes is crucial for aquaculturists. The present work was designed to investigate the salinity tolerance of the two channid species viz. Channa punctatus and Channa gachua. The experiment was carried out on well-acclimatized fish maintained in controlled laboratory conditions. The salinity tolerance limit was investigated by analysing the mortality chart during the experiment. Acclimatized groups of two channid species were transferred directly from FW to various dilutions of artificial SW ranging from 10 to 100% for 7 days. On the basis of % mortality record of each salinity and FW (control), upper salinity tolerance limit (USTL) was determined for both channid species. The result showed that the USTL of C. punctatus is 30% (292 mOsm L-1) of the full strength SW (988 mOsm L-1) by direct and gradual transfer from FW to various dilutions of SW from 10% to 100% SW (Table 2.1 and 2.2). However, another channid, i.e., C. gachua showed much higher USTL, i.e., 40% SW (388 mOsm L-1).

OP-26

Effect of Varying Protein-to-Energy Ratios on Growth, Nutrient Retention and Somatic Indices of Amur carp, Cyprinus carpio hematopterus

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ABSTRACT

Aquaculture contributes significantly to the production of fish contributing to global food security. Aquafeed must contain a balanced ratio of protein-to-energy. This ratio is crucial because it directly affects the utilization of dietary protein to body protein, fish growth, feed efficiency and overall health. Protein is essential for tissue repair and metabolism, while energy fuels bodily functions and efficient feed utilization. An imbalanced protein-to-energy ratio can result in suboptimal growth, poor feed conversion ratio, and excess nitrogen excretion, contributing to environmental pollution. The effects of different protein-to-energy (P/E) ratios on the Amur carp, Cyprinus carpio hematopterus, fingerlings were assessed in terms of growth performance, nutrient retention and somatic indices. A 3×3 factorial design was used with three proteins levels (250, 300 and 350 g/kg crude protein (CP)) and three energy levels (3.46, 3.88 and 4.30 kcal/g gross energy (GE)) to provide experimental diets with nine different dietary P/E ratios (72.2, 86.7, 101.1, 64.4, 77.2, 90.1, 58.1, 69.7, and 81.39 mg/kcal). Fish were hand-fed the diets in triplicate groups for 8 weeks at 9:00 and 16:00 until they appeared satiated. The groups fed on 350 g/kg CP with 3.88 kcal/g GE (P/E ratio of 90.2 mg/kcal) showed best growth performance, conversion efficiency, nutrient retention and somatic indices. The results of this study indicate that the optimum P/E ratio in diets for C. carpio hematopterus is 90.2 mg/kcal diet.

OP-27

Protective effect of glycitein on the transgenic Drosophila model of Alzheimer's disease.

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ABSTRACT

A transgenic fly line expressing wild type human Aβ42 were exposed to glycitein mixed in diet at final concentration of 100, 150, 200 and 300 µM. Along with the estimation of protein carbonyl content (PCC), glutathione-S-transferase (GSTs) activity, total glutathione (GSH) content, lipid peroxidation (LPO), acetylcholinesterase activity (AChE), superoxide dismutase (SOD) activity, catalase (CAT) activity, caspase 3 and 9 activities in the brain of treated as well as untreated AD flies (Positive control), the climbing assay, activity pattern, life span, aversive phototaxis suppression assay (APS) were studied. A dose dependent increase in the life span, delay in the loss of climbing ability as well as activity was observed in AD flies exposed to glycitein compared to unexposed AD flies. A dose dependent reduction in LPO, PCC, GST, AChE, SOD, CAT, caspase-9 and caspase-3 activity and an increase in the GSH content was also observed. Histopathological examination of fly brains using thioflavin-S and silver staining has revealed a significant dose dependent reduction in the expression of Aβ-42 peptides in AD fly groups exposed to 100, 150, 200 and 300 µM of glycitein. No gross morphological changes were observed in the brain sections of AD and control flies stained with toluidine blue. glycitein has probably showed its protective affect against AD flies by suppressing acetylcholinesterase activity or by preventing the aggregation or enhancing the disaggregation of amyloid plaques.

OP-28

Impact of a butanolide flupyradifurone exposure on histo-morphology of *Channa punctatus*

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ABSTRACT

Flupyradifurone (FDF) is a fourth generation butanolide insecticide and is believed to be less hazardous to non-targets of the agroecosystems. Frequent abnormalities in nontarget fauna, specifically in aquatic species are reported, but detailed toxicological information is not available. In this study, we investigated the impact of FDF on histomorphological parameters of Channa punctatus which is frequently exposed to FDF-laden agricultural run-offs and its residues/metabolites. Mature Channa punctatus (150±5.0 gm) were locally captured from an unexposed pond and randomly divided into control, low-dose (0.1% v/v), medium-dose (0.25% v/v), and high-dose (0.5% v/v) groups (n=6/group). Exposure was given through water for 24 and 48 hours and studied for length-weight ratio, fin length, scale length, fin and scale ratio, and pathological alterations in the gills and liver. Dose- and duration-specific alterations in feeding and swimming patterns were visible in FDF-exposed groups. Discoloration, shedding of scales, fin erosion, and abnormal opercular movement revealed alterations in external morphology. A significant ($P<0.05$) reduction in body weight, fin length, gills, and blood/tissue modification was observed in insecticide-exposed fish. Dose-dependent and duration-specific lesions/ulcers revealed increased susceptibility to infections in skin and fins. Histopathological analysis revealed necrotic damages and lesions in liver along with epithelial hyperplasia, lamellar fusion, necrosis, and inflammatory cell infiltration in the gill tissues. Physio-morphological deformities in fishes may lead to stunted growth, abnormal fin development, and skeletal malformations. Histomorphometric analyses indicate the physio-morphological disruptive potential of FDF in fishes that could further lead to impairment of trophic system and disturbance of aquatic ecosystems.

OP-29

Coronary Artery Disease (CAD): Conventional and Newer Risk factors

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ABSTRACT

Cardiovascular diseases (CVDs), particularly coronary artery disease (CAD), are leading causes of mortality worldwide, accounting for nearly 18 million deaths annually. In India, CAD has become a significant public health challenge, with its prevalence steadily increasing over the years. Urban regions show a prevalence of 7% to 13%, while rural areas report 2% to 7%, reflecting stark regional disparities.

The rise in CAD cases in India stems from a combination of lifestyle and epidemiological factors, including hypertension, diabetes, smoking, obesity, and dyslipidaemia, fuelled by socioeconomic shifts. Regional disparities in CAD prevalence are influenced by cultural, dietary, and genetic factors, with northern India exhibiting a higher burden compared to southern regions. Contributing factors like limited healthcare access, urbanization, and air pollution further aggravate the issue. In addition to traditional risk factors, emerging biochemical markers such as high-sensitivity C-reactive protein (hs-CRP), Lipoprotein(a) {Lp(a)}, Glycated Haemoglobin {HbA1c}, and homocysteine (Hcy) are gaining recognition. Elevated plasma Hcy levels, linked to MTHFR gene mutations, are identified as independent risk factors for CAD, particularly in Indians.

Obstructive Sleep Apnea (OSA), characterized by intermittent hypoxia and systemic inflammation, is another underrecognized risk factor that exacerbates CAD. The interplay of traditional and novel risk factors highlights the complexity of CAD pathogenesis, emphasizing the need for comprehensive prevention and treatment strategies tailored to India's diverse population.

OP-30

Insights into Hypoxia-Inducible Factor-1α as a Therapeutic Target in Liver Fibrosis

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ABSTRACT

Liver fibrosis is a progressive stage of liver cirrhosis that is the end-stage of several chronic liver diseases and accounts for more than one million deaths each year worldwide. Due to asymptomatic in progressive phase, its early detection can slow the rate of deaths related with cirrhosis and hepatocellular carcinoma. Hypoxia-inducible factor-1α (HIF-1α) is an essential transcriptional regulator for fibrosis as it controls the cellular response to hypoxic stress. With negligible side effects and cost friendly, phytomedicines application is a pressing need for its potential to modulate fibrosis via targeting the HIF- dependent pathways. Relevant information was obtained from the available literature, including key terms search on google scholar, PubMed and Web of science. The study revealed a network of HIF-1α-regulated pathways that include angiogenic agents, profibrotic mediators, and pro-inflammatory cytokines, all of which promote the development of hepatic fibrosis. Potential ways to treat the disease have been discovered, including the use of HIF inhibitors, phytomedicines, and Von-Hippel-Lindau (VHL) protein activity modification. By suppressing HIF-1α-driven pathways several phytomedicines demonstrated hepatoprotective effects, suggesting their potential as antifibrotic agents. A combined therapy including Phyto-drug with HIF-modulating approaches could lead towards the development of a novel a therapy of fibrosis. In order to develop evidence- based anti-fibrotic medications, future research warrant on concentrating these pathways on animals and human.

OP-31

Impact of Obesity on Liver Disease Progression: Epidemiology, Risks, and Treatment Strategies

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ABSTRACT

Obesity is increasingly recognized as a significant public health challenge, directly linked to various liver diseases, notably non-alcoholic fatty liver disease (NAFLD) and its more severe form, non-alcoholic steatohepatitis (NASH). These conditions are not merely isolated health issues; they are part of a broader metabolic syndrome that includes obesity, type 2 diabetes mellitus (T2DM), and cardiovascular diseases. The relationship between obesity and liver health is complex, involving various metabolic pathways that lead to fat accumulation in the liver. The accumulation of fat in the liver can cause inflammation and fibrosis, which may progress to more severe conditions such as hepatocellular carcinoma (HCC). Obesity contributes to this process through mechanisms like increased lipid influx, decreased fat oxidation, and enhanced lipogenesis. Obesity significantly increases the risk of developing HCC. Studies show that individuals with obesity have a 2-3 fold higher risk of HCC compared to their non-obese counterparts. This risk escalates further in those with additional metabolic issues like T2DM, where the incidence can increase by up to three times. Given these insights, addressing obesity is critical not only for improving overall health but also for preventing liver disease progression. Interventions such as very low-calorie ketogenic diets (VLCKD) have shown promise in reducing body weight and improving liver health markers among obese individuals. This approach highlights the importance of dietary management in mitigating the risks associated with obesity-related liver conditions. The interplay between obesity and liver disease underscores the need for comprehensive public health strategies aimed at reducing obesity rates. By understanding the mechanisms through which obesity affect liver health, healthcare providers can better target interventions to prevent and treat these increasingly common conditions.

OP-32

Taxonomic studies on locust species, Locusta migratoria (Linnaeus, 1758) and Schistocerca gregaria gregaria (Forskal, 1775) with some tactics for their effective control

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ABSTRACT

Locusts' swarming nature makes them the most destructive pests to agriculture, leading to significant economic loss for farmers. Taxonomic study of locusts provides a framework for identifying and classifying these short-horned grasshoppers. The migratory locust, Locusta migratoria (Linnaeus, 1758), belongs to the subfamily Oedipodinae (Cigliano et al. 2023), characterised by the absence of a prosternal process, a median carina almost crest-shaped, equally raised in the prozona and metazona on the pronotum, mesosternal lobes rounded, and a medial area with a well-developed and strong serrated intercalary vein on the tegmen, while Schistocerca gregaria gregaria (Forskal, 1775) belongs to the subfamily Cyrthacanthacridinae, characterised by the presence of a prosternal process, a dorsum of the pronotum tectiform with a weak median carina, mesosternal lobes rectangular, and no intercalary vein present in the median area of the forewing. The present study also provides some effective strategies to mitigate locust infestation, e.g., early detection with the help of sensors and IoT, chemical sprays by using drones, and effective Integrated Pest Management (IPM).

OP-33

Impact of lactational exposures to endocrine-disrupting pesticides on hypothalamic-pituitary-adrenal axis in mice

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ABSTRACT

The hypothalamic-pituitary-adrenal (HPA) axis is highly sensitive to environmental exposures of xenobiotics, including pesticides. This study evaluated the lactational exposure effects of environmentally realistic exposures of two contemporarily used endocrine-disrupting pesticides (EDP) and their equimixture on HPA axis of mice. Male Swiss albino mice were lactationally (PND1 to PND28) exposed to 0.5% of LD50 of a dithiocarbamate mancozeb/MCZ and a neonicotinoid imidacloprid/IMI. Their equimixture (MIX; 0.5% of LD50 of each) were exposed to evaluate the combinatorial actions. Effects on weight and histology of adrenal gland, circulatory glucocorticoid/mineralocorticoid levels, and hypothalamo-hypophysial expression of CRH/ACTH were evaluated at PND29 and PND63. The binding energy, Van der Waals energy and inhibition constant were analyzed by molecular docking to predict binding affinities of MCZ and IMI with glucocorticoid and mineralocorticoid receptors. Adrenal histomorphometry revealed disruptive effects of MCZ, IMI and MIX at PND29 which persisted till PND63. Substantial adrenotoxicity was prevalent in decreased cortex-medulla ratio, increased cell size, decreased cellular density and increased numbers of necrotic cells/lipid droplets in zona glomerulosa, zona fasciculata and zona radiata. Increased ($P<0.01$) plasma glucocorticoid on ELISA and decreased ($P<0.01$) CRH/ACTH expression in hypothalamus/pituitary on immunohistochemistry revealed hormonal imbalance. Molecular docking analyses reported differential binding affinities on different binding sites of receptors for MCZ, IMI and MIX that were in consonance with in vivo studies. Differential actions of EDPs-MIX could be due to the additive/synergetic actions on the HPA axis. Persistence of neonatal exposure impacts revealed the EDP-induced disruption of stress homeostasis and physiological responses during adolescence and adulthood.

OP-34

Nector plants of butterflies in Sariska Tiger Reserve

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ABSTRACT

Sariska tiger reserve is a famous protected area situated in the Alwar district of Rajasthan. this tiger reserve total covers 881 km2, out of which 273.8 notified as a national park in 1982 (Sankar et al. 2013). Sariska tiger reserve come under the sub-humid region with an average rainfall of 40 to 60 cm. Nectar is the resource of micro-nutrients that assist in the development. Nectar and larval food plant availability affect the overall size of the population also a significant factor in species composition. Nectar food plants of butterfly species were recorded by employing the visual count method (VCM) systematically at Sariska Tiger Reserve, Rajasthan during 2016 and 2018. Nectar food plants were classified into, herbs, shrubs, climbers, weeds and their flowering period was recorded. Flowering plants were identified with the help of field guides. Those plants that were difficult to identify in the field were photographed. They were later identified with India's Botanical Survey (BSI) experts, Jodhpur. Collected data were compiled and compared statistically. Nectar plant plays essential role in butterflies species composition and diversification in a particular habitat. Nectar affects overall physiology and meets nutrient requirements for a longer life span and egg production rate. Our study of butterflies-nectar plant assessment recorded 31 species out of 45 species of butterflies visited at 44 flowerings (Nectar) plant species. These 31 flowering plant species belong to 22 plant families.

OP-35

Demonstrating Plastic consuming efficiency of lepidopteran and coleopteran model insects

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ABSTRACT

Plastic is an artificial polymer obtained from conservative petrified oil, which is defiant to biodegradation. Of the total plastic, about 92% is PE (Polyethylene) and PP (polypropylene), both of which are widely used in wrapping and covering. With the overproduction and poor plastic waste management it's causing a trouble in environment. Since 1950, about five thousand eight hundred (5800) MN tons of primary plastic is discarded, which is no longer in use, and only nine percent has been recycled. By 2015, total 8,300 Mt of primary plastic produced globally ,out of it 500 Mt (~6%)were recycled,700 Mt(~9%) were burned, 2,500 Mt(~30%) were still in use and 4600 Mt (~55%) were estimated to have been discarded, ultimately accumulating in landfills and natural environments. Research suggests that plastic waste was landfilled and only 18% recycled. With the uncontrolled application of plastics and rising insistence being put down on methods convenient for plastic wither disposal, the call for biodegradation of plastic and biodegradable plastics wastes has presumed growing significance lately. Plastic biodegradation can be described as degradation of plastic films by microbes present in the gut of some insect species belonging to order Coleoptera and Lepidoptera. The well-known examples of Insects that can degrade plastic is the G. mellonella (wax moth), a lepidopteran and T. molitor (mealworm), a coleopteran . Hence to understand the whole mechanism of synthetic and natural polymer biodegradation, it is necessary to view the microbes and enzymes involved in it. Some studies have suggested that the larvae of mealworms can consume and break down certain types of plastic, such as polystyrene foam, into smaller fragments by chewing, which is then further broken down in their gut by micro biome. The larvae of G. mellonella can also break down certain types of plastic, particularly polyethylene. The enzymes and gut microbes play an important role in biodegradation of polyethylene.

OP-36

Resolving the taxonomic puzzle of Drawida jalpaigurensis Stephenson, 1916 using integrated approach of taxonomy

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ABSTRACT
The taxonomy of earthworms has long been challenged by morphological ambiguities and overlapping diagnostic traits, leading to contentious species designations. Drawida jalpaigurensis Stephenson, 1916, a species of the Moniligastridae family, has historically been subject to debate, with several researchers proposing its synonymy with Drawida nepalensis Michaelsen, 1907. This study employs an integrative taxonomic approach, combining morphological assessments and molecular phylogenetics, to resolve this taxonomic uncertainty. Detailed morphological re-evaluation revealed subtle but consistent differences between the two taxa, while mitochondrial gene sequences demonstrated clear genetic divergence supporting their status as separate species. The findings underscore the importance of integrative taxonomy in clarifying species identities and conserving biodiversity, particularly in poorly studied taxa like Moniligastridae. This study not only resolves a long-standing taxonomic enigma but also highlights the need for comprehensive approaches in biodiversity research.

OP-37

Taxonomic notes on some Indian genera of the family Mymaridae (Hymenoptera: Chalcidoidea) from UT Ladakh.

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ABSTRACT
The superfamily Chalcidoidea comprises 27 families (Cruaud 2024) with significant morphological, ecological, and biological diversity. The family Mymaridae is one of the most widely distributed, speciose, and physiologically diverse family among other Chalcids families. These insects throughout the world plays a significant role in the management of insect pests of agricultural and horticultural crops. Mymarids in combination with other biological control agents, have the potential to replace chemical pesticides in the management of agricultural pests. Mymarids are a well-known group of egg-parasitoids commonly used to control many insect pests worldwide (Li, 1994; Smith, 1996; Yousuf et al, 2020). From August 2021 to June 2023, a faunistic survey was conducted in various locations throughout the Trans-Himalayan regions of UT Ladakh. The research has led to collection, identification and classification of several Mymarid genera and species (Anagrus, Anaphes, Polynema, Mymar, Stythenium) from varied locations of UT Ladakh region, with the outcome of new regional records and two new species from India.

OP-38

Therapeutic efficacy of (-)-Epigallocatechin-3-gallate in combination with vitamin D on endocrinology and epigenetic modifications in Polycystic Ovary Syndrome (PCOS) patients: A Clinico-Biochemical and in-vivo study

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ABSTRACT

Background: PCOS is the most prevalent endocrine condition affecting about 8.2- 22.5% of reproductive aged women. Symptoms includes oligomenorrhea/oligo-ovulation/anovulation, hyperandrogenism, polycystic ovaries (PCO) and secondary comorbidities like type II Diabetes Mellitus, cardiovascular complications, infertility, etc.

Methods: Study included PCOS patients (n=100) and healthy control (n=50). Clinical and biochemical symptoms such as Ferriman-Gallwey score, body mass index (BMI), polycystic appearance of ovaries, hormone profile, Vitamin D levels and DNA methylation were determined. Furthermore, study was also conducted on PCOS induced rats, then therapeutic potential of vitamin D co-supplemented with (-)-Epigallocatechin-3-gallate (EGCG) was assessed using hormone profile, biochemical parameters, and ovarian histology. p-value ≤ 0.05 was considered significant.

Results: Clinical study suggests that PCOS patients were having high AMH and low vitamin D levels, persistent insulin resistance, hyperandrogenism, altered lipid profile which can lead to secondary complications, and infertility. Oxidative stress, inflammation, and altered DNA methylation were also seen which might be responsible for poor oocyte quality and anovulation behind PCOS development. The in-vivo study conducted on female rats correlated with the PCOS patients, in terms of hyperandrogenism, high AMH and low vitamin D levels, persistent insulin resistance etc. Furthermore, histomorphological and biochemical analysis depicted increase in antral follicles, follicular cysts, oxidative stress, and inflammation. Supplementation of vitamin D and EGCG restored ovarian morphology and other parameters.

Conclusion: The correlation between AMH levels with increase in antral follicles can be confirmed with the in-vivo study. Low level of vitamin D, increase in oxidative stress and inflammation making follicular micro-environment unfavourable for oocyte development. DNA methylation changes suggest epigenetic modifications, further study is needed to assess effect of methylation on different genes involved in fertility.

OP-39

Female fertility table of eri silkworm, *Philosamia ricini* (Lepidoptera: Saturniidae) on castor

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ABSTRACT

The data on female fertility of eri silkworm Philosamia ricini were collected on castor, Ricinus communis at the room temperature in the laboratory conditions. The observations showed that it complete its pivotal age within 10 days. The peak egg laying 52.70 eggs, 85.60 eggs and 67.50 eggs was recorded on fourth, fifth and sixth day. On the other hand, minimum egg laying was observed on first (8.40 eggs), ninth (2.60 eggs) and tenth (0.05 eggs) day. The other life parameters of female moth of eri silkworm such as potential fecundity, net reproductive rate, mean length generation, doubling time, finite rate of increase, intrinsic rate of increase and annual rate of increase was recorded as 335.22 eggs/ female, 97.82, 46.21 days, 6.97, 1.3659, 0.09945 females/ female/ day and 5.80 x 1015/annum, respectively. The other parameters of female of eri silk moth i.e., potential fecundity, net reproductive rate, mean length generation, doubling time, finite rate of increase, intrinsic rate of increase and annual rate of increase were also in favor of development on castor. The overall all findings revealed that all the parameters of life table were in favor for the development of eri silkworm on castor in the laboratory conditions.

OP-40

Study of plankton diversity from Bada Talab, village Gona Pasgawan, Lakhimpur Kheri, Uttar Pradesh

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ABSTRACT

Diversity of plankton is an excellent biological indicator of an environment's health. The importance of phytoplankton in the fresh water environment cannot be overemphasized. The planktonic study is a very useful tool for the evaluation of water quality in any type of water body. This study has been conducted to study the plankton composition in Bada Talab, Lakhimpur, Uttar Pradesh. Plankton constitutes a vital role in the aquatic food chain. Phytoplankton succession in open pond and lakes depends on the availability of nutrients, temperature, light intensity and transparency. The current investigations were researched from June 2023 to May 2024. The collected samples were then examined to identify and quantify plankton species using standard protocols. Several published plankton manuals were used for plankton collection and identification. Phytoplankton (Seven species), dominated by diatoms, cyanobacteria, and various other taxa, play a fundamental role as primary producers, influencing nutrient cycling and climate patterns. Zooplankton (9 species), including Rotifers, Copepods, and Calanoids, showcase a diverse community with distinct taxonomic members. The present study highlights the diversity & importance of plankton in the study area and emphasizes the importance of monitoring plankton populations for effective lake management and conservation strategies.

OP-41

Study of Physico-chemical parameters of the two ponds of district Shahjahanpur, Uttar Pradesh

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ABSTRACT

Water resources are contaminated by the effects of urbanization and industrialization, making them unfit for agricultural and drinking uses, despite the fact that water is essential to human survival.Ponds are classified as lentic water bodies, which get adversely affected by anthropogenic activities. The purpose of this study is to investigate the physico-chemical characteristics of two ponds located in the Shahjahanpur district. The Shahjahanpur district is home to numerous ponds, but human activity has destroyed the majority of them. The current study was conducted over the period of 12 months, specifically from June 2023 to May 2024. Monthly data is gathered and subsequently organized by season, accompanied by its specific standard deviation. The study encompassed various parameters, including water color, odor, temperature, pH, dissolved oxygen (DO), Biochemical Oxygen Demand (BOD), Alkalinity, Total Dissolved Solids (TDS), Chloride, Sulfate, Magnesium, Nitrate and Bromine. The method employed for the analysis is the standard methods recommended by APHA. The obtained values are compared with the standard limits. The results revealed that physico-chemical parameters of water from both ponds were not within the Permissible limits prescribed by WHO. This indicated that the selected water bodies are unsuitable for domestic and drinking purposes; thus adequate management has to be carried out by the society and implement government regulations to save natural resources from anthropogenic activities.

OP-42

Morphological examination of microsporidia isolated from honey bee (Apis mellifera) using different stains

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ABSTRACT

Microsporidia are obligate parasites that significantly affect honey bee health, impacting global apicultural and pollination services. The current study focuses on the morphological examination of microspores isolated from bee homogenates using a range of staining techniques to enhance diagnostic precision. Microspores were firstly isolated from infected honey bees and subjected to differential staining protocols including Giemsa, Methylene blue, Calcofluor white and trichrome staining to evaluate their efficacy in detecting and characterizing these pathogens. Morphological characteristics, including spore shape and structural details were compared across stains. Results suggest that Giemsa and trichrome staining were highly effective in highlighting spore morphology however calcofluor white helped in knowing more about spore wall detailing under fluorescence microscopy. The study underscores the importance of selecting appropriate staining methods for accurate identification of microsporidia, contributing to improved diagnostic capabilities and better management for honey bee health.

OP-43

Camellia sinensis leaves extract abates nitrosodiethylamine instigated hepatic scarring in Wistar rats

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ABSTRACT

Documented reports suggest that alcohol abuse, obesity, environmental pollutants, and overuse of conventional medicines are the major risks for liver diseases in India. The search for safer, affordable, and easy-to-reach alternatives is a pressing need. This study investigates the ability of a green tea supplement to prevent liver fibrosis generated by an established hepatotoxic chemical agent, N-nitrosodiethylamine (NDEA). Nitrosodiethylamine is a powerful mutagenic and carcinogenic substance found in a number of dietary items through which it reaches the human body. Biochemical assessments of liver function enzymes (ALT, AST, ALP, and bilirubin), superoxide dismutase, catalase, hydroxyproline and collagen were carried out in four different groups of animals. Further histopathological examination of tissue sections was also furnished via Masson's trichrome and Picrosirius staining to monitor the anatomical changes in the liver. Results of this study demonstrate significant perturbation in the investigated biochemical parameters and accumulation of collagen in the tissue in animals that received NDEA for two weeks. Green tea supplement in the standardized doses ameliorated these changes significantly, signifying its hepatoprotective and anti-fibrotic efficacy. Thus, it is suggested that green tea may be a possible alternative in treating liver-related disorders, specifically liver fibrosis, and hence may be recommended for its inclusion in a regular diet.

OP-44

Genetic Susceptibility of the single-nucleotide polymorphisms related to KCNQ1 (rs2237892) and KCNJ11 (rs5219) gene within type 2 diabetes Mellitus (T2DM) subjects in North Indian Population.

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ABSTRACT

Type 2 Diabetes Mellitus (T2DM) is a significant global health concern with a strong genetic predisposition. The present case-control study was investigated for the association of two single nucleotide polymorphisms (SNPs), KCNQ1 (rs2237892) and KCNJ11 (rs5219), with T2DM in a North Indian population. A total of 500 participants were recruited, comprising 250 T2DM patients and 250 normoglycemic controls. Genetic association analysis was performed under dominant, co-dominant, and recessive inheritance models using adjusted/unadjusted Odds Ratios (ORs). The T allele of KCNQ1 (rs2237892) exhibited a statistically significant increased risk of T2DM with an ORs (CIs) p-value i.e. 1.89 (1.39 - 2.57) 3.2 ×10-5, indicating an 89% elevated risk. Similarly, the K allele of KCNJ11 (rs5219) was associated with a 140% higher risk of T2DM, represented by ORs (CIs) p-value i.e. 2.40 (1.61 - 3.58) 6.2 ×10-5. Multifactor Dimensionality Reduction (MDR) analysis using R software also revealed a synergistic SNP (rs2237892) -SNP (rs5219) interaction, contributing an additional 0.89% susceptibility to T2DM. Clinical parameters was in unison and demonstrated statistical (ANOVA) significance at $p<0.05$ i.e. elevated fasting (F) and postprandial (PP) blood glucose levels in individuals with the TT genotype of KCNQ1 and EK/KK genotypes of KCNJ11. In conclusion, the study establishes a positive genetic association of KCNQ1 (rs2237892; T allele) and KCNJ11 (rs5219; K allele) variants with T2DM, highlighting their role as risk genetic markers in the North Indian population. These findings can improve ethnic genetic risk assessment and facilitate targeted intervention strategies for earlier prediction and management of T2DM.

OP-45

Oxidative Stress-Driven Peroxynitrite Formation, Nitro-Oxidizes Human Fibrinogen: Possible Role in Development of Atherosclerosis

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ABSTRACT

Structural remodelling of biological macromolecules like blood proteins induce neo-epitopes. This triggers immune response, which in turn results in the production of circulating autoantibodies. Fibrinogen (Fg) is one of the major blood protein exposed to different toxic and oxidant chemicals. Peroxynitrite (PON), a known powerful nitro-oxidizing agent has many biological activities and is able to disrupt functionalities of different biomacromolecules including Fg. This study aims to understand the interaction between Fg and PON, and its effect on the structure and function of human Fg. Computational results demonstrated stable interaction between Fg and PON. Spectroscopic results confirmed the structural changes in Fg due to modification at aromatic amino acid (tyrosine and tryptophan) residues. Formation of carbonyl content in modified protein confirmed the oxidizing capability of PON, leading to exposure of hydrophobic core thereby enhancing β-sheeted structure and ultimately resulting in aggregation. Immunogenicity of PON treated Fg was checked in animal subjects. Whereas, its antigenicity was checked in atherosclerosis patients. Immunization of experimental animals demonstrated that PON-Fg has much higher immunogenicity than its native counterpart. PON-Fg also exhibited strong interactions with antibodies obtained from patient samples. The remarkable high affinity of PON-Fg for these antibodies suggest that Fg appear to be structurally altered under in the atherosclerotic patients, resulting in the formation of neo-epitopes and the subsequent development of autoantibodies. Further investigations on this issue could help identify patient who are prone to development of atherosclerosis at an early stage.

OP-46

Role of genes in development of Zebrafish

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ABSTRACT

Overtime, Zebrafish *(Danio rerio)* has emerged as a popular model for studying developmental biology, toxicology, drug discovery and molecular genetics. Laying numerous transparent eggs in a controllable and predictable manner, well-defined embryological stages and easy maintenance has contributed in its establishment as a research model. Early embryonic development of Zebrafish is an interplay of various genes and signaling pathways. Embryogenesis in Zebrafish can be divided into seven broad periods—the zygote, cleavage, blastula, gastrula, segmentation, pharyngula, and hatching period. The basic body plan of Zebrafish embryo is established in the first 10 hours of development, this includes formation of anterior-posterior and dorsal-ventral axes, development of the three germ layers, specification of organ progenitors and the complex morphogenetic movements of cells. Signaling pathways such as Nodal signaling, BMP signaling, Wnt signaling and FGF signaling and genes such as nodal, cyclops, bmp2b, chordin, nogging, beta-catenin are involved in early development of Zebrafish embryo. Proper understanding of molecular genetics of development of zebrafish embryo can significantly contribute to study effect of various toxicants on the embryo development and other phenomena.

OP-47

Poly (lactic-co-glycolic acid) (PLGA) nanoparticles for cancer treatment

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ABSTRACT

Poly(lactic-co-glycolic acid) (PLGA) nanoparticles have emerged as promising candidates in the field of cancer treatment due to their biocompatibility, biodegradability, and versatile drug delivery capabilities. PLGA, a copolymer of lactic acid and glycolic acid, can be engineered into nanoparticles that encapsulate chemotherapeutic agents, thereby enhancing their solubility, stability, and controlled release. These nanoparticles offer controlled and sustained drug release of therapeutic agents to target specific tumor sites by modifying surface characteristics or functionalizing with targeting ligands, thereby reducing systemic toxicity and improving therapeutic efficacy. The ability to encapsulate both hydrophobic and hydrophilic drugs further broadens the scope of PLGA nanoparticles in cancer therapy. Here we highlight the methods of formation of PLGA-based nanoparticles, their physical and chemical properties, methods for drug-loaded PLGA synthesis, drug release mechanism and use of PLGA nanoparticle-based drug delivery system in cancer treatment. Additionally, the pitfalls and biosafety associated with PLGA nanoparticle formulations, are discussed. In conclusion, PLGA nanoparticles represent a promising strategy in the development of more effective, less toxic cancer treatments, with the potential to revolutionize personalized cancer therapy.

OP-48

Effect of feeding stress on economically important catfish, Clarias batrachus

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ABSTRACT

While conducting any study dealing with any aspect of physiology it is very important that the fish should be in a nutritionally sound state. Moreover, nutritional status of fish is also very important for its health and aquaculture practices. Therefore, in the present study an attempt has been made to investigate effect of feeding stress on the catfish, Clarias batrachus. To achieve the objective, fish were subjected to food deprivation for 2, 7, and 15 days. Results exhibited a significant increase in plasma cortisol levels at all the three time points while plasma osmolality and plasma glucose content did not show any significant changes after 2, 7 and 15 days of food deprivation. Liver and muscle glycogen content showed a significant decline throughout the duration of experiment. Overall, alterations in biochemical parameters reflect the physiological disturbance in fish. So, this study highlights the importance of using experimental animals which are in a nutritionally-sound state and it can also provide important insights for better aquaculture practices.

OP-49

In-vitro Effect of Biosynthesized Gold Nanoparticles (AuNPs) from Aloe barbadensis Miller against Fusarium oxysporum

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ABSTRACT

The rising global population, particularly in agricultural economies like India, has intensified the pressure on food security. A substantial fraction of crop yields is compromised annually due to plant-pathogenic fungi, such as Fusarium oxysporum, significantly reducing agricultural productivity. Traditional chemical fungicides, while effective, pose severe risks to human health, environmental safety, and long-term soil fertility, necessitating the development of eco-friendly alternatives. This study investigates the antifungal potential of gold nanoparticles (AuNPs) biosynthesized using the leaf extract of Aloe barbadensis Miller (Aloe vera). Biosynthesized AuNPs were characterized for their morphology and size using UV-Vis spectroscopy, SEM, EDX and XRD techniques, confirming their stability and bioactivity. Fungicidal efficacy was evaluated at four concentrations: 100, 200, 300, and 400 ppm. The results demonstrated a dose-dependent inhibition of F. oxysporum growth, with maximum fungal suppression observed at 400 ppm. At this concentration, mycelial growth inhibition reached 85%, accompanied by notable reductions in spore germination and hyphal integrity as observed under microscopic analysis. This study highlights the effectiveness of Aloe vera-mediated AuNPs as a sustainable and green approach for managing fungal pathogens. The findings highlight the potential of plant-derived nanotechnology in offering a dual advantage of effective pest control and reduced environmental impact, paving the way for greener agricultural practices. Future research focusing on field-level validation and scalability could further enhance the practical applicability of this novel antifungal strategy.

OP-50

BRIP1 helicase suppresses AID-induced genomic instability by preventing the accumulation of non-B DNAs

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ABSTRACT

Activation-induced cytidine deaminase (AID) expressed in antigen-activated B-lymphocytes diversifies immunoglobulin (Ig) genes through somatic hypermutation (SHM) and class switch recombination (CSR), targeting variable and switch regions, respectively. While AID primarily targets Ig loci, its mistargeting and aberrant expression are associated with oncogenic mutations and chromosomal translocations in cancers. Non-B DNA structures, such as G-quadruplexes (G4) and RNA-DNA hybrids, have been implicated in AID-induced genomic instability. We asked whether DNA/RNA helicases suppress this instability by resolving non-B DNAs at AID target and off-target sites. Using siRNA knockdown (KD) in the CH12F3-2A mouse B cell line, we screened several helicases and identified BRCA1 Interacting Protein 1 (BRIP1) as a novel regulator of CSR. Our studies suggest that BRIP1 DNA helicase suppresses AID-induced genomic instability by preventing the accumulation of non-B DNAs at AID target sites.

OP-51

Dietary manganese requirement of *Labeo catla* fingerling based on growth and tissue manganese concentration

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ABSTRACT

Manganese (Mn) is a trace mineral essential for growth, vertebral development and antioxidant metabolism in fish. Mn is found in high concentrations in bone, muscle, liver, kidney, and skin of the fish. Although Mn is absorbed by fish from water, it may be insufficient for the fish, hence diet borne Mn is the main source of uptake. The requirement for dietary Mn have been established for several finfish but not for Labeo catla fingerling. Therefore, a 12-week feeding trial was conducted in a continuous water flow-through system (1-1.5 L/min) to determine the optimum dietary Mn requirement of fingerling L. catla based on the growth and tissue Mn concentration. Seven purified isonitrogenous (350 g/kg crude protein) and isoenergetic (16.7 kJ/g gross energy) diets were prepared containing different concentrations of Mn (1.62, 5.73, 8.18, 11.19, 14.20, 17.18 and 20.21 mg/kg diet). These were fed to triplicate groups of fish (initial weight 3.21 ± 0.01g) to apparent satiation. The results showed that dietary Mn levels did not significantly affect feed intake of the fish. Weight gain, specific growth rate, feed efficiency, carcass and tissue Mn concentration increased significantly ($P<0.05$) with increased dietary Mn up to 11.19 mg/kg diet and then stabilized. Broken-line analysis of absolute weight gain, specific growth rate, feed conversion ratio and tissue manganese concentration exhibited the dietary manganese requirement of fingerling L. catla to be in the range of 11-12 mg/kg diet.

OP-52

Effect of Dietary Protein-to-Energy Ratios on Growth, Nutrient Retention, and Somatic Indices of Silver Carp Hypophthalmichthys molitrix fingerling

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ABSTRACT

Aquaculture plays a critical role in global food security by providing high-quality protein. Feed constitutes 60-70% of operational costs in intensive aquaculture, with protein being its most expensive yet essential component. As the demand for fish continues to rise due to increasing population, optimizing aquaculture practices has become essential. The appropriate protein: energy (P: E) ratio can maximize protein retention and minimize the use of protein as an energy source, as inadequate energy levels can lead fish to metabolize protein for energy. This study highlights the significance of an optimal P:E ratio in dietary formulations to enhance growth rate, feed efficiency and nutritional quality of fish. An 8-week feeding trial was conducted to determine optimum dietary P:E ratio for silver carp, Hypophthalmichthys molitrix, fingerlings (1.84 ± 0.20 g; 5.0 ± 0.30 cm). Nine experimental diets in a 3×3 factorial design were formulated to contain three levels of crude protein (250, 300, and 350 g/kg) and three levels of gross energy (3.46, 3.88 and 4.30 kcal/g) to provide different dietary P:E ratios (72.2, 86.7, 101.1, 64.4, 77.2, 90.2, 58.1, 69.7 and 81.39 mg/kcal). Feed was fed to triplicate groups of fish at 09:00 and 16:00h until apparent satiation. The P:E ratio of 90.2 mg/kcal was found to maximize body weight, specific growth rate, feed conversion ratio, protein retention efficiency, energy retention efficiency, and somatic indices. Inclusion of dietary crude protein and energy in the ratio of 90.2 mg/kcal was found to be optimal to formulate nutritionally-balanced and cost effective feeds for H. molitrix.

Poster Presentations

PP-1

Gene Editing of Atoh1 in Cadaver derived supporting cells for the Regeneration of auditory cells via CRISPR/Cas9 and Adenovirus System

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ABSTRACT

Atoh1 is a key regulator of cell fate determination and differentiation within the inner ear. Based on existing data, the fundamental basic helix-loop-helix transcription factor Atoh1 is both necessary and sufficient for hair cell differentiation. It is also the first transcription factor identified in hair cells during development. Keeping in view the role of Atoh1 in hair cell regeneration. we need optimal expression of Atoh1 in supporting cells. So we hypothesized that CRISPR/Cas9 mediated Atoh1 knock-in via adenovirus will regenerate hair cells from cadaver derived inner ear supporting cells. This work is highly novel as no previous study has precisely targeted and controlled Atoh1 expression. Our methodology involves genome editing with the help of gRNA and Cas9. We have generated donor vectors with ATOH1 and cloned left and right homologous arms for the respective safe harbor locus. A total of 12 vectors, including GFP for control, were created to facilitate homologous recombination for gene integration. For the CRISPR vector, we designed and cloned the gRNA and Cas9, and verified the cutting site. All vectors were confirmed by sequencing. We are in the process of preparing the adenovirus to knock in Atoh1 to the genome, which will reveal the regenerative potential of cochlear supporting cells into hair cells. This approach could pave the way for novel gene therapy treatments for auditory loss, addressing a critical unmet medical need. This study will also define the exact target where the Atoh1 gene needs to be delivered in the human ear for gene therapy.

PP-2

Structural and biological evaluation of Manganese(II) and Copper(II) complexes with 2, 5 -pyridine dicarboxylate ligands: Experimental and theoretical insights into antibacterial potential and Antibiofilm property

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ABSTRACT

Two novel metal coordination complexes, [Mn(HPDC)2(H2O)2] (YS-Mn) and [Cu(HPDC)2][NH(CH3)2]2 (YS-Cu), were synthesized using 2,5-pyridinedicarboxylic acid as the ligand. These complexes were characterized by advanced analytical techniques, including single-crystal X-ray diffraction, which revealed monoclinic (C2/c) and triclinic (P-1) systems for YS-Mn and YS-Cu, respectively. Biological evaluations highlighted the Mn(II) complex's superior antibacterial activity, with minimum inhibitory concentrations (MIC) as low as 128 μg/mL against Staphylococcus aureus 3160. The YS-Mn complex also demonstrated potent biofilm inhibition at sub-MIC concentrations. Molecular docking studies confirmed the interaction of YS-Mn with MetAPs in Escherichia coli, suggesting disruption of bacterial protein and DNA synthesis as the mechanism of action. This study underscores the potential of Mn(II) and Cu(II) complexes, particularly Mn(II), as promising therapeutic agents against drug-resistant pathogens. Further optimization and in-depth studies are essential for clinical translation.

PP-3

Impact of additives on economic parameters of eri silkworm, *Philosamia ricini* Donovan reared on castor

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ABSTRACT

An attempt was made to study economic parameters of eri silkworm in the laboratory of department of Zoology Gandhi Faiz-e-Aam College, Shahjahanpur. To start the experiment, the eggs of eri silkworm, Philosamia ricini collected from Eri Silk worm Seed Production Centre (ESSPC) Kokrajhar, Assam. The eggs were incubated and standard tray rearing method was practiced. For treatment of different additives 10 gram flour of soyabeen (Glycine max), masoor or lentil (Lens culinaris) were mixed with one kg leaves of castor (Ricinus communis). Experiments were conducted from third moulting to harvesting. Impact of feed additives on eri silkworm, Philosamia ricini and their effects on economic parameters were observed on rearing performances. The overall findings concluded that soyabeen feed additive showed better performance than masoor and control with respect to all parameters such as larval duration, weight of full grown larvae, weight of larva, single cocoon weight, shell weight, shell ratio, pupal period, pupation rate, leaf silk conversion rate and fecundity in number. Therefore, farmers of Uttar Pradesh specially district Shahjahanpur are advice to use soyabeen feed additive with castor leaves to increase the productivity of eri silkworm.

PP-4

Impact of feed additives on economic parameters of Mulberry silkworm *Bombyx mori L.*

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ABSTRACT

Before taking observations, supplying food additives of black gram *(Cicer arietinum),* mung *(Vigna radiata)* along with mulberry leaves were provided to the larvae of silkworm Bombyx mori. When the developmental of cocoon completed, different economic parameters i.e., larval duration, pupal duration, larval weight, single cocoon weight and number of fecundity of mulberry silkworm (Bombyx mori) were observed in the laboratory. The minimum larval duration of mulberry silkworm was recorded on control mulberry leaves (21.00 days) followed by black gram (Cicer arietinum) additive (21.10 days) and mung (Vigna radiata) additive (21.12 days) respectively. The pupal period was recorded minimum of 9.40 days on mulberry and mung. In addition, the maximum larval weight and single cocoon weight were recorded on black gram (Cicer arietinum) additive (3.92 gm and 1.850 gm). The number of egg laying was recorded highest on black gram additives (320 eggs) which followed by control i.e., mulberry only (313 eggs) and minimum on mung additive (313). The findings can concluded that all the additive feeds were suitable for the development of silkworm with an enhancement of economic parameters.

PP-5

Beneficial effects of ferulic acid in streptozotocin-induced diabetic neuropathy in male Wistar rats

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ABSTRACT

The available medications for diabetes mellitus (DM) are not sufficient to reverse the pathophysiological abnormalities and complications associated with the disease. The plant products are a remarkable source of natural medicines used in ameliorating various diseases, including diabetes. The antioxidants have a variety of distinct mechanisms of action through which they exert their biochemical effects and improve diabetic nerve dysfunction. Diabetic neuropathy (DN) was induced by high-fat diet-streptozotocin (HFD-STZ) treatment in male Wistar rats and validated by various behavioural and biochemical parameters including serum biochemistry, oxidative stress, inflammatory cytokines, and neuro-specific markers. In this study, ferulic acid (FA), a herbal compound, was used to ameliorate the complications of DN using different methods such as enzyme linked immunosorbent assay (ELISA), histopathology and transmission electron microscopic (TEM) analysis. In the present investigation, FA improved glycemic control, suppressed oxidative stress, and reduced neuro-inflammatory markers in diabetic rats. In diabetic rats, FA lowered neuro-inflammatory markers, inhibited oxidative stress, and enhanced glycemic control. The protective effects of FA could be due to its potent antioxidant ability leading to amelioration of DN. Hence, FA could be a possible candidate as a therapeutic agent in ameliorating diabetes and its complications for the successful treatment of painful neuropathy.

PP-6

Genotoxic and Cytotoxic Consequences of Silver Nanoparticle Exposure: Insights from a Wistar Rat Model

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ABSTRACT

Silver nanoparticles (AgNPs) have become indispensable in numerous fields, including medicine, electronics, and consumer products, owing to their unique properties. However, their widespread use has raised significant concerns regarding potential adverse effects on human health and the environment. This study aims to investigate the genotoxic and cytotoxic effects of AgNPs in Wistar rats, employing an integrative assessment strategy to provide a detailed toxicological profile. Wistar rats were administered AgNPs at varying doses through intraperitoneal route. Genotoxicity was assessed using chromosomal aberration (CA) and micronucleus (MN) assays in bone marrow, and the comet assay in peripheral blood to detect DNA strand breaks. Cytotoxicity and tissue damage were evaluated through biochemical analyses, measuring oxidative stress markers such as lipid peroxidation (MDA), reduced glutathione (GSH), and activities of superoxide dismutase (SOD) and catalase (CAT). Additionally, histopathological examinations of the liver and kidney were performed to identify morphological alterations. The results demonstrated a dose-dependent increase in chromosomal aberrations, micronucleus frequency, and comet tail length, indicating significant genotoxic effects. Biochemical analyses revealed elevated oxidative stress, with increased MDA levels and decreased antioxidant enzyme activities in treated groups. Histopathological evaluations showed liver and kidney damage, including hepatocellular necrosis, inflammation, and renal tubular degeneration. These findings highlight the genotoxic and cytotoxic risks associated with AgNP exposure, driven by oxidative stress and direct cellular damage. This comprehensive toxicological evaluation underscores the need for stringent regulatory measures and further studies on nanoparticle safety to mitigate potential health risks.

PP-7

Nematodes associations with gastropods

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ABSTRACT

Nematodes and gastropods have wide variety of associations ranging from parasitism to mutualism. These associations fall into a number of categories, which represent the ways in which nematodes have evolved to take advantage of gastropods as carriers or hosts. Because of the amazing ecological flexibility of nematodes their ability to move across freshwater, marine, and terrestrial habitats may have an impact on their association with gastropods. Not all associations are harmful; some have positive effects on ecosystems, like regulating pest population e.g., nematodes like Phasmarhabditis hermaphrodita, have evolved to become parasites of gastropods that serve as definitive host. They are commercially used to control slugs and snails. Some nematodes engage in endophoresis, where they inhabit the internal parts of host's body without causing direct harm. Necromeny involves the association which may stay till the death of host gastropods. Finally, the bacteria decomposing the dead or decaying host serve as food for the nematodes. Certain nematodes, belonging to Metastrongyloidea group, use gastropods as intermediate hosts, showcasing a complex life cycle that may involve multiple host species. According to phylogenetic analyses, several nematode lineages have evolved independently during their relationship with gastropods, suggesting an evolutionary trend towards parasitism. The present study aims to find out additional information on nematode gastropod interactions for ecological conservation and pest control, as well as for understanding the complex and varied relationships that exist between nematodes and gastropods in different ecological niches.

PP-8

Significance of egg- parasitoids (Trichogrammatidae, Mymaridae, Encyrtidae: Hymenoptera : Chalcidoidea) in biological control of agricultural and Horticultural pests

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ABSTRACT

Biological control of insect pests is a viable alternative to insecticides used in agricultural and Horticultural fields as insecticides cause many problems on the environment and human health (Holt and Hochberg, 1997). Biological control is an environment friendly and effective means of reducing the population of both agricultural and horticultural pest. The family Trichogrammatidae, Mymaridae, and Encyrtidae comprises very minute insects, usually 1.1 to 2.4 mm in length. The trichogrammatids can be easily recognised by having three-segmented tarsi and antenna with funicle not more than two segments. The mymarids can be recognized by having head with a transverse and membranous suture below anterior ocellus and Encyrtids can be recognized by having linea calva in their forewing and mid tibial spur robust. Trichogrammatids, mymarids, and encyrtids are utilized as biological control agents against different insect pests of crops, orchards, vegetables, forest trees, and fruits etc. Trichogrammatids, mymarids, and encyrtids are known to parasitize the eggs of several insects belonging to orders Coleoptera, Diptera, Hemiptera, Lepidoptera, Psocoptera, and Thysanoptera. An extensive survey from different districts of UP India was done from May 2024 to November 2024, and it is found that several species under different genera of the family Trichogrammatidae, Mymaridae and Encyrtidae (Hymenoptera: Chalcidoidea) such as Trichogramma, Anaphes, Polynema, Oligosita, Anagyrus, Leptomastix etc. were identified and their identification were made by using key to subfamilies, key to tribes, and key to genera and species (Doutt & Viggiani 1968; Yousuf & Shafee 1988).

PP-9

Thyrotoxicity assessment of fourth-generation insecticide flupyradifurone in a freshwater teleost, Channa punctatus

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ABSTRACT

The fourth generation pesticides are considered as safe to non-target species, especially to the aquatic non-targets. However several recent studies have raised concerns about their potential for interaction with endocrine systems of animals. In this study, we examined the thyroid disruptive potential of a fourth generation butanolide insecticide flupyradifurone (FDF) in a freshwater teleost, Channa punctatus. Mature Channa punctatus (150±5.0 gm) were locally captured from an unexposed pond and randomly divided into control, low-dose (0.1% v/v), medium-dose (0.25% v/v), and high-dose (0.5% v/v) groups (n=6/group). Exposure was given through water for 24 and 48 hours and studied for morphometric alterations and pathological modifications in the thyroid gland using eosin-hematoxylin staining and ImageJ. A significant ($P<0.05$) reduction in body weight, scales, and fin length was observed in insecticide-exposed fish. Discoloration, shedding of scales, fin erosion, and abnormal opercular movement were prevalent externally. Eosin-hematoxylin staining revealed necrotic lesions in follicles and damage to colloid filled lumens. Morphometric analyses suggested hyperplasia in follicular cuboidal and/or columnar epithelial cells having necrotic and fragmented nuclei suggesting their susceptibility to FDF. Disruptive effects were more prominent in a dose- and time-dependent manner. Histomorphometric examinations in Channa punctatus reveal the thyroid disruptive potential of FDF that could lead to impaired synthesis and release of thyroxine (T4) and triiodothyronine (T3). The thyroid gland plays a critical role in animals to regulate the metabolic /physiological functions. Morphological and/or physiological alterations in thyroid gland may result in its disrupted performance highlighting its sensitivity to environmental exposures to fourth generation pesticides.

PP-10

Morphometric and Allometric Relationships of Pethia ticto from the River Ganga: Insights into Growth Dynamics and Ecological Assessment

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ABSTRACT

Pethia ticto is a small indigenous fish species abundant in South Asian countries, recognized for its ability to adapt to a wide range of freshwater habitats. It's vivid colours and calm disposition have also made it popular in the aquarium trade. This study investigates the length-length (LL), length-weight (LW) relationships, and condition factor (K) of Pethia ticto. A total of 183 specimens were collected from different sampling stations along the upper, middle, and lower stretches of the River Ganga from September 2022 to December 2023, covering a wide size range. Standard length (SL), total length (TL), and body weight (W) were measured for each individual to establish LL and LW relationships. The lowest R^2 values for the LL and LW relationships were 0.330, 0.452, and 0.538 for specimens from Kanpur, Bhagalpur, and Varanasi, respectively, while the highest value, 0.823, was recorded at Narora. The b-values were 2.742, 1.612, 1.072, and 1.885 across the selected sampling sites, reflecting varied growth patterns. Condition factor (K) values were 1.420, 1.883, 2.026, and 1.595, providing insights into the well-being of the populations. These findings offer crucial baseline data for the biological and ecological management of Pethia ticto, shedding light on the species growth dynamics and overall condition in natural habitats.

PP-11

Investigating Calcite Dominance in *Channa punctata* Otoliths: A Confocal Micro-Raman Spectroscopic Study

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ABSTRACT

The biocalcareous otoliths, found in fish are situated in the internal ear and are immersed in the endolymph. These structures hold a plethora of information about the fish life and its environmental history. The process of biomineralization of otoliths involves the deposition of minerals onto an organic matrix, a process that is closely linked to the fish metabolic activities. The otolith crystalline structure is due to the presence of CaCO3 polymorphs, primarily aragonite with traces of calcite and vaterite. In the present study, confocal micro-Raman spectroscopy is employed to investigate the crystalline polymorphs of otolith in selected freshwater fish (Channa punctata) of the Ganga River. Raman signals showed the strong calcite band intensities of v1 stretching mode at 1087 cm-1 and weak signals of lattice mode at 154.9 cm-1, aragonite band intensities of v4 vibrational mode at 707 cm-1 and lattice mode at 208 cm-1. The vaterite band intensities of lattice mode was also recorded. Therefore, it was concluded that the calcite is the predominant polymorph in the selected fish species. The replacement of calcium by barium was mapped as whiterite (BaCO3) in C. punctata. The novel Raman signals were also recorded in the selected fish species. The findings can help to understand the biological processes involved in otolith formation and growth. Further detailed research is warranted to decipher the ecological factors that could have led to the relative abundance of calcite polymorphs in the target fish species.

PP-12

Epidemiology and Disease Patterns of Childhood Ocular Morbidities In North India: A Hospital Based Study

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ABSTRACT

Eye diseases in children represent a significant public health concern, especially in regions like North India, where access to healthcare is limited. This study was conducted to determine the patterns and prevalence of various ocular diseases among children aged 18 years or younger attending an eye hospital in relation to demographic factors. A hospital based cross-sectional study was conducted in Gandhi Eye Hospital, Aligarh, from March, 2024 to November, 2024. A total of 678 children aged 18 years and below with ocular disorders presenting for the first time and those children with a settled diagnosis coming for a follow-up visit were enrolled in this study. The information regarding name, age, gender, residential address and diagnosis were recorded and analyzed. Eye disorders were classified into various categories. Ratios, percentages, and chi-square associations were applied to test the statistical significance. $P<0.05$ was considered statistically significant. Prevalence of ocular morbidities was 59.1% for males and 40.9% for females. Refractive errors were the most common ocular disorders seen (21.2%), followed by ocular motility imbalances (11.8%), conjunctivitis (11%), congenital nasolacrimal duct obstruction (8.8%), and childhood cataract (8%). The study reveals that refractive errors, ocular motility imbalances and conjunctivitis were the most commonly occurring disorders. Since the majority of the causes were either treatable or preventable, therefore child healthcare programs should be intensified and collaborative efforts should be made in order to significantly reduce the burden of childhood eye diseases, prevent avoidable blindness, and improve the quality of life for children across North India.

PP-13

Dynamics of cellulosic activity in industrial wastes by using biological delignification and analysed parameter with physical and chemical pre-treatments of the substrate

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ABSTRACT

Present study was aimed to evaluate the factor affecting cellulosic bio-conversion of the wastes (Sugarcane, paper pulp, vegetable waste and wood chip). Lignocellulose as agriculture and industrial residual account for the majority of the total biomass present in city. To initiate the production of industrially important products from cellulosic biomass bioconversion of the cellulosic component into fermentable sugar is necessary. P. sajorcaju have the ability to degrade the cellulosic biomass to glucose monomers. Compost was prepared from filter collected from Satha sugar mill, vegetable wastes to Dhanipur Mandi, paper wastes and wood chip are collected from local market, Aligarh. Before composting the residue was pretreated with physical treatment, chemical tratement and biological delignification. Sugarcane trash, when pretreated with alkali and inoculated with P. sajorcaju, showed the highest biomass production of (4000±100) and cellulase activity of (10.98±3.71). This was followed by wood chips, which, after acid pretreatment, resulted in a biomass of P. sajorcaju of (3680±100) and cellulase activity of (8.34±2.80). The study demonstrates that P. sajorcaju effectively degrades lignocellulosic biomass into fermentable sugars, with alkali pre-treatment (4%NaOH) yielding the highest biomass and cellulase activity in sugarcane. Physical and chemical pretreatments significantly influence bioconversion efficiency, with the highest cellulase activity observed in alkali-treated sugarcane, followed by wood chips in acid pre-treatment. These findings highlight the potential for optimizing pretreatment methods to enhance the production of valuable bioproducts from cellulosic waste.

PP-14

Toxicity assessment of a commercial pesticide Dimethoate on freshwater zooplankton *Daphnia magna*

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ABSTRACT

Pesticides are used to safeguard crops by promoting increased agricultural output to meet population growth but they also pose a risk to the environment. Pesticides are not primarily applied to aquatic environments, but they do have an impact on aquatic organisms when they leach into waterways through agricultural runoff. The class of insecticides known as organophosphates, which are used in developing nations like India, have anticholinesterase properties and pose a serious risk to the health of non-targeted aquatic organisms like fishes and plankton. The most widely used model organism for evaluating the toxicity of a variety of pesticides and environmental contaminants is Daphnia magna due to its proven sensitivity to a toxicity test. Here, we have attempted to observe the short-term and immediate impacts of exposure to organophosphate dimethoate on Daphnia magna. A commercial formulation of the pesticide dimethoate 30% EC was used for the experimentation. The pesticide formulation was a mixture of adjuvant 65% w/w and active ingredient 35% w/w. Four tests to check toxicity of the chemical was performed which included Acute toxicity test, Immobilization test, Feeding behaviour and Rhythmic activity test. With the help of acute toxicity test the LC 50 for 48 hours was calculated as 0.69 mg/l. Immobilization test resulted in evaluating the EC50 value which was found to be 0.431 mg/l. On increasing concentration of the pesticide above the LC 50 value the feeding and rhythmic activity of Daphnia were also affected and showed a decreasing trend. The study suggests that the steady introduction of dimethoate through drainage, surface runoff, or effluents may negatively affect zooplankton physiology, lowering Cladocera population density and indirectly harming organisms that rely on Daphnia for sustenance, therefore impairing energy transfer of the aquatic ecosystem.

PP-15

Rotenone-induced neurotoxicity in *Drosophila melanogaster* and its modulation by hesperidin

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ABSTRACT

Neurotoxicity refers to the damage to the nervous system caused by exposure to natural or artificial toxic substances. They can harm the brain and peripheral nervous system, leading to a variety of neurological disorders. Neurodegenerative diseases are a group of disorders, characterized by the progressive degeneration of the structure and function of the nervous system. These conditions commonly lead to the decline in cognitive, motor, or sensory abilities, often progressing to disability. Rotenone, a natural compound derived from the roots and stems of certain plants, is known to cause neurotoxicity by inhibiting mitochondrial complex-I and triggering the generation of reactive oxygen species (ROS). Recently, natural plant-derived compounds have gained attention in reducing the neurotoxicity. In the present study hesperidin at the final concentration of 25, 50, 75 and 100 μM was mixed in the diet along with the 500 μM of rotenone and Drosophila melanogaster were allowed to feed on it for about 7 days. After the exposure of 7 days the flies were subjected to climbing assay, oxidative stress markers, MAO (Mono Amino oxidase), Caspase3 & 9, locomotor activity and immunohistochemistry. The exposure of flies showed a dose dependent decrease in the activity of GST, SOD, CAT, MAO, caspase-3 and 9 and reduced LPO. The results suggest that Hesperidin is potent in reducing the toxicity induced by rotenone in *Drosophila melanogaster.*

PP-16

Nickel chloride-induced cyto- and geno-toxicity in rat kidney: a biochemical and histological study

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ABSTRACT

Nickel (Ni) is a heavy metal that is a component of several enzymes and other proteins and is regarded as an essential element in microorganisms, plants, and animals. However, Ni is also thought to be dangerous to humans because of its carcinogenicity and toxic effects on several tissues and organs. As a result of its widespread use and potential adverse effects, concerns have been raised about human health effects upon exposure to Ni compounds. This study evaluated the effect of a single acute oral dose of nickel chloride (NiCl2) (45, 90, 135 and 180 mg/kg body weight) on the kidney of male Wistar rats. NiCl2 treatment diminished the content of reduced glutathione and total sulfhydryl groups but increased lipid and protein oxidation and also hydrogen peroxide levels. The specific activities of all major antioxidant enzymes were greatly inhibited. Lowered free radical quenching and metal-reducing ability were seen due to reduction in antioxidant power of the kidney. Oral NiCl2 administration inhibited marker enzymes of cortical brush border membrane. Diphenylamine and comet assays showed significantly increased DNA fragmentation while DNA-protein cross-linking in renal cortex and medulla of NiCl2 administered animals was also elevated, in comparison to the control group. Histopathological examination of NiCl2-treated rats showed abnormal morphology of renal corpuscles and tubules. All the changes were NiCl2 dose-dependent. These intestinal alterations could be due to significant impairment in the antioxidant defence process elicited by oxidative stress produced upon exposure to NiCl2 with more prominent changes at higher doses of the metal ion.

PP-17

Nanocarriers For Cancer Therapy

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ABSTRACT

The global burden of cancer has intensified in recent years, yet advances in treatment lead decrease in mortality rate. Cancer is a disease in which some of the body's cells grows uncontrollably and spread to other parts of the body. Nanocarrier are revolutionizing cancer treatment by providing targeted drug delivery and minimizing harm to healthy tissues. Nanocarrier including liposomes and inorganic nanoparticles are tiny particles designed to transport therapeutic agent to specific target sites within the body. The technique involves the use of nanocarriers, molecules, targeting agent, their fragments and other receptor ligands to selectively target cancer cells. The analysis emphasizes the impact of nanocarrier on human brain disorder. This article focuses on the surface modification of proteins, antibodies and glycoprotein to enhance their residence time, ability to cross the blood brain barrier and targeted drug delivery for treatment of brain disorder. According to recent research surface modified nanoparticles have shown higher cellular uptake, absorption and site-specific delivery in required conc. In conclusion, surface modification of nanoparticle is a promising strategy for improving the efficiency of targeted drug delivery in the brain.

PP-18

Green synthesis of metallic Nanoparticles and its Toxicity in vitro and in vivo in presence and absence of natural herbal antioxidants

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ABSTRACT

Green synthesis of metallic nanoparticles involves using environmentally friendly methods, often employing plant extracts, microorganisms, or other natural sources as reducing and stabilizing agents. This approach minimizes the use of hazardous chemicals, making it more sustainable. It's an area of research with applications in fields like medicine, catalysis, and electronics. The toxicity of biosynthesized nanoparticles depends on various factors such as the type of biological material used, the synthesis conditions, and the specific nanoparticle characteristics. The toxicity of biosynthesized nanoparticles can vary in vivo (Wistar rats Rattus norvegicus) and in vitro (microbes) models. Since there is a generation of oxidative stress by the nanoparticles, we also aim to determine its ameliorating effect with natural herbal antioxidants (Curcumin and Ricinoleic acid) against such toxicity. Ricinoleic acid derived from seeds of (Ricinus communis) is the main component of castor oil and exerts remarkable anti-inflammatory effects. Curcumin is a prominent constituent of turmeric and is known for its antioxidant and anti-inflammatory properties.

PP-19

Deciphering Drug Interactions in Helminth Parasites: In silico strategies for livestock health and food security.

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ABSTRACT

Helminth parasites significantly threaten livestock health, contributing to economic losses and global food insecurity. These infections compromise growth, fertility, and productivity in affected animals, challenging sustainable agriculture.The widespread emergence of drug resistance to existing anthelmintic drugs further increase this crisis, necessitating the discovery of effective alternatives. This study focuses on glutathione S-transferase (GST) of Fasciola spp. as a target to understand its potential involvement in drug resistance and its evaluatation as therapeutic target. In silico analyses were performed to understand the binding interactions of the current drug of choice, Triclabendazole (TCBZ), along with natural products and a novel metal complex. Results demonstrated that TCBZ exhibits superior binding affinity and interaction stability with the target protein, corroborating its status as the preferred therapeutic agent. While natural products and metal complex showed some promise but their interactions were less robust, indicating a need for their future exploration. These findings suggest that modifying the current drug of choice using advanced technologies, such as nanotechnology, structural optimization and drug delivery innovations, could enhance its effectiveness and might delay the onset of resistance. Furthermore, the study underscores the critical role of in silico methodologies in pre-screening and prioritizing compounds before progressing to in vitro and in vivo experiments, streamlining drug discovery processes. By integrating computational insights with modern drug optimization techniques, this research contributes to sustaining livestock health and global food security while paving the way for next-generation anthelmintic treatments.

PP-20

Effect of Tangeritin against Ethyl methanesulfonate induced toxicity in the third instar larvae of transgenic *Drosophila melanogaster (hsp70-lac Z Bg^9)*

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ABSTRACT

Tangeritin, is a polymethoxylated flavone naturally occurring in the peels of Mandarin oranges (Citrus reticulata). In this study we investigated the impact of tangeretin on Ethyl Methane Sulfonate (EMS)-induced toxicity in third instar larvae of transgenic Drosophila melanogaster (hsp70-lacZ) Bg9. The larvae were allowed to feed on a diet having 25µM of EMS alone and along with 20, 40, 60 and 80µM of Tangeretin for 24 hours. After 24 hours, the larvae underwent various analyses, including the ONPG assay, X-gal staining, trypan blue exclusion test, assessments of oxidative stress markers, Caspase-3 and Caspase-9 activity, and comet assay. The results obtained suggest that Tangeretin has a protective function against EMS induced toxicity.

PP-21

Optimum Dietary Protein-to-Energy Ratio on Growth, protein retention energy, energy retention efficiency, Somatic Indices, and Digestive Enzyme Activities of striped catfish *Pangasianodon hypophthalmus*

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ABSTRACT

Provision of diets with optimum protein-to-energy ratio is crucial for aquaculture production. It plays significant role to sustainable and efficient food production systems. Fish feed must contain adequate amount of energy that should come from non-protein sources in order to prevent the use of protein to generate energy and thus lower production costs. The dietary protein and energy components must be balanced optimally since too much or too little non-protein energy reduces protein and energy utilization and may also impair fish development. The present study was therefore conducted to evaluate the effects of different protein-to-energy (P/E) ratio on growth performance, nutrient retention and body composition of the striped catfish Pangasianodon hypophthalmus (2.63± 0.40 g; 9.56 ± 0.20 cm) by feeding nine experimental diets containing different dietary protein-to-energy ratio (D1-86.7, D2-77.2, D3-69.7, D4-101.1, D5-90.2, D6-81.39, D7-115.6, D8-103.09, and D9-93.02 mg protein/kcal GE). These diets contained three protein levels (300, 350, and 400 g/kg crude protein) and three energy levels (3.46, 3.88, and 4.30 kcal/g gross energy (GE). Six hundred and seventy-five healthy fish were randomly assigned to nine treatments in triplicate groups. The diets were hand-fed to the fish for 56-days until they appeared satiation twice a day. The groups fed diet 350 g/kg protein with 4.30 kcal/g GE with a P/E ratio of 81.39 (D6) mg/kcal energy resulted maximum live weight gain, feed conversion ratio, protein retention efficiency, energy retention efficiency, and somatic indices.

PP-22

Interaction of xanthoxylin with calf thymus DNA – deciphering the binding mode, genotoxicity and antioxidant activity

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ABSTRACT

Modulating gene expression via small molecules is one of the prime intents of nucleic acid molecular recognition. Deoxyribonucleic acid (DNA) is the pharmacological target for numerous medications used in clinical practice, primarily for cancer treatment. Understanding the interaction of ligands is crucial to ascertaining their mode of action and structural specificity. These studies yield information for developing therapeutics to control gene expression and provide structural guidelines in rational drug design. This study uses multi-spectroscopic and docking simulation methods to gain insight into the interaction of xanthoxylin with calf thymus DNA (Ct-DNA). Xanthoxylin is a phytochemical majorly found in Zanthoxylum species, and it was chosen based on in-silico screening from a virtual compound library. UV-vis spectroscopic studies confirmed the moderate binding affinity between xanthoxylin and Ct-DNA with a stoichiometry of 1:1. Fluorometric studies employing competitive displacement assays using fluorescent probes revealed groove binding mode. Moreover, circular dichroic studies and thermal melting analysis confirmed the groove binding of xanthoxylin. Thermodynamic parameters obtained for the xanthoxylin-Ct-DNA system suggest a spontaneous, enthalpically-driven and exothermic binding process involving primarily van der Waals forces and hydrogen bonds. Molecular docking studies partially corroborated the findings of the wet lab analysis. Further, a plasmid nicking assay confirmed the absence of genotoxicity for xanthoxylin. However, it showed a substantial antioxidant effect by considerably decreasing DNA lesions induced by the Fenton reaction.

PP-23

Anthelmintic efficacy of ethanolic extract of fenugreek (Trigonella foenum graecum) seeds on *Clinostomum complantum :* a progenetic metacercaria

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ABSTRACT

Helminth infections are widespread throughout the world, ranging from tropical and sub-tropical to temperate climates, affecting humans as well as livestock and causing huge economic losses worldwide. In order to combat the disease or reduce the infection, a number of pharmacological strategies are required. The present study focuses on evaluating anthelmintic efficacy of ethanolic extract of fenugreek seeds on *Clinostomum complanatum,* a digenetic trematode parasite that causes yellow grub disease in Trichogater fasciatus fish. The infection with *C. complanatum* poses a serious threat not only to fish health but also possess zoonotic potential in several raw fish eating regions. Antioxidant enzymes play a crucial role in detoxifying reactive oxygen species in helminths, thereby facilitating their survival. In this study, ethanolic extract of fenugreek seeds was prepared and tested against *C. complanatum* at different doses. Our findings showed a significant increase in the activity of the antioxidant enzyme glutathione-S-transferase in the parasites, leading to their eventual death. These findings suggest that the ethanolic extract of fenugreek seeds has potent anthelmintic properties against *C. complanatum,* and may provide a novel approach for controlling this parasitic disease.

PP-24

Slow conformational change in MutL is a rate-limiting step in DNA mismatch repair initiation

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ABSTRACT

DNA mismatch repair (MMR) corrects replication errors through the ordered assembly and activation of multiple MMR proteins in an ATP-dependent, tightly controlled manner. Mismatch recognition by MutS is followed by an ATP-induced conformational change that enables binding of MutL. ATP-binding by MutL is required to initiate the subsequent repair initiation. In contrast to the well-studied DNA and ATP induced conformational changes in MutS, little is known about the kinetics of the conformational transition in MutL. A hallmark of MutL is the nucleotide-driven transition between open/extended and closed/condensed conformations. To study the timing of individual events during the multistep mismatch repair initiation, we developed several FRET-based assays using labeled single-cysteine variants of Escherichia coli MutL and MutH. and quantitatively monitored MMR protein complex formation and associated conformational changes, and changes are correlated obtained parameters with mismatch-specific activation of the MutH endonuclease by MutS and MutL. Our results reveal that multiple loading of MutS sliding clamps increases incision efficiency and provide evidence for MutL closure being rate-limiting for MutH recruitment and activation.

PP-25

Evaluating the Health of Aquatic Ecosystems Using Indicator Species From Littoral Zone

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ABSTRACT

The littoral zone serves as an essential component of aquatic ecosystems, offering habitat diversity, supporting ecological functions, and contributing to the overall health of water bodies. Indicator species are vital for monitoring the health of aquatic ecosystems. Planktonic and benthic organisms respond quickly to changes in the environment and thus help in measuring the water quality and contamination. The present study aims to assess the health and quality of the selected aquatic ecosystems by identifying key indicators. The investigation involves analysis through various physico-chemical parameters such as air-water temperature, pH, alkalinity, dissolved oxygen, and carbon dioxide. For indicator species, the collection is done from the littoral zone using a plankton net of 60 µm mesh, a mud scrapper, followed by extraction (sieve size 500 µm and 200 µm). Species belonging to rotifers, ostracods, nematodes, and nymphs and larvae of the insects were sorted and identified using morphological keys given by Edmondson (1959), and the abundance of each species was recorded. The dominance of nematodes in benthic samples might be due to their sedentary habit and tolerance to stressful conditions. The dominance of the rotifer, Brachionus calyciflorus, was observed among plankton. Morphological features such as long posterior lateral spines and reduced body size help them withstand harsh circumstances, and thus they thrive successfully in contaminated environments, suggesting a high level of tolerance. In conclusion, the abundance of these species may indicate eutrophication and the extent of pollution in freshwater bodies.

PP-26

Protective effect of esculin and vanillin against CdCl2-induced oxidative damage, genotoxicity and histopathological alterations in rat intestine

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ABSTRACT

In this study, we investigated the potential role of dietary antioxidants, esculin and vanillin, in alleviating the harmful effects of CdCl2 on rat intestine. Experiments were carried out on adult male rats: Group 1 control; Group 2 esculin (100 mg/kg body weight for 10 days); Group 3 vanillin (100 mg/kg body weight for 10 days); Group 4 single oral dose of CdCl2 (90 mg/kg body weight);Group 5 and Group 6 were first administered with esculin/vanillin (100 mg/kg body weight) for 10 days followed by a single dose of CdCl2 (90 mg/kg body weight) on the 10th day. The rats were sacrificed after 24 h of the last treatment. The pre-treatment of both antioxidants significantly improved the activity of the brush border membrane enzymes along with attenuating CdCl2- induced oxidation of lipids, proteins and thiols. CdCl2 alone inhibited the activities of AO enzymes and decreased antioxidant power in intestine cells. The pre-treatment with both antioxidants significantly restored the activities of enzymatic AOs. Pre-treatment with esculin and vanillin effectively suppressed the overproduction of ROS in intestinal tissues, thereby protecting cellular components from oxidative damage. Prior administration of esculin/vanillin caused a statistically significant reduction in the CdCl2-induced DNA damage. Histopathological analysis showed significant improvement in the morphology and less tissue damage when rats were pre-treated with esculin/vanillin.

PP-27

Therapeutic Role of Promising Phytochemicals in Osteoporosis

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ABSTRACT

Osteoporosis is a growing global health concern, characterized by decreased bone density and increased fracture risk. Adverse side effects and toxicity limit the use of available anti-osteoporotic drugs viz selective estrogen receptor modulators, hormone replacement therapy, bisphosphonates, and calcitonin. Recent studies suggest that phytochemicals have osteogenic potential. Some promising phytochemicals like naringin, genistein, and piperine can modulate osteoblastic proliferation and apoptosis by increasing the expression of the runt-related transcription factor 2 gene. In vivo studies have shown increased bone mineral density and biochemical bone markers, alkaline phosphatase, osteocalcin, and osteoprotegerin in osteoporotic rats, indicating enhanced mineralization, active bone formation, and reduced bone resorption. Furthermore, some studies on animal models suggest increased bone volume, bone mineral content, trabecular thickness, bone quality, and reduced collagen-C telopeptide and soluble receptor activator of nuclear factor κB ligand, indicating a significant decrease in bone resorption. However, despite the positive results, further investigation is required to examine the effects of these phytochemicals at the clinical level.

PP-28

Computational identification of PDL1 inhibitors and their cytotoxic effects with silver and gold nanoparticles

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ABSTRACT

Immunotherapy is a promising treatment for cancer that aims to boost the immune system's response to cancer cells. This can be achieved by blocking Programmed cell death protein 1/Programmed death-ligand 1 (PD1/PDL1), which activates T cells. In this work, the aim was to find high-affinity drugs against PDL1 using computational tools and conjugate nanoparticles with them. The cytotoxic activity of the nanoparticle conjugated drugs was then tested. The screening of 100,000 drugs from the ZINC database and FDA-approved drugs was done computationally. The physicochemical properties and toxicity of the drugs were analyzed using SwissADME and ProTox-II, respectively. Silver nanoparticles and gold nanoparticles were synthesized using extracts of Catharanthus roseus flowers and Juglans regia shells, respectively. The characterization of AgNPs and AuNPs was performed using UV–Vis spectroscopy, X-ray diffraction, and Fourier transform infrared spectroscopy (FTIR). Their conjugation with the drugs Irinotecan, Imatinib, and Methotrexate was confirmed using UV–Vis, FTIR, and Dynamic light scattering. The top screened drugs were ZINC1098661 and 3 FDA-approved drugs (Irinotecan, Imatinib, and Methotrexate). Docking studies revealed that Irinotecan had the highest binding affinity towards PDL1 when conjugated with NPs. The Irinotecan-PDL1 complex was confirmed as the most stable through molecular dynamics simulations. The result of the methylthiazol tetrazolium assay showed that conjugated AgNPs and AuNPs with Irinotecan had a higher toxic effect on the A549 cancer cell line than AgNPs and AuNPs conjugated with Imatinib. This study provides a promising avenue for further investigation and development of nanoparticle-drug conjugates as a potential cancer immunotherapy strategy.

PP-29

Chenopodium album: A Versatile Plant of Nutritional and Ecological Significance

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ABSTRACT

Chenopodium album, commonly referred to as Bathua or lamb's quarters, is an annual herb having important medical, ecological, and nutritional benefits. This plant is frequently disregarded as a weed but has long been used as a nutrient-dense food source and medicinal remedy. This review delves into the multifaceted nature of C. album. We explore its nutritional value, including its high content of essential amino acids, Rich in vital vitamins (A, C, E and K), minerals (Iron, Calcium, and Magnesium), and dietary fiber, Bathua leaves support strong bones, a healthy immune system, and a healthy digestive system. Its nutritional profile is further improved by the protein-rich seeds. Additionally, we discuss its potential medicinal properties, such as its antioxidant, anti-inflammatory, and antimicrobial activities. Recent research has shown that lamb's quarters may also have anticancer properties. Studies have shown that the plant contains compounds that can help to prevent the growth of cancer cells. Beyond its use in food and medicine, Chenopodium album supports biodiversity, soil health, and the sustainability of ecosystems. It is a useful resource for enhancing agricultural resilience because of its growth patterns and adaptability. But because the plant contains oxalates, people with kidney problems should consume it sparingly, and some people may experience allergic reactions. Its agronomic promise is demonstrated by efforts to create high-yield cultivars like ICAR Pusa Bathua-1 and Kashia Bathua-2. The necessity to include this underappreciated plant into sustainable agricultural and nutritional practices while carefully managing the hazards involved is highlighted by the recognition of its many advantages.

PP-30

Impact of Chemoradiation on oral microbial species in patients of Head and Neck Carcinoma: A culture based study

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ABSTRACT

Chemoradiation disrupts the oral mucosal environment and induces shifts in the oral microbiota, increasing the abundance of pathogenic bacteria while reducing beneficial commensals. Characterizing these alterations in the oral microbiota can provide valuable insights into the effects of chemoradiation on the microbial community structure and its metabolic functions.

Details of participants: 30 Head and Neck Cancer patients undergoing concurrent chemoradiation were enrolled. Patients with serious co-morbidities were excluded from the study.

Methods: Our study aimed to evaluate the impact of concurrent chemoradiation on the oral microbiota of head and neck cancer patients, with a focus on microbial persistence at high radiation doses. Oral swab samples were collected at three time points: baseline (pre-treatment), mid-treatment, end of radiation therapy. Culture-based methods were employed to isolate and identify microbial species across these stages. The study investigated microbial dynamics in response to radiation doses of upto 70–80 Gy.

Results: Streptococcus and Staphylococcus species were consistently present throughout the treatment, demonstrating persistence even at high radiation doses. Candida species, Bacillus species and Escherichia coli were also identified in samples from certain patients, with variable frequency. The consistent presence of Streptococcus and Staphylococcus suggests their notable resilience to the cytotoxic effects of radiation.

Conclusion: This study highlights the resilience of specific microbial species under extreme radiation exposure, providing valuable insights into the interplay between microbiota and radiation therapy in head and neck cancer patients.

PP-31

Utilising road networks and the point count method to study bird diversity and composition across different habitat types in Chittaranjan, West Bengal, India.

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ABSTRACT

Urbanization profoundly alters biodiversity patterns, affecting avian communities and their ecological roles. However, heterogeneous urban landscapes can sustain notable species richness. Understanding the relationships between biodiversity and urbanization types is crucial for designing biodiverse urban spaces. Birds, as bio-indicators, provide critical insights into urban biodiversity. This study assessed bird diversity, abundance, and ecological guild structures in Chittaranjan, West Bengal, a suburban industrial township with diverse green habitat types. Surveys were conducted from February to May 2021 using the point count method. Total 84 bird species from 41 families and 18 orders were recorded. Bird species richness was highest in and around waterbodies, though evenness was low, with dominance by Dendrocygna javanica and Microcarbo niger. Openshrublands and tree-covered areas exhibited moderate evenness, while built-up areas supported the lowest species richness. The Shannon–Wiener Index revealed high bird diversity across open shrublands, followed by tree cover and built-up areas, with waterbodies exhibiting the lowest diversity. Insectivores dominated feeding guilds, followed by omnivores and carnivores/piscivores. Conservation status assessments identified one “Near Threatened” species Psittacula eupatria with decreasing population trend. Oriolus tenuirostris and Treron bicinctus were first recorded in this region, indicating a range extension. These results underscore the importance of diverse urban green spaces in sustaining bird populations and highlight wetlands as critical but vulnerable habitats. Findings contribute to developing sustainable urban planning strategies by creating and conserving diverse habitat types and structures for biodiversity conservation in rapidly urbanizing suburban regions. Future research should explore spatial and temporal patterns with anthropogenic influences to develop holistic management practices.

PP-32

Silica Nanoparticles: Unraveling Genotoxicity and the Protective Potential of Natural antioxidants

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ABSTRACT

Silica Nanoparticles are widely used in various biomedical, industrial, and environmental applications due to their unique physiochemical properties, such as high surface area, stability and biocompatibility. However, with the increasing utilization of these nanoparticle, concerns have arisen regarding their potential genotoxicity. This research investigates the genotoxic effect of Silica Nanoparticles (SiNPs) and evaluate the ameliorative potential of natural antioxidants. We first characterized the (SiNPs) using techniques such as Scanning electron microscopy (SEM) and X-ray diffraction (XRD) to determine their size and morphology. Subsequently, we assessed genotoxicity through chromosomal aberration analysis (CA), Micronucleus test (MNT), and Comet assays (CA), revealing a significant increase in DNA damage and chromosomal instability upon exposure to (SiNPs). Biochemical assays indicated elevated oxidative stress markers, while liver and kidney function tests highlighted potential organ toxicity. Importantly, the administration of natural antioxidant demonstrated a protective effect, significantly reducing the frequency of chromosomal aberrations and DNA damage, and restoring biochemical markers to near-normal levels. Our findings underscore the dual impact of Silica nanoparticles on genetic integrity and organ health, while emphasizing the potential of Natural antioxidants as a therapeutic strategy to mitigate these harmful effects. This study contributes valuable insights into the safety and risk assessment of nanomaterials in biological system.

PP-33

Precision Antibacterial Delivery: Nanoparticle-Based Strategies for Targeting Infections in Tumor Microenvironments

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ABSTRACT

Infections within the tumor microenvironment complicate cancer therapy by promoting tumor progression, inducing therapy resistance, and exacerbating inflammation. Microbial infections exploit the unique conditions of tumor microenvironment, such as hypoxia and acidity, to evade immune responses and support tumor growth. Traditional antibiotics, including aminoglycosides or beta-lactams, are often ineffective in tumor microenvironment due to limited penetration, rapid systemic clearance, and instability in acidic conditions, necessitating advanced delivery mechanisms. Nanoparticle-based systems provide a promising solution for precise infection control in Tumor microenvironment. Polymeric nanoparticles like poly(lactic-co-glycolic acid) (PLGA) and chitosan enable precise antibiotic encapsulation and sustained release. Lipidbased systems, such as liposomes and solid lipid nanoparticles, improve biocompatibility and antibiotic retention at target sites. Metallic nanoparticles, including silver nanoparticles and gold nanoclusters, offer intrinsic antimicrobial properties and can be functionalized with ligands like folic acid and transferrin for selective targeting of tumor-associated bacteria or cells. These systems protect antibiotics from degradation and utilize stimuli-responsive mechanisms, such as pH sensitivity or enzymatic triggers like matrix metalloproteinases and cathepsins, for site-specific delivery. Preclinical studies, including gold nanoparticles conjugated with antibiotics and lipid nanoparticles loaded with vancomycin, show significant efficacy in controlling infections and enhancing cancer therapy. However, concerns about safety and biocompatibility, such as off-target toxicity and potential disruption of healthy microbiota, require further investigation. This study underscores the transformative potential of nanoparticle-based approaches in simultaneously controlling infections and improving cancer therapy outcomes, paving the way for integrated, targeted therapeutic strategies.

PP-34

Taxonomic studies of some genera of the family Eulophidae (Hymenoptera: Chalcidoidea)

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ABSTRACT

Eulophidae (Hymenoptera: Chalcidoidea) is one of the largest and diverse family of the Chalcidoidea, and an ecologically significant group of parasitoid wasps. The majority genera of the family are cosmopolitan in distribution and occur in almost, all terrestrial ecosystems measuring about 0.5-3 mm in length and tarsi in both sexes 4-segmented and in antenna generally upto 4 funicular segments, typically have slender bodies with a metallic shine, displaying metallic colors . The family Eulophidae is currently represented by 324 genera and about 5300 described species and probably hundreds of others to be described genera wolrd-wide (Noyes, 2019; Rasplus et al., 2020). The Family Eulophidae is divided into four subfamilies - Eulophinae, Entiinae, Tetrastichinae and Entedoninae. The species belonging to the family Eulophidae are mostly endoparasitoids or ectoparasitoids. It is widely used in biological control programmes against major pests throughout the world (Noyes and Hayat, 1994; Heraty, 2009; Cruaud et al., 2004). Notable examples are Chrysocharis laricinellae and species of Euplectrus Westwood and Stenomesius Westwood are widely used in biological control. Despite their ecological importance, the taxonomy of many genera within Eulophidae remains underexplored and highlights the need for further taxonomic studies The findings contribute to a better understanding of biocontrol potential, aiding integrated pest management programs.

PP-35

Effect of *Eichhornia crassipes* root powder on the toxic effects induced by lead nitrate on *Hydra vulgaris*

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ABSTRACT

The present study investigated the effect of Eichhornia crassipes root powder against lead nitrate induced toxicity on Hydra vulgaris. Lead induce toxicity in organisms mainly through oxidative stress which ultimately leads to the death of organisms at higher doses.

Methodology

1. Culture of Hydra
2. Preparation of Eichhornia crassipes Root powder
3. Toxicity testing
4. Regeneration Assay
5. Analysis of oxidative stress markers

Hydra was subjected to a fixed concentration of lead nitrate at 0.1µM and root powder was added to the Hydra medium at the concentrations of 4×10-4 g/ml; 6×10-4 g/ml; 8×10-4 g/ml and 10×10-4 g/ml.

Results

Lead nitrate toxicity induced gross morphological changes in Hydra morphology including clubbing of tentacles, shortening of body and ultimately disintegration of Hydra. The results showed the increase in the rate of survival and regeneration in Hydra when root powder was added in a dose dependent manner.

Conclusion

The Eichhornia root powder was found to have a protective effect against lead nitrate induced toxicity in Hydra vulgaris. Thus, using Eichhornia root powder can be an eco-friendly method used to remove heavy metals from water which will in turn help the aquatic organisms to survive there.

PP-36

Economic potential of beekeepers at district Shahjahanpur, Uttar Pradesh

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ABSTRACT

The economic potential of honey production for rural development in India is undeniable. By leveraging sustainable practices, addressing challenges, and capitalizing on market opportunities, India can harness the full potential of its 'land of honey'. In order to know economic potential of beekeepers, primary data of investment and income was collected from 20 beekeepers with the help of questionnaire and Spearmans Rank Correlation method was applied in the observations. The observations showed that there exists almost high degree of positive correlation can go up (+ 0.71) between investment and income. This value of correlation can go up further provided the suggestions made in work are being adapted. Therefore we conclude that alternative hypothesis is accepted i.e., there exist a high degree of positive correlation between investment and income. Moreover, encourage women for beekeeping for providing them economic independence, particularly in rural areas, and it also provide opportunity to earn a sustainable income which promote local economies of the rural and sub rural areas.

PP-37

Impact of abiotic factors on the population dynamics of mustard aphid, Lipaphis erysimi (Kalt.) on Indian mustard, Brassica juncea

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ABSTRACT

An experiment was conducted to study the impact of abiotic factors on population dynamics mustard aphid, Lipaphis erysimi on Indian mustard, Brassica juncea. The correlation and regression analysis of mustard aphid showed that the abiotic factors i.e. temperature (maximum and minimum) and sunlight during day time effect the population of mustard aphid. The maximum temperature reduced the population of 35.00%, minimum temperature up to 5.00% and sunshine 4.80 %, respectively. On the other hands, maximum and minimum relative humidity and evaporation also play important role in developing population of aphids on Indian mustard. The enhancement in the population of mustard aphid was observed up to 10-35 % through relative humidity and 1.75 % through evaporation, respectively. Other factors, such as wind velocity and rainfall also play insignificant role on the population dynamics of mustard aphids. Therefore, the foggy and cold weather favor the development of mustard aphids as compare to sunshine day.

PP-38

Life table studies of eri silkworm, *Philosamia ricini* (Lepidoptera: Saturniidae) on castor

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ABSTRACT
Two life tables i.e., age specific and stage specific life table of eri silkworm were constructed on the castor, Ricinus communis at the room temperature in the laboratory conditions. The age specific life table shows continuous decreasing pattern of survivorship and life expectancy of eri silkworm was recorded which depends on the morality of eri silkworm. A sharp decline in survivorship during later stage were also recorded which coincided with the death of adults. The stage specific life table is a documentation of data on the mortality and survival of eri silkworm at different stages. The apparent mortality was recorded maximum at fifth instar. However, maximum survival fraction was recorded maximum at third instar stage. Similarly, maximum mortality survival ratio was recorded at fifth instar stage, and lowest at third instar stage on castor. The indispensable mortality of eri silkworm showed similar pattern as recorded with respect to apparent mortality with maximum at fifth instar. The k-value of eri silkworm showed maximum value at fifth instar followed by pupa, egg, prepupa and fourth instar, at first and second instar, respectively.

PP-39

Insect pest status of vegetable crops at district Shahjahanpur, Uttar Pradesh

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ABSTRACT
A survey was conducted in the farmer's field at three different places (Kurriya Kalan, Bareilly Mod and Paina Buzurg) of district Shahjahanpur, Uttar Pradesh. The study was conducted on the insect pest status on different vegetable crops viz., field pea, cauliflower, cabbage and brinjal. The findings showed that pod borer, Etiella zincknella and pea aphid, Acyrthosiphon pisum was cause damage on pea; cabbage butterfly, Pieris brassicae; diamond back moth, Plutella xylostella; and cabbage aphids, Brevicoryne brassicae was observed on cabbage; and further diamondback moth, Plutella xylostella; cabbage butterfly, Pieris brassicae and semilooper, Thysanoplusia orichalcea observed as major insect pest of cauliflower; moreover, brinjal shoot and fruit borer, Leucinodes orbonalis; hadda beetle, Epilachna vigintioctopunctata; and whitefly, Bemisia tabaci were found to associate with the brinjal. The pod borer and diamond back moth initially attack in January and remained active till the harvesting of crop at all the experimental sites. Aphid appears in the first week of January and remains active till the second and last week of February at all experimental sites. The foggy weather was generally favourable for the development and multiplication of aphids. The attack of whitefly was recorded in the first week of February, but shoot borer as well as hadda beetle appeared in the field during last week of February coincided with the increase of temperature. Therefore, the vegetables are highly vulnerable with the attack of insect pest at all experimental site.

PP-40

Infestation of aphid on different agricultural and horticultural plants at district Shahjahanpur, Uttar Pradesh

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ABSTRACT

To achieve the objective, infestation of different aphid species on agricultural and horticultural plants recorded at different seven places of district Shahjahanpur. The findings showed that a total of eight species of aphids were collected from various plants. The common aphid species are attacking agricultural crops were brinjal aphid, Aphis gossypii; cabbage aphid, Brevicoryne brassicae; mustard aphid, Lipaphis erysimi; coriander aphid, Hyadaphis coriandri on coriander; black citrus aphid, Toxoptera aurantii on citrus; pea aphid, Acyrthosiphon pisum on pea from the month rose aphid, Macrosiphum rosae; and green aphid, Myzus persicae on Tecoma. The different species of aphid remain active from the month of December to the late February and also up to the month of March at some places, which is coincided with the environmental conditions, among them low temperature and foggy weather favour the development of aphid. The findings concluded that the attack of aphid on different agricultural and horticultural crops is a serious problem of district Shahjahanpur and therefore, it is and urgent need to develop Integrated Aphid Management Strategy in the district to avoid the losses to commodities.

PP-41

Roosting tree utilization by Indian peafowl, *Pavo cristatus L.* at Lakhimpur Khiri, Uttar Pradesh

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ABSTRACT

Roosting is important phenomenon for the birds because by this they can reduce their energy, putting themselves in wind exposure, help in detecting predators and find food more easily. The observations was conducted on the utilization of three for roosting by Indian peafowl Pavo cristatus in rural and urban area of Lakhimpur Khiri, Uttar Pradesh. The study revealed that Indian peafowl utilized five common trees species viz., Peepal, Ficus religiosa; Mango, Mangifera indica; Banyan, Ficus benghalensis; Jamun, Syzygium cumini; and Neem, Azadirachta indica at the villages and four common trees viz., Oak, Quercus leucotrichophora; Babool, Acacia nilotica; Palm, Phoenix dactylifera; and Pear, Pyrus communis at urban areas of Lakhimpur Khiri. The height of peepal tree was recorded as 91, mango as 49, jamun as 65 and neem as 72 feet with roosting height of Indian peafowl at 65, 32, 59, 52 & 55 feet in rural area, respectively. As far as urban area was concerned, the height of tree Oak was observed as 80, babool 65, palm 49, and pear 30 feet with the roosting height of 68, 59, 38 and 20 feet, respectively. The percent roost height or covering height by the Indian peafowl was recorded as 0.71. 0.65, 0.76, 0.80, 0.76 feet on peepal, mango, Banyan, Jamun and Neem, in rural area and 0.85, 0.91, 0.78, and 0.67 feet on Oak, Babool, Palm, and Pear, respectively. In addition, number of Indian peafowl was recorded highest in rural area as compare to urban area, possibly due to habitat destruction in the urban areas.

PP-42

Phenotypic variability in otoliths as a tool for identifying stocks of Mystus vittatus in the River Ganga

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ABSTRACT

Stock identification is essential for understanding the connectivity and structure of fish populations across broad geographic regions, contributing to sustainable fisheries management. Otolith shape and structure have proven as an important tool in analyzing fish populations. The present study aims to investigate the phenotypic variability in otoliths of Mystus vittatus along the River Ganga, through detailed otolith shape and morphometric analysis to delineate spatial stock structure. A total of 269 fish samples were collected from four distinct locations on the river viz. Narora, Kanpur, Varanasi, and Bhagalpur. Spatial differences in otolith shape were evaluated using wavelet coefficients, and otolith morphometric parameters including size and shape indices. The statistical assessments, including ANOVA-like permutation test (PERMANOVA) and canonical analysis of principal coordinates (CAP), revealed significant differences in otolith shapes among the four populations. The Kruskal-Wallis and Dunn's tests further confirmed significant differences in most morphometric parameters across the populations. Principal component analysis (PCA) accounted for 39.2% and 23.4% of the total variance in the PC1 and PC2, respectively for the otolith morphometric parameters. The cross-validation classification using the random forest method showed a classification accuracy of 64.68% based on otolith shape and 59.11% based on morphometry. The findings of this study demonstrate the phenotypic variations among four populations of Mystus vittatus. Both otolith shape and morphometric analysis showed that the Narora population had the highest allocation success. These findings offer critical insight for effective fisheries management and conservation strategies of the target fish species in the River Ganga.

PP-43

Spatial variations in biometric parameters of *Cirrhinus reba* along the River Ganga

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ABSTRACT

The biometric assessment of a freshwater fish species Cirrhinus reba (minor carp) was conducted on four different sampling stations along the River Ganga. A total of 224 fish specimens were sampled, and various biometric parameters were measured and analyzed. The study revealed strong correlations in length-length relationships (LLRs) and length-weight relationships (LWRs) ($p < 0.001$) with R2 values close to 1 for all LLRs of selected fish species. Significant variations in growth trends, and condition factors of the selected fish species were noted across different sampling sites. The b values were 2.909, 2.911, 2.890 and 1.941 from the Narora, Kanpur, Varanasi and Bhagalpur sites, respectively. Condition factor values were below 1 from the Kanpur and Bhagalpur sites. The findings of the study provide valuable insights into the growth patterns and health status of the selected fish populations which are essential for its fisheries management, conservation efforts, and ecosystem sustainability. The study highlights the significance of biometric assessments in comprehending fish population dynamics and informing effective conservation strategies.

PP-44

Adverse effects of sublethal concentrations of Imidacloprid and 2-4 D on selected biological parameters of Cladocera: *Daphnia pulex*

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ABSTRACT

Environmental contamination is a growing concern, with many unanswered questions regarding the adverse effects of chemicals on non-target organisms. Cladocerans serve as a good biological model for ecotoxicity studies due to their easy culture, transparent body, and high sensitivity to chemical pollution (Santoso et al. 2020). Imidacloprid is an insecticide with the world's fastest-growing sales and 2-4 D is a widely used herbicide and is highly toxic to aquatic organisms in its ester forms (USEPA, 2024). The present study aims to determine the adverse effects of sublethal concentrations of Imidacloprid (a.i. Fipronil) and Sackweed-38 (a.i. 2-4 D) on the selected biological parameters of Daphnia pulex. Imidacloprid-induced reduction in the clutch size (5-6 eggs), heart rate bpm (157±6.8), and population size inds L-1 (134±9.1), whereas 2-4 D caused a reduction in the heart rate bpm (181±3.5) as compared to the control group. About 20% of Daphnia in the exposure groups switched to the production of ephippium, which further resulted in a reduction of newborn Daphnia. The study indicated that the Daphnia pulex is a reliable indicator of toxicity induced by sublethal concentrations of Imidacloprid and 2-4 D. Nevertheless, they respond with different sensitivity at various time points over 21days of exposure. The results concluded that the selected pesticides have discernible effects on the selected parameters of Daphnia pulex.

PP-45

Chromatin-Directed Proteomics in Response to Cancer Chemotherapeutic Drugs

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ABSTRACT

A large number of cancer chemotherapeutic drugs exert their anticancer activities by interacting with chromatin. A class of these anticancer chromatin-targeting drugs induces the formation of extremely toxic DNA-Protein complexes (DPCs), which, because of their considerable size and helix-distorting nature, interfere with the progression of replication and transcription machineries and hence, hamper the faithful expression of genetic information, contributing to genomic instability, leading to cancer cell death. Therefore, understanding chromatin dynamics in response to various anticancer drugs is of immense value. Here, we present our preliminary data on the isolation and characterization of DPCs following treatment of cancer cells with anticancer drugs. The ongoing proteomic analysis of these chromatin fractions is expected to reveal knowledge that could be valuable for developing better strategies to target cancers.

PP-46

Water Quality Parameters in Middle Stretch of Ganga River, Uttar Pradesh India

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ABSTRACT

The Ganga river is consistently receiving wastes along its course passing through state of Uttar Pradesh. About 3289 MLD of wastewater is contributed by 45 drains into the river in UP, deteriorating the water quality of this mighty and holy river. Present study aims to assess water quality of the middle stretch of Ganga River selecting three stations namely, in Bijnor, Kanpur and Varanasi. The water quality parameters, Temperature, pH, Total dissolved solids, Electrical conductivity, Total alkalinity, Carbon dioxide, Dissolved oxygen, Chloride, Total hardness, Calcium and Magnesium were recorded and compared with the standard values set by WHO and ISI. For the assessment of water quality in the middle stretch of River Ganga, the WQI is computed as it facilitates a single numeric value that defines overall water quality. The WQI is found to be 72.87, 84.09 and 74.95 at Bijnor, Kanpur and Varanasi, respectively. Which indicate poor water quality. Therefore, the water in the middle stretch of the river Ganga is not recommended for drinking and other domestic purposes unless subjected to purification.

PP-47

Doxorubicin as a Drug Repurposing for Disruption of α-Chymotrypsinogen-A Aggregates

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ABSTRACT

Protein conformation is affected by interaction of several small molecules resulting either stabilization or disruption depending on the nature of the molecules. Hg2+ is known to disrupt the native structure of proteins leading to aggregation. Accumulation of β-rich aggregates in the living system is found to be linked with copious number of disorders. Here, we have shown that an already existing FDA-approved drug; doxorubicin (DOX) can be reprofiled on preformed α-chymotrypsinogen A (α-Cgn A) aggregates. The zymogen showed formation of aggregates upon interaction with mercuric ions, with increasing concentration of Hg+2 (0-150 μM). The decline in the intrinsic fluorescence and hike in ThT and ANS fluorescence concomitant with blue shift, and turbidity at 360 nm, substantiate the unfolding of zymogen leading to β-rich aggregate formation. The secondary structural alterations analysed by CD and FTIR shows the transformation of native β-barrel conformation to inter-molecular β-rich aggregates. Moreover, we have investigated the effect of varying concentration of DOX i.e. 0-100 μM on the preformed aggregates of α-Cgn A upon incubation with 120 μM Hg2+. The DOX showed the dose dependent decrease in the ThT fluorescence and turbidity measurements endorsing the dissolution of aggregates were consistent with red shift in ANS and increased intrinsic fluorescence approaching toward native, confirming the breakdown of aggregates. The SEM validates the formation of aggregates with Hg2+ and their dissolution upon incubation with the DOX confirming its anti-aggregatory potential.

PP-48

Mental Health Perspectives in Academic Pursuits: Analysing the Role of Lifestyle Patterns in Research Scholars at Aligarh Muslim University, Western Uttar Pradesh State, Northern India

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ABSTRACT

This study is centred on evaluating the influence of lifestyle patterns on the mental well-being of research scholars at Aligarh Muslim University, located in Aligarh, India. The study focuses on two key lifestyle parameters: social media usage and sleep patterns. Additionally, it considers various physiological parameters, including heart rate (measured in beats per minute), peripheral capillary oxygen saturation (SpO2), and blood pressure. To assess the psychological well-being of participants, the Depression, Anxiety, and Stress Scale (DASS-21) inventory is employed. Statistical analysis was conducted using IBM SPSS Statistics 25 and Jupyter Notebook, with a sample size of 119 individuals selected through random sampling. The study's findings reveal a direct correlation between increased social media usage and disrupted sleep patterns. Furthermore, the study demonstrates that elevated social media engagement and irregular sleep patterns significantly contribute to psychological ailments, specifically depression, anxiety, and stress. Interestingly, the research suggests that females exhibit a higher propensity for these mental health issues compared to males. The study also includes statistical analyses between the Depression, Anxiety and Stress Scale (DASS-21) values and various physiological parameters, such as heart rate, oxygen saturation levels, and systolic and diastolic blood pressure. This study provides valuable insights into the relationship between lifestyle patterns, physiological parameters, and mental well-being among research scholars, contributing to a deeper understanding of the factors affecting the mental health of this specific population.

PP-49

Exploring translesion DNA polymerases as targets for cancer to chemotherapy

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ABSTRACT

Translesion synthesis (TLS) DNA polymerases are repair enzymes conserved in both animals as well as in plants. The TLS DNA polymerases are involved in the bypass of bulky DNA adducts during replication but also play important roles during DNA repair. Therefore, TLS DNA polymerases play a crucial role in suppressing genome instability and protecting DNA against extensive damage by deletion or addition of a few nucleotides at the repair site. In addition, several reports suggest that TLS DNA polymerases are involved in the repair of DNA damage caused by small molecules that stabilize G-quadruplex. G-quadruplexes are a non-B form of DNA, composed of guanine-rich repeating sequences of four-stranded DNA structures. Here, we analyzed the TCGA data and found that TLS DNA polymerases are overexpressed in human cancer. We further showed that overexpression is associated with survival outcomes of cancer patients and that the inhibition of a TLS DNA polymerase, alone or in combination with other anticancer drugs, inhibits the proliferation of cancer cells in vitro.

PP-50

Metal Organic Frameworks (MOFs) as Drug Delivery Systems (DDSs)

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ABSTRACT

This poster dives into the exciting potential of Metal-Organic Frameworks (MOFs) in drug delivery, showing how these materials could reshape the way we approach medicine. MOFs are remarkable for their huge surface area, customizable structure, and functional versatility, all of which make them strong candidates for carrying drugs directly to where they're needed most. The poster covers different ways to make these MOFs—from solvothermal to microwave-assisted and mechanochemical methods—each bringing unique advantages that can improve how these materials work as drug carriers. By adapting MOFs for cancer treatment, antimicrobial therapies, gene delivery, and combination therapies, researchers hope to achieve precise, targeted, and controlled drug release that responds to the body's natural cues, improving both effectiveness and safety. It also highlights crucial testing done on MOFs to confirm their stability, biocompatibility, and effectiveness, which are essential for real-world medical applications. Through this exploration, we get a glimpse of how MOFs could enable more personalized, efficient treatment options, potentially reducing side effects and increasing patient outcomes. Overall, this poster reveals MOFs as promising tools in drug delivery, pushing us closer to a future where therapies are more tailored and impactful than ever before.

PP-51

Nematodes Association with the Beetles

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ABSTRACT

The present abstract focuses on the nematodes association with the beetles. Nematodes, the transparent, triploblastic, bilaterally symmetrical, unsegmented metazoan occupy almost all types of niches on earth. The purpose of the study is that the cause of behind the associations between nematodes and beetles, the type of the interactions/associations and significance in terms of their associations between them. Due to their versatility, nematodes occur as free-living as well as parasitic forms showing different types of associations: phoresy (ectophoresy and endophoresy), necromeny and entomopathogeny with other cohabiting taxa. Nematodes with varied feeding habits are categorised as bacteriovores, fungivores, herbivores, omnivores, predators etc. and can be used as biological indicators. The interactions between these two groups are primarily driven by the nematodes' need for a host organism to complete their life cycle i.e nematodes use beetles as a vector or vehicle and in contrast beetles may benefit from the nematodes in terms of food or protection. The methodologies, measurements and findings include sample collection (beetles), isolation of nematodes, culture of nematodes, processing for light microscopy (morphometric analysis and line drawing) and Scanning Electron Microscopy. The species with morphological variations subjected to molecular analysis (DNA Extraction, PCR Reaction and Sanger Sequencing) for their identifications. The significance of the study include the diversity of the genera of nematodes associated with beetles, type of associations, life cycle and development of nematodes and the ecological behaviour and resource utilization related to nematodes. Additionally, their interaction influencing their coexistence and dependence on each other for survival.

PP-52

Assessment of the larvicidal effects of ETHION and ZINC OXIDE nanoparticles in mosquito control

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ABSTRACT

WHO has listed mosquitoes as among the top threats to public health, especially in developing nations. Each year, nations suffer billions of dollars in losses, spend billions on mosquito control programs and invest substantially in treatments for patients who have suffered complications after mosquito bites. Incorporating nanoparticles with insecticide into insect control strategies represents an innovative approach that can address many limitations associated with traditional insecticides, leading to more sustainable and effective management solutions. The co-exposure study involves preparing a solution of ethion insecticide and zinc oxide nanoparticles (ZnO-NPs). Mosquitoes are then exposed to this solution in a controlled environment. The ZnO-NPs are synthesized using a suitable method, and their characterization is done using techniques like TEM and XRD. The ethion insecticide is mixed with ZnO-NPs in varying concentrations, and their synergistic effect on mosquito mortality is evaluated. The experiment is replicated multiple times to ensure reliable results.The analysis reveals distinct patterns of percentage mortality across different stages of mosquito larvae and conditions. In the co-exposure (0.0001 EC Ethion + 25 mg/L NP), mortality increased significantly over time, reaching nearly 100% in the 1st stage, 95% in the 2nd, 3rd, and 4th stages, within 24 hours. This highlights a strong and consistent effect of the combined treatment across all larval stages. In contrast, using ethion (0.0001 EC alone) showed lower mortality overall. In the 1st stage, mortality reached a maximum of 95%, in the 2nd stage 90%, in the 3rd stage 87%, and in the 4th stage 60% at 24 hours. The inclusion of NP in the treatment enhanced the effectiveness, resulting in higher and faster mortality rates compared to Ethion alone. By incorporating ZnO nanoparticles, which possess larvicidal properties of their own, it may be possible to reduce the amounts of conventional insecticides required. This can lead to decreased ethion application, potentially minimizing environmental contamination and reducing the risk of insecticide resistance development in mosquito larvae. This research introduces a promising method for advancing mosquito control, blending traditional insecticides with cutting-edge nanotechnology for safer and more effective outcomes.

PP-53

Nervous system Modifications across Insect Orders: Insight into the Medically Significant Dipteran Flies

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ABSTRACT

The nervous system in insects exhibits remarkable structural and functional diversity across various orders, reflecting adaptations to ecological niches and life history strategies. This study focuses on comparative neuroanatomy across insect orders, emphasizing Dipteran flies due to their medical significance as vectors of diseases such as malaria, dengue, myiasis and leishmaniasis. A detailed comparative analysis reveals substantial differences in neural architecture within Diptera when compared with other insect orders such as Coleoptera, Lepidoptera, and Hymenoptera. Notably, Dipteran flies possess an advanced central nervous system when compared to other insect orders, characterized by a highly developed optic lobe and mushroom bodies, essential for complex visual processing and learning. Within Diptera, family-wise comparisons reveal specialized neural adaptations. Culicidae exhibit highly specialized olfactory lobes, optimized for detecting human odorants, crucial for host-seeking behaviour. Muscidae possess well-developed optic lobes, enabling efficient visual tracking and quick flight responses to evade threats. Calliphoridae demonstrate advanced mushroom bodies supporting memory formation and learning, essential for locating carrion for oviposition. Drosophilidae have compact neural networks and are key models in neurobiological research due to their well-mapped CNS. Sarcophagidae particularly Sarcophaga ruficornis, exhibit heightened chemosensory abilities for detecting decaying organic matter and wounds, making them significant in forensic entomology and wound myiasis research. Comparative neuroanatomical studies across insect orders reveal evolutionary innovations in Dipteran flies that underpin their medical importance. Future research could explore molecular foundations of these neural adaptations to inform novel approaches in disease vector management.

PP-54

Neural Adaptations across Insect Orders: Exploring Their Role in Hemiptera as a Key Agricultural Pest

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ABSTRACT

The evolutionary success of insects is closely tied to the diversity and flexibility of their nervous systems, which facilitate adaptive behaviors and ecological specialization. This study focuses on comparative nervous system modifications across major insect orders, emphasizing their role in driving functional adaptations and survival strategies. The structure of the adult Ventral Nerve Cord is variable both within and between insect orders, families, and genera, and even between castes and sexes of the same species. Variation occurs in the positions of ganglia, which may shift relative to the segments that they innervate and relative to other ganglia, and also in the pattern of fusions between neuromeres from neighboring segments to form composite ganglia. Hemiptera, a group of significant agricultural pests, offers a compelling case for understanding the link between neural adaptations and pest behavior. Hemipterans exhibit remarkable diversity in feeding habits and are characterized by specialized mouthparts adapted for piercing and sucking. These feeding adaptations are mirrored by modifications in their central and peripheral nervous systems, particularly in sensory and motor control regions. A comparative analysis of neural architectures across representative insect orders, including Diptera, Coleoptera, and Lepidoptera, with an emphasis on the unique neural configurations in Hemiptera. In Hemiptera, the mushroom bodies display reduced complexity, consistent with their reliance on simpler foraging strategies, while the subesophageal ganglion shows expansion correlating with the motor coordination required for their piercing-sucking feeding mechanism. This study explores Hemiptera's neural specialization in the context of insect nervous system evolution, highlighting its relevance to ecological adaptation and pest management.

PP-55

Study of Cadmium Toxicity on Behaviour And Oxygen Consumption In An Air Breathing Fish Channa Gachua

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ABSTRACT

Discharge of heavy metals into aquatic environment from various sources even below permissible levels creates health hazards in aquatic organisms. The persistence and ubiquitous nature of these pollutants coupled with their tendency to accumulate in organisms ultimately produce toxic reactions in aquatic biota especially fishes. This gives an overview of the heavy metal cadmium which is considered as one of the most toxic heavy metals. It deals among issues of the toxic effects of cadmium on the aquatic biota with emphasis on Channa gachua and the public health implication. Toxic metal are usually present in industrial municipal and urban runoff which can be harmful to human being and biotic life. Increased urbanization and industrialization are to be blamed for an increased level of trace metal especially heavy metals. There are more than 50 elements in periodic table that can be classified as heavy metals including 17 out of 50 are to be considered as a more toxic since cadmium is one of the most common heavy metal found in water bodies. Cadmium is extremely toxic even in low concentration and will bio-accumulate in organism and ecosystem and it has long biological impact in the human body ranging from 10-30 years. Cadmium in high doses induces structural and function alterations in various vital organs including liver kidney and gills of Channa gachua. Cadmium unlike synthetic compounds is a naturally occurring element and its presence has been detected in more than thousand species of aquatic and terrestrial flora and fauna. It is released to the biosphere from both natural and anthropogenic sources. Cadmium is considered as one of the top pollutants in most countries and international organization. Static bioassay tests were carried out in order to evaluate LC 50 values of Cadmium chloride in fresh water air breathing fish Channa gachua as well as to observe behavioural alterations posed by Cadmium. The LC 50 values for 24, 48, 72 and 96 hours were found 434.73, 409.87, 401.32 and 392.93 mg/L respectively. The major behavioural alterations observed during the experiments were erratic swimming restlessness muscle spasm profuse mucous secretion dis-colouration of the integument and cutaneous ulcerations in exposed fish Channa gachua. The overall increase in opercular beats in exposed fishes was also recorded throughout the experiments. Cadmium is toxic to animals which enters surface water from various sources. Being reactive it imparts acute and chronic poisoning. Fishes survive in close interaction with the water through their gills and thus susceptible to heavy metals drained from various sources.

PP-56

Impact of Sodium Cyanide on Behaviour and Oxygen Consumption In An Air Breathing Fish Channa Gachua

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ABSTRACT

Pollution of water bodies affects all the biotic communities including fishes. The chemical fertilizers, pesticides are the main sources of water pollution. The general effects of water pollution on fish may be considered as physical effects, oxidation effects, toxic chemical effects etc. As fish is excellent indicator of water quality and parameters such as fish population size, growth rate, condition factor and diversity are also indicative of the total health of water. Toxic chemicals generated through man's industrial agricultural and domestic activities eventually reach aquatic environment and cause a major threat to the inhabiting organisms. Since the aquatic environment is fragile and hence sensitive to the toxic effects of chemical pollutants including hydrophobic pollutants. Pollutants such as pesticides are known to alter the behavioural pattern, growth and reproductive potential and resistance to disease of aquatic organisms by effect on a variety of biochemical and physiological mechanisms. The toxicity of sodium cyanide (free cyanide) to the fresh water fish, Channa gachua was studied using static bioassay method. The LC 50 in 96 hours was found to be 33 µg/L. Behavioural changes when exposed to lethal concentration of sodium cyanide showed increased opercular movement increased surface behaviour loss of equilibrium change in body colour increased secretion of mucus irregular swimming activity rapid jerk movement partial jerk and aggressiveness. The swimming behaviour was in a cork screw palter, rotating along horizontal axis. In sub lethal treatment the schooling behaviour of the fish was slowly disrupted the ventilation rate was increased. The fish Channa gachua at 21st days of exposure exhibited balanced swimming and active feeding and behaved in normal way. Hence, oxygen consumption was decreased in lethal concentration (-22.64 -70.13%) but in sub lethal concentration decreased trend was improved and reached normal level at 21st day (-25.10-2.19). Alterations in oxygen consumption may be due to respiratory distress as a consequence of impairment in oxidative metabolism. Fish in sub lethal concentration were found under stress but that was not fatal.

PP-57

Computational identification of PDL1 inhibitors and their cytotoxic effects with silver and gold nanoparticles

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ABSTRACT

Immunotherapy is a promising treatment for cancer that aims to boost the immune system's response to cancer cells. This can be achieved by blocking Programmed cell death protein 1/Programmed death-ligand 1 (PD1/PDL1), which activates T cells. In this work, the aim was to find high-affinity drugs against PDL1 using computational tools and conjugate nanoparticles with them. The cytotoxic activity of the nanoparticle conjugated drugs was then tested. The screening of 100,000 drugs from the ZINC database and FDA-approved drugs was done computationally. The physicochemical properties and toxicity of the drugs were analyzed using SwissADME and ProTox-II, respectively. Silver nanoparticles and gold nanoparticles were synthesized using extracts of Catharanthus roseus flowers and Juglans regia shells, respectively. The characterization of AgNPs and AuNPs was performed using UV–Vis spectroscopy, X-ray diffraction, and Fourier transform infrared spectroscopy (FTIR). Their conjugation with the drugs Irinotecan, Imatinib, and Methotrexate was confirmed using UV–Vis, FTIR, and Dynamic light scattering. The top screened drugs were ZINC1098661 and 3 FDA-approved drugs (Irinotecan, Imatinib, and Methotrexate). Docking studies revealed that Irinotecan had the highest binding affinity towards PDL1 when conjugated with NPs. The Irinotecan-PDL1 complex was confirmed as the most stable through molecular dynamics simulations. The result of the methylthiazol tetrazolium assay showed that conjugated AgNPs and AuNPs with Irinotecan had a higher toxic effect on the A549 cancer cell line than AgNPs and AuNPs conjugated with Imatinib. This study provides a promising avenue for further investigation and development of nanoparticle-drug conjugates as a potential cancer immunotherapy strategy.

PP-58

Balancing the Essentiality and Genotoxicity of Copper

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ABSTRACT

Copper is an indispensable trace element necessary for the survival and proper functioning of nearly all living organisms, including humans. It plays a pivotal role in key physiological and biochemical processes, including energy production, iron metabolism, collagen synthesis, and neurotransmitter production. The distribution of copper and its transport proteins in the brain is crucial for maintaining cellular functions. However, disturbances in copper homeostasis can lead to severe neurological disorders and various health complications. This review delves into copper's dual role as both an essential nutrient and a toxic agent. Excess copper accumulation can induce oxidative stress, DNA damage, and genotoxicity, which are linked to its potential in causing chronic diseases. Special attention is given to copper nanoparticles and copper-based anticancer drugs, exploring their promising therapeutic applications alongside their toxicological profiles. We also provide insights into the mechanisms underlying copper-induced genotoxicity and discuss regulatory challenges in copper metabolism. This comprehensive review offers a critical assessment of copper's multifaceted role, addressing its benefits, risks, and future research directions.

PP-59

Comparative study of water quality on the basis of physicochemical parameter of river steps at Kanpur and Mathura

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ABSTRACT

Rivers are vital ecosystems supporting biodiversity and providing essential resources for humans and wildlife. However, sewage discharge, industrial waste, agricultural runoff, and urbanization severely impact their water quality and ecological health. This study compares key physicochemical parameters of the Ganga River step at Kanpur (26°28'43" N, 80°21'32" E) and the Yamuna River step at Mathura (27°29'33" N, 77°40'25" E), focusing on implications for aquatic life and human health. Water (Nov, 24) samples were analyzed for temperature, dissolved oxygen (DO), pH, total dissolved solids (TDS), and conductivity with respect to control aquaculture pond (Harduaganj Dehat Aligarh). The river steps at Kanpur exhibited higher DO and pH due to industrial discharge and untreated sewage, while the Yamuna steps at Mathura showed elevated TDS and conductivity, primarily from agricultural runoff and pesticide use. Visually, the Mathura steps appeared darker and more polluted. The Kanpur steps displayed higher biodiversity, particularly in fish species. The results underscore critical variations in pollution sources and water quality between the two rivers, reflecting distinct environmental stressors. These findings have significant implications for riverine ecosystem management and conservation. Targeted interventions, such as stricter effluent regulation and sustainable agricultural practices, are essential to restore the ecological balance and ensure the river sustainability.

PP-60

Assessment of Quality of Water Obtained From Yamuna River (Firozabad) Culture Pond (Kgf), Tap Water And Distilled Water

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ABSTRACT

The water quality profile of a river represents the extent of its pollution in terms of its health. Water pollution poses a significant environmental and health challenge in India, driven by rapid industrialization, urbanization, and unsustainable agricultural practices. Major sources of pollution include mining, industrial effluents, excessive use of fertilizers, and pesticides. Pollution affects not only the overall health of water bodies but also aquatic life, threatening its ecology. This study evaluates the pollution status of Yamuna (Firozabad), KGF Aquaculture and Fish Hatchery Aligarh, Tap water and Distilled water of Department of Zoology AMU, focusing on water quality parameters such as dissolved oxygen (DO), pH, Temperature, Conductivity, and Total dissolved solids (TDS) concerning . The order of pollution in the water of selected sites and controls (Tap water and distilled water) on investigation of Physicochemical properties are as followsYamuna River Firozabad > KGF Aquaculture and Fish Hatchery > Tap water > Distilled water The following study of the Physicochemical parameters of water shows that the water quality of the Yamuna River is not good for human consumption or aquacultural practices. It is necessary to make a better plan for the treatment of water.

PP-61

Age dependent expression and localization of transferrin receptor (TFRC-I) in the testis of mice in neo-natal, pre-pubertal, pubertal and reproductively active mice

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ABSTRACT

Aging is a time-dependent gradual progressive deterioration, accompanied by deceleration of various physiological functions leading to increased vulnerability and mortality. It has been suggested that one of the mechanisms of aging could be the accumulation of reactive oxygen species (ROS), and reduced iron transport to the cells in aged person. Iron is an important metal element involved in the regulation of male reproductive functions and has dual effects on testicular tissue. Male germ cells from early developmental stages to pachytene spermatocytes express high levels of transferrin receptor (TFRC). However, the relationship between aging and transport of iron in the testicular cells remains unexplored. Therefore, we sought this study to explore the expression and localization of TFRC in different ages of post-natal development in the testis of mice. Firstly, we performed the Immunohistochemistry of TFRC in the testis of mice. This was further confirmed by RT-PCR and immunoblot analysis. After this, we performed the immunohistochemistry of TFRC in neonatal, Pre-pubertal, pubertal, and adult respectively. This was further supported by the RT-PCR and immunoblot analysis. The result showed differential immunostaining of TFRC protein in different age group. The expression of TFRC protein increased significantly ($P < 0.05$) in the testis of pubertal mice as compared to the neonatal mice, and remained increased in the testis of reproductively mature adult mice. Correlation analysis suggested positive correlation between TFRC and testosterone, and testicular mass. Therefore, it points a very important question that a TFRC might play an important role in the management of infertility arising due to aging.

PP-62

Assessing the role of Berberine as an inhibitor of advanced glycation end products (AGEs) formation using in-vitro and molecular interaction studies

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ABSTRACT

Glycation leads to the formation of protein aggregates and advanced glycation end products (AGEs) by non-enzymatic reaction. AGEs have been linked to severe pathological conditions such as Diabetes, Cardiovascular disorders, Alzheimer's etc. Our research objective is to understand how methylglyoxal (MGO) triggers AGEs formation and protein aggregation in human serum albumin (HSA) and how phytochemical berberine protects it. Employing biochemical and biophysical techniques, we explored how berberine alters albumin's biochemical properties and structure during multiple glycation stages. HSA was incubated with methylglyoxal at varying concentrations of berberine for 7-14 days at a temperature range of 35-37°C. Methylglyoxal induced the formation of advanced glycation end products (AGEs), fibrillar aggregates, and hydrophobic protein patches in human serum albumin (HSA) as demonstrated by AGEs fluorescence, Thioflavin T (ThT) fluorescence, and 1- anilinonaphthalene-8-sulfonic acid (ANS) fluorescence studies. The secondary structure of HSA was also disrupted, as demonstrated by CD spectroscopy. All parameters were nearly reverted to native HSA forms in the glycated HSA+berberine samples. Molecular docking was utilised to identify the essential HSA residues involved in the HSA-berberine interaction and to ascertain the spontaneous binding of berberine to the HSA sub-domain, hence favouring thermodynamic binding. The binding energy of HSA-berberine was determined to be -9.1 kcal/mol. The binding of berberine to lysine and arginine residues might be linked to its antiglycation potential, as these amino acids play an important role in the glycation of proteins. However, further research is required to validate this assertion. Therefore, our study identifies AGEs and aggregates of the clinically significant protein HSA.

PP-63

Protozoans as alternative biological models: Potential and feasibility

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ABSTRACT

Biological models are experimental systems for understanding higher and more complex organisms, pathways, processes, and phenomena. This is possible due to the conserved biological and developmental pathways over the course of evolution from simpler and primitive organisms to more complex and advanced forms. Escherichia coli, Saccharomyces cerevisiae, Caenorhabditis elegans, Drosophila melanogaster, etcetera are commonly used models with their advantages and use cases. This study, however, aims to explore the feasibility and potential of using protozoans as models for biological research. A literature survey was conducted targeting studies utilising protozoans as models, and generalisable attributes significant to their usage as models were identified. Tetrahymena and other ciliates have been used to study predator-prey evolution and ecological interactions due to their rapid generation time, vast trophic diversity, and easier ethical oversight. Similarly, Dictyostelium discoideum is utilised for immune response research concerning signal transduction and phagocytosis. Chromera velia, Leishmania tarentolae, Tetrahymena pyriformis, and Trypanosoma brucei are practical models in research concerning mitochondria. Further, Tetrahymena has found wide usage as a model for ageing and toxicology research. However, unique features of certain protozoans such as macronucleus and haploidy need to be accounted for during experimental design and some pathogenic protozoans pose a health risk to researchers. In conclusion, protozoans are suitable biological models due to their relative simplicity compared to target organisms; low economic cost; less ethical oversight; vast molecular, genetic, organellar, and cellular diversity; expressibility of eukaryotic genes and thereby their genetic products; identifiability of most relevant protozoan taxa; and sustainable cell lineages.

PP-64

Microplastics: Emerging Environmental Contaminants and their Biological Impacts

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ABSTRACT

Microplastics, defined as plastic particles less than 5 mm in size, represent a critical environmental contaminant with far-reaching ecological implications. Due to their small size, they may spread far over terrestrial and aquatic environments, allowing for deep interactions with various kinds of biological systems. This issue has been acknowledged by the UN Environment Assembly, which passed a historic resolution to confront plastic pollution with a globally enforced tool. Recent scientific investigations have illuminated the complex physiological and behavioral consequences of microplastic exposure across multiple organism levels. According to scientific research, microplastic ingestion can cause serious health problems in certain experimental animals, such as oxidative stress, inflammatory reactions, and disrupting digestive systems. Furthermore, these particles have been connected in laboratory settings to developmental delays, reproductive problems, and measurable changes in organismal behavior and locomotion. Significant information gaps still exist despite a wealth of environmental studies, especially with regard to the subtle effects on model species such as Drosophila melanogaster. To clarify their possible long-term ecological and health effects, the complex methods by which microplastics interact with biological systems require more thorough scientific investigation.

PP-65

Effect of Copper Sulphate Poisoning on Reproductive Parameters (Sperm Count, Sperm Motility, Sperm Mortality, and Sperm Morphology) in *Mus musculus*

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ABSTRACT

Copper sulphate ($CuSO_4$) is widely used in agriculture and industries but poses a significant threat to environmental and animal health due to its potential toxic effects. This study aims to investigate the effects of copper sulphate poisoning on sperm parameters, including sperm count, sperm motility, sperm mortality, and sperm morphology, in Mus musculus (house mouse). The study utilized various doses of copper sulphate administered to male mice, and sperm quality parameters were analyzed post-treatment. Results indicate that copper sulphate adversely affects sperm count, motility, mortality, and morphology, suggesting its potential to induce reproductive toxicity in mammals.

CENTRAL COUNCIL FOR RESEARCH IN UNANI MEDICINE

Ministry of Ayush, Government of India

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MAJOR ACHIEVEMENTS

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- The CCRUM plays active role in public health through OPD and IPD services, co-location health centres, mobile clinical research program under Scheduled Caste Sub-Plan and Tribal Sub-Plan and school health program.

For further information please contact:

Director General

CENTRAL COUNCIL FOR RESEARCH IN UNANI MEDICINE

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PP-66

Effect of weather shift on changing roosting site of Cattle Egret (*Bubulcus ibis*) in Koshi region of Bihar

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ABSTRACT

Climate change and its impact on animals are well documented and related studies are being organized mostly around the hot-spots and conserved areas. The studies related to the abiotic factors on birds in the river Koshi are scarce. The river Koshi is famous for its mega-fan and dynamism in flow patterns in Bihar. Most of the area is agriculture dependent and birds are marked climatic indicators. In the present study, the Cattle Egret (*Bubulcus ibis*) is taken into consideration due to its close association with agriculture activities and sensitivity to climatic fluctuations like weather events. Documentation on roosting behaviour in relation to the population size, roosting occupancy, roost gathering and rate of arrival on specific site in both winter and summer were the prime objectives. Furthermore, the bad weather lowered the number of flock size of roosters, and when compared with other variables, has explicit significant effects and impels the change of roosting site during postponed and extreme winter invents. A proportionate change was also observed with rainfall and the summer months too. This suggests that prolonged cold waves in winter depress the Cattle Egret population while rainfall and humidity have shown a moderate effect. No mass mortality has been recorded during the study period. Studies on these gregarious birds in the Koshi region may open new dimensions for climatologists, environmentalists, ornithologists, etc., and first of their kind in this agro-climatic region. Our results are alarming. The future alteration in climatic conditions may change the collective behaviour of the native as well as migratory birds in particular and add space for invasive species in general.