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National Conference on Inflammation & Drug Discovery

Inflammo-CON 2025

5-7 February, 2025

Organized by
Department of Pharmacology,
Manipal College of Pharmaceutical Sciences,
Manipal Academy of Higher Education, Manipal.

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National Conference on
Inflammation & Drug Discovery
Inflammo-CON 2025

5-7 February, 2025

Venue: Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal

Preconference Workshop

Wednesday, 5 February 2025

Workshop Inauguration

Venue: Professor P Gundu Rao Conference Hall, Ground Floor, MCOPS Manipal

- Faculty Coordinator: Dr Sree Lalitha
- Volunteers: Sandra KS, Madhura Bose, Beere Vishnusai
  - Registration & Breakfast: 8:30 – 9:30 AM
  - Inauguration (for all the streams): 9:30 to 10:15 AM
  - Disbursement of Batches: 10:15-10:30 AM
  - Tea Break
  - Workshop session I: 10:45-12:45 AM
  - Lunch: 1:00 to 2:00 PM
  - Workshop session II: Demonstrations/Hands-on: 2:00- 4:00 PM

Stream 1: In Vitro Pharmacological Screening*	
Venue: Cell & Molecular Lab, 2nd Floor, Dept of Pharmacology, MCOPS, Manipal	
Faculty Coordinator Dr Pawan G Nayak **Other Coordinators** Bharath HB*(9901300955), Aadarsh Gopinathan, Akshatha Kamath, Vibhavari RJA, Paka Sravan Kumar	Foundations of cell culture and best practices
	Demonstrations –Microscopy and cell-based assays

* Maximum 10 participants

Stream 2: Zebrafish in Pharmacological Screening*	
Venue: Zebrafish Laboratory, First Floor, Dept of Pharmacology, MCOPS Manipal	
Resource person Dr Himanshu Gupta Associate Professor-Dept of Medical Biotechnology MGM School of Biomedical Sciences, MGM Institute of Health Sciences, Navi Mumbai	**Faculty Coordinator** Dr Yogendra Nayak **Other Coordinators:** Sandra KS* (9207902959), Beere Vishnusai, Madhura Bose, Krishnaprasad B, Sachindra Kumar

*Max 10-15 Participants

Stream 3: Network Pharmacology*	
Venue: Computer Lab, Ground Floor, MCOPS, Manipal	
Resource person Dr Shaik Mohammad Abdul Fayaz Associate Professor, Department of Biotechnology Manipal Institute of Technology (MIT), MAHE Manipal	**Faculty Coordinator** Dr Sree Lalitha **Other Coordinators:** Megh Vithalkhar* (8378003235), Manjunath PM, Ronak Patil, Priya Malik, Samyak Pandey, Rajni

* Max 15-20 participants

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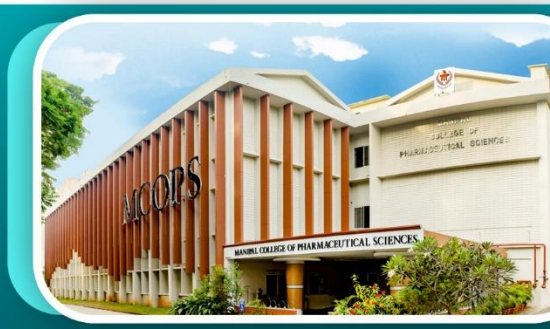
5-7 February, 2025 Venue: Sharada Hall, MCHP, MAHE, Manipal



Thursday, 6th February 2025

Time	Program/ Presenter	Topic
9.30 - 10.15 AM	Inauguration	
10.15 - 11.00 AM	**Dr Devinder Arora** Senior Lecturer, Griffith University, Gold Coast Campus, Australia	The Inflamed Moods - Neuroinflammation in anxiety and depressive disorders
11:00 - 11:15 AM	Break Tea/Coffee	
11.15 - 12.00 PM	**Dr Raghavender Medishetti** Scientist, Dr Reddy's Institute of Life Sciences, Hyderabad	Exploring Zebrafish Tyrosine Kinase Biology: Insights into Development and Disease Mechanisms
12.00 - 12.45 PM	**Dr Ashutosh Kumar** Assistant Professor, Department of Pharmacology and Toxicology, NIPER, Mohali, India	Inflammation and mitochondrial dysfunction: A vicious circle in diabetic neuropathy pathomechanism
12.45 – 2.00 PM	Lunch	
2:00 – 3.00 PM	Oral Presentations	
3:00 – 3.15 PM	Break Tea/Coffee	
3:15 – 5.00 PM	Poster Session	

Friday 7th February 2025

Time	Program/ Presenter	Topic
9.30 - 10.15 AM	**Dr G Jagadeesh** Senior Expert Pharmacologist, Center for Drug Evaluation and Research, FDA USA	An overview of the regulatory processes in new drug development
10.15 - 11.00 AM	**Dr MK Unnikrishnan** Adjunct Professor, Amrita Vishwa Vidyapeetham, Kochi, India	Chronic Inflammation: An Evolutionary Perspective
11:00 - 11:15 AM	Break Tea/Coffee	
11.15 -12.00 PM	**Dr Manjunath B Joshi** Professor and Associate Director-Research, Manipal School of Life Sciences, Manipal, India	Neutrophil extracellular traps in sterile inflammation and infections
12.00 - 12.45 PM	**Dr Jayesh Mudgal** Associate Professor, School of Pharmaceutical Sciences, Manipal University Jaipur, Jaipur, Rajasthan, India	Targeting Inflammasomes: Unlocking Therapeutic Potential in Neuroinflammation
12.45 – 2.00 PM	Lunch	
2:30 - 3:30 PM	Prize Distribution/ Valedictory	
3:30 PM	High Tea	

Resource Persons for Preconference Workshop

Dr Himanshu Gupta

Associate Professor, Dept of Medical Biotechnology, MGM School of Biomedical Sciences, MGM Institute of Health Sciences, Navi Mumbai

Resource Person for Preconference Workshop on
"Zebrafish in Pharmacological Screening"

Dr Fayaz S M

Associate Professor, Department of Biotechnology, Manipal Institute of Technology, MAHE Manipal

Resource Person for Preconference Workshop on
"Network Pharmacology"

Dr Pawan G Nayak

Assistant Professor, Department of Pharmacology, Manipal College of Pharmaceutical Sciences, MAHE Manipal

Resource Person for Preconference Workshop on
"In Vitro Pharmacological Screening"

Plenary Speakers During the Conference

Dr Devinder S Arora

Senior Lecturer, School of Pharmacy and Medical Sciences, Griffith University, Gold Coast, Australia

Plenary Talk: The Inflamed Moods - Neuroinflammation in anxiety and depressive disorders

Dr Ashutosh Kumar

Assistant Professor, Department of Pharmacology and Toxicology, NIPER, Mohali

Plenary Talk: Inflammation and mitochondrial dysfunction: A vicious circle in diabetic neuropathy pathomechanism

Dr Raghavender Medishetti

Scientist, Center for Innovation in Molecular and Pharmaceutical Sciences, Dr Reddy's Institute of Life Sciences, Hyderabad

Plenary Talk: Exploring Zebrafish Tyrosine Kinase Biology: Insights into Development and Disease Mechanisms

Dr MK Unnikrishnan

Adjunct Professor,
Amrita Vishwa Vidyapeetham, Kochi, India

Plenary Talk: Chronic Inflammation: An Evolutionary Perspective

Dr G Jagadeesh

Senior Expert Pharmacologist, Center for Drug Evaluation and Research, US Food and Drug Administration, USA

Plenary Talk: An overview of the regulatory processes in new drug development

Dr Manjunath B Joshi

Professor and Associate Director-Research, Manipal School of Life Sciences, MAHE, Manipal

Plenary Talk: Neutrophil extracellular traps in sterile inflammation and infections

Dr Jayesh Mudgal

Associate Professor, School of Pharmaceutical Sciences, Manipal University Jaipur, Jaipur, Rajasthan, India

Plenary Talk: Targeting Inflammasomes: Unlocking Therapeutic Potential in Neuroinflammation

Oral Presentation

O1: Topical 5-amino Salicylic acid promotes wound healing in Diabetic wounds via VEGF-2 receptor mediated angiogenesis

Shivaramakrishnan Balasubramanian[1,*], Praveen Thaggikuppe Krishnamurthy[1], Moola Joghee Nanjan Chandrasekar[2], Madhulika Dixit[3]
[1]Department of Pharmacology, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, Nilgiris, Tamil Nadu, India;
[2]Department of Pharmaceutics, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, Nilgiris, Tamil Nadu, India;3Department of Biotechnology, Indian Institute of Technology- Madras, Chennai, Tamil Nadu India
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Abstract

Wound healing and angiogenesis are synchronized vital processes for tissue repair and regeneration. In diabetic wounds, there is an imbalance between pro-angiogenic and anti-angiogenic biomolecules due to prolonged inflammation and impaired cellular proliferation. The cellular activities of these molecules at the wound site set the stage for the development of new blood vessels from existing viable cells. Recent studies have suggested that drug-induced angiogenesis is currently being explored as a potential treatment for healing diabetic wounds with impaired microcirculation. Here, we report that 5-aminosalicylic acid (5-ASA), an anti-inflammatory drug, accelerates diabetic wound healing through angiogenesis, likely via vascular endothelial growth factor receptor 2 (VEGFR2) signalling. This study aimed to investigate the efficacy of 5-ASA through topical application in an excision wound model and polyvinyl alcohol (PVA) sponge implantation model in diabetic rats. Experimental rats were treated with 5-ASA concentrations of 2.5% w/w and 5% w/w in simple ointment B.P. In addition, 5-ASA was also evaluated for its effects on cellular migration through an in vitro scratch assay using HaCaT cell lines and angiogenesis potential in transgenic zebrafish embryos (Tg(fli1:EGFP)y1). Results showed that 5-ASA significantly accelerated the closure of diabetic wounds. Biochemical markers, Masson's trichrome staining, and CD31 immunostaining of excised skin tissues and implanted sponges indicated that 5-ASA promoted the formation of granulation tissue, new blood vessels, and increased collagen deposition. Scratch assay studies showed increased cellular migration. In the zebrafish model, embryos treated with 5-ASA (60 µM to 80 µM) sprouted more new blood vessels in the intersegmental vessels, as shown by image analysis. Subsequently, in silico studies indicated that 5-ASA has the potential to bind with VEGF receptor 2, supporting its probable mechanism of action. In conclusion, the simple strategy of topically applying 5-ASA may have significant therapeutic potential for enhancing wound healing in diabetic patients.

O3: From Ancient Medicine to Modern Cure: The Efficacy of Nigellin® in Managing Allergies and Metabolic Syndrome

Anju Majeed, Silpa Prabha, Anjali Pandeyand Sarang Bani
Sami-Sabinsa Group Limited, Bangalore, Karnataka

Abstract

Nigella sativa./black seed and its preparations has been traditionally used in Unani, Ayurveda, Tibb, and Siddha, and is used across Arab nations for the prevention and treatment of numerous health conditions, with recent research beginning to validate historically reported benefits. medicinal plant's essential oil contains active compounds, including Thymoquinone, which are known for their therapeutic benefits. Nigellin®, product from Sami-Sabinsa Group Limited, standardised to have 5% Thymoquinone, is extracted through supercritical fluid extraction. In Vitro studies highlight Nigellin®'s potent antioxidant properties, demonstrated by its ability to inhibit lipid peroxidation and scavenge free radicals. Additionally, it inhibits the release of IL-2, IL-6, and PGE2 from primary human T lymphocytes and monocytes. It also demonstrated a bronchodilatory effect by enhancing PGE2 release in A549 human lung epithelial cells which may possess a favourable effect in the context of asthma1.In a clinical study, Nigellin® supplementation for 15 days resulted in a significant reduction in the duration and severity of symptoms associated with seasonal allergies. Participants reported improvements in Total Nasal Symptom Scores(TNSS)and Total Ocular Symptoms Score(standardized metrics used to evaluate the severity of symptoms associated with allergic rhinitis. TNSS assesses nasal symptoms such as congestion, runny nose, and sneezing, while TOSS evaluates ocular symptoms including itching, redness, and watery eyes),along with a reduction in Serum IgE levels. Importantly, no adverse events were observed, highlighting Nigellin®'s safety profile2.

Furthermore, Nigellin® has been shown to enhance glucose uptake by muscle cells and inhibit the enzymes alpha-glucosidase and DPPIV in vitro which supports its anti-diabetic effect. To substantiate these findings, Nigellin®was evaluated in participants with metabolic syndrome for 90 days resulted in the reduction of body weight, BMI, waist circumference, blood pressure, FBS, insulin resistance, and LDL. These findings highlight Nigella sativaoil's potential as a natural, safe, and effective remedy for managing seasonal allergies and metabolic syndrome.

O5: Experimental Validation of Network Pharmacology and Molecular Docking Predictions for *Swertia chirayita* in the Treatment of Lung Fibrosis

Bharath H B[1], Usha Y Nayak[2], Fayaz S M[3], Yogendra Nayak[1,*]
[1]Department of Pharmacology, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal, Karnataka 576104, India.
[2]Department of Pharmaceutics, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal, Karnataka 576104, India.
[3]Department of Biotechnology, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal, Karnataka 576104, India.

Abstract

Background: Lung fibrosis is an interstitial lung disease characterized by reduced gas exchange due to epithelial-mesenchymal transition (EMT), fibroblast proliferation and differentiation, and excessive extracellular matrix deposition. This study aimed to experimentally validate the mechanism of Swertia chirayita (SC) in treating lung fibrosis using in vitro cell culture models.

Methodology: Ethanolic extracts of SC were subjected to LC-MS/MS analysis to identify bioactive components. Targets for these components and relevant disease genes were identified using SuperPred and GeneCards databases. Primary targets were identified through network analysis in Cytoscape. Molecular docking and dynamics (MD) simulations were performed using Schrodinger to assess protein-ligand interactions. Functional enrichment analysis predicted pathway and biological process regulations. Cell migration assays were conducted on fibroblast cells, and immunohistochemistry was performed to evaluate the expression of the epithelial marker E-cadherin in A549 cells. Western blot analysis was used to validate target and pathway regulation as predicted by computational studies.

Results: LC-MS/MS analysis revealed 35 bioactive constituents in the SC ethanolic extract. Network analysis identified nine key targets regulating protein-protein interactions in lung fibrosis. Functional enrichment analysis indicated that SC components primarily inhibit TNF signaling and regulate cell proliferation, migration, hypoxia, and inflammatory responses. Major bioactive constituents of SC exhibited strong docking interactions with targets such as TNF, EGFR, IL6, MMP9, MAPK3, and AKT1. MD simulations of mangiferin, gentiopicroside, and bellidifolin demonstrated stable protein-ligand interactions. SC treatment inhibited fibroblast proliferation and differentiation in TGF-β1-induced fibroblast cells. Western blot analysis confirmed SC's inhibition of the TNF/NF-κB signaling pathway. Furthermore, SC significantly improved E-cadherin expression by inhibiting TGF-β1-induced EMT.

Conclusions: SC significantly inhibits fibroblast proliferation and EMT. SC acts through the TNF/NF-κB signaling pathway, which could be an alternative for the treatment of lung fibrosis.

Keywords: Lung fibrosis, Swertia chirayita, Computational study, Fibroblast proliferation, Mesenchymal transition.

O6: Therapeutic potential cardioprotective activity of co-administration of gossypin and melatonin against isoproterenol induced cardiotoxicity in rats

Anusha Sangalamath*, Manjunath Madalageri, Shridevi Gudennavar, Sanjay C Havaragi, Lingaraj A, Shubham Teli, Mallappa Shalavadi, Chandrashekar V.M
Department Of Pharmacology, BVVS Hanagal Shri Kumareshwar College of Pharmacy, Bagalkote-587101, Karnataka, India
*Presenting Author: sangalamathanusha@gmail.com

Abstract

Background: Cardiovascular diseases (CVDs) remain as the leading cause of mortality and morbidity worldwide. In present study, Gossypin, Melatonin & its Co-administration was used for the treatment of Isoproterenol induced cardiotoxicity in Rats.
Aim & Objectives: To evaluate the therapeutic potential cardioprotective activity of co-administration of Gossypin and Melatonin against isoproterenol induced cardiotoxicity in rats.
Materials and methods: Cardioprotective activity of Gossypin, Melatonin & Co-administeration was carried out on isoproterenol induced myocardial necrosis in male Wistar rats by measuring the hemodynamic parameters and levels of biochemical parameters in tissue homogenate. Infarction area and histopathological observations were studied at the end of the experiment.
Results: The Co-administration of Gossypin (20mg/kg) and Melatonin (10mg/kg) in Isoproterenol induced cardioprotective activity showed significant decrease in the lipid peroxidise (LPO) ($p<0.001$), Lactate dehydrogenase (LDH) ($p<0.001$), creatinine kinase-MB (CK-MB) ($p<0.001$), Serum glutamic oxoloacetic transaminase (SGOT) ($p<0.001$) levels and by significantly increasing superoxide dismutase ($p<0.001$), catalase ($p<0.01$), glutathione ($p<0.01$), total thiols ($p<0.01$), levels as compared to the control group. Further this protection is supported by measuring infarction area and histopathological findings.
Conclusions: The Co-administeration of Gossypin and Melatonin possesses a significant cardio protective activity against Isoproterenol induced cardiotoxicity in rats.

Keywords: Cardiovascular diseases, Cardioprotective, Isoproterenol, Myocardial necrosis, Gossypin, Melatonin.

O7: Modeling Diabetes in Zebrafish to Explore Metabolic Dysregulation and Regenerative Responses through Drug Interventions.

Himanshu Gupta[1]*, Sanskruti Thakur[1], Sana Mandlekar[1],
[1*]Department of Medical Biotechnology, Central Research Laboratory, MGM School of Biomedical Sciences, MGM Institute of Health Sciences, Kamothe, Navi Mumbai, India
[1]Department of Medical Biotechnology, Central Research Laboratory, MGM School of Biomedical Sciences, MGM Institute of Health Sciences, Kamothe, Navi Mumbai, India
[1]Department of Medical Biotechnology, Central Research Laboratory, MGM School of Biomedical Sciences, MGM Institute of Health Sciences, Kamothe, Navi Mumbai, India

Abstract

Diabetes mellitus (DM) is a chronic metabolic disorder with a rising global prevalence, significantly impacting public health. Zebrafish (Danio rerio), a genetically tractable vertebrate model, offers unique advantages for studying metabolic diseases due to its genetic similarity to humans and cost-effective maintenance. This study aimed to establish and optimize a chemically induced zebrafish model for DM using Streptozotocin (STZ) and Alloxan, evaluating their effects on blood glucose levels, metabolic parameters, tissue morphology, and caudal fin regeneration. Adult zebrafish were exposed to varying concentrations of STZ (0.1%, 0.2%, 0.3%, 0.4%) and Alloxan via intraperitoneal injection and oral administration, respectively. Blood glucose levels were monitored at intervals (days 2–12), alongside lipid profiling, caudal fin regeneration, and histopathological analysis. Embryo toxicity was assessed per OECD guidelines to determine developmental impacts. The results revealed dose-dependent hyperglycemia, with optimal induction achieved using 0.3% STZ and Alloxan on day 4. Higher doses (0.4%) accelerated hyperglycemia but caused mild hepatic abnormalities, including vacuolation and sinusoidal enlargement. Both compounds exhibited minimal developmental toxicity, although elevated heart rates were observed at higher concentrations for both the drugs. Caudal fin regeneration studies indicated delayed regenerative capacity in hyperglycemic zebrafish treated with higher STZ and Alloxan doses, demonstrating a correlation between metabolic stress and impaired tissue repair. This study validates the use of zebrafish as a robust model for diabetes research, demonstrating the effectiveness of STZ and Alloxan in inducing hyperglycemia with limited developmental impact but significant effects on tissue regeneration. These findings provide a foundation for exploring diabetic pathophysiology, wound healing impairments, and therapeutic interventions using zebrafish.

Keywords: Diabetes mellitus, Zebrafish model, Streptozotocin, Alloxan, Hyperglycemia, Caudal fin regeneration, Metabolic disease

O8: Exploring the anxiolytic therapeutics from the leaf extract and bioactive fraction of Getonia floribunda R. - A Preclinical And Molecular Docking Study.

Mahima Vilas Sawant Bhonsle 1, Dr. Liesl Maria Fernandes E Mendonça 1*
[1] Department of Pharmacology, Goa College of Pharmacy, Panaji- Goa, 403001
Email ID: Presenting author: mahimasawantmsb05@gmail.com
*Corresponding author: lieslpharma@gmail.com

Abstract

Getonia floribunda Roxb., a climber from the Combretaceae family native to tropical regions, has been traditionally and pharmacologically utilized for its diverse medicinal benefits. However, its effect on the Central Nervous System is unexplored. This study assessed the anxiolytic activity of the ethanol and acetone enriched fraction of leaf extract of Getonia floribunda Roxb. in Wistar albino rats using Elevated Plus maze (EPM) , Optovarimex-Autotrack and Rotarod. Two doses of the extract and its acetone enriched fraction were prepared i.e. (EEGF 100 mg/Kg, 200 mg/Kg and AEGF 100 mg/Kg, 200 mg/Kg). The phytochemical screening revealed the presence of flavonoids, triterpenoids, alkaloids, tannins, glycosides, carbohydrates and saponins. Post One hour administration, a significant increase (***$p<0.001$) in the percentage of time spent in the open arms and open arm entries of EPM following the administration of both the doses of acetone fraction was seen. A significant dose-dependent increase (****$p<0.0001$) in the resting time (RT) at a dose of AEGF 200mg/kg was seen in Optovarimex-Autotrack system indicating CNS depressant action. Also, a decrease in Fall-off time from the rotarod was seen for EEGF 200 mg/Kg (*$p<0.05$) indicating skeletal muscle relaxant action. LC-MS analysis identified various compounds, including flavonoids, phenols, terpenoids, esters from the extracts. Molecular docking against the BZD-binding site of the GABAA receptor (PDB ID: 6X3X) assessed the anxiolytic potential of these compounds. Penduletin and calycopterin with no prior literature on anxiolytic activity showed the highest binding affinity indicating significant potential for anxiolytic activity. Therefore, acetone-enriched fraction showed a significant, dose-dependent anxiolytic and CNS depressant effect via interactions with the receptor due to increased chloride ion influx and subsequent neuronal hyperpolarization

O9: Protective effect of bixin isolated from Bixa Orellana Linn, on experimentally induced neurotoxicity in rats.

Pooja C D*, Shravan Narasimha K V, Syed Mansoor Ahmed, Vijaya Kumar S.
Department of Pharmacology Sree Siddaganga College of Pharmacy, Mahalakshmi Nagar, Tumkur- 572103
*gowdapooja105@gmail.com

Abstract

Introduction: Neurodegenerative disorders are conditions characterized by structural, biochemical, or electrical abnormalities in the nervous system, leading to a variety of symptoms. Parkinson's disease (PD), Alzheimer's disease (AD), and Huntington's disease (HD) are some of the well-known neurodegenerative conditions.
Bixa Orellana L., commonly known as the Annatto tree, (family Bixaceae) is a plant native to the tropical Americas. Its seeds contain bixin, an apo-carotenoid with antioxidant and anticlastogenic properties. Historically, Brazilian tribes have used annatto seeds to treat epilepsy, suggesting potential neuroprotective effects.
Aim and Objectives: The aim of this study was to evaluate the neuroprotective effects of bixin isolated from Bixa Orellana L. seeds on 3-nitropropionic acid (3-NP)-induced neurotoxicity in rats.
Methods: In the experiment, Albino Wistar rats were pretreated with bixin, followed by 3-NP (15mg/kg i.p) administration for 7 days, beginning on the 8th day. Behavioural assessments, including ambulatory behaviour, anxiety (elevated plus maze), balance (balance beam), and grip strength (hanging wire), were conducted on the 14th day. On the 15th day, rats were sacrificed, and their homogenate brains were analysed for oxidative stress markers (GSH, catalase, LPO, total protein, total thiols), histopathological changes, and TTC staining.
Results: Bixin pretreatment significantly improved motor deficits, reduced anxiety-like behaviour, and enhanced body balance, grip strength, and ambulatory behaviour in rats subjected to 3-NP-induced neurotoxicity. Furthermore, bixin pretreatment significantly mitigated the oxidative stress induced by 3-NP.
Conclusion: This study provides scientific assessment for the traditional use of Bixa Orellana L. in the treatment of neurotoxicity, suggesting that bixin may have potential as a neuroprotective agent in the management of neurodegenerative disorders

O10: Exploring the Role of Tissue Factor in NETosis, Inflammation, and Coagulation During Lung Injury: In Vitro and In Vivo Perspectives

Aleena Varughese*, Yashodhar P Bhandary
Cell biology and molecular genetics, Yenepoya Research Center, Yenepoya (Deemed to be University), Mangalore, India.
*aleenavarghese2020@gmail.com

Abstract

Introduction: Idiopathic Pulmonary Fibrosis (IPF) is a non-communicable, progressive disease with limited therapeutic options, characterized by irreversible fibrosis and declining lung function. Following the post-COVID era, the prevalence of IPF in India has been rising at an alarming rate with a survival rate ranging from 2.5-5 years. Tissue Factor (TF) is a protein that starts the clotting process and is important in lung fibrosis. It increases inflammation and promotes NETosis, where neutrophils release DNA to trap pathogens and cause tissue damage. In lung fibrosis, TF works with inflammation and NETs to worsen the disease. Understanding how TF works in this way could lead to new treatments for lung fibrosis.

Methodology: We used string analysis to investigate the interconnections between proteins involved in inflammation, NETosis, fibrosis, and tissue factor. Our study includes both cell line and animal model experiments, with BEAS-2B cells as controls, A549 cells for comparison, and C57BL/6 mice as the animal model. In the cell line study, we induced lung injury and fibrosis using bleomycin (40 ng/ml), rIL-17A (5 ng/µl), rPAI-1 (5 ng/µl), rTF (40 ng/µl), and TGF-β (5 ng/µl). After 24 hours of treatment, the cells were analyzed using RT-PCR and immunofluorescence to assess gene and protein expression. In the animal study, after treatment, the lungs were isolated, embedded in paraffin, sectioned into 3 mm slices, and prepared for immunofluorescence as well as Masson's Trichrome (MT) analysis.

Results: String analysis confirms there is a connection between Inflammation, Coagulation, NETosis, and Pulmonary Fibrosis with interaction score of 0.9.Tissue factor (TF) expression is upregulated in TGF-β treated(5ng/ml) A549 Cells when compared to the Bleomycin (BLM) (40ng/ml) model of lung injury and fibrosis whereas the recombinant Tissue factor treated (r.TF) (10ng/ml) showed slight elevation when compared to control. Immunofluorescence of TF and Neutrophil elastase with BLM, TGF—β, IL-17A, and PAI-I shows that TF plays a pivot role in inflammation, coagulation, and fibrinolysis.MT Staining confirms that inflammation triggers the progression of lung injury which could lead to fibrosis .

Conclusion: The study indicates that the Tissue Factor plays a significant role in the pathogenesis of lung fibrosis, suggesting it could be a potential therapeutic marker and target for treating lung fibrosis by modulating inflammation, coagulation, and fibrinolysis pathways.

Keywords: Inflammation, Lung Fibrosis, NETosis, Tissue Factor

O11: Sabroxy®: A safe nootropic supplement to boost brain performance

Anju Majeed, Seetha Alagesan, Anjali Pandey and Sarang Bani
Sami-Sabinsa Group Limited, Bangalore, Karnataka

Abstract

Brain supplements, also known as "nootropics" help to support memory, focus and concentration to get optimal brain power. Oroxylum indicum (Bignoniaceae family), commonly called Indian trumpet tree, has a long history of use in traditional medicine for its neuroprotective and anti-epileptic activities. The biological activities of O. indicum are associated with the presence of flavonoids. The major flavones in O. indicum include oroxylin A, chrysin, and baicalein. Sabroxy® from Sami-Sabinsa Group is a standardized plant extract of the dried bark of O. indicum, containing not less than 10% oroxylin A, 15% baicalein, and 6% chrysin that confines the scientifically proven neuronal health benefits.

Brain-derived neurotrophic factor (BDNF) plays a critical role in neuronal protection against brain anomalies. In an in vitro study using SHSY-5Y neural cells, Sabroxy® significantly upregulated BDNF expression in a dose-dependent manner.

Sabroxy® decreased the reactive oxygen generation, lipid peroxidation and nitrite content in the brain of rodent models. Sabroxy® also increased mitochondrial activity by increasing mitochondrial complex 1 in the brain and cortex. Moreover, preclinical acute, sub-acute, 90 days safety studies performed as per Good Laboratory Practices showed that Sabroxy® is a safe supplement for brain health.

A randomized, double-blind, placebo-controlled study was conducted in 82 healthy individuals with self-reported mild cognitive impairment. Supplementation of Sabroxy® at a dosage of 500 mg, twice daily for 12 weeks increased BDNF levels in the serum by 27.13%, compared to 22.6% in placebo. Furthermore, participants taking Sabroxy® demonstrated greater improvements in episodic memory and performed better on various cognitive tasks, including immediate word recall, numeric working memory, and a location learning task, compared to those on the placebo. Sabroxy® was well-tolerated, with no serious adverse effects reported, indicating its potential as a promising herbal candidate for enhancing brain health.

Poster Presentation

Stream 1

C01: Review Of the Anticancer Effects of Hesperetin on Osteosarcoma

Richard Lobo*, Vijishna LV
Department of Pharmacognosy, Manipal College of Pharmaceutical Sciences,
Manipal Academy of Higher Education, Manipal
*richard.lobo@manipal.edu

Abstract

Hesperetin, a metabolite of hesperidin, has been shown to have potential anticancer properties, particularly against osteosarcoma, a malignant bone cancer primarily affecting adolescents and young adults. Its primary mechanism of action is through the induction of apoptosis, cell cycle arrest, anti-angiogenic properties, and modulation of key signaling pathways. Hesperetin enhances the expression of pro-apoptotic proteins and down-regulates anti-apoptotic proteins, thereby promoting cell death in osteosarcoma cells. It also disrupts the cell cycle by down-regulating cyclins and cyclin-dependent kinases, preventing cell proliferation and ultimately leading to cell death. A major regulator of angiogenesis, vascular endothelial growth factor (VEGF), is likewise inhibited by hesperetin, which lowers the creation of new blood vessels in tumors. Additionally, it lowers oxidative stress by scavenging free radicals and increasing the activity of antioxidant enzymes, which stops the spread of cancer. However, clinical studies on hesperetin's efficacy and safety are limited, and further research is needed to establish optimal dosages, delivery methods, and potential synergistic effects with other anticancer agents.

Keywords: Hesperetin, Apoptosis, Angiogenesis

C02: Evaluation of Anti-Cancer Activity of Beta-Sitosterol from Axinella in Treating Prostate Cancer

Rachael Swetha R[a], Sarvesh Nikesh[b], P.R. Anand Vijayakumar[c]* SP Dhanabalan[d]
[a] Department of Pharmacology, SRM College of Pharmacy, Kattankulathur.
[b] Department of Pharmacology, JSS College of Pharmacy, Ooty.
[c]* Department of Pharmacology, JSS College of Pharmacy, Ooty.
[d] Principal, JSS College of Pharmacy, Ooty.
*rachelswetha@gmail.com

Abstract

In this research we analyze the anticancer activity provided by beta-sitosterol, which is a phytosterol derived from the marine sponge Axinella Tenudigitata, employed in the treatment of Prostate cancer(PC) tested on male Wistar rats. Prostate cancer is a common disease among men that occurs due to the imbalance in tumor suppressor pathways (MDM2-p53 axis) and changes in androgen receptor signaling.

In-silico studies were performed using molecular docking (PDB ID:7BIV) to find the drug interaction between Beta-sitosterol with MDM2-p53 complex. The studies showed that high binding affinity (-8.2 kcal/mol) and appreciable protein-ligand interactions are present during molecular dynamic simulation over 100 nanoseconds. MM/GBSA analysis also approved of the energetic stability of Beta-Sitosterol-MDM2 complex.

In-vivo studies were performed where PC was induced using a combination of testosterone and MNU in male wistar rats. Beta-sitosterol was administered through oral route at a dose of 10mg/kg and 20mg/kg doses for 2 weeks. Compelling reductions in the tumor weight (1.2 ± 0.1g vs 0.8 ± 0.05g for 20mg/kg, $p < 0.05$) was observed. Retention of body weight was also observed. Histopathological analysis revealed that there was reduced hyperplasia and improved cellular construction in the treated groups.

The final results reveal that beta – sitosterol efficiently inhibits MDM2- p53 interaction while reactivating p53 tumor suppressor functions leading to apoptosis. This indicates that Beta-sitosterol could potentially be a novel anti – cancer drug for castration resistant prostate cancer.

Keywords: Prostate cancer, Axinella tenugutata, tumor.

C03: Evaluation Of Anticancer Activity of Matricaria Recutita L. on EAC and DLA Tumour Bearing Balb/C Mice

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Abstract

Background: Matricaria recutita L. (German chamomile) is known for its anti-inflammatory properties and is gaining interest in cancer therapy. This study evaluated its anticancer potential on Ehrlich Ascites Carcinoma (EAC) and Dalton's Lymphoma Ascites (DLA) in Balb/C mice.
Aim: To assess in-vitro and in-vivo anticancer activity of Matricaria recutita L.
Materials and Methods: Methanolic extract of Matricaria recutita L. (MMR) was tested in-vitro
via DPPH radical scavenging, MTT assay (HeLa & MCF-7 cells), and Trypan blue exclusion (EAC cells). In-vivo activity was tested on EAC and DLA models with experimental groups: Normal, Control, 5-FU (20 mg/kg), and MMR (100, 200, 300 mg/kg orally for 14 days). On 15th day animals were evaluated for hematological parameters, biochemical analysis, organ-to-body weight ratio, survival time, tumor volume, and body weight changes.
Result: The DPPH radical scavenging activity of MMR yielded an IC50 value of 93.56 µg/ml. MTT assay results indicated IC50 values of 193.33 µg/ml and 76.67 µg/ml against HeLa and MCF-7 cells, respectively and Trypan Blue Exclusion showed a dose-dependent reduction in EAC cell viability. In-vivo anticancer activity significantly ($p<0.001$) decreased body weight, WBC, platelets, packed and mean cell volume, ALP, LDH, and significantly ($p<0.001$) increased RBCs, Hb, lymphocytes, and median survival time. In the DLA model, tumor volume, body weight, and WBC decreased significantly ($p<0.001$), while RBCs and life span increased significantly ($p<0.001$).
Conclusion: Matricaria recutita L. exhibited potent anticancer activity in in-vitro and in-vivo models, highlighting its therapeutic potential.

Keywords: Anticancer, Matricaria recutita, MTT, 5-flurouracil, Tumor volume, Free radical scavenging activity.

C04: Autophagy In Tumour-Inducing Inflammation: A Pathway to Cancer Control

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Abstract

Homeostasis is key to the health and survival of organisms. Autophagy, an adaptive process that clears intracellular waste, has well-established tumor-suppressive properties. New studies indicate that autophagy inhibits cancer development by reducing inflammation and improving immunity. A meaningful mechanism through which autophagy stifles tumor-promoting inflammation is xenophagy. Following infection of H. pylori, Salmonella, Listeria, or Shigella, which causes sustained and/or unresolved inflammation and increased cancer risk, pathogen-associated molecular patterns (PAMP) stimulates xenophagy, which, by reducing pathogen load, attenuates microbe-induced inflammation. These intracellular bacteria are recognized by autophagy receptors such as p62, NBR1, and NDP52, promoting autophagic clearance. Another mechanism is through toll-like receptors (TLRs), immune regulators that modulate inflammatory response. They stimulate diverse transcriptional pathways such as nuclear factor-κB (NF-κB), mitogen-activated protein kinase (MAPK), and interferon-regulatory factors (IRFs), pathways which are associated with the transcription of cancer-related genes that regulate tumour progression and inflammation. Studies suggest that TLR4-induced autophagy performs a protective function against the progression of hepatocellular carcinoma (HCC) and adrenocortical carcinoma and also reduces inflammatory cytokines such as IL-1β, IL-6, IL-12, TNF-α, and IFN-γ. As an immune stimulator, autophagy promotes the trafficking of the engulfed antigens to endosomes, which are loaded onto MHC class II molecules that eventually translocate to the plasma membrane and present antigens to CD4+ T cells. This leads to increased recognition of tumour antigens and increased adaptive immunity. Therapy-induced autophagy can lead to cell survival and has been identified as a target for drug inhibition. Clinical trials of chloroquine derivatives in combination with therapies that induce autophagy are ongoing. Therapeutics that target regulators of necrotic cell death are already in early-phase clinical trials. This can indicate a potential treatment option for cancers in the future.

C05: In Silico And In Vitro Screening of Novel Thiazole Incorporated Indole Carboxamides for Anticancer Activity

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Abstract

c-MET is a proto-oncogene which is overexpressed in various cancer types and therefore, targeting the c-MET signalling pathway leads to decreased cancer progression. Several therapeutic techniques targeting the HGF/c-Met signalling system is being developed, amongst which small molecular inhibitors are most widely explored. Indole and benzimidazole moieties have shown excellent anti-cancer activity in previous research and hence, can be modified to target c-MET inclusive cancers. The aim of the study is to evaluate the binding affinity of synthesized Indole Carboxamides on c-MET kinase and to evaluate their cytotoxic and apoptotic activity on various cancer cell lines. In silico molecular docking studies were used to evaluate the designed and synthesised drugs against c-Met kinase(2WGJ). MMGBSA tests were used to assess the compounds' binding affinity for the target. The synthesised compounds were also tested for any breaches of Lipinski's Rule of 5 and ADMET property prediction. In silico Pharmacokinetic studies of compounds showed that all the compounds have optimum oral bioavailability with good gut-blood barrier permeability, blood brain barrier permeability and excellent serum albumin binding. Among the synthesized 8 compound one compound C8 (N- (thiazole- 2- yl)- 1H- indol- 3- carboxamide)) shows significant cytotoxicity against MCF- 7, MDA-MB-231 and HepG2 cells. Whereas it is completely nontoxic on VERO cells which revealed the cancer cell specificity of compounds. C8 (N- (thiazole- 2- yl)- 1H- indol- 3- carboxamide) was found to be most potent compound with IC50 values of 15, 30.78 and 0.94 µM against MCF-7, MDA-MB-231 and HepG2 cells respectively. When compared amongst the cell lines, HepG2 was found to be most sensitive for compounds. As compounds C8 showed good cytotoxic and apoptotic effects on MCF-7, MDA-MB-231 and HepG2 cells, they can be explored further by in vivo experiments. In vitro and in vivo target specific c-MET binding assays have to be performed to confirm the target specificity of compounds.

Keywords: c-MET, indole, anticancer, Insilco, cell line studies

C06: Production and Purification of L-Asparaginase from *Aspergillus Sydowii* MPS15

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Abstract

L-asparaginase is an enzyme used in cancer treatment that primarily targets acute lymphoblastic leukemia (ALL) by hydrolyzing L-asparagine, an amino acid necessary for the growth of cancer cells. The bacterial sources used in the current commercial manufacture of L-asparaginase are linked to higher immunogenicity risks. We studied Aspergillus sydowii MPS15, a marine fungus, as a possible source of L- asparaginase production in order to address issue. Since fungal enzymes are eukaryotic, they have no immunogenic potential, which makes them a promising candidate for therapeutic applications. The activity and stability of the enzyme was achieved by purifying the enzyme using acetone precipitation followed by membrane dialysis. This study aims to underline the potential of fungal L-asparaginase as an anticancer and medication along with its anti-inflammatory properties which highlight its capacity to lower immunogenicity while maintaining therapeutic effectiveness.

C07: Molecular Mechanisms of Daphnetin in Preventing Lung Cancer – A Comprehensive Review

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Abstract

Lung cancer is one of the leading causes of cancer deaths in the world. Because of this, new therapeutic agents must be found. One natural coumarin derivative that has elicited concern in the area of potential anti-cancer agents is daphnetin. This review covers the molecular mechanisms of daphnetin's anti-lung cancer activity. Daphnetin is known to display anti-proliferative, pro-apoptotic, and anti-angiogenic activities in lung cancer cells. Daphnetin is known to have an effect on the PI3K/AKT and MAPK/ERK, NF-κB pathways, which are critical pathways in cancer cells for survival, growth, and metastasis. In addition, daphnetin has been shown to inhibit lung cancer cell migration and invasion by inducing cell cycle arrest and apoptosis while also inhibiting EMT. MiRNAs (microRNAs) and their target genes controlling daphnetin also plays a vital role in lung carcinoma. Additionally, daphnetin enhances the effectiveness of chemotherapy and radiotherapy on lung cancer cells, thus qualifying it as an adjuvant therapeutic agent. The review discusses in detail daphnetin's molecular mechanisms of action against lung cancer and its advantageous prospects for being a new anti-lung cancer drug.

C08: Isocitrate Dehydrogenase and Cancer

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Abstract

The isocitrate dehydrogenase (IDH) enzymes IDH1 and IDH2 are of paramount importance in cancer biology and metabolism. Mutations in these enzymes, typically leading to oncometabolite 2-hydroxyglutarate (2-HG) production, are associated with several cancers, including gliomas, acute myeloid leukaemia (AML), and chondrosarcomas. Promising therapeutic strategies have emerged to target mutant IDH enzymes following recent advances in knowledge of the molecular and cellular consequences of IDH mutation in the context of cancer. These findings have led to the clinical development of IDH inhibitors for their potential to reverse 2-HG accumulation and to the application of precision medicine. In addition, issues related to the targetability of IDH, including drug resistance, are discussed, along with the need for further exploration into combination therapies. By synthesizing current knowledge, this conceptual study provides a comprehensive understanding of the landscape of IDH mutations, its role in tumour metabolism, targeting IDH, an update on small molecules and inhibitors targeting IDH in cancer treatment and future research directions.

Keywords: Isocitrate Dehydrogenase (IDH), IDH Mutations, Cancer Metabolism, 2-Hydroxyglutarate (2-HG), IDH Inhibitors.

C09: Harnessing Neutrophil Extracellular Traps for Targeted Drug Delivery in Cancer and Encephalitis

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Abstract

Neutrophils adapt to form web-like DNA structures known as Neutrophil Extracellular Traps (NETs) to combat pathogens. The production of reactive oxygen species (ROS) activates enzymes such as myeloperoxidase, neutrophil elastase, and protein arginine deiminase type-4, leading to neutrophil extracellular trap formation (NETosis). When induced by microbial signals, NETosis helps prevent excessive inflammation. Besides having a role in immunity, NETs have potential as targeted drug delivery systems for harsh conditions like lung cancer, breast cancer, encephalitis, and systemic lupus erythematosus. Their unique properties, like trapping circulating tumor cells (CTCs) and overcoming biological barriers when conjugated with tannic acid nanoparticles, make them promising for drug delivery, potentially reducing adverse drug reactions from conventional therapies. Although still in preclinical stages, NET-based therapies could address drug resistance seen in cancer and infectious diseases and deliver drugs past the blood-brain barrier (BBB) in CNS inflammation. One method involves using lymphocyte antigen-6 complex locus G6D-Interferon β at tannic acid-based lipid nanoparticles (Ly6G-IFNβ@TLP) nanoparticles, which are taken up by neutrophil elastase and can penetrate brain barriers. Tannic acid reduces ROS production, minimizing immune activation, and engineered NETs can enhance cytotoxic effects against tumor cells. The effectiveness of this therapy depends on factors like pathogen type and dosage form, typically resolving encephalitis in 2-3 weeks when administered via injection to avoid triggering inflammatory responses.

Keywords: Neutrophil Extracellular Traps, NETosis, Circulating Tumor cells, Ly6G-IFNβ@TLP.

C10: Inflammation in lung fibrosis and the role of Targeted formulation of Quercetin

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Abstract

Lung fibrosis is an inflammatory disorder caused by prolonged exposure to occupational hazardous chemicals such as silica, asbestos, and coal. It can also be triggered by autoimmune diseases, chronic exposure to certain molds, persistent lung infections, radiation, and drugs such as bleomycin. When the cause remains unknown, the condition is referred to as Idiopathic Pulmonary Fibrosis (IPF). Chronic injury to the lung epithelium due to these factors leads to excessive release of pro-inflammatory and pro-fibrotic mediators, including IL-6, IL-13, TGF-β, and various cytokines. These mediators promote macrophage activation and myofibroblast differentiation through multiple cell signaling pathways such as JAK/STAT, TGF-β/Smad, and PI3K/AKT. Currently, only two drugs, nintedanib and pirfenidone, are approved for the treatment of lung fibrosis. Preclinical evidence suggests that quercetin exhibits promising therapeutic potential against lung fibrosis. Among its various biological effects, its anti-inflammatory properties have been extensively explored, particularly in the context of interstitial lung diseases. However, quercetin has multiple pharmacokinetic limitations that must be addressed for successful clinical application. In this study, we have reviewed lung-targeted formulations of quercetin that hold potential for treating lung fibrosis. Among the various delivery systems, dry powder inhalers are emerging as a promising approach, offering an effective and targeted means of drug delivery.

Keywords: Lung Fibrosis, Quercetin, Pharmaceutical Formulations.

Poster Presentation

Stream 2

N01: Anti-Parkinson's Disease Activity of Momordica Diocia Against 6-Hydroxydopamine Induced Neurodegeneration In Rats

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Abstract

Background and objective: Traditionally Momordica dioica played a significant role inneuroprotective and maintaining human health and aim of the present study is to evaluate the neuroprotective activity of Momordica dioica against Parkinson's disease in rat model.
Materials and methods: Neuroprotective activity of Momordica dioica was carried out on Parkinson's disease on Sprague-Dawley rats. Parkinson's disease was induced by the striatal 6- OHDA lesions. The behavioural studies such as muscular coordination by rotarod, fore paw adjustment by tread mill, locomotory activity by open field and stepping test was performed along with enzymatic and non-enzymatic levels of antioxidants were estimated. Striatal infraction area and histophathological studies were also performed.
Results: The ethanol extract of Momordica dioica, showed neuroprotective effect against Parkinson's disease by positive response in behavioural activities including significant decrease in lipid peroxidation (LPO) and increase in superoxidase dismutase (SOD), catalase (CAT), gluatathione (GSH) and total thiol levels in ethanol extract of Momordica dioica treated groups as compared to control group, striatal infarction and histopathology study also confirms the neuroprotective effect of the Momordica dioica.
Conclusions: The ethanol extract of Momordica diocia showed neuroprotective effect against Parkinson's disease in rat model.

Keywords: Momordica diocia, Parkinson's disease, 6-OHDA, Neuroprotective.

N03: Exploring The Role of Cystine-Glutamate Antiporter (SXC-) Inhibitor in Chronic Model of Epilepsy

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Abstract

Introduction: Despite available therapies, 25% of epilepsy patients face treatment failure, underscoring the need for novel antiepileptic drugs with distinct mechanisms. Recent studies emphasize the role of the cystine-glutamate antiporter (Sxc-) in regulating the hippocampal synaptic glutamate pool, influencing the neuronal excitability. Genetic deletion of Sxc- showed anticonvulsant and antiepileptogenic effects in rodent epilepsy models. Additionally, pharmacological inhibition of Sxc- with sulfasalazine (SAS) prevented seizures in vitro and rodent seizure models. However, the effect of SAS on chronic epilepsy and associated cognitive impairments remains insufficiently explored.
Aim: To investigate the effects of SAS in Pentylenetetrazol (PTZ)-induced kindling model of epilepsy and the associated cognitive impairment in mice.
Methods: Male Balb/c mice were treated with PTZ (30 mg/kg) on alternate days for 23 days to induce kindling. Seizure episodes were monitored for 30 minutes following each PTZ injection. SAS (25 or 50 mg/kg, i.p. b.d) or vehicle was administered daily, and 30 minutes prior to each PTZ injection. Neurobehavioral assays assessing cognition were conducted, and mice were sacrificed on day 24 for brain inflammatory cytokine gene expression and histopathological changes.
Results: Chronic sub-convulsive dose of PTZ administration led to progressively increased seizure severity, culminating in generalized tonic-clonic seizures. SAS treatment dose-dependently reduced seizure scores and increased the latency to seizure onset. Additionally, the Morris Water Maze (MWM) test demonstrated that SAS improved epilepsy-induced cognitive deficits. SAS also significantly downregulated the mRNA expression of pro-inflammatory cytokines (TNF-α, IL-6, IL-1β) and mitigated neuronal damage, as indicated by Hematoxylin and Eosin staining.
Conclusion: Above findings suggest that SAS attenuates the progression of chronic epilepsy, reduces neuroinflammation, and alleviates cognitive impairment in the PTZ- kindling model. This highlights SAS as a potential therapeutic agent for epilepsy management and its cognitive complications.

N04: Exploring The Kynurenine Pathway-Mediated Neuroinflammation: A Breakthrough Approach to Major Depression and Antidepressant Resistance

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Abstract

Major Depressive Disorder (MDD) and associated mood disorders have evolved into a significant concern and a daunting hurdle in the psychiatric community. Regardless of the advancement expanding in the field of neurodegenerative studies and related psychiatric disorders, MDD has emerged as a substantial and vital concern in society. The report provided by the STAR*D trial illustrates that approximately 30% of MDD patients do not respond to conventional antidepressant therapy, leading to the emergence of treatment-resistant depression (TRD). Many research findings concerning MDD, have highlighted the involvement of the kynurenine pathway and associated metabolites to likely have a contribution in the etiology of depression. This review seeks to establish the possible link between the kynurenine pathway and the pathophysiology of major depression and antidepressant resistance, emphasizing the importance of maintaining a balance between neuroprotective and neurotoxic metabolites within the pathway besides highlighting areas where further investigation is needed.

Keywords: Kynurenine Pathway, Neuroinflammation, Treatment-Resistance Depression, Major Depressive Disorder

N05: In-Silico Docking Study and Neuroprotective Potential of Apixaban on Scopolamine Induced Alzheimer's Disease in Zebrafish Model: A Drug Repurposing Study

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Abstract

Background and Objective: Recently, combination therapy involving Acetylcholinesterase and clotting factor Xa inhibitor with other neuroprotective agents has shown desirable effect in the management of neurodegenerative diseases. The present study designed to evaluate the neuroprotective activity of Apixaban against Scopolamine induced neurobehavioral and biochemical changes in Alzheimer's disease zebrafish model.

Materials and Methods: Neuroprotective activity was carried out by scopolamine induced Alzheimer's disease in Zebrafish. In-silico study of selected Apixaban was docked with ACE & clotting factor Xa. Test group animals administrated with apixaban (5, 10 and 20 mg/L.) for 21 days. The Behavioral parameters were assessed using the (Novel Tank diving Test) NTT, T-maze and Dark chamber test were performed at Days 7th, 14th and 21st . Biochemical parameters and histopathology of brain tissue was assessed on the final day of the experiment.

Results: Molecular docking study indicated that apixaban formed strong enzyme ligand complex with ACE enzyme & clotting factor Xa. Apixaban administration shows neuroprotective activity by significant decrease in time spent in bottom and increases the number of entries and time spend in top in NTT and decreased the number of entries in dark chamber and increase the time spent in light chamber than compare to time spent in novel arm on T maze. Biochemical parameters showed significant decreases in lipid peroxidation and Acetylcholinesterase level, and increased in Glutathione, CAT, GSH, Total thiols, SOD in the treated groups as compared with control groups.

Conclusion: In conclusion, the present study suggests that administration of apixaban possesses neuroprotective activity against scopolamine induced cognitive impairment and associated oxidative stress.

Key words: Alzheimer's disease, tau protein, Aβ plaques, oxidative stress, apixaban, scopolamine, Acetylcholinesterase.

N06: Exploring Synthesis-Dependent Neurotoxicity and Behavioural Impacts of Al2O3 Nanoparticles in Zebrafish Larvae and Adults

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Abstract

Aluminum oxide (Al2O3) nanoparticles (NPs) hold promise for innovative biomarker development, disease detection, and therapeutic applications due to their unique physicochemical properties. This study investigates the synthesis-dependent effects of biologically and chemically synthesized Al2O3 nanoparticles on zebrafish larvae and adults. Advanced characterization techniques (UV-Vis spectroscopy, TEM, FTIR, XRD, and ICP-AES) revealed distinct structural differences, with biologically synthesized NPs being amorphous and spherical and chemically synthesized NPs crystalline and rod-shaped. Zebrafish were exposed to varying concentrations of Al2O3 NPs (1–12.5 µg/mL) to evaluate developmental, behavioral, and physiological impacts. In larvae, chemically synthesized NPs exhibited higher toxicity, with LC50 values of 8 µg/mL, causing severe developmental abnormalities and visible deformities. Biologically synthesized NPs demonstrated milder effects, with LC50 values of 9 µg/mL and reduced neurobehavioral disruptions. Behavioral assays in larvae revealed dose-dependent effects, with chemically synthesized NPs inducing pronounced anxiety-like responses at lower concentrations. Adult zebrafish exposed to these nanoparticles showed alterations in social behavior, exploratory patterns, and anxiety levels, reinforcing the critical impact of synthesis on behavioral outcomes.These findings underscore the importance of synthesis parameters in modulating nanoparticle interactions with biological systems. Biologically synthesized Al2O3 NPs, with their lower toxicity and higher biocompatibility, emerge as safer candidates for applications in biomarker discovery and therapeutic interventions. This study highlights the potential of Al2O3 nanoparticles in advancing diagnostics and treatments for neurodevelopmental and cognitive disorders, utilizing zebrafish as a robust preclinical model.

Keywords: Aluminum oxide nanoparticles (Al2O3 NPs), Zebrafish, Synthesis-dependent toxicity, Neurobehavioral assays, Developmental and adult studies

N07: Novel Therapeutic Strategies to Detect Biomarkers in Motor Neuron Disease (MND)

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Abstract

Motor Neuron Disease (MND), also known as Amyotrophic Lateral Sclerosis (ALS), is a neurological condition that affects motor neurons, the brain, and spinal cord nerve cells responsible for voluntary muscle movement and respiration. Motor neurons deteriorate and die,
so they stop transmitting messages to the muscles, causing them to weaken. Early identification and effective disease monitoring are crucial for improving patient outcomes, yet viable biomarkers for MND remain few. This area investigates potential therapeutic options for detecting biomarkers in MND, with an emphasis on new and developing technologies. Systemic assessments such as neurofilament proteins and metabolomics for neuronal injury and oxidative stress have aided in the finding of MND biomarkers. Imaging tools such as MRI and PET reveal structural and metabolic abnormalities, whereas electrophysiological approaches such as TMS and EMG detect early neural malfunction, which aids in diagnosis and disease monitoring. Omics methods like proteomics, transcriptomics, and metabolomics detect biomarkers such as NFL and TDP-43, as well as gene expression alterations and metabolic disturbances in MND. Non-invasive liquid biopsies detect cfDNA, miRNAs, and exosomes, and improved imaging (PET, MRI) using molecular markers allows for real-time monitoring of neuroinflammation and neuronal death. Perhaps the most consistent discoveries in ALS biomarkers involve neurodegeneration biomarkers, which may be utilized to supplement clinical diagnosis because to their high sensitivity and the availability of detection tools. The identification of biomarkers for ALS is challenged by the disease's heterogeneity and the participation of several converging pathological processes. In recent years, tremendous efforts in ALS biomarker research have resulted in multiple intriguing CSF biomarkers, many of which demonstrate relationships with ALS clinical characteristics.

N08: Bioactive Compound Nanoparticles for Alzheimer's Disease

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Abstract

Introduction: Alzheimer's disease has been clinically defined as a progressive neuro-degenerative disorder and pathologically by the accumulation of amyloid beta plaques and tau tangles in the brain. It is characterized by cognitive decline as well as neuropsychiatric symptoms. Aβ fibres and tau tangles cause activation of glial cells leading to release of neuroinflammatory cytokines. Novel strategies such as phytocompound loaded nanoparticles can be utilized to improve drug delivery across the blood brain barrier, improve targeting, bioavailability, enhance the therapeutic efficacy, provide effective neuroprotection and reduce neuroinflammation.

Methodology: Conventional therapies aim to alleviate the symptoms rather than modifying the disease condition. They also face the problem of not being able to cross the blood brain barrier effectively. Hence newer technologies focus on enhanced BBB penetration and disease modification. A recent study presents curcumin loaded red blood cell membrane coated nanoparticles as a new therapy. Curcumin reduces the β-amyloid pathology, and the technology inculcated through use of polymers for formation of nanoparticles enhances the BBB penetration. Other such examples include selenium nanoparticles conjugated with B6 peptide; gold nanoparticle conjugated with peptides etc.

Discussion: Bioactive compounds from natural sources play an important role in treatment of Alzheimer's disease. They are characterized by the presence of antioxidant, anti-inflammatory effects, reduced tau and amyloid β pathology as well as reduction of oxidative stress and neuroinflammation. Combining these with nanoparticle technology can improve BBB penetration which serves as the major problem. Hence, they are essential for developing safe
and effective treatments for AD.

Conclusion: Bioactive loaded nanoparticles serve as an effective treatment strategy for AD, improving targeting to produce anti-inflammatory effects and enhancing BBB penetration thus overcoming the difficulties faced by conventional therapies. Presence of bioactive compounds can help in reducing side effects and enhancing therapeutic efficacy, thus serving as a promising avenue for AD treatment.

Keywords: Alzheimer's, bioactive compounds, Aβ fibres, tau tangles, inflammation, nanoparticles.

N09: To Study the Effect of Saraswatarishtam on Physical Endurance and Cognitive Function in Old Male Fischer Rats.

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Abstract

Introduction: Aging is a slow but gradual process that is characterized by a continuous decline in the normal physiological functions of living organisms over their lifespan. Cellular senescence plays an essential role in the initiation of aging and age-related diseases. Senolytics are a class of drugs that selectively clear senescent cells. Saraswatarishtam is a herbo-mineral formulation consisting of 18 plants. It has been claimed to be useful in treating central nervous system disorders.
Aim: To evaluate the effect of Saraswatarishtam on physical endurance and cognitive function in old Fischer rats.
Methodology: Adult male Fischer rats, weighing 150g-250g were used for the study. They were divided into 2 control groups with 6-12 months young rats (C1) and 12-18 months older rats(C2). 2 groups of aged rats were treated with two doses (T1-1.8ml/kg of SA, T2-2.6ml/kg of SA) which served as treatment group. Rats were treated once daily for 3 months. At the end of 3rd month treadmill test, novel object recognition test and biochemical analysis were conducted.
Result: There were 3 groups of old rats compared with the young control group. In treadmill test, the C1 group travelled mean distance of 33.57 ±12.29m, were as in C2 group it was 8.57 ±4.19m, which is significantly lower than the 2 treatment groups [46.29 ± 7.83 for T1, 44.71 ± 7.59 for T2] [P=0.002]. Similar results were observed for total time to complete the task and number of animals completing the task in the treadmill test. T2 had higher discrimination index (0.46±0.06) compared to T1(-0.42±0.22) and C2(-0.34±0.15). The biochemical parameters like liver and renal function test were within normal range for all groups.
Conclusion: Saraswatharishtam may mitigate age related decline in physical and cognitive ability possibly through its senolytic property in male Fischer rats.

N10: Effect of combination therapy of vitamin D, biotin and omega-3 polyunsaturated fatty acids for depression: A preclinical study

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Abstract

Background: Major Depressive Disorder (MDD) affects 3.8% of the global population, causing cognitive, behavioural, and emotional issues. Conventional antidepressants like selective serotonin reuptake inhibitors (e.g., fluoxetine) often have side effects and limited effectiveness. Evidence suggests omega-3 fatty acids, vitamin D, and biotin may reduce depressive symptoms due to their anti-inflammatory and neuroprotective properties. However, the effectiveness of their combination is under-researched. This study aimed to evaluate the impact of these nutrients alone and with fluoxetine in depression.

Methods: Thirty Sprague-Dawley (SD) rats were equally divided into five groups (1-control, 2-disease control, 3-fluoxetine standard, 4-nutrient combination, and 5-combination with half-dose fluoxetine). Depression was induced using a Chronic Unpredictable Mild Stress model over four weeks. Behavioural tests (sucrose preference test [SPT] and elevated plus maze [EPM] and biochemical analyses (MDA, SOD, catalase, thiol, BDNF) were performed. Data from behavioural and biochemical evaluations were presented as Mean ± SEM and analysed using one-way ANOVA with Tukey's post hoc test using SPSS software.

Results: In SPT, it was seen that Groups 3, 4 and 5 showed higher sucrose preference, and in EPM, they spent more time in open arms (indicating improved anhedonia, reduced anxiety) compared to the disease control. Biochemically, Groups 4 and 5 had significantly (p value <0.05) higher BDNF, catalase activity, SOD levels, and thiol content, and lower MDA levels compared to group 2.

Conclusions: In conclusion, these findings suggest that the combination of vitamin D, biotin, and omega-3 PUFA, demonstrated significant antidepressant effects and these nutrients could offer a promising and safer alternative or adjunctive treatment for MDD, warranting further exploration.

Poster Presentation

Stream 3

G01: Anti-inflammatory potential of vanillic acid against cholesterol gall stones-An In Vitro Study

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Abstract

Worldwide, cholelithiasis, or gallstone disease, is a prevalent gastrointestinal disease. It is marked by biliary colic in the bile ducts and is linked to a high rate of morbidity and death. Gallstone disease has a complicated pathogenesis. Cholecystectomy is the primary treatment for cholelithiasis. The aim of this study is to evaluate the potential of phenolic acid (vanillic acid) and safe alternative for gallstone dissolution. In this research, we employed computational modeling techniques (in-silico) using ligand -protein approach to predict the interactions between phenolic acids and key biomolecular targets implicated in cholelithiasis formation. The In-silico and In vitro methods are used to evaluate phenolic acids for anti-cholelithiatic activity. Docking were performed with several receptors such as Tumour Necrosis Factor alpha (TNFα), Peroxisome proliferator-activated receptor gamma (PPARγ), Interleukin-6 (IL-6), and Hydroxymethy lglutaryl-CoA (HMG CoA) and phenolic acids such as chlorogenic acid,coumaric acid, Caffeic acid ,Ferulic acid and Vanillic acid .Based on high binding affinity from In-silico method, In-vitro study was performed. For In-vitro anti-cholelithiatic method,cholesterol human gall stone were collected along with human bile from the hospital. The treatment was performed between standard drug Ursodeoxycholic acid (UDCA) 2mg/ml and test drug (Vanillic acid-2mg/ml,7mg/ml) which was incubated for 4 weeks. Weight of gall stone and the amount of cholesterol release in the bile before and after treatment were evaluated. The results of the In-silico show that vanillic acid has high binding affinity when compared to other phenolic acids .From In vitro study, the vanillic acid exert decrease in the weight of cholesterol gall stone and increase in the amount of cholesterol released from gall stone. Vanillic acid also shows morphological alterations in gallstone. The present study provides an overview of the pharmacological and clinical potential of the (Vanillic acid). Further, In-vivo studies should be carried for understanding the mechanism behind vanillic acid over anti cholelithiatic activity.

G02: Hepatoprotective activity of Bixin isolated from Bixa orellana Linn in Experimentally induced Hepatotoxicity in Rats

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Abstract

Introduction: The liver is crucial for metabolism, detoxification, nutrient storage, and homeostasis but is vulnerable to diseases like hepatitis, cirrhosis, and liver cancer, often due to toxins. Reactive oxygen species (ROS) induce oxidative stress, worsening liver conditions. Bixa orellana Linn., from the Bixaceae family, contains Bixin, a carotenoid with antioxidant properties. Bixin protect the liver by reducing oxidative stress, a key factor in liver diseases that affect millions worldwide and contribute to 2 million deaths annually.

Aim and Objectives: The study evaluates the hepatoprotective potential of Bixin from *Bixa orellana* L. through isolation, confirmation, and biochemical analysis in ethanol-induced hepatotoxicity in rats.

Methods: The ethanol-induced hepatotoxicity study was conducted on Wistar rats (150–250 g), divided into five groups of six rats each. Over 14 days, various treatments were administered: a control group received 1% Tween 80, the ethanol control group was treated with ethanol (4 g/kg) along with corn oil and Tween 80, while the silymarin group was given silymarin (100 mg/kg) along with ethanol and corn oil. Two experimental groups received low (2.5 mg/kg) and high (5 mg/kg) doses of Bixin with ethanol and corn oil. Blood samples were collected 24 hours after the final treatment via tail vein, with serum separated by centrifugation. Liver samples were harvested for analysis. Assessed parameters included liver weight, volume, biochemical markers (SGOT, SGPT, ALP, bilirubin, protein, glutathione, lipid peroxidation), and histopathological changes.

Results: Ethyl alcohol caused liver damage with enlargement and elevated enzymes. Bixin (2.5 mg/kg) and Silymarin (100 mg/kg) restored liver parameters, improved antioxidant activity, reduced lipid peroxidation, and demonstrated significant hepatoprotective effects.

Conclusion: Hepatoprotective effect of Bixin was conformed by enhancing serum enzyme levels, antioxidant activity, and liver histology, supporting traditional use and necessitating further research to compel its mechanisms.

Keywords: Bixin; Ethanol; Silymarin; Bixa Orellana Linn.

G03: Evaluation of Acute Anti-Ulcer Activity of Polyherbal Formulation against Pylorus Ligation in Rat Model

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Abstract

Background: The plants such as *Colebrookea oppositifolia*, *Spinacia oleraceae*, *Trachyspermum ammi* were traditionally used as anti-inflammatory, anti-fungal, anti-microbial, hepatoprotective properties, so those plants were selected for anti-ulcer activity.
Aim & Objectives: To evaluate the polyherbal formulation of the *Colebrookea oppositifolia*, *Spinacia oleraceae*, *Trachyspermum ammi* for antiulcer activity using pylorus ligation induced gastric ulcer in wistar rats.
Materials and Methods: Anti-ulcer activity was carried out by using polyherbal formulation of plants *Colebrookea oppositifolia*, *Spinacia oleraceae*, *Trachyspermum ammi*, was screened against pylorus ligation induced ulcers in rats. The evaluations parameters ulcer score, total acidity, gastric volume and gastric pH were measured.
Results: In pylorus ligation induced ulcer model, treatment groups received 390 mg/kg and 780 mg/kg PHF of *Colebrookea oppositifolia*, *Spinacia oleraceae*, *Trachyspermum ammi*, at the ratio of 1.25:1.5:1.5 and showed significant decrease in ulcer score, total acidity, gastric volume and increase in pH of gastric acid as compared to control group in Pylorus ligated stomach of the rats.
Conclusion: In conclusion, the present study shows that the polyherbal formulation possesses antiulcer activity in pylorus ligation induced gastric ulcers in wistar rats.

Keywords: Anti-ulcer, *Colebrookea oppositifolia*, *Spinacia oleraceae*, *Trachyspermum ammi*,
ulcer index and ulcer score.

G04: Investigation of Antiulcer Activity of *Curcuma Vamana* in Acute and Chronic Ulcers Rat Model

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Abstract

Aim and Objective: To investigate antiulcer activity of Hydro alcoholic extract of *Curcuma vamana* (HACV) in acute and chronic ulcers rat model.
Background: Traditionally, *Curcuma vamana* was used for treating ulcer and other diseases.
Materials and method: Antiulcerogenic activity of HACV (100, 200 and 400mg/kg, P.O) was evaluated employing aspirin + pylorus ligation induced acute ulcer model and acetic acid induced chronic ulcer models in rats. The antisecretory, cryoprotection and antioxidant hypothesis were evaluated.
Results: There was a significant dose-dependent decrease in the ulcerative lesion index and significant increase in the mucus content and percentage protection in standard and HACV treatment groups in both models in rats as compared to the control group. The reduction in gastric fluid volume, total acidity and an increase in the pH of the gastric fluid in aspirin + pylorus ligation rats as compared to control group, proved the antisecretory and cytoprotective activity of HACV. Biochemical parameters showed significant decrease in Lipid Peroxidation ($p<0.001$) and increased in superoxide dismutase ($p<0.001$), catalase ($p<0.001$), glutathione ($p<0.001$), in the standard and HACV treated group as compared with control group in both the models proved the antioxidant property of HACV. The histopathological findings also shows that there was a decrease in erosion and damage of mucosal layer and sub mucosal oedema and inflammation as compared to control group.
Conclusion: In conclusion from in-vivo studies indicate that HACV demonstrates significant anti-ulcer activity. These studies collectively support the potential of HACV as a powerful therapeutic agent for the treatment of ulcers.

Key words: HACV, *Curcuma vamana*, Anti-ulcer, Antisecretory, Pylorus ligation, Acidity

G05: Evalution of Hydroalcoholic Leaf Extract of *Piper Betle* Linn. on Experimentally Induced Inflammatory Bowel Disease (IBD) in Rats

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Abstract

Introduction: The term inflammatory bowel diseases comprise two different intestinal diseases differentiated by histology and location.In Crohn's disease, a transmural inflammation which involves any portion of the gastrointestinal tract has been demonstrated, while ulcerative colitis (UC) induces inflammation of the colonic mucosa *Piper betel* Linn (family: Piperaceae) commonly known as betel vine leaves. It is bestowed with abundant active compounds including flavonoids, hydroxychavicol and eugenol having anti-inflammatory and antioxidant activities, making it a potential therapeutic agent for IBD.

Aim and Objectives: This study was aimed to evaluate the protective effect of hydroalcoholic leaf extract of *Piper betel* against indomethacin-induced Crohn's disease in rats.

Methodology: In Indomethacin induced enterocolitis model, each group had 6 animals (n=6), Group I received normal saline, Group II received hydroalcoholic leaf extract of *Piper betel* (HALEPB) (400 mg/kg), Group III as disease control, Groups IV and V were received with HALEPB (200 mg/kg and 400 mg/kg, p.o), and Group VI received standard sulfasalazine (100 mg/kg, p.o) for seven days. Groups III, IV, V, VI received Indomethacin on 8th and 9th days, on 12th day, the rats were sacrificed and the oxidative stress parameters like Catalase (CAT), Myeloperoxidase (MPO), Lipid peroxidation (LPO), and serum parameters like Lactate dehydrogenase (LDH) were performed by macroscopic scoring of the ileum was assessed to measure the extent of inflammation by biochemical and histopathological assessments.

Results: HALEPB pretreatment at doses of 200 and 400 mg/kg significantly reduced ulcer scores, mitigated oxidative stress markers (CAT, MPO, LPO), and lowered serum LDH levels. Additionally, it improved clinical activity and macroscopic scores compared to the disease control group.

Conclusion: HALEPB demonstrated protective effects against indomethacin-induced injury in ileum could be likely due to its antioxidant and anti-inflammatory properties. These findings suggest that *Piper betel* leaf extract could be a potential therapeutic option for IBD.

G06: Evaluation of Gastric Ulcer Protection by Ethanolic Extract of *Feronia Limonia* in Rats

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Abstract

Introduction: Peptic ulcer is a common digestive disorder, occurs due to an imbalance between offensive factors such as acid and pepsin and defensive factors such as mucin secretion and cell proliferation. It is mainly caused by long-term use of non-steroidal anti-inflammatory drugs (NSAIDs), alcohol consumption, infection of Helicobacter pylori, imbalance in antioxidant enzyme activity. *Feronia limonia* L., belongs to the family Rutaceae, commonly knowns as Wood apple. Its Leaves contains polyphones, flavonoids (imperatorin, bergapten and xanthotoxin), alkaloid, steroid, amino compounds, psoralen, orientin, vitexin, tannins etc.

Aim and Objective: The aim of this study is to evaluate the antiulcer activity of ethanolic leaves extract of *Feronia limonia* against indomethacin induced ulcer in rats.

Method: The antiulcer activity of leaves extract was evaluated using experimental animals. Group I received normal control, Group II received extract alone, Group III served as disease control received indomethacin on 14th day, group IV and V were pretreated with leaves extract (100 mg/kg and 200 mg/kg), group VI received standard famotidine (50mg/kg) for about 14 days. On 14th day,10mins prior to administration of extract and test drug, indomethacin (20 mg/kg) was given orally to all groups except group I and group II. Six hours later the administration of extract and test drug, the animals were sacrificed and the parameters like acid volume, ulcer index, pH, total acidity, glutathione, lipid peroxidation, catalase and histopathological studies were performed.

Result: The pretreatment with leaves extract caused a beneficial effect on indomethacin induced ulcer in rats as evidenced by the reduction in the acid volume, total acidity, ulcer index, lipid peroxidation and showed an increase in pH, glutathione and catalase activity.

Conclusion: The ethanolic leaves extract of Feronia limonia showed significant protective activity, the activity may be due to partly inhibition of acid secretion and cytoprotective activities of the phytoconstituents.

G07: Nanomedicine Innovations in Inflammatory Bowel Disease: Trends and Advances

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Abstract

Introduction: Inflammatory bowel disease (IBD), encompassing conditions such as Crohn's disease and ulcerative colitis, poses significant public health challenges. Traditional therapies sometimes concentrate on treating symptoms without addressing the underlying reasons, which leads to side effects and limited effectiveness. By utilizing the special qualities of nanotechnology, nanomedicine presents a possible path toward bettering the diagnosis and treatment of IBD.
Methodology: The Web of Science Core Collection was used to do a thorough bibliometric study. CiteSpace and VOSviewer were used to examine studies published between 2001 and 2024 in order to pinpoint important contributors, worldwide research trends, and new areas of study in IBD nanomedicine applications.
Results: Interest in using nanomedicine to treat IBD is expanding, as seen by the recent high in publications. With notable developments in medication delivery methods, gut microbiota manipulation, and immune control, China and the US emerged as the top contributors. Nanoparticles showed better therapeutic results, fewer adverse effects, and increased effectiveness in targeted medication delivery. The creation of plant-derived nanovesicles and multipurpose nanoparticles that combat inflammation and oxidative stress are examples of emerging developments.
Conclusion: By facilitating precision therapy, improving drug stability, and reducing systemic adverse effects, nanomedicine offers a revolutionary approach to the treatment of IBD. To further develop these technologies and turn them into clinical applications, more multidisciplinary research and cooperation are necessary, providing promise for more patient-friendly and successful IBD therapies.

Keywords: Nanomedicines, IBD, Treatment, Drugs, Trends

G08: Exploration of Tasimelteon as a Potential Modulator of Liver Dysfunction in Experimental Non-Alcoholic Steatohepatitis (NASH)

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Abstract

Non-alcoholic fatty liver disease (NAFLD) is a prevalent metabolic disorder affecting up to one-third of the population in developed nations. Its incidence is rapidly increasing due to lifestyle changes, poor dietary habits, and the global rise in obesity. NAFLD encompasses a spectrum of liver conditions, ranging from simple hepatic steatosis to non-alcoholic steatohepatitis (NASH), which affects 10% to 30% of NAFLD patients and can progress to cirrhosis and hepatocellular carcinoma. NAFLD is often accompanied by insulin resistance and metabolic dysregulation, contributing to its complex pathophysiology. Moreover, patients with NAFLD face increased risks of hepatic and cardiovascular mortality. This study explores the therapeutic potential of tasimelteon, a melatonin receptor agonist, for managing NAFLD. A combination of in silico, in vitro, and in vivo approaches was employed. In silico studies involved receptor-ligand interaction analysis and Swiss ADME profiling, which provided insights into tasimelteon's pharmacokinetics, bioavailability, and drug- likeness. In vitro assays using HepG2 cell lines assessed the cytotoxicity and therapeutic effects of tasimelteon through MTT assays. In vivo studies on experimental NAFLD models included measurements of key biochemical parameters such as aspartate transaminase (AST) and alanine transaminase (ALT), which are markers of liver function. Detailed liver histopathology studies were conducted to evaluate tissue architecture, inflammation, and fibrosis. While liver biopsies are currently the gold standard for diagnosing NAFLD, they are invasive and carry potential risks. Advancements in non-invasive diagnostic tools, including imaging techniques, biomarker assays, and genetic testing, hold promise for improving early detection, monitoring, and treatment outcomes. These innovative methods will aid in enhancing our understanding of NAFLD pathogenesis and optimizing targeted therapeutic strategies, including the use of agents like tasimelteon.

Keywords: NAFLD, Tasimelteon, HepG2, in silico analysis, liver histopathology, non-invasive diagnosis.

G09: Effects of *Terminalia chebula* against liver injury: A Systemic and meta-analysis of Preclinical studies

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Abstract

Terminalia chebula, a prominent medicinal plant in traditional medicine systems, has garnered attention for its hepatoprotective properties. This systematic review and meta-analysis aim to evaluate the efficacy of *T. chebula* against liver injury in preclinical studies. Comprehensive database searches were conducted to identify relevant studies assessing its protective effects against various experimentally induced liver injuries. The outcomes included biochemical markers of liver function, histopathological changes, and oxidative stress parameters. Results from the meta-analysis demonstrate that *T. chebula* significantly reduced levels of liver enzymes (e.g., ALT, AST, ALP) while enhancing antioxidant activity (e.g., SOD, GSH). Histopathological assessments further corroborate its protective effects, showing reduced tissue damage and improved liver architecture. The findings suggest that the hepatoprotective activity of *T. chebula* is likely attributed to its potent antioxidant, anti-inflammatory, and regenerative properties. This review highlights its promise as a natural intervention for liver health and underscores the need for standardized research methodologies in future investigations.

G10: Molecular Insights into Non-Alcoholic Steatohepatitis (NASH): Identification of Key Genes and Pathways

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Abstract

Non-alcoholic Fatty Liver Disease (NAFLD) is a spectrum of liver disorders characterized by the accumulation of fat (>5% steatosis) in hepatocytes. Non-alcoholic steatohepatitis (NASH) a progressive form of NAFLD, is marked by hepatic inflammation, which, if left untreated, can progress to liver fibrosis and ultimately hepatocellular carcinoma (HCC).

This study aimed to explore the molecular mechanisms and identify key genes involved in NASH by analyzing gene expression profiles from patients with the NASH. Two datasets, GSE24807 and GSE17470, were obtained from the GEO database. Differential expression analysis using GEO2R identified 425 common differentially expressed genes (DEGs), comprising 320 up-regulated and 105 down-regulated genes.

To refine the analysis, DEGs were validated against three gene-disease databases: the Comparative Toxicogenomic Database, GeneCards, and DisGeNET. This validation led to the selection of 13 critical DEGs. A protein-protein interaction (PPI) network was subsequently constructed using Cytoscape software to analyse the relationships between these genes.

The findings from this study provide valuable insights into the molecular pathways underlying NASH. The 13 identified DEGs may serve as potential therapeutic targets and diagnostic biomarkers, offering a foundation for developing more effective treatment strategies for NASH.

G11: Evaluation of Hepatoprotective efficacy of Hydroalcoholic Extract of *Impatiens balsamina*

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Abstract

Introduction: Impatiens balsamina, commonly known as garden balsam or rose balsam, belongs to the Balsaminaceae family. It contains several bioactive compounds, including flavonoids, coumarins, and phenols, possess anti-inflammatory and antioxidant properties.
Aim and Objectives: This study aimed to evaluate the assessment of the Hydroalcoholic extract of Impatiens balsamina (HAEIB) as a protective agent against ethanol induced hepatotoxicity in rats.
Methods: Hepatoprotective activity of HAEIB was assessed in rats with ethanol-induced hepatotoxicity for 14 days, using silymarin as a standard reference. Key biomarkers such as serum glutamate oxaloacetic transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), total bilirubin (TB), alkaline phosphatase (ALP), and total protein (TP) were measured. Additionally, tissue antioxidant levels of glutathione (GSH) and superoxide dismutase (SOD), along with histopathological changes in liver tissue, were examined.
Results: the ethanol-induced hepatotoxicity group showed significant increases in liver weight, SGOT, SGPT, ALP, TB, and lipid peroxidation (LPO), along with a marked reduction in GSH, SOD, and TP levels Compared to the normal group. However, treatment with HAEIB (200 mg/kg and 400 mg/kg p.o.) and silymarin significantly reversed these changes. Histopathological analysis revealed that HAEIB treatment prevented necrosis and inflammation in liver tissue.
Conclusion: The results of this study suggest that HAEIB exhibits hepatoprotective activity, as demonstrated by the improvement in physical parameters, serum enzyme levels, antioxidant status, and histopathological findings.

Keywords: Hepatoprotective, Impatiens balsamina, Ethanol, Silymarin.

G12: Beta Sitosterol Ameroliation in the P13K Signaling Pathway in Relation To Dss-Induced Ulcerative Colitis in Zebrafish Model

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Abstract

Ulcerative colitis (UC) is a chronic inflammatory bowel disease, and Plant phytosterol play a vital role, has exhibited beneficial efficacy against UC. As a clinically frequent disease, it can affect individuals throughout their lives, with multiple complications. In this study, network pharmacology approach and molecular docking in silico were applied to uncover the potential effect of Beto-sterol and molecular mechanisms. The PI3K/Akt signal transduction pathway is involved in the regulation and release of pro-inflammatory cytokines such as TNF-α and plays an important role in the development and progression of UC. Molecular docking of the Beta sitosterol and in vivo Method DSS induced colitis in zebrafish model. Unfortunately, traditional murine models are not efficient for the further study of IBD. The zebrafish model has been used to study the composition of intestinal microbiota, novel genes, and therapeutic approaches. The use of herbal therapy in inflammatory bowel disease (IBD) is increasing worldwide.

Poster Presentation

Stream 4

E01: Comparative evaluation of Intranasal and Intraperitoneal Cigarette smoke extract (CSE) and Intraperitoneal lipopolysaccharide (LPS) administration in chronic pulmonary inflammation mice model: Necroptosis, a key player

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Abstract

Background: Chronic pulmonary inflammation is a critical factor in the pathogenesis of various respiratory diseases. The prolonged inflammation in these diseases is associated with necroptotic cell death. Hence, understanding the mechanisms involved is essential for developing effective treatments. This study aimed to investigate the role of necroptosis as a significant contributor to inflammation and lung tissue damage.
Material and methods: BALB/c mice were subjected to daily administration of cigarette smoke extract (CSE) either intranasal (IN) or weekly intraperitoneal (IP) administration of CSE along with fortnightly intraperitoneal lipopolysaccharide (LPS) for 60 days. At the end of the administration, inflammatory markers, histopathological changes, and necroptotic cell death were assessed in lung tissues.
Result: Our results indicated that both, IN and IP administration of CSE with LPS effectively induced chronic pulmonary inflammation by altering oxidative and antioxidative parameters, infiltrating immune cells, and collagen deposition. Interestingly we observed an activation of necroptosis pathways through increased expression of necroptotic proteins determined through western blotting and immunohistochemistry.
Conclusion: The findings suggest that necroptosis plays a pivotal role in the inflammatory response associated with the pathogenesis of various respiratory diseases, highlighting its potential as a therapeutic target.

E02: Synergistic Potential of *Solanum xanthocarpum* Phytochemicals in Combating Lung Fibrosis-Associated Inflammation: A Bioinformatic Perspectives

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Abstract

Background: Lung fibrosis (LF) is a progressive and critical condition marked by excessive release of inflammatory mediators and accumulation of extracellular matrix, resulting in compromised lung function. Although therapeutic advancements have been made, identifying safe and effective anti-fibrotic agents remain a challenge. *Solanum xanthocarpum* (SOC), an Indian medicinal plant widely used in traditional medicine for treating respiratory conditions such as asthma, cough, and inflammation, holds promise for therapeutic applications, though its underlying molecular mechanisms are not fully understood.

Objective: This study uses multiple bioinformatics tools to investigate the synergistic anti-fibrotic properties of phytochemicals derived from SOC by targeting key regulatory proteins and inflammatory pathways implicated in LF.

Methods: A comprehensive methodology combined with network pharmacology, gene ontology, and pathway enrichment analysis. Databases including IMMPT, GeneCards, DisGeNet, UniProt, SuperPred, DAVID, and PubChem were used to identify potential targets and build networks such as protein-protein, pathway-target, and phytochemical-pathway-target interactions. Key hub genes and pathways were pinpointed, followed by molecular docking and MMGBSA binding free energy calculations to assess the strength of phytochemical-protein interactions, supported by 2D visualization analyses.

Results: The study identified 131 common targets between LF-associated genes and phytochemical targets. Pathway enrichment analysis highlighted fourteen key signaling pathways, including PI3K-Akt, MAPK, and HIF-1. Docking results demonstrated that phytochemicals such as quercetin, apigenin, and solasonine had strong docking scores and favorable binding energy values. The 2D interaction analyses of these compounds showed significant interactions with essential hub proteins, including MTOR, HIF1A, STAT1, and NFKB1.

Conclusion: The results of this study infer that SOC phytochemicals such as quercetin, apigenin, and solasonine have synergistic potential in mitigating LF by interacting with multiple key targets in modulating critical inflammatory pathways.

Keywords: Network Pharmacology, *Solanum xanthocarpum*, Lung Fibrosis, Molecular Docking, PI3K-Akt signaling.

E03: Synthesis, Biological Evaluation, Network Pharmacology, and Molecular Docking of Quinolin-2-one-Sulphonylurea Hybrids as Anti-Diabetic and Anti-Inflammatory Agents

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Abstract

Using a molecular hybridization approach, 20 quinolin-2-one-sulphonylurea hybrids were synthesized through a 4 or 5 step reaction process. The synthesized compounds were evaluated for their in vitro anti-inflammatory and anti-diabetic activities. Compounds 4, 7, 9, 14, 16, and 18 exhibited significant hypoglycaemic activity, with compound 18 showing the strongest activity against glucose modulation (IC50 = 0.63 μM). In addition, compounds 6, 10, and 13 demonstrated notable anti-inflammatory effects by inhibiting key inflammatory mediators. In vitro assays validated the antioxidant and glucose-lowering potential of these compounds, particularly through inhibition of alpha-amylase and alpha-glucosidase enzymes. The mechanism of action for compounds 4, 7, and 18 was further explored using network pharmacology and molecular docking, identifying 15 key genes and 12 associated pathways. Docking studies revealed strong binding affinities of these compounds with alpha ketoreductase, comparable to the standard drug Glibenclamide. ADMET analysis confirmed their oral bioavailability and compliance with Lipinski's rule. These findings emphasize the therapeutic potential of quinolin-2-one-sulphonylurea hybrids as dual anti-diabetic and anti-inflammatory agents. The study lays a strong foundation for future pharmacological and clinical development of these compounds.

E04: Anti-Allergic Activity of Curcuma Vamana on Mast Cell Mediated Allergy by Compound 48/80 in Rodent Models

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Abstract

Background and objective: In Ayurveda Curcuma vamana is used in treatment of various diseases like Abdominal pains, menstrual disorder, wounds, Eczema, Jaundice, Inflammation and Blood purification activity etc. The present study was conducted to evaluate antiallergic activity of ethanol extract of Curcuma vamana on Experimental models.
Materials and methods: The protective effect of ethanol extract of Curcuma vamana against compound 48/80 induced anaphylaxis and pruritis models for acute phase of hypersensitivity reactions were carried out. The late phase hypersensitivity reactions by compound 48/80 induced mast cell degranulation and histamine release from blood along with serum nitric oxide (NO) levels were measured.
Results: The ethanol extract of Curcuma vamana showed inhibitory effect on anaphylaxis induced by compound 48/80 and significant dose dependent anti-pruritic property was observed by inhibiting the mast cell degranulation. Mast cell membrane stabilization activity was also observed in compound 48/80 induced mast cell activation. Dose dependent reduction in the histamine release, along with decreases release of serum, peritoneal fluid and BAL fluid nitric oxide (NO) levels were observed.
Conclusions: These results suggest that the ethanol of Curcuma vamana showed potent anti-allergic activity by inhibition of histamine release from mast cells.

Key Words: Curcuma vamana, Mast cell degranulation, nitric oxide (NO), Anaphylaxis, Pruritus, Hypersensitivity reaction, Histamine release.

E05: In-Vivo Assessment of the Anti-Allergic Efficacy of *Ficus racemosa* Linn. Bark Extract

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Abstract

Introduction: Allergy occur when the immune system reacts excessively to allergens, leading to the release of histamines and other chemicals from mast cells. Ficus racemosa bark extract contains flavonoids, phenols, tannins, glycosides, steroids, alkaloids and saponins.
Aim and Objectives: To evaluate the anti-allergic efficacy of hydroalcoholic extract of *Ficus racemosa* bark (HAEFRB) against Compound 48/80-induced mast cell degranulation in rats using an in-vivo model.
Methods: Albino Wistar rats (180-200g) are randomized into five groups (n=6), based on body weight, On Day 1, Group I receives normal saline (10 ml/kg, orally); Group II - V are sensitized with compound 48/80 (1 mg/kg, s.c.). Group III &IV treated with HAEFRB (200 mg/kg and 400 mg/kg orally); and Group V receives ketotifen fumarate (1 mg/kg orally) respectively till 7 days. On Day 7, two hours after the last treatment, rats were euthanized, Mesenteric pans were mounted on slides groupwise, challenged to 5 µg/ml compound 48/80, except Group I, and stained with toluidine blue, immersed in xylene, and observed under a microscope at 45X magnification. The number of intact and degranulated mast cells were counted, and the percentage of protection in treatment groups were calculated.
Results: Group II treated with Compound 48/80 (1 mg/kg) significantly increased mast cell degranulation as compared to Group I. Treatment with HAEFRB (200 mg/kg and 400 mg/kg) significantly reduced degranulation to 70.53% and 73.00%, while ketotifen fumarate (1 mg/kg) showed the highest protection at 78.55%.
Conclusion: This study shows the significant anti-allergic activity of hydroalcoholic extract of *Ficus racemosa* Linn. Bark may be due to the presence of flavonoids, phenols and tannins, which contribute anti-allergic efficacy and stabilizes mast cells by inhibiting the release of histamine.

Keywords: *Ficus racemosa* Linn.; anti-allergic; mast cells; compound 48/80

E07: Antilithiatic and Nephroprotective activity of Myristica attenuata on ethylene glycol induced lithiasis and gentamicin induced Nephritis

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Abstract

Background and objective: The Myristica attenuata is claimed kidney diseases in the present study to perform Ethylene glycol induced lithiasis and gentamicin-induced nephritis.
Materials and methods: Lithiasis was induced in male Wistar rats with 0.75% ethylene glycol and treated with Cystone (750 mg/kg) and Ethanolic extract of Myristica attenuata (200mg/kg & 400mg/kg) for 28 days. Biochemical markers (serum/urine creatinine, urea, uric acid, magnesium, phosphorus, calcium, oxalate) and kidney tissue components (calcium, phosphate, oxalate) were analyzed alongside histopathology. Gentamicin-induced nephritis (100 mg/kg, 8 days) was treated with selenium (2mg/kg) and Ethanolic extract of Myristica attenuata (200 mg/kg &400 mg/kg). Kidney function markers and antioxidants (SOD, CAT, LPO, GSH) were evaluated.
Results: In lithiasis study, Serum biochemical parameters levels of Creatinine, Urea, and Uric acid, Phosphorus, and Calcium significantly reduced as compared to the control group, and magnesium significantly increased as compared to control group. In urine creatinine, Urea, Uric acid has significantly reduced as compared the control group, oxalate, calcium, Phosphorus and magnesium increases significantly as compared to the control group. Tissue homogenate calcium, oxalate, and Phosphorus significantly decreases as compared to the control group. Gentamicin-treated animals may develop kidney fibrosis. This study examined MAP kinases, nuclear factors, and macrophages in the kidney. In gentamicin-induced nephritis, serum and urine creatinine, uric acid, and urea were lower than the control group. Antioxidants (SOD, GSH, catalase) increased, while lipid peroxidation (LPO) was also higher compared to the control group.
Conclusions: The ethanolic extract of Myristica attenuata diminishes the stone and prevents kidney inflammation. May be potential drug for lithiasis and nephroprotective.

Key words: Antilithiatic, Nephritis (Kidney Inflammation), Myristica attenuata

E08: Montelukast: A Reno-protective Agent Against Acute Kidney Injury in Asthmatics

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Abstract

Background: Cysteinyl-leukotrienes (CysLTs) mechanistically interplay in the pathogenesis of asthma and acute kidney injury (AKI). Montelukast, one of the commonly used anti-asthmatic medications, has shown reno-protective effects via multiple mechanisms in the pre-clinical and clinical studies. Therefore, we hypothesize that the pleiotropic effect of the montelukast will be beneficial in preventing AKI in asthmatics.
Aim: To explore the protective effect of the montelukast against acute kidney injury (AKI) in asthmatics.
Method: We propose a randomized controlled study in the Department of Respiratory Medicine of the Kasturba Medical College, Manipal. The adult patients admitted for uncontrolled asthmatic attacks without any prior kidney problems will be recruited for the study. The envelope method will be used to randomize intervention and control arms. uncontrolled asthmatic attacks and prescribed montelukast, and the control arm will be those without montelukast. These patients will follow up for one week. Intention-to-treat (ITT) analysis will be carried out.
Discussion: Nephropathy studies show that CysLTs reduce renal blood flow and glomerular filtration rate (GFR) by triggering vasoconstriction. In addition, CysLTs are involved in recruiting infiltrating polymorphonuclear cells and consequently exacerbating immune-mediated damage to the kidney. On the other hand, Montelukast, a selective antagonist of leukotriene receptors has a reno-protective effect. The drug exhibits antioxidant, anti-tory, anti-apoptotic, and neutrophil- inhibiting properties, thereby improving kidney function and histopathological changes. In addition, it improves GFR and other kidney dysfunctions.
Conclusion: Although the mounting evidence shows that Montelukast has the potential effect of reducing AKI in different conditions, a well-controlled study with a sufficient sample size should be carried out to test our hypothesis in asthmatics.

Keywords: Acute kidney injury; asthma; Montelukast; Leukotrienes.

E09: Anti-Allergic Activity of Punica Granatum L. Fruit Rind Using Ex-Vivo Model

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Abstract

Introduction: Allergy is a hypersensitivity condition where the immune system reacts to typically harmless environmental elements known as allergens. Punica granatum L., commonly called pomegranate, is a large deciduous shrub from the Punicaceae family. Punica granatum extracts possess antimicrobial, antidiabetic anti-inflammatory, healing activity.

Aim and Objectives: The goal of the current study is to evaluate the mast cell stabilizing properties of hydroalcoholic extracts of Punica granatum Ex-Vivo.

Methodology: Punica granatum L. hydro alcoholic extract was prepared by hot continuous process using Soxhlet extractor, the HAPG extract was quantitatively estimated for phenols, flavonoids and tannins. An Ex-Vivo study was performed using isolated rat mesentery. The mesenteric pans were mounted, grouped and treated with Normal Saline, HAPG, and Disodium cromoglycate (100 µg/ml) as the Standard control. And compound 48/80 induced mast cell degranulation in rat mesenteric pan.

Results: The quantitative estimation of phenols, flavonoids and tannins was found to be 34.46mg GAE/gm, 2.8016mg REq/gm and 17.83mg TAE/gm at 500 µg/ml respectively. The presence of these phytochemicals in HAPG contributed to its antioxidant properties. In Ex Vivo study normal saline exhibited 81.55% intact cells, while Compound 48/80 (5µg/ml) showed 32.55% intact cells. HAPG, at a concentration of 50, 100, 200µg/ml, exhibited mast cell protection of 66.68%, 80.29% and 78.74% respectively. These finding indicate that Punica granatum extract has a protective effect on mast cell.

Conclusion: The present study on HAPG extract showed beneficial effect of Punica granatum L rind in the treatment of allergic diseases, particularly in significant reduction in mast cell degranulation.

E10: Exploring Insulin Signaling: A Comparative Analysis of Presentation and Model-Based Teaching

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Abstract

Background: Teaching the insulin receptor mechanism is a critical topic in understanding cellular signaling and glucose homeostasis, yet the best teaching method remains debated. This study compares the effectiveness of presentations and physical models in enhancing student comprehension.

Methods: A comparative study was conducted with two groups, namely, Group A consisting of ten students & Group B consisting of ten students: Group A receiving traditional slide-based presentations and Group B engaging in interactive physical models. Comprehension was assessed through pre- and post-tests with qualitative feedback.

Results: According to the survey, 80% of Group A rated it with 4 stars, 10% with 2 stars, & 10% with 1 star. While for the model approach, 70% of Group B rated it with 5 stars, 10% with 4 stars, and 20% with 3 stars. Findings suggest that while presentations provide a broad conceptual overview, physical models enhance spatial perception and engagement. Students using models demonstrated higher retention and application skills compared to those exposed to presentations alone.

Conclusion: The survey results indicate a clear preference for the interactive model approach, with most students rating it highly. Despite this, presentations remain valuable for their detailed and systemic explanation of the topic. Therefore, combining both approaches may offer a balanced strategy to maximize learning outcomes in insulin receptor education. Further studies should explore integrating virtual models with physical models for an enhanced learning experience.

Keywords: Insulin receptor mechanism, Slide-based presentations, Physical model.

Poster Presentation

Stream 5

M01: To evaluate the anti-osteoporotic potential of Prunus armeniaca in ovariectomy-induced osteoporosis in female rats.

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Abstract

Background: Traditionally, Prunus armeniaca (Apricot) fruits has been shown great significance in management and treatment of osteoporosis.
Aim & Objectives: To evaluate the anti-osteoporotic potential of Prunus armeniaca in ovariectomy-induced osteoporosis in female rats.
Materials & Methods: The Anti-Osteoporotic activity of alcoholic extract of Prunus armeniaca was carried out in Female Sprague-Dawley rats. The disease was induced by ovariectomy. The evaluation parameters like serum parameters, urine analysis, femur parameter & histopathological studies were performed.
Results: The alcohol extract of Prunus armeniaca has shown Anti-Osteoporotic effect by significantly increasing Uterine weight, Femoral length, weight, density, volume and lumbar hardness. Serum and urine analysis also shows significant decrease in ALP, Calcium, Phosphorus and Creatinine, Calcium and Phosphorus respectively. Ash contents such as ash weight, ash percentage, ash calcium, ash density and ash phosphorus is also increased. Similarly histopathological study also confirmed the effect of the drug on ovariectomized rats.
Conclusion: The findings, of this study shows that the alcoholic extract of Prunus armeniaca (Apricot) fruit possesses significant anti-osteoporotic activity.

Key words: Osteoporosis, Prunus armeniaca, Ovariectomy, In-vivo study.

M02: Unalamation: A Paradigm Shift in Chronic Inflammation Management through Immune Modulation

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Abstract

Diseases such as cancer, cardiac disorders, and autoimmune diseases have underlying chronic inflammation as their pathogenesis. The traditional anti-inflammatory approach is often based on inhibiting the pro-inflammatory cytokines, which disrupts the immune balance. The new concept of Unalamation argues that chronic inflammation is due to a deficiency in anti-inflammatory mediators, contrary to the classical excess of pro-inflammatory activity alone. This imbalance leads to the activation of the immune system for a prolonged period and tissue damage, advocating for immune resolution instead of a suppression approach. Considering this approach, the primary therapeutic objective should be to enhance the activity of anti-inflammatory pathways. Strategies employing biologics like Interleukin-10 agonists and TGF-β modulators targeted to promote immune tolerance. Specialized pro-resolving lipid mediators, derivatives of Omega -3 – Fatty acids like Lipoxin, Resolvins, and Maresins that promote inflammation resolution. Small molecule inhibitors like JAK-STAT pathway modulators and COX-2 inhibitors are currently being re-engineered to focus on immune modulation instead of blockade of inflammatory cascades. Further nutraceuticals, like curcumin and resveratrol, modulate inflammation through natural bioactive compounds. Recently, cell-based therapies like mesenchymal stem cells and regulatory T-cell therapies have directly restored immune Homeostasis. The pharmacological approach of Unalamation lies in its focus on immune modulation rather than suppression, emphasizing pro-resolving drug classes. This novel approach calls for rediscovering inflammation treatment paradigms shifting toward long-term immune balance strategies rather than acute inflammation inhibition. Future research should prioritize identifying biomarkers of Unalamation and conducting clinical trials to validate these novel therapeutic approaches.

M03: Anti-hypertensive and Cardioprotective activity of Sarcostemma acidum against L NAME Induced Hypertension and Isoproterenol Induced Cardiac Damage in Rats

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Abstract

Background and objective: Traditionally, the plant Sarcostemma acidum is used for the treatment of various diseases, including cardiovascular disorders. In present study, ethanol extract of Sarcostemma acidum (ESA) was evaluated for the treatment of myocardial necrosis induced by isoproterenol and L-NAME induced hypertension.

Materials and methods: Antihypertensive activity was carried out on L-NAME induced chronic hypertensive rats. The animals were treated with ESA for 42 days. The various parameters like systolic, diastolic and mean arterial blood pressure were measured by invasive carotid artery cannulation method using AD instrument 8 channels, Lab chart solution software. Cardioprotective activity was carried out on isoproterenol induced myocardial necrosis in Wistar rats by measuring the hemodynamic parameters and levels of biochemical in tissue homogenate and enzyme markers in serum at the end of the experiment.

Results: In antihypertensive activity the ESA at 200mg/kg & 400mg/kg doses and losartan 20mg/kg shown significant reduction in systolic ($p<0.001$), diastolic ($p<0.01$ to $p<0.001$) and mean arterial blood pressure ($p<0.01$ to $p<0.001$) as compared to the control group. The ESA shown cardioprotective activity by significant decrease in lipid peroxidase (LPO), lactate dehydrogenase, CK-MB levels whereas significant increase in SOD ($p<0.05$ to $p<0.001$), catalase ($p<0.01$), glutathione ($p<0005$ to $p<0.01$) and total thiols ($p<0.01$) levels as compared to the control group. Further this protection is supported by measuring infraction area and histopathological findings.

Conclusions: In conclusion, ESA demonstrates strong cardioprotective effects against isoproterenol-induced cardiac damage and antihypertensive activity in L-NAME-induced hypertension in rats.

Key Words: Sarcostemma acidum, L-NAME, carotid artery, AD instrument

M04: Cardioprotective Effects of Amlodipine and Bisoprolol Combination: An Angiogenesis Based Study in Transgenic Zebrafish Embryo

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Abstract

Ischemic heart disease remains leading cause of death worldwide. However, current research strategies address the fundamental problem of lost cardiac tissue and compromised microvasculature particularly in post myocardial infarction. Restoring blood flow to ischemic regions and tissue repair support mechanism of angiogenesis (formation of new blood vessels from a pre-existing vasculature) exemplifies as a promising therapeutic strategy. Clinically, it is reported that Bisoprolol and Amlodipine in combination restores cardiac performance to improve quality of life in post MI patients. In this study, the role of combining Amlodipine with Bisoprolol in promoting cardiac regeneration through angiogenesis via vascular endothelial growth factor receptor 2 (VEGFR2), Platelet-Derived Growth Factor Receptor- β (PDGFR- β), and Fibroblast Growth Factor 1 Receptor (FGFR1) signalling pathways were studied. Molecular docking studies and dynamics simulations were performed to evaluate the binding interactions of both drugs with targeted receptors carried out using Schrodinger LLC Maestro and GROMACS. Angiogenesis effect of the combination was evaluated through the development of intersegmental vessels (ISV) and sub intestinal vessels (SIV) in transgenic zebrafish embryos Tg (fli1: GFP) line. Results showed that both drugs had strong binding affinities to the targeted receptors in silico and had stable molecular dynamics trajectories that suggested sustained drug receptor interactions. By Image analysis, in vivo studies in embryos treated with three combination doses: low (Amlodipine 10 ppm + Bisoprolol 15 ppm), medium (Amlodipine 20 ppm + Bisoprolol 30 ppm), and high (Amlodipine 30 ppm + Bisoprolol 45 ppm) showed dose-dependent increases in blood vessels- ISV and SIV, indicating improved angiogenesis potential as compared to control group. This combination showed promising cardioprotective effect that go beyond their known pharmacological actions by enhancing angiogenesis. This study suggests the potential of such clinically used drug combination in cardiac tissue regeneration by increasing vascularization in post myocardial infarction patients.

M05: Evaluation of wound healing efficacy of hydrogel formulation of Suberohydroxamic acid using adult zebrafish model

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Abstract

The efficacy of a hydrogel formulation containing Suberohydroxamic acid (SHA) for wound healing was evaluated using an adult zebrafish model. SHA, a hydroxamic acid derivative with potential anti- inflammatory and regenerative properties, was incorporated into a biocompatible hydrogel matrix for sustained release. The adult zebrafish model, known for its rapid wound healing and tissue regeneration capabilities, was employed to assess the therapeutic potential of SHA in promoting skin repair following a standardized lesion. The zebrafish were treated with the SHA-loaded hydrogel or a control hydrogel, and wound closure was monitored over a 21-day period using digital imaging. Histological analysis, were performed to investigate the effects of SHA on tissue regeneration, inflammation, and extracellular matrix remodeling. Results demonstrated that the SHA-loaded hydrogel significantly accelerated wound closure, enhanced reepithelialization, reduced inflammation, and promoted collagen deposition compared to the control group. Moreover, the expression of pro- regenerative markers such as VEGF and collagen genes was upregulated in the treated wounds. These findings suggest that SHA has potential as an effective agent for accelerating wound healing and tissue regeneration. Further studies are warranted to elucidate the underlying molecula mechanisms and optimize SHA formulations such as pH, Spreadability, extrudability, Swelling index, Compatibility study, Viscosity clinical applications in wound management.

Keywords: Anti-inflammatory, Suberohydroxamic acid, hydrogel.

M06: Evaluation of Wound Healing and Anti-Inflammatory Effect of Topical Formulations of Boswellia serrata Using Adult Zebra Fish and Macrophage Raw 264.7 Cells

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Abstract

A large majority of the population in the world have employed medicinal plants for their therapeutic needs. There is an urgent need to find scientific evidence of the therapeutic nature of medicinal plants to be used in general practice. Inflammation is a common risk factor in the pathogenesis of conditions such as infections, arthritis, type 2 diabetes mellitus, obesity and cancer. The aim of the present study is to investigate the anti-inflammatory effect of the Boswellia serrata by formulating topical agents of gel and ointment using adult zebra fish model and macrophage RAW 264.7 cells The study has employed the utilization of adult zebrafish to evaluate the wound healing efficiency of the ointment and gel formulation of the B.serrata extract. In vitro anti-inflammatory activity was conducted by albumin denaturation assay, anti-proteinase activity, and membrane stabilization assay which showed a significant % inhibition when compared with standard Aspirin. In this study, we investigated the anti inflammatory activities of B.serrata extract in lipopolysaccharide (LPS)-induced RAW 264.7 macrophages. It was seen that the ethanolic extracts of B.serrata significantly repressed the production of inflammatory mediators such as nitric oxide and the expression of pro inflammatory cytokines in the LPS-stimulated RAW 264.7 cells. Caudal fin transection model was employed for induction of inflammatory wound healing using zebrafish. The parameters for evaluation of wound healing efficacy is the measurement of regenerative capacity of the fin and neutrophil estimation. Histopathological examination of wound was also performed. Upon treatment of 500 µg of ointment, the fishes show a maximum amount of fin regeneration by comparison with gel preparation. Utilisation of the 500 µg of ointment also revealed a high amount of neutrophil count at the side 24 hours after the infliction of wound and a reduction in the inflammatory mediators after one day.

Keywords: Boswellia serrata, Macrophage RAW 264.7 cells,

M07: Applications of Solid Lipid Nano Papain for diabetic wound healing as a modified therapy

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Abstract

Papain is traditionally used in many therapies & also used in the management of specific disease
conditions. However, papain solution is unstable; activity is greatly reduced when exposed to an acidic environment. Therefore, this study aimed to prepare Papain-loaded Solid Lipid Nanoparticles (P-SLN) by investigating the influence of variables on the response using Box-Behnken design (BBD). This involves a systematic exploration of influential factors to optimize the P-SLN. The P-SLNs are thoroughly characterized for Particle size, Zeta potential, Polydispersity index, entrapment efficiency, morphology. Papain-SLN exhibited a diameter of 556.7 ± 1.78 nm, zeta potential of -11.4 ± 3.0 mV, a polydispersity
index of 0.27 ± 0.049 and EE of 83% ± 5.34%. A study of in vitro release shows the slow release of the Papain-SLN the diffusion of the Papain from the lipid matrix & mathematical release kinetics was fitting to the Higuchi model. Safety assessments of the Papain-SLNs were conducted utilizing Caco-2 cell lines. The evaluations involved employing the MTT assay to assess cell viability and the LDH assay to evaluate cell toxicity. The successful optimization of P-SLNs demonstrates the potential to reduce papain's stability. The developed P-SLN used against for the wound healing activity against the conventional papain. The wound healing score was proved better than the conventional P-SLN.

M08: Temporomandibular joint disorder: an in-depth analysis of contemporary understanding and management

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Abstract

Temporomandibular Joint Disorder (TMD) is a multifaceted condition that affects the temporomandibular joint, surrounding muscles, and related structures. Individuals with TMD often experience a range of symptoms, including pain, jaw muscle tenderness, limited jaw movement, and joint noises. These cardinal signs are frequently accompanied by headaches, facial pain, hearing disturbances, dizziness, and a sense of misaligned teeth. Diagnosing TMD involves a comprehensive approach. Clinical assessment, including a physical examination, is essential for identifying symptoms and evaluating the patient's condition. Imaging techniques, such as X-rays, CT scans, and MRI, are valuable for visualizing the joint, detecting dislocations, and assessing joint health. The goal of TMD treatment is to alleviate pain and enhance jaw function. The approach taken depends on the severity and underlying causes. Conservative methods encompass lifestyle adjustments, stress management, and physiotherapy to address muscle imbalances. Pharmacological management may involve pain relievers, muscle relaxants, or anti-inflammatory drugs. In particular, inflammation plays a critical role in TMD, with acute and chronic inflammatory responses resulting from trauma, infection, or systemic conditions like arthritis. Pro-inflammatory cytokines and prostaglandins drive the inflammatory process, leading to joint degradation and pain. Management strategies aim to alleviate symptoms through anti-inflammatory treatments, physical therapy, and emerging targeted biologics, offering improved outcomes. In severe cases, more invasive treatments, like corticosteroid injections or arthrocentesis, may be required. Surgical interventions, such as arthroscopy or joint replacement, are considered in rare instances. Physiotherapy plays a vital role in TMD management. Specialized exercises and manual techniques aid patients in regaining jaw function, reducing pain, and preventing further complications. Tailored treatment approaches that consider diverse symptoms and underlying factors offer hope for improved quality of life and relief from this complex condition.

Keywords: Temporomandibular joint Disorder, Pharmacological Management, Physiotherapy,
Arthrocentesis.

M09: Evaluation of Wound Healing Potential of Annona squamosa Extracts Using an Adult Zebrafish Model

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Abstract

Wound healing is a sequential process involving inflammation, proliferation, and remodeling to restore tissue structure and function. Inflammation, the initial phase, is critical for wound healing, as neutrophils recruited to the site perform key effector functions such as degranulation, cytokine secretion, and phagocytosis. However, unresolved inflammation can impair healing, particularly in aged and diabetic individuals. This study evaluates the wound healing potential of Annona squamosa extracts using a novel, cost-effective adult Zebrafish wound model, which mimics mammalian inflammatory profiles and provides quick, reproducible results. The caudal fin transection technique was employed to assess inflammation and fin regeneration, with neutrophil population dynamics as key indicators. Ethanolic and aqueous extracts of A. squamosa were prepared, formulated into topical gels, and applied to the wound site. The extracts enhanced neutrophil recruitment within 24 hours and promoted faster resolution of inflammation, with the aqueous extract at 500 µg concentration demonstrating superior efficacy. Fin regeneration measurements showed significant improvement by day 5 in treated groups compared to controls. Statistical analysis confirmed the extracts' ability to accelerate the healing process by modulating inflammation. This study highlights the potential of A. squamosa extracts in wound healing and establishes adult Zebrafish as a viable model system for evaluating bioactive compounds. The findings contribute to the development of alternative, efficient models for wound healing research.
Keywords: Wound healing, Inflammation, Annona squamosa, Neutrophil migration

M10: Evaluation of potential anti-inflammatory activity of Paspalum scrobiculatum against acute and chronic inflammation animal model

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Abstract

Background: Inflammatory disorders are common in modern life and plant provide an interesting source for new compounds bearing anti-inflammatory properties. In this regard, paspalum scrobiculatum consider to be promising role against inflammation.
Objective: To evaluate the anti-inflammatory and anti-arthritic activity of ethanolic extract of Paspalum scrobiculatum in animal models.
Materials and Methods: The anti-inflammatory and anti-arthritic activity of ethanolic extract of Paspalum scrobiculatum (EEPS) was evaluated by carrageenan induced paw edema, acetic acid induced writhing response and FCA induced chronic inflammation in animal models.
Results: Molecular docking investigations were carried out on the plant-derived compounds. The ligands bind to the TNF- α (PBD ID: 2AZ5) and COX-1 (PDB ID: 3N8Y) active site regions. The quercetin phytochemical component of EEPS, had a binding affinity of -7.8 kcal/mol towards TNF-α. The EEPS showed significant anti-inflammatory activity by reducing the edema volume ($P<0.001$) against carrageenan-induced paw edema in rat and in acetic acid induced writhing response the EEPS showed significant reduction in hind limb stretches, pelvic rotation ($P<0.05$ to 0.001) as compared to control group. In FCA induced arthritic rats, the treatment with different dose of EEPS shown significant reduction in paw volume and thickness ($P<0.05$ to 0.001). The protective action in arthritic rats was also substantiated by decrease in development of arthritis ($P<0.05$ to 0.001), vascular permeability ($P<0.01$ to 0.001), biochemical parameters ($P<0.01$ to $P<0.001$). Histopathological findings showed significant reduction in destruction of joints.
Conclusion: These results revealed that EEPS shows potential anti-Inflammatory and anti-arthritic activity.

Keywords: Paspalum scrobiculatum, Anti-inflammatory, Carrageenan, Acetic acid, FCA Arthritis.

M11: Anti-Inflammatory and Analgesic Activity of Quinazoline Derivatives in Acute and Chronic Inflammatory Animal Models

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Abstract

Background: Quinazoline derivatives shows both anti-inflammatory and analgesic roles. Their actions are primarily mediated through the inhibition of COX enzymes, modulation of inflammatory cytokines, interference with pain receptors, and potential opoid like effects. These properties make quinazoline derivatives valuable in the development of novel therapeutic agents for treating inflammatory and analgesic conditions.
Aim & Objective: To evaluate anti-inflammatory and analgesic activity of Quinazoline derivatives (AAQ1) and NiAAD3 in acute and chronic inflammatory animal models.
Materials and Methods: The acute anti-inflammatory activity of Quinazoline derivatives were carried out on carrageenan induced model and analgesic activity in acetic acid induced and hot plate method in animals by measuring the paw edema, writhing response and reaction time (time interval taken by animal to lick paw) respectively. The anti-inflammatory activity was carried out on FCA induced chronic inflammation in rats by measuring paw edema, development of arthritis, vascular permeability, release of histamine from blood and haematological parameter. Paw edema was measured with help of digital Plethysmometer.
Results: The Quinazoline derivatives AAQ1 and NiAAD3 3mg/kg, 7mg/kg doses and Diclofenac 10mg/kg showed anti-inflammatory activity by significantly decreasing ($p < 0.01$ to < 0.001) the paw edema, writhing response, hot plate, vascular permeability and histamine were also showing significant reduction ($p < 0.001$), and haematological parameter such as ESR showed significantly ($p < 0.01$) decreased level as compared to the control group.
Conclusion: The above results suggested that the protective role of quinazoline derivatives (AAQ1, NiAAD3 3 & 7mg/kg) in carrageenan induced acute and FCA induced chronic inflammation model. Interestingly, the test compounds AAQ1 and NiAAD3 quinazoline derivatives showed potential analgesic and anti-inflammatory activities.

Key words: Inflammation, Analgesic, Quinazoline derivatives.

M12: Effect of Ficus Racemosa Linn. Bark Extract on Mast Cell Degranulation: an Ex-Vivo Study

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Abstract

Introduction: Ficus racemosa Linn., commonly known as the cluster fig tree, goolar has been used for wide range of ailments such as diabetes, liver disorders, diarrhoea, inflammation and respiratory diseases.

Objective: To evaluate the hydroalcoholic extract of Ficus racemosa bark (HAEFRB) for its anti-allergic activity by Ex-vivo model, mast cell degranulation induced by Compound 48/80 in rat mesentery.

Methodology: The HAEFRB extract was quantitatively estimated for phenols, flavonoids and tannins. An Ex-vivo study was performed using isolated rat mesentery. The mesenteric pans were mounted, grouped and treated with Normal Saline, HAEFRB and Disodium cromoglycate (100µg/ml) as the Standard control. After treatment, all the pans were challenged with Compound 48/80 for 10 minutes except normal saline treated slides. The mesenteric pans were then fixed in formaldehyde, stained with toluidine blue and observed under a microscope to assess mast cell degranulation.

Results: The quantitative estimation of phenols, flavonoids and tannins were found to be 92.09mg GAE/100g, 1,212mg QE/100g and 1.744mg TAE/g respectively. The presence of these phytochemicals in HAEFRB contributed to its antioxidant properties. Normal saline exhibited 75.85% intact cells, while Compound 48/80 (5µg/ml) exhibited 32.17% intact cells. HAEFRB, at a concentration of 10, 25, 50, 100, 1000µg/ml, exhibited mast cell protection of 54.9%, 60.13%, 63.56%, 58.4% and 30.10% respectively. These findings indicate that Ficus racemosa bark extract has a protective effect on mast cells.

Conclusion: The study concludes that HAEFRB, at a concentration of 50µg/ml, demonstrates promising anti-allergic activity through its ability to protect mast cells from degranulation. These findings support the traditional use of Ficus racemosa in managing allergic conditions.

Keywords: Ficus racemosa Linn., Anti-allergic activity, Mast cells degranulation.

M13: Regulations Governing Inflammation Research

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Abstract

Inflammation research is critical in understanding diseases ranging from autoimmune disorders to chronic inflammatory conditions such as arthritis, inflammatory bowel disease, and cardiovascular ailments. However, this field operates within a complex regulatory framework to ensure ethical practices, reproducibility, and the safety of therapeutic advancements. This study highlights key regulatory considerations in inflammation research, emphasizing preclinical and clinical stages, ethical oversight, and compliance with global standards. Preclinical inflammation research often involves animal models to evaluate potential therapies or mechanisms. Guidelines such as the 3Rs Principle (Replacement, Reduction, Refinement) and adherence to the standards outlined by organizations like the OECD and AAALAC are pivotal. These regulations ensure that animal studies are conducted ethically, using validated protocols that minimize harm while maximizing scientific value. The increased demand for human-derived organoid models of inflammation and alternative in vitro strategies stems from regulators' calls for reducing animal utilization. Clinical research on inflammation therapies must comply with Good Clinical Practice guidelines as mandated by the International Council for Harmonization. Regulatory authorities such as the FDA, EMA, and PMDA require rigorous evaluation of study designs, endpoints, and safety monitoring plans to approve clinical trials. For example, biomarkers used to assess inflammatory responses must meet validation criteria for accuracy, sensitivity, and clinical relevance. At every phase, data integrity and reproducibility are essential. Sometimes support of legal frameworks such as GDPR and HIPAA is needed for the collection and sharing of a patient's data for a clinical study targeting inflammatory diseases. In conclusion, regulations surrounding inflammation research serve to align scientific inquiry with ethical and legal standards, fostering the development of safe and effective treatments. Continued collaboration between researchers, industry, and regulatory bodies is essential to navigating the evolving landscape of inflammation research while maintaining patient safety and scientific integrity.

M14: Evaluation of Anti-inflammatory and Analgesic activity of *Suregada angustifolia* leaves extract in animal models

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Abstract

Background: Traditionally *Suregada angustifolia* is used to treat many diseases such as skin infections, leprosy, and cancer etc. it also considers to be promising role against inflammation.
Objective: To evaluate the anti-inflammatory and analgesic activity of methanolic extract of *Suregada angustifolia* [MESA] in animal models.
Materials and Methods: The acute anti-inflammatory activity of *Suregada angustifolia* was carried out on carrageenan and acetic acid induced inflammation and analgesic activity was carried out by hot plate method in animals by measuring the paw edema, writhing response and reaction time (time interval taken by animal to lick paw) respectively. The chronic anti-inflammatory activity was carried out on FCA induced chronic inflammation rats by measuring paw edema, development of arthritis, vascular permeability. Paw edema was measured with the help of digital Plethysmometer.
Results: The *Suregada angustifolia* (MESA) 100, 200 and 400mg/kg doses and Diclofenac 10mg/kg showed anti-inflammatory activity by significant decreasing ($p<0.01$ to $p<0.001$) the paw edema, writhing response, reaction time, arthritis and vascular permeability also showing significant reduction ($p<0.01$) and hematological parameter such as ESR showed significantly ($p<0.01$) decreased level as compared to the control group.
Conclusion: These results suggested that the protective role of *Suregada angustifolia* (MESA 100, 200, 400mg/kg) analgesic in hot plate method, anti-inflammatory in carrageenan induced acute inflammation and FCA induced chronic inflammation model. Interestingly, the test compound Suregada angustifolia showed potential analgesic, anti-inflammatory activity.

Keywords: anti-inflammatory, carrageenan, suregada angustifolia, FCA, MESA.

M15: Phytochemicals from Amherstia nobilis Leaves for Anti-inflammatory Activity

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Abstract

Objective: *Amherstia nobilis* (Fam: Fabaceae), is a sole member of the Amherstia genus. It is a flowering tree originally from Burma, seen occasionally in India. The leaves of this plant have been reported to contain bioactive compounds having anti-inflammatory activity. There is insufficient scientific data for authenticating the leaves, which would benefit future researchers. Thus, the aim of this work is to establish various pharmacognostical, physicochemical, and phytochemical parameters of leaves to serve as benchmarks for quality control and authentication, and eventually, this work will help in the discovery of a new phytomolecule for anti-inflammatory activity.

Methods: The organoleptic, morphological, microscopic, and physicochemical analysis, along with preliminary phytochemical investigations, were performed for the extract. Phytochemical screening involves the preparation of extracts via maceration using ethanol followed by fractionization.

Results: *Amhersia nobilis* leaf anatomy reveals unique midrib and lamina structures, featuring lignified xylem, calcium oxalate crystals, and unicellular trichomes. The extract tested positive for alkaloids, carbohydrates, terpenoids, tannins, phenols, coumarins, flavonoids, and glycosides. GC-MS analysis of the ethanolic extracts identified therapeutically important compounds such as phenol, phytol acetate, and squalene.

Conclusion: Analysis of diverse macroscopic, histological traits and physicochemical properties can offer an efficient and cost-effective approach to identify and standardise the *Amherstia nobilis* leaf. Qualitative phytochemical analysis unveiled a plethora of plant secondary metabolites showcasing significant anti-inflammatory potentials. Consequently, the extract could be harnessed for isolating valuable secondary metabolites, paving the path for future drug discovery.

M16: The Inflammatory Response in MI: From Damage to Repair

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Abstract

Myocardial infarction (MI) is a major cause of morbidity and mortality in the worldwide, with serious economic burden in developed and developing countries. Inflammation is intimately involved in the pathogenesis of cardiovascular disease (CVD) including MI. The measurement of inflammatory markers may be a potent method for identifying individuals with increased inflammation at risk of future cardiovascular events. Cardiac injury, including myocardial infarction, triggers a complex and highly orchestrated inflammatory response, involving the activation of various immune cells and the release of numerous inflammatory responsive elements particularly cytokines (IL-1α, IL-1β, IL-6, TNF-α) elaboration are active after myocardial infarction. The release of verity of damage associated molecular pattern (DAMP) proteins from necrotic cardiac resident cells following acute myocardial infarction (AMI), that stimulate innate immune pathways. DAMPs include high mobility group box-1 (HMBGB1), heat shock proteins, adenosine, and IL-1α, ATP, mt-DNA, which act as ligands for pattern recognition receptors (PRRs), such as Toll-like receptors (TLRs) and nucleotide-binding oligomerization domain-like receptor family of cytosolic proteins (NLRP3, also known as Nod-like receptors), transcription nuclear factor kappa B (NF-kB) in leukocytes, vascular cells and fibroblasts. In response to DAMPs, activated TLRs induce the release of a number of inflammatory responsive elements. Cytokine-mediated induction of adhesion molecules in endothelial cells and integrin activation in leukocytes trigger adhesive interactions, ultimately leading to the recruitment and extravasation of neutrophils, mononuclear cells, monocytes and lymphocytes in the infarcted myocardium. AMI triggers an acute inflammatory response, which serves to repair heart. However, exaggerated inflammatory response leads to adverse left ventricular (LV) remodelling and heart failure. The main purpose of this review is to give a versatile overview of the current understanding of the role of inflammatory responsive elements in MI and to develop novel drugs to treat MI in future by understanding the specific inflammatory target involved in MI.

Key words: Myocardial infarction, Cytokine, Interleukins, Tumor necrosis factor- α (TNF-α).

M17: Recent Drugs to Prevent Chronic Graft-Versus-Host Disease (cGVHD)

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Abstract

Chronic graft-versus-host disease (cGvHD) is a challenging and intricate syndrome featuring diverse clinical characteristics similar to autoimmune and other immunological conditions that occur after allogeneic stem cell transplantation, wherein the donor's immune cells target the recipient's tissues. Standard prophylactic treatments, mainly utilizing calcineurin inhibitors (CNIs) and methotrexate, have successfully decreased acute GVHD but demonstrated minimal effectiveness in preventing cGVHD. Recent progress in pharmacological approaches has brought forth new agents that present encouraging alternatives. These include recently approved medications like ibrutinib, ruxolitinib, and belumosudil which aim at particular pathways related to immunomodulation, along with abatacept and post-transplant cyclophosphamide (PTCy), both of which have proven to be effective alternatives for preventing cGVHD. Ruxolitinib, a Janus Kinase (JAK) inhibitor efficiently regulates cytokine signalling pathways crucial for T cell activation, especially in steroid refractory scenarios. Ibrutinib is a selective and permanent blocker of Bruton's tyrosine kinase (BTK) protein, which is responsible for B cell receptor signalling and the activation of T and B cells. Belumosudil selectively inhibits rho-associated coiled-coil kinase 2 (ROCK2), resulting in decreased T cell activation and inflammation. Research indicates that newly approved drugs have shown better quality of life and response rates, especially for patients exhibiting refractiveness to conventional therapy. Various medications are utilized to prevent chronic graft-versus-host disease (cGVHD), with newly approved treatments and emerging therapies challenging current first-line therapies, becoming second-line treatments used for management after unsuccessful attempts following previous standard therapy.

M18: Integration of Molecular Docking, Molecular Dynamics and Network Pharmacology to Explore the Multi-Target Pharmacology of GSTC3 Against Atherosclerosis

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Abstract

Atherosclerosis (AS) is a lipid-driven chronic inflammatory vascular disease with a complex and interrelated mechanism. AS is a prevalent underlying pathology of cardiovascular diseases (CVDs) characterized by lipid accumulation, SMC proliferation, cell apoptosis, fibrosis, and local inflammation. Herbal medicine is one of the most commonly used alternative medicine for the prevention and treatment of many conditions including CVD. GSTC3, an anti- atherosclerotic polyherbal formulation, containing the extracts of the gum resin of *Commiphora mukul*, root of *Salacia reticulata*, bark of *Terminalia arjuna*, and rhizome of *Curcuma longa*. This study employs a network pharmacology and molecular docking approach to investigate the potential mechanisms underlying the therapeutic effects of candidate components and targets from GSTC3 in the treatment of complications in AS. Candidate components from GSTC3 were extracted from the Dr. Duke's, IMPPAT, PubMed Database and component targets from Swiss Target Prediction and SuperPred web servers, while Atherosclerosis related targets were obtained from Genecards, OMIM, TTD, PharmGKB, and DrugBank. Venn diagram analysis identified common targets. A Protein–Protein interaction (PPI) network and gene enrichment analysis elucidated potential therapeutic mechanisms. Molecular docking evaluated interactions between core targets and candidate components, followed by molecular dynamics simulations to assess stability. We identified 140 potential candidate components and 844 targets in GSTC3 for AS treatment. PPI analysis revealed 17 core targets, and gene enrichment analysis highlighted modulated pathways. Molecular docking showed favorable interactions, with molecular dynamics simulations indicating high stability of key complexes. Our study unveils candidate compounds, core targets, and molecular mechanisms of GSTC3 in AS treatment. These findings provide a scientific foundation for further research and potential development of therapeutic drugs.

Keywords: Atherosclerosis, GSTC3, Network Pharmacology.

M19: Fungal Metabolites: Key Drivers of Inflammation

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Abstract

Fungal metabolites, belonging to the category of secondary metabolites, play an essential role in influencing individual immune responses by affecting key genes related to the inflammatory process. These distinctive compounds, which include mycotoxins, alkaloids, polyketides, and terpenoids, can either initiate or dampen inflammation depending on their chemical composition and the circumstances under which they are introduced into the body. Certain metabolites, such as AFBs, AFs, OTA, and PAT, stimulate the production of inflammatory cytokines like TNF-α, IL-1β, and IL-6, while others, like cyclosporine and lovastatin, act as immunosuppressants, helping to reduce inflammation through their immunosuppressive characteristics. Several of these targets lead to changes in critical signalling pathways such as NF-κB, MAPKs, and TLRs, which are vital for the production of cytokines and the activation of immune cells. Recent studies have highlighted that when non-susceptible conditions emerge in the body, they can alter inflammatory genes, impacting processes like DNA methylation and histone acetylation. Factors that influence individual variations in responses to these interactions include the concentration of metabolites, the length of exposure, and genetic makeup. Fungal metabolites associated with inflammation-related disorders such as cancer, neurodegeneration, and autoimmune diseases are evidently displaying their potential therapeutic roles. Nevertheless, as these metabolites also act as immunomodulatory substances and toxins, their effects on inflammation necessitate additional research. The current study highlights the need for further research into the relevance of fungal metabolites and their significant pathogenic effects to enhance human health.

Keywords: Secondary Metabolites, Inflammation, Immunosuppressants, Signalling Pathways, Inflammatory-Related Disorders