2024

INCD

Nutraceuticals: Basic Science to Clinical Applications

6th International Conference on Nutraceuticals and Chronic Diseases
&
10th meeting of Society for Translational Cancer Research

February 22-24, 2024

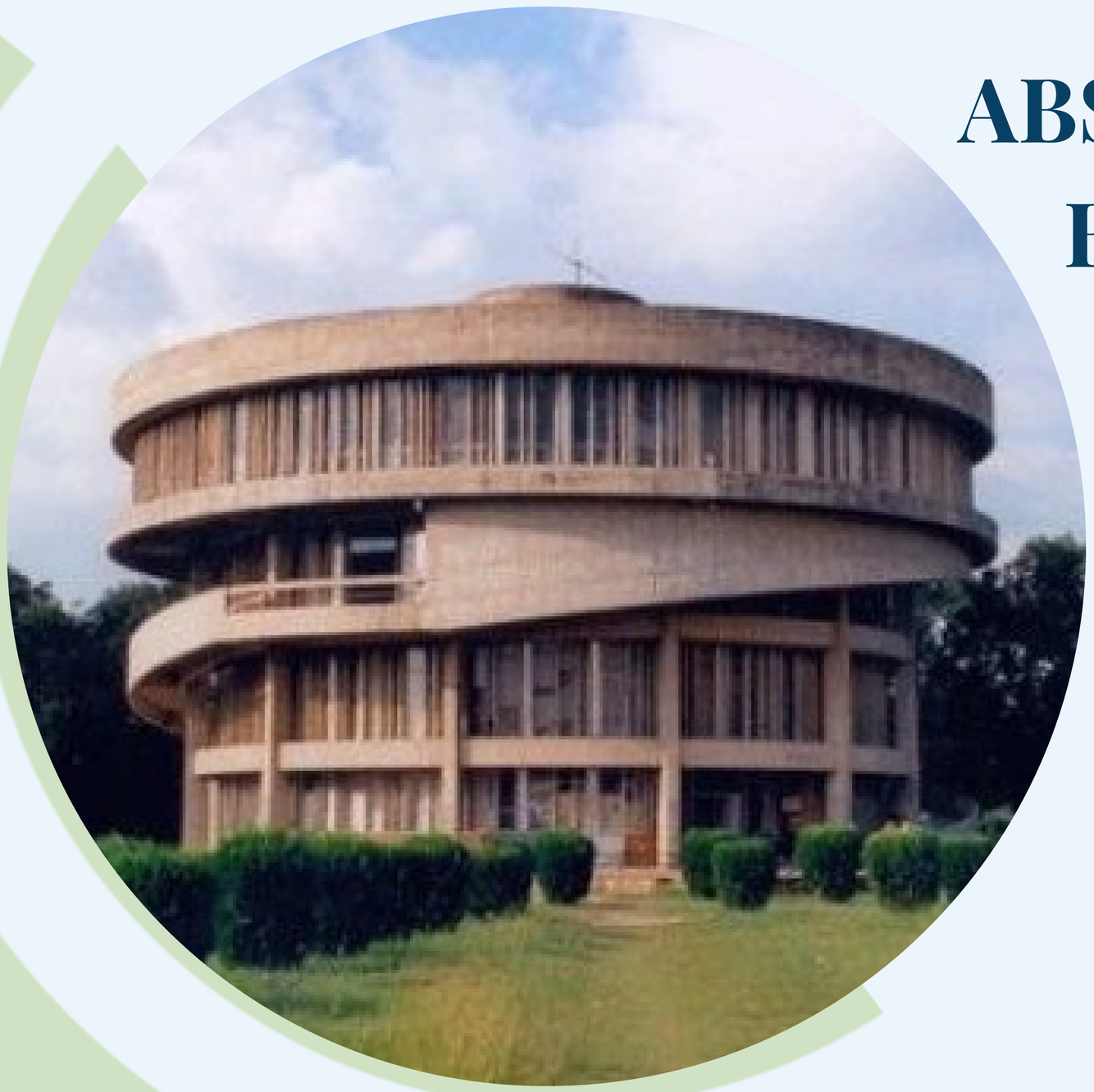
Organized By:
Department of Biochemistry
Panjab University, Chandigarh

SNCD

STCR

PI-RAHI

CRIKC



ABSTRACT BOOK

https://incd.puchd.ac.in

DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology
Government of India

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2024
INCD

Professor Renu Vig
Vice - Chancellor

PANJAB UNIVERSITY
CHANDIGARH, *India* 160 014

MESSAGE

I am delighted to share that the Department of Biochemistry is organizing the 6th International Conference on Nutraceuticals and Chronic Diseases (INCD-2024) from February 22nd to 24th, 2024.

Panjab University takes great pride in championing initiatives that contribute to the global advancement of knowledge and INCD-2024 is a shining example of this commitment. The conference, a flagship academic event, focuses on the escalating burden of morbidity and mortality caused by chronic diseases – an area of significant national and worldwide interest. The chosen conference theme, "Nutraceuticals: Basic Science to Clinical Applications," underscores the importance of bridging scientific research with practical applications.

The conference promises to be a dynamic platform for discussions, covering topics such as the potential of nutraceuticals derived from spices, dietary agents, and medicinal plants in preventing and treating diseases such as cancer, neurodegenerative, cardiovascular, and pulmonary conditions.

I am pleased to note that the conference will feature presentations from both delegates and students, showcasing their work in the domain. This effort will surely contribute to the integration and advancement of nutraceuticals and pharmaceuticals as indispensable tools in our country's healthcare system.

My heartfelt congratulations to the organizers, participants, and sponsors for their collective efforts to shape INCD 2024 into an exceptional event. Thanks for your dedication to creating a platform that fosters meaningful exchanges and breakthroughs in the field.

As the conference unfolds, my warmest wishes to all attendees for a productive and enlightening experience. May the discussions and insights shared during INCD 2024 significantly advance our understanding of nutraceuticals and chronic diseases, making a positive impact on global healthcare practices.

(Renu Vig)

Telephones : 0091-172-2541945 (Office), Fax : 0091-172-2541022, E-mail : vc@pu.ac.in
Website : www.pu.ac.in

MESSAGE FROM THE DIRECTOR RESEARCH AND DEVELOPMENT CELL (DRDC)

PROF. HARSH NAYYAR

MESSAGE

It gives me a great pleasure to welcome the distinguished guests, participants, and delegates to Panjab University on the occasion of 6th International Conference on Nutraceuticals and Chronic Diseases (INCD 2024) on 22-24th February, 2024

The theme of this year's conference **"Nutraceuticals: Basic Sciences to Clinical Applications"** underscores the significance of nutraceuticals in health and disease. It will serve as a platform for discussing a broad spectrum of topics, ranging from basic sciences to recent trends in nutraceutical research, with a focus on their potential in preventing and treating chronic diseases. Chronic diseases not only harm individual health but also strain social support systems and contribute to economic burdens on communities. It is in this context that the role of nutraceuticals becomes paramount. These bioactive compounds, derived from spices, dietary agents, and medicinal plants, have shown promising potential in preventing and mitigating the effects of chronic diseases. The deliberations of this conference shall add knowledge to the various aspect of this very pertinent subject.

The events of the scientific program include orations by eminent scientists around the globe, presentations by young scientists of our country, and poster presentations by the delegates. The scientific committee has taken all possible efforts to ensure a seamless and thought provoking sessions.

I am sure that each of us will find this conference a stimulating and informative meeting. On behalf of the scientific committee, I express gratitude to Society of Nutraceuticals and Chronic Diseases and Society for Translational Cancer Research for giving opportunity to Panjab University to host this mega scientific meet.

MESSAGE FROM CHAIRPERSON, INTERNATIONAL ADVISORY COMMITTEE

PROF. BHARAT B. AGGARWAL

MESSAGE

I'm excited to introduce the International Conference on Nutraceutical and Chronic Diseases (INCD-2024). This conference reflects our dedication to improving healthcare and knowledge in India. Our journey began with the establishment of **the International Society on Translational Cancer Research,** aiming to foster collaboration and innovation in cancer research. Since our inaugural conference in Thiruvananthapuram in December 2005, inaugurated by the esteemed former President of India, Abdul Kalam, we have continued to host biennial conferences.

Recognizing India's rich heritage in spices, Ayurveda, and natural products as medicine, we initiated **the International Symposium on Nutraceuticals and Chronic Diseases.** From Cochin in 2016 to Goa (2017), Rishikesh, Dehradun (2018), and Guwahati, Assam (2019), Delhi (2022) we have strived to delve into the potential of nutraceuticals in combating chronic diseases.

Now, with immense pride and gratitude, we present the sixth edition of this symposium, hosted in Chandigarh in 2024. I extend my heartfelt gratitude to Professor Navneet Agnihotri and Professor Rajat Sandhir, for their invaluable contributions to this conference. May this conference be a source of inspiration, fostering new ideas and partnerships that will lead to breakthroughs in nutraceutical research, ultimately contributing to the prevention and management of chronic diseases worldwide.

My best wishes for the event.

12th February 2024

MESSAGE

Dear Esteemed Delegates,

On behalf of the Society of Nutraceuticals and Chronic Diseases, we extend our warmest greetings to each of you.

Welcome to "The City of Beauty" and the esteemed 6th International Conference on Nutraceuticals and Chronic Diseases. Since its inception in 2016 in Kochi, Kerala, India, our conference series has been dedicated to fostering nutraceutical research aimed at preventing and treating chronic diseases. Over the years, we have successfully convened five conferences, each contributing to vibrant discussions and advancements in the field. From Bogmallo, Goa (2017) to Delhi University, Delhi (2022), these gatherings have not only facilitated fruitful dialogue but also inspired budding researchers towards the vast potential of nutraceutical exploration.

We are delighted that this year's conference is hosted by Panjab University, under the esteemed guidance of Prof. Navneet Agnihotri and Prof. Rajat Sandhir. The overwhelming response from academia, students, and industry reaffirms the significance of our collective mission. We are confident that the exchange of ideas and networking opportunities provided by this conference will further catalyze nutraceutical research, both in India and beyond.

We humbly request your unwavering support for the success of this conference. Our gratitude extends to Panjab University and the dedicated organizers for their invaluable efforts in bringing this event to fruition.

Together, let us embark on this journey towards advancements in nutraceutical research and the alleviation of chronic diseases.

With warm regards

On behalf of Society for Nutraceuticals and Chronic Diseases

Prof. Ajaikumar B. Kunnumakkara
(Executive Secretary)
&
Prof. Oommen V. Oommen
(President)

Society for Translational Cancer Research

Register No : Reg. No: T-766/07

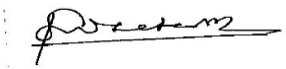
PROF. P.R. SUDHAKARAN
PRESIDENT, SOCIETY OF TRANSLATIONAL CANCER RESEARCH

MESSAGE

I am extremely pleased that the Department of Biochemistry of The Panjab University is organizing the 10th Translational Cancer Research Symposium of the Society for Translational Cancer Research along with INCD24 of the Society for Nutraceuticals and Chronic Diseases during 22nd - 24th February 2024. The organizers deserve special appreciation for conducting a workshop for young researchers on "Identification, characterization and formulation of Nutraceuticals" preceding the conference on 21st February.

Development and application of new tools and techniques have led to tremendous advances in cancer research. Recent advances have brought into spotlight the importance of tumor microenvironment, cellular communication, metabolic reprogramming of tumor cells and several other factors critical for tumor growth and metastasis. Heterogeneity of tumor is becoming increasingly evident thanks to advances in single cell analysis. RNA splicing anomalies and miRNA dysregulation associated with tumor development are being recognized. Sensitive and high throughput methodologies generate huge body of data globally. Computational and AI based tools are being developed to analyze these data. Several driver genes have been identified and molecules that target them are under active investigation. Efforts to overcome drug resistance and possibilities of adjuvant therapy are being explored. Leveraging traditional knowledge, several natural products and new molecules are being investigated. Importance of diet and life style in human health and disease is being increasingly recognized and the new era of research, including population-based studies repeatedly remind us about the importance of dietary factors and nutraceuticals in chronic disease development and management. This joint meeting of the Society for Translational Cancer Research and the Society for Nutraceuticals and chronic disease, being organized under the auspices of the Department of Biochemistry of the Punjab University, Chandigarh in collaboration with several National Laboratories in Chandigarh is particularly significant in this context.

It is a matter of great satisfaction that participants from both within and outside India, including senior scientists, will be discussing an impressive array of topics relating to cancer, nutraceuticals and other chronic diseases, during this conference. It also provides a suitable platform for young researchers to present and discuss their research with experts in their area and help networking and develop collaborations. The Society is extremely thankful to the Department of Biochemistry of the Punjab University, particularly to Professor Navneet Agnihotri for organizing this event putting together an excellent technical programme. It is my privilege, on behalf of STCR, to wish an intellectually exciting and socially rewarding time to all the members of both the societies and the delegates.



Prof.(Dr). P.R. Sudhakaran
M.Sc., Ph.D., FAMS Dept. of Computational Biology & Bioinformatics,
University of Kerala, Thiruvananthapuram, India.

FROM THE DESK OF ORGANIZING SECRETARIES, INCD 2024

Prof. Navneet Agnihotri

Prof. Rajat Sandhir

Dear Participants and Esteemed Colleagues,

It is with immense pleasure and anticipation that we extend a warm welcome to you for the 6th International Conference on Nutraceuticals and Chronic Diseases (INCD 2024), organized by Department of Biochemistry of Panjab University. This prestigious event is scheduled to take place from February 22nd to 24th, 2024, with an exciting pre-conference workshop on February 21st, 2024, focusing on "Nutraceuticals: Isolation, Characterization, and Formulation."

The conference will delve into a spectrum of topics, ranging from nutraceuticals derived from spices, dietary agents, and medicinal plants, and their therapeutic applications in chronic diseases such as cancer, neurological and neuromuscular disorders, metabolic disorders, immunological diseases, and emerging infectious diseases. The upcoming conversations will explore the most recent advancements in phytochemicals aimed at combating cancer, molecular targets for treatment, and techniques for drug delivery, alongside exploring alternative therapies and innovative domains within nutraceutical research. Our delegates represent a rich tapestry of knowledge including renowned scientists, nutritionists, and practitioners of various medical disciplines, including allopathic, ayurvedic, homeopathic, unani, modern, and traditional medicine.

Our program encompasses a diverse array of sessions, including plenary sessions, invited lectures, young scientist award sessions for oral and poster presentations and a stimulating panel discussion. We are confident that these sessions will foster insightful discussions and catalyze innovative research collaborations.

We extend our heartfelt gratitude to the pivotal financial support from Panjab University and esteemed government funding agencies like DBT, SERB (DST), RUSA, UT-DST, and CSIR. Special thanks are due to our corporate sponsors, including ThermoFisher Scientific Eppendorf, Merck, Regeneration Technologies and Himedia, and others, whose generous contributions have played a crucial role in making this conference a reality. Special gratitude is extended to Friends of Narula Research, USA, and our esteemed colleagues at Horiba Ltd., whose significant support made this event possible. We are sincerely indebted to the unwavering support offered by Prof. Acharan S. Narula, whose commitment ensures the success of not only the current but also upcoming INCD conferences.

Our heartfelt appreciation goes out to our collaborating institutions for their instrumental role in every aspect of the conference. We would also like to express our sincere thanks to the organizing committee, Scientific Advisory committee, volunteers from the Department of Biochemistry, and everyone involved in contributing to make this event truly memorable. Finally, we would also like to express our gratitude to the Society of Nutraceuticals & Chronic Diseases (SNCD) and the Society of Translational Cancer Research (STCR) for entrusting us with the responsibility of hosting this esteemed conference. Your belief in our capabilities is deeply appreciated, and we are honored to have had the opportunity to collaborate with you.

To all the participants, thank you for your active involvement in this meeting and for encouraging your colleagues and students to be a part of this conference. We are confident that your participation will be an enriching and rewarding experience. Finally, we hope that your stay in the modest accommodations provided in different guest houses of Panjab University will be comfortable. Any inadvertent inconvenience caused is deeply regretted.

Best regards,

Prof. Navneet Agnihotri
Organizing Secretary
Department of Biochemistry
Panjab University, Chandigarh-160014

Prof. Rajat Sandhir
Co-Organizing Secretary
Department of Biochemistry
Panjab University, Chandigarh-160014

2024 INCD

Celebrating the auspicious occasion of the 6th International Conference on Nutraceuticals and Chronic Diseases & 10th Meeting of the Society for Translational Cancer Research

Nutraceuticals: Basic Science and Clinical applications

Being held at

The Department of Biochemistry, Panjab University, Chandhigarh, Panjab, India

During February 22-24, 2024

The friends of Narula Research, LLC at Chapel Hill, NC, USA are delighted and grateful for the opportunity to offer a

Conference Dinner - as a "Guru ka Langar"

A luminary example to honor the divine in the heart of man by selfless service that is free of the ego cage of "I, Me and Mine"

Best wishes and choicest greetings to the Organizers, Foreign and domestic Invited Speakers, Delegates, & Volunteers of the Conference

Acharan S. Narula and Susan H. Narula,
Narula Research, LLC, Chapel Hill, NC 27516, USA

(December 25, 2023)

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ORGANIZING SOCIETIES

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(Reg. No. T-766/07)

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Society of Nutraceutical & Chronic Diseases
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(**Vice President**)

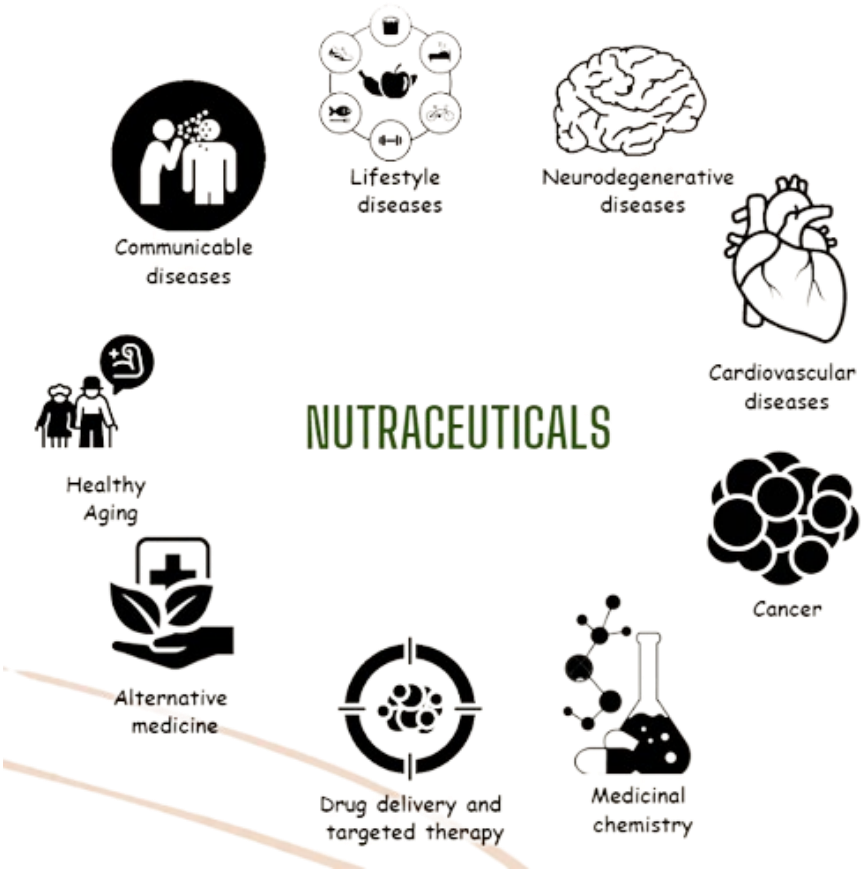
Ajai K. Kunnumakkara
(**Secretary**)

Sreejith P.
(**Joint Secretary**)

Subash Gupta
(**Treasurer**)

ABOUT THE CONFERENCE

"**6th International Conference on Nutraceuticals and Chronic Diseases (INCD-2024)**", an annual meeting of the **Society for Nutraceuticals and Chronic Diseases (SNCI)** will be held at Chandigarh. The earlier International Conferences of SNCI held at various locations in India (Cochin in 2016; Goa in 2017, Rishikesh in 2018; Guwahati in 2019 and Delhi in 2022) had an overwhelming response and were a huge success. INCD 2024 is expected to provide a platform for exchange of knowledge, research expertise and ideas among the participants from across the globe in the area of nutraceuticals and chronic diseases. Keeping in mind the importance of nutraceuticals in health and disease, the conference has been planned with the theme "Nutraceuticals: Basic Science to Clinical Applications". The conference plans to focus on the following topics:



The conference will provide a forum to discuss and deliberate on a wide range of topics from basic science to advances and recent trends in nutraceutical research and their potential in prevention and treatment of chronic diseases. The delegates will be an amalgamation of experts from various fields and would include scientists, nutritionists, allopathic, ayurvedic, homeopathic, unani, modern and traditional medicine practitioners. Another added attraction of the meeting would be participation of various nutraceuticals and pharmaceuticals industries.

On behalf of Panjab University Chandigarh, we are pleased to invite you to the 6th International Conference on Nutraceuticals and Chronic Diseases, 22nd - 24th February, 2024 to deliberate on the vast potential of nutraceuticals in the prevention and treatment of chronic diseases.

ABOUT PANJAB UNIVERSITY

Panjab University (PU) is one of the oldest Universities of India, established in 1882 at Lahore, now in Pakistan, and was shifted to independent India in 1947. It has a campus spread in an area of 550 acres located in Sector 14 and 25 of Chandigarh. PU is imparting education to over 2.5 lakh students through its 78 teaching and research departments located on the twin campus at Chandigarh and through 200 affiliated/constituent colleges spread over Punjab and Chandigarh besides 4 Regional centers at different places in Punjab. The University supports excellence and innovation in academic programmes, promotes excellence in research, scholarship and teaching. The University is ranked among the top Institutions in the

Country by the various National and International accreditation agencies. **Panjab University website: https://puchd.ac.in**

A university stands for humanism, for tolerance, for reason, for the adventure of ideas and for the search of truth. It stands for the onward march of the human race towards ever higher objectives. If the universities discharge their duties adequately, then it is well within the nation and the people"

--Pandit Jawaharlal Nehru

ABOUT DEPARTMENT OF BIOCHEMISTRY

The Department of Biochemistry was established in 1962 and has grown steadily over the years and is recognized as a leading center for teaching and research in the country. The department offers undergraduate and postgraduate and doctoral degrees in Biochemistry. The faculty members of the department are engaged in the research in the areas of Cancer Biology, Neurobiochemistry, Biosensors, Immunological Disorders, Experimental Therapeutics, Microbial Biochemistry and Stress Biology. The Alumni of the department occupy prestigious positions in academia and industry. The faculty of the research in the department is supported by extramural grant from all the major funding agencies. The Department has received support from the University Grants Commission (UGC), Department of Science & Technology (DST) and Department of Biotechnology (DBT) for infrastructure grants. **Department of Biochemistry website: https://biochemistry.puchd.ac.in/**

Scientific Programme

Pre-Conference Workshop Nutraceuticals: Isolation, Characterization and Formulation February 21st 2024 (Wednesday)		
9.00am to 9:30am	**Registration & Inauguration**	
9:30am to 11:00am	**Prof. Sanjay Jachak** **(NIPER, Mohali, INDIA)**	**Isolation, Characterisation and Purification of Nutraceuticals**
11:00am to 11:30am	**Tea**	
12:00pm to 1:00pm	**Dr. Ankit Saneja** **(CSIR-IHBT, Palampur, HP, INDIA)**	**Novel Formulation Approaches for Augumenting the Bioavailability & Therapeutic Efficacy of Nutraceuticals**
1:00pm to 2:00pm	**Lunch**	
2:00pm to 5:00pm	**Prof. Sanjay Jachak** **(NIPER, Mohali, INDIA)**	**Hands on experience and training**

DAY 1 February 22nd 2024 (Thursday)			
8:30am to 9:30am	**Registration**		
9:30am to 11:00am **Venue: Golden Jubilee Hall, PU, Chandigarh**	**Inauguration Ceremony &** **Keynote Lecture by: Prof. Dulal Panda** (NIPER, Mohali, INDIA)		
11:00am to 11:30am	**High Tea**		
11:30am to 1:35 pm **Venue: Golden Jubilee Hall, PU, Chandigarh**	**PS1: Plenary Session-1** **SESSION: SPICE IN LIFE: NUTRACEUTICALS** **Chairperson:** **Prof. Sanjay V. Malhotra** (Oregon Health & Science University, Portland, USA) **Prof. Oommen V Oommen** (University of Kerala, Thiruvananthapuram, Kerala, INDIA)		
	11:30am- 11:55am	**PT1: Prof. Bhimanagouda Patil** (Texas A&M University, Houston, USA)	**Revisiting Citrus Flavonoids: Potential for Preventing Cancer and Improving Gut Health**
	11:55am-12:20pm	**PT2: Prof. Oommen V Oommen** (University of Kerala, Thiruvananthapuram, INDIA)	**Nutraceuticals Research and Biodiversity Conservation**
	12:20pm- 12:45pm	**PT3: Prof. Subhash C. Chauhan** (University of Texas, Rio Grande Valley, Texas, USA)	**Antibody mediated Targeted Drug Delivery approach for Pancreatic Tumors**
	12:45pm-1:10pm	**PT4: Prof. Sanjay V. Malhotra** (Oregon Health & Science University, Portland, USA)	**Designing drugs to combat resistance against cancer treatment**
	1:10pm-1:35pm	**PT5: Prof. Tej K Pandita** (Texas A&M University, Houston, USA)	**Role of stem cell factor Nanog in chromatin structure and DSB repair**
1:35pm to 2:30pm	**Lunch** **Venue: Golden Jubilee Hall (Lawns), PU, Chandigarh**		
2:30pm to 4:00pm **Venue: Golden Jubilee Hall, PU, Chandigarh**	**IT1: Invited Talks-1** **SESSION: NUTRACEUTICALS AND THERAPEUTICS** **Chairperson:** **Prof. Subhash C. Chauhan** (University of Texas, Rio Grande Valley, Texas, USA) **Prof. Subash C. Gupta** (AIIMS, Guwahati, INDIA)		
	2:30pm-2:50pm	**IT1: Prof. Ajay Goel** (BRI, City of Hope, California, USA)	**The role of dietary botanicals in the prevention and treatment of gastrointestinal cancers**
	2:50pm-3:10pm	**IT2: Prof. Rana P. Singh** (JNU, New Delhi, INDIA)	**Halting Mitochondrial Exchange Inhibits Chemotherapy Resistance in Cancer**
	3:10pm-3:30pm	**IT3: Prof. Sushil K. Jain** (Louisiana State University, USA)	**A Novel Approach to treat vitamin D deficiency: A placebo controlled double blind clinical trial in African Americans**
	3:30pm-3:50pm	**IT4: Prof. Shilpa Buch** (University of Nebraska Medical Center, Omaha, USA)	**HIV-Tat & Morphine mediated astrocytic senescence & Alzheimer's like pathology leading to EV mediated neuronal injury**

<table>
<tr><td>2:30pm to 4:00pm
<u>Venue</u>: ICSSR Hall-I, PU, Chandigarh</td><td>PARALLEL SESSIONS</td><td colspan="3"><u>ILS2: Invited Talks-2</u>
<u>SESSION</u>: NUTRACEUTICAL SOLUTIONS FOR LIFESTYLE DISORDERS
Chairperson:
Prof. Ajaikumar B. Kunnumakkara (IIT, Guwahati, INDIA) and
Prof. Sharmistha Sinha (Institute of Nano-Science & Technology, Mohali, Punjab)</td></tr>
<tr><td></td><td></td><td>2:30pm-2:50pm</td><td>IT5: Prof. Irfan Rahman
(University of Rochester Medical Center, New York)</td><td>Nutraceuticals in Chronic Lung Aging Diseases: Potential for Therapeutic Targets</td></tr>
<tr><td></td><td></td><td>2:50pm-3:10pm</td><td>IT6: Prof. Jayanth Ramadoss
(Wayne State University, Detroit, USA)</td><td>Phosphatidic Acid, a Direct Alcohol-Target Lipid Rescues Fetal Growth Restriction & Maternal Uterine Artery Dysfunction in Rat FASD Model</td></tr>
<tr><td></td><td></td><td>3:10pm-3:30pm</td><td>IT7: Dr. Manorama Patri
(Central University of Himachal Pradesh, INDIA)</td><td>Neuroprotective Potency of Saffron Stigma Extract and Crocin against Benzo[a]pyrene-induced Neurodegeneration in Zebrafish (Danio rerio)</td></tr>
<tr><td></td><td></td><td>3:30pm-3:50pm</td><td>IT8: Prof. Prabhudas S. Patel
(The Gujrat Cancer & Research Institute, Ahmedabad, INDIA)</td><td>Identification of therapeutic targets for oral cancer using Computational and Biomolecular approaches</td></tr>
<tr><td>3:00pm to 4:00pm
<u>Venue</u>: ICSSR Hall-II, PU, Chandigarh</td><td></td><td colspan="3"><u>Young Scientist Award Session-1</u>
Chairperson:
Prof. Indu Verma (PGIMER, Chandigarh, INDIA)
Prof. Amarjit Singh Naura (Panjab University, Chandigarh)</td></tr>
<tr><td></td><td></td><td colspan="2">OP1: Sosmitha Girisa
(Indian Institute of Technology Guwahati, Assam, India)</td><td>Withaferin A Suppresses Mortalin-Regulated Oral Carcinogenesis by Targeting Akt/mTOR Signaling</td></tr>
<tr><td></td><td></td><td colspan="2">OP2: Sweta Makwana
(Central University of Rajasthan, India)</td><td>Unmasking TRIMp: Exploring its Oncogenic Role and Investigating Plant-Derived Compounds for Breast Cancer Treatment</td></tr>
<tr><td></td><td></td><td colspan="2">OP3: Kajal
(Lovely Professional University, Phagwara, Punjab, INDIA)</td><td>Anticancerous potential of phytoconstituents frombroccoli-extract against breast cancer</td></tr>
<tr><td></td><td></td><td colspan="2">OP4: Dr. Anam Ashraf
(Jamia Millia Islamia, New Delhi, INDIA)</td><td>Noscapine: Repurposing an opium alkaloid as a potential anti-cancer drug through Aurora Kinase B inhibition</td></tr>
<tr><td></td><td></td><td colspan="2">OP5: Saba Noor
(Jamia Millia Islamia, New Delhi, INDIA)</td><td>Investigating AURKB Inhibitory Potential of Baicalin: A Targeted Approach towards Lung Cancer Therapy</td></tr>
<tr><td></td><td></td><td colspan="2">OP6: Trivedi Tithi Shailendra
(Gujarat University, Ahemdabad, INDIA)</td><td>Decoding Nature's Harmony: MicroRNA Orchestration by Holarrhena pubescens and its Revolutionary Implications in Medicinal Plant Therapeutics</td></tr>
<tr><td>4:00pm to 5:00pm
<u>Venue</u>:
Golden Jubilee Hall (Dining area), PU, Chandigarh</td><td colspan="4">Poster Session-1
Moderator: Prof. Sukesh Chander Sharma</td></tr>
<tr><td>4:00 pm to 4:30 pm</td><td colspan="4">Tea</td></tr>
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<table>
<tr><td>4:30pm to 6:00pm
<u>Venue</u>: Golden Jubilee Hall, PU, Chandigarh</td><td rowspan="5">PARALLEL SESSIONS</td><td colspan="3"><u>ILS3: Invited Talks-3</u>
<u>SESSION:</u> Nutraceuticals and Epigenetics
Chairperson:
Prof. Sushil K. Jain (Louisiana State University, USA) and
Prof. Sanjay Jachak (NIPER, Mohali, INDIA)</td></tr>
<tr><td>4:30pm-4:50pm</td><td>IT9: Prof. Jyotdeep Kaur (PGIMER, Chandigarh, INDIA)</td><td>Folic acid and vitamin B12 imbalance in pregnancy and newborn outcomes: a transgenerational epigenetic study</td></tr>
<tr><td>4:50pm-5:10pm</td><td>IT10: Prof. Chandi C. Mandal (Central University of Rajasthan, INDIA)</td><td>Interplay between oncogene ZNF726 and DNMT1 for breast tumorigenesis in association with dysregulated cellular cholesterol levels</td></tr>
<tr><td>5:10pm-5:30pm</td><td>IT11: Dr. Anil Mukund Limaye (IIT, Guwahati, INDIA)</td><td>Enterolactone, a mammalian enterolignan, regulates CYP1A1 expression in MCF-7 breast cancer cells</td></tr>
<tr><td>4:30 pm to 6:00 pm
<u>Venue:</u> ICSSR Hall-I, PU, Chandigarh</td><td colspan="3"><u>ILS4: Invited Talks-4</u>
<u>SESSION</u>: Innovative and Therapeutic Nutraceuticals
Chairperson:
Prof. Jayanth Ramadoss (Wayne State University, Detroit, USA)
Prof. Prabhudas S. Patel (The Gujrat Cancer & Research Institute, Ahmedabad, INDIA)</td></tr>
<tr><td>4:30pm-4:50pm</td><td>IT12: Prof. Subash C. Gupta (AIIMS, Guwahati, INDIA)</td><td>Elucidating the therapeutic potential of mitochondrial prohibitin and a small molecule inhibitor for breast cancer therapy</td></tr>
<tr><td>4:50pm-5:10pm</td><td>IT13: Prof. Satwinderjeet Kaur (GNDU, Amritsar, INDIA)</td><td>Cassia fistula L.: ‘Golden shower’ tree with promising chemopreventive potential</td></tr>
<tr><td>5:10pm-5:30pm</td><td>IT14: Dr. Shivraj Hariram Nile (NABI, Mohali, INDIA)</td><td>Unlocking Nature's Treasure-Harnessing Fruit Biowaste for Innovative Nutraceuticals in the Development of Functional Foods and Therapeutic Drugs</td></tr>
<tr><td>5:30pm-5:50pm</td><td>IT15: Dr. Ankit Saneja (IHBT, Palampur, INDIA)</td><td>Deciphering the complexation Mechanism of Nutraceuticals with Cyclodextrin Derivatives and its translational Potential for development of Oral Thin Films</td></tr>
<tr><td rowspan="3">6:00pm to 6:20pm
<u>Venue</u>: Golden Jubilee Hall, PU, Chandigarh</td><td colspan="3">Industry Talks</td></tr>
<tr><td>Dr. Ankur Gautam (MERCK)</td><td colspan="2">Skilling India through MERCK Labs</td></tr>
<tr><td>Dr. Piyush Das (Thermo Fisher Scientific)</td><td colspan="2">Unlocking the Future of Life Sciences-Our Unique Value Proposition in Research</td></tr>
<tr><td>6:20pm to 6:50pm
<u>Venue</u>: Golden Jubilee Hall, PU, Chandigarh</td><td colspan="4">General Body Meeting of the Society for Nutraceuticals and Chronic Diseases</td></tr>
<tr><td>6:50pm to 7:50pm
<u>Venue</u>: Law Auditorium, PU, Chandigarh</td><td colspan="4">Cultural Programme</td></tr>
<tr><td>8:00pm onwards</td><td colspan="4">Dinner
<u>Venue</u>: Golden Jubilee Hall (Lawns), PU, Chandigarh</td></tr>
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DAY 2 February 23rd 2024, (Friday)			
8:30am to 9:00am	**Registration**		
9:00am to 11:05am **Venue: Golden Jubilee Hall, PU, Chandigarh**	**PS2: Plenary Session-2 (HYBRID MODE)** **SESSION: HONOURING CONTRIBUTIONS OF PROF. SUKH DEV** **Chairperson:** **Prof. Arun Kumar Grover** (Former Vice-Chancellor, Panjab University, Chandigarh) **Prof. Anand Swaroop** (National Institutes of Health, Bethesda, USA)		
	9:00am-9:35am	**PT6: Dr. Acharan S. Narula** (Narula Research, LLC, Chapel Hill, North Carolina, USA)	**Inflammation, Immunity, Chronic Diseases and Cancer: When the "Standard of Care" has been exhausted, what is next? Leads for Drug Development from traditional medicine and Natural Products**
	9:35am-10:00am	**PT7: Prof. Sudesh Kumar Yadav** (CSIR-IHBT, Palampur, INDIA)	**Himalayan bioresources – A treasure trove of nutraceuticals for combating chronic diseases**
	10:00am-10:25am	**PT8: Prof. Anand Swaroop** (National Institutes of Health, Bethesda, USA)	**Genetic susceptibility, epigenome and influence of diet and age on pathogenesis of age-related macular degeneration**
	10:25am-10:50am	**PT9: Prof. Deepak Kumar** (North Carolina Central University, Durham, USA)	**Environmental Exposure and Chronic Disease Outcomes**
11:00am to 11:30pm	**Tea**		
11:30am to 2:00pm **Venue: Golden Jubilee Hall, PU, Chandigarh**	**PS3: Plenary Session-3** **SESSION: NUTRACEUTICAL INTERVENTIONS FOR STRESS AND CANCER (DAILAB PIKNIKH SERIES 54)** **Chairperson:** **Prof. Ajay Goel** (BRI, California, USA) and **Dr. Sunil Kaul** (AIST, JAPAN)		
	11:30am-11:50am	**PT10: Dr. Renu Wadhwa** (AIST, JAPAN)	**Nutraceutical and Pharmaceutical Potential of Honeybee Propolis**
	11:50am-12:05pm	**PT11: Dr. Sunil Kaul** (AIST, JAPAN)	**Ashwagandha and Stress Management: Experimental evidence from Cell Culture Based Assays**
	12:05pm-12:20pm	**PT12: Dr. Yoshihiro Ohmiya** (AIST, JAPAN)	**Luciferase based screening system for nutraceuticals**
	12:20pm-12:35pm	**PT13: Prof. Ajaikumar B. Kunnumakkara** (IIT, Guwahati, INDIA)	**Curcumin formulations for enhanced bioavailability and efficacy: What we learned thus far?**
	12:35pm-12:50pm	**PT14: Dr. Fayaz Malik** (CSIR-Indian Institute of Integrative Medicine Sanat Nagar, Srinagar, INDIA)	**Elimination of Chemo-resistant Stem-like Cells in TNBCs by a Novel Stem cell Modulator led to better treatment outcome**
	12:50pm-1:05pm	**PT15: Dr. Jaspreet Kaur Dhanjal** (Indraprastha Institute of Information Technology, Delhi, INDIA)	**Hypoxia stress and neurodifferentiation signalings: experimental and computational perspectives**

	1:05pm-1:20pm	**PT16: Dr. Shanuja Beri** (Kalindini College, University of Delhi, INDIA)	**Antiperoxidant Treatment for Iron-Induced Epilepsy- An Experimental Study**
	1:20pm-1:35pm	**PT17: Prof. Pratap K. Pati** (GNDU, Amritsar, INDIA)	**Biotechnological interventions in medicinal and nutritionally rich crops**
1:35pm to 2:30pm	**Lunch** **Venue: Golden Jubilee Hall (Lawns), PU, Chandigarh**		
2:30 pm to 4:00 pm **Venue: Golden Jubilee Hall, PU, Chandigarh**	**PARALLEL SESSIONS** **IT5: Invited Talks-5** **SESSION: UNVEILING METASTASIS IN CANCER** **Chairperson:** **Prof. Pratap K. Pati** (GNDU, Amritsar, INDIA) **Prof. Shalmoli Bhattacharrya** (PGIMER, Chandigarh, INDIA)		
	2:30pm-2:50pm	**IT16: Dr. Manish K. Tripathi** (University of Texas, McAllen, USA)	**Exploring the Role of lncRNA Malat1 in Advancing CRC and Metastatic Processes**
	2:50pm-3:10pm	**IT17: Prof. Girish J. Kotwal** (University of Louisville, Kentucky, USA)	**Significant noninvasive survival outcome of metastasized prostate cancer and neuroendocrine tumors with a combination therapy using modern medicine treatment and nutraceuticals from turmeric and pomegranate**
	3:10pm-3:30pm	**IT18: Prof. Shailja Singh** (JNU, New Delhi, INDIA)	**'Erythritol', a safe nutraceutical exhibits multi-stage anti-malarial activity by permeating into Plasmodium falciparum through aquaglyceroporin channel**
	3:30pm-3:50pm	**IT19: Prof. Ritu Aggarwal** (PGIMER, Chandigarh, INDIA)	**Understanding the comprehensive differential miRNA profile in tissue biopsies in cervical carcinoma on next generation sequencing platform**
2:30pm to 4:00pm **Venue: ICSSR Hall-I, PU, Chandigarh**	**IT6: Invited Talks-6** **SESSION: NUTRACEUTICALS AND NEUROLOGICAL DISEASES** **Chairperson:** **Prof. Anita Jagota** (Univ. of Hyderabad, INDIA) **Dr. Vikas Rishi** (NABI, Mohali, INDIA)		
	2:30pm-2:50pm	**IT20: Prof. Alok Chandra Bharti** (University of Delhi, INDIA)	***In vivo* Antiangiogenic Effect of Nimbolide, Trans-chalcone and Piperine for use against Glioblastoma**
	2:50pm-3:10pm	**IT21: Prof. Suhel Parvez** (Jamia Hamdard, New Delhi, INDIA)	**Role of Dopamine-D2-Agonists in Targeting Mitochondria for Mediating Neuroprotection in Subarachnoid Hemorrhage**
	3:10pm-3:30pm	**IT22: Dr. Abhai Kumar** (Deen Dayal Upadhyaya Gorakhpur, INDIA)	**NMR based Serum metabolomics revealed metabolic signatures associated with oxidative stress and mitochondrial damage in brain stroke and the role of Withania Somnifera in stroke management**
	3:30pm-3:50pm	**IT23: Prof. Anita Jagota** (University of Hyderabad, INDIA)	**Therapeutic effects of herbal nutraceuticals (Curcumin and Withania Somnifera hydro alcoholic leaf extract) on Circadian dysfunction, Aging and Neurodegeneration**

<table>
<tr><td>3:00 pm to 4:00 pm
Venue: ICSSR Hall-II, PU, Chandigarh</td><td></td><td colspan="3">Young Scientist Award Session-2
Chairperson:
Prof. Dipti Sareen (Panjab University, Chandigarh, INDIA)
Dr. Sheikh Tasduq Abdullah (IIIM, Jammu, INDIA)</td></tr>
<tr><td></td><td></td><td colspan="2">OP7: Akhil
(Panjab University, Chandigarh,INDIA)</td><td>Puerarin affects Inflammation in Lupus Pathology: Study on Pristane Induced Mice Model</td></tr>
<tr><td></td><td></td><td colspan="2">OP8: Yogain Taank
(Panjab University, Chandigarh, INDIA)</td><td>Evaluation of ergosterol and its metabolites as LXR agonists and their anticancer potential in colon cancer</td></tr>
<tr><td></td><td></td><td colspan="2">OP9: Greeshma S.
(University of Kerala, Thiruvananthapuram, INDIA)</td><td>Evaluating the Mitochondrial Protective Efficacy of Triphala: An In Vitro and In Vivo Investigation into Mitigating Dysfunction</td></tr>
<tr><td></td><td></td><td colspan="2">OP10: Fidha Latheef
(University of Kerala, Thiruvananthapuram, INDIA)</td><td>Unlocking the Therapeutic Potential of PLGA-Encapsulated Shogaol Nanoparticles Combating in A375 Melanoma Cell</td></tr>
<tr><td></td><td></td><td colspan="2">OP11: Najeeb S
(University of Kerala, Thiruvananthapuram, INDIA)</td><td>Exploring Cholesterogenic Alterations and Mitochondrial Dysfunction in Alopecia</td></tr>
<tr><td></td><td></td><td colspan="2">OP12: Sourbh Suren Garg
(LPU, Punjab, INDIA)</td><td>Formulation development, characterization and assessment of acarbose-encapsulated guar gum nanoformulation against type 2 diabetes</td></tr>
<tr><td>4:00 pm to 5:00 pm
Venue: Golden Jubilee Hall (Dining area), PU, Chandigarh</td><td colspan="4">Poster Session-2
Moderator: Dr. Nirmal Prabhakar</td></tr>
<tr><td>4:00pm to 4:30pm</td><td colspan="4">Tea</td></tr>
<tr><td>4:30pm to 6:10pm
Venue: Golden Jubilee Hall, PU, Chandigarh</td><td>PARALLEL SESSIONS</td><td colspan="3">ILS7: Invited Talks-7
SESSION: NUTRACEUTICALS: THERAPEUTIC PROSPECTS IN INFLAMMATION & OTHER CHRONIC DISEASES
Chairperson:
Prof. I.P. Singh (NIPER, Mohali, INDIA) and
Dr. Ruby John Anto (Institute of Advanced Virology, Thiruvananthapuram, INDIA)</td></tr>
<tr><td></td><td></td><td>4:30pm-4:50pm</td><td>IT24: Prof. Dheer Singh
(ICAR-National Dairy Research Institute, Karnal, INDIA)</td><td>Milk Nanostructues: Emerging Profit Bullets For Dairy Industry And Gene Therapeutics</td></tr>
<tr><td></td><td></td><td>4:50pm-5:10pm</td><td>IT25: Dr. Md Imtaiyaz Hassan
(Jamia Millia Islamia, New Delhi, INDIA)</td><td>Targeting Sphingosine kinase 1 by phytonutrients: A structure-based approach to control Idiopathic pulmonary fibrosis and lung carcinoma</td></tr>
<tr><td></td><td></td><td>5:10pm-5:30pm</td><td>IT26: Prof. Partha Roy
(IIT Roorkee, INDIA)</td><td>Kaempferol: A major phytochemical present in honey plays critical role in protecting pancreatic β-cells and preventing obesity related diabetes</td></tr>
<tr><td></td><td></td><td>5:30pm-5:50pm</td><td>IT27: Dr. Sreejith Parameseara Panicker
(University of Kerala, Thiruvananthapuram, INDIA)</td><td>Investigating Compromised Mitochondrial Metabolism and Assessing Phytochemical Influence on Hair Follicle Health</td></tr>
<tr><td></td><td></td><td>5:50pm-6:10pm</td><td>IT28: Dr. Harinder Singh
(Bright Lifecare, Gurgaon, INDIA)</td><td>Nutraceuticals: A Paradigm Shift Towards Better Future</td></tr>
</table>

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<tr><td>4:30pm to 6:10pm
<u>Venue:</u> ICSSR Hall-I, PU, Chandigarh</td><td colspan="3"><u>ILS8: Invited Talks-8</u>
<u>SESSION</u>: AYUSH THERAPIES IN CHRONIC DISEASES
Chairperson:
Prof. Chanderdeep Tandon (Amity University, INDIA)
Prof. Satwinderjeet Kaur (GNDU, Amritsar, INDIA)</td></tr>
<tr><td></td><td>4:30pm-4:50pm</td><td>IT29: Dr. Sathyanarayan B.
(Muniyal Institute of Ayurveda Medical Sciences, Manipal, INDIA)</td><td>Role of Trina dhanya (millets) in cancer prevention-a scientific review</td></tr>
<tr><td></td><td>4:50pm-5:10pm</td><td>IT30: Prof. Sidharth Mehan
(ISF college of Pharmacy, Moga, Panjab, INDIA)</td><td>Matrine mediated neuroprotective potential in experimental Multiple Sclerosis: Evidence from CSF, blood markers, brain samples and in-silico investigations</td></tr>
<tr><td></td><td>5:10pm-5:30pm</td><td>IT31: Dr. Sheikh Tasduq Abdullah
(IIIM, Jammu, INDIA)</td><td>Biological Basis of Metabolic Dysfunction-Associated Steatohepatitis (MASH) and Therapeutic Role of Natural Products</td></tr>
<tr><td></td><td>5:30pm-5:50pm</td><td>IT32: Prof. Rashmi Singh (Banaras Hindu University, Varanasi, INDIA)</td><td>Implications of environmental pollutant Inhalation: A possible therapeutic approach towards Pulmonary fibrosis</td></tr>
<tr><td></td><td>5:50pm-6:10pm</td><td>IT33: Dr. Nitin Kumar Singhal
(NABI, Mohali, Punjab, INDIA)</td><td>Harnessing the Therapeutic Potential of Ginger-Derived Extracellular Vesicles in Type 2 Diabetes: A Multi-Faceted Approach Targeting Glucose, Lipid Metabolism, and Beta Cell Protection</td></tr>
<tr><td>5:00pm to 6:00pm
<u>Venue:</u> ICSSR Hall-II, PU, Chandigarh</td><td colspan="3"><u>Young Scientist Award Session-3</u>
Chairperson:
Prof. Deepak Kumar (North Carolina Central University, Durham, USA)
Dr. Anil Mukund Limaye (IIT, Guwahati, INDIA)</td></tr>
<tr><td></td><td colspan="2">OP13: Ragni Gupta
(CSIR-IIIM, Jammu, INDIA)</td><td>Molecular mechanisms underlying Ultraviolet-B Radiation induced premature Senescence in Human Dermal Fibroblasts: Therapeutic Role of Natural Products</td></tr>
<tr><td></td><td colspan="2">OP14: Rakesh Kumar Dhritlahre
(CSIR-IHBT, Palampur, HP, INDIA)</td><td>Formononetin-Vitamin E Conjugate Synergistically Support Adipogenesis, Attenuates Oxidative Stress, and Restores Insulin Sensitization in Differentiated Preadipocytes</td></tr>
<tr><td></td><td colspan="2">OP15: Simrandeep Kaur
(GNDU, Amritsar, INDIA)</td><td>Hemidesmus indicus (L.) R. Br. root fraction possess radical scavenging activity and ameliorates H_2O_2 induced oxidative stress in human blood lymphocytes</td></tr>
<tr><td></td><td colspan="2">OP16: Souvik Karmakar
(GNDU, Amritsar, INDIA)</td><td>Understanding the Antiviral Potential of Azadirachta indica Bark Extract and Tinospora cordifolia Stem Extract against Murine β- Coronavirus Infections</td></tr>
<tr><td></td><td colspan="2">OP17: Daiahun Thabah
(North-Eastern Hill University, Shillong, INDIA)</td><td>Potentilla fulgens ameliorates AMPKα1 and α2 in brain of alloxan-induced diabetic mice</td></tr>
<tr><td></td><td colspan="2">OP18: Vibhisha Vaghasi
(Gujarat Biotechnology University, Gujarat, INDIA)</td><td>Exploring potential cross-reactive peptides to combat leptospirosis: An immunoinformatic Approach</td></tr>
<tr><td>6:15pm to 7:00pm
<u>Venue:</u> Golden Jubilee Hall, PU, Chandigarh</td><td colspan="3">Panel Discussion
<u>SESSION</u>: NUTRACEUTICALS FROM LAB TO CLINICS: THE WAY FORWARD</td></tr>
<tr><td>7:00 pm onwards</td><td colspan="3">Banquet
<u>Venue</u>: Alumni Gardens, PU, Chandigarh</td></tr>
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DAY 3 February 24th 2024 (Saturday)			
9:00am to 11:05am **Venue: Golden Jubilee Hall, PU, Chandigarh**	**PS4: Plenary Session-4** **SESSION: NANONUTRACEUTICAL THERAPY** **Chairperson:** **Prof. Girish J. Kotwal** (Univ. of Louisville, Kentucky) **Dr. Murali Yallapu** (University of Texas Rio Grande Valley, McAllen, USA)		
	9:00am-9:25am	**PT18: Dr. Murali Yallapu** (University of Texas Rio Grande Valley, McAllen, USA)	**Natural compound-based nanomedicine for cancer therapy**
	9:25am-9:50am	**PT19: Dr. Ruby John Anto** (Institute of Advanced Virology, Thiruvananthapuram, INDIA)	**Uttroside B: A novel drug candidate against Non-alcoholic steatohepatitis and hepatocellular carcinoma**
	9:50am-10:15am	**PT20: Prof. Indu Pal Kaur** (Panjab University, Chandigarh, INDIA)	**Newer Healthcare Paradigm: Unveiling Nano-nutraceuticals**
	10:15am-10:40am	**PT21: Prof. Minni Singh** (Punjabi University, Patiala, INDIA)	**Nutraceuticals and the nanotechnology intervention: towards complementary supportive therapies**
	10:40am -11:05am	**PT22: Dr. Jiban Jyoti Panda** (INST, Mohali, INDIA)	**BBB Breaching Amino-acid Nanoassemblies: Exemplified as Anti-glioma and Anti-Amyloid Agents**
11:05am to 11:30am	**Tea**		
11:30am to 12:50pm **Venue: Golden Jubilee Hall, PU, Chandigarh**	**IT9: Invited Talks-9** **SESSION: NUTRACEUTICALS FOR WELLNESS** **Chairperson:** **Dr. Manish K. Tripathi** (University of Texas, McAllen, USA) **Dr. Sumit Aggarwal** (ICMR, New Delhi, INDIA)		
	11:30am-11:50am	**IT34: Dr. Vishvanath Tiwari** (CU, Rajasthan, INDIA)	**Combating carbapenem-resistant Acinetobacter baumannii using plant secondary metabolite naringin derivative targeting its AdeABC efflux protein**
	11:50am-12:10pm	**IT35: Prof. Bikash Medhi** (PGIMER, Chandigarh, INDIA)	**Clinical Trial for Food and Food with Medicinal Properties**
	12:10pm-12:30pm	**IT36: Dr. Ravindra Pal Singh** (Gujarat Biotechnology University, Gujarat, INDIA)	**Glycogenomics of the human gut bacteria in health and diseases**
	12:30pm-12:50pm	**IT37: Dr. Monika Garg** (NABI, Mohali, INDIA)	**Harnessing Nutraceutical Potential: NABI's Journey with Anthocyanin-Enriched Black Wheat**

11:50am to 12:50pm **Venue: ICSSR Hall-I, PU, Chandigarh**	**PARALLEL SESSIONS**	**Young Scientist Session-4** **Chairperson:** **Prof. Archana Bhatnagar** (Panjab University, Chandigarh) and **Prof. Ritu Aggarwal** (PGIMER, Chandigarh, INDIA)	
		OP19: Dr. Nidhi Mahajan	**Synthesis and characterization of peanutshell-Bioscaffold: A promising 3-D paradigm candidate for tissue engineering and translation**
		OP20: Dr. Nilanjana Basu (Amity University, Uttar Pradesh, INDIA)	**The Anti-Epithelial-Mesenchymal Transition Property of *Arnica montana* in Triple-Negative Breast Cancer is Linked to Mitochondria-Mediated Apoptosis**
		OP21: Mangala Hegde (IIT, Guwahati, INDIA)	**Reserpine-Mediated Inhibition of Triple-Negative Breast Cancer Cell Proliferation and Metastasis via Targeting NGALR and Inducing Ferroptosis: A Therapeutic Perspective**
		OP22: Dr. Payal Rani (Manav Rachna International Institute of Research and Studies, Faridabad, INDIA)	**Milk miRNAs: The potential nutraceutical and functional food**
		OP23: Dr. Ragini Singh (Academy of Scientific and Innovative Research, Ghaziabad, INDIA)	**Interplay of Genetic Variations in *p53* and MDM2: Impact on MMP-2 and MMP-9 Gene Expression in Oral Carcinogenesis, and the Potential Therapeutic Role of Resveratrol and Its Analogues**
		OP24: Abhishek Goel (CSIR-IHBT, Palampur, HP, INDIA)	**Benzosuberene-alkyl sulfones inhibit mitotic clonal expansion, encourage mitochondrial non-shivering thermogenesis, and induce beiging in differentiated white adipocytes**
1:10pm to 2:30pm	**Lunch break** **Venue: Golden Jubilee Hall (Lawns), PU, Chandigarh**		
2:30pm to 4:00pm **Venue: Golden Jubilee Hall, PU, Chandigarh**	**Valedictory and Prize distribution**		
4:00pm to 4:30pm	**High Tea**		

ABSTRACTS

Plenary Talks

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Session: Nanonutraceutical Therapy			
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PT1

Revisiting Citrus Flavonoids: Potential for Preventing Cancer and Improving Gut Health

Dr. Bhimanagouda S Patil

Director, Vegetable and Fruit Improvement Center, and USDA National Center of Excellence, Department of Horticultural Sciences, Texas A&M University, College Station, Texas 77843, United States.

Abstract

Citrus flavonoids are characterized by their 15-carbon structure with aromatic rings and a ketone group, and have been a focus of study in our research that aims to understand the effects of plant-derived bioactive compounds on human health. For example, we showed that citrus flavonoids, including naringenin, quercetin, sinensetin, and apigenin, modulate bacterial cell-cell communication, *Escherichia coli* O157:H7 biofilm formation and *Vibrio harveyi* pathogenicity. These effects suggest that citrus flavonoids can inhibit foodborne illness. Moreover, the consumption of citrus fruits also modify gut microbiota. Recent studies by our collaborator's lab have highlighted the influence of citrus flavonoids on gut microbiota through modulation of the aryl hydrocarbon receptor (AhR). In this context, the lab investigated the structure-dependent AhR activity of 14 flavonoids in Caco2 colon cancer cells, using induction of *CYP1A1* and *UGT1A1* gene expression as endpoints. Notably, luteolin and apigenin were identified as CYP1A AhR antagonists. In addition to the promising results on AhR activity, our findings have also demonstrated the potential cancer-preventive properties of selected citrus flavonoids, primarily through their interactions with Phase-I and Phase-II enzymes and antineoplastic activities. Notably, the combination of hesperidin, naringin, and crude citrus flavonoids has shown promise in elevating the levels of Phase-II enzymes, suggesting their potential utility in chemoprevention strategies. Pre-exposure to hesperidin and rutin has proven effective in reducing toxicant-induced oxidative stress and genomic DNA fragmentation. Furthermore, we validated the role of apoptosis in inducing cytotoxicity in pancreatic cancer cells when exposed to lime juice containing rutin, neohesperidin, hesperidin, and hesperitin. Our investigation of six citrus flavonoids revealed that naringin and naringenin can effectively prevent oral cancer. Similarly, we demonstrated that eight structurally similar citrus flavonoids inhibit colon cancer cells (SW480), promoting intestinal health and potentially preventing colon cancer. Although promising results have linked citrus flavonoids to improving the gut microbiota and potentially preventing various cancers, and despite some progress in improving the bioavailability of citrus flavonoids through various delivery methods such as emulsions and nanoparticles, significant challenges persist. Ongoing research is essential to gain a deeper understanding of the synergistic interactions of flavonoids with dietary components, their structural relationships with biological parameters, *in vivo* effects, and the determination of optimal therapeutic dosages to promote and sustain gut health.

PT3

Antibody mediated Targeted Drug Delivery approach for Pancreatic Tumors

Prof. Subhash C. Chauhan

Institute of Cancer Immunotherapy, School of Medicine, University of Texas Rio Grande Vally, McAllen, Texas, USA.

Abstract

Pancreatic ductal adenocarcinomas, originating from the epithelial cell lining of ducts, account for approximately 95% of tumors in this category, showcasing a survival rate of less than 5-7%. Unfortunately, little progress has been seen in the outcomes of patients with PDAC as tumor develops high desmoplasia and chemo-resistance to chemotherapeutic drugs, such as gemcitabine (Gem). The therapies are unable to penetrate to the fibrotic tumors leading to insufficient availability of the therapeutic drugs at the tumor site. We and others have shown that MUC13 is aberrantly expressed in pancreatic tumors but not in normal pancreas, which makes MUC13 as an excellent protein for specifically targeting pancreatic tumors. Herein, we demonstrate a unique ability of our in-house generated mouse and humanized monoclonal antibody of MUC13 to penetrate and target pancreatic cancer. These antibodies have been conjugated with our recently developed novel patented superparamagnetic iron oxide nanoparticles (SPIONS) to deliver therapeutics specifically to pancreatic tumors. In this study, we are using curcumin that depletes tumor microenvironment and gemcitabine to investigate the efficacy of the MUC13 conjugated SPION in delivery of therapeutic drugs. Our results demonstrate that enhanced uptake of MUC13-SPION formulation in MUC13 positive (MUC13+) PanCa cells, compared with MUC13 null (MUC13-) cells as demonstrated by immunofluorescence, Prussian blue staining and flow cytometry experiments. Interestingly, the formulation resulted in sustained delivery of curcumin (CUR), enhanced inhibition of cell proliferation, migration and invasion in MUC13+ cells as compared with MUC13- cells, which suggests the targeting efficacy of the formulation. In PanCa orthotopic mice model, MUC13-SPION efficiently targeted pancreatic tumors resulting in significant tumor accumulation. We observed inhibition of tumor volume, metastasis, gem resistance and improved survival in mice treated with the formulation. Additionally, the tumor tissues from treated mice showed extensive downregulation of PCNA and expression of key proteins in SHH pathway, such as SHH, Gli-1, Gli-2, Patched 1, SMO, which has been associated with cancer progression and drug resistance. In conclusion, the results indicate high therapeutic significance of MUC13-SPIONS for achieving pancreatic tumor specific delivery of drugs.

PT4

Designing drugs to combat resistance against cancer treatment

Sanjay V. Malhotra, PhD, FRSC

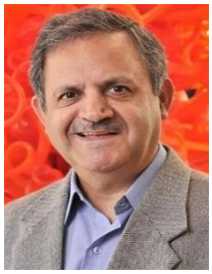
Sheila Edwards-Lienhart Endowed Chair in Cancer Research,
Professor, Department of Cell Development & Cancer Biology,
Director, Center for Experimental Therapeutics,
Director, Center for Radiochemistry Research Knight Cancer Institute, Oregon Health& Science University.

Abstract

Resistance to therapy continues to be the biggest challenge in cancer treatment today. There are many underlying mechanisms within the same heterogenous tumor that contribute to drug resistance. Solving this problem would require creation of a framework that dissects and partitions resistance into its biological determinants. Assessment of the physical properties of the tumor and deep analysis of tumor drivers, druggability, dependencies, and vulnerabilities, early detection of emergence of resistance, precise monitoring and powerful analytics that factor in clinical experience represents a challenging task. Aberration in the protein translation can lead to changes in the protein expression that can serve as the drivers of tumor progression. Ribosomes are a molecular machine that acts as a hub for protein synthesis, and dysregulation of ribosome function is causative for cancer formation. Our investigation on the causes of ovaroian and breast cancer progression has identified a small molecule 'SU056' that shows efficacy against ovarian (OC) and triple-negative breast cancer (TNBC) models. SU056 treatment inhibits growth and clonogenic potential of TNBC cells, by arresting the cell cycle progression through G2/M phase. Proteomics analysis suggested translational process as a target of SU056 in these cells. We found that its treatment modulated expression of several molecules of translational complex such as RPL, RPS, and translation initiation factors (eIF6, eIF5, eIF4A, eIF4G), which leads to overall inhibition. This was further confirmed by tumor xenograft study with different TNBC models, which also showed that metastatic nodules in the lungs were inhibited by SU056 compared to control group. The results were further confirmed in a Patient Derived Xenograft (PDX) model. Overall, our study has identified a lead candidate SU056, and provides strong foundation to further develop a new therapy for treatment of patients with OC and TNBCs.

PT5

Role of stem cell factor Nanog in chromatin structure and DSB repair



Prof. Tej K. Pandita

Center for Genomics and Precision Medicine, Texas A&M College of Medicine, Houston TX 77030, USA.

Abstract

Normal neural stem cells (NSCs) have the capacity to self-renew as well as give rise to glia and neurons during embryonic development in a niche dependent manner. Brain tumor derived glioma stem-like cells (GSCs) share many properties of NSCs, but more importantly contain tumor initiation potential that contributes to evasion of cytotoxic therapies and patients relapse (PMID: 31160393). While NSCs have a robust DNA double strand break (DSB) repair capacity, this capacity declines as they differentiate into post-mitotic cells such as neurons (PMID: 29103969). Similarly, glioma stem-like cells (GSCs) also maintain a high DSB repair capacity (PMID: 20581868). We have previously reported that depletion of the pre-existing H4K16ac marks established by MOF, the histone H4K16 acetylase, correlates with mouse Purkinje neuronal cell loss (PMID: 23045680), improper neural stem and progenitor cell development (PMID: 31794431). We are interested to evaluate and compare the DNA damage repair mechanism in human NSCs and GSCs to identify specific, posttranslational histone modifications that account for their robust DSB repair. Previously it was found that differentiated stem cells (astrocytes and dopaminergic neurons) have lower H4K16ac levels as well as less robust DSB repair than do parental undifferentiated stem cells. Reduced DSB repair also correlated with reduced levels of the Nanog and OCT4 (PMID: 29103969) stem cell like factors and Nanog depletion decreased cell survival after ionizing radiation (IR) or cisplatin treatment. Nanog's precise contribution to DSB repair, however, is still unclear. Nanog is found more abundant in H4K16ac gene-rich (euchromatin) regions than in gene-poor (heterochromatin) regions and higher levels of H4K16ac correlated with increased loading at DSBs of homologous recombination (HR) mediated repair proteins (PMID: 29888761). Since GSCs have higher levels of Nanog and gliomas are resistant to IR, we will discuss whether Nanog modulates chromatin status to promote efficient DNA damage repair. Higher H4K16ac levels in transcribed regions correlated with increased loading of RNA polymerase ll (Pol ll) and Cockayne syndrome B (CSB) whereas inhibition or depletion of either factor decreased recruitment of HR-linked proteins (PMID: 29888761). To directly examine chromatin structure and DSB repair in pre- and post-differentiated NSCs and GSCs, site-specific DSBs induced by CRISPR/Cas9 liposomes are being exploited, allowing to determine the chromatin structure at the level of histone modifications and repair protein recruitment at DSBs using chromatin-immunoprecipitation/polymerase-chain-reaction analysis. New DSB repair analysis systems based on their introduction into human cell lines, I-SceI cleavage sites at defined genome locations within gene-poor and -rich regions (PMID: 31286070) will be discussed. These tools have allowed us to determine how DSB repair is influenced by the pre-existing epigenetic landscape in the presence or absence of Nanog and how chromatin disassembly/reassembly and histone variants/modifications further regulate this process. We will discuss the novel identified chromatin modifying factors to enhance or suppress DSB repair in differentiated stem cells for uncovering therapeutic targets for neurodegenerative disorders and cancer.

A Tribute to Prof. Sukh Dev, FNA

Acharan S. Narula, Ph.D.
Narula Research, LLC., Chapel Hill, NC 27516

Like the sacred river Ganges!
Born of the glorious Himalayas
Flowing gently into our plains
And, feeding the entire nation
Finally, merge into the Ocean…

Like the nurturing Light …
That originates from the mighty Sun
Like the Vedantic Inspirations…
That come to us from the Bhagavad-Gita
And, the Wisdom that explodes …
In the great Upanishads!

To my Guru Ji
I wish to say…
AS an alumnus of Panjab University, your life has inspired not only your students, but also those who merely came in touch with you!

Guru ji, you are truly a " Sukh Dev".
Offering "sukh" to One and All
Living the " Life" that you live
Like that of a genuine " DEV ".

As an offering of love to you, my " Guru Dev"
Comes this " heart felt" tribute
For a healthy, happy and joyful
100th Birthday on June 17, 2024!

Dr. Acharan S. Narula, Ph.D.

Where Divinity, Science and Research are undifferentiated

Narula Research, LLC, Chapel Hill, NC, USA

Serving the Divine in the Heart of Man

We Bring Gifts of Health to Life!

Are delighted to offer their

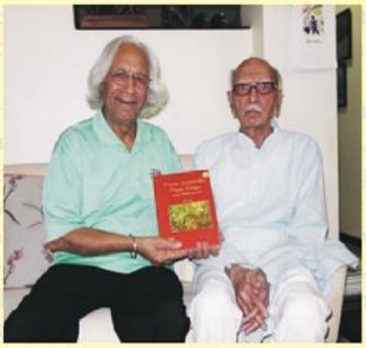
Choicest greetings and Best wishes to:

Dr. Sukh Dev, FNA

On the auspicious occassion of his

99th Birthday, June 17, 2023

A mentor par excellence, Dr. Sukh Dev, at 99+ years of age continues to inspire, by way of being a luminary example of excellence!



Shown above are pictures of Acharan S. Narula with Dr.Sukh Dev, FNA at his home in Bhavnagar, Gujrat, India (November 18-19, 2018)

PT6

Inflammation, Immunity, Chronic Diseases and Cancer: When the "Standard of Care" has been exhausted, what is next? Leads for Drug Development from traditional medicine and Natural Products

Dr. Acharan S. Narula

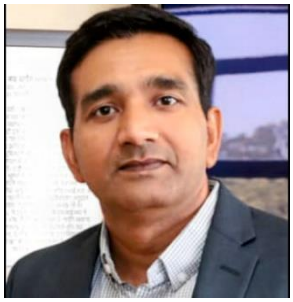
Narula Research, LLC,107 Boulder Bluff, Chapel Hill, NC 27516, USA

Abstract

The goal of host immunity is the clearance of pathogens or injured cell debris and cancer cells with minimal harm to the host and maintain homeostasis. This requires that the tuning and timing of the innate immune response, coupled with adaptive immune response mediated by antigen presenting cells (i.e., macrophages, dendritic cells and B cells) and T cells should do its rightful job in favor of the host. However, when both the innate and adaptive immune responses, including neural regulation of innate immunity are less than optimum, pro-inflammatory cytokines and chemokines that are known to cause tissue and organ damage persist and inflammation becomes chronic, meaning it proceeds unchecked. Chronic inflammation is the cause of major human ailments, such as asthma, arthritis, atherosclerosis, ulcerative colitis, obesity, type 2 diabetes, rhino sinusitis, psychiatric disorders, depression, neurodegenerative diseases, autoimmune diseases etc., as well as cancer. Understanding the molecular mechanisms of cell survival and cell death are fundamental to host health. Thankfully, various forms of cell death, i.e., excititoxicity, ferroptosis, lysosomal cell death, apoptosis, necroptosis, pyroptosis are now getting well understood (See: A guide to cell death pathways, Nature Reviews Molecular Cell Biology, 2023 December 18). It thus should open avenues of great hope to the suffering human beings. I will provide compelling evidence of a successful outcome, using botanical preparations developed at Narula Research for patients suffering from, e.g., pan ulcerative colitis, FAP (Familial Adenomatous Polyposis), Familial hypercholesterolemia coupled with diabetes, osteoarthritis, where the standard of care had totally failed. Time permitting a rare example of (1) a reversal of Amyotrophic lateral sclerosis and (2) a successful outcome in the case of a person with lipo-fibrosarcoma using immunotherapy, without the potential side effects of "*immune checkpoint inhibitors adverse effects"* will be discussed. As of January 2024, PubMed search reveals more than 10,000 publications discuss the immune mediated adverse effects of checkpoint inhibitors. Two recent, **New England Journal of Medicine:** 388(16), April 2023 publications (1) Immune Checkpoint Inhibitors ---- The need for Innovation, (2) The Wild West of Checkpoint Inhibitor Development (**New England Journal of Medicine**:386(14), April 7, 2022), says it all.

PT7

Himalayan bioresources – A treasure trove of nutraceuticals for combating chronic diseases



Prof. Sudesh Kumar Yadav

Director, CSIR-Institute of Himalayan Bioresource Technology, Palampur – 176061 (H.P.), India.
Professor, Academy of Scientific and Innovative Research, Ghaziabad, India.

Abstract

Chronic diseases and associated comorbidities such as metabolic disorders (diabetes, cardiovascular disorders (CVD), stroke, and COPD), sensory loss and mental health disorders, and cancer are the leading causes of death (35%) and disability (50%) in India affecting different age groups, primarily above 60 years. Although primary treatment options are available, their implementation is very low owing to the higher costs and continued dependency on medications. Preventive care and supplementation of nutraceuticals mainly botanicals, antioxidants and micronutrients have been identified to reduce the incidence of chronic diseases and associated comorbidities. In this context, CSIR-IHBT has developed number of nutraceutical and functional food formulations utilizing Himalayan bioresources against CVD, cartilage damage, non-alcoholic fatty liver (NAFLD), stroke and kidney injury. The formulations are based on the traditional medicine systems such as AYUSH; coupled with metabolomics and pre-clinical bio-efficacy validation. Some noteworthy technologies are synbiotic formulations targeting cellular ageing, plant derived polyphenols for cancer and stroke management, Kangra tea and culinary spices based immunomodulatory formulation and microalgae-based formulation for treatment of NAFLD. The major mechanisms behind most of these formulations are scavenging of reactive oxygen species (ROS), enhancement of endogenous antioxidant system and inhibition of inflammation pathway. In the case of cancer, the mechanisms were cell cycle inhibition, induction of apoptosis and inhibition of cell proliferation. Few formulations have been clinically validated such as *Punicatone* for cardioprotection, *Medhakara* for enhanced cognitive function, *AllayJoint* for cartilage support and *Spirulina* and *Shiitake* mushroom based food formulations for the management of iron and vitamin D deficiency respectively.

Keywords: Metabolic disorders, Cancer, Himalayan bioresources, Metabolomics, Bio-efficacy, Antioxidant, Immuno-modulatory

PT8

Genetic susceptibility, epigenome and influence of diet and age on pathogenesis of age-related macular degeneration

Dr. Anand Swaroop

Senior Investigator and Chief, Neurobiology Neurodegeneration & Repair Laboratory (N-NRL) National Eye Institute, National Institutes of Health, Bethesda, USA.

Abstract

A brief synopsis: Genetic susceptibility, advanced age and environmental factors including diet and supplements are major contributors to onset and severity of age-related macular degeneration (AMD), a leading cause of blindness in the elderly. Over 60 distinct genetic loci have been identified by genome-wide association studies. However, we have little mechanistic insight into the interaction of genetics with advancing age and environmental factors that likely alter epigenome. Diet and supplements are specifically shown to slow down the progression of disease in epidemiological studies. I will discuss our recent studies that utilize a combination of human genetics and mouse models to dissect the influence of environment and diet on retinal biology and phenotypes.

PT9

Environmental Exposure and Chronic Disease Outcomes

Deepak Kumar, PhD

Associate Provost and Dean of Research and Sponsored Programs, Professor of Pharmaceutical Sciences
Julius L. Chambers Biomedical/Biotechnology Research Institute (BBRI), North Carolina Central University, Durham, NC 27707

Abstract

Environmental exposure can have serious consequences on human health leading to the onset and exacerbation of outcomes for chronic diseases such as liver disease, type 2 diabetes, and cancer. Multiple exposures from industry, climate change, and even household chemical exposure can modulate cellular pathways that contribute to the poor outcomes. Our lab is studying the mechanisms of action of environmental exposures that can modulate accumulation of lipids in liver cells. The accumulation of excess fat in the liver, often associated with high fat diet or other risk factors, can damage the organ and lead to serious complications. We are interested in the effects of industry waste containing forever chemicals like Per- and Polyfluorinated Substance (PFAS) and cyanotoxins produced by freshwater prokaryotic cyanobacteria within harmful algal blooms on these pathophysiological processes. Previous studies have shown that exposure to PFAS is associated with changes in lipid metabolism and the development of fatty liver disease as well as cancer, and also affects the immune system, thyroid and kidney function, and insulin signalling. Similarly, direct exposure to cyanotoxins through inhalation, skin contact, or ingestion of contaminated drinking water has been associated with hepatotoxicity. We are investigating the molecular mechanisms underpinning these activities. In our lab, we have investigated the effects of acute and chronic exposures of low and physiologically relevant concentrations of PFAS and cyanotoxins on fatty liver disease-relevant pathways in human hepatocytes and in liver cell models. Collectively our data suggest that acute/chronic physiologically relevant concentrations of PFAS and cyanotoxins enhance liver cell steatosis and fibrosis by the activation of the UPR pathway and by modulation of NAFLD-related gene expression. Our results are uncovering mechanisms of action of environmental exposure and highlight the impact of environmental exposures on the onset and progression of chronic diseases and provide a platform for therapeutic or nutraceutical intervention.

PT10

Nutraceutical and Pharmaceutical Potential of Honeybee Propolis

Renu Wadhwa (Prime Senior Research Scientist)

AIST-INDIA DAILAB, National Institute of Advanced Industrial Science & Technology (AIST), Central 5-41, Tsukuba 305-8565, Japan
CycloChem Bio Co., Ltd., 7-4-5 Minatojima-minamimachi, Kobe 650-0047, Japan.

Abstract

Propolis, known as honeybee glue, is a hive-building resinous substance produced by honeybees by mixing their saliva with the plant materials they visit. It has a complex chemical nature and possess a wide range of bioactivities. Caffeic acid phenethyl ester (CAPE) is a predominant bioactive component of New Zealand propolis, most popular amongst all know kinds of propolis. We investigated the molecular mechanism(s) of anti-stress and anticancer activities using human cultured cells and report that CAPE modulates oxidative stress, hypoxia, protein aggregation and cancer signaling. Analyses of control and CAPE-treated cells showed growth arrest/apoptosis as supported by molecular markers. Low non-toxic doses of CAPE caused activation of pro-hypoxia and neurodifferentiation activities, which are expected to be beneficial for the treatment of neurodegenerative diseases. Indeed, the Drosophila model of Alzheimer's disease and the mouse model of amnesia/memory loss supported the improvement of disease symptoms and the activation of physiological functions in CAPE-treated groups. In the recent COVID-19 pandemic, we extended the analyses to examine the anti-COVID-19 potential of CAPE and found that CAPE has the ability to (i) interact with M^{pro}, a viral protein critically involved in its replication, (ii) downregulate TMPRSS2, a host cell surface receptor involved in viral infection. It showed ~60% inhibition of virus infection in cell-based assays. Taken together, CAPE is proposed to possess nutraceutical and pharmaceutical potential that could be enrolled in the management of stress, cancer, neurodegenerative diseases and COVID-19. Based on our results, we have generated CAPE-gCD complex and Propolis-gCD powder that offers high stability and activity.

Keywords: Propolis, caffeic acid phenethyl ester, neurodegeneration, COVID-19, management

PT11

Ashwagandha and Stress Management: Evidence from Cell Culture Based Assays

Dr. Sunil Kaul

AIST-INDIA DAILAB, National Institute of Advanced Industrial Science & Technology (AIST), Tsukuba, Japan.

Abstract

Ashwagandha (*Withania somnifera*), the most popular herbs used in the Indian system of home medicine (Ayurveda), is highly trusted for its therapeutic potential. Its active constituents including withanolides - withaferin-A (Wi-A), withanone (Wi-N) have been reported to possess multimodal anticancer activity. Chronic stress and aging are often considered pre-cancerous conditions, associated with numerous other pathologies. Management of stress and aging with natural compounds has become a priority of research. Oxidative, metal, and hypoxic stress are largely associated with these phenotypes. We recruited chemical models of these in a cell-based three-way screening of some natural compounds. Four (withaferin-A, Wi-A; methoxy withaferin-A, mWi-A; withanone, Wi-N, and triethylene glycol, TEG) of the 70 compounds were found to protect against oxidative and metal stress. Molecular assays revealed that while stress caused an increase in (i)apoptosis, (ii) ROS accumulation coupled with mitochondrial depolarization, (iii) DNA double-strand breaks, (iv)protein aggregation, and treatment with low non-toxic doses of the selected compounds caused considerable protection. Furthermore, Wi-N, TEG, and their mixture treated normal human fibroblasts (at young, mature, and senescent stages representing progressively increasing accumulation of stress) showed an increase in proliferation. Taken together, these results suggest an anti-stress potential of Wi-N and TEG that may be useful in the treatment of environmental and age-related pathologies.

Keywords: Ashwagandha, withanolides, triethylene glycol, stress, management, cell culture, evidence

PT12

Luciferase based screening system for nutraceuticals

Dr. Yoshihiro Ohmiya

Biomedical research Institute, National Institute of Advanced Industrial Science & Technology (AIST), Kansai Base, Ikeda, Osaka 563-8577, Japan

Abstract

An immune response is **multiple physiological reactions which occurs within an organism for the purpose of keeping a body homeostasis against several exogenous factors.** For the purposes of the evaluating bioactive compounds, bioluminescence reporter assay system is a powerful tool. Bioluminescence is a simple reaction that is triggered by the addition of luciferin solution, and the equipment for measuring light intensity is simple and convenient. So, luciferases are suitable reporter enzymes for the quantitative measurement of gene expression. Our team originally established the multicolored reporter assay using color difference beetle luciferases, which this system can evaluate the bioactivity of compounds based on the complicated cellular mechanism. Until now, reporter cell lines using our system has been identifying several bioactive compounds from natural resources for immune response or antioxidant. In this lecture, I will talk about the principle of bioluminescence tools and how to identify the novel bioactive compounds from natural resource based on clarifying the bioactive mechanism of them. For example, we established the monitoring the dynamics of Keap1-Nrf2 pathway using dual color luciferases and identified the antioxidant compound from natural resource.

Keywords: Bioluminescence, immune response, luciferin, luciferase, natural resource

PT13

Curcumin formulations for enhanced bioavailability and efficacy: What we learned thus far?

Prof. Ajaikumar B. Kunnumakkara

Cancer Biology Laboratory, Department of Biosciences and Bioengineering, Indian Institute of Technology-Guwahati, Guwahati 781039, Assam, India.

Abstract

Curcumin is recognized for its diverse range of pharmacological properties, which make it a promising candidate for the prevention and treatment of numerous chronic diseases. These conditions encompass arthritis, autoimmune diseases, cancer, cardiovascular diseases, diabetes, hemoglobinopathies, hypertension, infectious diseases, inflammation, metabolic syndrome, neurological diseases, obesity, and skin diseases. However, curcumin's potential as an oral medication is hindered by inherent limitations, including its poor solubility and bioavailability. These limitations stem from factors such as low water solubility, inadequate intestinal permeability, susceptibility to degradation at alkaline pH, and rapid metabolism. To enhance curcumin's oral bioavailability and therapeutic effectiveness, various formulation techniques have been explored. These techniques involve coadministration with piperine, incorporation into micelles, micro/nanoemulsions, nanoparticles, liposomes, solid dispersions, spray drying, and noncovalent complex formation with galactomannosides. These approaches have been investigated through in vitro cell culture models, in vivo animal models, and clinical trials in humans. This presentation will focus on clinical trials conducted with various generations of curcumin formulations, assessing their safety and efficacy in the treatment of diverse diseases. Additionally, we will discuss the advantages and limitations of each formulation in comparison to placebos and/or established standard care therapies for these medical conditions. Through an integrative approach aimed at minimizing bioavailability and safety concerns while minimizing adverse side effects, these next-generation formulations hold promise in advancing the prevention and treatment of complex chronic diseases.

PT14

Elimination of Chemo-resistant Stem-like Cells in TNBCs by a Novel Stem cell Modulator led to better treatment outcome

Dr. Fayaz Malik

CSIR-Indian Institute of Integrative Medicine Sanat Nagar Srinagar 190005, India.

Abstract

Acquisition of chemo-resistance in TNBC remains a huge clinical challenge leading to increased patient morbidity, making it obligatory to find out new approaches to improve the treatment outcome. Targeting stem-like cancer cells (CSCs) has been shown as an alternative approach to address chemo-resistance, as a number of studies have shown their role in tumor initiation and progression and drug resistance. In this study, during our screening, we identified a small molecule (AQ1) for its potential to effectively target breast CSCs using cellular and mice models. AQ1 significantly decreased the CSC population as evaluated by the use of ALDH and other CSC-specific surface markers, besides the reduction in the size and number of mammospheres. In addition, AQ1 treatment led to the downregulated of cell migration and invasion, and the expressions of mesenchymal markers. AQ1 treatment eliminated paclitaxel non-responsive cells in various TNBC cell lines and showed an improved response in mice tumor models. AQ1 treatment in combination with chemotherapeutic agent paclitaxel led to the non-recurrence of tumors in mice, thus indicating the potential use of AQ1 in addressing chemo-resistance.

PT15

Hypoxia Stress and Neurodifferentiation Signalings: Experimental and Computational Perspectives

Dr. Jaspreet Kaur Dhanjal

Assistant Professor, Department of Computational Biology, Indraprastha Institute of Information Technology Delhi, Okhla Industrial Estate, Phase III, New Delhi 110020, India.

Abstract

Hypoxia or oxygen deficiency has been associated with various disorders like cancer, chronic heart and kidney diseases, reproductive diseases and metabolic disorders. It has been shown to be detrimental to the brain and is implicated in the pathogenesis of neurodegenerative diseases. However, recent studies have also reported the role of intermittent hypoxia in the induction of neurogenesis in mice brain. This holds immense potential to be conditioned for use in the recovery from brain injuries. In line with this, we have identified pro-hypoxic natural compounds - caffeic acid phenethyl ester and tectorigenin that have the ability to stabilize HIF-1α for initiating hypoxia signalling, ultimately leading to neurodifferentiation.

Keywords: Hypoxia, Neurodifferentiation, CAPE, Tectorigenin, Natural compounds

PT16

Antiperoxidant Treatment for Iron-Induced Epilepsy- An Experimental Study

Dr. Shanuja Beri

Assistant Professor, Department of Zoology, Kalindi College University of Delhi, India.

Abstract

Lipid peroxidation of the neuronal membranes by iron released from extravasated hemoglobin that catalyzes the formation of oxygen-derived free radicals has been shown to mediate clinical post-traumatic epilepsy by a variety of experimental approaches including biochemical and electrophysiological activity analyses. In this premise, we investigated if antioxidants could attenuate epileptic activity in iron-induced post-traumatic experimental epilepsy animal models. Intracortical injection of $FeCl_3$ in the rats was followed by administration of antioxidant drugs at different intervals. The occurrence and progression of epileptic activity were monitored electrocorticographically, biochemically, and visually by specific techniques. We showed significant attenuation of the electrographic seizures in the ipsilateral epileptogenic focus suggesting the therapeutic value of the antioxidant treatment of post-traumatic epilepsy. In several earlier studies, antioxidants have been tested as preventive measure for initiation of epileptic activity. Our study demonstrated that antioxidants could be useful for teatment of iron-induced epilepsy.

PT17

Biotechnological interventions in medicinal and nutritionally rich crops

Prof. Pratap Kumar Pati

Biotechnology Department, Guru Nanak Dev University, Amritsar-143005, India.

Abstract

Medicinal plants synthesize a diverse array of secondary metabolites, that possess significant biological activities. Nowadays, the utilization of medicinal plants has evolved into a highly lucrative business worldwide. The increasing demand for plant-based alternatives has fueled the commercial cultivation of medicinal plants. Further, due to their significant health benefits, affordability, and lesser side effects compared to synthetic drugs, there has been immense interest for conservation, sustainable utilization and value addition of medicinal plants and their produce. In addition to this, research in the direction of producing future climate-resilient crops, and establishing agrotechnology for the cultivation of non-traditional crops, will further provide an impetus to the mission of achieving global food and nutritional security. Our laboratory has been working on conservation, propagation and improvement of many important medicinal plants. Attempts are also being made to grow nutritionally rich and high valued crops such as low-chilled apple, saffron, banana and β-carotene, and anthocyanin-rich sweet potato and pineapples with an aim towards crop diversification for the state of Punjab.

PT18

Natural compound-based nanomedicine for cancer therapy

Dr. Murali Yallapu

Co-director, Medicine and Oncology Unit, South Texas Center of Excellence in Cancer Research, University of Texas Rio Grande Valley, McAllen, Texas-78504, USA

Abstract

The US FDA has permitted a number of therapeutic agents for cancer treatment. However, most therapeutic agents are expensive and have some degree of systemic toxicity which makes overbearing in clinical settings. In addition, conventional therapeutic agents may not efficiently tackle drug resistance, metastasis, and recurrence of disease. These accounts for an urgent clinical need to discover natural compounds with precisely safe and highly efficient for the cancer prevention and cancer therapy. Among many natural chemopreventive molecules, gambogic acid (GA) is the principle bioactive and caged xanthone component, a brownish gamboge resin secreted from the Garcinia hanburyi tree. This molecule showed a spectrum of biological and clinical benefits against various cancers. In this talk, we will delineate distinct biological characteristics of GA as a novel anti-cancer agent. This talk will also delineate specific molecular mechanism(s) of GA that are involved in anti-cancer, anti-metastasis, anti-angiogenesis, and chemo-/radiation sensitizer activities. Furthermore, we will document recent evidence, development, and implementation of various nanoformulations of gambogic acid (nanomedicine) will be described. At the end of the talk, we will provide our laboratory research based on GA and its applicability in cancer research.

Keywords: Adjuvant; Cancer treatment; Chemosensitizer; Chemotherapy; Drug resistance; Gambogic acid; Nanomedicine; Nanoparticles.

PT19

Uttroside B: A novel drug candidate against Non-alcoholic steatohepatitis and hepatocellular carcinoma

Dr. Ruby John Anto

Molecular Bioassay Laboratory, Institute of Advanced Virology, Life Science Park, Thiruvananthapuram, INDIA.

Abstract

We have previously reported the therapeutic potency of uttroside B (Utt-B), a saponin isolated from the leaves of *Solanum nigrum* Linn (*S. nigrum)*, to induce an apoptotic mode of cell death in Hepatocellular carcinoma (HCC), while being pharmacologically safe, *in vivo*. This innovation has been granted a patent by the USA (US20190160088), Canada (3,026,426), Japan (JP2019520425), South-Korea (KR1020190008323) and Europe (EP3463382). Recently, Utt-B received 'orphan drug' designation in the treatment of HCC, from the US FDA. In the current study, we evaluate the therapeutic efficacy of Utt-B against non-alcoholic steatohepatitis (NASH) and HCC. Treatment with Utt-B improved the pathologic features associated with NASH such as steatosis, inflammation and fibrosis. We also report the role of Utt-B in preventing the progression of NASH to HCC in a steatohepatitis-derived HCC mouse model. Our study not only reveals the pro-survival facet of Utt-B- induced autophagy but also discloses the interesting dynamics involved in the autophagy-apoptosis interplay in HCC during Utt-B-induced cell death. Further, mechanistic evaluation has revealed that Utt-B targets EGFR, mTOR and MAPK in eliciting a therapeutic response against HCC. Our results indicate that Utt-B is a more potent anti-HCC drug than sorafenib and the antitumor effect of Utt-B against HCC can be further enhanced by blocking autophagy. Moreover, data from toxicity studies conducted in human subjects suggest that the whole leaf extract of *S. nigrum* containing IC50 concentration of Utt-B is pharmacologically safe in healthy volunteers, and patients diagnosed with NAFLD, NASH and HCC. Taken together, our findings suggest that Utt-B improves the pathologic features of NASH and exhibits greater efficacy than sorafenib in combating HCC, and hence can be developed as a candidate drug molecule to treat NAFLD, NASH and HCC.

PT20

Newer Healthcare Paradigm: Unveiling Nano-Nutraceuticals

Prof. Indu Pal Kaur

University Institute of Pharmaceutical Sciences (UIPS), Panjab University, Chandigarh, India.

Abstract

A nutraceutical is defined as a food item or its constituent that imparts medical or health benefits, encompassing the prevention and treatment of diseases. The perspective of utilizing natural sources for therapeutic outcomes has propelled the manufacturing of nutraceuticals into a billion-dollar industry. The escalating use of nanotechnological products in various fields has paved the way for their remarkable applications in food science, particularly in the development of nano-nutraceuticals. Nano-formulations have emerged as a reality, providing solutions to challenges associated with bioavailability, toxicity, and sustainability of these nutraceuticals due to their unfavourable physicochemical properties.

This talk will aim to provide an updated overview of the significance of nanotechnological approaches, especially solid lipid nanoparticles (SLNs), liposomes and nanolipid carriers in enhancing the bioavailability of nutraceuticals. These nanostructures play a crucial role in protecting labile nutraceuticals from pH variations, delivering them precisely to the targeted sites, and minimizing toxicity concerns. Furthermore, the application of nanotechnology extends to skin care products, pharmaceuticals, and dietary supplements. For example, the nutraceutical curcumin, also hailed as a "wonder drug," has demonstrated its efficacy in various inflammatory conditions, including cancers. Its noteworthy attributes, such as antiaging, anti-inflammatory, antioxidant, antitumor, chemo sensitizing, P-gp efflux inhibition, and antiproliferative activity, underscore its significance in chemotherapy but exhibit poor aqueous solubility and permeability. To enhance the therapeutic potential of curcumin, SLNs offer distinct advantages, including high drug payload, extended shelf life, biocompatibility, biodegradability, and streamlined industrial production processes. Nanotechnology is also utilized in foods with immune-boosting nutraceuticals, including vitamins, minerals, antioxidants, omega-3 fatty acids, and probiotics. This talk will discuss innovative nutraceutical delivery systems inspired by nanotechnology.

PT21

Nutraceuticals and the nanotechnology intervention: towards complementary supportive therapies

Prof. Minni Singh

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Abstract

In the last decade, nutraceuticals have gained substantial recognition, which is attributed to the fact that these are nature-derived products, which have been used as prophylactics as well as therapeutics. Some key classes being studied for their therapeutic activities are terpenoids and polyphenols. Interestingly, deriving these from wastes and utilizing them as treatments contributes significantly towards sustainable solutions of the near future. This work entails deriving bioactives from various sources, mainly food wastes, highlighting the limitations in the use of these nutraceutical compounds and the role of nanotechnology in overcoming the challenges thereof. Different types of nanoformulations, viz. polymeric nanoparticles, nanoemulsions, solid lipid nanoparticles, and nanostructured lipid carriers will be discussed. With the outbreak of SARS-CoV-2 and its manifestation as COVID 19, many bioactives are being studied for their efficacy as complementary therapies. The basis lies in identifying their effectiveness which, in turn, relies on the mechanism of disease manifestation. A particular study of the use of nano-nutraceuticals as hepatoprotective agents will be presented. The rationale, however, is not to compete with the standard of care treatments, but to complement the same, which would allow better management of diseases.

PT22

BBB Breaching Amino-acid Nanoassemblies: Exemplified as Anti-glioma and Anti-Amyloid Agents

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Abstract

Effective treatment of CNS diseases including brain tumors, HIV and other neurodegenerative diseases has long been hampered by the inability of many drug molecules to cross the blood brain barrier (BBB). Highly restrictive tight junctions between the brain capillary endothelial cells are mainly responsible for the barrier properties and limit the transfer of almost all drugs from blood to brain. Recent strategies enhance the capacity of therapeutic molecules to cross the BBB by modifying the drug itself, or by coupling it to a vector for receptor or adsorption-mediated transcytosis. Our goal in the present work is to explore the ability of amino acids and their hybrid nanostructures for safe and effective delivery of drugs across the BBB for theranostic applications. Stimuli responsive nanocarriers for cancer specific delivery are also being developed. These nanostructures owing to their ease of synthesis and high biocompatibility will act as excellent carriers that selectively and aggressively target the CNS. Nanotheranostic systems for Alzheimer's disease has also been explored.

Keywords: Theranostics, amino acid, glioblastoma, blood brain barrier, Alzheimer's

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IT1

Exploring the Role of lncRNA Malat1 in Advancing CRC and Metastatic Processes

Prof. Ajay Goel

Founding chair, Department of Molecular Diagnostics and Experimental Therapeutics, Beckman Research Institute of City of Hope, Monrovia, California; City of Hope Comprehensive Cancer Center, Duarte, California).

Abstract

Colorectal carcinoma (CRC) is the second leading cause of cancer-related deaths in the United States with a significant health disparity between African Americans (AA) and Caucasians (CA) regarding its incidence drug response, and mortality. Apart from family history, obesity, diet, and stress factors alteration could be major drivers of CRC disparity. These factors are associated with the dysregulated function of the major endocrine (HPA: hypothalamus-pituitary-adrenal) axis and higher levels of biochemical stressors (cortisol, cytokines, leptin). Moreover, the five-year survival rate of patients diagnosed with localized-stage disease is 90%, and survival declines to 71% and 14% for patients diagnosed with regional and distant stages, respectively. This requires a better biomarker for the early diagnosis of the disease. Recently, our laboratory has identified a novel long noncoding RNA (LncRNA) namely, Metastasis Associated Lung Adenocarcinoma Transcript 1 (LncRNA MALAT1), which is highly over-expressed in CRC and is involved in its pathogenesis. The differential expression of lncRNA MALAT1 in underserved populations and its regulation will be discussed.

IT2

Halting Mitochondrial Exchange Inhibits Chemotherapy Resistance in Cancer

Prof. Rana P. Singh

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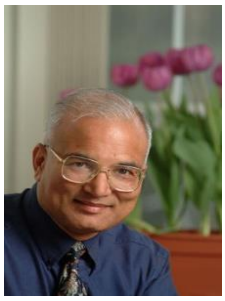
Special Centre for Systems Medicine, JNU, New Delhi, India.
Skaggs School of Pharmacy and Pharmaceutical Sciences, University of Colorado, AMC, Aurora, CO, USA.

Abstract

Cancer chemotherapy is associated with toxicity to healthy tissues and it also leads to the development of drug resistance. The development of chemotherapy resistance may involve different mechanisms. In this regard, mitochondria transfer could also be a biological event contributing to the development of resistance. Mitochondria can move out from one cell to enter another cell under certain conditions. Cancer cells are known for horizontal or vertical transfer of mitochondria. We addressed the question whether the exchange of mitochondria between tumor cells can make the chemotherapy less effective. To test this hypothesis, we used head and neck cancer cells and tagged the mitochondria with mito-GFP and mito-RFP. Chemotherapy or hypoxia was found to increase the frequency of mitochondrial exchange among the cancer cells. An athymic mice tumor xenograft study of these cells showed that the cells that acquired the mitochondria from other cells are having more tumorigenic potential and increased resistant to the chemotherapy. For its translational relevance, we explored whether a small molecule can alter the process of mitochondrial exchange in cancer cells. A small molecule compound was found to inhibit mitochondrial exchange and survival of human HNC cells in combination with chemotherapy. Our findings suggested that treatment with the small molecule increased the effect of chemotherapeutic drugs on cancer cells both *in vitro* and *in vivo*. It enhanced the cytotoxicity of chemotherapeutic drugs as well as induced apoptosis in cancer cells. An increased cellular and mitochondrial ROS was followed by caspases activation. Overall, the mitochondrial exchange was observed in head and neck cancer cells which increased the chemotherapeutic resistance, and suppression of the mitochondrial exchange in cancer cells made these cells sensitive to chemotherapy.

IT3

A Novel Approach to treat vitamin D deficiency: A placebo controlled double blind clinical trial in African Americans.



Prof. Sushil K. Jain

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Abstract

Over one billion people worldwide have vitamin D (VD) deficiency and are at risk for various diseases such as diabetes, rickets, and Alzheimer's disease. L-cysteine (LC) is essential for the VD-hydroxylases/metabolism genes, required to convert VD to 25(OH)VD. The animal studies show that VD+LC co-supplementation increases blood 25(OH)VD levels than VD alone. Thus, VD deficiency needs to be corrected at two levels: VD supplements and upregulating VD-metabolism genes (*CYP2R1/CYP27A1/CYP27B1/VDR)*. Bioavailable 25(OH)VD is critical for its therapeutic benefit compared with total 25(OH)VD levels. **This presentation will discuss an epidemic of 25(OH)-vitamin D-deficiency, importance of bioavailable 25(OH)-vitamin D and a novel approach to treat 25(OH)-vitamin D-deficiency.** This clinical trial investigated whether VD+LC co-supplementation is superior to VD alone in increasing bioavailable 25(OH)VD levels in African Americans. Subjects (n=165; 18-65yrs) were block randomized and supplemented for 6 months into one of the four groups: placebo, LC (1000mg/day), Vitamin D3 (2000 IU/day), or VD+LC. Fasting blood samples were collected at the baseline and final visit. Various biomarkers were analyzed in the clinical lab of the hospital. Plasma levels of insulin, VDBP, SHBG, free & total testosterone levels, and inflammatory markers were analyzed using ELISA. Unblinding analysis showed no differences in age, BMI, calcium, liver, or kidney function among the four groups. Blood levels of HOMA IR, Neutrophil to Lymphocyte ratio, CRP, and HbA1c levels were significantly lower in the VD+LC group. There was a significant increase in bioavailable 25(OH)VD in the VD+LC group than VD alone. Interestingly, blood levels of free testosterone were elevated in the VD+LC group. *In-vitro* studies showed that testosterone treatment significantly upregulated VD metabolism genes in THP-1 monocytes. L-cysteine co-supplemented with VD upregulates the expression of VD-metabolism genes thereby increasing the bioavailable 25(OH)VD and lowering the inflammation levels. This study suggests that compared to VD-alone, VD+LC co-supplementation could be a better approach in raising the circulating 25(OH)VD and lowering the risk of inflammations in African Americans. This trail was registered at clinicaltrials.gov as NCT04939792. (Supported by grant from NCCIH 5R33AT010637 and 3R33 AT010637-02S1).

IT4

HIV-Tat & Morphine mediated astrocytic senescence & Alzheimer's like pathology leading to EV mediated neuronal injury

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Abstract

Introduction: Although cART usage has increased the lifespan of HIV^{+} individuals, paradoxically, its dependence is also associated with increased risk of comorbidity of HIV-Associated Neurocognitive Disorders (HAND). Heroin abuse can accelerate the process of HAND pathogenesis, specifically age-sensitive brain functional networks in patients. Based on our previous findings that astrocytes play a major role in HIV Tat & Morphine-mediated amyloidosis & senescence-like phenotype, and since these senescence associated secretory phenotype (SASP) cargoes can be released in extracellular vesicles (EVs), we sought to assess whether HIV-1 Tat & Morphine- stimulated astrocyte derived EVs (ADEVs) containing these toxic cargoes could lead to synaptodegeneration in neurons *invitro* and when administered in the brains of naïve mice. This study aims to focus on the cellular cross-talk mediated by astrocyte-derived extracellular vesicles (ADEVs) in inducing synaptodendritic injury.

Methods: We assessed the novel role of lncRNA BACE1AS in HIV-Tat/ morphine mediated astrocytic senescence & amyloidosis, further the role of ADEVs carring SASP cargoes leading to neuronal injury. Additionally, we assessed the behavioral deficits & ageing phenotype in morphine dependent, as well as Tat-ADEV injected mice.

Results: HIV-Tat/ Morphine induced senescence phenotype (p16, p21, ROS, cell cycle arrest, β- gal activity, cytokines) & accumulation of amyloids in human astrocytes *invitro*. We found that this phenomenon was regulated by lncRNA BACE1AS by silencing approach. Next, EVs isolated from HIV-Tat/ morphine exposed human astrocytes showed to carry SASP cargoes in them and the EV numbers were regulated by lncRNA BACE1AS. These EVs upon being uptaken by the neurons *invitro* & *invivo* that can induce neuronal senescence & synaptodendritic injury. Interestingly, *invivo* validation showed that morphine administered mice exhibited ageing phenotype, cognitive deficits and ageing phenotype in the frontal cortex and hippocampus. Further, when these ADEVs were injected in the naïve mice hippocampus, the animals exhibited synaptodegeneration. **Conclusion(s)**: This study thus underscores the role of lncRNA BACE1AS in astrocytic senescence & amyloidosis and the role of ADEVs in mediating synaptodegeneration leading to cognitive impairments associated with HAND.

Keywords: BACE1AS, ADEVs, ageing, synaptodegeneration, cognitive study.

IT5

Nutraceuticals in Chronic Lung Aging Diseases: Potential for Therapeutic Targets

Prof. Irfan Rahman

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Abstract

Several inflammatory and immunological alterations that occur during pulmonary diseases often mimic alterations observed in the aged lung. From the molecular perspective, pulmonary diseases and aging partake in familiar mechanisms associated with significant dysregulation of the immune-inflammatory responses. Aging alters inflammation and immunity to respiratory conditions associated with age-impacted pathways and mechanisms that contribute to the development of pulmonary diseases, Recently, we studied the impact of age-related molecular alterations in the aged immune system during various lung diseases, such as Chronic Obstructive Pulmonary Disease, Idiopathic Pulmonary Fibrosis, Asthma that could possibly improve on current therapeutic interventions by naturally occurring polyphenols, in particular senolytics via immunomodulatory strategies to boost outcomes in the elderly. We further provided the insights into the context of lung-related diseases and describe the alterations in the functioning of immune-inflammatory cells during various pulmonary conditions altered with age. We will discuss how aging alters senescence and its cellular phenotypes during pulmonary conditions, and how polyphenolic compounds alters senescence (immunosenescence) mechanisms, and provide rationale for therapeutic targets (via senolytics/senotherapeutics/senomorphics) in chronic lung diseases of aging.

Senolytics and senomorphic compounds (e.g. quercetin and Dasatinib) could have a tremendous impact in the development of therapeutics approaches to ameliorate the detrimental effect of senescence. We will further discuss the involvement of CAR T cells, which are synthetic receptors that are capable of readdressing the specificity and other functions of T cells; aspects, which have been shown to be lost in many lung diseases, and possibly regulated by nutraceuticals impacting cellular senescence.

IT6

Phosphatidic Acid, a Direct Alcohol-Target Lipid Rescues Fetal Growth Restriction & Maternal Uterine Artery Dysfunction in Rat FASD Model

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Abstract

A cardinal feature of Fetal Alcohol Spectrum Disorders (FASD) is growth restriction. Fetal growth, neonatal birth weight, and survival are all directly related to major uterine circulatory adaptations in normal pregnancies. Alcohol exerts specific direct effects on lipids that control fundamental developmental processes. Based on our data that alcohol is transphosphatidylized to phosphatidylethanol (PEth) at the expense of phosphatidic acid (PA), the simplest phospholipid, we hypothesized that PA, a direct target of alcohol metabolism, would alleviate alcohol-induced vascular dysfunction of the maternal uterine artery and rescue fetal growth deficits. Mean fetal weight, and crown-rump length of the alcohol-administered rats (once-daily gavage, GD 4-10: 4.5 g/kg, BAC, 216 mg/dl; GD 11-20: 6 g/kg, BAC, 289 mg/dl) were ~9% and ~8% lower ($P<0.05$) than the pair-fed control pups, respectively and *in vivo* PA administration (4.5 mg/kg, GD 5-10; 6 mg/kg GD 11-20) concomitant with alcohol completely rescued the FASD growth deficits. Untargeted lipidomics showed 73 of 326 lipids were altered with alcohol and targeted lipidomics showed alterations in PA and related phosphatidylcholine, phosphatidylethanolamine, phosphatidylglycerol. Acetylcholine-induced uterine artery relaxation was significantly impaired in alcohol-administered rats ($P<0.05$), and *in vivo* PA administration completely reversed the alcohol-induced vascular dysfunction. To validate specificity and direct actions of PA, *ex vivo* supplementation of 10^{-5} M PA similarly reversed alcohol-induced vasodilatory deficit in animals; no difference was detected after PA treatment between pair-fed control and alcohol groups ($P=0.37$) with significant interaction between PA concentrations and alcohol exposure (PA X Alcohol, $P<0.0001$). Alcohol significantly reduced vasodilatory P-Ser1177 endothelial nitric oxide synthase (eNOS) levels in the uterine artery ($P<0.05$). PA treatment significantly reversed P-Ser1177 eNOS level in alcohol-exposed uterine arteries ($P<0.05$) following *ex vivo* PA *or in vivo* PA. Neither alcohol treatment nor PA affected total eNOS levels. Our data provide the first evidence of the interaction of the simplest lipid molecule (PA) with alcohol on FASD growth phenotype and maternal uterine artery vascular function and demonstrates PA's relationship with the vasodilatory eNOS system. Overall, the current study demonstrates that PA, an essential nutrient and signaling molecule with roles in growth and neuron development may be a promising therapeutic molecule in FASD pathogenesis. NIH [HL151497 (JR), AA23520 (JR), AA23035 (JR)].

IT7

Neuroprotective Potency of Saffron Stigma Extract and Crocin against Benzo[a]pyrene-induced Neurodegeneration in Zebrafish (*Danio rerio*)

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Center for Computational Biology and Bioinformatics, School of Life Sciences, Central University Himachal Pradesh Himachal Pradesh, Pin-176206, India.

Abstract

Saffron is a well-known expensive spice, which has many pharmacological properties against a variety of ailments. Saffron stigma and leaf contain apocarotenoids and bioactive phytochemicals having therapeutic potential against human disorders. Polycyclic aromatic hydrocarbons (PAHs) are one of the most common toxins in today's aquatic environment. Benzo[a]pyrene (B[a]P), a high molecular weight PAHs prototype, and reported as a potent neurotoxicant, which is profoundly contaminating the environment. The present study investigated the therapeutic efficacy of Saffron extracts, on B[a]P-induced behavioral changes, altered antioxidant activities, and neurodegeneration in zebrafish. The behavioral responses monitored through the light-dark preference test and novel tank diving test suggested that B[a]P treated zebrafish group showed alteration in anxiolytic-like behavior. Animals exhibited their native behavior when treated alone with Saffron Stigma Extract (SSE) and crocin, an apocarotenoid which also reduced the altered behavior induced by B[a]P. The SSE and synthetic crocin stimulated the antioxidant activities with an accumulation of reduced glutathione and catalase enzymes, indicating a protective role against B[a]P-induced oxidative stress. The histopathological studies showed the percentage of pyknotic cell counts in the Periventricular Gray Zone region of the Optic Tectum was 1.74 folds high in B[a]P treated animals as compared to control. Furthermore, the treatment of SSE and crocin reduced the pyknosis induced by B[a] P-mediated neurodegeneration, possibly due to a better protective mechanism. Future studies may reveal the detailed role of potent bioactive compounds and the mechanisms of reduction in pyknosis Saffron plant extracts against B[a]P-induced neurotoxicity.

Keywords: Saffron, Benzo[a]pyrene, Apocarotenoids, Neurobehavior, Pyknosis.

IT8

Identification of therapeutic targets for oral cancer using Computational and Biomolecular approaches.

Prof. Prabhudas. S. Patel

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Abstract

While there have been significant advancements in cancer treatment, oral cancer still has a grim outlook and is frequently identified at an advanced stage. To address these difficulties, researchers should actively seek diagnostic and prognostic biomarkers that also serve as therapeutic targets. Hence, the objective of this current research was to create and confirm a biomarker panel for oral cancer, and subsequently assess and validate natural compounds against the targeted protein. To enhance the reproducibility and resilience of gene signature biomarkers, a cross-platform integration method was employed, involving eight eligible microarray datasets from Affymetrix and Agilent platforms. This integration led to identification of 65 concordant differentially expressed genes. A 13 gene panel (CXCL8, CXCL10, FN1, GBP1, IFIT3, ISG15, MMP1, MMP3, MMP10, OASL, SERPINE1, SPP1, and PLAU) was then constructed by considering their immense biological importance, interactions in PPI network, and substantial alterations in TCGA cohort. Expression and prognostic assessments of the chosen gene panel were validated virtually through cross-validation using the Oncomine database and the KM plotter database. The expression of the gene panel was further validated in clinical samples of two chief sites of oral cancer, buccal mucosa (N=50) and tongue (N=50) using qRT-PCR. The expression levels of CXCL8, CXCL10, FN1, GBP1, MMP1, MMP3, PLAU, and SERPINE1 were significantly higher in both oral cancer subsites, where as ISG15, IFTI3, MMP10, and SPP1 displayed site-specific significantly altered gene expression. Remarkably, MMP1 exhibited utmost alterations, 40-fold increase in BMSCC and 30-fold increase in TSCC in comparison to adjacent normal tissues, with significant prognostic value in KM plotter database and thereby emerged as promising drug target. The MMP1 inhibitors were identified through high throughput structure-based virtual screening approach from NPACT library possessing 11,000 compounds. Top five hits, available in Indian Plants and with reports for their anti-cancer activity in head and neck cancer cell lines, belong to several flavonoids. Details of molecular dynamics simulation, and ADMET analysis verified conclusively these molecules as best scoring and potential MMP1 inhibitors. Briefly, our research finds 13 potential genes, particularly MMP1 that can be used as a possible oral cancer biomarker and shed light on five NPACT flavonoids that can act as effective MMP1 inhibitors.

Key words: Biomarker, Docking, Flavonoids, Integrative analysis, Oral Cancer.

IT9

Folic acid and vitamin B12 imbalance in pregnancy and newborn outcomes: a transgenerational epigenetic study

Prof. Jyotdeep Kaur

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Abstract

Mandatory supplementation during pregnancy generally leads to an upsurge in the intake of the vitamin. Increasing demands for folic acid are met with mandatory supplementations, while vitamin B12 needs remain mostly unmet and unaddressed. Thus, an imbalance of vitamin B12, and folic acid is likely and such an imbalance during pregnancy might predispose offspring to poor growth and development. Hence, we aimed to examine the effect of an imbalance of maternal folic acid and vitamin B12 during pregnancy on newborn outcomes. Further, using animal model we determined the transgenerational effects of these dietary manipulations through epigenetic alterations.

In the first part of the study, maternal and cord blood samples and placental samples were collected from pregnant women for estimation of RBC folate, serum vitamin B12, and homocysteine. Newborn anthropometric parameters were measured. Pregnant women were stratified into groups based on the imbalance of the MRBF and serum vitamin B12 values as well as on the MRBF/maternal vitamin B12 (MVB12) ratio. All the anthropometric parameters of the newborn and placental weight were reduced in the altered MRBF/MVB12 ratio.

To study the transgenerational effect of the imbalance of vitamin B12 and folic acid C57BL/6 mice were used. C57BL/6 mice (F0) were given different dietary combinations of folic acid, and low vitamin B12, animals were mated. A group of males and female mice born (F1) were continued on the same diet (sustained group) while others were shifted to a normal diet (transient group) for 6-8 weeks. Mice were mated and on day 20 of gestation, the placenta (F1) and fetal tissues (F2) were isolated. The effect of diet on different growth parameters, gene expression of imprinted fetal growth-related genes, and various epigenetic mechanisms, including global and gene-specific DNA methylation and post-translational histone modifications, were studied. Results revealed that dietary imbalance of folic acid and vitamin B12 altered the global methylation as well as gene-specific methylation and histone methylation in placental tissues. From our animal study, it can be concluded that exposure to an imbalanced diet of low vitamin B12 and folic acid can lead to alteration in the establishment of epigenetic marks, which cannot be restored even on shifting the postnatal diet to a balanced one. The results of this study support new dietary guidelines, possibly for Indian pregnant women to consider VB12 supplementation along with folic acid.

IT10

Interplay between oncogene ZNF726 and DNMT1 for breast tumorigenesis in association with dysregulated cellular cholesterol level

Prof. Chandi C. Mandal

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Abstract

Genetic and epigenetic changes act simultaneously for the initiation, development and metastasis of cancer diseases. In fact, both somatic mutations and abnormal methylation in cancer genome bring the most complex molecular pathology in cancer tissues. Environmental factors (i.e., macro-, micro- or cellular-, cytoplasmic- and nuclear-environment) play key role in both genetic and epigenetic changes including stemness property of a cell. Our database and cell culture based experiments revealed cold-temperature as a cancer risk factor. This study identified ZNF 726 as an oncogene which is induced in breast cancer cells upon cold exposure. Our experimental analysis endorsed that the dysregulation of cholesterol level and its regulatory gene expression is a frequent occurrence in breast tumor tissues. Cholesterol depleting drug MβCD reduced the expression of oncogene ZNF726 in breast cancer cells with simultaneous reduction of tumorigenic activity. Epigenetic regulator DNMT1 was found to be decreased in response to cholesterol lowering simvastatin treatment in breast cancer MDA-MB-231 and MCF-7 cells. It was observed that both DNMT1 and ZNF726 physically interacts in breast cancer cells. Thus, the interplay role in regulation of both DNMT1 and ZNF726 is crucial in controlling cancer growth and metastasis.

Keywords: Epigenetics, ZNF726, DNMT1, Breast cancer, Cholesterol and Cold temperature

IT11

Enterolactone, a mammalian enterolignan, regulates CYP1A1 expression in MCF-7 breast cancer cells

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Abstract

Enterolactone (EL) is a mammalian enterolignan, produced as a result of gut microbial biotransformation of dietary plant lignans. The association between plant lignan consumption, or serum EL concentration with breast cancer risk is controversial. More recent meta-analysis revealed their beneficial effect in post-menopausal women. This, coupled to the ability of EL to bind the estrogen receptor-□, affect the viability of breast cancer cells positively or negatively, and modulate estrogen target gene expression or estrogen responsive gene promoters, implicates estrogen-ER□ signalling axis in the biological effects of EL. Here, I present data to show the differential effect of EL on the proliferation of ER□-positive and ER□-negative breast cancer cells. Induction of TFF-1 mRNA expression by EL, motivated a genome-wide analysis of the transcriptomic response of MCF-7 cells to EL using next generation sequencing (RNAseq). Gene set enrichment or gene ontology analysis of EL-modulated genes revealed estrogen-like impact of EL on gene expression. Among other estrogen-regulated genes, we validated EL-mediated suppression of CYP1A1, a known estrogen-repressed gene. Given that CYP1A1 is also an aryl hydrocarbon receptor (AHR) target, and the role of ER□-AHR interaction therein, we addressed the role of AHR in EL-mediated regulation of CYP1A1. Our preliminary results indicate that EL mimics AHR inhibitor in terms of its ability to suppress CYP1A1. The involvement of both ER□ and AHR in EL-mediated regulation of CYP1A1 suggests, that like estrogen, EL impacts the interplay of ER□-AHR interaction at the regulatory sequences on CYP1A1 promoter. Finally, the implications of EL-mediated suppression of CYP1A1 in the context of breast cancer etiology and risk will be discussed.

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IT12

Elucidating the therapeutic potential of mitochondrial prohibitin and a small molecule inhibitor for breast cancer therapy

Prof. Subash C. Gupta

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Abstract

Prohibitin (PHB) is a pleiotropic molecular chaperone that is known to be involved in several maladies. The role of this protein in breast cancer is poorly understood. In this study, we examined the relevance of this protein in breast cancer. The mRNA transcript of PHB was observed in a number of cancer types including breast cancer. An interrogation of the online dataset at cBioPortal revealed that the 'overall survival' of patients with alterations in PHB was significantly less as compared to the cases without alterations in PHB. PHB was localized in the mitochondria of breast cancer cells. The level of PHB in breast cancer cells was increased by H_2O_2 and also by Moringin (MG), which is a small molecule isothiocyanate obtained from the seeds of *Moringa oleifera* (also called Miracle Tree or Drumstick). From molecular docking studies, MG was found to interact with PHB, DRP1 and SLP2. The isothiocyanate inhibited the proliferation and long-term colony formation in both MCF-7 and MDAMB-231 breast cancer cells. From a number of assays such as AO/PI staining, phosphatidylserine externalization, cell cycle analysis and DAPI staining, the isothiocyanate was found to induce apoptosis in breast cancer cells. MG induced the expression of proapoptotic protein such as cytochrome c, p53, and cleaved caspase-7. Further, the expression of cell survival proteins such as Bcl-xL, Bcl-2, and survivin was suppressed in both cancer cell lines. A depolarization in mitochondrial membrane potential suggested the involvement of mitochondria in MG induced apoptosis. The isothiocyanate suppressed the migration by breast cancer cells. MG was found to interact with p65 and p50 subunits of NF-κB. Further, the isothiocyanate suppressed the p65 nuclear translocation induced by TNF-α while inducing reactive oxygen species generation and SOD activity in breast cancer cells. MG induced the expression of tumor suppressor lncRNAs while suppressing the expression of oncogenic lncRNAs. Overall, the study provide an evidence for the activities of MG against breast cancer. The study also opens a new window to develop further on the role of PHB in breast cancer cells.

IT13

Cassia fistula L.: 'Golden shower' tree with promising chemopreventive potential

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Abstract

Cancer, a leading global cause of mortality, accounted for 19.3 million new cases and 10.0 million deaths in 2020. *Cassia fistula* L. commonly known as 'Indian laburnum' or 'Golden shower' is widely used in the Ayurvedic, Unani and Chinese Folk medicinal system for the treatment of various diseases and disorders. Pharmacological investigations have reported that various components of the plant exhibit notable bioactivities, including anti-inflammatory, hepatoprotective, antifungal, antibacterial and wound healing properties. The multifaceted role of oxidative stress in various stages of carcinogenesis underscores the significance of phytochemicals from *Cassia fistula* in their role in combating cancer. Phytochemical analysis of extracts and fractions from leaves, fruits, seeds and bark revealed bioactive fractions to be rich in phenolic and flavonoids. These fractions showed significant inhibition of mutagenicity against direct-acting and S9-dependent mutagens. CaLA fraction from leaves, CaFH fraction from fruits and CaMC fraction from bark exhibited noteworthy cytotoxicity against HeLa cells (cervical cancer). Epiafzelechin isolated from leaves and Piperine from bark of *Cassia fistula* displayed strong antiproliferative effects in HeLa and MCF-7 cells respectively. Further investigations into the mode of cell death revealed apoptosis induction in cancer cells, validated by morphological, flow cytometric, and SEM studies. Mechanistic studies revealed the downregulation of survival-promoting proteins (p-Akt, p-NF-kB, GSK-3β, Bcl-xl), upregulation of apoptosis-related genes (caspase-8, p53), and modulation of cell cycle regulators (β-catenin, CDK2). *In vivo* studies exhibited strong anticancer activity of CaMC in EAC model, hepatoprotective potential of CaLE against thioacetamide-induced liver damage in rats, emphasizing their role in mitigating oxidative stress and inflammation. This investigation highlights the chemopreventive potential of *Cassia fistula* L. phytoconstituents, positioning them as promising candidates for cancer prevention and therapy.

IT14

Unlocking Nature's Treasure- Harnessing Fruit Biowaste for Innovative Nutraceuticals in the Development of Functional Foods and Therapeutic Drugs

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Abstract

The plant-based food processing industry generates large volumes of biowaste that could be used to produce value-added products and their utilization become an important issue for bio-economy. This food processing results in tremendous losses of valuable non-nutritional, nutritional, and functional bioactive components, including proteins, fibers, carbohydrates, phenolics, carotenoids, and other secondary metabolites. However, it is possible to recover important bioactive components from waste generated during the industrial processing of various fruits and vegetables like onion, apple, citrus and soybean products by applying various extraction and analytical methods. In most cases, the wasted by-products can present similar or even higher contents of bioactive compounds than the final product. The aim of this this research is to promote the production and processing of different fruits and vegetables biowaste including citrus, apple, onion, and soybean waste highlighting the possibility of the integral exploitation of by-products rich in bioactive compounds and having health benefits. Finally, the importance of extraction techniques of bioactive compounds designated as food additives is also included. The extraction of secondary metabolites from fruit skin, peel and seed wastes using various extractions methods with aid of solvents like n-hexane, ethanol, chloroform, and methanol is a challenging task due to their chemical diversity and complex structures. Therefore, it's very important to explode novel extraction technologies having low cost, short time consumption, easy operation processes, and utilizing eco-friendly solvents. Thus, this study is aimed to determine the effect and feasibility of these green methods for extraction of bioactive components from different fruit waste for possible analysis of bioactive compounds with health benefits. Further, evaluation of their performance within the human cells using various in vitro and in vivo models against treatment of various diseases like cancer, diabetes, gout, and neuroprotection with higher bioavailability.

Keywords: Biowaste; bioactive compounds; fruits; antioxidants; cancer

IT15

Deciphering the complexation Mechanism of Nutraceuticals with Cyclodextrin Derivatives and its translational Potential for development of Oral Thin Films

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Abstract

Unveiling the Complexation Mechanism of Nutraceuticals with Cyclodextrin Derivatives and Its Translational Potential for Development of Oral Thin Films. Nutraceuticals often referred as medicinally or nutritionally functional foods, are often associated with therapeutic limitations because of their poor water solubility, low permeability, short half-lives which eventually leads to low oral bioavailability to humans. In this regard, inclusion complex formation using different β-cyclodextrin derivatives [Methyl (M-β-CD), Hydroxypropyl (HP-β-CD), Sulfobutylether (SBE-β-CD)] has emerged as promising approach for enhancing their solubility, stability and therapeutic efficacy. However, unveiling the fundamental complexation mechanism behind inclusion complex formation of β-CD derivatives with these nutraceuticals is an emerging area. In this talk, I will discuss how we can decipher fundamental binding of inclusion complex formation using spectroscopic and biophysical techniques with recent case studies of phloretin and genistein. Further, I will also discuss the translational potential of these inclusion complexes for the development of oral thin films, which can serve as a promising delivery system for these nutraceuticals.

IT16

Exploring the Role of lncRNA Malat1 in Advancing CRC and Metastatic Processes

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Abstract

Colorectal carcinoma (CRC) is the second leading cause of cancer-related deaths in the United States with a significant health disparity between African Americans (AA) and Caucasians (CA) regarding its incidence drug response, and mortality. Apart from family history, obesity, diet, and stress factors alteration could be major drivers of CRC disparity. These factors are associated with the dysregulated function of the major endocrine (HPA: hypothalamus-pituitary-adrenal) axis and higher levels of biochemical stressors (cortisol, cytokines, leptin). Moreover, the five-year survival rate of patients diagnosed with localized-stage disease is 90%, and survival declines to 71% and 14% for patients diagnosed with regional and distant stages, respectively. This requires a better biomarker for the early diagnosis of the disease. Recently, our laboratory has identified a novel long noncoding RNA (LncRNA) namely, Metastasis Associated Lung Adenocarcinoma Transcript 1 (LncRNA MALAT1), which is highly over-expressed in CRC and is involved in its pathogenesis. The differential expression of lncRNA MALAT1 in underserved populations and its regulation will be discussed.

IT17

Significant non-invasive survival outcome of metastasized prostate cancer and neuroendocrine tumors with a combination therapy using modern medicine treatment and nutraceuticals from turmeric and pomegranate.

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Abstract

Despite several advances in the field of Medicine, cancer and COVID have remained a significant challenge to global public health. Since 1990, the number of global cancer deaths increased by 21% in the death rate from 46 million to 56 million/year as per the data reported in 2019. The number is estimated to increase further despite the advances in the modern medicine. The COVID-19 pandemic added to the numbers of global deaths by 7 million including 1/2 a million in India and over a million in the most advanced country, with the 3rd largest population, USA. For most of this century, our research efforts in the continents of Africa and N. America have focused on finding scientific evidence in support of natural and complimentary medicine, primarily nutraceuticals and have focused on the health benefits of curcumin and broad-spectrum enveloped virus neutralizing compounds (EVNCs). We have built our research on curcumin on the pioneering work of Dr. Bharat Aggarwal who demonstrated that curcumin can selectively destroy cancer cells without harm to normal cells. We have observed that bioavailable curcumin in combination with Piperine (from black pepper extract) provides benefit in holding off metastasis in combination with controlling hormones that promote malignant cancers. Additional activities of curcumin in blocking complement mediated inflammation were reported by us. A better survival outcome from synergistic effect of lowering PSA levels and shrinkage of prostate due to a year of curcumin treatment along with lowering testosterone with Lupron in a case of metastasized prostate cancer to the bone will be discussed. One of the foundations of the 21st century science for surviving viral pandemics is the introduction of the EVNCs from pomegranates. Our work building on the pioneering work of Dr. Robert Neurath, who demonstrated anti-HIV activity of pomegranate, we tested pomegranate juice against Herpes, different strains of Influenza, Poxviruses and showed the potent antiviral activity in pomegranate juice. We found that 1/20the of a milliliter can neutralize a million virus particles of any of the enveloped viruses we tested. A well-documented case of severe COVID suggests that a daily consumption of about 200 milliliters enough to neutralize 4 billion respiratory diseases causing virus particles. In conclusion, we have observed the promise of nutraceuticals from two natural ingredients abundant in Asia, Africa and N. America that have yet to realize their full potential in alleviating suffering from cancer and deadly viral diseases.

IT18

‘Erythritol’, a safe nutraceutical exhibits multi-stage anti-malarial activity by permeating into Plasmodium falciparum through aquaglyceroporin channel

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Abstract

The increased resistance of human malaria parasite Plasmodium falciparum to currently used drugs necessities the development of novel anti-malarials. Here, we examine the potential of erythritol, a sugar substitute for therapeutic intervention. Erythritol is a permeant of Plasmodium falciparum aquaglyceroporin (PfAQP), which is a multifunctional channel responsible for maintaining hydro-homeostasis. We show that erythritol effectively inhibited growth and progression of asexual blood stage malaria parasite, and effect invasion and egress processes. It also inhibited the liver stage (sporozoites) and transmission stage parasite (gametocytes) development. Interestingly, erythritol inhibited in vivo growth of malaria parasite in mouse experimental model. It was more effective in inhibiting parasite growth both in vivo and in vitro when tested together with a known anti-malarial ‘artesunate’. Additionally, erythritol showed cytokine-modulating effects that suggest its direct effect on the host immune system. Ammonia detection assay demonstrated that erythritol uptake effects the amount of ammonia release across the parasite. Our functional complementation assays suggest that PfAQP expression in yeast mutant restores its growth in hyperosmotic conditions but showed reduced growth in the presence of erythritol. Osmotic lysis assay suggests that erythritol creates osmotic stress for killing the parasite. Overall, our data bestow erythritol as a promising lead compound with an attractive antimalarial profile and could possibly be combined with known drugs without losing its efficacy. We propose the use of erythritol based sweet candies for protection against malaria especially in children living in the endemic area.

IT19

Understanding the comprehensive differential miRNA profile in tissue biopsies in cervical carcinoma on next generation sequencing platform

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Abstract

Background: Non coding RNA are being increasingly recognized as one of the key players in several cancers including cervical cancer. Recent studies have suggested the role of these epigenetic markers in cervical carcinogenesis and progression. However, there is scant literature which describes the entire miRNome in cervical carcinoma particularly in Indian women using state of the art Next Generation Sequencing platform. We recently conducted a study where the miRNA transcriptome profile was studied and dysregulated candidate miRNA were identified.

Methods: Fresh tissue samples from patients of Cervical Squamous cell carcinoma and normal cervical tissue were collected from the outpatient department and operation theatre. The samples were transported in cold chain and subjected to RNA isolation with Trizol reagent. RNA Integrity Number (RIN) was ascertained with Agilent Bioanalyser 2100. For library preparation TrueSeq small RNA library preparation kit (Illumina) was used and sequencing was performed on the Illumina MiSeq platform. DEseq2 software was used to analyse the miRNA profile data to identify the differentially expressed miRNAs. Deep In-silico analysis of the miRNA profiling data was done with online tools: TargetScan, miRDB and miRPath DIANA to predict the target genes of deregulated miRNAs. The miRNA and the target gene association studies were further validated by primer-probe based real time experiments on additional 30 tissue samples.

Results: The bulk Sequencing results revealed 1224 dysregulated miRNAs in cancer group. On the basis of the fold change and p-values, 33 miRNAs exhibited significant differential expression and 29 of these miRNAs were significantly downregulated and 4 were significantly upregulated in the cervical carcinoma patients. mir-211-3p, miR-133a-3p, miR-409-3p and miR-145-5p demonstrated substantial upregulation in patients with advanced stage of cancer. The top ten most downregulated miRNAs were miR-144-5p, miR-200-5p, miR-486-5p, miR-582-3p, miR-18a-3p, miR-21-5p, miR-183-5p, miR-141-5p, miR-155-5p, miR-182-3p. In-silico analysis revealed contribution of deregulated miRNAs in regulation of their target genes MDM2, CDKN2A, E2F1, CCNE1, MYCN, TP53, Beta-catenin, CDK4, CDK6 which are involved in major cancer pathways. The target genes MDM2, CDKN2A and E2F1 were significantly overexpressed in cervical carcinoma patients.

Conclusion: The current study is pioneer in generating miRNA transcriptome for cervical cancer from Indian subcontinent. The data generated will aid in incorporating miRNA based immunotherapy in Indian women with cervical cancer. The data identifies potential micro RNAs which include mir-211-3p, miR-144-5p, miR-200-5p and miR-486-5p for immunotherapy.

IT20

In vivo Antiangiogenic Effect of Nimbolide, Trans-chalcone and Piperine for use against Glioblastoma

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Abstract

Glioblastoma (GBM) is the most common aggressive malignant form of brain cancer arising from supportive glial cells. It is characterized by a high degree of cellular and molecular heterogeneity with the ability to disseminate throughout the brain parenchyma and thrive in specific or poorly accessible sensitive areas making complete resection impossible. GBM as a rapidly dividing solid tumor is coupled with marked angiogenesis for gases and nutrient supply essentially required for growth. Present study was aimed to screen all reported anti-angiogenic phytochemicals using *in silico* approach to evaluate their ability to cross BBB for their utility in GBM therapy. Screening of over 100 phytochemicals reported to have anti-angiogenic property having well-defined structures published in PubChem revealed, 35 of the phytochemicals with BBB permeability with an acceptable probability score >0.8. Docking of these phytochemicals with VEGFR-2 ECD2-3 and TKD showed 30 phytochemicals (out of 35 BBB permeable leads) achieved/crossed the benchmark binding affinity <-6.4 kcal/mol of TKD with the native ligand ATP, however, none of the phytochemicals could cross the benchmark binding affinity <-8.6 kcal/mol of ECD2-3. From 30 of these phytochemicals, trans-chalcone (TC) and piperine (PPR) were taken for further study. Using *in vitro* 2D and 3D U87 GBM models, the non-cytotoxic dose of TC and PPR was determined to be ≤11µM for *in vivo* CAM study. *In vivo* evaluation of the anti-angiogenic activity of TC and PPR at 1 and 10µM in CAM directly as a standalone model showed antiangiogenic activity including decreased vascular density as well as reduced VEGF and VEGFR-2 transcript level. This was further confirmed by decreased vascular density as well as reduced VEGF and VEGFR-2 transcript levels in CAM U87 xenografts. Taken together, the data suggests the lead phytochemicals TC and PPR have the potential to inhibit angiogenesis in GBM through VEGFR-2 expression inhibition.

IT21

Role of Dopamine-D2-Agonists in Targeting Mitochondria for Mediating Neuroprotection in Subarachnoid Hemorrhage

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Abstract

The role of mitochondria-mediated oxidative stress and neuronal apoptosis is significant in the occurrence of early brain injury subsequent to subarachnoid hemorrhage (SAH). While previous studies have highlighted the therapeutic potential of dopamine D2 agonists in the context of ischemic stroke and Alzheimer's disease. However, there is a conspicuous gap in evidence regarding the D2 agonist's capacity to enhance mitochondrial biogenesis and maintain quality control in the aftermath of subarachnoid hemorrhage. This current investigation delves into the effects of dopamine D2 agonist-specific doses, specifically 5 and 10 mg/kg body weight, in a male Wistar rat model subjected to endovascular perforation SAH. Post-injury assessments encompassed SAH grading based on blood clot analysis, nissle staining, and a comprehensive neurobehavioral evaluation. The neurobehavioral assessment included parameters such as beam balance, grip strength, and rota rod performance to validate motor coordination. Evaluation of reactive oxygen species (ROS), with a focus on superoxide ions as a marker of oxidative stress, was conducted using spectrophotometry. Furthermore, Western blotting was employed to elucidate apoptotic and necrotic markers. The results of this study unveiled that the utilization of the dopamine D2 agonist yielded improved neurobehavioral outcomes, mitigated brain edema, and alleviated oxidative stress and mitochondrial-associated apoptosis. These findings underscore the promising therapeutic potential of dopamine D2 agonist in ameliorating the deleterious effects of SAH through its impact on mitochondrial function and oxidative stress pathways.

IT22

NMR based Serum metabolomics revealed metabolic signatures associated with oxidative stress and mitochondrial damage in brain stroke and the role of Withania Somnifera in stroke management

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Abstract

Brain stroke (BS, also known as a cerebrovascular accident), a serious health crisis all across the globe, has been a leading cause of permanent disability and most often death due to lack of immediate medical attention. While progress has been made in prevention and management, the complexities and consequences of stroke continue to pose significant challenges, especially, its impact on patient's quality of life and independence. During stroke, there is a substantial decrease in oxygen supply to the brain leading to alteration of cellular metabolic pathways, including those involved in mitochondrial-damage, leading to mitochondrial-dysfunction. The present proof-of-the[1]concept metabolomics study has been performed to gain insights into the metabolic pathways altered during brain stroke and potentially discover new targets for interventions to mitigate the effects of cellular and mitochondrial damage in BS. The serum metabolic profiles of 108 BS-patients were measured using 800 MHz NMR spectroscopy and compared with 60 age and sex matched normal control (NC) subjects. Compared to Normal Control, the serum levels of glutamate, TCA-cycle intermediates (such as citrate and succinate), and membrane metabolites (betaine, choline, etc.) were found to be decreased BS patients, whereas those of methionine, mannose, mannitol, phenylalanine, urea, creatine and organic acids (such as 3-hydroxybutyrate and acetone) were found to be elevated in BS patients. These metabolic changes hinted towards hypoxia mediated mitochondrial dysfunction in BS[1]patients. Further, the area under receiver operating characteristic curve (ROC) values for five metabolic features (methionine, mannitol, phenylalanine, mannose and urea) found to be more than 0.9 suggesting their high sensitivity and specificity for differentiating BS from NC subjects) found to be more than 0.9 suggesting their high sensitivity and specificity for differentiating BS from NC subjects. Further, the in silico interaction between elevated metabolites identified in BS patients as compared with controls was done by interaction of Withania Somnifera active metabolites using system biology approach. The results of in silico studies after data analysis might provide some very effective herbal therapeutic effect which may help in management of Stroke post treatment.

IT23

Therapeutic effects of herbal nutraceuticals (Curcumin and Withania Somnifera hydro alcoholic leaf extract) on Circadian dysfunction, Aging and Neurodegeneration

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Abstract

Aging is associated with changes in several basic parameters of circadian timing system (CTS) in leading to circadian dysfunction. The suprachiasmatic nucleus (SCN) in hypothalamus in brain contains a light-entrained circadian clock. It is involved in regulation of neuronal, endocrine and behavioural rhythms through the expression of various clock genes. It regulates the rhythmic production and release of melatonin (messenger of darkness) from pineal gland involving close interaction of core circadian machinery with a network of interconnected transcriptional and translational feedback loops. Circadian clock which maintains the daily 24 hour rhythms (sleep-wake cycle) of an organism is suggested to have a link with alterations and disruptions occurring during aging and age-related diseases such as Alzheimer's disease, Parkinson's disease, dementia etc. Various studies from our group demonstrated the differential alterations in behavioural patterns in spatial learning and memory and percentage day and night activity with aging in the locomotor rhythms, clock gene expression, 5-HT metabolism components, protein profiles, antioxidant enzymes, inflammatory and molecular biomarkers of learning and memory. In this study we report therapeutic effects of herbal nutraceuticals Curcumin and Ashwagandha on age induced daily chronomics in neurodegenerative changes in the functional integrity of CTS. Additionally we have observed ameliorating effects of Ketogenic diet in restoration of CTS function in Parkinson Disease and Aging. This work may prove useful towards targeting novel treatments for circadian dysfunction, good health and longevity.

IT24

Milk Nanostructures: Emerging Profit Bullets for Dairy Industry and Gene Therapeutics

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Abstract

Milk, the Nature's gift, is a cornerstone of the global dairy industry, driven by its nutritional and health benefits. Besides, milk nanostructures such as exosomes open novel avenues for the dairy industry. They hold potential in the pharmaceutical sector and cater to the dairy farmers' economy through value-addition. Globally, few industries are leveraging the profit-potential of milk-nanostructures, directly or as carriers for drug delivery against metabolic and infectious diseases. Despite India's status as the diabetes capital of the world, the country has been slow to recognize the therapeutic potential of milk's natural wonders. Therefore, there is an urgent need of new start-ups to venture on milk exosomes for improving public health and the country's economy. To promote such industries, our lab offers valuable insights on cow and buffalo milk exosomes, their miRNA, stability at different household conditions, and the bioavailability of their cargos. We proved that both hydrophilic (siRNA) and hydrophobic (e.g. curcumin) molecules can be encapsulated into milk exosomes, the encapsulated milk exosomes were stable to the simulated digestion process and can cross the intestinal barrier. In order to encapsulate siRNA, we developed a simple and efficient method without involvement of any toxic chemicals or reagents. Our studies revealed that siRNA loaded exosomes can be used for delivery of RNA into intestinal or liver human cells to knockdown the targeted gene in understanding metabolic regulation of biochemical pathways as well as in gene therapy. To implement such technologies for the benefit of common public, industries need to come forward.

IT25

Targeting Sphingosine kinase 1 by phytonutrients: A structure-based approach to control Idiopathic pulmonary fibrosis and lung carcinoma

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Abstract

Idiopathic Pulmonary Fibrosis (IPF) is a life-threatening disorder characterized by the deposition of proteins in the extracellular connective tissues of the air spaces of lung that causes irreversible fibrosis with a very poor survival rate, leading to the lung cancer. Sphingosine kinase (SphK1) is potential lipid kinase solely responsible for the phosphorylation of sphingosine. Interestingly, in lung fibroblast cells the proliferative effects of TGF-β1 are mediated by SphK1. Since, the dysregulation of SphK1/S1P signaling leads to the development of pulmonary fibrosis and other lung disorders; therefore, the modulation of S1P metabolism offers a novel therapeutic approach to control human pulmonary fibrosis. Here, we propose that the Inhibition of SphK1 in lung pathogenesis would show promising anti-fibrotic responses by utilizing SphK1 as a promising target for the development of effective therapeutics. We used natural products and chemically synthesized compounds to target SPHK1. We have chosen harmaline, querecetin, ellagic acid, cinconine, etc., and reported their mechanism of binding to SphK1 and subsequent inhibition. Molecular docking combined with fluorescence binding studies revealed that these compounds strongly bind to the substrate-binding pocket of SphK1 with an appreciable binding affinity and significantly inhibits the kinase activity of SphK1 with an IC_{50} value in the micromolar range. To induce specificity, we have designed several chemical derivatives and validated their SPHK1 inhibitory potential. The cytotoxic effect of these small-molecule inhibitors was determined on non-small-cell lung cancer cells by MTT assay and we found effective anticancer potential. Harmaline induces apoptosis in non-small-cell lung carcinoma cells (H1299 and A549), possibly via the intrinsic pathway. Our findings suggest that natural products could be implicated as a scaffold for designing potent anticancer molecules with SphK1 inhibitory potential. We propose to develop potential SPHK1 inhibitors that may provide a better treatment for IPF and its related pathological complications.

Keywords: Kinase inhibitors, Anticancer therapy; Idiopathic Pulmonary Fibrosis; MD simulation; Molecular docking; Drug design and discovery, Lung cancer

IT26

Kaempferol: A major phytochemical present in honey plays critical role in protecting pancreatic β-cells and preventing obesity related diabetes

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Abstract

Pancreatic β-cells are affected by fatty acids which plays a vital role in the pathological manifestation of obesity linked to type II diabetes. Thus, rescuing β-cells from fatty acid inducedapoptosis is linked to prevent obesity related type II diabetes. Kaemferol, a natural flavonoid present in honey, has been previously shown to have extensive therapeutic implications for its inherent anti-oxidative, anti-inflammatory, anticancer and anti-microbial activities. In the presentstudy, we intended to determine the cytoprotective effect of kaemferol on pancreatic β-cells undergoing apoptosis under the palmitic acid-stressed condition. We found that kaemferol could show prominent increase in cell viability by attenuating palmitic acid-induced lipotoxicity of pancreatic β-cells. The protective effect by kaempferol was through inhibition of apoptosis and up-regulation of autophagy. The study was confirmed by both in vitro and in vivo analysis. Our data showed that kaemferol also up and down-regulates phosphorylation of AMPK and mTOR respectively. Subsequently, upon inhibition of AMPK phosphorylation by compound C (an inhibitor of AMPK), kaemferol mediated autophagy was abolished which further led to the decline in β-cell survival. Such observations collectively lead to the conclusion that, kaemferol exerts its cytoprotective role against lipotoxicity by activation of autophagy via AMPK/mTOR pathway.

IT27

Investigating Compromised Mitochondrial Metabolism and Assessing Phytochemical Influence on Hair Follicle Health

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Abstract

Hair has a vital role in how individuals perceive themselves, express their uniqueness, showcase their cultural heritage, and maintain their physical health among humans. Alopecia is the term used to describe the condition of hair loss that can happen in any part of the body, regardless of the reason. There are different classifications of hair loss, which include symptoms that range from little thinning to complete absence of hair. Alopecia can be categorised into two main types: scarring alopecia and non-scarring alopecia. Scarring alopecia is categorised into three main groups according to the presence of inflammatory cells: lymphocytic, neutrophilic, and mixed. Scarring alopecias frequently result from inflammatory processes that cause the destruction of hair follicles, ultimately resulting in irreversible hair loss. The exact cause and development of PCA have not been completely understood. However, current knowledge suggests that PCA is considered an inflammatory disease. The therapy options for PCA are limited in quantity and have minimal effectiveness in controlling the progression of the illness. Prior studies have demonstrated that sterol intermediates, which are involved in the production of cholesterol, are the causative agents for initiating inflammation in the hair follicle. The inflammation was significantly affecting the function of hair follicles and causing oxidative damage. Oxidative damage causes a decline in mitochondrial viability, which ultimately results in the apoptosis of hair follicle cells. To validate this, we performed experiments using samples from individuals with alopecia as well as mouse models. This study was mostly about looking at metabolomics analysis on skin and scalp biopsies from both healthy and sick people, including K14-AhR-CA mice and their wild-type littermates. The primary change observed in the K14-AhR mouse model was the buildup of fatty acids within the hair follicle. Caproate was shown to accumulate in the FFA tissue, but laurate was more abundant in scalp biopsies. This observation offers proof of compromised mitochondrial metabolism in both the alopecia model and samples taken from patients. The FFA samples and K14-AhR animals displayed a decrease in glutathione (GSH) levels and an increase during oxidised glutathione (GSSG) levels, suggesting possible impairment of mitochondria function and reduced energy metabolism in the early stages of illness advancement. Several phytochemicals possess the capacity to mitigate oxidative damage and promote oxidative damage. Similarly, these phytochemicals preserve mitochondrial metabolism and protect mitochondria from apoptosis. However, specific exposure to particular phytochemicals can disrupt the balance of hair follicle homeostasis. Phytochemicals such as Resveratrol and Tanic Acid protect against oxidative damage and preserve the functionality of mitochondria. Pelgonic and Behenic acids, which are phytocompounds found in various plant products, have the ability to disrupt the physiology of hair follicles and cause harm to them. This study offers valuable insight into the impact of various phytochemicals on the functioning of the hair follicles. It has the potential to contribute to the creation of products that promote hair health.

Keywords: Alopecia, Scarring Alopecia, Metabolites, Aryl Hydrocarbon Receptor, FFA, Resveatrol

IT28

Nutraceuticals: A Paradigm Shift Towards Better Future

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Abstract

In recent years, there has been a noticeable shift in consumer preferences and healthcare approaches, emphasizing a holistic and preventive approach to well-being. This transition is exemplified by the growing prominence of nutraceuticals, a category of products that bridge the gap between traditional nutrition and pharmaceuticals. Nutraceuticals encompass a broad spectrum of products derived from food sources with purported health benefits beyond basic nutritional value. Ranging from fortified foods and dietary supplements to herbal extracts and functional beverages, nutraceuticals are gaining traction for their preventive and therapeutic attributes. This paradigm shift is driven by an increasing awareness of the integral link between diet, lifestyle, and overall health. Key aspects of this transformation include the exploration of bioactive compounds, such as antioxidants, vitamins, minerals, and phytochemicals, found in various food sources. The advancements in scientific research and technology have facilitated the development of targeted and personalized nutraceutical interventions. Integrating nutraceuticals into daily routines presents a cost-effective and sustainable approach to preventive healthcare, potentially reducing the reliance on pharmaceutical interventions and minimizing the economic burden associated with chronic diseases. As the nutraceutical industry continues to expand, regulatory frameworks are evolving to ensure product safety, efficacy, and accurate labeling. Collaborations between the scientific community, regulatory bodies, and industry stakeholders are crucial to establishing evidence-based standards for nutraceutical development and marketing. In nutshell, nutraceuticals hold a promising potential as a catalyst for a healthier future. These supplements not only empower individuals to take charge of their well-being but also contribute to a paradigm shift in healthcare, emphasizing prevention, personalized nutrition, and a holistic approach to achieving and maintaining optimal health.

IT29

Role of *Trina Dhanya* (millets) in Cancer prevention-a scientific review

Dr. Sathyanarayana B.

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Abstract

Noncommunicable chronic diseases (NCCDs) like cancer are the leading causes of morbidity and mortality globally. The mismatch between present day diets and ancestral genome is suggested to contribute to the NCCDs burden. There is an aberrant gene expression due to epigenetic changes in all cancer types. So, an intuitive and holistic approach to cancer therapy would be to use these bioactive dietary compounds as a means of not only neutralizing epigenomic aberrations as cancer treatment, but also as cancer prevention. In Ayurvedic text millets have been referred by the name as Kudhanya or Kshudra Dhanya and Trina Dhanya. *Kshudra Danya* is a group of small seeded cereals used as human food since ages. They are popular by the name millets. As Millets are packed with nutrients, they have numerous health benefits. Ayurveda has a distinguished explanation of *Kshudra Danya* (millets) with their specific qualities and effects, based on which their indications and contraindications can be elicited. Millets have many nutraceutical properties that are helpful to prevent many health problems such as lowering blood pressure, risk of heart disease, prevention of cancer and cardiovascular diseases, decreasing tumour cases etc. Millets are known to be rich in phenolic acids, tannins, and phytate that act as "antinutrients" However; these antinutrients reduce the risk for colon and breast cancer in animals. It is demonstrated that millet phenolics may be effective in the prevention of cancer initiation and progression *in vitro.* In the current paper role of various mentioned Ayurveda including major millets like pearl millet, finger millet, sorghum millet and minor millets like foxtail millet, barnyard millet, kodo millet, adlay millet, brown top millet etc in cancer prevention and management will be discussed.

Keywords: Trina dhanya, millets, cancer, antioxidant

IT30

Matrine mediated neuroprotective potential in experimental Multiple Sclerosis: Evidence from CSF, blood markers, brain samples and in-silico investigations

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Abstract

Multiple sclerosis (MS) is a debilitating, inflammatory, and demyelinating disease of the central nervous system influenced by environmental and genetic factors. Around 2.8 million people worldwide are affected by MS due to its challenging diagnosis and treatment. Our study investigates the role of the JAK/STAT and PPAR-gamma signaling pathways in the progression of multiple sclerosis. Inflammation and demyelination can be caused by dysregulation of these pathways. Modulating the STAT-3, mTOR, and PPAR-gamma signaling pathways may offer therapeutic potential for multiple sclerosis. Matrine (40 and 80 mg/kg, i.p.), a quinolizidine alkaloid derived from Sophora flavescens, has been investigated for its therapeutic potential in our laboratory. Matrine has been studied for its neuroprotective effect in neurodegenerative diseases. It inhibits inflammatory responses and promotes regeneration of damaged myelin sheaths, indicating its potential efficacy in treating multiple sclerosis. Matrine exerts its neuroprotective effect by inhibiting STAT-3 and mTOR and promoting PPAR-gamma expression.GW9662, a PPAR-gamma antagonist (2 mg/kg, i.p.), was administered to evaluate the involvement of PPAR-gamma and to compare the efficacy of matrine's potential neuroprotective effect. Matrine's interaction with the STAT-3, mTOR, and PPAR-gamma pathways in multiple Sclerosis was also validated and confirmed through insilico investigation. In addition, matrine altered the CBC profile, intensifying the clinical presentation of multiple sclerosis. In addition, we evaluated the diagnostic potential of various biological samples, including CSF, blood plasma, and brain homogenates (striatum, cortex, hippocampus, and midbrain). These samples were used to evaluate the neurochemical changes caused by neurobehavioral alterations during the progression of multiple sclerosis. These results indicate that matrine treatment ameliorated multiple sclerosis and that the mechanism underlying these effects may be closely related to the modulation of the STAT-3/mTOR/PPAR-gamma signaling pathway.

Keywords: Multiple Sclerosis; Demyelination; Matrine; Myelin; Oligodendrocytes; Neuroprotection

IT31

Biological Basis of Metabolic Dysfunction-Associated Steatohepatitis (MASH) andTherapeutic Role of Natural Products

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Abstract

The sequential events that lead to nonalcoholic steatohepatitis (NASH) are yet to be classified. In the present study we have tried to decipher the chronology of whole body, tissue, and cellular events that occur during the evolution of High Fat, High Cholesterol, High Fructose diet-induced NASH. Male C57Bl/6 mice were assigned to a fast-food (FF; high calorie, high cholesterol, high fructose) or standard-chow (SC) diet over a period of 36 wk. Liver histology, gene expression, and hepatic lipid content were analyzed. We observed that the evolution of NASH in the FF diet-induced model is multiphasic, particularly in terms of hepatic lipid composition. Our study demonstrates the longitudinal analysis, the evolution of nonalcoholic steatohepatitis (NASH) on a fast-food diet-induced model. Key findings include *1*) hepatic lipid composition changes in a multiphasic fashion as NASH evolves; *2*) insulin resistance precedes hepatic inflammation and fibrosis. Further we evaluated the ameliorative effect of Glabridin (GBD), an isoflavane from reputed plant *Glycyrrhiza glabra* against the intracellular events caused by palmitic acid and alcohol in mouse hepatocytes and fast food diet and alcohol -induced steatohepatitis in C57BL/6Jmice (FF model). GBD therapy considerably reduced intracellular events in AML-12 cells exposed to PA + EtOH. GBD treatments significantly improved body metrics, biochemical indexes, and histological features in C57BL/6J mice compared to FF + EtOH. Moreover, protein and gene expression investigations revealed a strong therapeutic effects on oxidative stress, inflammation,steatosis, fibrosis, and apoptosis -related molecular signaling cascades.

IT32

Implications of environmental pollutant Inhalation: A possible therapeutic approach towards Pulmonary fibrosis

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Abstract

Lungs are in direct contact with the environment and are continuously stimulated by several environmental contaminants, mainly particulate matter, environmental endotoxins (Lipopolysaccharide, LPS), plasticizers, pesticides and herbicides which cause severe lung damage when exposed either through localized or systemic routes. They may be recognized by innate immune system involving the pathogen associated molecular patterns mainly toll like receptors–4 (TLR4) which initiates inflammatory response dominated mostly by neutrophils, macrophages and proinflammatory cytokines releases such as TNF-α, IL-1β and IL-6. Allergic asthma is a disease characterized by airway inflammation, oxidative stress and remodelling of airways (fibrosis). These abnormalities include increased production of variety of cytokines, chemokine and growth factors responsible for the activation of intracellular signaling pathways. As per earlier reports, increased expression of several proteins were observed in the airways, including pro inflammatory proteins, cytokines, chemokines, and adhesion molecules. Various inflammatory signaling proteins, including protein kinase C (PKC), growth factor tyrosine kinase receptors, nicotinamide adenine dinucleotide phosphate (NADPH)/reactive oxygen species (ROS), PI3K/Akt, MAPKs, nuclear factor-kappa B (NF-κB), activator protein-1 (AP-1), and other signaling molecules regulate time course and intensity of asthmatic response by resident and circulating cells. Nutraceuticals, also been called medical foods, designer foods, phytochemicals, may be used to improve health, delay the aging process, prevent chronic diseases, so they function as immunomodulators. Recently, the application of phytochemicals and their combination therapies, to treat various complex diseases including allergic asthma is emerging as a new area of interest. Combination therapies also limit their side effects and enhance their effectiveness. These therapies may serve as alternative therapies that are needed to reduce the need for continuous oral corticosteroids.

IT33

Harnessing the Therapeutic Potential of Ginger-Derived Extracellular Vesicles in Type 2 Diabetes: A Multi-Faceted Approach Targeting Glucose, Lipid Metabolism, and Beta Cell Protection

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Abstract

Type 2 diabetes mellitus (T2DM) is a metabolic disorder characterized by high fasting blood glucose levels and peripheral insulin resistance. The prevalence of T2DM has been alarming the whole world over the recent years. The current treatment strategies to manage T2DM includes several drugs such as Metformin, Sulfonylureas, Thiazolidinediones, Dipeptidyl peptidase-4 inhibitors, SGLT2 inhibitors, and Glucagon-like peptide-1 analogue and painful insulin injections. These strategies are costly and require regular adequate dosage to prevent the increased glucose level in the body. On the other hand, the emergence of nanotechnology has enabled new prospects for drug therapies in T2DM. Additionally, the applications of biomedicine have attracted increasing attention in recent decades. Exosome are nanosized extracellular vesicles comprising of proteins, lipids and nucleic acids which are responsible for intercellular communication. Exosomes have been shown to alleviate diabetes mellitus (DM) in both animal models and clinical trials. In present study, we investigated whether exosomes isolated from ginger (G-ELNs) have a therapeutic effect on the insulin resistant HepG2 cells and high-fat diet and streptozotocin (STZ) induced diabetic mice model. We found that treatment with G-ELNs increased the uptake of glucose (2- NBDG) and further inhibited the expression of key hepatic gluconeogenesis enzymes, PCK-1 and G6PC in insulin resistance HepG2 cells. Further, we established a mice model of T2DM using a high-fat diet and streptozotocin (STZ). We found that the oral dosage of G-ELNs for 4 consecutive weeks significantly reduced fasting blood glucose levels and improved glucose tolerance in T2DM mice. Further, G-ELN treated mice displayed significantly improved insulin sensitivity via improved phosphorylation of Akt-2 at serine 474. These mice also showed reduced hepatic gluconeogenesis, lipid accumulation and improved glycogen storage as evident by the reduced expression of PCK1, G6PC (key enzymes of gluconeogenesis), FAS, Srebp1 (key enzymes of lipogenesis) and increased expression of GYS2 (key enzyme of glycogenesis). G-ELN treatment further inhibited STZ induced pancreatic beta cell damage, altogether providing an alternative approach for T2DM treatment.

IT34

Combating carbapenem-resistant *Acinetobacter baumannii* using plant secondary metabolite naringin derivative targeting its AdeABC efflux protein.

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Abstract

Acinetobacter baumannii is an opportunistic ESKAPE pathogen that causes pneumonia and UTI infections. Phenotyping, genotyping, and quantitative proteomics studies suggested the overproduction of OXA and AmpC β-lactamases, efflux pumps, and siderophore receptors in carbapenem-resistant *A. baumannii* (CRAB). Efflux pumps were selected for further investigation due to their widespread distribution and broad substrate specificity. Investigation of efflux pumps in CRAB suggests the presence of AdeABC, AdeFGH, AdeIJK, and AbeM. Experimental studies using gene mutants demonstrated the significant role of AdeABC in carbapenem resistance, biofilm formation, surface motility, pathogenesis, bacterial adherence, and invasion of CRAB to host cells. The structure-based screening of different plant secondary metabolites, followed by molecular mechanics, molecular dynamics simulation, and experimental validation using efflux pump mutants and antibiotic accumulation assay identified naringin dihydrochalcone (NDC) as the lead against AdeB protein. Naringin dihydrochalcone was selected as a capping agent for silver nanoparticles, and FTIR, UV, DLS, and SEM were used to characterise the prepared NDC-capped silver nanoparticles (NDC-AgNPs). The investigated molecular mechanism showed that the NDC-AgNPs possessed multiple mechanisms of action. In addition to efflux inhibitory activity, it generates reactive oxygen and nitrogen species as well as causes changes in the electrochemical gradient of CRAB. It was also observed that *A. baumannii* did not develop resistance against NDC-AgNPs for several generations and was effective against different clinical isolates of *A. baumannii*. Therefore, the present study provided insight into the efflux pump-mediated carbapenem resistance, and possible inhibitor NDC-AgNPs to combat AdeABC-mediated resistance in *Acinetobacter baumannii*.

IT35

Clinical trials for food & foods with medicinal properties

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Abstract

Nutraceuticals—which include both traditional foods and foods with established medical benefits—have drawn a lot of interest due to their possible health advantages. Herbal supplements, functional foods, and special diet foods are the three possible investment areas in this regard. To evaluate the short- and long-term effects on relevant biomarkers, patient-reported outcomes, and overall quality of life, rigorous randomized controlled trials (RCTs) are being carried out. Concurrently, there are multidisciplinary trials that look at dietary supplements, functional foods, and botanical extracts to see if they have any therapeutic potential using imaging studies, molecular analyses, clinical assessments, with focus on neurodegenerative and gastrointestinal disorders in addition to immune-related conditions and cardiovascular disorders, metabolic syndrome, and inflammatory diseases. RCTs for novel foods, however, also bring up questions about safety and ethics for the population included in the study. A food trial's success can be increased by taking into account the taste and/or dietary preferences of the population being studied, carefully evaluating and assessing the trial at each stage. Because the general population is made up of a diverse range of people from different regions and cultures, most developing countries are streamlining their efforts to define novel foods and foods with medicinal properties as well as to establish guidelines for review and approval of such foods for general public consumption. Still, the validation of the available scientific evidence for the claims/indications being made for these foods need to speed-up, given the industry's constant rise for novel foods and the public's growing inclination and/or curiosity toward them.

IT36

Glycogenomics of the human gut bacteria in health and diseases

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Abstract

Human gut harbours large number of microorganisms with an estimated of 100 trillion cells, belonging to about 1000 different species. It makes this organ far most diverse than other organs of the human body in term of dwelling of microbes. Metagenomic studies showed that most people share core bacterial communities of 50-100 species that harbor more than 6000 functional gene groups. Those assigned functional genes involve in the digesting complex glycans, and synthesize short-chain fatty acids, indispensable amino acids, cofactors and vitamins. That fraction of whole gut microbiota sometime referred as minimal gut genome or minimal gut metagenome. Additionally, it has been predicted that human gut microbial communities comprise of several unknown functional genes yet from unknown bacteria that could involve in the causal relationship with the host, and are essential for proper functioning of gut. Given a myriad of known and unknown functions, gut microbiota is also referred as second genome body of the human. Genome of the human is assumed to encode only 17 glycoside hydrolases (GHs) that are only involved in utilization of starch, lactose and sucrose. This scenario implies that most of the dietary derived glycans end-up in the colon where they are available to microbial digestion and fermentation. At present, metagenomic studies of gut microbiota are delivering enormous amounts of sequence data regarding species and genetic contained of them sampled from diverse geographical locations, different ages and cultural traditions. However, our reckoning about functional variations upon changes in diet in healthy and diseased conditions of an individual are very scarce and running with very little pace. Amid vast numbers of annotated gene identified in our gut microbiota through metagenomics, those ones that encode Carbohydrates Active enZymes (CAZymes) and transporters are principally interested, which encode variety of enzymes responsible for digestion of complex glycans, glycoconjugates and oligosaccharides and their utilization respectively. Therefore, exploring of glycogenomics of the human gut microbiota is an interesting. This can pave the way for development of nutraceutical therapy for treatment of dysbiosis.

IT37

Harnessing Nutraceutical Potential: NABI's Journey with Anthocyanin-Enriched Black Wheat

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Abstract

Nutraceuticals, substances within foods providing medical benefits, are pivotal in addressing health challenges. NABI, Punjab, India, has developed black wheat as a nutraceutical powerhouse to combat malnutrition. Adaptable blue, purple, and black wheat lines, enriched with anthocyanins, iron, and zinc, were created from exotic donors. Our research explores the impact of anthocyanin-rich whole wheat on obesity, revealing preventative potential and resistance to harmful microorganisms. Colored wheat serves as a prebiotic, positively influencing gut microorganisms. In diabetes studies, promising outcomes highlight its efficacy. Colored wheatgrass juices surpass white wheat in nutraceutical profiles, while products like vermicelli, chapatti, cookies, and cakes exhibit enhanced qualities. Notably, black wheat products experience fewer amino acid losses during cooking. Commercialization efforts, involving 28 companies, mark a pivotal step in transitioning anthocyanin-rich colored wheat from innovation to market. Yet, scaling up production and consumption remains a key frontier, underscoring the need for continued efforts.

ABSTRACTS

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OP1

Withaferin A Suppresses Mortalin-Regulated Oral Carcinogenesis by Targeting Akt/mTOR Signaling

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Oral cancer is a prominent malignancy in India with a rapid rise in incidence of approximately 1 lac cases and 50,000 mortalities annually. Representing one-fourth of the total cancer burden in India, it is highly prevalent among males. The North-Eastern region has emerged as a hotspot for oral cancer which is linked to high tobacco consumption. Despite available therapeutic modalities, challenges persist due to late-stage diagnoses and tumor recurrence, affecting the prognoses and survival of oral cancer patients. Hence, it is imperative to identify therapeutic target for the management of oral cancer. This study focuses on exploring the role of Mortalin, a heat shock protein, in oral cancer. Overexpression of Mortalin have been implicated in various cancers such as osteosarcoma, hepatocellular carcinoma, glioblastoma, breast cancer, etc., associated with poor prognosis in patients. Notably, our investigation revealed significant upregulation of Mortalin in oral cancer tissue samples and cell lines, with overexpression correlating to advanced stages and high-grade of the disease. Furthermore, mechanistic studies involving the knockdown of Mortalin in oral cancer cell lines revealed the modulation of the Akt/mTOR signaling pathway and various molecules such as survivin, p-pRB, p53, p-wee-1, cyclins, caspases, VEGF-A, MMPs and cadherins. Thus, Mortalin emerges as a potential biomarker, warranting for targeted inhibition. Our exploration further delves into the inhibitory efficacy of Withaferin A (WiA), derived from *Withania somnifera*, as potential therapeutic agent for oral cancer. Interestingly, treatment of oral cancer cells with WiA exhibited suppression of Mortalin, along with modulation of the Akt/mTOR pathway and key hallmarks proteins involved in oral cancer. In conclusion, Mortalin presents as a promising biomarker, and the exploration of its targeted inhibition by WiA offers a prospective approach for better management of oral cancer.

OP2

Unmasking TRIMp: Exploring its Oncogenic Role and Investigating Plant-Derived Compounds for Breast Cancer Treatment

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Breast cancer stands as a leading cause of cancer-related mortality and a prevalent malignancy affecting women worldwide. The intricate molecular cascades underlying cancer pathogenesis entail the dysregulation of multiple signaling pathways. Within this context, the TRIM (Tripartite Motif) protein family emerges as a diverse and extensive collection of proteins characterized by a conserved structural motif known as the tripartite motif, composed of three distinct domains: the B-box domain, Coiled-coil domain, and RBR (Ring-finger, B-box, and coiled-coil) domain. TRIM proteins are associated with the regulation of protein degradation through the ubiquitin-proteasome system. Employing an analysis using online cancer databases like GEPIA2, the study determined the differential expressions of all TRIM genes out of which 16 TRIM genes exhibited significant upregulation in the context of breast cancer. However, the role of TRIMp in breast cancer remained largely unexplored. Moreover, TRIMp displayed elevated expressiomn in 21 out of 33 different cancer types. In order to elucidate the role of TRIMp in breast cancer, the study executed gene silencing through siRNA in MCF-7 breast cancer cells. The MTT assays and cell count was performed to gauge cell viability and proliferation. Wound healing and transwell assays were performed to assess cellular migration and invasive properties. Intriguingly, upon the knockdown of TRIMp, several crucial cancer-associated genes, including BCL-2, BCL-XL, CDK-2, CDK-4, Vimentin, and ZEB-2, exhibited downregulation at the mRNA level. Furthermore, owing to the lack of knowledge regarding the structural aspects of the TRIMp protein, computational modeling tools such as Robetta, iTasser, and Swiss Modeller were utilized to construct a three-dimensional model of TRIMp. This model holds promise as a valuable resource for potential targeting of TRIMp. The development of a drug library encompassing 2100 plant-derived metabolites was done, which were systematically screened to identify potential drug candidates targeting TRIMp. In summary, these outcomes clearly demonstrated that the depletion of TRIMp led to a reduction in breast cancer cell proliferation, migration, and invasion, thus it could have oncogenic significance. The prospect of targeting TRIMp emerges as a promising and innovative therapeutic avenue for the treatment of breast cancer.

OP3

Anticancerous potential of phytoconstituents frombroccoli-extract against breast cancer

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Breast cancer is a metastatic carcinoma that is recognized as a leading cause of deathin women worldwide and is still an unanswered medical challenge. In recent times, various breast cancer therapies such as the use of synthetic drugs, chemotherapy, and traditional surgery have been used in clinical therapeutic treatment for breast cancer, which are reported to possess several side-effects some of which are damage to healthy tissues and poor drug efficiency. This suggests that there is a need to look for an alternative strategy that possesses immense potential to inhibit the pathogenesis of breast cancer by reducing these side effects. Since plants are an emerging source of natural compounds including phytochemicals, they can be a potential candidate for the treatment of breast cancer. In this study, we prepared an extract from Broccoli (Brassica oleracea var. *italica*) and screened the natural phytoconstituents present in it using GC-MS and LC-MS. Our result showed that there are volatile and non-volatile phytochemicals present which are antioxidant and anticancerous in nature. Similarly, the developed extract was also found to be rich in polyphenols and inhibit the generation of free radicals by using total phenolic content, DPPH, and ABTS experiments. In addition, treatment of developed broccoli extract to cancerous cells i.e. MDA-MB-231 and MCF-7 cells were found to be cytotoxic. In contrast, the extract was found to be non-cytotoxic to non-cancerous cells i.e. MCF-10 cells, suggesting their potential to inhibit the growth of breast cancerous cells. Therefore, the results of the current study demonstrated the immense potential of extract to reduce breast cancer pathogenesis. However, more translational research is required to bring the broccoli extract-phytoconstituents to the stage of clinical trials for further approval of their clinical relevance in human welfare.

OP4

Noscapine: Repurposing an opium alkaloid as a potential anti-cancer drug through Aurora Kinase B inhibition

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Aurora Kinase B (AURKB), a critical regulator of mitosis, plays a pivotal role in cancer progression. Aberrant AURKB phosphorylation drives tumorigenesis, making it an attractive target for cancer therapeutics. However, existing AURKB inhibitors face limitations like poor selectivity and toxicity. This study explores the potential of noscapine, a dietary polyphenol, as a selective AURKB inhibitor.
In silico docking and binding affinity calculations suggested strong interactions between noscapine and the AURKB ATP-binding pocket. Fluorescence quenching experiments confirmed these interactions using recombinant AURKB expressed in E. coli. Importantly, ATPase assays revealed that noscapine significantly inhibited AURKB activity with an IC50 < 50 µM. Molecular dynamics (MD) simulations further elucidated the stability and conformational changes of the AURKB-noscapine complex, providing insights into the mechanism of inhibition. Additionally, noscapine exhibited cytotoxic effects on A549 lung cancer cells (IC50 < 100 µM), suggesting its potential in cancer therapy.Overall, this study demonstrates the potential of noscapine as a novel and selective AURKB inhibitor. Its favorable binding affinity, inhibitory activity, and anti-cancer effects warrant further investigation for the development of noscapine-based therapeutics against AURKB-driven tumors. Additionally, the identified interaction site can guide the design of synthetic analogs with improved potency and selectivity.

OP5

Investigating AURKB Inhibitory Potential of Baicalin: A Targeted Approach towards Lung Cancer Therapy

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The abnormal functioning of cell cycle regulators, including Aurora kinase B (AURKB) belonging to the serine/threonine kinase family, triggers the pathogenesis of several diseases, including cancer. Selective targeting of kinases depicting atypical phosphorylation and possessing oncogenic potential has gained the attention of intensive pharmacological research. To date, studies on selective AURKB targeting and an in-depth understanding of underlying molecular mechanisms still need to be discovered. In line with shortcomings associated with conventional anti-cancer drugs, alternative therapies involving the usage of phyto-constituents have been extensively explored with effective therapeutic benefits. Recently, a paradigm shift has been observed in screening bioactive natural compounds as potential kinase inhibitors in cancer therapeutics. In the quest to identify potential AURKB inhibitors, natural polyphenols, including resveratrol, mangiferin, syringic acid, cholic acid, baicalin, tocopherol, thymol, vanillin, caffeic acid, and quercetin, were selected based on previous findings. An integrated experimental approach coupled with the molecular dynamic (MD) simulation was used to elucidate the binding mechanism of these compounds with AURKB. Recombinant AURKB was expressed in DE3 cells and purified with Ni-NTA chromatography for *in-vitro* assays ATPase assay revealed that mangiferin and baicalin significantly inhibited AURKB activity with IC_{50} values of 20.0 μM and 31.1 μM, respectively. In addition, minimal conformational changes in the structure and formation of stable AURKB-ligand complex were observed during MD simulation analyses. Finally, cell-based studies suggested that baicalin exhibited *in-vitro* cytotoxicity and anti-proliferative effects on lung cancer cell lines. Our findings report that baicalin binds efficiently within the kinase domain of AURKB and significantly inhibits catalytic activity. Thus, the baicalin scaffold can be implemented in the design and development of novel AURKB inhibitors against lung cancer.

OP6

Decoding Nature's Harmony: MicroRNA Orchestration by Holarrhena pubescens and its Revolutionary Implications in Medicinal Plant Therapeutics

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Holarrhena pubescens, a cherished medicinal treasure within the *Apocynaceae* family, has graced the landscapes of the Indian subcontinent for centuries, bearing a rich legacy in Ayurveda and ethno-medicine with an exceptional track record of minimal side effects. This study delves into the unexplored realm of microRNAs, enigmatic non-coding small RNAs orchestrating post-transcriptional gene expression. The hypothesis suggests that these molecules may weave a tapestry of medicinal benefits within the body upon ingestion, regulating gene expression for therapeutic use. To unravel the concealed intricacies of *Holarrhena pubescens*, we conducted an extensive analysis using high-throughput sequencing on the Next Generation Sequencing Illumina platform. A staggering 42,755,236 raw reads from *Holarrhena pubescens* stems, obtained from a small RNA library, unveiled a constellation of 687 known and 50 novel miRNAs. Like elusive notes in a celestial melody, these newfound miRNAs were predicted to engage in specific interactions with human genes. Subsequent annotations revealed vital roles in biological processes and signalling pathways, resembling a symphony - Wnt, MAPK, PI3K-Akt, AMPK pathways, and endocytosis. The revealed opus of *Holarrhena pubescens* miRNAs took centre stage, elucidating a profound association with various human diseases, including cancer, congenital malformations, nervous system disorders, and the mysterious realms of cystic fibrosis. The identification of crucial hub proteins—*STAT3*, *MDM2*, *GSK3B*, *NANOG*, *IGF1*, *PRKCA*, *SNAP25*, *SRSF1*, *HTT*, and *SNCA*—engaged in a harmonious dance with human diseases underscored the significance of this symphony, particularly resonating in the fields of cancer and cystic fibrosis. In a crescendo of discovery, this symphony of findings unveils, for the first time, the celestial repertoire of *Holarrhena pubescens* miRNAs. This botanical virtuoso orchestrates a unique cross-species control of human gene expression, providing transformative insights into the mechanisms underlying its myriad properties. Let us explore the promising possibilities of miRNA transfer and encourage the scientific community to join us in a new era of medicinal plant therapeutics. This ethereal symphony has the potential to transform healing, and we look forward to showcasing its impact on the international scientific stage.

OP7

Puerarin affects Inflammation in Lupus Pathology: Study on Pristane Induced Mice Model

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Introduction: The complexity of chronic autoimmune disorder, Systemic lupus erythematosus (lupus), is still an enigma for researchers. Mitochondrial dysfunction and oxidative stress are known to be important aspects that can regulate lupus aetiology. The aim of this study was to evaluate the role of Puerarin, a functional food which is one of the main components of root of *Pueraria lobata*, in regulating the lupus pathology through modulation of mitochondrial mechanisms such as AMPK axis, which can directly or indirectly regulate the inflammation and oxidative stress. **Methodology:** The study was carried out on Pristane-induced Balb/c mice lupus model (LM) using Puerarin. Evaluation of anti-oxidant enzymes (MnSOD and catalase), mitochondrial complexes, pro-inflammatory cytokines (IL-1β, IFN-ϒ, IL-17A) levels, biochemical parameters was carried out. Puerarin cytotoxicity was analysed by using MTT assay. Tissue sections were studied using haematoxylin and eosin staining & immunohistochemistry. The AMPK axis expression was analysed by using quantitative PCR and western blotting. **Results:** Elevated levels of anti-oxidant enzymes in plasma from LM were observed in response to Peurarin in dose dependent manner. The levels of various proinflammatory cytokines such as IL-1b, IL-17, IFN-γ and anti-nuclear antibodies (ANA) were significantly decreased while levels of anti-inflammatory cytokine- TGF- b were found to increase after administration of Puerarin dosage to LM mice. Various biochemical parameters altered in LM fell within normal limits on Puerarin treatment. Immune complex deposition in kidney and liver were also reduced on treatment with Puerarin. Mitochondrial activity and AMPK axis were also modulated by Puerarin in LM. **Conclusion:** Owing to the immunomodulatory and anti-inflammatory effects observed alongside mitochondrial activity upon administration of the nutraceutical compound Peurarin, it is suggestive of being beneficial in management of the chronic systemic autoimmune disorder- lupus.

OP8

Evaluation of ergosterol and its metabolites as LXR agonists and their anticancer potential in colon cancer

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Aberrant cholesterol homeostasis is now a well-recognized hallmark of cancer and is implicated in metastasis as well as chemotherapeutic resistance, which are two prevalent causes of therapy failure and cancer associated mortality. Liver X receptors (LXRs) are one of the key transcription factors that are involved in the regulation of cholesterol homeostasis. Activation of LXRs induce cholesterol efflux via enhancing the expression of ABC transporter genes mainly ABCA1 and ABCG1. Keeping in mind this pivotal role of LXRs, a composite analysis of several novel sterols as potential LXR agonists has been performed. **Ergosterol** (Erg) and its metabolites named as **ERG1**, **ERG2**, **ERG3** and **ERG4** displayed very good binding affinities in the range of -13 to -11 kcal/mole for both LXRα and LXRβ. Out of these five sterols, Erg, Erg2 and Erg3 formed critical activating interactions involving two hydrogen bonds (Arg305 and Glu267) with LXRα. Similarly, Erg, Erg1 and Erg3 formed critical hydrophobic interactions involving His435, with LXRβ binding pockets. To examine the stability of docked complexes, root mean square deviation (RMSD), root mean square fluctuation (RMSF) and hydrogen bonding pattern was analysed. RMSD values obtained were well within the narrow range of 0.1 to 0.2 nanometre (nm) for both LXRα and LXRβ. *In vitro* cytotoxicity showed that these sterols significantly altered the cell viability of colon cancer cells (HCT116, HCT15, and SW620). However, their effect on cell viability of CHO-K1 normal epithelial cells was much less as compared to cancer cells suggesting a tumor specific effect. Furthermore, Treatment of stably transfected ABCA1-Luciferase reporter HCT116 cells with T0901317 resulted in a concentration dependent increase in LXR activation, indicating the ability of the reporter constructs to identify LXR agonists. Reporter assay revealed that Erg, Erg2 and Erg4 resulted in significant activation of LXRs.

OP9

Evaluating the Mitochondrial Protective Efficacy of Triphala: An *In Vitro* and *In Vivo* Investigation into Mitigating Dysfunction

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Mitochondria play a crucial role in supporting various physiological functions by serving as the primary supplier of cellular energy and a vital element in cell differentiation and survival. Dysfunction of which is a critical issue since mitochondria play an important role in health, aging, and diseases. This study aimed to explore the mitoprotective potential of Triphala in countering chemically induced mitochondrial dysfunction in HaCaT cell lines and assess Triphala's regenerative capacity in Hydra. Here the mitotoxicants used include Rotenone, a broadly used biological pesticide, and Chloramphenicol, a synthetic antibiotic. For *in-vitro,* concentrations of the test chemicals and rescue compound were fixed via MTT assay. For validating the results, cellular wound healing assay and AO/EB staining were carried out. Later on, the rescue ability of Triphala was explored by dividing HaCaT cells into nine experimental groups (control, vehicle- for Rotenone and Chloramphenicol, Rotenone (1.5□M), Chloramphenicol (100□M), Triphala (6.25□g), Rotenone and Triphala (1.5□M, 6.25□g) and Chloramphenicol and Triphala (100□M, 6.25□g)). And this has been confirmed via gene expression analysis and MitoTracker/Dapi staining method. Our results suggest that Triphala can restore mitochondrial viability after the cell has undergone mitochondrial depletion. The experiment was carried out in hydra to find the regenerative ability of Triphala, a freshwater cnidarian to ascertain *in vivo* relevance of the study. For this, the mitotoxicants and the Triphala were individually treated with varying concentrations to understand their effect on the model organism. AO staining for measuring apoptosis and DCHFDA staining for measuring intracellular ROS has been done to validate the data acquired from the *in vitro* approach. The rescue ability of Triphala in hydra was determined by exposing the animal model to the test compounds and subsequent treatment with Triphala showed a promising impact. And from the regeneration assay, it is evident that Triphala enhanced hydra's regenerative efficiency.

OP10

Unlocking the Therapeutic Potential of PLGA-Encapsulated Shogaol Nanoparticles Combating in A375 Melanoma Cell

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Cancer is a leading global cause of death, affecting people of all ages and genders. Conventional treatments can harm normal cells. However, ginger and its compounds, including gingerol and shogaol, show promise in eliminating cancer cells in animal models and labs, playing a crucial role in disease management. 6-Shogaol has demonstrated promising anti-cancer properties by inhibiting the growth and inducing programmed cell death (apoptosis) in various cancer types. However, it faces limitations such as low bioavailability and a lack of selectivity. To address these limitations, we explored the use of PLGA-encapsulated 6-shogaol nanoparticles. **Aim**: This study aimed to enhance the bioavailability and specificity of 6-shogaol in combating melanoma in A375 cell lines via PLGA-6-shogaol nanoparticles. **Materials & methods:** Nanoparticles were synthesized using the nanoprecipitation techniques, and Shagoal-loaded PLGA nanoparticles underwent characterization through various techniques. FT-IR analysis confirmed the presence of Shagoal biomolecules within the PLGA nanoparticles, while SEM and DLS were employed to examine particle size, shape, and zeta potential. Cell proliferation and migration were assessed using MTT and Scratch assays. AOEB and crystal violet staining were employed to evaluate the apoptotic effect of PLGA-6-shogaol. PCR confirmed the upregulation of apoptotic genes SMAD 3 and Caspase 9 via the TGF β pathway. **Results**: The PLGA nanoparticles loaded with Shagoal were synthesized using the nanoprecipitation technique. The nanoparticle size was determined via zeta-sizer-based dynamic light scattering, showing an average particle size distribution of 6.9nm. Functional groups were identified through FT-IR analysis, and the nanoparticles' morphology was assessed using a scanning electron microscope (SEM). The ability of nano-shagoal, compared to regular shagoal, to inhibit cancer cell spread was investigated using a scratch assay, showing that PLGA-6- Sgl NPs significantly reduced cell migration compared to shagoal-treated cells. To analyze programmed cell death (PCD), an AO/EtBr double-staining approach was employed. At higher concentrations (2µM/ml), PLGA Sgl nanoparticles exhibited significant apoptotic potential compared to Shagoal. The anticancer potential of the test compound was determined by its impact on growth inhibition, with the compound demonstrating maximum cytotoxic effects at a higher concentration of 2.5µM/ml for nano-sgl compared to Shagoal. Substantially, the real-time PCR gene expression data revealed that nano-sgl effectively upregulated the activity of TGF-β and SMAD B3 while downregulating the activity of Bcl-2. These changes led to caspase activation, ultimately triggering the process of apoptosis. The overall results showed successful PLGA-SGL nanoparticle optimization, leading to decreased cell viability and migration. Conclusion: PLGA-6-shogaol effectively enhances therapeutic potential against A375 melanoma cells by activating caspases through the TGF β pathway, with significant implications for melanoma treatment.

OP11

Exploring Cholesterogenic Alterations and Mitochondrial Dysfunction in Alopecia

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Mitochondria contribute significantly to various processes in the skin, such as pigmentation, cell signaling, vascular homeostasis, wound healing, and hair growth. Mitochondrial dysfunctions have a pivotal role in the pathogenesis of many diseases. Dysfunctional mitochondria produce less ATP, creating an energy deficit that disrupts vital cellular processes. The present study combines gene expression analysis with proteomics approach to get more data on the molecular basis of cholesterols inhibition and intermediate accumulations in alopecia through fibrosis. Regulation of gene expression in cholesterol homeostasis has been studied for many pathologic conditions. This study examines the correlation between impaired mitochondrial function in the hair follicle and the resulting harm to pilosebaceous function and structure. The study was used to look at what happened when cholesterol production was stopped and precursors built up in the hair follicles of living C57BL/6 mice and human hair follicle keratinocyte cells (HaCaT) grown in the lab. We conducted studies on mitochondria's structural damage and functional changes in both *in vitro* and *in vivo* models. The aim was to investigate the modifications in cholesterol biosynthesis that result in mitochondrial harm by applying simvastatin and atorvastatin as inhibitors of cholesterol and utilizing 7DHC as the precursor. Cholesterol inhibition throws a wrench in the machinery of hair follicle mitochondria, as revealed by detailed analysis of their proteins, genes, and microscopic architecture, ultimately disrupting their crucial energy-producing role. Our research sheds light on the critical role of cholesterol in maintaining healthy hair follicles.

OP12

Formulation development, characterization andassessment of acarbose-encapsulated guar gum nanoformulation against type 2 diabetes

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Diabetes is an emerging epidemic disease with an estimated 425 million people already affected worldwide and the figures are expected to rise up to 629 million by 2045. Acarbose is a competitive inhibitor of α-Glucosidase, which exerts hypoglycemiceffects by delaying carbohydrate digestion without substantially affecting serum insulinlevel. However, the clinical application of acarbose is hampered due to its short half- life in systemic circulation, so the drug requires repetitive administration (3-4 times perday), with doses of 25-100 mg, which further leads to several gastrointestinal side effects like abdominal pain, flatulence, and diarrhea. Therefore, there is a need to develop sustained-release formulations for avoiding repetitive administration and reducing gastrointestinal side effects of acarbose by improving its short half-life. To address these issues, herein, we developed acarbose-encapsulated guar gum nanoformulation. The acarbose-encapsulated guar gum nanoformulation was synthesized and characterized using spray-dryer, SEM, FTIR, XRD, and HPLC. The developed spray-dried nanoformulation was also evaluated *in vitro* to observe its antioxidant and anti-diabetic potential. The developed acarbose-encapsulated guar gum nanoformulations exhibit spherical shape under SEM and the peak reduction wasobserved under XRD examination. The drug loading capacity and encapsulation efficiency of nanoformulations were found to be 89.52%, 80.59%, 72.016%, and 64.68%, 78%, 80.94% respectively. Furthermore, these nanoformulations were capable to inhibit the free radical generation, and activities of carbohydrate-digesting enzymes: α-glucosidase and α-amylase. The acarbose-encapsulated guar gum nanoformulation was found to be non-cytotoxic and capable of normalizing hyperglycemic conditions mimicked in L6 cells. Furthermore, the developed formulation was able to prevent the cascade of hyperglycemia-induced oxidative stressin L6 cells by restoring the levels of antioxidant enzymes such as catalase, glutathione-S-transferase, superoxide dismutase, and reducing lipid peroxidation. Therefore, these findings collectively indicated that acarbose-encapsulated guar gum nanoformulations may serve as a promising nanocarrier for improved therapeutic efficacy of acarbose indiabetes.

OP13

Molecular mechanisms underlying Ultraviolet-B Radiation induced premature Senescence in Human Dermal Fibroblasts: Therapeutic Role of Natural Products

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Aging is the major risk factor for cancer, cardiovascular diseases, diabetes and neurodegenerative disorders. Photoaging is the term used to describe the effects of prolonged exposure to Ultraviolet radiation on tissue homeostasis which accelerates the onset of age-related phenotypes and raises the risk of skin cancer. UV radiation affects the skin in a number of ways out of which cellular senescence plays a major role in photoaging. Cellular senescence, a state of permanent cell cycle arrest is characteristic of aged organisms which is associated with multiple cellular, molecular and phenotypic alterations. In the current study, we were able to induce premature senescence in Primary Human Dermal Fibroblasts at sub cytotoxic doses of UV-B which was confirmed by β-Galactosidase staining. Further results were validated by studying protein markers of senescence p16, p21 and p53 through western blotting. Excessive senescent cell buildup can impair tissue regeneration and promote an inflammatory environment that initiates and leads to development of number of age-related illnesses, including cancer. We investigated the therapeutic potential of natural products for their ability to relieve stress induced premature senescence in fibroblasts and found preliminary results in one of the natural compound. The compound coded as MFN showed significant antioxidant activity and was able to restore UV-B induced cytotoxicity. Next, we also investigated the molecular mechanism that could have driven cellular senescence. UV-B is known to increase ROS (Reactive Oxygen Species) production which damages DNA and leads to senescence. Mitochondria are the primary source of ROS and are highly dynamic organelles that undergo coordinated cycles of fission and fusion, termed as mitochondrial dynamics. So we have explored the role of mitochondrial dynamics in UV-B induced premature senescence in fibroblasts and found that UV-B at sub cytotoxic doses induce mitochondrial fission in senescent cells while simultaneously downregulating mitochondrial fusion markers.

OP14

Formononetin-Vitamin E Conjugate Synergistically Support Adipogenesis, Attenuates Oxidative Stress, and Restores Insulin Sensitization in Differentiated Preadipocytes

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Diabetes mellitus is a metabolic illness characterized by persistent hyperglycemia. The available therapies are associated with many health hazards. Therefore, a promising modulator derived from natural origin are greatly desired. Formononetin (FMN) is an isoflavone commonly found in soy and red clover, has traditionally used to lower incidence of metabolic syndromes, especially obesity and diabetes. However, inconsistent metabolism and poor bioavailability restrict its clinical translation. In order to overcome this limitation, FMN was conjugated with Vitamin E to synthesized VESylated-FMN. It was characterized through Ultra Performance Liquid Chromatography - Mass Spectrometry (UPLC-MS), High-Resolution Mass Spectrometry (HRMS), Nuclear Magnetic Resonance (NMR), and Differential Scanning Calorimetry (DSC). Thereafter, its potency in support of adipogenesis, insulin sensitization and mitigation of oxidative stress brought on hyperglycemia was evaluated in differentiated preadipocytes. We, interestingly found that VESylated-FMN promote adipogenesis, attenuate oxidative stress and insulin sensitization in high glucose exposed adipocytes by increasing intracellular glucose absorption, triglyceride accumulation, suppressing intracellular reactive oxygen species (ROS) production and upregulating insulin-sensitizing gene expression respectively. Overall, FMN in conjugation with vitamin E can effectively augment prior insulin sensitivity by reducing oxidative stress for efficient glycemic control in diabetes.

OP15

Hemidesmus indicus (L.) R. Br. root fraction possess radical scavenging activity and ameliorates H_2O_2 induced oxidative stress in human blood lymphocytes

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The surplus generation of reactive oxygen species (ROS) by exogenous or endogenous agents is directly associated with cellular DNA damage, resulting in oxidative stress which contributes to prevalence of pathological conditions such as cataract, diabetes, cardiovascular disorders, cancer and aging. Various antioxidant defence mechanism functions as ROS quenchers, thus, establishing an optimal prooxidant and antioxidant balance. Plants are considered as reservoir of natural antioxidants attributed to the presence of phenols and flavonoids to greater extent. Hemidesmus indicus (L.) R. Br. also known as Indian Sarasparilla, Anantmul is been traditionally utilised in the treatment of various diseases. The present study investigated the antioxidant and genoprotective effect of various fractions of Hemidesmus indicus (L.) R.Br. roots. i.e. hexane (Hi-Hex), chloroform (Hi-CI), ethyl acetate (Hi-Ea) and methanol (Hi-Me). The results showed that methanolic fraction (Hi- Me) possess the highest antioxidant activity in DPPH and superoxide radical scavenging assay with the ICso value of 41.44 µg/ml and 64.56 µg/ml respectively. The Hi-Me fraction also exhibited good genoprotective effects against DNA damage induced by hydrogen peroxide in Comet assay with significant reduction in tail DNA from 24.5% to 2.7% at the highest concentration of 200 µg/ml. Furthermore, Gas chromatography and mass spectroscopy (GCMS) studies were conducted for the analysis of various phytoconstituents accountable for the above activities.

OP16

Understanding the Antiviral Potential of *Azadirachta indica* Bark Extract and *Tinospora cordifolia* Stem Extract against Murine β- Coronavirus Infections

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The recent global health crisis initiated by SARS-CoV-2, a β-coronavirus, has significantly impacted the world population. Beyond pulmonary complications, SARS- CoV-2 infection has diverse effects, extending to the manifestations of the central nervous system (CNS). This highlights an urgent need for effective therapeutic interventions. Within the family of β-coronaviruses, the Mouse Hepatitis Virus (MHV) stands out as a model system for studying the disease progression induced by β- coronaviruses. In the realm of contemporary medicine, Ayurveda has experienced a decline in prominence despite its provision of a holistic and personalized approach. *Azadirachta indica* and *Tinospora cordifolia* hold significant Ayurvedic relevance in managing several diseases, including viral infections, due to their potent antiviral and immune-boosting properties. The impact of Neem Bark extract and Tinospora cordifolia on MHV infection and spread was investigated using Neuro-2a cells as a model system, which was characterized through the expression of Map2 and NFM, validating their identity as neuronal precursor cells. Studies suggest that neem bark extract (NBE) can effectively restrict the infectivity and fusogenicity of murine-coronaviruses (MHV-A59/ RSA59) and human coronavirus (SARS-CoV-2), but the underlying mechanism of action is still not understood. Pre-incubation of the virus with Neem Bark extract DCM F1 and its derivative fraction DCM_F1_F1' resulted in a marked reduction in virus infectivity and spread. High levels of Nimbin and 4-Epinimbin, prominent compounds in these fractions, suggest their potential to inhibit β-Coronavirus infectivity. Furthermore, *Tinospora cordifolia* stem extract effectively diminished virus infection and spread. Additionally, its contribution to lower cellular oxidative stress was observed. These findings underscore the potential of these natural extracts in mitigating MHV infection and contributing to a cellular antioxidant effect. This research paves a path for future explorations of these natural extracts as potential therapeutic candidates against β- Coronaviruses and also highlights their role in mitigating oxidative stress in infected cells.

OP17

Potentilla fulgens ameliorates AMPKα1 and α2 in brain of alloxan-induced diabetic mice

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Roots of *Potentilla fulgens L.* (Rosaceae) a medicinal plant used by the locals of Meghalaya, has been shown to possess hypoglycemic and anti-hyperglycemic properties in mice. However, the exact mechanism remains unclear as to how *P. fulgens* extract exert its glucose lowering properties. The present study investigates the mechanisms by which *P. fulgens* ameliorates diabetes, and examines whether *P. fulgens* improves the expression of AMPK in alloxan induced diabetic mice. Crude methanolic and dichloromethane extracts of *P. fulgens* (250 mg/kg b.w) were administered to normal and diabetic Swiss albino mice via i.p. route for a period of 14 days. Blood glucose tolerance test were evaluated. The protein and gene expressions of AMPKα1 and α2 in brain tissues were determined by Western blot and Real-time PCR. For docking analysis, AMPKα1 and α2 were autodock with their respective ligands using Autodock 4.2 package. The effect of *P. fulgens* on the behavior of mice was also examined using the force swimming test and quantification of serotonin. Extracts of *P. fulgens* and metformin showed a significant effect on glucose tolerance in diabetic mice. Expression of AMPKα1 and α2 in brain were partially restored by of *P. fulgens*. The results were compared against the effects of the standard anti-diabetic drug metformin. Docking results of the compounds showed strong activity with the proteins and the difference between binding energies, interactive amino acid residues can be observed. The force swimming test indicated a stress-like behavior in mice which was evident from the decrease in mobility and serotonin level. The results provide evidence that AMPKα1 and α2 are involved in sugar reducing effect of *P. fulgens*.

OP18

Exploring potential cross-reactive peptides to combat leptospirosis: An immunoinformatic Approach

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Leptospirosis is a newly discovered zoonotic disease caused by the pathogenic helical spirochetes known as *Leptospira*. These spirochetes can infect both humans and animals suffering from mild to severe illnesses, and they have efficient methods of spreading the disease throughout their host. Therefore, to overcome these gaps, peptide-based vaccines might be the best way to control the immune response against *Leptospira*. Using immunoinformatic techniques, highly immunogenic proteins from the proteome of *Leptospira* interorgan serogroup Icterohaemorrhagie serovar Lai strain 56601 were discovered in the current study. Testing of 15 linear B-cells and 10 best T-cells (Helper- lymphocyte (HTL) with maximum number of HLA-DR binding alleles and 8 cytotoxic T lymphocyte (CTL)) epitopes revealed that the most immunogenic and conserved outer membrane Lepin protein was both antigenic and non- allergenic. Furthermore, the Pep-Fold3 platform was used to generate a 3D structural model of CTL epitopes. Research was done to find out how successfully the top-ranked CTL peptide models bind to HLA-A*0201 (PDB ID: 4U6Y) using the Autodock 4.2 docking server. The epitope SSGTGNLHV binds to HLA-A*0201 with a binding energy of -1.29 kcal/mol. The complex structure docked with the anticipated epitope-allele was optimized and its stability evaluated by the application of molecular dynamics modeling. As a result, this epitope possesses the greatest capacity to elicit an immune response and generate strong *Leptospira* vaccine candidates. All things considered, this work presents a novel vaccine candidate and might inspire more investigation into leptospirosis vaccinations.

OP19

Synthesis and characterization of peanutshell-Bioscaffold: A promising 3-D paradigm candidate for tissue engineering and translation

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The process of tissue engineering involves cells and growth factors combined with scaffolds. Scaffolds are the 3-D constructs which provide physiochemical and biological signals for *invitro* ECM formation which further gets degraded/resorbed/metabolized when implanted *invivo* and aids in tissue repair and regeneration. Cellulose is a promising non-toxic biomaterial for bioscaffold development and tissue engineering as it mimics ECM, provides matrix for cellular adherence, proliferation, differentiation and eventual biodegradation. Peanut shells were used for isolation of cellulose and synthesis of nanocellulose crystals which were extracted from cellulose by acid hydrolysis and further freeze dried to synthesize nanocomposite, a non-toxic porous scaffold. Characterization of bioscaffold was done by scanning and transmission electron microscopy, FTIR spectroscopy and XRD. Post characterization, mesenchymal stem cells C3H10T1/2 were grown onto the peanut shell scaffold. Viability assays and DAPI staining revealed non-cytotoxicity of scaffold and adherence and proliferation of stem cells onto the bioscaffold respectively indicating it to be a suitable candidate for tissue growth, repair and regeneration.

OP20

The Anti-Epithelial-Mesenchymal Transition Property of *Arnica montana* in Triple-Negative Breast Cancer is Linked to Mitochondria-Mediated Apoptosis

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Triple Negative Breast Cancer (TNBC) has a dismal prognosis because of its extremely invasive and metastatic nature. Due to lack of hormone receptors in TNBCs, hormonal therapies are not indicative and the treatment techniques rely mostly on harsh chemotherapy regimens and surgery that causes chemotherapeutic resistance and disfigurement of the body, respectively. As a result, novel treatment approaches with low or no toxicity are the need of the hour. Homoeopathy is a complementary and alternative system of therapeutics that is popular for reduced or least side-effects. In our earlier studies we found that homoeopathic medicine, *Arnica montana* had potential anticancer characteristics that are effective against hormone-dependent breast cancer. We investigated its effect on TNBC in this work. *Arnica montana* was used in cell invasion and migration assays on the TNBC cell line MDA MB231. RT- qPCR was used to investigate the expression of important genes involved in apoptosis and EMT. *Arnica montana* inhibited cell survival, invasion, and migration in MDA MB231 cells. Furthermore, gene expression analysis revealed that apoptotic genes Caspase-3 and Caspase-9, as well as the epithelial marker E-cadherin, were upregulated. On the other hand, the mesenchymal markers N-cadherin and Vimentin, along with the anti-apoptotic marker Bcl-2, were downregulated. *Arnica montana* inhibited migration and progression of EMT in *in vitro* model. These findings establish the groundwork for future research in animal models to explain its potential therapeutic significance in TNBCs.

OP21

Reserpine-Mediated Inhibition of Triple-Negative Breast Cancer Cell Proliferation and Metastasis via Targeting NGALR and Inducing Ferroptosis: A Therapeutic Perspective

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Triple-negative breast cancer (TNBC), primarily prevalent among pre-menopausal women, represents the most aggressive form of breast cancer. Given the limited treatment options attributable to the diminished expression of hormone receptors, addressing TNBC remains a formidable challenge. Throughout history, medicinal plants have been extensively employed for diverse therapeutic purposes. Reserpine, an indole alkaloid traditionally employed for hypertension management, is sourced from the roots of *Rauwolfia serpentina*. Despite historical utilization of the root extract in cancer treatment, the precise molecular mechanisms underlying the anti-cancer properties of reserpine remain elusive. This present investigation endeavors to elucidate the anti-cancer actions of reserpine specifically within TNBC cells. Treatment with reserpine demonstrated a marked inhibition of TNBC cell proliferation, clonogenic potential, cell cycle progression, and migration. Furthermore, a dose and time-dependent reduction in the expression of the neutrophil gelatinase-associated lipocalin receptor (NGALR) was observed. Elevated NGALR expression has been linked to the pathogenesis of various cancers. Mechanistic exploration unveiled that reserpine regulates NGALR levels by directing it towards proteasomal degradation pathways. Additionally, the study revealed that reserpine treatment augmented ferroptosis, ultimately inducing the death of TNBC cells. Collectively, these findings suggest that reserpine modulates ferroptosis by facilitating the proteasomal degradation of NGALR in TNBC cells. The identification of this regulatory pathway demonstrated the potential therapeutic efficacy of reserpine in the treatment of TNBC. Further exploration and validation of these findings may pave the way for the development of targeted interventions for TNBC leveraging the unique properties of reserpine.

OP22

Milk miRNAs: The potential nutraceutical and functional food

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Milk miRNA is now being considered as a bioactive component of milk. Exosome encapsulated milk miRNAs constitutes the major fraction of total milk miRNAs present in the milk. As exosomes are the mediators of cell-cell communication and signaling cascade in the target cell, encapsulated miRNAs can affect the cellular processes. Bovine miRNAs can enter via milk exosomes and may affect the gene regulation. Therefore, the identification and characterization of microRNA in buffalo milk exosomes was aimed. The milk exosomes were isolated, characterized and used for total RNA isolation for small RNA sequencing. 351 microRNA and 17 novel microRNA in the buffalo milk exosomes were identified. The ten most abundant microRNA in buffalo milk exosomes were bta-miR-148a, bta-miR-30a-5p, bta-miR-21-5p, bta-miR-99a-5p, bta-miR-27b, bta-miR-200a, bta-miR-26a, bta-miR-26c, bta-let-7g and bta-let-7i were. bta-miR-148a and −30a-5p were differentially expressed whereas bta-miR-21-5p, bta-miR-200a and bta-let-7g were consistently expressed across lactation stages, out of 5 validated microRNAs. For the identification of gene targets of the 10 most abundant microRNAs, TargetScan was used taking *Homo sapiens* as the reference genome. A total of 1539 miRNA targets were taken for network and pathway analysis. 9 significant gene clusters were predicted by in silico analyses which can be affected by buffalo milk exosomal microRNA, which were found to be involved in important cellular processes. Hub gene interaction, string and cytoscape network analysis indicated that ubiquitin proteasomal degradation is the most regulated cellular process by buffalo milk exosomal miRNA. In summary, the spectrum of miRNA identified along with *in silico* analysis has unveiled the potential insights into the physiological functionality of bovine milk microRNA in humans.

OP23

Interplay of Genetic Variations in *p53* and MDM2: Impact on MMP-2 and MMP-9 Gene Expression in Oral Carcinogenesis, and the Potential Therapeutic Role of Resveratrol and Its Analogues

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In this study, we investigated the intricate relationships between *p53* alterations, *MDM2* polymorphism, and *MMP-2* and *MMP-9* gene expression in the context of oral carcinogenesis. The association analysis revealed a significant influence of *p53* polymorphism (rs1042522) on MMP-2 expression levels, with both heterozygous (Arg/Pro) and homozygous (Arg/Arg) patients at *p53* exon 4 exhibiting significantly elevated MMP-2 transcript levels compared to homozygous patients (Pro/Pro) (p=0.047 and p=0.036, respectively). Conversely, patients homozygous for the Arg or Pro allele displayed lower MMP-9 transcript levels (p=0.017 and p=0.017). Intriguingly, no significant associations were observed with MDM2 polymorphism or p53 mutations.
In the combined analysis, cases with the Arg allele and p53 mutation demonstrated higher MMP-2/9 mRNA levels compared to cases with the Pro/Pro genotype at exon 4 locus with mutation. However, the combined analysis of MMP-2 expression levels with *p53* mutations and *MDM2* (rs2279744) polymorphism did not reveal a clear trend. Notably, MMP-2 expression levels were significantly higher in patients with the Arg/Arg genotype compared to patients with the Arg/Pro genotype at exon 4 locus with T/T genotype at the MDM2 locus (p=0.036).
In summary, our findings shed light on the complex interplay between genetic variations in *p53* and MDM2, and their collective impact on MMP-2 and MMP-9 gene expression in oral carcinogenesis. This study underscores the need for a nuanced understanding of these molecular interactions for a comprehensive view of oral cancer progression. Further MMPs if targeted with resveratrol have the potential to control the progression of the disease via multifaceted anti-cancer mechanisms. Resveratrol modulates MMP transcription through pathways like MAPK and NF-κB, crucial in MMP regulation. It also affects transcription factors like AP-1, controlling MMP gene expression. Resveratrol analogues, addressing solubility and bioavailability challenges, enhance therapeutic potential. Further preclinical and clinical research is vital for a comprehensive understanding of their therapeutic efficacy.

OP24

Benzosuberene-alkyl sulfones inhibit mitotic clonal expansion, encourage mitochondrial non-shivering thermogenesis, and induce beiging in differentiated white adipocytes

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Obesity is ectopic body fat generation that is prejudiced to health and quality of life by impairing energy metabolism. Excessive calorie intake with physical inactivity results in weight gain, which worsens dyslipidemia and insulin resistance over time. Fat expenditure is necessary to maintain cellular physiology. Benzosuberene-alkyl sulfone analogue (BSAS-1) is known to be a partial Peroxisome Proliferator-Activated Receptor Gamma (PPARγ) agonist that exhibits anti-adipogenic attributes by halting the early phase of preadipocytes differentiation. However, sulfones as an anti-obesity agent with uncoupling cellular energy production are not explored to date. Therefore, in the present study, the efficacy of BSAS-1 was tested on differentiated preadipocytes for lipid-lowering potential by inducing thermogenic signatures. BSAS-1 upregulated phosphorylated AMPK expression which was further validated by Dorsomorphin, an AMPK inhibitor. BSAS-1 also enhances mitochondrial biogenesis observed with increased Mitotracker immunofluorescence. It also inhibits lipid peroxidation, protein carbonylation, and promotes insulin sensitivity. It upregulates adiponectin and downregulates Leptin levels. Collectively, BSAS-1 could be able to treat obesity by transdifferentiating white fat into beige fat.

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PP1

The Promising Role of Hempseed Oil in PCOS Management

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Polycystic ovary syndrome (PCOS) is the most common metabolic-hormone disorder affecting young women. PCOS is associated with infertility and includes the presence of irregular menstrual cycles, multiple cysts in the ovaries and high blood levels of the hormone testosterone. Women with PCOS are more likely to be overweight or obese, and to have high levels of HDL and sugar (glucose) in the blood, thereby predisposing them to Type-2 Diabetes and Cardiovascular Disease (CVD). Currently, women with PCOS are lacking safe and effective treatments to target both the hormonal and HDL levels in the blood. First-line interventions include diet and lifestyle, and the drug metformin is commonly prescribed to reduce high blood sugar, but these treatments do not improve blood levels of HDL. While the positive impact of Hempseed Oil (HSO) on hormonal imbalances in the reproductive system is evident, its potential anti-androgenic effects on reproductive parameters in an animal model of polycystic ovarian syndrome (PCOS) remained unexplored. The results of this study furnish robust, evidence-based support for the prospect of efficacious early intervention in mitigating the risk factors for cardiovascular disease and Type-2 Diabetes among young women at high risk for PCOS.

PP2

Ameliorative effects of Oleanolic acid against HCl aspirated Acute lung injury

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Acute lung injury (ALI) is a pulmonary disorder which includes Neutrophilic inflammation, increased permeability of alveolar capillary membrane, edema and reduced lung compliance. A range of direct/indirect pathogenic factors such as reduced lung compliance and edema. Steroid therapy and mechanical ventilation are the interventions usually applied against ALI. But, these have side-effects and less effectiveness. So the search for new treatment regimes is ongoing. Oleanolic acid (OA) which is a tri-terpenoid known for its anti-inflammatory and anti-oxidant properties and we have recently observed its protective against ALI mediated lung inflammation. In the present work we aimed to compare the preventive vs the therapeutic efficacy against HCl-induced ALI and associated lung function. Female Laca mice were exposed Intratracheal to 0.1N HCl for induction of ALI. OA was administered orally at a dose of 5mg/Kg b.wt. at two different time points i.e., either 1hr before or 2hr after HCl instillation. Mice were subjected to pulmonary function test (PFT) after 24hrs followed by euthanization and BALF procurement for inflammatory cell analysis. Analysis of total cells in BALF revealed that the numbers of inflammatory cells were significantly increased in HCl treated mice. The majority of the BALF cells were neutrophils. In contrast, OA administration led to substantial decrease in inflammatory cells. Moreover better resolution of inflammation was observed in mice pre-treated 1hr before HCl administration as compared to post treatment group. PFT analysis revealed that OA restored lung function parameters which were affected negatively upon HCl exposure. Further experiments will be conducted to analyze the potential of OA in improving the relevant molecular factors which may be involved ALI pathogenesis.

PP3

Folic acid depletion along with inhibition of the PERK arm of endoplasmic reticulum stress pathway promotes a less aggressive phenotype of hepatocellular carcinoma cells

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Folate is a vital vitamin involved in one-carbon metabolism and any changes in folate status may lead to epigenetic alterations. It is already known that stages and liver cancer progression are negatively correlated with folate levels. Nevertheless, mechanisms involved in folate deficiency in HCC (Hepatocellular carcinoma) are still not completely understood. So, this study tests the hypothesis that due to the increased demand for ER (endoplasmic reticulum) proteins, folate deficiency might lead to the induction of UPR (unfolded protein response), which is further correlated with HCC outcomes. HCC cells were cultured in both folate normal (FN) and folate deficient (FD) conditions and the expression of genes of ER stress pathway was investigated. The results demonstrated activation of UPR via induction of PERK, ATF4 and LAMP3. Besides this, FD reduced the migratory capacity and the invasiveness of HCC cells along with the reduction in mesenchymal markers like vimentin but increased apoptosis. Treatment with GSK2606414 (PERK inhibitor) decreased the FD induced expression of PERK, ATF4 and LAMP3 in FD cells. Also, GSK2606414 was found to increase apoptotic cell death and to further reduce the cancer hallmarks selectively in FD cells and not in FN cells. Altogether, our data suggest that targeting the ER stress pathway along with folate deficiency may provide a more promising elimination of the metastatic potential of HCC cells contributing to more effective therapeutic agents.

PP4

Development, characterization and in-vitro evaluation of lignin-based hydrogel for antimicrobial applications

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The increasing global issue of antibiotic resistance highlights the pressing requirement for innovative methods to combat bacterial infections. In this study, we present the development, characterization, and in-vitro evaluation of a novel lignin-based hydrogel as a promising platform for antimicrobial drug delivery. Oxytetracycline, a broad-spectrum tetracycline antibiotic, was incorporated into the lignin-based hydrogel to exhibit its antimicrobial properties. The lignin-based hydrogels were prepared using the freeze and thaw method, utilizing lignin and chitosan as the biopolymeric matrix, and polyvinyl alcohol and chondroitin sulfate as cross-linkers. Different techniques including FESEM, FTIR, and DSC along with the swelling index, moisture content, and degradation studies were employed for the characterization of the hydrogels' structural and morphological properties. In-vitro drug release studies demonstrated sustained and controlled release of oxytetracycline from the hydrogel with cumulative release of 25% and 13% in 48 hrs at pH 7.4 and 4, respectively. The released oxytetracycline exhibited potent antimicrobial activity against both gram-negative and gram-positive bacteria (*E.coli* and *S.aureus*) with higher potency against *S.aureus.* Furthermore, cytotoxicity towards the L-929 fibroblast cell line and hemotoxicity assays revealed the biocompatibility of the lignin-based hydrogel, highlighting its safety for potential biomedical applications. This lignin-based hydrogel offers a versatile and sustainable platform for antimicrobial drug delivery, addressing both the urgent need for effective antimicrobial therapies and the utilization of lignocellulosic biomass. In conclusion, this study presents a promising lignin-based hydrogel loaded with oxytetracycline as an innovative and sustainable approach for antimicrobial and anti-oxidant applications in dermatology and wound care.

PP5

Evaluation of anticancer potential of 5-Fluorouracil (5-FU) and Ergosterol in Colorectal Cancer

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5-Fluorouracil (5-FU) represents one of the major constituents of chemotherapy combination regimens in colorectal cancer (CRC) treatment, however this regimen is linked with adverse effects and chemoresistance. Therefore, developing more efficient and novel approaches for CRC treatment is urgently needed to overcome these problems and improve the patient survivalrate. Natural products, with remarkable chemical diversity, have been extensively investigatedfor their anticancer potential for more than half-century. Ergosterol (ergosta-5,7,22-trien-3β- ol), a mycosterol present in edible white button mushroom, Agaricus bisporus has cholesterol lowering properties and can be used to treat cancer. The underlying mechanism of chemosensitizing potential of Ergosterol remains poorly understood. Ergosterol may act as a potentially effective anticancer adjuvant agent for treating CRC. Thus, the anticancer potentialof 5-FU and Ergosterol on CRC cell lines SW480 and SW620 was examined by MTT assay. The CRC cell lines were treated with different concentrations of 5-FU and Ergosterol for 48 hours and IC50 value was determined. The IC50 values calculated for 5-FU were 47.1598487µM ± 2.895332157 for SW480 cells and 70.9083973 µM ± 3.707360246 for SW620 cells. The IC50 values calculated for Ergosterol were 115.498471 µM ± 5.651057 for SW480 cells and 124.072497 µM ± 3.483518742 for SW620 cells.

PP6

Exploring the antagonistic potential of mycocin produced by *Wickerhamomyces anomalus* as an alternative approach to antimicrobial therapeutics.

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Resistance to antimicrobial drugs is an emerging concern worldwide. The threat of invasive microbial infections to public health is currently driving researchers in the direction of finding new antimicrobial agents from various sources to combat microbial resistance. Many yeast species display the antagonistic activity against specific pathogens therefore by secreting one or several kinds of killer toxins (mycocins) is an emerging area of research. Specially, the toxins displaying glucanase activity are widely recognized in the genus *Wickerhamomyces.* Currently, *Wickerhamomyces anomalus* has aroused particular interest in microbiology and biotechnology fields as well as in the development of innovative therapeutics approaches. Different Mycocins secreted by *W. anomalus* have broad spectrum of antagonistic activity against plant, animal and human pathogens. Therefore, the present study was undertaken to isolate and partially purify the killer toxin from cultural supernatant of *W. anomalus* using size exclusion chromatography. It was indicated that expected molecular weight of the protein is between 15-37 kDa. Moreover, the presence of the toxin in different fractions was confirmed through well diffusion assay against gram positive and gram negative bacteria such as *Bacillus cereus*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*, *Proteus mirabilis* respectively. It was observed that maximum inhibitory action of mycocin was against gram positive bacteria as compared to gram negative bacteria. Thus, the antagonist activity of *mycocin* can be used as future perspectives in the development of new bio-drugs, which may overcome the limitations connected to conventional antimicrobial and drug resistance.

PP7

Preventive role of *Aloe vera* against pancreatic and renal tissue alterations in experimentally induced diabetes

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The present study was designed to investigate the modulatory effects of *Aloe vera* gel extract against alterations induced in pancreatic and renal tissues during streptozotocin (STZ) induced diabetes in mice. Male balb/c mice were divided into two groups on day zero: **Untreated** mice served as control and **Treated** mice were orally administered with *Aloe vera* gel extract (50 mg/ kg body weight) on alternate days for 60 days. Later, animals were divided into four groups on day 61: **Group I** served as **control**. **Group II (AV)** was orally administered with *Aloe vera* gel extract (50 mg/ kg body weight) on alternate days for 30 days. **Group III (STZ)** was administered with STZ intraperitoneally (80mg/ kg body weight) for consecutive 5 days (day-61-65). **Group IV (AV+STZ)** animals received *Aloe vera* gel extract on alternate days along with STZ for 5 successive days as mentioned in group II and III. Hyperglycemia was observed after STZ administration in STZ and AV+STZ groups. Pancreatic and renal tissues from STZ group exhibited increased damage as evident from altered histoarchitecture, certain renal function markers (serum urea and blood urea nitrogen), enhanced oxidative stress markers [lipid peroxidation and advanced oxidation of protein product, decreased reduced glutathione levels and differential variations in carbohydrate metabolizing enzymes (hexokinase and aldolase). *Aloe vera* acted as a hypoglycemic agent and decreased damage to pancreatic and renal tissues as observed from improved histoarchitecture, mitigation in oxidative stress markers, and modulation of antioxidant defense system and carbohydrate metabolizing enzymes. These positive outcomes warrant comprehensive investigations exploring the detailed mechanism of action of *Aloe vera* against diabetes.

PP8

Modulation of orphan Cytochrome P450 2W1 isoenzyme using phytochemicals.

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Cytochrome P450 2W1 (CYP2W1) is an orphan enzyme that belongs to a multigene family of cytochrome isoenzymes. What makes it an attractive therapeutic target in colorectal cancer (CRC) is that its expression has been observed only in CRC and HCC so far and its expression is correlated to poor patient survival. Phytochemicals are known modulators of cytochrome P450's expression and activity. The present study was focused on modulating CYP2W1's activity using phytochemicals. CYP2W1 protein structure was created using homology modelling as its structure was not available. Phytochemicals were taken from three repositories: PDTDB, Serpentina, and Phytochemica and a list of phytochemicals was screened using *in silico* approach based on their binding affinity. The phytochemicals with binding affinity >-7 were taken into account. The interactions among CYP2W1 protein and phytochemicals were analysed using Ligplot tool. Subsequently the cytotoxicity of selected phytochemical(s) was tested in SW480, SW620 cell lines and ic50 was determined, which was found to be 46.8±6.5µM for SW480 and 59.5±2 µM for SW620.

PP9

Development of Electrochemical biosensor for detection of Alzheimer's Biomarker using PEI/CuO Nanoparticles

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Alzheimer's disease (AD) is the third most predominantly occurring disease. It is an untreatable neurodegenerative disease characterized by progressive deterioration of brain cells and change in behavior, personality, orientation on time and space, functional capacity which affects the daily life of patient. Currently, AD is diagnosed by detecting deformities in patient's brain using sophisticated techniques including MRI (Magnetic Resonance Imaging), PET (Positron Emission Tomography) and NIR (Near Infrared). We report a electrochemical biosensor for detection of AD by using the miRNA-137 as a efficient biomarker. In this context, the copper oxide nanoparticle/polyethyleneimine/Au-Pd nanocomposite coated fluorine tin oxide electrode used as a immobilization platform for complementary DNA (cDNA) of miRNA-137. The immboilization was done between the thiolated cDNA and Au-Pd through covalent binding. The characterization of modified electrode has been done by Field emission scanning electron microscopy (FESEM), electrochemical characterizations done by Cyclic voltammetry, Electrochemical Impendence Spectroscopy. Concentration 15 µg of c-DNA and hybridization time 20 min were optimized. The linear range was 1fg to 100 ng/mL and limit of detection was 0.114 pg/mL for detection of miRNA-137. It provides highly selectivity from complementary DNA from non-complementary DNA for miRNAs and presented a long shilf life of 28 days. In this regard, a biosensor can be an ideal alternative owing to its high sensitivity, easy-to-use procedure, cost effectiveness, and compactness. Therefore, this novel biosensor is a potential strategy to diagnosis of Alzheimer. Detailed results will be presented during conference.

PP10

Comparative modulation of MAPK signaling by curcumin in bisphenol-a induced cell lines

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Cancer, a global health concern is also influenced by environmental factors such as endocrine-disrupting chemicals. The present study looks at how curcumin (CUR) protects against bisphenol-A stimulated human endometrial (RL-95-2), cervical (HeLa), and breast (MCF-7) cancer cell lines. Bisphenol-A (BPA), which is often employed in the manufacturing of plastics and consumer goods, has been linked to the development and progression of hormone-related malignancies. The effect of BPA on cancer cell growth and apoptosis was investigated in this study. MTT assay revealed a substantial increase in cancer cell proliferation caused by BPA (1-10 µM), which was completely mitigated by co-treatment with CUR (5µM). Furthermore, ROS production studies demonstrated that BPA decreased ROS levels in cancer cells, whereas co-treatment with CUR increased ROS production and promoted apoptosis. In light of these findings, we used ELISA to check the phosphorylation level of ERK, JNK, and P38 MAPK signaling pathways. Results revealed that BPA, at a 1µM concentration, markedly increased the expression of ERK, JNK, and P38 across all three cell lines. Conversely, CUR (5µM) demonstrated an inhibitory effect on the phosphorylation of ERK in all three cell lines besides, attenuating the JNK in HeLa cells, and P38 in MCF-7 cells. Divergent MAPK responses in cancer cell lines underscore the complexities of cellular responses in cancer biology. Therefore, understanding this molecular complexity is critical for creating specific therapies for environmental carcinogenesis.

PP11

An electrochemical impedimetric detection of holotranscobalamin (holoTC) biomarker for vitamin B12 analysis

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Vitamin B12 is an essential micronutrient required for the proper functioning of the human body. However, screening for vitamin B12 insufficiency is hindered by the low sensitivity of the current Total vitamin B12 test. Holotranscobalamin (holoTC) is an early indicator of the negative vitamin B12 balance as it is the first protein to decline in the serum. Given this, we report a novel impedimetric immunosensor based on flower-like poly(3,4-ethylenedioxythiophene) (PEDOT) nanostructural film impregnated with silver molybdate nanoparticles (Ag_2MoO_4 NPS) deposited on FTO electrode. The prepared electrodes were characterized by Field emission scanning electron microscopy (FESEM) with energy-dispersive X-ray spectroscopy (EDS), X-ray diffraction (XRD), and electrochemical studies. The activated anti-holo-TC antibody was immobilized and optimized to capture the target in a response time of 10 minutes. The electrochemical performance of the sensor was carried out by using the electrochemical impedance spectroscopy technique (EIS). A good linear relationship between ΔR_{ct} and holoTC was obtained in the range from 0.01 pg/mL to 100 ng/mL, with a detection limit of 0.08 pg/mL. The proposed sensor was successfully applied in human serum samples for holoTC detection. The experimental results showed that the immunosensor is highly selective towards holo-TC and presented an acceptable stability of 20 days with reproducibility RSD $\leq$ 4 %. To the best of our knowledge, this is the first developed electrochemical immunosensor for holoTC detection. Detailed results will be presented during the conference.

PP12

Hepatoprotective and cardioprotective role of *Picrorhiza kurroa* (Kutki) against increased antioxidant enzymes in fenoterol induced toxicity in mice

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The entire world is turning towards natural herbal drugs because of the widespread belief that green medicines are healthier and safer than synthetic ones. Thus, in the present study we investigated the effects of *P.kurroa* extract against fenoterol induced cytotoxicity in mice. *P. Kurroa* is a well known herb in the Ayurvedic system of medicine and has traditionally been used to treat disorders of liver, heart, upper respiratory tract etc. Even the World Health Organization (WHO) estimated that the people of developing countries like India rely on traditional medicines which are mostly plant derived drugs for their primary health needs. Liver and heart tissue were used to test the cytoprotective potential of this extract and Fenoterol, a beta agonist was used to induce hepatotoxicity and myocardial toxicity in order to generate oxidative stress. Fenoterol have been used worldwide in tocolytic therapy and for the treatment of respiratory diseases like asthma since 1970's, because of their ability to relax smooth muscles. Thus, the present data provide a rationale for use of *Picrorhiza Kurroa* (kutki) as a suitable herbal treatment for the management of fenoterol induced cytotoxicity. These studies will be helpful to assess the risks related with use of asthmatic drugs like fenoterol in humans as well as to develop strategies for therapeutic applications. The present study will not only confirm the cytoprotective and antioxidative role of *P. Kurroa* against oxidative stress in mice but can also provide its potential effective intervention to fenoterol induced toxicity. Though, the mechanisms by which fenoterol exerts cytotoxicity are still not clearly understood. Therefore, present findings can pave way for carrying out in-depth studies in future.

PP13

Nanoparticles as Drug Delivery Systems: A Review of the Implication of Nanoparticles' Physicochemical Properties on Responses in Biological Systems.

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In the last four decades, nanotechnology has gained momentum with no sign of slowing down. The application of inventions or products from nanotechnology has revolutionised all aspects of everyday life ranging from medical applications to its impact on the food industry. Nanoparticles have made it possible to significantly extend the shelf lives of food product, improve intracellular delivery of hydrophobic drugs and improve the efficacy of specific therapeutics such as anticancer agents. As a consequence, nanotechnology has not only impacted the global standard of living but has also impacted the global economy. In this review, the characteristics of nanoparticles that confers them with suitable and potentially toxic biological effects, as well as their applications in different biological fields and nanoparticle-based drugs and delivery systems in biomedicine including nano-based drugs currently approved by the U.S. Food and Drug Administration (FDA) are discussed.

PP14

Exploring the Anticancer Potential of Estradiol: A Comprehensive Study on Colon Cancer Cell Lines

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Colorectal cancer (CRC) is a prevalent malignancy worldwide, posing a significant burden on healthcare systems. Despite advances in treatment modalities, including surgery, chemotherapy, and radiotherapy, CRC remains a leading cause of cancer-related mortality. The rising incidence of CRC, particularly in regions adopting western lifestyles, underscores the urgent need for innovative therapeutic approaches. This study investigates the anticancer properties of estradiol, a form of estrogen, on colon cancer cell lines. Preliminary *in silico* studies identified PIK3R1 as a potential target of estradiol within the PI3K-AKT pathway, implicating its role in modulating cell proliferation and apoptosis. To assess its effectiveness, several parameters, including cytotoxicity, apoptosis, lactate dehydrogenase (LDH) activity, and cell cycle progression, were evaluated in colon cancer cell lines (HCT116 and SW620) and a normal epithelial line (CHO-K1) following treatment with estradiol. Results revealed a significant increase in cell death in colon cancer cells treated with estradiol, with minimal effects on normal epithelial cells. Annexin V/PI staining indicated induction of apoptosis, while cell cycle analysis demonstrated G2/M phase arrest, supporting the antineoplastic potential of estradiol. Moreover, LDH activity assays suggested a reduction in aerobic glycolysis, known as the Warburg effect, in estradiol-treated cells, further highlighting its anticancer mechanisms. At the molecular level, estradiol treatment suppressed the expression of PI3K and AKT proteins in colon cancer cells, consistent with *in-silico* predictions. Conversely, expression of FOXO, a tumor suppressor, was increased, suggesting a role in promoting apoptosis and DNA repair. These findings provide insights into the therapeutic potential of estradiol against CRC, offering a promising avenue for future research in chemoprevention strategies. By targeting key signaling pathways and modulating cellular processes, estradiol emerges as a potential candidate for CRC treatment, with implications for broader cancer therapy.

PP15

Metabolite Profiling and Antidiabetic Activity of Indian Seaweeds: A Promising Alternative to Conventional Pharmaceuticals

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Diabetes mellitus presents a concerning metabolic anomaly characterized by elevated blood glucose levels and disruptions in the intricate balance of fat, carbohydrate, and protein metabolism. Within the realm of carbohydrate metabolism, key enzymes like α-amylase and α-D-glucosidase wield the power to regulate diabetes mellitus by slowing the process of carbohydrate digestion. Existing anti-diabetic pharmaceuticals such as acarbose, voglibose, and metformin inhibit α-amylase and α-D-glucosidase. However, these marketed drugs have limitations because of their side effects. Hence, natural bioactive components are the alternative for treating such metabolic disorders. Various studies highlight the potential of seaweeds, harbouring bioactive elements capable of modulating glucose-induced oxidative stress and exerting control over carbohydrate digestive enzymes. The present study demonstrates the phytochemical screening, metabolite profiling, antioxidant and antidiabetic activity of Indian seaweeds. Methanolic extracts of six selected Indian seaweeds were analysed for total phenolic content, total flavonoid content, total protein, total soluble sugar, Total reducing sugar, antioxidant activity, and antidiabetic activity. Further, the solvent-solvent fractionation of methanolic extract was performed with Hexane, Dichloromethane, and Aq. Methanol. Fractions were subjected to GC-MS-based metabolite profiling. Analysis showed that seaweeds are rich in phenolics, flavonoids, proteins, and carbohydrates and show effective antioxidant and antidiabetic activity. Hence, the study revealed that seaweeds are promising functional food and can be a potent alternative to existing antidiabetic pharmaceuticals.

PP16

Microbial assistance in cancer treatment: Green synthesis of nanoparticles with anticancer potential

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Cancer has become the primary cause of death among human beings. Despite the availability of easy diagnosis and treatment techniques such as chemically derived drugs, chemotherapy, surgery, and radiotherapy, the patients suffer from severe side effects and induced strains due to the above treatment techniques. Henceforth, researchers are focusing on the unique properties of nanomedicine as an alternative treatment technique for the verdict and treatment of cancer. ZnO-NPs are one of the most prominent and promising agents for cancer treatment, exhibiting toxicity to human cancer cells after targeted delivery. Biological reducing agents are being explored worldwide to minimize the effects of toxic chemicals used in nanoparticle fabrication. The present study demonstrates a green approach for the synthesis of zinc oxide nanoparticles employing cell-free supernatant (CFS) of microbial strain 4VPT5-9. Cell-free supernatant was used as the biological reduction agent for synthesizing zinc oxide nanoparticles from precursor zinc acetate dihydrate. The resultant nanopowder was characterized using various analytical techniques, such as UV–visible spectroscopy, Fourier Transform Infrared spectroscopy, X-ray diffraction, Dynamic Light Scattering, and Transmission Electron Microscopy. The nanopowder was stored in dried form. The size range of nanoparticles obtained upon synthesis at optimum conditions was 120–150 nm as reported by TEM. From the X-ray diffraction studies, the lattice planes and obtained peak positions confirmed the hexagonal close-packed crystalline structure of ZnO-NPs. Nanoparticles were tested for their anticancer potential and were found to be active against human breast cancer line (MDA-MB- 231) and human colorectal cancer cell line lines in a dose and time-dependent manner. Therefore, the current study introduces a new safe multifunction ZnO-NPs as a potential tool for therapeutic application. (HCT-116). Hence, an easy and effective green approach for the synthesis of zinc oxide nanoparticles, with efficient anticancer potential is reported in this study.

PP17

Computational scrutiny of Anethum foeniculum miRNAs in Homo sapiens and Arabidopsis thaliana: Genome wide identification of cross-kingdom and inter-kingdom study

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MicroRNAs are small non-coding RNAs that hybridize with complementary sequences in mRNA and silence genes through destabilizing mRNA or preventing mRNA translation; Small RNA pharmaceuticals are currently awaiting FDA approval for therapeutic usage, and microRNAs are speculated to be useful biomarkers for a number of disorders. This field of study is growing conveniently and has a bright future ahead of it. Fennel (*Anethum foeniculum*) is an important resource for the pharmaceutical industry, a valuable spice plant with health care and industrial applications. Functional enrichment analysis and human disease association will be used to characterise the fennel miRNAs and their targets in Arabidopsis thaliana and Homo sapiens. An analysis of the *Anethum foeniculum* genome's MiRnome and its effects on the transcriptomes of *Arabidopsis thaliana* and *Homo sapiens* was conducted using a homology-based computational algorithm. We have identified 100 miRNAs of fennel and in addition, functional enrichment analysis was evaluated for *Arabidopsis thaliana* and *homo sapiens*. Moreover, PPI network analysis, hub gene identification, and MD simulation analysis of the top hub node were incorporated and their target genes, which comprise 1314 genes in Arabidopsis thaliana and 2536 genes in Homo sapiens. Fennel miRNA targets in *Arabidopsis thaliana* were found to be involved in 56 different metabolic pathways, according to functional enrichment analysis. Highly enriched human KEGG pathways were linked to a number of illnesses, most notably in pancreatic cancer. The top ten nodes in the protein–protein interaction network of human targets was identified; seven hub nodes—*MAPK1*, *PIK3R1*, *STAT3*, *EGFR*, *KRAS*, *CDC42*, and *SMAD4*—have demonstrated their involvement in the pathway leading to pancreatic cancer. The Blast algorithm predicted that 21 fennel miRNAs are homologs of 16 human miRNAs; among them, the *CSPP1* target was a shared target for the homologs of afo-miR11117a-3p and has-miR-6880-5p. Since our findings are the first to identify all 100 fennel miRNAs, we can better understand *Anethum foeniculum* miRNAs and the diseases and biological processes they are linked to by making predictions for their endogenous and human target genes.

PP18

Synthesis of Cellulose Nanocrystals from Peanut shell: an agro-waste based futuristic Bioscaffold

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Background and Aim: Cellulose nanocrystals generally extracted by cellulose, which is most abundant natural polymer. Cellulose nanocrystals are liquid crystalline in nature and have needle like structure basically hydrophilic in nature. Cellulose nanocrystals are surface modified to produce high-performance nanocomposites using hydrophobic polymers. Peanut shells are an agricultural waste contains 44.8% of cellulose. This cellulose can be used to create Cellulose nanocrytals to form nanocomposites which is used as drug delivery system.
Methods: High quality peanut shells were sterilised and grounded to less than 150mm particle size. Then lignin was removed from peanut shells powder by treating it with NaOH and cellulose was extracted by soxhlet method by using nitric acid. The extracted cellulose was bleached to off-white colour and washed with distilled water and lyophilized to produce cellulose powder. Cellulose nanocrystal suspension is produced by acid hydrolysing the cellulose.
Results: Off white colour powder cellulose was produced from peanut shells and cellulose nanocrystals suspension was obtained from cellulose.
Conclusion: In this study cellulose is exctracted from peanut shells and further used to make cellulose nanocrystals suspension.

PP19

Decoding the nutraceutical mechanism of andrographolide to combat chronic HepatoCellular Carcinoma – A network pharmacology approach

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HepatoCellular Carcinoma, being one of the most mortally convoluted and chronic oncology with rising number of occurrences worldwide, emerging as a fetal challenge in hepatology and oncology research. The nutraceutical phytoconstituent andrographolide, derived from *Andrographis pani*culata is conveyed to reconcile a number of human ailments including chronic diseases such as Non-Alcoholic SteatoHepatitis and HepatoCellular Carcinoma. However, the causal mechanism underlying the effects of Andrographolide on hepatocellular carcinoma still remains skeptical. The present study anticipates to analyze the nutraceutical impact of Andrographolide over HCC and assess the underlying pharmacological mechanism implicated in HCC treatment established via assimilated approach of network pharmacology and molecular docking. Herein, the Network pharmacology scheme was instigated to investigate potential HCC targets. The Andrographolide targets along with HCC targets were extracted from multiple databases. A total of 162 potential overlapping targets among HCC and Andrographolide were obtained and further subjected to protein–protein interaction network construction, gene ontology analysis and pathway enrichment analysis to annotate the genes functionally. Finally, network representing the interactions among HCC, Andrographolide, targets and their respective pathways was constructed. The top 10 hub nodes were identified and validated by survival analysis, expression studies, molecular docking and Molecular Dynamic simulation. The results derived from our study significantly predict Andrographolide related potential targets (ALB, CCND1, HIF1A, TNF and VEGFA) in association with HCC besides correlated pathways and also provides the novel insights revealing therapeutic mechanism of nutraceutical andrographolide over HCC. Our findings provide a scientific foundation for anti-oncogenic clinical application of andrographolide in HCC nutraceuticals.

PP20

Exploring the MicroRNA Landscape: Unveiling the Regulatory Dance between Conocarpus erectus L. and Homo sapiens. A Computational Genomic Odyssey

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Conocarpus erectus, a well-known member of the Combretaceae family, is highly regarded in traditional medicine. We hypothesized that miRNAs, which are endogenous short RNAs that regulate gene expression, contribute to the therapeutic effects of plants by modulating human gene expression. The study utilizes a cross-kingdom computational method to investigate the effects of *Conocarpus erectus* L. miRNAs on human target genes at the molecular level. It has been predicted that 15 miRNAs can be found in the publically accessible transcriptome data of *Conocarpus erectus* L. Later annotations of gene functions suggest potential roles in biological processes and signaling pathways, including the insulin signaling pathway, MAPK, PI3K-Akt, and neurotrophic signaling pathway. Disease association suggests links between health conditions such as diabetes, cardiovascular disease, nervous system disorders, and vascular diseases and potential targets. **The pathway analysis was conducted to understand better the molecular relationships between anticipated miRNAs, targeted genes, and transcription factors.** The top hub nodes involved in human illnesses, such as diabetes, include *CDC42, MAPK14, NTRK2, AR,* and *PIK3R1*. The study characterized miRNAs of *Conocarpus erectus* L. using bioinformatics analysis. This research has revealed the potential to regulate human gene expression across species. By regulating gene expression across different species, this study could lead to the discovery of therapeutic targets, such as plant miRNAs, for various diseases, including diabetes.

PP21

Evaluation of anti-diabetic and lipid-lowering potential of *Salicornia brachiata* Roxb. seed oil

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Diabetes mellitus and obesity are lifestyle-related diseases widely observed throughout the globe with around 422 million to 1.9 billion people suffering currently. India is the world's third-largest consumer of edible oils and consumption is increasing continuously due to increased population growth, economic progress, and urbanization. Edible oils comprising of essential fatty acids, phytosterols, tocopherols, phenolic components, and vitamins which are great source of nutrients in the human diet. Owing to these, such types of edible oils also possesses several pharmacological activities. Hence, Oil was extracted from the seeds of halophyte *Salicornia brachiata* collected from the Gujarat coast and phytochemical analysis, in vitro and in vivo biological activity was carried out. Phytochemical analysis carried out by Gas chromatography-Mass spectrometry described the presence of linoleic acid in a prominent concentration along with other essential fatty acids. Concentration dependent α-glucosidase enzyme inhibition was observed which elucidates its potential for the treatment of diabetes mellitus. Moreover, oil was found to be palatable during the in vivo pharmacological studies with significant reduction in the blood glucose and lipid parameters. In conclusion, extracted oil from the seeds of halophytic plant was found to possess several essential polyunsaturated fatty acid components which has potential to impart anti-diabetic and lipid lowering activity.

PP22

Molecular mechanism of antidiabetic efficacy of the secretory metabolites of probiotic *Lactobacillus* spp.

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Diabetes is a medical condition arising due to insufficient production of insulin in the case of Type-I and defective response of insulin in Type-II. India has earned the notorious title as “Capital of diabetes” as it harbours world’s largest number of diabetic patients (72 million in 2017). The overall prevalence of diabetes and prediabetes in the Indian states is 7.3% and 10.3%, respectively. Prolonged use of synthetic antidiabetic medications is associated with various side effects. Thus, alternative natural probiotic remedial treatment should be explored for lowering both the cost and the adverse effects of drugs. The present study evaluated the antidiabetic potential of *Lactobacillus spp. in-vivo*. The antidiabetic potential of this strain was further evaluated in streptozotocin (STZ)-nicotinamide (NA) induced diabetes mellitus type2 rat model. The blood glucose level and other biochemical parameters were normalized after the probiotic treatment for 15 days. Thus, with this in the background, the purpose of this study was to evaluate the ability of cell free ethyl acetate extract (EAE) of *L. plantarum* to inhibit broad spectrum intestinal digesting enzymes such as alpha-glucosidase and alpha-amylase *in-vitro* as these enzymes are considered crucial for evaluating the potency of an antidiabetic agent.The ethyl acetate extract (EAE) of the cell-free culture supernatant of overnight cultured *L. plantarum* in MRS broth was prepared and tested for inhibitory activities against α-glucosidase (AGI) and α-amylase (AAI). EAE showed 100% inhibition of AGI at the concentration 20mg/ml. Whereas, it caused 50% inhibition of AAI at the dose 57.8mg/ml. Further, a synbiotic formulation will be prepared using this strain and can be used as a nutraceutical product having a therapeutic efficacy to maintain the healthy human gut and diabetes also.

PP23

Development of micropropagation protocol for different varieties of Sweet Potato through nodal segment

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Sweet potato (*Ipomoea batatas* L.) belongs to the family Convolvulaceae. It is an important perennial tuber crop and plays a significant role in the food security of the world. Besides high nutritive values, it is known to have innumerable medicinal properties against various diseases such as type 2 diabetes, oral infection, anemia, hypertension, stomach cancer, cardiovascular disease, allergies, aging, dysentery, etc. Nevertheless, sweet potato possesses several therapeutic activities such as antimicrobial, antioxidant, anticancer, anti-inflammatory, and antiulcer. Cultivation of sweet potato is primarily done by the vegetative methods of propagation using vine/stem cutting or through tuber. However, the major limitations in vegetative propagation involve the high carryover of diseases affecting its growth and productivity. Moreover, in this method, the multiplication is slow and season dependent. Hence, technological interventions are required to address these issues and provide a large number of healthy and elite planting materials to the farmers to boost their economy. Therefore, in this background in-vitro propagation protocol was developed using nodal segments. Various media, Plant Growth Regulators and carbon sources were standardized. Novel cytokinin such as meta-topolin was used for the development of efficient micropropagation protocol. Various auxin and cytokinin have also been tried for regeneration from different explants for in vitro propagated shoots. Cell suspension cultures are also being raised for protoplast isolation and regeneration. Efforts are also undertaken for the development of agrotechnology for commercially important varieties of sweet potato.

PP24

Sex-Specific Effects of Sucrose Withdrawal on Anxiety-like Behavior and Neuroimmune Response

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Sugar bingeing induces maladaptive neuroadaptations to decrease dietary control and promote withdrawal symptoms. This study investigated the sex differences in sucrose bingeing and withdrawal-induced negative mood effects and underlying neuroimmune response in the prefrontal cortex and nucleus accumbens of C57BL/6 male and female mice. We used a two-bottle sucrose choice paradigm to develop sucrose dependence in mice. Female mice consumed more sucrose than male mice when given free access to water and 10% sucrose for four weeks. A significant increase in the mRNA expression of neuroinflammatory markers (*Il1β, Tnfα*) was found in the prefrontal cortex of males exposed to sucrose withdrawal. Sucrose bingeing and subsequent withdrawal showed elevated protein levels of pro-inflammatory cytokines/chemokines/growth factors in the prefrontal cortex (IL-1β, IL-6, TNFα, IFN-γ, CCL5, VEGF) and nucleus accumbens (IL-1β, IL-6) of male mice as compared to their water controls. These effects were concurrent with reduced mRNA expression of synaptic plasticity marker (*cFos*) in the prefrontal cortex of sucrose withdrawal males. One week of sucrose withdrawal showed anxiety-like behavior in male mice, not females. In conclusion, this study demonstrates that repeated access to sucrose induces depression and anxiety-like behavior when the sugar is no longer available in the diet and these effects are male-specific. Elevated neuroinflammation in reward neurocircuitry may underlie these sex-specific effects.

PP25

Antiproliferative Activities of the isolated Fractions of *Tragopogon dubius* roots against A549, HeLa and MCF-7 Cancer Cells, UPLC-ESI-QTOFMS, GC-MS Metabolite Profile, and Antioxidative Functions.

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Although a number of pharmacological properties have been linked to *Tragopogon dubius* leaf and root extracts, the biological attributes of *Tragopogon dubius* remain unknown. Moreover, only a limited number of active compounds have been identified so far. This work is aimed to investigate the anti-oxidative and cytotoxic properties as well as profiling the secondary metabolites in the methanolic fraction (TrDM) of *Tragopogon dubius* root which is consumed as food, using UHPLC-ESI-QTOFMS and gas chromatography−mass spectrometry (GC−MS). TrDM-1 and TrDM-2 fractions isolated from TrDM by Preparative thin layer chromatography were also evaluated for antioxidant and antiproliferative activities. It was found that TrDM-2 fraction possess potent antioxidant properties against DPPH, ABTS, and Superoxide Radical Assay with IC_{50} values of 51.9, 55.10, and 59.2 µg/mL, respectively. Furthermore, TrDM-2 also demonstrated potent cytotoxic effects, showed dose dependent antiproliferative potential against A549, HeLa and MCF-7 cancer cell lines with GI_{50} 31.62, 35.68 and 69.65µg/mL respectively. UHPLC−MS, GC−MS and Qualitative phytochemical analysis revealed that Methanolic root fraction TrDM is rich in phenolics, flavonoids, terpenoids, volatile constituents, and a plethora of active metabolites, probably responsible for the observed activities. These findings indicate that TrDM is endowed with pharmacologically relevant active principles with strong potential for use in the amelioration of disease conditions related to oxidative stress, and anti-cancer properties and therefore worthy of further investigations.

PP26

Advancements in Clinical Investigation and Biophysical Characterization of Interferon-beta: A Versatile Approach to Autoimmune Disorders

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Interferons are emerging as pivotal players in the dynamic field of clinical trials, offering new avenues for treating various challenging health conditions. From the intricate landscape of autoimmune disorders exemplified by multiple sclerosis (MS) to the viral onslaught of hepatitis C and the relentless battle against non-Hodgkin's lymphoma, interferons are at the forefront. Multiple Sclerosis, a multifaceted condition impacting the central nervous system, disrupts immunological functions, sparking abnormal inflammatory responses, and culminating in damaging demyelination and axonal loss. Pioneering the treatment landscape since the 19th century, beta interferons have long been the trusted allies for MS patients, with recent clinical research demonstrating their tangible positive effects on disease progression. The pleiotropic mode of action of interferon-beta seems to be primarily mediated through its impact on several components of the immune system, such as antigen-presenting cells, T-cells, and B-cells to promote an anti-inflammatory response. We have optimized the expression and purification of the human recombinant interferon-beta 1b protein from the inclusion bodies of Escherichia Coli. Our next steps involve a comprehensive characterization of this novel protein using various biophysical and biochemical tools. Understanding its biophysical attributes enhances our knowledge of how it interacts with cellular components and contributes to its functional effects. Notably, we aim to investigate the confirmational and structural changes in the protein at different environmental conditions using various brain osmolytes which would provide significant information, leading us towards developing novel therapeutic approaches.

PP27

Unveiling Baicalin and Resveratrol: Novel Approaches to Inhibit PIM-1 Kinase for Therapeutic Intervention in Prostate and Breast Cancers

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PIM-1 kinase is one of the members of the Ser/Thr kinases family, a well-studied therapeutic target for cancer therapy. PIM kinases differ from other kinases in their distinctive structure, which includes their distinct ATP-binding site in the hinge region, making them prospective targets for therapeutic intervention. Its elevated expression is frequently associated with prostate and breast cancer progression. Targeting PIM-1 could disrupt crucial signaling pathways contributing to cancer growth and resistance to conventional treatments. We screened 100 natural compounds in the search for potential inhibitors of PIM-1. Using integrated computational and experimental approaches, two natural compounds, baicalin and resveratrol, were investigated for their binding affinity and inhibitory potential. Baicalin and resveratrol bind to PIM-1 with a docking score of -10.2 and -7.5 kcal/mol, respectively. Subsequently, fluorescence binding studies estimated excellent affinity with *K*a values, $5.9 \times 10^5\ M^{-1}$ and $1.7 \times 10^7\ M^{-1}$ for baicalin and resveratrol, respectively. In addition, baicalin and resveratrol strongly inhibited PIM-1 with IC_{50} values of 36.8µM and 75µM, respectively. Furthermore, both baicalin and resveratrol suppress the proliferation of cancer cells in a dose-dependent manner, with baicalin's IC_{50} value for LNCaP and MDA-MB-231 cells being 34.8 µM and 35.6 µM, respectively, and resveratrol's being 15.2 µM and 41.6 µM, respectively. We conclude that baicalin and resveratrol may be considered potent PIM-1 inhibitors, opening up promising possibilities for the development of anti-cancer therapy via targeting PIM-1 for prostate and breast cancer. The research emphasizes the importance of interdisciplinary approaches to get deeper mechanistic insights into the inhibitory potential of baicalin and resveratrol for PIM-1 kinase and open up new avenues for cancer therapeutics. This study delves into natural inhibitors of PIM-1, utilizing natural compounds offers a safer alternative to synthetics, and understanding their binding mechanisms can drive the development of more potent, specific, and pharmacokinetically optimized derivatives or analogs.

PP28

Lactobacillus rhamnosus attenuates bone loss and maintains bone health by skewing Treg-Th17 cell balance in Ovx mice

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Osteoporosis is a systemic skeletal disorder characterized by enhanced fragility of bones leading to increased rates of fractures and morbidity in large number of populations. Probiotics are known to be involved in management of various inflammatory diseases including osteoporosis. But no study till date has delineated the immunomodulatory potential of Lactobacillus rhamnosus (LR) in bone health. In the present study, we examined the effect of probiotic-LR on bone health in the ovariectomy (Ovx) induced postmenopausal mice model. In the present study, we for the first time report that LR inhibits osteoclastogenesis and modulates differentiation of Treg-Th17 cells under in vitro conditions. We further observed that LR attenuates bone loss under in vivo conditions in Ovx mice. Both the cortical and trabecular bone content of Ovx+LR treated group was significantly higher than the Ovx-group. Remarkably, the percentage of osteoclastogenic CD4+Rorγt+Th17 cells at distinct immunological sites such as BM, spleen, LN and PP were significantly reduced, whereas the percentage of anti-osteoclastogenic CD4+Foxp3+Tregs and CD8+Foxp3+Tregs were significantly enhanced in LR-treated group thereby resulting in inhibition of bone loss. The osteoprotective role of LR was further supported by serum cytokine data with a significant reduction in osteoclastogenic cytokines (IL-6, IL-17 and TNF-α) along with enhancement in anti-osteoclastogenic cytokines (IL-4, IL-10, IFN-γ) in LR treated-group. Altogether, the present study for the first time establishes the osteoprotective role of LR on bone health, thus highlighting the immunomodulatory potential of LR in the treatment and management of various bone related diseases including osteoporosis.

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Baicalin as a MTH1 Inhibitor: A Breakthrough in Anticancer Treatment

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Unlike healthy tissues, tumor cells display an inclination towards genomic instability, which stems from increased oxidant levels generated by oncogenic signaling and abnormal cellular metabolism. The MTH1 protein plays a crucial role by sanitizing the oxidized dNTP pools. It prevents the incorporation of damaged bases during DNA replication. If oxidized dNTPs are incorporated during DNA replication, it leads to DNA damage and cell death, inhibiting the proliferation of cancer cells. Hence, cancer cells depend on the activity of MTH1 to avoid the incorporation of oxidized dNTPs followed by apoptosis. We have introduced Baicalin as a natural inhibitor of MTH1 using a combination of docking and molecular dynamics (MD) simulation studies followed by experimental measurements of binding affinity and enzyme inhibition assays. The Docking and MD Simulations demonstrated the efficient binding of Baicalin to the active site of the MTH1 protein and the complex Baicalin-MTH1 is appreciably stable complex. *In silico* findings were validated by *in vitro* studies including cell-free and cell-based enzyme assay, suggesting the strong inhibition of MTH1 by Baicalin with IC_{50} values of <50µM and <30µM respectively. Fluorescence measurement estimated a strong binding affinity with K_a - 3.4 * 10^6. The treatment of breast cancer cells with Baicalin significantly controls cell growth and subsequently induces apoptosis as seen by AnnexinV and Calcein AM-PI staining. Our study provides a rationale for the therapeutic evaluation of Baicalin and Baicalin based inhibitors in MTH1 associated cancers and other diseases. This highlights the potential of Baicalin as a MTH1 inhibitor for a novel approach in anticancer treatment.

PP30

Balancing Health and Habitat: The Crucial Role of Catalase in Therapeutics and the Environment

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Catalase is a key antioxidant enzyme that uses Hydrogen peroxide (a non-radical ROS) as its substrate and breaks it down to molecular oxygen and water. This enzymatic reaction helps to maintain cellular integrity and prevents oxidative stress, which is implicated in various diseases including cancer, cardiovascular disorders, neurodegenerative conditions, and aging-related ailments. Along with the profound implications in disease progression, catalase also helps in increasing environmental sustainability by detoxifying ecosystems, defending against environmental stressors, and maintaining ecological balance. The exceptional kinetic and thermodynamic properties of catalase are fundamentally significant, and following thorough research, its remarkably high catalysis rate in comparison to conventional chemical catalysts still beholds many intriguing questions. Our study intends to gain deeper insights into the structural and functional integrity of catalase under various stress circumstances employing multi-spectroscopic techniques (such as UV-vis spectroscopy, Fluorescence spectrophotometry, and Circular dichroism), activity assay, and *in-silico* approaches (including molecular dynamic simulation) in order to delve deeply into its complex role. The proposed research would offer a molecular foundation for comprehending its role in reducing extreme stress situations mimicking different occurring conditions and indicate to take Catalase under consideration as a possible therapeutic target in treating different illnesses or reducing stress.

PP31

Investigation of Interactions between extrinsic fluorescent dye with Macromolecular Crowding Agents and Their Monomers: ABiophysical Elucidation and Computational Approaches

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Protein aggregation is a common occurrence during protein folding, posing challenges to theirfunctional roles and contributing to various human diseases, particularly neurodegenerative disorders. Fluorescence spectroscopy, utilizing extrinsic fluorescent dyes, is a valuable technique for monitoring protein aggregation in vitro. These dyes selectively bind to the aggregated protein portions, leading to enhanced fluorescence intensity. In our investigation, we have uniquely explored the binding of extrinsic fluorescent dyes to macromolecular crowding agents and their monomers, even in the absence of proteins. The studied additives include dextran-70 and ficoll-70, as well as their monomers glucose and sucrose, respectively. Through a comprehensive approach involving various biophysical techniques such as extrinsicfluorescent dye-binding assays, molecular docking, isothermal titration calorimetry (ITC), andtransmission electron microscopy (TEM), we have elucidated the interactions between these extrinsic fluorescent dyes and macromolecular crowding agents, along with their monomers. The results of our study strongly suggest a significant likelihood of interaction between the dyes and additives, as evidenced by the robust binding observed between these dyes and the crowding agents and their monomers.

PP32

Exploring Nutraceuticals Targeting SLC11A1 as Potential Therapeutics for Lung Cancer through *In-silico* Studies

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Lung cancer, characterized by its high invasiveness and metastatic propensity, is the second most commonly diagnosed cancer in both males and females. Despite notable advances in treatment strategies such as chemotherapy, targeted therapy, radiotherapy and surgical intervention, the long-term survival rate of patients remains suboptimal. Hence, it has become imperative to identify novel therapeutic targets and drugs for treatment of lung cancer. In the present study, using datasets from TCGA and CPTAC, we found that SLC11A1, a 60 kDa transmembrane protein, exhibited significantly downregulated expression in lung cancer tissues compared to normal tissues. A consistent trend of downregulation across various clinicopathological parameters was also noted. Kaplan Meier survival analysis further revealed that lung adenocarcinoma (LUAD) patients with low levels of SLC11A1 expression had poor survival rate. Correlation analysis using TCGA lung cancer datasets divulged the set of protein-coding genes that showed strong positive correlation with SLC11A1 expression, while enrichment analysis of these correlated genes revealed the potential functions and pathways in which SLC11A1 could be involved. These studies cumulatively suggests that SLC11A1 may serve as a promising therapeutic target in the treatment of lung cancer. Moreover, to explore potential interventions, molecular docking was performed to identify natural compounds that can potentially act as a ligand to target SLC11A1. Diosgenin showed the highest binding affinity with a score of -9.6 kcal/mol, followed by other compounds, namely, wogonin, piceatannol, fisetin, reserpine, and apigenin having docking scores of -8.2, -8.2, -8.1, -8.0 and -7.9 kcal/mol respectively. This highlighted the binding interaction and the potential efficacy of these natural compounds in the context of lung cancer treatment by targeting SLC11A1. In conclusion, our analysis provides compelling evidence for considering SLC11A1 as a viable therapeutic target in lung cancer, with natural compounds demonstrating promising binding capabilities, thus warranting further investigation for clinical applications.

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Investigating the Role of Quercetin-3-O-Rutinoside as an Anti-cancer Agent Targeting TIPE3 Receptor: Insights from Docking Studies

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Cancer remains a formidable global health challenge, necessitating innovative approaches for the development of targeted therapeutics. The tumor necrosis factor alpha-induced protein 8 like 3 (TIPE3) protein has recently emerged as a potential target in cancer, playing a pivotal role in modulating signaling pathways associated with carcinogenesis. This study employed computational docking studies to investigate the interaction between quercetin-3-O-rutinoside, a naturally occurring flavonoid, and the TIPE3 protein. Utilizing in-silico methodologies, we explored the potential of quercetin-3-O-rutinoside (IUPAC- 3′,4′,5,7-Tetrahydroxy-3-[α-L-rhamnopyranosyl-(1→6)-β-D-glucopyranosyloxy] flavone) as a ligand for targeting the TIPE3 protein. Molecular docking analyses showed a high binding affinity of -15.367 kcal/mol between the flavone and TIPE3 protein. Our computational studies revealed insights into the binding interactions, providing valuable information on the potential efficacy of quercetin-3-O-rutinoside as a ligand targeting TIPE3 protein. This study offers a foundation for further experimental validation of quercetin-3-O-rutinoside as a promising candidate for developing targeted therapies against TIPE3-mediated carcinogenesis.

PP34

Ellagic acid and ethyl ferulate conjugated gold nanoparticles for the treatment of triple negative breast cancer

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Triple negative breast cancer (TNBC) is the epicenter of breast cancer research, ascribing to its highly complex, heterogeneous and incomprehensible nature. Novel targeted therapies are debilitated to aim at TNBC cells considering the lack of estrogen receptor, progesterone receptor and HER2 receptors. In the present study, phyto origin gold nanoparticles (AuNps) are prepared to target TNBC cells via EPR effect, also the AuNps can infiltrate in to the cells via receptor mediated endocytosis (RME) utilizing the 'protein corona' assimilated on the surface. Ethyl ferulate (EF) and ellagic acid (EA) are used to chemically reduce gold chloride to AuNps, phytochemicals well recognized for its anti- cancer potential. Triangular and dissimilar shaped nanoparticles are produced to validate the anti-cancer potential averse to MDA-MB-231 cells. UV-visible spectroscopy, XRD and EDX confirmed the formation of AuNps, DLS pattern confirmed that the statistical distribution of nanoparticles is in the 10-100nm range. TEM images verified the distinct surface morphology of AuNps and FT-IR spectra showed the shift in functional groups after the bio reduction. Preeminently, our *in-vitro* studies including MTT and colony formation assay verified the anti-proliferative potential of EF-AuNp and EA-AuNp with Ic50s 18µg/ml and 12µg/ml respectively. Further, PI-FACS and Live and dead assay confirmed the cytotoxic potential of phyto - nano complexes in MDA-MB-231 cells. Nonetheless, our findings confirmed the anti-cancer potential of EF-AuNps and EAZD- AuNps, additional studies are highly recommended in *in-vivo* system.

PP35

Exploration of Nutraceuticals Targeting Solute Carrier Family Proteins as Putative Therapeutics against Head and Neck Cancer

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In India, HNC stands as a prominent and lethal contributor to the oncological landscape, with over 5.5 lakh individuals diagnosed, representing 27.5% of all cancer cases. Despite considerable advancements in therapeutic modalities encompassing surgery, radiation therapy, chemotherapy, targeted therapy, and immunotherapy, the overall survival of patients with HNC remains suboptimal. Thus, the imperative to identify novel therapeutic targets for augmenting patient survival and cure rates persists. Recent investigations have unraveled the pivotal role of solute carrier proteins in the initiation and progression of cancer. In the current study, we investigated the involvement of Solute Carrier Family 10 member 3 (SLC10A3) in head and neck cancers. SLC10A3, a 50kDa solute carrier protein encoded by the SLC10A3 gene comprising 477 amino acids across 5 exons, emerged as a subject of scrutiny. Analysis of mRNA and protein levels in HNSC tumor tissues, utilizing datasets from The Cancer Genome Atlas (TCGA) and Clinical Proteomic Tumor Analysis Consortium (CPTAC), revealed a significant upregulation of SLC10A3 compared to normal tissues. Kaplan-Meier survival analysis further demonstrated a remarkable association between elevated SLC10A3 expression and reduced survival in TCGA-HNSC patients. Correlation analysis identified 26 genes positively correlated with SLC10A3 expression, participating in diverse cellular signaling pathways. These findings collectively highlight SLC10A3 as a promising therapeutic target for developing interventions against head and neck cancer. Subsequently, we explored natural compounds, due to their minimal adverse effects and potential anti-cancer properties, that target SLC10A3. Molecular docking studies unveiled diosgenin as the most promising candidate, exhibiting a binding energy of -7.7. Other compounds, including apigenin, ellagic acid dihydrate, and curcumin, demonstrated substantial binding affinities. The study demonstrated the potential of these natural compounds as candidates for further therapeutic development targeting SLC10A3 in the context of head and neck cancer.

PP36

Anti-malarial activity of solvent fractions of Xanthium strumarium, Bergenia ciliata, and Nicandra physalodes against Plasmodium berghei in mice

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Recent years have witnessed a growing resistance of the malaria parasite to existing antimalarial drugs, highlighting the urgency for affordable and effective alternatives. Therefore, this study aimed to access the antimalarial potential of solvent fractions derived from the leaf extracts of plants Bergenia ciliata, Nicandra physalodes, and Xanthium strumarium in mice, addressing the need for new therapeutic options in the face of drug-resistant malaria. A rodent malaria parasite, Plasmodium berghei, was used to inoculate the infection in healthy male Balb/C mice of age 4-5 weeks and weight 25-30 gm. The solvent fractions (alkaloidal and non-alkaloidal) of plant extracts were administered at different doses 100, 250, and 500 mg/kg by following 4-day suppressive test. Parameters including parasitemia, chemosuppression were assessed and further biochemical analysis and histopathology conducted on most active dose group i.e., 500 mg/kg. The 4-day chemosuppressive findings showed that XS 500, BC 500, and NP 500 have 77.1%, 68%, and 51% antimalarial activity. Necroscopic analysis showed normal organs in XS 500 and BC 500 while hepatomegaly and splenomegaly were observed in NP 500 group. Furthermore, plants fractions showed improvements in LFT, RFT, and PCV, which were supported by improved histopathological data of the liver, spleen, and kidney. The finding of the study suggests the oral administration of dichloromethane fraction of N. physalodes, X. strumarium, and the alkaloidal fraction of B. ciliata showed antimalarial activity by inhibiting the parasitemia in mice infected with Plasmodium berghei. The results collectively indicate that, these plants have promising antiplasmodial activity against chloroquine resistant Plasmodium berghei strain, which upholds earlier in-vitro & in-vivo findings with chloroquine sensitive strain as well as folkloric uses. Thus, these plants could be considered as potential sources to develop new antimalarials.

PP37

Colitis associated Inflammatory stress is effectively attenuated by dietary consumption of green tea EGCG in a murine model of aging

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Age-dependent increased risk of inflammatory bowel diseases such as ulcerative colitis is being increasingly realized, and yet therapies targeting this disorder within the purview of aging are limited. The present study attempted to assess the efficacy of green tea epigallocatechin gallate (EGCG) consumption in preventing the severity and progression of dextran sulphate sodium (DSS)-induced ulcerative colitis in 18 months old middle-aged male mice. Acute colitis was induced in animals using DSS and protective effects of EGCG consumption were examined. Different parameters related to disease progression and molecular markers related to oxi-inflammatory stress, localized and systemic cytokine response, epithelial barrier integrity, and cell cycle progression profile were evaluated. DSS treatment induced rapid and severe symptoms of colitis such as consistently increased DAI score, shortened and inflamed colon accompanied by increased levels of inflammatory proteins (TNFα/IL-6/IL-1β) in both the colon tissue and cultured splenocytes indicating exaggerated Th1 immune response. Markers of oxidative stress increased while antioxidant defences and the expression of tight junction genes in the colonic cells were attenuated. Dysregulation in the expression of cell cycle inhibitory genes (p53/p21WAF1/p16Ink4a) indicated possible induction of colitis-induced dysplasia. On the other hand, EGCG consumption strongly attenuated all the measured ostensible as well as molecular markers of the disease progression as evidenced by improved DAI score, cellular antioxidant capacity, attenuated Th1 cytokine response both in the colon and cultured splenocytes, enhanced expression of tight junction genes, and cell cycle inhibitors thereby suggesting systemic effects of EGCG. Together, these observations suggest that drinking EGCG-rich green tea can be a significant way of managing the severity of colitis during aging.

PP38

Attenuation of *c-Myc* expression in breast cancer by hesperidin-mediated stabilization of its promoter proximal G quadruplex region.

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Down-regulation of c-*Myc*, protooncogene, a key transcription factor, which gets overexpressed in many cancer types, has been shown to have positive effects on breast cancer management. The epigenetic regulator, G-Quadruplex (G4) silencer element (Pu-27), is located upstream of the c-*Myc* promoter. Stabilizing this regulator and restoring its basal expression holds an optimistic approach towards successful anticancer therapy. In this study, we have undermined the potency of a widely available citrus flavanone Hesperidin for its ability to bind with the c-*Myc* G quadruplex through *in silico* and *in-vitro* analysis. Hesperidin depicted a strong interaction with Pu-27 (binding score: -7.241), it interacted with 5 separate regions of Pu-27 G4 by hydrogen bonding; with the binding free energy of -48.344Kcal/Mol. The binding constant of the ligand with Pu-27 was observed to be 1.16×10^4 $M^{-1.}$ The ellipticity of Pu-27 G4 and its melting temperature (T_m) also increased substantially with an increase in the concentration of Hesperidin. Atomic force microscopic images also indicated the formation of a higher-order nanostructure of Pu-27 G4 in presence of Hesperidin. *In vitro*, PCR stop assay depicted a decline in the PCR product of Pu-27 primer dimer with an increase in Hesperidin concentration. This ligand also depicted selective cytotoxicity on MDA-MB-231 breast cancer cells over noncancerous human embryonic cell lines (HEK 293) and attenuated the clonogenicity and migration potential of MDA-MB-231 cells *in -vitro*, while downregulating c-*Myc* expression in cancer cells *in-vitro* and *in -vivo* in a mice tumor model.

PP39

Phytopharmacological and Computational analysis of *Potentillafulgens L.*, a deeper insight to its anti-diabetic action

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This study was aimed to investigate the anti-diabetic potential of *Potentilla fulgens L.* using combination of phytopharmacological and advanced computational approaches.A positive result was observed with the Glucose Tolerance Test (GTT) carried out withthe fractionated extract. GTT is a gold standard diagnostic test for anti-diabetic assay.Further, the LC-MS analysis of the sequential column solvent extracted fraction revealed the unique presence of 10 different compounds which have not beenreported earlier. In addition, molecular docking analysis using 'GOLD' of the compounds vis-à-vis the binding site to SIRT1, a key signaling molecule involved in glucose homeostasis, showed that the phytochemicals Pelargonidin and Naringenin amongst others demonstrated stronger binding score towards the target. It was also observed that these compounds adhered to the Lipinski's rule, which is a measure ofdrug-likeness compared to the reference anti-diabetic drug metformin and vildagliptin.Western blot and qRT-PCR of SIRT1 in selected target tissues under normal, diabeticand diabetic treated conditions revealed that the expression of altered SIRT1 was improved significantly following administration of the standardized dose of the PF extract.

PP40

Exploring the role of Zinc Finger Protein 726 in transdifferentiation of Breast Cancer

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Zinc finger protein 726 (ZNF726) oncogenic role in breast cancer is known but its involvement in the osteogenic activity of breast cancer has not been investigated. Recent study indicates that ZNF726 might be a therapeutic biomarker for breast cancer. Zinc finger proteins have diverse roles in cellular processes, including osteoclastogenic activity. Osteoclastic (bone reabsorption) is one of the properties of breast cancer. Breast cancer cells secrete osteoclastogenic factors that enhance osteoclast activity, leading to bone resorption and the release of growth factors that further promote cancer cell activity in the bone microenvironment. However, the role of ZNF726 in osteoclastic activity has not been studied. In this study, we mainly focused on the role of ZNF726 in osteoclastic activity in overexpressed conditions. This study investigated the osteoclastic activities in response to ZNF726 in breast cancer cells (MDA-MB-231 and MCF-7). Experimental observations revealed significantly higher expression of osteoclastic activity-enhancing factors, RANKL and CSF-1, in ZNF726-overexpressed cells as compared to the control group. In our study, we also find that knockdown of ZNF726 leads to decrease in the expression of osteoblast marker genes (RUNX2, Osterix, and ALP) at mRNA level. ZNF726 knockdown also decreases the main adipocyte marker i.e. PPARγ at mRNA level. Collectively, these results indicate that ZNF726 may act as a positive regulator of trans-differentiation of breast cancer cells, modulating osteoblast diffentiation. This study provides a new rationale to explore novel approaches for targeting ZNF726 to inhibit its oncogenic effects in breast cancer.

PP41

Airborne Particulate Matter in atmosphere of Varanasi, UP: A study on PM_{10} induced oxidative lung damage

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Particulate matter (PM) is ubiquitous air pollutant with well-established detrimental effects on respiratory health. The levels of both PM_{10} and $PM_{2.5}$ have surpassed the established Indian National Ambient Air Quality Standards, raising serious concerns about the environmental and health consequences. Present study has been undertaken to investigate the presence of various bound elements in PM_{10} and $PM_{2.5}$ mainly C, Si, S, F, N, Na, Fe, Co, Mn etc. In present report, impact of PM_{10} has been investigated in normal and asthmatic mice where PM_{10} exposures has induced inflammation and oxidative stress in both normal and asthmatic lungs; however, asthmatic lungs were severely affected. Here, Balb/c mice were sensitized with Ovalbumin (OVA) through i.p. (Intraperitoneal) route, followed by OVA aerosol (1%OVA) challenge. Mice were then exposed to PM_{10} (0.5 mg/kg) via intranasal route (i.n.) for continuously 5 days, which led to the recruitment of inflammatory cells to the lungs and enhanced ROS production. Initial fibrotic changes were also observed which were confirmed by Matrix Metalloproteinase-9 (MMP-9) activity by Gelatin Zymography and lung histopathology. All the PM samples studied so far enhanced proinflammatory mediators like nitric oxide and inflammatory markers as compared to unexposed healthy mice controls. These findings may be informative about air quality and various pathological changes in the human subjects who are silently being exposed continuously. Detailed investigations will help in finding therapeutic strategies in near future.

PP42

Di-butyl Phthalate a plasticiser aggravates asthmatic condition through modulating Nrf-2/Keap-1/Hmox-1 signalling in mice model

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Exposure to phthalates is widespread nowadays and its inhalation leads to lung damage as it acts as immune adjuvant to airway inflammation. Present study was undertaken to investigate Di-butyl Phthalate (DBP) inhalation and its impact on lungswhere persistent inflammation leads to oxidative stress, injury and airway remodeling (Fibrosis). Here, OVA sensitized mice were exposed to DBP inhalation for an hour prior to each OVA aerosol challenge. DBP exposure has shown enhanced inflammatory cell recruitment to the lungs which has exacerbated the asthmatic condition. Persistent inflammation led to alteration in MMP-9/TIMP-1 ratio and Nrf- 2/Keap-1/Hmox-1signalling. Intranasal administration of curcumin, a plant-derived polyphenol, has significantly reduced DBP exposed inflammation by reducing NF-κBexpression and protect mice lungs from oxidative damage by activating Nrf-2. Antioxidant enzyme levels mainly, NQO-1, HO-1, and Catalase were enhanced after curcumin pretreatment and proved equally potential like dexamethasone, a known anti-inflammatory corticosteroid. Overall, this data demonstrated that DBP aggravated allergic asthma via oxidative stress, and fibrosis that curcumin ameliorate oxidative stress and pulmonary toxicity of DBP. These results suggest that oxidative stress participates in the exacerbation of allergic asthma resulting from intranasal exposure to DBP, highlighting a novel pathway for the connection between DBP and allergic asthma.

PP43

Developing an Innovative Strategy by Exploring the Use of Small Molecules for Enhanced Production of Withanolide in *Withania somnifera* (L.) Dunal.

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Withania somnifera, known as Indian ginseng or Ashwagandha, a medicinal plant, belongs to the family Solanaceae, variedly used in Unani and African medicinal system for 3000-4000 years. *Withania* is known for its various industrially important metabolites including withanolides, withaferin A and withanone which are recognized for their tendency to restrain human body from diseases and syndromes such as diabetes, asthma, arthritis, alzheimer's disease, cardiovascular diseases by enabling its neuroprotective, anti-tumor, anti-microbial, anti-inflammatory properties. Hence, due to its pharmacological significance, thereis a pressing need to fulfill the growing requirement for these secondary metabolite(s). Inhibition of key enzymes will redirect the metabolic flux towards these pharmaceutically important withanolides synthesis pathway(s). Earlier in the lab we attempted gene silencing using RNAi construct for redirection of sterol biosynthetic pathway. However, the phenotypeclearly suggests a tradeoff between plant metabolite production and growth. Hence, an alternative approach is being developed in the laboratory where plant growth will be independent of metabolic redirection. Herein, we are going to use small molecule approach for inhibiting critical enzymes of sterol biosynthetic pathway leading to higher production ofbioactive metabolites in *Withania somnifera*. Therefore, the present research aims to fulfill the demand for withanolides using integrated bioinformatics, chemistry and biotechnology toidentify potential small molecules or to design and validate their role in the inhibition of key branch point enzymes of the withanolide pathway. The success of this proposed mechanism will help to meet the requirements of the pharmaceutical industry for its multiple therapeutic uses.

PP44

In silico analysis and biochemical characterization of recombinant nattokinase in *E. coli*

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Heterologous expression of nattokinase, a potent fibrinolytic enzyme, has been successfully carried out in various microorganisms. However, the successful expression of thisenzyme could not be achieved in *E. coli.* This study delves into the expression of nattokinase in *E. coli* followed by its biochemical characterization and functional analysis for fibrinolytic activity. Successful gene cloning, expression, and purification of nattokinase in pET28a vectorand *E. coli* BL21 host strain at 16°C, 180rpm for 16 h enabled the production of recombinant nattokinase. Enzymatic assays demonstrated its protease activity, while characterization revealed optimal catalytic conditions at 37°C and pH 8.0, with remarkable stability over a broadpH range (6.0 to 10.0) and up to 50°C. The kinetic constants were determined as follows: Km = 25.83 ± 3.43 µM, Vmax = 62.91 ± 1.68 µM/s, kcat = 38.45 ± 1.06 s^{-1}, and kcat/Km = 1.49 x10^6 M^{-1} s^{-1}. In addition, the assessment of clot lysis time on an artificial clot (1mg) was found to be 51.5 ± 2.5 minutes unveiling nattokinase's fibrinolytic potential. Through molecular docking, a substantial binding energy of -6.46 Kcal/mol was observed between nattokinase andfibrin, indicative of a high binding affinity. Key fibrin binding residues, including Ser300, Leu302, and Asp303, were identified, emphasizing the specificity of this interaction. Out of these residues, Asp303 serves as one of the ligands for Ca^{2+} ions in the 2nd binding site. This comprehensive study provides crucial insights into the expression of protein in soluble form in *E. coli*, biochemical properties and functionality, paving the way for future research and potential applications in medicine and biotechnology.

PP45

Development of hepatic-targeted capsaicin-encapsulated lignin nanoparticles for alleviating Non-Alcoholic Fatty Liver Disease (NAFLD)

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Non-alcoholic fatty liver disease (NAFLD) is a growing public health concern, and there are currently limited effective treatment options available, thus, becoming a critical risk factor for end-stage liver disease and cirrhosis worldwide. Thus, it is imperative to develop innovative therapeutic approaches to confront the increasing prevalence of NAFLD. Nutraceuticals in this field have emerged as promising candidates due to their antioxidant, anti-fibrotic, anti-steatotic, and non-toxic nature. Still, they have certain limitations like low bioavailability, limited stability, light sensitivity, and probable changes after their delivery which can be overcome by incorporating them into nano-formulations, particularly polymeric nanoparticles. Polymeric nanoparticles offer several benefits for NAFLD including targeted drug delivery, enhanced drug solubility, prolonged drug release, and minimized side effects and first-pass metabolism. This research project explores the potential of capsaicin-encapsulated lignin nanoparticles (CA-LNPs) as a unique and targeted therapeutic intervention for NAFLD. Capsaicin, a bioactive compound found in capsicum, has demonstrated anti-oxidant, anti-inflammatory, anti-steatotic, and anti-fibrotic properties that have a protective role against NAFLD. It activates transient receptor potential vanilloid subfamily1 (TRPV1) through peroxisome proliferator-activated receptor δ (PPAR δ)-induced autophagy that prevents NAFLD. Lignin due to its non-toxic, eco-friendly, abundant, multifunctional, and biodegradable nature has garnered significant attention for polymeric drug delivery systems. Being a natural polyphenolic compound, lignin has demonstrated a remarkable antioxidant property. Incorporating these two natural compounds into nanoparticles offers promising approach to enhance capsaicin's bioavailability, stability, and targeted delivery to hepatic cells. This research will encompass a multidisciplinary approach including encapsulation of capsaicin into lignin nanoparticles, optimization studies using different concentrations of lignin and capsaicin, characterization including particle size, poly-dispersity index (PDI) and zeta-potential, and evaluation of their therapeutic potential in NAFLD models. The study will also employ in-vitro cell culture utilizing oleic acid-induced hepato-steatotic HepG2 cells and in-vivo animal models employing high-fat-diet induced NAFLD in rats for evaluating bioavailability antioxidant, anti-steatotic, anti-inflammatory, and lipolytic effects. Furthermore, in-vitro cytotoxicity assays will be conducted to evaluate the safety of nanoparticles. The proposed research has the capability to offer a cost-effective and targeted therapeutic approach for NAFLD. The findings will substantiate the development of bioactive compounds and innovative drug delivery systems that can contribute to the treatment of liver-related diseases and other chronic inflammatory conditions.

PP46

Unravelling the Therapeutic Potential of Physalis minima L. in Alzheimer's Disease: A Comprehensive Network Pharmacology Analysis and Molecular Docking

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The pathogenic landscape of Alzheimer's disease (AD) is complicated, requiring novel approaches to therapeutic intervention. The pursuit of natural products for drug development in Alzheimer's disease (AD) over synthetic compounds is driven by several factors, such as their neuroprotective properties, targeting multiple pathways, and having fewer side effects. The *Physalis minima* L., or cape gooseberry, has demonstrated promising results with respect to its rich phytochemical composition, anti-inflammatory, antioxidant and anti-neuroinflammatory properties, and possible application in managing Alzheimer's disease. However, to properly comprehend its mechanisms and effectiveness in treating this condition, further research is required. Phytochemicals were sourced from the IMPATT database, and Superpred identified compound targets. An interactome, mapping relationships between compounds and AD-associated genes, was created using DisGeNET and GeneCards. Cytoscape facilitated network visualization, and String query was used for protein-protein interaction analysis. Additionally, DAVID's database integrated data to reveal KEGG pathways and biological processes. Core targets were identified for the molecular docking to confirm the activity of *Physalis minima*. Overall, 50 common targets were found. 2 targets, APH1A and **GSK-3β** were identified for docking based on the topological parameters and String disease network. Inhibition of APH1A and **GSK-3β** regulates amyloid-beta peptides and reduces BACE1-mediated cleavage of APP through a NF-κB signalling-mediated mechanism. Hyperoside, astragalin, and hexadecenoic acid exhibited superior docking scores among the compounds, with the majority demonstrating strong binding affinity. The bioinformatic analysis have shown phytochemicals acts via the PI3K/AKT and HIF-1α pathways in AD to inhibit hyperphosphorylation in Tau and decreases amyloid precursor protein (APP), and amyloid-beta (Aβ) peptides formation respectively. This interdisciplinary approach provides a comprehensive understanding of the potential therapeutic role of *Physalis minima* in AD, offering valuable insights for further experimental validation and drug development.

PP47

Ketogenic diet with oxyresveratrol and zinc inhibits glioblastoma and restores memory function and motor coordination

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To date, there is no effective cure to treat the highly malignant brain tumor, glioblastoma (GBM). GBM is the most common, aggressive central nervous system tumor (CNS). They mostly originate in the glial cells like microglia, oligodendroglia, astrocytes, or subpopulations of the cancer stem cells (CSCs). Glucose plays an important role in the energy metabolism of normal as well as cancer cells, but cancer cells exhibit an increased demand for glucose which is required for their differentiation and proliferation. Hence the main idea of this project is to cut down the supply of glucose to the cancer cells and provide an alternate source of energy to the normal cells that are ketone bodies since the cancer cells cannot utilize the ketone body as an alternate source of energy. Zinc is considered an important micronutrient that plays a pivotal role in the epigenetic regulation of GBM. Furthermore, zinc also enhances the action of epigenetic modulators such as HDAC inhibitors like oxy resveratrol. To study this concept, the anti-cancer effect of the ketogenic diet and zinc-modulated oxy-resveratrol was evaluated against the C6 cell lines induced GBM in the Wistar rat model. Also, behavioral studies were performed to assess memory function and motor coordination which are usually affected in GBM. Our results suggested that improved memory function and motor coordination in the tumor-bearing animals.

PP48

In-vitro evaluation of the cardioprotective activity of *Moringa oleifera* Lam. against Doxorubicin-induced cardiotoxicity

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Doxorubicin, also known as Adriamycin, is an anti-tumor drug that belongs to the anthracycline class of antibiotics. Anthracyclines particularly doxorubicin has been the mainstay of cancer treatment for many years. It has been used to treat various types of cancer such as bladder cancer, leukemia, breast cancer, lymphoma, Kaposi sarcoma, and others. But despite its efficacy, the use of doxorubicin has been limited due to the dose-dependent development of cardiotoxicity which can lead to heart failure. Hence, there lies a need for new therapeutic interventions to prevent the cardiotoxic effects of chemotherapy in cancer patients. Using phytochemicals may help to decrease these adverse effects. *Moringa oleifera* Lam. is a plant with wholesome and therapeutic worth, which belongs to the family Moringaceae. It is a rich source of secondary metabolites that are bioactive such as flavonoids, amino acids, carbohydrates, vitamins, and minerals, which is known to have various pharmacological effects and biological activities such as anti-diabetic, anti-inflammatory, anti-cancer, hepatoprotective, cardioprotective activity. The ethanolic extract of *Moringa oleifera* (MEE) leaves was prepared using the Soxhlet extraction process. The in-vitro evaluation of the effect of MEE was carried out using SRB assay. Exposure of 20µM doxorubicin to H9C2 cells (rat cardiomyocytes), MCF-7 and HCT-116 (cancer cells) caused 50% inhibition of cell viability. Pretreatment with MEE showed significant increase in the cell viability in H9C2 cells, while in MCF-7 and HCT-116, the test extract increased the cytotoxic potential of doxorubicin. The results suggest that MEE can have cardioprotective effect without hampering the cytotoxic efficacy of doxorubicin against cancer.

PP49

Orally Fast Dissolving α-Lipoic Acid Nanofiber Film: Preparation, Characterization and Anti-inflammatory Activity

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The evolution of oral drug delivery research has advanced solid oral dosage forms, transitioning from basic tablets to modified-release tablets, oral disintegrating tablets (ODTs), and ultimately to oral thin films (OTFs). OTFs are the innovative drug delivery systems in addressing the challenges associated with antioxidant administration, ultimately promoting their use in managing oxidative stress -related diseases and improving overall patient well-being. The aim of this work was to explored combined effect of inclusion complexation and nanofiber technology as a potential rapid disintegrating delivery system for oral anti-inflammatory treatment using lipoic acid (a nutrceutical). α-lipoic acid (LA), known for its strong antioxidant and anti-inflammatory potential, faces challenges due to its poor solubility and thermal instability. To address these issues, in this work we have utilized methyl- beta-cyclodextrin (M-β-CD) to create inclusion complex (IC) of LA and thereafter encapsulated in pullulan nanofiber using green and sustainable approach (without utilizing organic solvent). The process involved the formation of an inclusion complex between LA and M-β-CD, followed by the addition of PUL in the electrospinning solution. Further, detailed structural and morphological characterizations, *in vitro* dissolution, disintegration, and release studies were conducted. Along with biocompatibility studies, measurements of reactive oxygen species (ROS) generation, nitrite (NO) production, downregulation of pro-inflammatory enzymes (iNOS and COX-2), and cytokines (TNF-α, IL-6, and IL-1β) in LPS-stimulated RAW264.7 macrophages were also conducted. The developed nanofibers film (NFF) demonstrated accelerated release, quick dissolution, and disintegration along with high encapsulation efficiency. Additionally, NFF demonstrated the ability to manage the production of NO, ROS, suppresses the upregulation of pro-inflammatory enzymes (iNOS and COX-2), cytokines (TNF-α, IL-6, and IL-1β) and nuclear translocation of NF-κB in lipopolysaccharide (LPS) stimulated RAW 264.7 macrophage cells. Overall, the findings of this study provide strong evidence for the anti-inflammatory potential of NFF, suggesting its potential use in the treatment of inflammatory diseases.

PP50

Enhancing temozolomide antiglioma response by (+) Catechin hydrate in male Wistar rat model

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Glioblastoma is a malignant tumor with several cells protruding deep into the cerebral lobes of the brain. The main disadvantage of the antiglioma drug, temozolomide, is that it easily crosses the blood-brain barrier and causes direct toxicity to normal brain cells. Green tea is the main dietary source of catechin. (+) Catechin hydrate has decreased the oxidative stress and cognitive impairment caused due to several chemotherapeutic agents. This study aimed to evaluate the role of catechin in preventing temozolomide-induced oxidative stress in C6-induced glioblastoma. Male Wistar rats, weighing 200-250g were randomized into four groups with 8 animals per group. Stereotaxic surgery was performed on the animals and the treatment was given according to the designed schedule. Normal control received Carboxymethylcellulose (CMC) (0.25% w/v, po), disease control received CMC (0.25% w/v, PO), temozolomide (temozolomide 20 mg/kg, IP for 28 days in 5 days cycle), and catechin + temozolomide group received (catechin 100mg/kg, p.o. + temozolomide 20mg/kg, I.P.). Behavioral assessment was performed by the passive avoidance test. Antioxidant estimations of the hippocampus and frontal cortex were performed. Histology of the tumor, hippocampus, and frontal cortex was also done. Temozolomide and catechin concomitant treatment showed a significant reversal in time spent in the darkroom compared to disease control in the passive avoidance test. The combination also showed a significant decrease in tumor volume compared to disease control. Histopathological and antioxidant results also confirmed the determined tumor as well as behavioral parameters. Treatment with catechin and temozolomide combination showed significant improvement in behavioral and tumor parameters, which could be due to the prevention of resistance or their neuroprotective and antitumor effects. However, molecular pathways need to be explored to support the data.

PP51

Small RNA sequencing and identification of *Andrographis paniculata* nutraceutical miRNAs with potential cross-kingdom human gene targets

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Cross-species post-transcriptional regulatory potential of nutraceutical small non-coding microRNAs (miRNAs) has been well documented by plenteous studies. Nutraceutical microRNAs are transferred to host cells via oral ingestion wherein they play a decisive role in regulation of host genes. Thus nutraceutical miRNAs have evolved as the nascent bioactive molecules imparting pharmacological values to traditionally used nutraceutical plants. The present study aims to investigate small RNA profiling in order to uncover the potential regulatory role of miRNAs derived from *Andrographis paniculata*, one of the most widely used herb by tribal communities for chronic liver disorders. In this study, High-throughput sequencing method was used to generate raw data, ~60 million sequences were generated from *A. paniculata* leaves. Using computational tools and bioinformatics approach, analyses of 3,480,097 clean reads resulted in identification of 3,440 known and 51 putative novel miRNAs regulating 1365 and 192 human genes respectively. Remarkably the identified plausible novel miRNAs apa-miR-5, apa-miR-1, apa-miR-26 and apa-miR-30 are projected to target significant host genes including CDK6, IKBKB, TRAF3, CHD4, MECP2 and ADIPOQ. Subsequent annotations revealed probable involvement of the target genes in various pathways for instance p38-MAPK, AKT, AMPK, NF-Kβ, ERK, WNT signalling, MYD88 dependant cascade, and pathways in cancer. Various chronic diseases such as human papilloma virus infection, Alzheimer's, Non-alcoholic Fatty Liver, Alcoholic liver diseases, HepatoCellular Carcinoma (HCC) and numerous other cancers were predominantly found to be linked with target genes. Our findings postulate novel interpretations regarding modulation of human transcripts by *A. paniculata* miRNAs and exhibit the regulation of chronic human diseases by plant-derived nutraceutical miRNAs. Though our study elucidates miRNAs as novel nutraceutical agents, however experimental validations for assessment of therapeutic potential of these miRNAs are still warranted.

PP52

Impact of $PM_{2.5}$ on COPD pathogenesis: Analysis of cellular and molecular factors

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Chronic Obstructive Pulmonary Disease (COPD) is a progressive, inflammatory disorder of the lungs marked by emphysema and chronic bronchitis. Inflammation and tissue remodelling are the major reasons for COPD. The major causative agents of COPD are cigarette smoke and particulate matter ($PM_{2.5}$). However, dynamics of COPD pathogenic alterations due to $PM_{2.5}$ exposure are not very clearly known. Accordingly, the present study investigated the effects of $PM_{2.5}$ on lungs to find out the mechanisms which may be involved in COPD pathogenesis. For this, a single dose of either 50µg, 100µg or 200µg $PM_{2.5}$ was given to male BALB/c mice, intratracheally on day 0 followed by euthanization either on day 2 or 4. It was observed that neither of the doses led to significant inflammatory response after 2 days of $PM_{2.5}$ instillation. Whereas, after 4 days both 100µg and 200µg doses were able to generate strong inflammatory response. Further, time course studies revealed that the inflammation induced by 100µg dose of $PM_{2.5}$ peaked at day 7 and persisted till 14th day, followed by resolution of inflammation at day 21. Pulmonary function test data showed progressive decline in the lung function parameters up to 28 days. Pro-inflammatory mediators were increased both at mRNA as well as protein levels with time. MMP-9, a metalloproteinase was also elevated in the lungs in a progressive manner. Its high levels have been reported in sputum of COPD patients and associated with damage to lung parenchyma and tissue remodelling. Histological analysis of lung tissues confirmed the induction of emphysematous lesions as observed on 28th day, pointing towards an irreversible damage being caused to lungs upon $PM_{2.5}$ exposure. This also correlates with the progressively deteriorating lung function parameters and high levels of MMP-9 even after resolution of inflammation beyond 14 days' time point.

PP53

The significance of gallic acid and its derivative for comprehending the intricate mechanisms of gallic acid-induced ferroptosis and the hindrance of Metabolic pathways in pancreatic ductal adenocancinoma (PDAC).

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Pancreatic ductal adenocarcinoma (PDAC) cancer, particularly the KRAS mutant form of it, presents a difficult oncology challenge due to its aggressive nature and constrained therapy options. Recent studies have investigated the role that phenolic and polyphenolic compounds may have in the treatment of this particular cancer. These substances, which are prevalent in many plant-based diets, have been shown in trials to have strong preventive potential against KRAS-mutated pancreatic cancer. Their mode of action is multifaceted and includes the suppression of the MAPK kinase and mTOR pathways, the alteration of HSP90, and the regulation of p53 and NRF2. The MAPK pathway is one of the major routes that is mediated by mutant KRAS protein for cell proliferation, cell survival and cell differentiation. According to earlier research, NRF2 is the primary regulator of ferroptosis in cancer cells. In this study, we performed molecular docking of these phenolic and polyphenolic compounds, as well as their derivatives, to identify the compound that was most suited to interact with the PDAC target protein, which involved in cell proliferation and apoptosis. The effectiveness of these screened compounds is subsequently confirmed through in vitro tests.

PP54

Identification of unknown ZNFp as an oncogene in breast cancer

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The aberrant binding activity of transcription factors to DNA can act as a trigger for cancer progression. The DNA binding activity of transcription factors is in turn governed by zinc finger proteins (ZNFs). Hence unregulated ZNF activity can be a driving force for cancer progression. This fact is illustrated by literature review which show that ZNFs can act as either oncogenes or tumor suppressors. Thus, identification of novel ZNFs which may have oncogenic potential is of utmost importance. In order to accomplish this, a screening process was implemented in which expression profile analysis and survival curve analysis in breast cancer were initially done via online servers. This was followed by pan-cancer survival curve and expression profile analysis. This led to identification of few novel ZNFs in context of breast cancer. This was followed by literature analysis of interacting partners of the selected ZNFs, to identify ZNFs with highest possibility to act as oncogenes. Subsequently, survival curve and expression profile analysis was carried out in context of breast cancer subtypes. Finally, correlation analysis as well as fold change analysis in different breast cancer projects using GEO was done. This led to the observation that ZNFp may act as oncogene in case of luminal subtype of breast cancer. This observation was further evaluated by experimental observation. The knockdown of ZNFp hindered MCF-7 breast cancer cell proliferation, cell viability, epithelial- mesenchymal transition, migration, and invasion capacity.

PP55

Therapeutic Evaluation of Inula racemosa in Lung Fibrosis: A Network Pharmacology Perspective

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Lung fibrosis has become a critical ailment after the COVID-19 pandemic and has fatal implications among COVID-19 survivors. FDA-approved drugs have underlying side effects and are incompetent in curing the disease. *Inula racemosa* (Pushkarmoola) is an Indian traditional medicinal plant widely used in Ayurvedic formulations for treating several lung diseases. The anti-inflammatory, anti-asthmatic and anti-cancer properties of Pushkarmoola are extensively studied. However, the anti-fibrotic activity of Pushkarmoola is not explored. Hence, in this work, we followed network pharmacology to reveal active phytoconstituents of Pushkarmoola with specific biological target mechanisms. The phytochemicals of Pushkarmioola roots were identified from the literature and IMPPAT database. Using the SwissADME database, phytochemicals having high gastrointestinal absorption, drug-likeliness >0.1 and oral-bioavailability >30% were selected. Potential disease and phyto-molecule targets were found using the DisGeNet and SuperPred databases, respectively. A Protein-Protein interaction (PPI) network for overlapping disease and phytochemical targets was constructed using the Cytoscape 3.10.0 software and the STRING Protein-query. Similarly, the DAVID database was used for GO/KEGG-pathway analysis, and pathways and their targets were chosen for the Pathway-Target interaction (PTI) network. Shared targets between PPI and PTI were selected for molecular docking using Maestro Software. There were 50 potential phytochemicals, 1068 disease targets and 129 overlapping targets. Thirteen significant pathways and 71 targets were identified from PTI. From PPI, 86 nodes were identified, and Top-25 hub genes were selected for docking. Andrographolide was docked with targets like EGFR, HMOX1, HRAS, and TGFBR1. Andrographolide and isoinunal showed a significant docking score and binding energy with IGF1. IGF1 is directly linked to the HIF-signalling pathway. Thus, down-regulation of HIF-signalling pathway mediators like HIF-1α and HIF-2α may be the therapeutic action of Pushkarmoola. Further, *in vitro* and *in vivo* studies will be carried out to see the effectiveness of Pushkarmoola.

PP56

Paternal folate deficiency leads to insulin resistance in offspring mice

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Maternal folate deficiency has been found to be associated with the development of insulin resistance in the offspring as depicted by some human as well as animal studies. Recent studies reported that paternal folate deficiency in mice altered sperm epigenome and resulted in metabolic disorders in the offspring. We hypothesized that paternal folate deficiency has a role in the development of insulin resistance in the offspring, and to confirm this we studied the effect of paternal folate deficiency on circulatory markers of insulin resistance in the offspring in mice. C57/Bl6 mice model was used for this study and animals were divided into two groups (on the basis of folate diet), PNMN (paternal normal maternal normal) and PDMN (paternal deficient and maternal normal). Glucose tolerance test (GTT) and insulin tolerance test (ITT) were performed on offspring mice one week prior to the sacrifice. ELISA was performed to determine the effect of paternal folate deficiency on insulin levels, inflammatory cytokines (TNF-alpha and IL-1 beta), adipokines (RBP 4, adiponectin and leptin) and free fatty acids. An impaired GTT and high glucose levels were seen in 10-week-old male offspring of PDMN group. Insulin levels were also found to be significantly increased in the same group. However, no change was observed in case of inflammatory cytokines and free fatty acid levels. Gene expression studies reported enhanced expression of gluconeogenic and lipogenic genes in PDMN group. Results obtained suggest that paternal folate deficiency might have some association with the development of insulin resistance in the offspring, but further studies on the protein level will help us delineate the underlying mechanism.

PP57

Unveiling Antimicrobial Potential: Bacterial Diversity and Bioactive Compounds from the Indian Sector of the Southern Ocean

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Exploring the bioactivities of organisms remains a valuable approach for developing new pharmacological products. Despite advancements in drug synthesis, screening natural compounds directly from organisms continues to yield a high percentage of new medicinal compounds. The Southern Ocean, rich in microbial diversity, holds promise for discovering novel biologically active substances. The marine environment, with its vast microbial diversity and unique ecological conditions, is estimated to host 10^6–10^8 bacterial species. Marine organisms thriving in extreme conditions such as pressure and temperature produce a diverse array of secondary metabolites, including polysaccharides, polyunsaturated fatty acids, antioxidants, sterols, proteins, pigments, and compounds with antimicrobial properties. This study presents novel insights into the microbial diversity of the Indian sector of the Southern Ocean, focusing on bacterial isolates with potential antimicrobial properties. Water and sediment samples were collected, and *Bacillus* spp., *Pseudomonas* spp., and *Actinomycetes* spp. were identified through cultural and morphological characteristics. 16S rRNA sequencing and phylogenetic analysis confirmed eight bacterial organisms, paving the way for taxonomic classification in this region. The isolated bacteria were mass-cultured, and their extracts exhibited varying levels of antibacterial activity. This suggests their potential as sources of bioactive compounds. Ongoing experiments with purified fractions aim to elucidate the chemical nature and mechanism of action of these compounds. The significance of these findings lies in the urgent need for new antimicrobial agents amid increasing antibiotic resistance. The study contributes to the understanding of microbial diversity in the Southern Ocean, shedding light on the role of microorganisms in marine ecosystems. The identified bacterial isolates hold promise for the development of novel drugs to combat bacterial infections. This research aligns with global efforts in drug discovery and underscores the importance of exploring marine bacteria as valuable reservoirs for biotechnological advancements.

PP58

Exploring the role of Cordycepin in PTSD: An Insightful Approach through Network Pharmacology and Docking Analysis

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Post traumatic stress disorder (PTSD) is a chronic debilitating condition that significantly impairs an individual's quality of life and results in a substantial socioeconomic burden. Standard SSRI and SNRI therapy only give symptomatic alleviation with high remission rates, driving the quest for other therapies. Cordycepin a nucleoside analogue present in "*Cordyceps militaris"* and have been used traditionally for many ailments. Recent literature suggest cordycepin has an important role in modulating multiple targets in inhibiting the molecular pathways implicated in CNS disorders through different experimental designs. Super-pred, GeneCards, DisGeNET database, and STRING platform were used to screen and construct the protein interaction network of cordycepin for PTSD. A network encompassing disease targets was established for visualization through Cytoscape. Furthermore, potential targets underwent protein functional annotation, and their associated signaling pathways were identified using Gene Ontology and KEGG enrichment analyses were obtained based on the DAVID database. GRIN1, MAPK1, MTOR, HIF1A and NEF2L2 with high betweenness in the network were involved in gene expression and neurodegenerative pathways. The target proteins' crystal structures were obtained from the Protein Data Bank (PDB, https://www.rcsb.org/). Maestro was used to perform molecular docking on the prepared protein. Out of selected five proteins, cordycepin showed good docking score with MAPK1, GRIN1 and MTOR. This data imply that the glutamate-mediated neuronal signalling system may be involved in PTSD, emphasising the importance of further research to evaluate its therapeutic effectiveness.

PP59

Poly (I:C) exacerbates OVA-induced allergic asthma by causing a major shift in the immune response

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Viral respiratory infections trigger severe exacerbations of asthma, worsen disease symptoms, and impair lung function. Poly (I:C), a structural mimic of double-stranded RNA, is commonly used to study immune responses linked to respiratory viral infections. The current study seeks to assess the influence of poly (I:C) on asthma exacerbations. Additionally, the protective effects of dexamethasone, a steroid class of drugs, was evaluated under the condition. Female BALB/c mice were sensitized and challenged with Ovalbumin (OVA), followed by intranasal administration of poly (I:C). Dexamethasone was administered intraperitoneally before poly (I:C) instillation. Mice were assessed for airway hyperresponsiveness (AHR), a marker of lung function. In addition, bronchoalveolar lavage fluid (BALF) was procured to evaluate the inflammatory response, and histopathological changes in the lungs were examined. OVA-exposed mice exhibited a significant increase in total BALF inflammatory cells, prominently eosinophils. Intriguingly, poly (I:C) at a dose of 200µg augmented lung inflammation in OVA-exposed mice. Remarkably, poly (I:C) reduced the eosinophil count following OVA exposure but substantially increased the neutrophils. Dexamethasone failed to affect poly (I:C) mediated recruitment of neutrophils in the lungs. Additionally, mice exposed to OVA/poly (I:C) developed AHR as reflected by an increase in sRaw which was not altered by dexamethasone. Our findings suggest that poly (I:C) treatment in OVA-exposed mice seems to switch inflammatory response from eosinophils to neutrophils, which may account for dexamethasone's inability to suppress lung inflammation/AHR under the condition. Further, histopathological analysis revealed that lungs of OVA-exposed mice showed marked infiltration of inflammatory cells in bronchioles and peri-vascular region, further aggravated by poly (I:C). Interestingly, poly (I:C) administration following OVA exposure showed a switch from Th2 to Th1 cytokine profile which was not affected by dexamethasone further accounting for steroid resistance. Overall, our data suggests that poly(I:C) mediated asthma exacerbation is steroid refractory in nature.

PP60

Sex-Specific Effects of Ketogenic Diet on Anxiety-like Behavior and Neuroimmune response in C57Bl/6J Mice

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The ketogenic diet (KD) has been shown to reduce anxiety and enhance cognitive functions.However, the sex-specific effects of KD on anxiety-like behavior and the underlying molecular mechanisms contributing to these effects, including neuroinflammation, areunelucidated. This study investigated the sex-specific effects of KD on anxiety-like behaviorand the neuroimmune response in the prefrontal cortex (PFC) of male and female C57BL/6J mice. Animals were fed either a control diet (CD- 17% fat, 65% carb, 18% protein) or a KD (80% fat, 5% carb, 15% protein) for four weeks. KD increased the levels of circulating β- hydroxybutyrate (BHB) both in males and females however, PFC BHB levels were found tobe elevated only in KD males. However, KD did not affect the behavior of females but improved motor abilities and reduced anxiety levels in males. KD suppressed the mRNA expression of the putative microglial markers (*Cd68, P2ry12, Nox2*) and induced morphological changes in the male PFC microglia. No sex- and treatment-specific effects were observed on the mRNA expression of pro-inflammatory cytokines (*1l1β, Tnfα, Il6*) in the PFC, but a sex-specific decrease in IL1β and an increase in IL10 levels was found in thePFC of KD males. Additionally, BHB increased the production of IL-10 whereas decreased the production of IL1β by human microglia in *in-vitro* conditions. In summary, these resultsdemonstrate that the anxiolytic and motor function enhancement abilities of KD are male- specific. Reduced pro-inflammatory and improved anti-inflammatory factors in the male PFCmay underlie these effects.

PP61

Sesaminol glucoside as a potential inhibitor of fibroblast proliferation and extracellular matrix deposition in lung fibrosis: A computational intervention study

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Fibroblast proliferation plays a significant role in the development of lung fibrosis due to its characteristic processes of growth and differentiation. The activation of EGFR upregulates the positive signals of myofibroblast formation and enhances MMP9 activation in matrix deposition. To investigate the molecular mechanism underlying the inhibition of fibroblast proliferation and extracellular matrix deposition by sesaminol glucoside through network pharmacology, molecular docking, and dynamics studies. Sesaminol glucoside was identified as a potential component of Sesame from network pharmacology and molecular docking analysis. The compound targets were retrieved from the SuperPred database and matched them with lung fibrosis targets identified from the DisGeNET and GeneCards datasets. A protein-protein interaction network of 78 nodes and 323 edges was obtained from the String protein query in Cytoscape. An analysis of the network using topological parameters resulted in the identification of 18 hub targets. The core targets (EGFR, MMP9, TLR4, STAT3, TGFB1, and CXCR4) were obtained by merging the compound hub targets and disease query hub targets in the Cytoscape. Bioinformatics analysis of the network has revealed that the major pathways affected are EGFR tyrosine kinase inhibitor resistance and the HIF-1 signaling pathway. Molecular docking was performed on all 6 core targets identified through network pharmacology and obtained a good docking score and interactions with sesaminol glucoside. To confirm the stability of the docking complex molecular dynamics were performed for 100 ns. The protein (MMP9 and EGFR) ligand complex retained the hydrogen bonds observed during docking, maintained structural compactness, exhibited stable RMSD, RMSF, and reduced flexibility throughout the simulation period. Computational experiments suggest that sesaminol glucoside may inhibit the formation of extracellular matrix and the migration and proliferation of fibroblasts. However, further confirmation of the study findings is required *in vitro* and *in vivo* studies, which are currently in the experimental stage.

PP62

Houttuynia cordata Thunb. upregulates expression of dipeptidyl peptidase-IV and sodium glucose cotransporter 2 in alloxan-induced diabetic mice

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Glucagon-like peptide-1 (GLP-1) is an insulinotropic hormone reducing postprandial glucose excursions which is an advantage in Type 2 diabetes. However, its major limiting factor is susceptibility to degradation by dipeptidyl peptidase IV (DPP-IV) enzyme. Therefore, it becomes important to identify DPP-IV inhibitors that act as potential antidiabetic agents. Commercial DPP-IV inhibitors are available in the market but there are associated undesirable side effects. The objective of the study was to find out how *H. cordata* affects DPP-IV and SGLT2. Alloxan-induced diabetic mice with blood glucose >200mg/dL were treated with methanolic extract of *H. cordata*, reference drugs- vildagliptin and dapagliflozin for 14 days. After 14 days treatment, tissues were collected and examined. The protein and mRNA expression of DPP-IV and SGLT2 were determined using Western Blotting and Real-Time PCR. The effect of *H. cordata* on behavior and morphology was also determined. DPP-IV and SGLT2 expressions decreased in diabetic mice. However, treatment with *H. cordata* significantly improved the activity and expression of DPP-IV and SGLT2. The decreased mobility and expression of serotonin and serotonin receptors observed in diabetic mice were ameliorated on treatment with *H. cordata*. The morphological aberrations observed in diabetic were also improved. This study demonstrates the DPP-IV and SGLT2 inhibitory effects of *H. cordata*. It also suggests that *H. cordata* has cytoprotective properties and it underlines the association between diabetes and depression.

PP63

Antioxidant and antiproliferative potential of fractions of *Iris kashmiriana* flower

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One of the main characteristics of cancer is altered redox homeostasis, which is characterised by higher levels of oxidative stress in comparison to normal cells. A certain level of reactive oxygen species (ROS) is necessary for the growth and proliferation of cancer cells, however severe oxidative stress that exceeds this threshold can also kill cancer cells. Therefore, it has been established that one effective method of preventing the growth of cancer cells is the manipulation of intracellular ROS with the use of medicines and nutraceuticals. *Iris kashmiriana* is a member of family Iridaceae and known to possess cardioprotective, analgesic and anti-inflammatory properties. The objective of the current study was to assess the antioxidant, anti-proliferative, and apoptosis-inducing properties of different fractions of *Iris kashmiriana* flower extracts. The plant's ethyl acetate fraction (IK-EA) was discovered to have strong antioxidant properties; in the DPPH, ABTS, and Superoxide anion scavenging assays, the corresponding IC_{50} values were 74.15, 80.05, and 90.52 µg/ml. Furthermore, with a GI_{50} value of 49.13 µg/ml, the IK-EA fraction showed strong cytotoxicity against the MCF-7 cell line. Subsequent experiments using phase contrast and fluorescence microscopy on MCF-7 cells showed that treatment with the IK-EA fraction caused rounding of the cells, nuclear condensation, and chromatin condensation, indicating the capacity of IK-EA fraction to induce apoptosis. Different polyphenols viz. epicatechin, rutin, quercetin, caffeic acid and chlorogenic acid etc. were identified by HPLC analysis in fractions of *Iris kashmiriana* flower. These results imply that the *Iris kashmiriana* flower has excellent antioxidant and cytotoxic potential due to its abundance of phytoconstituents, which have been identified via HPLC analysis.

PP64

Demographic Profile of Cancer Patients admitted in Tertiary Care Hospitals in Punjab

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Background Cancer is a medical condition that can happen to anyone irrespective of their economic status, caste, creed, or other demographic factors. It is important to understand the socioeconomic circumstances of patients' families because cancer treatment involves substantial number of financial resources and often forces families into destitution.
Materials and Methods A total of 202 cancer patients in the state of Punjab were interviewed and results were analyzed using SPSS version 19.
Results The study revealed that the mean age of cancer diagnosis was 50.70 years, while the median age value was observed to be 54 years. No notable variation was observed across genders. Additionally, most patients were classified as belonging to the general category. The study revealed that patients exhibited an inadequate level of education, which could have potentially influenced their engagement with healthcare providers. The study further revealed that a significant proportion of female cancer patients were homemakers, while a majority of male patients were employed in the private sector. The study also found that most of the patients had to discontinue their employment. A total of 12.38 percent of the caregivers also opted to leave their employment in order to provide care for the patient. The current investigation also validates the assertion of low survival rates in India.
Conclusion Demographic factors play a crucial role in cancer epidemiology and have significant implications for government policy-making in healthcare. Demographic factors, such as age, gender, and ethnicity, influence cancer incidence and mortality rates. For instance, certain cancers are more prevalent in specific age groups, and gender-based disparities exist in cancer types. Understanding these demographic patterns helps governments allocate resources and tailor screening and prevention programs to high-risk populations.

PP65

Endogenous bisulfite (HSO_3^-), a reactive sulphur species, detection in Cancer cells using Fluorescent probe

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Bisulfite (HSO_3^-) is widely used as an antioxidant and antimicrobial agent in the food and beverage industry. These bisulfites when in large quantities cause several illnesses, including diarrhea, hypotension, allergic reactions, cardiovascular diseases, and neurological disorders.They are also generated endogenously in cytosols and mitochondria upon the oxidation of sulfur-containing amino acids.In addition to the bisulfite found in food additives, another source of bisulfite is the sulfur dioxide (SO_2) gas generated from contemporary industrial operations, primarily by the combustion of coal and fossil fuels. SO_2 is a gaseous air pollutant that easily releases sulfite (SO_3^{2-}) and bisulfite (HSO_3^-) in water or when hydrated during inhalation and is, therefore, harmful to cells, tissues, and bio-macromolecules. Small chemical molecular fluorescent probes are, therefore, a good alternative for their real-time detection of these species in living cells. The red fluorescent probe MGQ was developed in the Department of Chemistry, GNDU, Amritsar, whichin the presence of BSA or HSA reacts with (HSO_3^-) andshowsan increase in fluorescence intensity. The cytotoxicity of the probe MGQ was tested using MTT assay and the cell viability was found to be approx. 80% at 50 µM MGQ concentration. The probe alone gave a strong red fluorescence signal whereas the fluorescence intensity signals in the red channel gradually decreased when cancer cells were pretreated and $HSO_3^-$and displayed strong green fluorescence.

PP66

Molecular Insights into Bisphenol-A Induced Lipotoxicity and Epigenetic Regulation in NAFLD Pathogenesis

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Metabolic dysfunction-associated steatosis liver disease (MASLD), previously known as Non-alcoholic fatty liver disease (NAFLD), is predominantly a severe chronic liver disease that affects 25% of the world's population. NAFLD is a spectrum of diseases comprised from simple steatosis to steatohepatitis to cirrhosis and ultimately to hepatocellular carcinoma. NAFLD is associated with many risk factors, which include Type II diabetes, insulin resistance, genetic predisposition (polymorphism in PNPLA3 and TM6SF2 genes) and environmental factors, alteration in intestinal microbiota, dyslipidemia, sedentary lifestyle, consumption of foods rich in fructose and unsaturated fatty acids and overconsumption of the carbohydrates which leads to the process of *de novo* lipogenesis. In the past few decades, food contaminants acting as endocrine disruptors have played a critical role in metabolic diseases. Bisphenol A is one such chemical produced worldwide, which is a central endocrine disruptor and highly prevalent in our environment. It is used as a monomer of polycarbonate plastics and epoxy resins and is widely used in producing various consumer products. People are often exposed to low levels of BPA through leaching from diets and beverage containers. The average daily estimate of BPA in adults is 0.4–1.4µg BPA/kg body weight per day. Even a low dose of BPA exposure could lead to adverse effects, which include hepatotoxicity, endocrine system disruption, and metabolic diseases. BPA plays a significant role in the pathogenesis of NAFLD. The molecular insights underlining the BPA-induced lipotoxicity are still in their infancy. Therefore, in this study, we aimed to investigate the molecular mechanism of activation of BP-A-induced lipotoxicity in different human liver-derived cell types. Furthermore, Epigenetic modifications such as DNA methylation and histone modifications are influenced by environmental factors to regulate hepatic steatosis and NAFLD severity. Therefore, we also want to study the pattern of DNA methylation and histone modifications in chronic BPA exposure.

PP67

Hydrogen Sulfide: A Gaseous Signaling Molecule Regulating Critical Biological Processes and its Role in Diseases

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Hydrogen sulfide (H_2S) stands as one of the three well-recognized gaseous signaling molecules in biological systems. This colorless, combustible, and water-soluble gas, 2along with nitric oxide (NO) and carbon monoxide (CO), constitutes a vital family of endogenous gases responsible for regulating a multitude of physiological and pathological processes. These processes encompass critical functions such as angiogenesis, inflammation, relaxation of smooth muscles, vasorelaxation, control of myocardial ischemia-reperfusion injuries, and safeguarding neuronal integrity. In mammalian cells, three enzymes such as 3-mercaptopyruvate sulfur transferase, cystathionine γ-lyase (CTH), and cystathionine β-synthase (CBS) are actively engaged in the production of H_2S. Dysregulation and abnormal expression of these enzymes has been causally linked to various forms of cancer that significantly impact various facets of cancer development. These include resistance to apoptosis, DNA repair mechanisms, tumor growth, modulation of cancer metabolism, promotion of metastasis, and angiogenesis. The reduced expression of H_2S is widely recognized as having a profound influence on cytoprotective pathways due to its inherent anti-inflammatory, anti-apoptotic, and antioxidative properties. Hence, the identification and therapeutic targeting of endogenous H_2S are of paramount importance for the early diagnosis and effective treatment of disorders associated with this gas. For the comprehensive exploration of cellular responses to H_2S in diverse biological processes, the real-time monitoring of H_2S levels and their fluctuations is indispensable. An emerging trend involves the application of optical techniques that enable non-invasive, on-site dynamic analysis through the sensing and imaging of H_2S within complex biological systems. As such, the development of more efficient H_2S-responsive bio-imaging probes, possessing both quantitative imaging capabilities and therapeutic potential, is being considered a promising strategy for the improved diagnosis and treatment of disorders linked to H_2S.

PP68

Risk of mortality among cancer patients in India: an empirical evidence

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Background It is still empirically uncertain how human errors and negligence cost cancer patients their lives. Objectives The primary objective of this study is to investigate the impact of three variables related to human error, namely cancer stage at diagnosis, selection of hospital, and delay in treatment commencement, on the risk of patient mortality. These variables are attributed to human neglect and indecisiveness. In addition, the study seeks to construct a regression equation that may facilitate predictions regarding patient outcome based on odds ratios. Materials and Methods A total of 202 cancer patients were interviewed and results were analyzed using SPSS version 19. Initial associations were determined with the help of Chi-Square test, and variables exhibiting significance were further subjected to Binary Logistic Regression. Results During the preliminary Chi-Square analysis, a strong association between Cancer Stage, Delay and Patient Outcome has been observed. However, the choice of hospital type has been found insignificant. The results of binary regression revealed that the variable "Stage of Cancer" has only been found to have a significant impact on the patient's mortality risk. Upon progression from the initial stage to the advanced stage, the probability of survival decreased to just 36 out of 1,000 patients (OR: 0.036). Conclusion The factor of human negligence, referred to as "Stage," has been identified as a crucial determinant affecting the likelihood of a patient's survival, while human indecisiveness component “Delay” has been found insignificant statistically but deemed significant in the study considering lives of cancer patients.

PP69

Molecular Docking and Molecular Dynamic Simulation Studies of Flavonoid Targeting Allosteric Inhibition of Glycogen Synthase Kinase-3β for Alzheimer's disease

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The study discusses the computational based virtual screening and molecular dynamic simulation studies of flavonoid targeting the Allosteric Inhibition of Glycogen Synthase Kinase-3β for Alzheimer's disease. Currently, in this study we have used an extensive range of *in-silico* approaches to screen a large number of possible target hits to get insight into the binding profile with the Glycogen synthase kinase-3β (GSK-3β) using Maestro software from Schrodinger Inc. PDB: 1PYX was obtained from PDB site followed by protein preparation using protein preparation wizard panel. All Flavonoid compounds (50) was downloaded and prepared using Ligprep tool. Both the protein and ligands were prepared at the neutral pH of 7.5±0. Grid was generated using coordinates of the pocket 7 as identified by SiteMap tool. GLIDE was used to predict the drug binding of the prepared Flavonoid compounds to the pocket on GSK-3β surface. The selected hit compounds were identified based on the docking score and binding interactions with the key residues. Thus selected hit molecules were subjected to Molecular dynamic simulation study using Desmond. Sitemap analysis revealed the presence of 7 pockets with good site score and D score. Out of 7 pockets, pocket 7 was identified as the suitable drug binding pocket containing residues ARG209, SER236, THR235, THR330, PRO331 which are essential for the allosteric targeting of GSK-3β based on the literature. Then all compounds were subjected to XP docking. Among all other compounds only these ligands Formononetin, Theaflavin, Tangeritin and Theaflavin-3-gallate, Cardamonin, and Gossypin were subjected to Molecular dynamic simulation study using Desmond. Among selected hit molecules, Gossypin showed the most stable interactions with these key amino acid residues. For supporting this further *in-vitro*, *in-vivo* experiments and clinical trial are necessary.

PP70

Ginger derived extracellular vesicles alleviate Type 2 diabetes via improving glucose and lipid metabolism and relieving beta cell destruction

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Exosomes are nanosized extracellular vesicles (EVs) that shows great promises in the area of therapeutics. Exosomes have been shown to alleviate diabetes mellitus (DM) in both animal models and clinical trials. In this study, we aimed to investigate whether exosomes isolated from ginger have a therapeutic effect on type 2 DM (T2DM). We established a mice model of T2DM using a high-fat diet and streptozotocin (STZ). We found that the oral dosage of ginger exosome for 4 consecutive weeks was able to reduce blood glucose levels. The hypoglycemic effect of exosomes seemed to be partially mediated via the inhibition of hepatic gluconeogenesis, which was supported by the activated p-Akt, p-FoxO1 and inhibited PCK-1 and G6PC protein expressions in the liver as well as increased glucose uptake in high glucose induced HepG2 cells. The gene expressions of hepatic gluconeogenesis were also down-regulated by exosomes in HFD/STZ induced T2DM mice. In addition, exosomes suppressed HFD/STZ induced lipid accumulation by regulating related gene and protein expressions such as FAS and SREBP-1, in-turn improving glycogen deposition. G-ELN treatment further inhibited STZ induced pancreatic beta cell damage, altogether providing an alternative approach for T2DM treatment.

PP71

Evaluation of Panobinostat, an HDAC inhibitor, in regulating the glycolytic upregulation in tumours

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In tumours and other proliferating cells, significant glucose uptake and metabolism occurs with production of lactate even in the presence of oxygen and functioning mitochondria by Warburg Effect. This is caused by oncogene activation and alterations in tumour suppressor genes. Gluconeogenesis is the key component controlling glucose homeostasis and has also been suggested to play an equally important role in switching of tumour cells towards aerobic glycolysis. Fructose-1,6-bisphosphatase (FBP1), the rate-limiting enzyme in gluconeogenesis, plays an important role in modulating glucose metabolism in cancer and is associated with cancer development and progression. Its expression in tumours is significantly lower than that in non-tumour tissues, as confirmed in gastric cancer cell lines and others. knockdown of HDAC1 individually led to a small increase in FBP1 expression at both the protein and mRNA levels. However, Warburg effect-related genes and elevated HDAC1 expression are linked to an invasive and proliferative phenotype in GBM cells; as a result, HDAC1 inhibitors might reduce the Warburg effect in GBM cells. So, our study aims to evaluate the role of HDAC1 inhibitors in the regulation of glycolytic upregulation in C6 induced glioblastoma model. In this study, Panobinostat was docked with HDAC1 protein and further Molecular Dynamics (MD) simulations was performed using Schrodinger Maestro software. The C6 glioblastoma model was developed by the intracerebroventricular (ICV) injection of C6 glial cells in rats. Following the tumour development, Panobinostat treatment was given for a period of 21 days. At the end of treatment period, cerebral cortex was isolated for western blot analysis. The western blot analysis showed a significant decrease in HDAC1 protein level in the treatment group. Further studies on FBP1 protein levels needs to be performed to evaluate its role on HDAC inhibition.

PP72

HLA-E mediated augmentation of TGF-beta and IL-15 triggers carcinogenesis in cervical carcinoma

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Introduction: Human Papillomavirus (HPV) is an absolute etiological factor for cervical cancer but additional genetic and immunological factors required to fuel the carcinogenesis. Human Leucocyte Antigen (HLA) -E is a non-classical HLA which is expressed on the surface of tumor cells and is known to promote tumorigenesis as it communicates with Natural Killer (NK) cells and T cell receptors, thus modulating innate and adaptive immunity. HLA-E interaction with inhibitory CD94/NKG2A receptors on NK cells prevents NK cell mediated lysis leading to immune escape of virus infected cells and tumor cells. HLA-E augments the expression of Interleukin (IL-15) and Transforming growth factor (TGF) -beta.
Methodology: The present study analyses expression of HLA-E protein in HPV infected cervix and cervical carcinoma tissues and soluble HLA-E levels in peripheral blood. Fresh cervical biopsies were collected from squamous cell cervical carcinoma patients (n=43) and normal cervix tissues (n=22) were enrolled from patients undergoing hysterectomy for benign causes. DNA based dot blot hybridization was performed for HPV genotyping. Western blot was performed on tissue lysates and ELISA was performed on carcinoma cervix (n=43) and normal cervix (n=55) to determine serum HLA-E levels. **Results:** Presence of high-risk HPV was observed in entire carcinoma cohort with HPV 16 alone in 72% of patients whereas multiple HPV subtypes were present in rest of the cases. The protein expression of HLA-E, TGF-beta and IL-15 were studied in three groups: carcinoma cervix, HPV infected normal cervix and HPV negative normal cervical tissue. The increased HLA -E expression was highly significant in cervical carcinoma group in comparison to normal cervical tissue ($p=0.000$) and was nearly significantly increased in HPV infected cervix ($p=0.057$). The protein expression for IL-15 was highly significant ($p=0.000$) in both carcinoma cervix as well as HPV infected cervix in comparison to normal cervix, whereas the TGF-beta represented high significance ($p=0.000$) in cancer group and a near-high significance ($p=0.013$) in HPV infected cervix group. The serum HLA-E characterized significantly elevated levels in carcinoma group ($p=0.038$) as compared to normal group. **Conclusion:** The present findings indicate that HLA-E mediated increased expression of TGF- beta and Il-15 are involved in carcinogenesis of cervical carcinoma by facilitating the immune escape of tumor cells. This makes HLA-E as a potent target for the treatment of cervical cancer.

PP73

An analytical study of biochemical variables in chemotherapy-treated cancer patients

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Cancer is a group of more than hundred diseases that develop across time and involve the uncontrolled division of the body's cells. Although cancer can develop in virtually any of the body's tissues, and each type of cancer has its unique features, the basic processes that produce cancer are quite similar in all forms of the disease. Lung and breast cancers were the leading sites of cancer in males and females, respectively Origin or causes of cancer may lie outside the body and, more important, that cancer could be linked to identifiable and even preventable causes. The genetic changes that contribute to cancer tend to affect three main types of genes— proto-oncogene, tumour suppressor genes and DNA repair genes. Proto-oncogenes are involved in normal cell growth and division. However, when these genes are altered in certain ways or are more active than normal, they may become cancer-causing genes (or oncogenes), allowing cells to grow and survive when they should not. Tumor suppressor genes are also involved in controlling cell growth and division. With time and advances in science, scientists have been able to find cure for cancer which include removal by surgery, chemotherapy, radiotherapy. In this review a study was conducted to study the effect of chemotherapy and radiotherapy on a chemical level in cancer patients. A total of 150 patients were taken into consideration out of which in 23, the tumour was removed surgically and 25 healthy individuals were taken as control which did not have any renal or liver dysfunctions and were healthy individuals. The patients suffering from cancer are divided according to the mode of treatment prescribed to them i.e chemotherapy, radiotherapy or a combination of both and the biochemical parameters are estimated in control as well as cancerous patients.The paramters include urea, creatinine, SGPT, Bilirubin, Alkaline phosphatase, total protein, albumin, magnesium, calcium, iron, zinc, and immunoglobins – IgG, IgA, IgM.

PP74

Exploration of natural compounds targeting ACLY for oral cancer therapy

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Abstract: Oral cancer poses a substantial public health challenge in India, representing a global epicenter with one-third of the total incidences worldwide. This malignancy exerts a significant burden in terms of disease prevalence, low survival rates, elevated mortality, determinants of disease, and a relentless strain on the limited healthcare resources of the nation. Despite advancements in treatment modalities, the five-year survival rate for oral cancer patients remains notably low. ATP citrate lyase (ACLY), a pivotal enzyme in lipid biogenesis, emerges as a critical player in the initiation and progression of various malignancies, exhibiting potential as both a prognostic indicator and therapeutic target. Overexpression of ACLY in cancer cells contributes to the generation of its products, namely oxaloacetate (OAA) and Acetyl-CoA, which significantly promote crucial signaling pathways implicated in tumorigenesis. Extensive research over decades underscores the pragmatic potential of natural compounds in treating diverse chronic diseases, including cancer. This study focuses on the analysis of select natural compounds as potential inhibitors targeting ACLY for oral cancer. Molecular docking studies were conducted with various natural compounds to assess their ability to bind effectively to ACLY. The analysis revealed superior binding affinities of these compounds to ACLY. Notably, diosgenin, fisetin, apigenin, wogonin, curcumin, piceatannol, and resveratrol exhibited the most favorable binding energies to ACLY protein. Thus, diosgenin, fisetin, apigenin, and wogonin hold promise as potent sources of anticancer agents for addressing oral cancer.

PP75

Development of Immunochromatography for residue analysis of pesticides in agricultural products

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Immunochromatography, one of immunoassays, is a quicker and easier measurement method than Enzyme-Linked Immunosorbent Assay (ELISA) widely used for residue analysis of pesticides. We have developed twenty-one ELISAs and these ELISA kits are commercially available for residue analysis of pesticides in agricultural products, by using monoclonal antibodies prepared for their ELISAs. Some immunochromatographs for residue analysis of pesticides were developed using these antibodies. Recently, we developed Immunochromatographs for the fungicides chlorothalonil, azoxystrobin, and bitertanol with these antibodies. The working range, the specificity, and the recovery rate of the developed immunochromatograph for the azoxystrobin were evaluated. The working range for azoxystrobin was 1 ng/mL to 50 ng/mL by this immunochromatograph. The immunochromatograph showed high specificity for azoxystrobin. Azoxystrobin spiked into several garden crops homogenates was extracted with methanol solution and was easily analyzed. The working range for azoxystrobin was 1 ng/mL to 50 ng/mL by this immunochromatograph. The immunochromatograph showed high specificity for azoxystrobin. Azoxystrobin spiked into several garden crops homogenates was extracted with methanol solution and was easily analyzed. The recovery rate was 103 - 125% and correlated well with the results obtained by HPLC analysis. This immunochromatography can be applied for residue analysis of azoxystrobin in agricultural products.

PP76

Alkaline phosphatase inhibitor levamisole on breast cancer potential evidenced in cell and animal model

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Levamisole, a widely used veterinary drug used against helminthic also showed anticancer activity. Many studies showed that levamisole is an alkaline phosphatase inhibitor (ALP). Cancer is a complex heterogenous disease, and the molecular pathophysiology or the mechanism varies from cancer to cancer even within the same type of tumor cells. Breast cancer showed microcalcification activity through expressed various osteoblastic markers including ALP. The objective of this study is to examine the role of levamisole in terms of cancer in vitro and in vivo. Our study's purpose was whether the levamisole showed anticancer activity by inhibiting ALP, known as an early osteoblastic marker. In an in vitro study, Levamisole decreased the cell stemness, viability, migration, and EMT in metastatic breast cancer MDA-MB-231 cells. Levamisole suppressed the expression of mesenchymal genes, which confirmed the anticancer role of levamisole. Moreover, levamisole showed an anticancer effect on MDA-MB-231 cells on colony and spheroid formation. Thus, levamisole inhibits the cancer via targeting ALP in an in vitro model. Further, an in vivo study of BLAB/c mice with levamisole showed a significant reduction in tumor growth as compared to the control. These findings suggest that by inhibiting ALP, levamisole showed an anticancer role in breast cancer in vitro and in vivo.

PP77

Investigating antibacterial properties of herbal compounds and formulations against potentially harmful bacteria

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Antimicrobial resistance is a serious threat faced by modern era. Many potential microbes are acquiring multi drug resistance and eventually cause harm to the human life. Biofilm-mediated antimicrobial resistance is one of the mechanisms that helps microbes thrive in harsh environments. A biofilm constitutes a complex assemblage of bacteria enveloped within a self-produced matrix of extracellular polymeric substance. This biofilm formation stands as a crucial survival strategy for species when faced with unexpected shifts in environmental conditions, such as changes in temperature and nutrient availability. Hence, the bacteria can evade the immune response of the host and exhibit resistance to antimicrobial treatments. *Staphylococcus aureus* and *Pseudomonas aeruginosa*, the two bacteria, which could form biofilm causes severe harm to us. The cutaneous manifestation of *Staphylococcus aureus* consists of impetigo, ecthyma (severe form of impetigo), cellulitis, staphylococcal scalded-skin syndrome (SSSS), Toxic shock syndrome etc., while *Pseudomonas aeruginosa* causes green nail syndrome, folliculitis, infection of the ear, ecthyma gangrenosum, fasciitis, and burn wounds. Even though there are lot of synthetic drugs are available in the market, these kinds of bacteria continually develop resistance towards it. This worrying worldwide issue has invariably prompted the current serious seek for novel antibiotics from natural resources. The herbal compounds used in the present study are resveratrol against *Staphylococcus aureus* and Curcumin-Collagen combination against *Pseudomonas aeruginosa*. The aim is to evaluate antibacterial property, estimation of Minimum Inhibitory Concentration (MIC) values, minimum bactericidal concentration (MBC) values, antiadhesion and antibiofilm properties of particular compounds against specific bacteria. The wound healing property of CCL is also evaluated by scratch wound assay. From the results, it could be concluded that, CCL combination and Resveratrol is effective against S. aureus and *P. aeruginosa*. Furthermore, reserch studies will be essential to ascertaining the herbal compounds safety and effectiveness in real-world scenarios.

PP78

The Association of Nutritional diet pattern and Short Sleep Duration in Geriatric Population suffering from Chronic Insomnia

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Chronic insomnia is one of the common medical condition with serious health effects. Dietary nutrition has major role on healthy sleep. Nutritional factors and diet pattern interplay significant role in metabolic functions which involves cyclic sleep durations via melatonin and its biosynthesis from tryptophan. Diets rich in fruits, vegetables, legumes, and milk based sources of dietary tryptophan and melatonin have been shown to predict favorable sleep. A cross-sectional study was done in the Out Patient Department of Geriatric Medicine, Sir Sunderlal Hospital Varanasi. All old adult patients (>60 years) attending the Hospital were enrolled for three successive years (2019-2022), in the study. The chronic insomnia patients were screened with Pittsburgh Sleep Quotient Index (PSQI) Hindi version, self-designed questionnaire was filled based on dietary consumption, nutritional pattern using the food frequency methodology. Body mass index (BMI) and central obesity was calculated from waist circumference based on measured data. Statistical analysis was performed on SPSS software. Chronic insomnia was seen prevalent in 23% of the old age population sampled (n=300). Among the study population, 15% were obese (BMI ≥ 30 kg/m2) and 18% had central obesity. Epidemiological findings shows short sleep duration and diet pattern are interrelated, greater intake of energy giving foods carbohydrates, saturated fats, sweets at night reduced sleep efficiency up to 21% and increased awakening times at night in insomnia sufferers, In the population 28% percent of patients who had insomnia had central obesity factor, which was statistically significant. 32% of old age females showed more insomnia sufferer compared with the male subjects having obese condition. A low consumption of protective foods including vegetables, fruits, and whole grains was prevalent insomnia sufferers. Negligence of Vitamin B and milk supplements intake were significant among female insomnia elderly. Dairy products rich in tryptophan and melatonin biosynthesis needs to be maintained, changes in diet pattern of older adults will be helpful for improving overall sleep and health management.

PP79

Anti-telomerase activity of phytochemicals in HPV-associated malignancies

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Telomerase, a ribonucleoprotein enzyme, plays a pivotal role in maintaining telomerelength, thereby influencing cellular senescence and immortality. A common feature ofmany malignancies is dysregulation of telomerase activity, where elevated expression promotes uncontrolled cell survival and proliferation. The molecular landscape of HPV-associated malignancies, such as cervical cancer (CaCx) and head and neck cancer (HNSCC), is further complicated by the interaction between viral oncoproteins and telomerase activity. Phytochemicals, bioactive compounds derived from plants, have drawn a lot of interest owing to their several health-promoting qualities. According to recent studies, certain phytochemicals possess the ability to modulate telomerase activity and influence telomere length, thereby exhibiting anti-cancer properties. Among these, sanguinarine, and PEITC (phenethyl isothiocyanate) have shown promising effects by inhibiting the telomerase activity in cancer cells. In our research, we focused on four specific phytochemicals—Sanguinarine, PEITC, Morusin, and Psoralidin—which are known to target Cancer Stem Cells and we are investigating their role in anti-telomerase activity in HPV associated malignancies. Moreover, understanding the mechanisms by which these phytochemicals influence telomerase activity and telomere length is crucial for the development of targeted cancer therapies, offering a promising avenue for future research and clinical applications.

PP80

Supercritical CO_2 extraction of phenolic compounds from *Lagerstroemia speciosa* leaves: Optimization of parameters by central composite design and evaluation of their biological activity

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Lagerstroemia speciosa (LS), an abundant and underexploited plant in Southern and Northern India is a valuable reservoir of bioactive compounds renowned for its effective health-promoting properties. The aim of this study is to develop an ideal methodology for extracting total phenolic compounds (TPC) from LS leaves through supercritical CO_2 extraction (SCE-LS) using Response Surface Methodology (RSM). SCE was carried out at varied parameters, exploring pressure between 20 to 40 MPa and temperature 70 to 110 ºC at varying time durations; out of which 29.59 MPa pressure, 89.50 ºC temperature, and 53.85 min extraction time were discovered best conditions. The highest extraction yield of the dry weight of biomass was 99.31 ± 2.57 mg/gm of phenolic content. Ultra Performance Liquid Chromatography combined with Photo Diode Array (UPLC-PDA) analysis of the extract revealed the presence of p-hydroxybenzoic acid, vanillic acid, p-coumaric acid, chlorogenic acid, and vanillin. The crude extract was evaluated to check it antidiabetic potential against α-amylase and α-glucosidase. Extract exhibited significant inhibitory properties with IC_{50} values of 30.09 ± 2.58 and 59.45 ± 3.4 against α-amylase and α-glucosidase, respectively. Additionally, the purification of vanillin and *p*-coumaric acid resulted in enhanced inhibitory activity. The structural properties of vanillin and *p*-coumaric acid were confirmed using ^{1}H NMR. The designed experiment allowed the determination of the physical conditions under which LS releases compounds with both antioxidant and antidiabetic enzyme inhibitory activity. Most of them were of the phenolic type as it was demonstrated through the calorimetric assays and UPLC-PDA.

PP81

Morin supplementation mitigates prenatal stress induced gut dysbiosis and anxiety-like behaviors in F1 Wistar rats

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Maternal prenatal exposure to psychosocial stressors and adverse life events affects the in-utero development of gut-brain axis in offspring. This psychosocial stressful exposure is one of the crucial risk factors for stress induced gut dysbiosis mediated anxiety and depressive disorders in adulthood. However, intergenerational effects of prenatal stress and the precise mechanism by which gut dysbiosis contributes to the cognitive impairment remains unclear. In the current investigation, exposure to prenatal stress caused cognitive impairment in F1 generation via gut dysbiosis and altered microbial metabolites. Pregnant rodents were administered prenatal psychosocial stressors, which include restraint, noise, light, and odour stress. Consequently, we found that maternal prenatal stress altered the specific gut microbial community structure in F1 offspring, causing the abundance of detrimental microbes, known as gut dysbiosis. As a result, the composition of short chain fatty acids, indicators of gut dysbiosis, also got deviated as compared to the control group. Furthermore, findings also indicate that the F1 generation of stressed mothers exhibited restricted interest, impaired social behavior, reduced learning & memory, and increased anxiety-like behavior hinted towards cognitive impairment possibly associated with gut dysbiosis induced propionic acidemia like condition. Advancements to improve gut health, such as nutraceutical intervention, intake of probiotics, and fecal microbiota transplantation are emerging strategies to treat these diseases. In this direction, the current study explored the promising therapeutic potential of a nutraceutical, morin, the concurrent treatment of which to pregnant rats regulated the abundance and richness of its gut microbiota leading to improvement of cognitive health of the next generation. In conclusion, morin supplementation demonstrates potential effectiveness in alleviating mood related neurological disorders through the modulation of gut microbiota & their metabolites in a stressor rat model and can be used for its great potential to counteract the adverse effects of gestational stress on the health of offspring.

PP82

Beneficial potential of Gallic Acid against HCl-induced Acute Lung Injury in mice

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Acute Lung Injury (ALI) is the pulmonary manifestation of an acute systemic inflammatory process caused by increased permeability of the alveolar-capillary barrier, leading to inflammatory injury to lungs with accumulation of protein-rich edema, invasion of neutrophils, and elevated cytokine production. Gallic acid (GA) is a tri-phenolic compound with excellent anti-inflammatory and anti-oxidative properties shown to be effective in several lung diseases but its role remains unexplored in the context of ALI. So, the present study was designed to investigate the beneficial potential of GA against lung inflammation and pulmonary functions in HCl-induced ALI using mice model of the disease. Female Laca mice were intratracheally administered 0.1N HCl to induce ALI and GA (200 mg/kg *b.wt.*) was administered intraperitoneally 2 hr after HCl administration. Mice were then subjected to double chamber plethysmography for assessment of various pulmonary functions at two time points (6hr and 24hr) after HCl instillation followed by procurement of bronchoalveolar lavage fluid (BALF) for inflammatory cell analysis. The total number of inflammatory cells in BALF begin to increase 6hr after HCl instillation which further augmented at 24hr. Differential cell analysis revealed that neutrophils were the major population of inflammatory cells recruited into the lungs following HCl treatment. Notably, GA administration blunted the HCl-induced neutrophilic infiltration substantially 24hr after HCl instillation but did not cause significant change at 6hrs post injury. Further, HCl instillation negatively affected various pulmonary functions at 6hrs post-injury, worsening at 24hr. GA treatment restored the lung function parameters towards normal significantly at 24hr but not at 6 hrs post ALI induction. Overall, our findings suggest that GA has the ability to protect against progression of lung inflammation upon HCl-mediated ALI, even when administered after the induction of injury. Further studies would be carried out to study the effect of GA on the underlying molecular factors involved during ALI.

PP83

Biochemical characterization of bifunctional enzymatic activity of a recombinantprotein (Bp0469) from *Blautia producta* ATCC 27340 and its role in the utilization ofarabinogalactan oligosaccharides

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Human consumption of larch arabinogalactan has a significant effect on enhancingprobiotic microflora in the gut, and it also promotes the production of short-chain fatty acids. Bacterial members of Lachnospiraceae family are important and play significant roles in maintaining our gut health. However, it is less known about biochemistry of members of this family by which they utilize non-cellulosic fiber in the gut. For enhancing this understanding,we studied that B. *producta* ATCC 27340 grew on arabinogalactan oligosaccharides (AGOs) as compared to polysaccharide form of arabinogalactan. Recombinant protein (Bp0469) was heterologously expressed in Escherichia coli BL21 (DE3). Based on genomic, structural models, and biochemical characteristics, identified Bp0469 is a peculiar enzyme with two distinct domains that cleave α1–5 linked arabinobiose and β-D-Galp-1-3/4 linkages. The Bp0469 suggested to help the bacterium to grow on AGOs and may help us to manipulate ourgut microbiota for improving our gut health during dysbiosis. Additionally, a method developedin the study for making arabinogalactan oligosaccharides is quick, cheap, and viable, which could have a lot of applications in the food and pharmaceutical industries. Overall, the study enhances the knowledge on nutritional perspective of B. *producta* ATCC 27340 for thriving onnon-cellulosic biomass, and identified enzyme can also be used for producing industrial important arabinogalactan oligosaccharides (AGOs).

PP84

Psoralidin as Potential anti-Cervical Cancer Therapeutic that Targets the Regulators of Cancer Stemness

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Cervical cancer (CaCx), ranked as the fourth most common cancer among women worldwide, poses a significant global health challenge. Resistance to standard treatments such as chemo/radio therapy and the recurrence of aggressive tumors contribute to its high mortality. The emergence of therapy resistance and relapse is linked to a small subset of slow-growing Cancer Stem Cells (CSC) that possess the properties of tumorigenesis, self-renewal, and multi-lineage differentiation potential. Because of slow cycling, these cells maintain themselves in semi-quiescent stage and protect themselves from different anti-proliferative anti-cancer drugs. Keeping in view recent advances in their phenotypic and functional characterization, feasibility of targeting CSC and associated stem cell signaling bears a strong translational value. Psoralidin, derived from *Psoralea corylifolia* seeds, showed promising role in targeting cancer stem cells of breast. To explore its impact on cervical CSC (CCSC), IC50 dose of Psoralidin was established against C33a, SiHa, and HeLa cell lines in 2D cultures. CaCx cells showed a dose-dependent growth inhibition against Psoralidin treatment with IC50 ranging from 3-4µM. The cervical CSC were then enriched using non-adhesive culture system and their stemness characteristics were identified with q-PCR and immunofluorescence staining of putative stem cell markers Oct4, SOX2, CD44 and Nanog. Under the non-adhesive culture system, cells formed spheres ranging from size 400-600µm. Moreover, the expression of stemness markers increased significantly in 3D cultures compared to 2D cultures. Later, the enriched CSC were treated with Psoralidin and the effect on sphere formation efficiency and expression of stemness markers was observed. Psoralidin treatment reduced the size and number of spheroids formed along with loss of spheroidal integrity. Psoralidin exerted anti-CCSC activity by downregulating the expression of stem cell markers Oct4, CD44, Nanog. Overall, our data suggests Psoralidin has potential to specifically target CCSCs and can be used as adjuvant with the existing treatment regime.

PP85

Mitigating Cardiovascular Risks in High-Fat Diet-Induced Metabolic Syndrome by Short-Chain Fatty Acids

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Metabolic Syndrome (MetS) is a multifaceted health condition triggered by high-calorie diets and sedentary lifestyles, culminating in a cascade of metabolic irregularities. This syndrome markedly elevates the risk of cardiovascular diseases and other serious health complications. A critical component of MetS management is understanding its intricate association with dietary factors. High-fat diet (HFD) have been linked to the development of MetS, exacerbating conditions like obesity, insulin resistance, dyslipidaemia, and inflammation. Current study explores the effectiveness of SCFAs in mitigating HFD-induced MetS, with a primary focus on their impact on cardiovascular health. The study involves a comprehensive evaluation of SCFA supplementation in animal models subjected to HFD. Key parameters such as body weight, fasting blood glucose levels, lipid profiles, oral glucose tolerance test, blood pressure, insulin tolerance test, and the activities of alanine aminotransferase, aspartate aminotransferase, urea, and creatinine, were measured. The findings demonstrate that SCFAs effectively curtail the trajectory of body weight gain, improve insulin sensitivity, with significant reduction in triglycerides, total cholesterol, and LDL, while partially restoring levels of HDLs. Moreover, SCFAs mediated amelioration of oxidative stress markers suggested a multi-faceted mechanism through which SCFAs protect cardiovascular health. In conclusion, SCFAs represent a promising avenue for mitigating HFD-induced MetS and the associated risk of cardiovascular diseases. Their diverse physiological effects, ranging from lipid regulation to organ protection, underscore their therapeutic potential. This research unveils the significant role of SCFAs as potential ameliorants for cardiovascular health in the context of MetS, providing a foundation for future clinical investigations and potential dietary interventions.

PP86

PINK1/PARKIN mediated mitochondrial dysfunction in Silica induced Pulmonary fibrosis

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The mitochondrial dysfunctions play critical role in some diseases, but how these processes are regulated in silicosis, remains limited. Fibroblast proliferation and deposition of extracellular matrix in lung tissues are linked to the development of silicosis.Here, 35-days of silica exposed model has been developed which may closely resemblethe clinical symptoms of silicosis in human. We explored here, role of damaged mitochondria and oxidative stress in mouse model of silicosis. Swiss mice (female) were intranasally instilled with sonicated sterile silica suspension (120 mg/kg) or sterile saline solution thrice a week. Significantly higher Reactive oxygen species with higher number of neutrophils and macrophage recruitment were observed in all three durations of silica exposures while Nrf2 level was lowered in 35 days than 21 and 28-days of exposure whichshowed higher lung inflammation and oxidative stress. Transmission electron microscopicanalysis has confirmed presence of large number of aberrant shaped mitochondria (swollen, round shape) in 35 days model of silicosis and autophagosome formation were least. Western blot analysis of mitophagy and autophagy markers such as Pink1, Parkin,Cytochrome c, SQSTM1/p62, the ratio of light chain LC3B II/LC3B I expressions were also found higher in 21 days and 28 days model groups but were significantly reduced inthe 35 days model. MMP9/TIMP1 ratio and hydroxyproline levels were also foundmaximum in the 35 days group model which demonstrates excess extracellular matrix deposition and fibrosis. Curcumin (5 mg/kg,i.n) and /or dexamethasone, a known corticosteroid (10 mg/kg, i.p) was administered an hour prior to silica administration. Current study revealed silica induced lung damage in the mice model of silicosis characterized by airway inflammation, collagen deposition and enhanced expression of fibrosis markers (MMP-9, α-SMA, Hydroxyproline), were significantly reduced in curcumin treatment groups.

PP87

pH-Triggered, Synbiotic Hydrogel Beads for In Vivo Therapy of Iron Deficiency Anemia and Reduced Inflammatory Response

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Iron deficiency anemia (IDA) is the most common and ignored nutritional disorder in India, affecting 57% of women and 25% men aged 15-49. The current traditional diet of wheat and rice doesn't provide the daily requirement of iron is one of the major reason for IDA in India. The most common, well-studied treatment to replenish iron stores is iron supplementation through oral route in the form of drugs or fortified foods. Iron supplements with high dosage of iron content (>12.5 mg) gets absorbed less than 5% and 20% in duodenum and colon respectively. Non absorbed iron damages the beneficial barrier commensal gut bacteria, resulting intestinal inflammation. Reports have indicated positive influence of the administration of gut bacterial modulators such as probiotics, prebiotics, and any other dietary molecules to stimulate healthy gut bacteria in enhancement of iron absorption without adverse side effects. In this study, we have prepared an iron supplement to navigate through the side effects of conventional oral iron supplements. In this study we wanted to counter the damage caused to gut microbiome and also increase the absorption of iron content. We encapsulated iron dextran along with prebiotic and probiotic in a hydrogel made up of Hyaluronic Acid. Hydrogel swells up due to ionic interactions caused due to increased pH at intestine thus releasing contents for absorption. The formulation showed efficient in vitro and in vivo iron bio availability.

PP88

Development of a simple and rapid Zebrafish larva model of Aluminium-induced neurotoxicity

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The zebrafish (*Danio rerio*) has evolved as a flexible model organism for neurotoxicity investigations, with distinct characteristics that have brought it to the forefront of neuroscience research. Zebrafish larvae, with their small size, optical transparency, and rapid generation time, offer advantages over adult zebrafish in terms of easy manipulation, increased chemical permeability, and cost-effectiveness.Aluminium (Al) neurotoxicity is an increasing concern due to its chronic influence on developing organisms. In the current study, we developed an aluminium chloride ($AlCl_3$) induced neurotoxicity model in larval zebrafish. During the study, 6 hours post fertilization (*hpf*) larvae were exposed to 25, 50 and 100 µM concentrations of $AlCl_3$ till 7 days post fertilization (*dpf*) to induce neurotoxicity. After the exposure, the locomotor impairment and mortality were recorded as an indicator for neurotoxicity and the best concentration was selected for further studies. *In-situ* investigations utilising dichloro-dihydro-fluorescein diacetate (DCFDA) for reactive oxygen species (ROS) detection and Neuronal N (NeuN) immunostaining for neuronal death evaluation was carried out in the larvae. Thereafter, neurotoxicity associated neurotransmitter estimation was carried out in the larva using high performance liquid chromatography-electrochemical detection (HPLC-ECD) to further validate Al- induced neurotoxicity. Additionally, gene and protein expression studies were performed using real-time polymerase chain reaction and western blotting respectively to evaluate neurotoxicity specific markers. The Al exposure increased the ROS levels, promoted neuronal death, and lowered the GABA levels in the zebrafish larvae, thus indicating increased oxidative stress, neuronal damage, and significant effect on neurotransmission respectively. The results concluded that theAl exposure at 50 µM concentration for 7 days in zebrafish larvae induces neuronal damage and alters other molecular markers and neurotransmitter levels similar to as that of rodents. Therefore, this model may act as a potential alternative model for preclinical screening of neuroprotective agents.

PP89

Fagopyrum Tataricum (L.) Gaertn Prevents Neurotoxicity Via Interacting Glycogen Synthase Kinase-3β Signalling in Zebrafish Model

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Fagopyrum tataricum (L.) Gaertn, often known as Tartary buckwheat, is an edible pseudocereal that notably gained attention for nutraceutical potential due to its nutritional profile and bioactive components. The previous research finding of our lab showed that F. tataricum regulates the Glycogen synthase kinase-3β (Gsk-3β) pathway in rodent model of menopause [1]. A complex interplay between oxidative stress and neuroinflammation causes neurotoxicity. The current study aimed to investigate the neuroprotective effects of F. tataricum seed extract (ft-ext) against neurotoxicity induced by acrylamide (ACR) in the zebrafish larval model. The ft-ext phytochemically characterised with high-performance liquid chromatography-photodiode array (HPLC-PDA), was assessed for subatomic interactions via in-silico docking and tested for in-vitro anti-inflammatory activity. Neuroprotective efficacy of ft- ext on 5 days' post-fertilized zebrafish larvae exposed to ACR for 72h was examined, and oxidative stress-related genes with key protein expressions were analysed using real-time polymerase chain reaction and western blotting respectively. HPLC-PDA analysis of the extract detected caffeic acid, chlorogenic acid, ferulic acid, quercetin, rutin, kaempferol, vitexin, syringic acid, and p-coumaric acid. The extract exhibited anti-inflammatory effects, and prevented locomotor deficits by improving the total distance travelled and mean speed in larvae with an overall reduction in mortality. The treatment with ft-ext also mitigated oxidative stress by increased mRNA expression of nrf2, gpx, and hmox1a, and downregulated trxr2 in ACR-exposed larvae. Additionally, the treatment inactivated Gsk-3β, maintaining normal Nrf2 and β-catenin levels, as supported by molecular docking results with Gsk-3β [2]. The ft-ext exhibits the ability to prevent ACR-mediated neurotoxicity and enhance cognitive function by suppressing oxidative stress mediated by Gsk-3β. This suggests that ft-ext holds promise as a potential therapy for neurodegenerative diseases.

PP90

Role of *Withania somnifera* and Psalm tree fruit juice on Gut Microbiome of Breast cancer in Eastern Uttar Pradesh

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Background: Studies conducted on survey and incidence of cancer patients in Uttar Pradesh and Bihar depicted that, females outnumbered males with a ratio of 1.33:1. Major cancer sites in females were cervix and breast followed by head and neck.
Objective: To understand the role of *Withania somnifera* extract and fruity juice of Psalm tree in prevention of damage caused by free radical generations during cancer chemotherapy is investigated through gut microbiome study of breast cancer patients.
Methodology: The stool samples of 20 healthy controls and 20 Breast Cancer Patients undergoing chemotherapy were investigated. The bacteria were isolated from stool samples and were sub-cultured using standard procedure. The free radicals were estimated in plasma sample of controls and breast cancer patients using standard procedures. The mixed extract of fruit juice of Psalm tree and aqueous extract of *Withania somnifera* were mixed and subjected to cultured microorganism from stool samples of control and breast cancer patients.
Results: The enzymes level of nitric oxide estimate in form of nitrite level in plasma of breast cancer patients were significantly high as compared with controls. Further, the mixed extract of fruit juice of Psalm tree and *Withania somnifera* has significantly inhibited the growth of several Clostridium perfringens, Clostridium difficile, *and* Bacteroides *spp.*
Conclusion: The current study signifies that herbal extract of Indian medicinal plant and traditional food habit like intake of Psalm tree fruit juice can ameliorate the harmful effect of Cancer chemotherapy in Breast Cancer treatment.

PP91

Comparative aspects of rodent and non-rodent animal models of mechanistic and translational sporadic Alzheimer's disease

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Alzheimer's disease (AD) is a multifactorial pathology with most cases having a sporadic presentation. AD is 7th leading cause of death and currently affects 55 million people worldwide. Despite numerous treatment options, sporadic AD (sAD) is progressive disease with severe comorbidities such as hypercholesterolemia, hypertension, atherosclerosis, and diabetes mellitus. Therefore, animal models predictive of the efficacy and safety of novel compounds in humans are of great value to address the unmet need for improved therapeutics. Although rodent models provide important mechanistic insights, their predictive value for therapeutic outcomes in humans is limited. In recent years, the non-rodent models such as zebrafish for sAD has gained significant attention for biomedical research because of its fundamental resemblance with human neuroanatomical, neuropathological and neurochemical pathways. In this review, behavioural, anatomic, biochemical, physiological, molecular, pathological and morphologic aspects relevant to AD research will be compared between different animal models. Further, this review will discuss different chemical-induced, diet-induced, and other relevant models in respect to rodent and non-rodent models. This paper presents an outline that critically assesses the applicability and limitations of the current approaches in disease modelling for AD. Also, we attempted to provide key suggestions for the best-fit model to evaluate potential therapies, which might improve therapy translation from preclinical studies to clinical with AD.

PP92

A Review of the Dopamine Theory of Addiction

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Substance abuse is a neuropsychiatric disorder characterized by a recurring desire to continue taking a drug despite its harmful consequences. Addiction is of two types: Substance addiction and Behavioral addiction (e.g. mobile phone & internet addiction). 50% Americans aged 12 and older have used illicit drugs at least once. In India, around 7.21 crore people are affected by drugs. Drug overdose death is approx. 1 million since 2000 in the US. There are two major neurological pathways involved in addiction. First is the decision-making prefrontal cortex, which supresses inappropriate reward response, is altered by drug abuse. Second is the mesolimbic dopamine reward pathway, which is essential for survival is physically altered by drug abuse to result in uncontrolled cravings. In this review the origins of the dopamine theory of addiction and the ability of addictive drugs to elicit the release of dopamine in the human striatum have been discussed. There is robust evidence that stimulants increase striatal dopamine levels. There are some evidences that alcohol may have such an effect, but little evidence, that cannabis and opiates increase dopamine levels. Moreover, there is ample evidence that striatal dopamine receptor availability and dopamine release are diminished in individuals with stimulant or alcohol dependence but not in individuals with opiate, nicotine or cannabis dependence. These observations have implications for understanding reward and treatment responses in various addictions.

PP93

Effect of anthocyanins on gut health markers, Firmicutes-Bacteroidetes ratio and short-chain fatty acids: a systematic review via meta-analysis

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Researchers discovered that diets rich in anthocyanin-rich fruits and vegetables signifcantly impacted gut flora. To conclude, large-scale randomized controlled clinical trials are challenging to conduct; therefore, merging data from multiple small studies may aid. A systematic review collects and analyses all researches on a particular subject and design. This comprehensive review and meta-analysis examined the infuence of dietary anthocyanins on Firmicutes/Bacteroide (Fir/Bac) and short-chain fatty acids (SCFAs) content. The current meta-analysis followed the guidelines of PRISMA - the preferred reporting items for systematic reviews and meta-analyses. Diets high in anthocyanins substantially reduced the Fir/Bac ratio in the assessed trials. Among three SCFAs, the highest impact was observed on acetic acid, followed by propionic acid, and then butanoic acid. The meta-analysis results also obtained suffcient heterogeneity, as indicated by I^2 values. There is strong evidence that anthocyanin supplementation improves rodent gut health biomarkers (Fir/Bac and SCFAs), reducing obesity-induced gut dysbiosis, as revealed in this systematic review/meta-analysis. Anthocyanin intervention duration and dosage signifcantly infuenced the Fir/Bac ratio and SCFA. Anthocyanin-rich diets were more efective when consumed over an extended period and at a high dosage.

PP94

Biosynthesis and Evaluation of Anthocyanin-Enriched Wheat Varieties (Black, Blue, Purple) for Enhanced Antioxidant Content and Premium Biscuit Quality

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This study addresses the absence of a premium biscuit-quality wheat cultivar in India, despite being the third-largest biscuit producer globally. We explored anthocyanin-enriched wheat varieties for their health benefits and formulated colored wheat germplasm for antioxidant-rich biscuits. Integrating a hard-pre-existing black wheat commercial line with high-yielding soft-textured white lines through breeding, around 35 advanced lines, showcasing different colors (7 white, 9 purple, 11 black, 8 blue), and robust yield potential under local climatic conditions were selected. Advanced black-1 (soft texture) and black-6 (very soft texture) lines exhibited superior biscuit-making quality with a high spread ratio (13.2 and 14), mirroring the positive controls {white-6 (vs)-15}, and surpassing the average (8.9) and negative controls {white-C3 (7.7) and white-C4 (8.4)}. Grains showed low hardness indices (49.8 and 32.4), protein content (9.1 and 8.2%) and dough exhibited excellent parameters including low hardness and high springiness. Despite a reduction in anthocyanin content during baking, both lines demonstrated a 1.3-fold higher antioxidant activity compared to control. These black wheat lines present significant potential for commercialization, offering an avenue to enhance the quality and nutritional profile of biscuits in the food industry.

PP95

Fenugreek a promising source for novel oligosaccharide: Enzymatic production and their application as nutraceuticals in functional foods

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Mannooligosaccharides (MOS) are non-digestible mannan derived oligosaccharides having degree of polymerization varying from 2 to 10. They are known to have immunological, therapeutic and biomedical properties. One most important property is that they can act as prebiotics as they help in proliferation of beneficial gut bacteria while inhibiting pathogenic bacteria These can be derived from hydrolytic breakdown of mannan into smaller units. Apart from agro wastes such as palm kernel cake, copra meal, soybean meal etc they can also be derived from Ivory nut, Guar gum, Tara gum etc..The biological properties of MOS varies with not only degree of polymerization and also with the length and groups present in the side chains. Substrates such as endosperm of fenugreek which has high degree of galactose in the side chains therefore MOS derived from it might have different bioactive properties. Despite numerous health benefits of fenugreek and being a rich source of galactomannan, its MOS is very less explored. In the present study fenugreek was pretreated and hydrolyzed using mannanase to obtain MOS from it. The generated MOS were qualitatively detected by TLC analysis. MOS having varying degree of polymerization (M2-M6) were observed whereas no monomeric sugar was detected. Derived MOS showed very good prebiotic potential and antioxidants effects. The structural analysis of MOS was analysed by FTIR , NMR etc. Their other bioactive properties are being evaluated.

PP96

Scaleup of the Process for the Economical Production of Mannooligosaccharides by the Enzymatic Hydrolysis of Copra Meal and Evaluation of Their Neutraceutical Properties

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Non-digestible oligosaccharides (NDO) are well known for their nutraceuticals properties. Mannooligosaccharides (MOS) are one of the NDO derived from the mannan rich substrate and are emerging prebiotic candidate. *Bacillus subtilis* MAN7 was isolated which produced a novel industrially important mannanase (MAN-7). Enzymatic process was standardized for the production of MOS from pretreated copra by the hydrolytic action of MAN-7 in high yields. The aim of the present study was to scaleup of the process for the economical production of mannooligosaccharides by the enzymatic hydrolysis of copra meal and evaluation of their nutraceuticalsproperties. Process was scaled-up for the enzymatic production of MOS in an economical sustainable manner from an agro-industrial wasteunder standardized conditions. Hyperproduced oligosaccharides were purified by activated carbon and ethanol treatment and then structurally characterized by chromatographic and spectroscopic techniques. Purified MOS selectively enhanced the growth of health promoting bacteria while not supported the growth of enteropathogenic bacteria. MOS were resistant in the presence of digestive juices viz. salivary fluid, gastric juice, and bile juice. No cytotoxic effect of MOS was observed on HEK293 cells. All these properties make them a highly suitable candidate for their application as prebiotic agents. Moreover, MOS also showed antioxidant and anticancerous potential therefore they can be explored for their application as other nutraceuticals agents also.

PP97

Boomin India's Nutraceutical: From Tradition to Billion-Dollar Industry

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The nutraceutical industry in India has experienced exponential growth, with current demand driven by a burgeoning health-conscious population seeking preventive healthcare solutions. Projections indicate sustained expansion, with the market expected to reach unprecedented heights fuelled by rising disposable incomes and lifestyle-related health concerns. Nutraceutical business emerged gradually in India by introduction of herbal remedies in 1930s; Vitamin and mineral supplement market in 1960s; but nutraceuticals got recognition as a distinct category in Drugs and Cosmetic act 1991. After 2010 a significant rise in demand of nutraceuticals has been noticed. Major players like Himalaya Wellness, Dabur, Patanjali Ayurveda and Amway India dominate, offering diverse products such as dietary supplements, functional foods, herbal medicines and beauty supplements. These companies hold a significant market share, accounting for over 40% of market. This dynamic landscape reflects a promising future, driven by consumer demand for holistic wellness solutions and industry innovation. At present Indian nutraceutical market is valued at approximately US Dollar 11 billion and is projected to reach US Dollar 30 billion by 2027. The projected sustained expansion to unprecedented heights has been fuelled by rising disposable income, lifestyle-related health concerns, urbanization and the rise in ageing Indian population. Future growth, however, hinges on innovation, regulatory support, and expanded distribution channels.

PP98

Functional β-mannooligosaccharides: Sources, enzymatic production and application as neutraceuticals

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One of the emerging non-digestible neutraceuticals are β-mannooligosaccharides (β-MOS). β-MOS are β-mannan derived oligosaccharides, they are selectively fermented by gut microbiota, promoting the growth of beneficial microorganisms (probiotics), whereas the growth of enteric pathogens remains unaffected or gets inhibited in their presence, along with production of metabolites such as short-chain fatty acids. β-MOS also exhibit several other bioactive properties and health-promoting effects. Production of β-MOS using the enzymes such as β-mannanases is the most effective and eco-friendly approach. For the application of β-MOS on a large scale, their production needs to be standardized using low-cost substrates, efficient enzymes and optimization of the production conditions. Present study is focused on the enzymatic production of β-MOS along with an evaluation of their neutraceuticals and other bioactive properties along with characterization, structural-functional relationship. Preliminary studies in cell culture/in-vivo were performed to evaluate their use as neutraceuticals in functional food.

PP99

MC-Au/MSS-Z8 Porous Network Assisted Sensitive Electrochemical Biosensing of 25-Hydroxyvitamin D_3

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Vitamin D deficiency is an emerging pandemic, whose continued persistence could greatly enhance the severity of fatal diseases including cancer and COVID-19. Therefore, the regular monitoring of vitamin D levels is essential to maintain overall health status. With this view, a feasible yet effective electrochemical biosensor has been developed for rapid and cost-effective detection of 25-hydroxyvitamin D_3 (25-OHD_3). Herein, exceedingly conductive microcubic gold (MC-Au) augmented mesoporous silica sphere-metal organic framework (MSS-Z8) based nanoplatform was constructed. The MSS-Z8 offered improved stability, meso-microporosity with high surface area ($S_{BET(MSS)}$, 49.95 $m^2\ g^{-1}$ < $S_{BET(MSS\text{-}Z8)}$, 643.4 $m^2\ g^{-1}$), which illuminates its potential for efficient attachment of MC-Au particles. Further, the bio-recognition element i.e. antibody specific to vitamin D was conjugated via Au-SH interactions. After characterization and optimization of Ab/MC-Au/MSS-Z8/FTO immunosensor, the electrochemical detection of 25-OHD_3 was carried out using differential pulse voltammetry technique in $[Fe(CN)_6]^{3-/4-}$ redox couple. The immunosensor displayed a concentration dependent decrease in current response upon incubation of 25-OHD_3, which formed the basis of 25-OHD_3 detection up to 0.23 pg mL^{-1} along with a wide functional linear response range of 0.01-10^6 pg mL^{-1}. Therefore, the present immunosensor holds great prospect for real time quantification of vitamin D.

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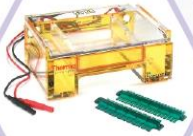
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