32MYM

32ND MID YEAR MEETING OF THE INDIAN ACADEMY OF SCIENCES

A CISCO WEBEX EVENT | 4, 11, 18, 25 JUNE & 2 JULY

11 JUNE 2021
16:00 –18:30 h

PLANT SCIENCES
GENERAL BIOLOGY
MEDICINE

Abstract e-Book

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32ND MID YEAR MEETING OF THE INDIAN ACADEMY OF SCIENCES

VIRTUAL / CISCO WEBEX EVENT
4, 11, 18 & 25 JUNE | 16:00–18:30 h
2 JULY | 14:00–19.30 h

EVENT SCHEDULE

PLANT SCIENCES/ MEDICINE/ GENERAL BIOLOGY

Inaugural Lectures by Fellows/Associates

11 JUNE 2021 (FRIDAY)

16:00–16:20 **Wild Ginger and Banana Families of India: An Overview**
M. Sabu
MBGIPS, Calicut

16:25–16:45 **The Fcs-like Zinc Finger Proteins Fine-Tune the Nutrient Signaling and Growth and Stress-Response Trade-Off's In Plants**
Ashverya Laxmi
NIPGR, New Delhi

16:50–17:10 **Plasmonic Nanocapsules for Photothermal Therapy**
Amit Jaiswal
IIT, Mandi

17:15–17:35 **Heterogeneities in Neural Circuits: Origins and Implications**
Rishikesh Narayanan
IISc, Bengaluru

17:40–18:00 **Structure, Function and Modulation of G Protein-Coupled Receptors**
Arun K Shukla
IIT, Kanpur

18:05–18:25 **Highly Sensitive and Specific Panel of Diagnostic Biomarkers for Differentiating Sarcoidosis from Tuberculosis Identified using NMR-Based Serum Metabolomics Approach**
Dinesh Kumar
CBMR, Lucknow

Link for Webex attendees: bit.ly/MYM2021_Day2
YouTube Live Stream: youtu.be/YRHGL-8ynBU

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Inaugural Lectures by Fellows/ Associates

MAMIYIL SABU

Malabar Botanical Garden and IPS, Calicut, Kerala

FELLOW

2020

Plant Sciences

11 June 2021
16:00 -16:20 h

Wild Ginger and Banana Families of India: An Overview

The talk is a comprehensive presentation on the taxonomy, uses, IUCN status of wild gingers and banana in India.

The gingers include the members of the family Zingiberaceae, which consist of about 21 genera and about 200 species in India. Of these, one genus and 35% of the taxa are endemic to India. The Calicut University Botanical Garden holds the largest collection of gingers in India.

Banana family or Musaceae form the second largest family of the order Zingiberales in India. A live germplasm of Indian Musaceae is established in the Calicut University Botanical Garden and Malabar Botanical Garden. Recently 14 new species have been discovered from India. We could rediscover five species after a lapse of 57 to 121 years. This present work includes all wild bananas from India, endemism, IUCN status, ecology etc.

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Inaugural Lectures by Fellows/ Associates

ASHVERYA LAXMI
NIPGR, New Delhi

FELLOW
2021
Plant Sciences

11 June 2021
16:25 -16:45 h

The FCS-Like Zinc Finger Proteins Fine-Tune the Nutrient Signaling and Growth and Stress-Response Trade-Offs in Plants

The antagonistic interaction of The Target Of Rapamycin (TOR) and SNF1-related protein kinase 1 (SnRK1), which are two serine-threonine kinases that originated in eukaryotes, is crucial for the survival of the organisms. These kinases have highly conserved functions across the eukaryotes, but did undergo significant evolutionary innovations for optimization according to the lifestyle of different eukaryotic lineages. The speaker and team have identified a novel class of C2-C2 zinc fingers, which they named *FCS-Like Zinc fingers* (FLZ). These proteins were found to be physically associating with different subunits of SnRK1 and specifically with RAPTOR, the regulatory subunit of TOR. Molecular analysis of various FLZ genes identified that they are involved in the regulation of protein stability of SnRK1α1, the major kinase subunit of SnRK1. Further, they were also found to be working adaptor proteins bridging TOR and SnRK1 complexes in plants.

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Inaugural Lectures by Fellows/ Associates

AMIT JAISWAL
IIT, Mandi

ASSOCIATE
2020
General Biology

11 June 2021
16:50 –17:10 h

Plasmonic Nanocapsules for Photothermal Therapy

Nano-scale noble metal particles have garnered interest due to its excellent property to generate localized heat upon excitation of its surface plasmon, which if targeted to tumour site can lead to cell death. The speaker and group have developed rattle-shaped monometallic and bimetallic nanocapsules having absorption in the Near infrared region (NIR) and demonstrated its (plasmonic photothermal therapy) PPTT activity and stimuli responsive drug delivery. The engineered metal nanorattles structures have a solid Au core and a thin, porous metal shell and possess extinction in both the NIR-I and NIR-II region of the biological window. The unique properties of these plasmonic structures such as porous nature, intrinsic electromagnetic (EM) hotspots and broad absorption in the NIR region were utilized in designing a stimulus responsive nanotheranostic system capable of SERS-based bioimaging drug delivery and PPTT.

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Inaugural Lectures by Fellows/ Associates

RISHIKESH NARAYANAN
IISc, Bengaluru

FELLOW
2020
General Biology

11 June 2021
17:15 – 17:35 h

Heterogeneities in Neural Circuits: Origins & Implications

In this talk, two case studies will be presented on the origins and implications of different forms of heterogeneities in neural circuits. The first case study relates the dentate gyrus (DG), which has been implicated in memory formation. A case will be made that the expression of heterogeneities not only acts as a substrate for executing response decorrelation (an important function of the DG circuit) but also imparts functional resilience to the DG network in the face of perturbations. In the second case study involving the medial entorhinal cortex, that is implicated in spatial navigation, the introduction of distinct forms of heterogeneities hampers grid-patterned firing of neurons there. Here, the destabilizing impact of heterogeneities on neural circuit function is eliminated by the introduction of an endogenously-expressed neural mechanism that suppresses slow inputs. Together, these analyses emphasize that experimental analyses and computational models should embrace the complexity and heterogeneities that are inherent to biological systems, rather than over-simplifying them to structure–function relationships that ignore biological complexity or the ubiquitous heterogeneities.

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Inaugural Lectures by Fellows/ Associates

ARUN K SHUKLA
IIT, Kanpur

ASSOCIATE
2019
General Biology

11 June 2021
17:40–18:00 h

Structure, Function and Modulation of G Protein-Coupled Receptors

G Protein-Coupled Receptors (GPCRs) are the main conduit of information transfer across the cell membrane. These receptors and their signaling networks are intricately involved in almost every physiological and pathophysiological processes in human body such as cardiovascular regulation, immune response, neurotransmission, behavior and mood regulation. About half of the currently prescribed drugs target this class of receptors including alpha and beta blockers, angiotensin receptor blockers and anti-histamines. GPCR targeting drugs are used in congestive heart failure, hypertension, asthma, allergies, schizophrenia, Parkinson's disease and cancer. Our long-term goal is to understand the structural basis of GPCR activation and signaling, and leverage this information to design better therapeutics. In this talk, I will present our recent efforts involving a multipronged approach to decipher the activation, signaling and regulation of selected GPCRs.

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Inaugural Lectures by Fellows/ Associates

DINESH KUMAR
CBMR, Lucknow

ASSOCIATE
2019
Medicine

11 June 2021
18:05–18:25 h

Highly Sensitive and Specific Panel of Diagnostic Biomarkers for Differentiating Sarcoidosis from Tuberculosis Identified using NMR-based Serum Metabolomics Approach

Sarcoidosis (SAR) is an uncommon granulomatous disease which shares the similar clinical and radiological features with tuberculosis (TB). Clinical symptoms common in TB are often manifested in sarcoidosis as well. Most of the SAR patients end up receiving anti tubercular therapy erroneously. The diagnosis of SAR poses a great challenge due to its relative rarity, lack of sensitive and specific diagnostic tests and its heterogeneous presentation. Often, SAR is diagnosed based on exclusion of TB. There is a need to identify non-invasive biomarker(s) for differentiating SAR from TB. In this direction, the serum metabolic profiles of SAR and TB patients and healthy subjects were measured using NMR spectroscopy and compared. A significant serum metabolic disparity between SAR and TB patients was observed and a panel of discriminatory metabolites were further tested for statistical significance as well as diagnostic potential. The various results of the study will be presented during the meeting.