MICROBIOLOGISTS SOCIETY, INDIA STUDENT CHAPTER,
Department of Biotechnology,
KLEF, Vaddeswaram, Guntur, Andhra Pradesh

Speaker: Dr. Biswapriya Misra

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Topic: A Metabolomics and Integrated Omics Approach to Human Metabolic Disease and Health in Precision Medicine Era

A guest lecture for third-year Biotechnology students was organized on 08/11/2024 through the Webex platform. The session was delivered by **Dr. Biswapriya Misra** researcher from Wake Forest School of Medicine shared valuable insights from his professional journey in the life-science industry.

Rapid adoption of high-throughput -omics approaches in this 'Big Data Driven Omics Era' where analysis of biological samples using genomics, transcriptomics, proteomics, and metabolomics technologies can generate tera- to peta-byte sized data on a daily basis- leads to sizeable challenges in computation and insightful biological interpretation. Of these, metabolomics is the study of entire complement of biochemicals found in an organism (it's cells, tissues, organs, and bodily fluids) which are biosynthesized internally, and are coming from exposures (gut microbiota to diet). An organism's metabolome is the closet to phenotype (i.e., health and disease) and a realistic proxy to an individual's genotype (i.e., genes and variants)- thus paints the entirety of metabolism. Further, the integration of metabolomics with other -omics datasets aids in identification of pathways, networks, and eventually panels of biomarkers that would have relevance to biomedical research and healthcare for identifying targets for therapeutic interventions in a translational set-up.

Currently the Misra Laboratory is focused on generating high quality metabolomics datasets leveraging the high-resolution mass-spectrometry (HR-MS) platforms (GC-Orbitrap-MS and LC-Orbitrap-MS) to combine with other -omics layers such as genomics (transcriptomics, epigenetics), proteomics, and clinical data sets to provide insights in metabolic changes that are associated with human and non-human primate wellness and disease conditions, specifically metabolic syndromes such as atherosclerosis, diabetes, obesity, and Alzheimer's disease.

Using 3-4 examples of metabolomics, and integrated omics conducted in multiple animal disease models, I will show case the potential of these mass-spectrometry and data driven approaches in addressing challenges of metabolic disorders (cardiovascular diseases, diet-induced obesity, aging among others) in human health and wellness in a systems biology context. Efforts such as these form the corner stone of precision/ personalized medicine in clinical research arena in the clinics in near future to pave way for the future interdisciplinary consortia of engineers, physicians, and biomedical scientists.

Dr.C Chandrasekhar   **Dr.V.Praveen Kumar**

I/C PSA - BT   **HoD-BT**