

REPORT about Course

NAME OF EVENT:

GIAN-MHRD sponsored course on “Molecules to Humans: Applications of Multidimensional NMR in Deciphering Bio-molecular Structures, Functions and Cellular Mechanism”.

DATE & VENUE OF EVENT:

December 2-7 (2019), organized by Department of Chemistry, National Institute of Technology Hamirpur

COURSE CONTENT:

1. Eukaryotic gene regulatory mechanisms and disease pathogenesis
2. Genome integrity and cancer; Metabolism and diseases
3. NMR and its application to study above processes and associated diseases
4. NMR in therapeutic development; and Hands-on-experience in analyzing NMR data

EXPECTED BENEFITS DERIVED & APPLICATIONS:

Advanced NMR (Nuclear Magnetic Resonance) spectroscopy methods have been used to solve the three dimensional structures of bio-molecules such as proteins, enzymes, nucleic acids and lipid membranes. Additionally, this technique can quantitatively monitor the thermodynamic and kinetic aspects of interactions of proteins and ligands (e.g., drug molecules). In fact, it can even be used to track *in vivo* metabolism in humans and animals as well. With the introduction of two-dimensional (2D) NMR experiments and subsequent development of 3D/4D NMR technologies, atomic level interpretation of macromolecular interactions has become possible. This course covered all major aspects (Principles/Instrumentations/Applications) of multi-dimensional NMR methods such as [¹H, ¹³C, ¹⁵N] resonance COSY, NOESY, SECSY, TOCSY and TROSY with applications in deciphering biomolecular structures and mechanisms, and cellular metabolism and functions.

Applications of NMR in cancer metabolomics and drug metabolism covered in this course. Further, applications of NMR in regulation of gene expression presented in this course toward molecular understanding of the most essential biological process and therapeutic development, since gene expression is central to all cellular processes and functions, and misregulation of gene expression is associated with a growing number of human diseases including various types of cancers


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