OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Nutritional Science & Therapy

July 15-17, 2013 Courtyard by Marriott Philadelphia Downtown, USA

The science of genomics, proteomics & metabolomics: Role in human healthcare

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Advances in Genetics led to the development of the Sciences of Omics and System Biology. They provide the tools for a better understanding of human diseases and for the development of new drugs and ultimately the possibility of Personalized Medicine. It is now possible to determine the entire DNA sequence of a genome as well as the entire protein sequence of a proteome in any organism because of the coming of Throughput technologies and Bioinformatics. Understanding of DNA and Proteins is very important in maintaining the human health.

Understanding of DNA can identify the genes and proteins responsible for diseases and for interactions of drugs. Proteins are important as defective proteins can be the cause of a number of diseases. Proteins are also used as drugs to treat many diseases. In addition several drugs interact with proteins determining the effectiveness of the drugs and their side effects. In view of these facts, the development of the science of Omics such as Genomics, Proteomics and Metabolomics has become very crucial for understanding the cause and the treatment of diseases and for the maintenance of human health.

Methods are now developed to decipher the entire sequence of the genome of a person within few hours in a cost effective way : Which can be utilized to find the nature of a defective gene that is responsible for causing the disease ; this paves the way for the development of Genomic medicine. The structure and function of Proteins became amenable to analysis after the establishment of relation between a gene and a protein by Beadle and Tatum in 1941 and the development of method for sequencing of amino acids in a protein by Edman in 1950. Some of these aspects of Proteomics including the development of different genetic, biochemical and throughput technologies and future medical possibilities will be discussed.

Biography

Mishra received his BS (Honors) and MS degrees from Patna University in India and Ph.D. Degree from McMaster University. He received his post -doctoral training with the late Nobel Laureate Professor E. L. Tatum at the Rockefeller University. He was a Fellow for Medical Research of the Jane Coffin Child Fund and later Research Associate with Professor Tatum where he devised the first gene transfer in a eukaryote, *Neurospora crassa.*

Later he joined the University of South Carolina Molecular Biology Group and remained there as Professor of Genetics. He was also a Visiting Professor at the Max Planck Institute for Molecular Biology in Heidelberg , Germany and in Genetic Institute of Greenwood, SC.

He has served as a scientific advisor to the FAO of the United Nations on many occasions and also on the Review Panel of the Human Genome Project of the Dept of Energy, USA. He is a Fellow for the American Association for the Advancement of Science since 1986 for his contribution to the science of Genetics.

He visited China in May, 2000 supported by the Rockefeller Foundation among the first group of Scientists when China became first open to the West. In addition he has been invited to present his work in Australia, EU, Japan, India and Thailand.

In addition to a large number of articles published in leading journals, he has published two books by John Wiley & Sons of New York, one on Proteomics in 2010. He has trained a large number of Ph.D. students and post-doctoral fellows from different countries including that from EU, Middle East, India and China.

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