

The purpose and scope of this '**Therapeutics Discovery Symposia**' is to provide a forum for the discussion of the current state of the art in emerging branches of modern biology to develop appropriate therapeutics for various diseases..

**Therapeutics Discovery Symposia -2013** will have four parallel theme meetings:

- RNAi, MicroRNAs & Single Cell Biology-2013 Meeting
- Epigenomics, Sequencing & SNIps-2013-Meeting
- Stem Cells and Signaling-2013-Meeting
- Optogenetics-2013 Meeting

### **History & Scope of the Optogenetics-2013 Meeting:**

Brain diseases, in particular neurodegenerative diseases, represent a growing public health concern. Understanding the biology of neuronal cells (neurons) and their communication with neighboring cells at synapses is crucial in order to know the defects and pathophysiology of brain disorders. To discover and develop innovative drug compounds for these central nervous system diseases it is essential to gather intellectual minds from academia, biotech and pharmaceutical industries to have a forum. Such forum will enhance knowledge and dissipate of data and ideas which will ultimately bring more scientific and business collaborations.

### **History of the theme meeting:**

This is the third focused theme conference on the topic of "**Neuron to Synapse.**" The first one, organized on May 27-28, 2008 at the Harvard Medical School, Boston Massachusetts, USA, which was inaugurated by Nobel Laureate Dr. Leon Cooper, Director of the Institute for Brain and Neural Systems at Brown University, and Dr. Joshua Sanes, Director of the Center for Brain Science at Harvard University. In the alternate year, the second one organized on May 7-8, 2010 near Rockefeller University in New York City, USA, for which keynotes are given by Dr. Robert Darnell of Rockefeller and Dr. Joseph LeDoux of New York University.

Similar theme conference was also run in alternate years in Europe as "**European Neurodegenerative Diseases,**" the first one held on September 20-21, 2010 at the Oriel College, University of Oxford, England, for which keynote was given by Dr. Anthony Monaco Pro Vice-Chancellor (then at) of the University of Oxford and Dr. John Collinge of the University College of London, England. In this meeting, the topic of Optogenetics was introduced by the founder of the field Dr. Gero Miesenbock of Oxford. The second one held on October 10-11, 2011 at CNR Institute, Tor Vergata-Rome, Italy, for which keynote was given by Dr. Antonino Cattaneo, Director of the European Brain Research Institute.

### **Scope of this meeting:**

This is the first '**Optogenetics**' theme meeting, and third in the '*Neuron to Synapse*' series in USA, focused on the emerging theme of '*Optogenetics*' to be held in Greater Boston area at Hilton Garden Inn, Waltham, Massachusetts. USA. In 1979, Francis Crick has suggested that the major challenge facing neuroscience was the need to control one type of cell in the brain while leaving others unaltered. He later speculated that light might have the properties to serve as a control tool but no one has experimentally demonstrated. It took almost three decades to get experimental evidence in 2005 to this strategy in neuroscience by Gero Miesenbock of Oxford, Edward Boyden and Karl Deisseroth of Stanford. Gero Miesenbock defines Optogenetics, '*which uses genetic strategies for observing and controlling the function of neurons with light*', whereas Deisseroth, defines '*the combination of genetic and optical methods to achieve gain or loss of function of well-defined events in specific cells of living tissue*'. The biochemistry of opsins helped to develop a new field of optogenetics and molecular engineering. Optogenetics is an important research tool continues to grow rapidly, and is now used in

about 800 laboratories and opened associated technologies for delivering light deep into organisms as complex as freely moving mammals, for targeting light-sensitivity to cells of interest, and for assessing specific readouts, or effects, of this optical control.

Although, the optogenetics arose from neuroscience, it addresses a much broader unmet need in the study of biological systems beyond neuroscience to muscle, cardiac, and embryonic stem cells. Disease models also have been explored, including for Parkinson's disease, anxiety, retinal degeneration, respiration, cocaine conditions, and depression. It is hoped that a combination of viral optogenetic therapy and optical-fiber implant could enable treatments to combat specific neural abnormalities in neurodegenerative disease.

This international meeting in '*Therapeutics Discovery Symposia*' will bring together experts and young researchers from both academia and industry (with diverse backgrounds in optics, bioengineering, molecular and cellular neurobiology, electrophysiology, behavior, cognition, perception, and disease biology) and discuss the optogenetic applications in form of keynote lectures, invited talks, short oral, and poster presentations. Dedicated time allowed for presentation of posters, viewing the exhibits, and to know the available cutting-edge reagents and services in the field.

The conference should be interesting for graduate students, postdoctoral fellows, professors from academia and scientists, directors and executives from industry, as well as for anyone interested in brain functions and their associated diseases. Authorities in the field will be invited as key speakers.

All the members who participate in this symposium have to register for the meeting.

**Venue:** Hilton Garden Inn (420 Totten Pond Rd, Waltham, Massachusetts, USA), is recently renovated star hotel (with all amenities) near the Rt. 95/128 high-tech corridor. The hotel is well connected to Boston and Cambridge by bus transportation. Waltham is a western suburban city ten miles away from Boston, named after town in England. Waltham is the hub for several information technology, and biotech companies. Waltham also known as a watch-manufacturing city, and home for Brandeis and Bentley Universities.