

## 3rd Canadian IBRO school of neuroscience : neurodegeneration and regeneration

The International Brain Research Organisation (IBRO) recently organized a two week summer school on Neural Degeneration and Regeneration in the University of British Columbia (UBC), Vancouver. Twelve students from India, Argentina, Brazil, Indonesia, China, Morocco, Kenya and Cuba, were selected from some 130 candidates to travel to UBC and interact with some of the leading group leaders in the campus and share their thoughts through a unique inhouse interactive program. The initiative of IBRO seeks to build capacities in the developing countries by picking budding researchers from these countries such that the trained individuals are able to positively transform the scientific environment of their home countries when they return back. In a marked departure from sponsoring such scholars for attending big meetings, such small groups witness enhanced perspective development. The school followed the 3<sup>rd</sup> Canadian Association of Neuroscience meeting where all students presented their posters and had a chance to interact with the Canadian neuroscience community at large.

The school included talks (presentations, lectures) from leading researchers and clinicians who discussed the pathological and medical sequelae of various neurodegenerative diseases including the approaches that promote regeneration and repair. The students were encouraged to be active participants, not only to ask questions but also to present their own research. The sessions were arranged in various centres in the campus which exposed the students to the strong infrastructure facilities enjoyed by UBC researchers. The school was hosted at University of British Columbia- (UBC) affiliated research centres such as Michael Smith Labs, Life Sciences Institute, Brain Research Centre, Centre for Molecular Medicine and Therapeutics and iCORD. The sessions were designed in such a manner that these evoked interest in linking the basic research to translational research with possible therapeutic interventions. Students were encouraged to consider humanistic and ethical principles in performing their research by exposing them to special session on neuroethics.

The neurodegenerative diseases of the nervous system reduce the quality of life of millions of people worldwide. Neurodegenerative diseases like Alzheimer's, Parkinson's disease and amyotrophic lateral sclerosis are considered one of the major challenges of modern medicine. In the past several decades enormous effort has been placed into resolving the mechanism(s) of neurodegeneration but in spite of great advances many areas remain to be explored as lucidly presented by one of the pioneers of the field – Prof. Patrick McGuire of UBC. Majority of these advances were discussed in the invited talks. Thus some presenters argued that protein misfolding, aggregation, and accumulation represent the key pathogenic events common to most neurodegenerative diseases. The

advances in molecular biology and whole genome approaches have identified a number of gene mutations that appear to be predisposing factors for protein misfolding and aggregation in such disorders. Accumulation of aggregated proteins inside neurons or in the neuropil leads to synaptic dysfunction, neuritic alterations, neuronal death, and disease symptoms. The future therapeutic interventions in neurodegenerative diseases might include the reduction in apoptosis, protection and plasticity, the molecular modification of aberrant genes, and artificial induction of neurogenesis.

The bioinformatics training session was very useful. Several neuroscientists with expertise in genetics, molecular and cellular biology, transgenic mouse modeling and informatics, focused on developing tools to understand the molecular mechanisms of neurodegenerative disorders by combining a multidisciplinary approach. It was particularly interesting to attend sessions by clinician-scientists and neuroscientists who emphasized the power of collaboration in advancing our knowledge about neurodegenerative diseases. The neuroethical implications of the application of these technologies in understanding the brain were also introduced. The daily sessions finished with a general discussion where the interaction between the faculty and the students led to useful leads and interesting debate. Majority of such sessions lasted until late night.

The role of immigrants in the development of science in Canada and the world was also emphasised. A number of discussion-intensive sessions were devoted to elements of scientific career development including discrimination and bias (racism, sexism, age-ism). Strategies for developing mentorship networks in order to maintain and enhance career development were discussed periodically. This school was preceded by the meeting of the Canadian Neuroscience Society which provided a unique opportunity for these students to interact with Canadian researchers. The students were encouraged to put up their posters at this meeting. Majority of these students attending the course chose to stay for an additional 1-2 days at the end of the formal program which showed the linkages they had developed to the program mentors and other labs. All students were provided with course content and a resident accommodation. Their stay was moderated by the recruitment of local trainees which acted as their hosts and mentors.

### Faculty

**UBC:** Jane Roskams, PhD, Peter Rieckmann, MD PhD, Jon Stoessl, MD, Wolfram Tetzlaff, MD, PhD, Blair Leavitt, MD PhD, Lynn Raymond, MD, PhD, Martin McKewon, MD, PhD, Tim Murphy, PhD, Yu Tian Wang, PhD, Anthony Phillips, PhD, Judy Illes, PhD, Brian MacVicar, PhD, Dan Goldowitz, PhD, Kurt Haas, PhD, Shernaz Bamji, PhD, Joanne Weinberg, PhD, Catherine Rankin,

PhD, Tania Lam, PhD, Christopher Loewen, PhD, Tim O'Connor, PhD. McGill University and IBRO Ante Padjen, MD, PhD

**Trainee Faculty** (MD, PhD students): Will Guest (ALS), Andre Gaudet (Peripheral nerve regeneration).

**Outside UBC:** Sharon Louis and Allan Eaves (Stem Cell technologies), Mike Hawrylycz (Allen Institute for Brain Research)

**Summary** (1) Dr Sir John Sulston (Nobel laureate, 2002) presented a lunchtime talk and discussion on the role of ethics and intellectual property in advancing science and medicine in developing countries. (2) Dr Pat McGeer gave an engaging and informative after dinner presentation on the history of neurodegenerative disease, and hopes for the future. (3) Students completed a visit to a biotechnology company, Stem Cell Technologies, to learn how individuals make career choices to enter industry, and to understand how biotech companies work; (4) Hands-on bioinformatics training on genomic analysis

and imaging software; (5) Evening ethics discussions on the role of international scientists on the design and implementation of science and health policy, the reporting of scientific fraud, the regulation of clinical and pre-clinical "trials" and the role of a support network in helping to maintain the optimal mental health and well being of developing scientists. Students actively participated in all the school activities: Theoretical classes (interesting questions and discussions), Practical Activities, Students presentations and Round Tables were as interesting as beach volleyball and soccer. All students and some tutors were lodged in Green College on the BC campus. All lectures were video recorded as part of the IBRO Edu learning resources and will be made available on the web shortly.

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*\*Based on the IBRO School organised at UBC, Vancouver from May 24 to June 3, 2009.*