

## ISN Symposium on “Spatial Signaling in Neurons”

April 24-28<sup>th</sup>, 2013, Dead Sea, Israel

### Meeting Report

The organizers greatly appreciate the support of the International Society for Neurochemistry for this Symposium, which constituted a major event of the EMBO Conference “From Spatial Signalling to sensing Spatiality”. The funds awarded by the ISN enabled us to devote an entire session of this meeting to a topic within ISN’s main goals, such as the control of spatial signalling in different neuronal compartments. The contributions of the ISN Symposium speakers massively enriched the scientific content of this EMBO meeting by emphasizing the challenges that are associated to spatial signalling in neurons during differentiation and homeostasis.

The speakers for the ISN Symposium on “Spatial Signaling in Neurons” included:

- Vivian Budnik, University of Massachusetts Medical School, USA.  
Of synapses, RNP assembly and viruses (and everything in between).
- Valeria Cavalli, Washington University School of Medicine, USA.  
Long distance signalling in axon regeneration.
- Eleanor Coffey, Turku Centre for Biotechnology, Finland  
Location matters; compartmental JNK function in neurons.
- Francisca Bronfman, Catholic University of Chile, Chile  
BDNF regulates Rab11-mediated endosome dynamics to induce dendritic branching.

The presentation by Professor Budnik focused on the issue of synaptic signalling, and in particular on the functional communication between presynaptic and post-synaptic cells. Wnt signalling plays a major role during synapse development, during which a Wnt receptor fragment enters the nucleus of the postsynaptic cell, where it forms prominent foci. Professor Budnik presented data demonstrating that these foci constitute large ribonucleoprotein (RNP) granules harbouring synaptic protein transcripts. RNP granules exit the nucleus by budding through the nuclear membranes using a mechanism similar to that used by certain viruses, such as herpes virus. This budding involves phosphorylation of lamin, a protein linked to muscular dystrophies, and is impaired by a mutation in TorsinA causing early onset dystonia in human patients.

This lecture was followed by the presentation by Professor Cavalli, which focussed on long range axonal signalling during regeneration. With axons extending for extremely long distances from the cell body, robust mechanisms must be in place to ensure efficient communication between synapses and the cell body. Professor Cavalli presented data demonstrating a fundamental role of the histone deacetylases HDAC5 in axonal regeneration. Tubulin deacetylation is a limiting process during central nervous system (CNS) regeneration, suggesting that therapeutics causing HDAC5 activation will be beneficial to drive CNS recovery upon injury.

The presentations from Professor Coffey and Bronfman delved on localised signalling and its importance for neuronal differentiation and homeostasis. Professor Coffey showed to the attendees data on a proteomic screen aimed at the identification of novel targets of JNK, a family of protein kinases controlling cell death in the nervous system. She also described novel light-responsive tools allowing the modulation of the activity of these kinases with high selective temporal and spatial resolution. Professor Bronfman analysed instead the role of Rab11-positive recycling endosomes on brain derived neurotrophic factor (BDNF) signalling and the relevance of this endocytic compartment in dendritic branching. Importantly, her team demonstrated that BDNF signalling directly controls Rab11 activity, which is required for dendritic branching.

Professors Giampietro Schiavo (Cancer Research UK London Research Institute) chaired this

ISN Symposium.

99 scientists attended the conference. These included faculty, post-doctoral fellows, and graduate students. Importantly, a high proportion of attendees (45%) and invited speakers (31%) were female and a substantial proportion of the participants were junior faculty, post-doctoral fellows and graduate students.

Attendees for the meeting truly represented an international audience. Participants represented the following countries: Austria, Belgium, Brazil, Canada, Chile, Finland, France, Germany, Israel, Ireland, India, Italy, Japan, Poland, Russia, Singapore, Scotland, Spain, Switzerland, The Netherlands, UK & USA..

Additionally, editorial staff from EMBO J (Karin Dumstrei, Senior Editor, EMBO J) and Cell Press (Katja Brose, Editor in Chief, Neuron) attended the entire meeting and ISN Symposium.

A full financial report on the usage of the Funds awarded by the ISN is appended to this document. The funds were used in whole to support travel and registration of the invited speakers for this ISN symposium.