PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

Open PhD position for CSC scholarship candidates 2015

Please note: the PhD position is only offered to Chinese PhD candidates for application in the framework of the FUB-CSC Program.

Department/Institute:	Institute for Biology/Neurogenetics
Subject area:	Genetics and Developmental Biology
Name of Supervisor:	Prof. Sigrist
Number of open positions:	1
Project title:	The Jun Kinase pathway in active zone assembly of Drosophila neuromuscular terminals

Project description:

Synaptic vesicles (SVs) fuse at specialized membranes ("active zones"), covered by electron dense scaffolds ("cytoplasmic cytomatrix"), crucial for the stability and function of synapses. Addressing how active zones are assembled and remodelled is a focus of the Sigrist lab.

Liprin-a/Syd-1 clusters, while ELKS family member Bruchpilot (BRP) and Rim-binding protein (RBP) accumulate later during scaffold maturation. RBP finally tethers functionally relevant components (Ca^{2+}-channel a-subunit, RIM) via its SH3-II and –III domains to the active zone. Which mechanisms ensure reliable long-range transport of such scaffold proteins and restrict their interactions before active zone integration remains largely unknown. We recently found evidence that BRP and RBP are co-transported, and that high affine binding to Aplip1/JIP1, a Kinesin heavy chain adaptor previously found involved in SV transport, is needed to restrict BRP/RBP scaffolding to synaptic terminals. BRP and RBP (but not Syd-1 and Liprin-a) co-accumulated within ectopic axoplasmic scaffolds present in *srpk79D* mutants, and directed axonal co-transport of BRP/RBP positive clusters was observed in vivo. Combining molecular screening with X-ray crystallography and calorimetry, we find that SH3-II and -III of RBP bind to a proline-rich motif of Aplip1/JIP1. Integrity of this motif was essential to protect axons from ectopic accumulations of both, synaptic vesicle proteins as well as active zones, which we observe within *aplip* mutant axons by electron and super-resolution light microscopy.

The successful candidate will us the methods spectrum mentioned above to further investigate protein interactions and signaling pathways steering synapse and active zone assembly. In particular, the role of Jun Kinase and related signaling events in the cross-talk of long-range axonal transport and local deloading and assembly should be addressed.

Language requirements:

English language proficiency is needed, German language proficiency is not, as thesis should be written in English language

Academic requirements:

Candidates are expected to hold a Masters Degree in Neuroscience, Biology, Biochemistry, Biomedicine or related subjects.

Link to professor and further information:

In a first step the complete application should submit to the Beijing Office for evaluation by January 4th. Please don't contact the professor before. He will get in contact with you after having received the complete application in January.