The 87th iCeMS SEMINAR

Tue 13 Sep 2011
11:00-12:00

Role of Guidance Receptors in Cortical Radial Migration

Lecturer: **Dr. Yuan Xiaobing**

Laboratory of Neural Circuit Development
Institute of Neuroscience, Shanghai Institutes for Biological Sciences (SIBS), Chinese Academy of Sciences (CAS)

Venue: Seminar Room (#A207), 2nd Floor Main Building
iCeMS Complex 1, Kyoto University

During the morphogenesis of neocortex, newborn neurons undergo radial migration from the ventricular zone toward the surface of the cortical plate (CP) in an "inside-out" order. Recently axon guidance molecules have emerged as important players in cortical radial migration. We observed that the guidance factor Slit1 is intensively expressed in upper layers of CP and its receptors Robo1 and Robo2 and a recently identified Robo family member Robo4, which was considered to be solely expressed in endothelial cells, are expressed in radially migrating neurons. Down-regulation of the expression of either Robo2 or Robo4 in newborn neurons by using in utero electroporation of specific siRNAs led to severe retardation in the radial migration of these neurons *in vivo* and reduced trans-well migration of neurons in culture. Surprisingly, Robo2, but not Robo4, could activate Cdk5 in a Slit-independent manner. Radial migration of newborn neurons upon knockdown of Robo2 could be fully rescued by co-transfection with truncated Robo2 mutants without Slit binding activity or intracellular signaling activity and could be partially rescued by co-transfection with the Cdk5 activator p35 but not by Robo4. Cultured cortical neurons with reduced Robo4 expression exhibited higher sensitivity to the repulsive factor Slit1 in both growth cone collapse assay and transwell migration assay. Overall, our results suggest that Robo2 may promote cortical radial migration through its regulation of Cdk5 activity in a Slit-independent manner, whereas Robo4 may promote the CP invasion of newborn neurons by silencing the repulsion of CP-derived Slit1.

Contact: iCeMS Assoc. Prof. Mineko Kengaku at kengaku-g@icems.kyoto-u.ac.jp

Hosted by: iCeMS (Institute for Integrated Cell-Material Sciences), Kyoto University
Co-hosted by: Center for Frontier Medicine, Global COE Program, Kyoto University