Jan 24 (9:00−12:35)

・Fumio Matsuzaki (Inst. of Devel., Aging and Cancer, Tohoku Univ.)

Asymmetric Division of Drosophila Neural Stem Cells: a Basis for Neural Diversity

Neural cell diversity arises in part from asymmetric divisions of precursor cells. Drosophila neural stem cells, neuroblasts, have been studied as a model system of this process since the discovery of the asymmetric segregation of neural fate determinants, Numb and Prospero, during neuroblast divisions. To better understand the mechanisms of asymmetric neuroblast divisions, we have screened for mutations affecting the localization of Miranda, which localizes Prospero in neuroblasts. This screen revealed a previously unidentified mechanism responsible for the asymmetric localization of all known determinants, which involves a cascade of two cortical tumor suppressor proteins, Giant larvae and Discs large. These proteins regulate myosin function to mediate cortical protein targeting in mitotic neuroblasts, and create intrinsic differences between daughter cells.

・Jonas Frisen (Karolinska Institute/Medical Nobel Institute)

Generation of Neurons from Stem Cells in the Adult Brain

Neurons are continuously generated in certain regions of the adult mammalian brain. These neurons derive from multipotent, self-renewing neural stem cells. Such stem cells can be cultured from the walls of the ventricular system of the adult rodent and human brain. Under certain conditions, adult neural stem cells can generate a large number of different non-neural cell types. We have found, by in vivo labeling experiments, cell sorting and in vitro cultures, that ependymal cells have neural stem cell properties in the rodent. Ependymal cells divide rarely to give rise to subventricular zone progenitor cells which generate neuroblasts that migrate to the olfactory bulb. In response to a spinal cord injury, ependymal cells lining the central canal are induced to proliferate and generate migratory progeny which differentiate to astrocytes and contribute to scar formation. Further studies on the regulation of stem cell differentiation may allow the development of strategies to stimulate neurogenesis in the adult brain.