The 86th iCeMS SEMINAR

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16:00-17:00

The Retina as a Model to Explore Different Pools of Neuronal Progenitors

Lecturer: **Dr. Caren Norden**

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

The retinal neuroepithelium is a fascinating structure to study neuronal development. We focus on questions concerning proliferation of different progenitor pools in this tissue. The most abundant form of proliferation is taking place in the pseudostratisfied epithelium in which nuclei undergo interkinetic nuclear migration, IKNM discovered by Sauer in 1935. The main feature of IKNM is the differential distribution of nuclei within the elongated cells of pseudostratified epithelia depending on cell cycle phase. The idea that apical to basal movement o nuclei might involve a passive component was raised in Sauer's original study. Our group has recently confirmed this idea and found that IKNM in the zebrafish retina is actually best described by stochastic motions of nuclei that are punctuated with phases of directed movement around mitosis. We now set out to understand how the different phases of the cell cycle map onto different modes of nuclear movement in IKNM. Our analysis reveals that IKNM comprises rapid apical nuclear migration only during G2 phase, and that stochastic nuclear motion during S as well as G1 phases arises as a result of the migration of neighbouring G2 nuclei. These are accompanied by significant basal actomyosin accumulations. Additionally, we show that progression through G2 is a prerequisite for the directed nuclei movements preceding mitosis.

Another class of progenitors in the retina are the basal progenitors that have recently be shown to give rise to the horizontal cell layer (Godinho et al. 2007). We elaborate on this finding by performing high spatio-temporal resolution microscopy following single basal progenitor cells. We find that divisions appear to always happen after contact with the amacrine cell layer and observe that some cells from these divisions actually migrate back into the AC layer. These initial findings open the possibility that basal progenitors in the retina give rise to more than one type of retinal neuron.

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