CDB SEMINAR

Speaker: Sarah Dunlop

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Title:

" Molecules, maps and training: Seeing again after optic nerve regeneration "

Date:	**Friday, December 3**
Time:	**17:00 -18:00**
Place:	**1F Auditorium of Building C,CDB**

Summary:

Functional recovery of severed central nerve tracts will require protection of axotomised neurons from apoptosis, stimulation of axon regeneration and re-establishment of appropriate functional connections. Here we address the latter issue by studying the molecular basis of topographic map restoration during optic nerve regeneration. The strict topographic representation of the retina onto primary visual centres allows us to assess the accuracy of axon regeneration behaviourally, electrophysiologically and anatomically. We have investigated pre-requisites for restoration of topography taking advantage of the differing capacity for successful optic nerve regeneration within the vertebrate phylum. In fish and lizards the optic nerve regenerates to visual centres but restores topography only in fish. As a consequence, vision is restored in fish but not in lizard. Our results using immunohistochemistry, *in situ* hybridization and RT-PCR indicate that, as in development, tyrosine kinase Eph receptors and their ligands, the ephrins are key players in establishing topography. Moreover a balance between glutamatergic excitatory and GABA-ergic inhibitory connections and, in addition LTP (long-term potentiation)-like changes are required to consolidate and refine connections. These changes take place spontaneously in fish but not in lizard. However, they are facilitated in lizard by intensive visual stimulation via a visual training task. The result implies that, as neuroprotective and neuroregenerative procedures are devised for mammals, appropriate training regimes may be required to re-establish and stabilise topography and reinstate useful function.

Keywords: optic nerve regeneration, training, gene expression, neural activity

Host: **Shinichi Nakagawa** <Cell Adhesion/Tissue Patterning, CDB >

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