

Diploma/Masters Thesis in developmental neurobiology

Cell polarity of the vertebrate CNS

Cell polarity is an important feature of complex tissues. Epithelia lining the digestive tract or the neuro-retina of the visual systems rely on apico-basal polarity to fulfill their respective function. Cell culture based systems and systematic genetic analysis mostly in *Drosophila* and *C. elegans* have elucidated many components that are required for cellular polarity. Recently, genetic screens in teleosts such as zebrafish (*Danio rerio*) and medaka (*Oryzias latipes*) have provided further insight into the molecular mechanisms underlying cellular polarity in vertebrates. The development of the completely transparent fish embryos can be examined by non-invasive microscopy. Thus, their development is not affected by the analysis. Apico-basal polarity in cells of the developing embryo can be visualized *in vivo* using GFP-tagged proteins that are localized along the apico-basal axis. Furthermore, the simple architecture of neuroepithelia during early fish development allows to visualize the subcellular localization in the living embryo using a fluorescence dissection microscope.

We are interested in identifying genes that are essential for epithelial cell polarity in the vertebrate nervous system. The genetic model systems that we use are zebrafish and medaka. The proposed master/diploma thesis aims to establish GFP-tagged proteins to visualize apico-basal polarity *in vivo* using transient and stable transgenesis. On the one hand available GFP-tagged proteins will be expressed under the control of specific promoters. On the other hand additional genes with an expected specific localization along the a-b axis will be fused to GFP and tested in fish embryos. These ‘*in vivo* sensors’ for apico-basal polarity will then be used to visualize the development of epithelial polarity in the CNS by time-lapse microscopy and to characterize mutants that have previously been isolated in chemical mutagenesis screens.

For further information see <http://itgmv1.fzk.de/itg/loosli/loosli.html> or contact felix.loosli@itg.fzk.de.