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Regulation of Wnt-Signaling by Ciliary Protein Complexes in Cilia Independent Contexts

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Epithelial and neuroepithelial cells are polarized with respect to the body/organ axis. This feature is widespread in all animals, ranging from insects to humans, and also critical for asymmetric stem cell divisions. The difference between epithelial tissue (such as the disc-epithelia in *Drosophila*) and cells in tissue culture is that, in addition to apical-basolateral polarity, epithelial tissues develop an obvious polarity with respect to the body axes, called planar cell polarity, or PCP for short. The core PCP pathway is a Wnt-Frizzled pathway that regulates cytoskeletal elements via Dishevelled (Dsh) and Rho-family GTPases, from *Drosophila* to human tissues. PCP mutations result in loss of cellular orientation and cell polarity. This is easiest and best studied in *Drosophila*, in wings, thorax and abdomen, and in compound eyes. The underlying Wnt-signaling pathway(s), Wnt-PCP and canonical Wnt-signaling are conserved and regulate related developmental and stem cell aspects of coordinated cellular polarization in mammals. My lab focuses on the regulation of the Wnt-pathway regulation. Recent work utilizes patient derived data from neural tube closure defects (a mammalian PCP regulated feature) that inform our functional and mechanistic studies with the *Vang/Vangl* genes of the PCP pathway. In parallel we have completed genome wide screens with focus on cilia associated factors, and have identified functions of several cilia associated protein complexes in a non-ciliated contexts, which can affect Wnt signaling, in the Wnt-PCP pathway or canonical Wnt/b-catenin signaling. Our recent mechanistic insights into these cilia complex functions in the Wnt-pathways will be discussed.

Biography:

Marek Mlodzik was born in Prague, Czech Republic. He completed his Undergraduate and PhD studies at the Biozentrum, University in Basel, Switzerland in Cell Biology and Genetics; subsequent postdoctoral training at the University of California, Berkeley USA, in the Dept of Biology. 1991-2000 Faculty/group leader appointment at the EMBL, Heidelberg, Germany, in the Developmental Biology Program. Since 2000 at the Icahn School of Medicine in New York as Professor in Cell, Developmental and Regenerative Biology; Chair of the department since 2007, with secondary appointments in Oncological Sciences and Ophthalmology.