**Regulation and functions of mechanical forces in neurons**

Sampada Mutalik

Axons are axi-symmetric structures with high aspect ratios and may utilize rapid mechanical signalling as a means of information transfer. Axons experience mechanical stretch during their growth and even after formation of connections due to the growth of surrounding tissue and embryo. Despite this continuous stretch axons maintain fairly uniform diameter suggesting intrinsic mechanisms of tension regulation. Though there is accumulating evidence suggesting the role of mechanical tension in neuronal development; mechanisms of tension generation and regulation remain unclear. We use micro contact printing assay to address these questions. Our study suggests an active contraction based mechanism of tension generation. As underlying cytoskeleton and motor activity may regulate mechanical tension, we are developing protocols to address this using inhibitors of cytoskeletal dynamics and associated motor proteins. It is hoped that these studies will reveal the mechanistic basis of axonal tension regulation and will give us direction to explore biomechanical signalling in neuronal development.

We are also interested in understanding the role of actin nucleators in neuronal development. Studies from our lab suggest that the FMN2 is enriched in nervous system and important in filopodia formation. Studies from non neuronal cells suggest the role of formin-2 in stress fibre formation and maintainace of focal adhesions. On this background, we are trying to understand the role of FMN2 in the regulation of traction force.