TIFR Centre for Interdisciplinary Sciences
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Seminar

Developmental mechanisms of projection neurons in the forebrain

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The underlying theme of my research is studying the developmental origin and migration of projection neurons in two different systems in mice; a component of the olfactory system, one of the most ancient sensory systems, and the neocortex, an evolutionarily recent structure in the brain. In my PhD thesis work, I discovered a novel neuronal migratory stream which contributes projection neurons to the pheromone sensing accessory olfactory bulb (AOB). I identified a developmental basis for its functional subdivisions; the anterior and the posterior AOB, and described a very unusual trajectory for this migration to the pAOB. In addition, I demonstrated an evolutionary conservation of this migration in the frog, Xenopus.

For my ongoing postdoctoral work, I am investigating the development of the neocortex, which is the seat of cognition and intelligence in the brain. It consists of multiple layers with distinct neuronal types. Majority of cortical neurons are projection neurons (PNs) that mediate multiple information processing streams, and are diverse in terms of their laminar location, gene expression and connectivity. However, it is unclear how cortical progenitors contribute to the specification of these diverse PNs. Our findings from comprehensive lineage tracing question the dogma of inside-out pattern of layering and suggest a more complex scenario. We hypothesize that PN birth order is based on cell types, better defined by characteristics beyond laminar position. Ongoing experiments include axon tracing to identify projection targets and analysis of corticogenesis based on PN morphology.

In my talk, I will present my research trajectory and highlight how I have identified and characterized novel phenomena that may provide evolutionary insights into brain development.

Thursday, Jan 12th 2017

11:30 AM (Tea/Coffee at 11:15 AM)

Seminar Hall, TCIS