Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Molecular dissection of vomeronasal neurons: discovery of novel genes and differential endoplasmic reticulum environment

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The sensory neurons of vomeronasal organ trigger genetically hardwired innate behaviours in several vertebrate species by detecting chemo signals including pheromones. Originating from a common progenitor, these sensory neurons diverge to express two distinct families of G-protein coupled receptors (GPCRs) associated with Gnao1 and Gnai2 subunits. In order to identify if Gnao1 and Gnai2 neurons fundamentally differ in terms of their molecular and cellular properties, I developed single cell transcriptomics of mouse vomeronasal neuroepithelium. This led to the creation of a single cell atlas that is made publicly accessible at www.scvnoexplorer.com. Surprisingly, the analysis revealed significantly higher expression of endoplasmic reticulum (ER) associated genes within Gnao1 neurons. In addition, differences in ER content and prevalence of cubic membrane ER ultrastructure were uncovered by electron microscopy, indicating fundamental differences in ER function. Furthermore, my research identified novel ER resident proteins that are not expressed in any other mouse tissues. Experiments on the gene-deletion mouse model of one such gene showed significant downregulation of V2R type GPCRs indicating the specific and non-redundant roles of these proteins as ER chaperones. Collectively, these data provide a new perspective on the diversity, development and complexity of vomeronasal neuronal subsets and identify important cellular differences in terms of ER gene expression and ultrastructure.

Monday, Apr 22nd 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H