

Students' Annual Seminar

Chemogenetic Control of Phagocytosis

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Microglia are the central nervous system (CNS) resident innate immune cells that play a vital role in neuronal circuit development and brain homeostasis. Microglia sculpts neuronal circuits through synaptic pruning and eliminates cellular debris through controlled phagocytosis. The regulation of neuronal phagocytosis by microglia depends on the delicate balance between "eat-me" and "don't eat-me" molecules that are present on neurons. Disruption of the delicate equilibrium of "eat-me" and "don't eat-me" signals is associated with various neurological disorders, highlighting the significance in understanding the mechanisms governing the display and recognition of these signals, and developing new strategies to manipulate microglial phagocytosis. Here, we aim to develop a platform technology for controlling phagocytic ability of microglia in the brain through cellular engineering. We show that microglia engineered to express designer receptors showed a boosted phagocytic response against the cargo of interest in cell culture systems. In this seminar, I will discuss the experimental attempts towards utilising the microglia with booted phagocytosis for neuronal circuit remodelling and other potential applications.

Friday, Jan 5th 2024

14:30 Hrs (Tea / Coffee 14.15 Hrs)

Seminar Hall, TIFR-H