

## **Internal Seminar**

### **Design and development of fluorescent tools for targeted microglia imaging**

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Microglia are tissue-resident macrophages of the central nervous system.<sup>[1]</sup> Under physiological conditions, homeostatic microglia continuously scan their surroundings to interact and to ensure the proper functioning of neurons, astrocytes, and blood vessels.<sup>[2]</sup> The critical role of microglia in brain circuit development and in neurodegenerative diseases such as Alzheimer's disease (AD) and Parkinson's disease (PD) is currently emerging, with new opportunities in targeted modulation of microglia.<sup>[3]</sup> Microglia is mostly refractory to genetic modifications, which limits our understanding of these cells in live human tissues and in animals. Currently, there is a huge unmet need for developing specific and non-invasive live imaging tools to visualise microglia in health and disease. In this presentation, I will discuss the design and development of probes for live imaging of microglia through targeted labelling of microglia-specific G-protein-coupled receptors (GPCRs). I will also discuss ligand-directed protein labelling strategies in live cells in which a protein of interest can be labelled without perturbing its function.

#### **References:**

1. Nimmerjahn, A.; Kirchhoff, F.; Helmchen, F. Resting microglial cells are highly dynamic surveillants of brain parenchyma in vivo. *Science* 2005, 308, 1314–1318 DOI: 10.1126/science.1110647.
2. Brown, G. C.; Neher, J. J. Microglial phagocytosis of live neurons. *Nat. Rev. Neurosci.* 2014, 15, 209–216 DOI: 10.1038/nrn3710.
3. Li, Q.; Barres, B. A. Microglia and macrophages in brain homeostasis and disease. *Nat. Rev. Immunol.* 2018, 18, 225–242 DOI: 10.1038/nri.2017.125.

***Monday, Jun 3<sup>rd</sup> 2024***

***12:00 Hrs***

***Seminar Hall, TIFR-H***