THE GIS
SPEAKER SERIES

Genome Institute of Singapore
GIS

Cortical inhibitory neurons exhibit cell-type specific maturation programme early in development

Dr. Lynette Lim

Group Leader, Flemish (Vlaams) Institute for Biotechnology, Center for Brain and Disease – VIB-CBD, Leuven, Belgium

Assistant Professor, University of Leuven – KUL, Faculty of Medicine, Leuven, Belgium

Host: LIU Jinyue

Friday 19 July 2024
10.30am – 11.30am

GIS Seminar Room (Level 2)
60 Biopolis Street, Genome, Singapore 138672

About The Speaker

Lynette Lim is a neurodevelopmental biologist. Her research focuses on understanding the intricacies of brain circuit formation, particularly the specification and maturation of cortical inhibitory neurons. In the Lim lab, advanced techniques such as genetic models and spatial and single-cell transcriptomics are employed to unravel the developmental programs that drive neuronal diversity and shape cortical circuitry.

Originally from Singapore, Lynette earned her PhD from the National University of Singapore in 2007 under the mentorship of Prof Markus Wenk, delving into the realm of lipid metabolism in neurons for her thesis. In 2012, Lynette was honored with a fellowship from the European Molecular Biology Organization (EMBO), leading her to postdoctoral training with Prof Oscar Marin. She spent time at both the Insituto de Neurosciencia in Spain (2012-2014) and King's College London (2014-2019). Her postdoctoral research contributed seminal insights into the early developmental programs governing brain wiring. This groundbreaking work has been showcased in esteemed journals such as Science, Nature Neuroscience, and Neuron, cementing her reputation as an emerging leader in the field of cortical circuit assembly.

Lynette has received prestigious awards, including Wellcome Trust Sir Henry Dale Fellowship in 2019 (respectively declined). In 2020, she assumed the role of group leader at the Flanders Institute of Biotechnology, Center for Brain and Disease (VIB-CBD), alongside her appointment as Assistant Professor at the University of Leuven (KUL) in Belgium. In recognition of her excellence, Lynette was among the select group of 13 distinguished researchers awarded the flagship FWO Odysseus grant in 2021. This prestigious accolade aims to attract exceptional talent to Flanders, fostering their integration into the Flemish research community while advancing the frontiers of knowledge.

About The Seminar

The mammalian cerebral cortex contains an extraordinary diversity of cell types that emerge through the implementation of different developmental programs. Delineating when and how cellular diversification occurs is particularly challenging for cortical inhibitory neurons, as they represent a relatively small proportion of all cortical cells, migrate tangentially long distances from their embryonic origin to the cerebral cortex, and have a protracted development. Here we combine single-cell RNA sequencing and spatial transcriptomics to characterize the emergence of neuronal diversity among somatostatin-expressing (SST+) cells, the most diverse subclass of inhibitory neurons in the mouse cerebral cortex. We found that SST+ inhibitory neurons segregate during embryonic stages into long-range projection (LRP) neurons and two types of interneurons, Martinotti cells and non-Martinotti cells, following distinct developmental trajectories. Two main subtypes of LRP neurons and several subtypes of interneurons are readily distinguishable in the embryo, although interneuron diversity is further refined during early postnatal life. Our results suggest that the timing for cellular diversification is unique for different subtypes of SST+ neurons and particularly divergent for LRP neurons and interneurons. Thus, the diversification of SST+ inhibitory neurons involves differential temporal cascades of molecular programs driving their divergent developmental trajectories.