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NNRIS Bench to Bedside Seminar Series

Date: 22 October 2021 (Friday)

Time: 12:00pm – 1:00pm

Zoom Details: https://nus-sg.zoom.us/j/88055716654?pwd=UEVOcEo2b1g3S2JqakRpWThPdjJZQT09
Meeting ID: 880 5571 6654
Passcode: 932626
Note: Please rename your login name to include your institute to facilitate admission

Moderator: **Assoc Prof Hyunsoo Shawn Je**
Neuroscience & Behavioural Disorders Programme, Duke-NUS

NOVEL MOLECULAR MECHANISMS UNDERLYING THE REACTIVATION OF QUIESCENT NEURAL STEM CELLS

Dr. Mahekta Gujar
Research Fellow
Laboratory of Neural Stem Cells
Neuroscience & Behavioural Disorders Programme
Duke-NUS Medical School

Abstract:
The ability of stem cells to switch between quiescence and proliferation is crucial for tissue homeostasis and regeneration. Drosophila quiescent neural stem cells (NSCs) extend a primary cellular protrusion from the cell body prior to their reactivation. However, the structure and function of this protrusion are not well established. Recently, we have shown that in the protrusion of quiescent NSCs, microtubules are predominantly acentrosomal and oriented plus-end-out toward the tip of the primary protrusion. In this talk, we will show that the Golgi apparatus is enriched in the protrusion initial segment and may act as the MTOC in qNSCs. We further identify two critical Golgi proteins Arf1 and its GEF Sec71 as regulators of NSC reactivation via regulating microtubule growth. We also show the minus-end microtubule binding protein, Patronin, as a key regulator of NSC reactivation and its new role in localizing Arf1/Sec71 to the Golgi. Ultimately, E-cadherin (E-cad) is localized to the NSC-neuropil contact sites, in a Patronin and Golgi-dependent manner to promote reactivation of quiescent NSCs.

Biography:
Dr Mahekta received her PhD in Molecular, Cellular and Developmental Biology in June 2018 from The University of Kansas, USA. Her graduate work focused on understanding how neuronal axons form functional neural circuits with their appropriate synaptic partners by using the small nematode C. elegans motor axons to study growth cone morphology and axon pathfinding. She joined Prof. Hongyan Wang's lab as a postdoctoral research fellow in August 2018. In May 2020, she was awarded a two-year Khoo Postdoctoral Fellowship Award. Her current research interest is to understand the mechanisms that regulate the balance between quiescence and proliferation of neural stem cells (NSCs) in Drosophila larval brains.

CHARACTERISATION OF AGGREGATION INDUCED EMISSION NANOPARTICLES (AIE-NPS) AS A LONG-TERM CELLULAR TRACER FOR PD TRANSPLANTATION

Dr. Jang Se Eun (Joanne)
Research Fellow
Neural Stem Cells Research Laboratory
National Neuroscience Institute

Abstract:
Intracerebral transplantation of stem cells derived dopaminergic (DA) neurons is an emerging therapeutic strategy to ideally halt or reverse the progression of neurodegenerative diseases such as Parkinson's disease (PD). In this study, we hypothesise that CORIN tagged AIE-NPs labelled dopaminergic neurons increases penetration- and retention rate, and also improves cell labelling specificity to better study stem cell transplantation in PD mice model. To address our hypothesis, here, we aim to 1) optimize the specificity and conjugation efficacy of AIE-NPs to DA progenitor cells to improve cellular retention and, 2) to determine the host neuroinflammatory pathways upon transplantation in 6-OHDA lesioned PD mouse brain. We will perform various behavioral tests to examine associated motor behavior alterations followed by a series of immunohistochemistry assays to characterize the expression of host macrophage and pro-inflammatory factors. Current study provides insights to better understand the therapeutic potential of nanoscale technologies for stem cell transplantation therapy and in neuroimaging. Also, we hope our study can shed light to the advancement in live cell imaging using photo acoustic AIE-NPs in the near future.

Biography:
Dr Jang completed her doctorate degree in The Queensland Brain Institute under the supervision of Dr. Victor Anggono in 2019, where her research focus was on unravelling the molecular mechanism that regulates synaptic plasticity which in turn would determine the process of learning and memory. After her graduation, she moved back to Singapore for her post-doctoral training at NNI with A/Prof Zeng Li's lab and is working on stem cell transplantation in PD mice brain striatum and generation of disease cerebral organoids to determine disease progression and the associated molecular mechanism.

All are welcome. No registration is required.