Developmental regulation of neural stem/progenitor cell fate

Yukiko Gotoh

The University of Tokyo

A fundamental question in understanding tissue development is how resident stem cells or multipotent progenitors give rise to the various cell types in appropriate numbers and at the right locations to achieve tissue organization. Neural stem/progenitor cells (NPCs) in the mammalian neocortex initially divide symmetrically to increase their pool size (expansion phase). They then divide asymmetrically and give rise to neuronal and glial cell types in a region- and developmental stage–dependent manner and with high precision (neurogenic and gliogenic phases, respectively). We have previously shown that Polycomb group (PcG) complex and high mobility group A (HMGA) proteins play pivotal roles in driving the fate switches of NSCs associated with the transition from the neurogenic phase to the gliogenic phase. At this talk, I would like first to focus on how these and other proteins control the fate of NPCs. Second, I will address the mechanisms underlying the transition from the expansion phase to the neurogenic phase and discuss their potential role in psychiatric diseases such as autism spectrum disorder. Finally, I will talk about the mechanisms underlying the regulation of slowly-dividing embryonic NPCs that later become adult subventricular neural stem cells.