BDR SEMINAR (Kobe & online hybrid)

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Max Planck Institute of Molecular Cell Biology and Genetics

Tuesday, June 28, 2022

14:00-15:00

1F Auditorium, DB Building C, Kobe / Broadcast online via Zoom

Zoom meeting URL will be announced on the event day by e-mail.

※Non-BDR members: Please register from the following link.
https://krs1.riken.jp/m/bdrseminarregistration

Neural stem cells, human-specific genes, and neocortex expansion in development and human evolution

Summary

Two major classes of neural stem and progenitor cells (NPCs) in the developing neocortex can be distinguished. First, NPCs that reside in the ventricular zone (VZ), i.e. neuroepithelial cells, apical (or ventricular) radial glia (aRG), and apical intermediate progenitors, collectively referred to as apical progenitors (APs). Second, NPCs that reside in the subventricular zone (SVZ), i.e. basal (or outer) radial glia (bRG) and basal intermediate progenitors, collectively referred to as basal progenitors (BPs). Neocortex expansion is thought to be linked to an increased abundance and proliferative capacity of BPs.

The following topics will be addressed.

1. The role of the human-specific gene ARHGAP11B in BP amplification.
2. The finding that the ability of ARHGAP11B to amplify BPs is based on a single C-to-G base substitution.
3. The ability of ARHGAP11B to expand the neocortex of a non-human primate, the common marmoset.
4. The localization of ARHGAP11B in mitochondria of NPCs and its action to promote glutaminolysis, a metabolic pathway characteristic of cells with high proliferative capacity.
5. The finding that ARHGAP11B is necessary and sufficient to ensure human-type BP levels in primate cerebral organoids.
6. The increase in cognitive performance of ARHGAP11B-transgenic mice, which exhibit an expanded neocortex.
7. The increase in BP proliferative capacity due to the changes in their morphology in the course of neocortex evolution

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