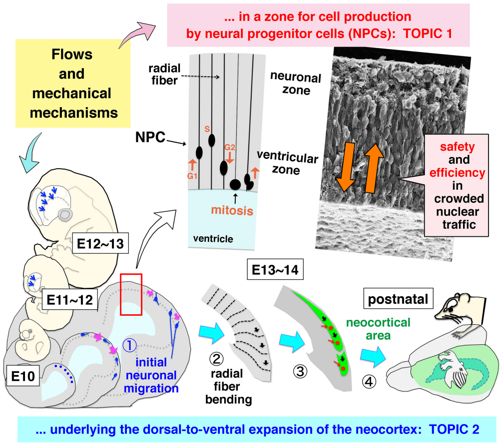

大脳皮質づくりを支える流れとちから

Flows and mechanical forces underlying corticogenesis

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Mechanical mechanisms involving pushing or spring-like recoiling function in a variety of physiological human-body systems such as motor-skeletal, cardiovascular, or respiratory. But, how organ development is regulated mechanically remains unclear, especially in the embryonic brain. Towards the formation of the cerebral cortex, the embryonic telencephalic wall thickens through the production of new cells by highly elongated neural progenitor cells (NPCs, also called radial glial cells). NPCs undergo cell cycle-dependent to-and-fro movement of their nuclei (called interkinetic nuclear migration), thereby filling a zone facing the lateral ventricle (i.e., ventricular zone, VZ) with dense nuclear countercurrents. The first/main part of this talk will summarize that the safe and efficient organization of highly densified NPC nuclear traffic is essential for normal corticogenesis, showing three types of cellular or tissue-level mechanical devices contributing to the dynamics and homeostasis of the mid-embryonic mouse cortical VZ.1–3 In the additional part, how mechanical bending of the outer part of NPCs' radial fibers by a dorsal-to-ventral (tangential) flow of early-generated neurons primes the ventral expansion of the cortex4 will be shown.

大学院特別セミナー

2021年9月6日(月)

17:00~18:30　ZOOM開催

1. Okamoto et al. TAG-1–assisted progenitor elongation streamlines nuclear migration to optimize subapical crowding. Nat. Neurosci. 16, 1556-1566, 2013.
2. Shinoda et al. Elasticity-based boosting of neuroepithelial nucleokinesis via indirect energy transfer from mother to daughter. PLOS Biol. 16, e2004426, 2018.
3. Watanabe et al. Differentiating cells mechanically limit the interkinetic nuclear migration of progenitor cells to secure apical cytogenesis. Development 145, dev162883, 2018.
4. Saito et al. Dorsal-to-ventral cortical expansion is physically primed by ventral streaming of early embryonic preplate neurons. Cell Rep. 29: 1555-1567, 2019.

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