



STem cells And DEvelopment

PICS

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How progenitor and neurogenic capacities are spatiotemporally allocated during brain morphogenesis: towards a 4D-perspective

The generation of cell diversity in the central nervous system occurs during embryogenesis and requires a precise balance between cell proliferation, commitment to specific fates, and further neuronal differentiation. The cellular and molecular mechanisms regulating this balance in the embryonic brain are still poorly understood. I will discuss our latest results in how the neurogenic capacity in the embryonic hindbrain is spatiotemporally allocated, and how the fate and the growth of the hindbrain boundary cells are regulated. By generating a CRISPR-based knock-in zebrafish transgenic line to specifically label the hindbrain boundaries, we unveiled that boundary cells undergo a functional transition to become neurogenic during hindbrain segmentation concurrently as they maintain the progenitor cell pool. Boundary cells engaged in neurogenesis coinciding with the onset of Notch signaling, which triggered their asymmetrical cell division. Our findings reveal that distinct neurogenic phases take place during hindbrain growth and suggest that boundary cells contribute to refine the final number, identity, and proportion of neurons in the brain.

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