Neurogenesis regulation in the posterior embryonic brain

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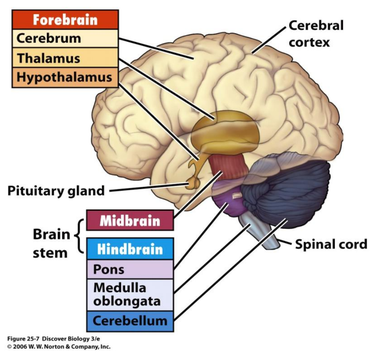
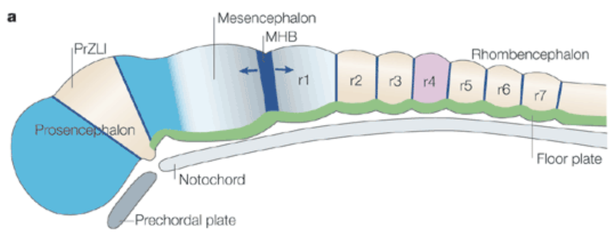
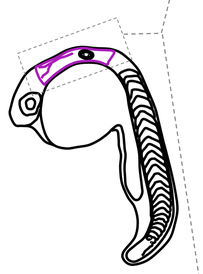
INTRODUCTION

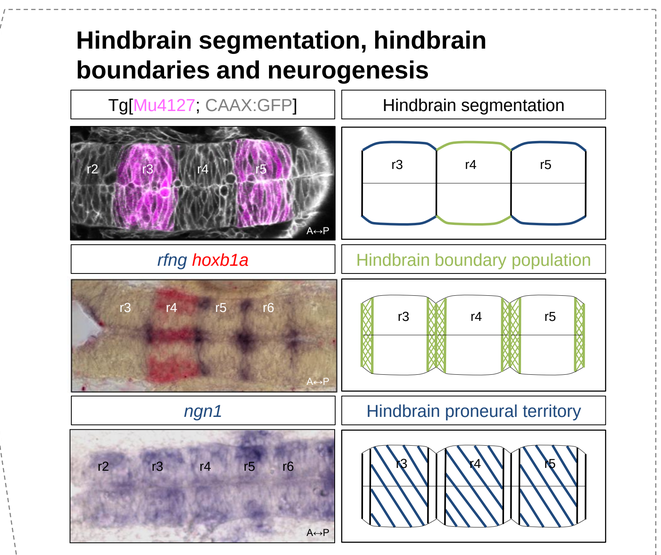




In zebrafish we can distinguish different parts in the brain. We have focused on the hindbrain also called rhombencephalon.

During embryogenesis it is transiently divided into 7 rhombomeres. Each rhombomere gives rise to different types of neurons.



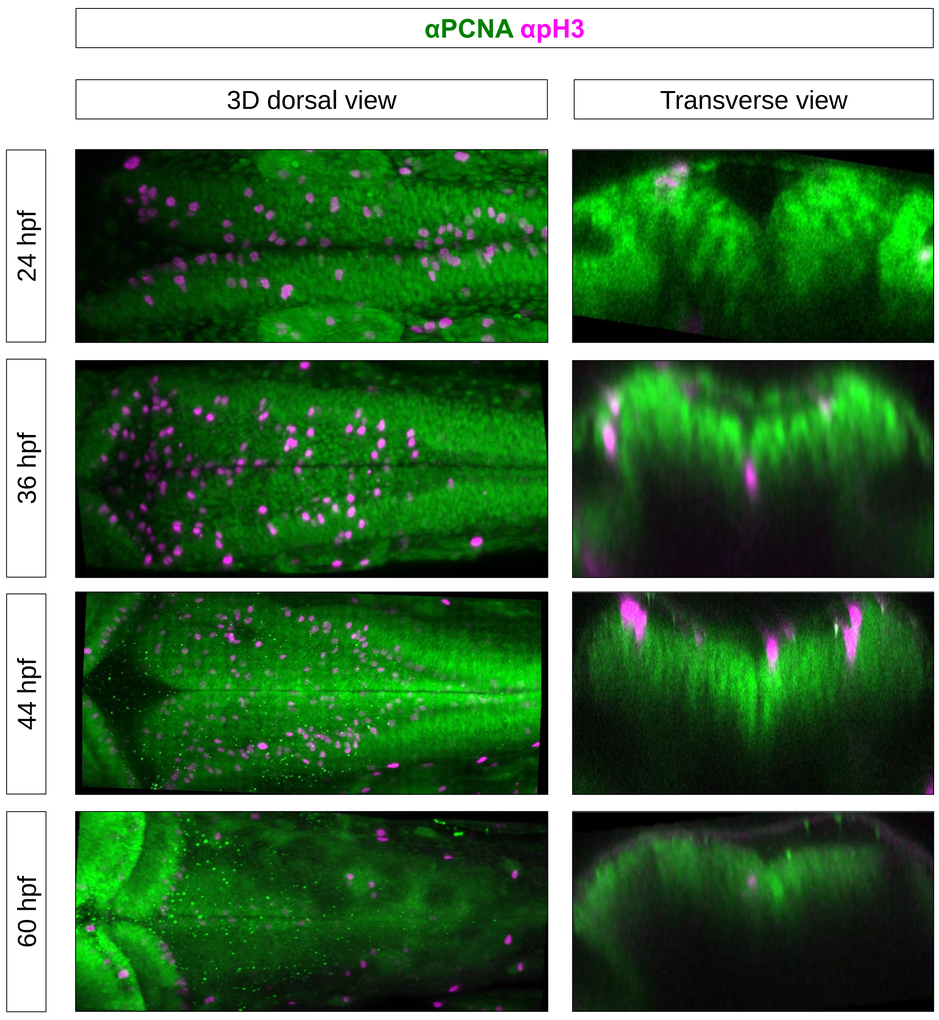


AIMS

- Find out how neurogenesis is regulated within the hindbrain
- Analyze the spatiotemporal distribution of progenitor domains in the posterior brain.
- Determine the involvement of signaling pathways in progenitor regulation.

RESULTS

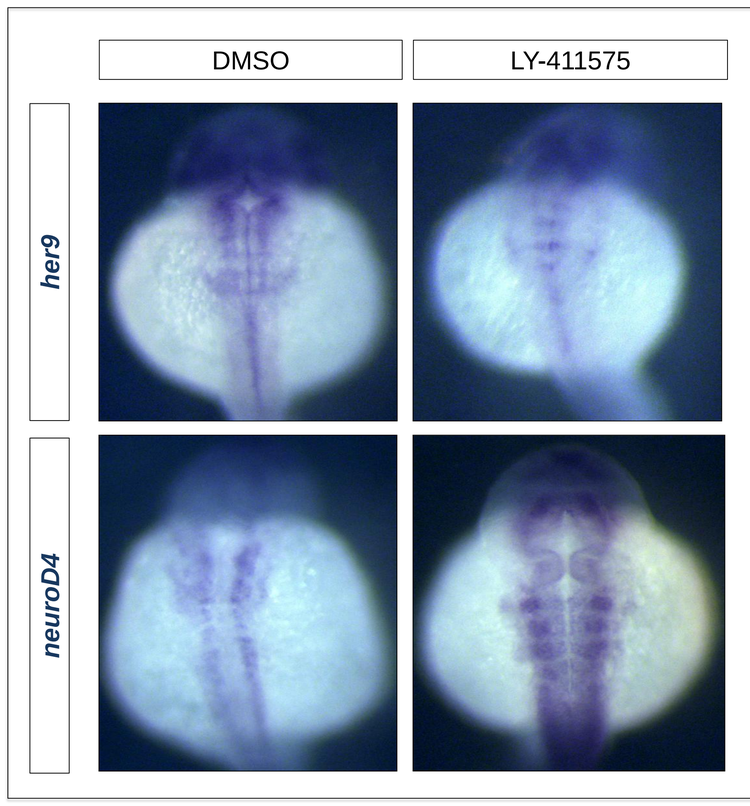
1.- Distribution in space and time of hindbrain progenitors



pH3 and **PCNA** are proteins that can be detected in cells during proliferation.

pH3 is present in progenitors undergoing mitosis.

PCNA is present in progenitors throughout interphase (G1).

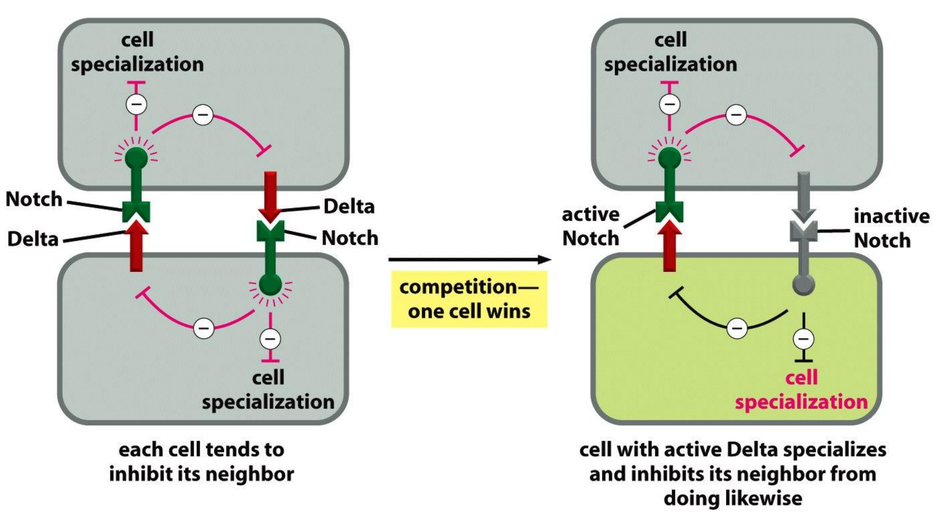


Control samples were treated with DMSO, and no effects on both *her9* target and neurogenesis were observed.

When NOTCH was inhibited with LY-411575 (pharmacological drug):
• *her9* (NOTCH target) was not expressed in the whole hindbrain but in the boundary cell population (BCP).
•*neuroD4* (proneural gene) was overexpressed in rhombomeric territories except BCP.

Therefore, BCP is independent on the NOTCH pathway.

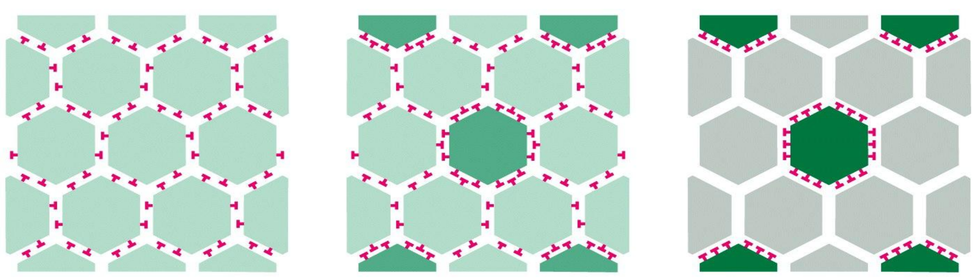
2.- Notch signaling and hindbrain progenitors



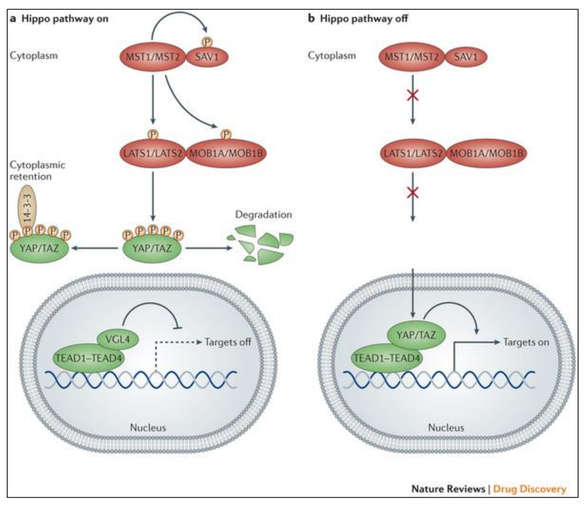
Notch pathway is a toolkit signaling pathway directly related to the development of neural system and the maintenance of neuronal progenitors.

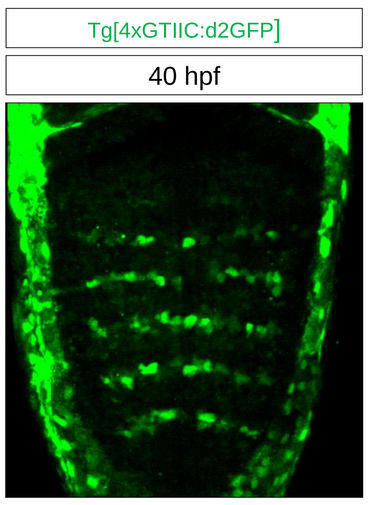
Ligand : Delta
Direct targets : *hes* genes
Undirect targets : Proneural genes

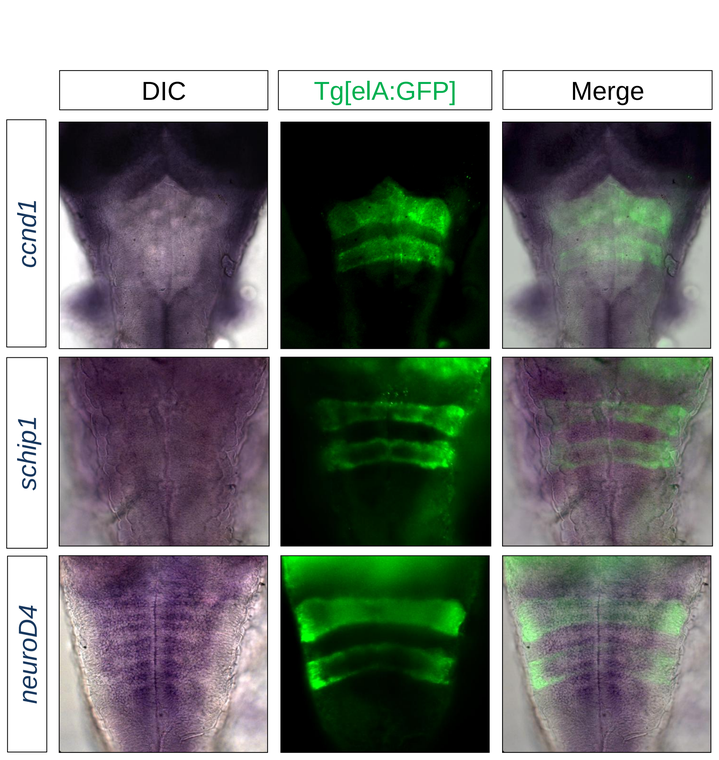
Notch off → Proneural on
Notch on → Proneural off



3.- Yap/Taz-activity and hindbrain progenitors







Hypothesis:
We proposed that *Schip1* is involved in initiation of the Hippo pathway and expression of *ccnd1* is regulated by Yap/Taz activity in the BCP.

Outcome:
None of the genes are involved in the Hippo pathway as the obtained results do not indicate their expression in the BCP.

REFERENCES

Kiecker and Lumsden, 2005
Johnson and Halder, 2014