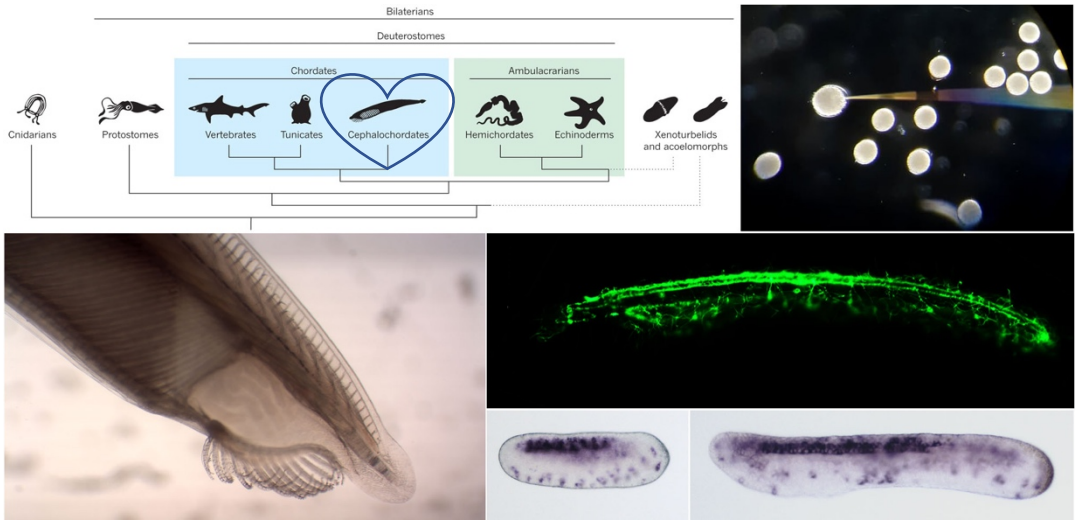
DEVELOPMENTAL BIOLOGY



EVOLUTION OF NEUROGENESIS IN CHORDATES

Amphioxus is a small fish-like marine invertebrate that lives burrowed in shallow waters. It is the only living representative of the cephalochordates which, together with tunicates and vertebrates, constitute the chordate phylum. Amphioxus is an extremely interesting model in evolutionary biology not only because it is basal in the chordate tree but also because it appears to have mantained many characteristics unchanged during evolution. These facts makes it a good proxy of the last invertebrate ancestor of the vertebrates. Our lab has been interested in the study of amphioxus nervous system for years. We are indeed deeply persuaded that its knowledge is the key to understand the diversification that occurred during the vertebrate radiation. At present, we are focusing on characterizing the signaling pathways involved in the differentiation of neurons and glial cells during amphioxus development and rigeneration. To do so, we perform pharmacological perturbation of the main developmental signaling pathways (e.g., Wnt, BMP, Hedgehog) and genetic manipulation by oocyte microinjection. The phenotypes resulting from such treatments are then analyzed by immunohistochemistry and *in situ* hybridization followed by brightfield, epifluorescence and confocal microscopy. In parallel, to better understand the neural circuits in amphioxus larvae, we study the responses to chemical and mechanical stimulation. In collaboration with the Aquarium of Genova will be evaluated the possibility to maintain and breed in captivity amphioxus of *B. lanceolatum*, In particular, will be investigated the optimal breeding by evaluating different types of substrate, food and environmental parameters with the aim of defining a breeding protocol that allows the maintenance of the specimens over time with regular maturation of the gonads, emission of gametes, birth of the larvae and their metamorphosis and growth to an adult individual.

Keywords: cephalochordates, amphioxus, protochordates, evolution, nervous system

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