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## Review

## Early Steps in the Formation of Neural Tissue in Ascidian Embryos

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## Abstract

Ascidians are simple invertebrate chordates whose lineage diverged from that of vertebrates at the base of the chordate tree. Their larvae display a typical chordate body plan, but are composed of a remarkably small number of cells. Ascidians develop with an invariant cell lineage, and their embryos can be easily experimentally manipulated during the cleavage stages. Their larval nervous system is organised in a similar way as in vertebrates but is composed of less than 130 neurones and around 230 glial cells. This remarkable simplicity offers an opportunity to understand, at the cellular and molecular levels, the ontogeny and function of each neural cell. Here, we first review the organisation of the ascidian nervous system and its lineage. We then focus on the current understanding of the processes of neural specification and patterning before and during gastrulation. We discuss these advances in the context of what is currently known in vertebrates.


## Keywords





ascidians; chordates; evolution; nervous system; neural induction; embryo; development; neurone; Otx; BMP; FGF; proteases; CNS; PNS; placodes; neural crest



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