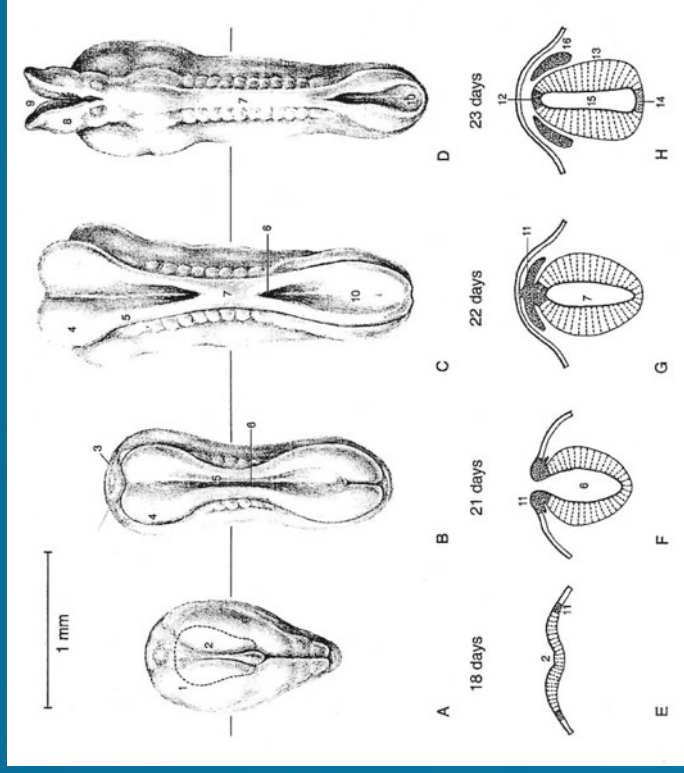
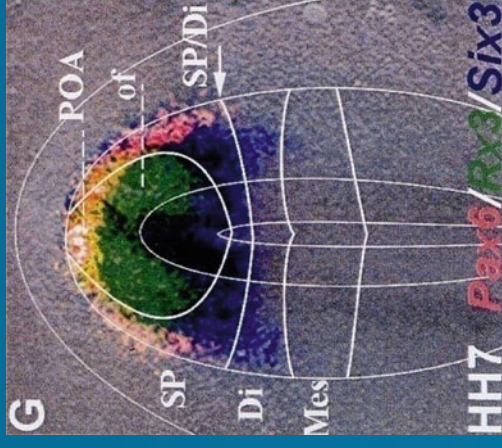


Towards a New Neuromorphology

1. From the classic to modern neuromorphology, an introductory overview
1.1 Neural plate – Neural groove – Neural tube
 An enormous increase of insight into the molecular regulatory processes and gene expression patterns during early development



Dorsal aspects and cross sections of some human embryos



Expression patterns of some genes in the anterior neural plate of a chick embryo (Sánchez-Arroyes et al. 2009)

1.1 Neural Plate—Neural Groove—Neural Tube

Plate 4

Most of you will know that the human brain begins as a tiny epidermal plate, called the ‘neural plate’, whose lateral edges rise upward, approach each other and finally fuse, so that the originally flat neural plate is transformed into a hollow neural tube with a fused roof plate (left panel). Note that this closing process does not occur synchronously over the length of the developing central nervous system (CNS). It begins in the future cervical (neck) region and proceeds from there anteriorly and posteriorly, so that the initially large anterior and posterior neural openings or ‘neuropores’ become progressively smaller and finally disappear. Experimental fate-mapping has shown that the rostralmost closing point lies at the locus of the future anterior commissure.

It should be emphasized that our knowledge concerning this early ontogenesis of the CNS just outlined, has enormously increased during the last decades, due to the development of molecular neurobiology. The right-hand panel symbolizes this progress. It shows the expression patterns of some developmental regulatory genes in the anterior neural plate of a chick embryo illustrating prospective telencephalic- (pink) and eye fields (green).

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