

Development of brain in chick

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The neural tube formed from the neural ectoderm is located dorsally in the median plain of the embryo and forms the basis for the central nervous system. Before going into the development of brain a brief idea about the formation of neural tube in chick is dealt with. During gastrulation of chick a primitive streak with Hensen's node is formed. In the 24 hours chick-embryo, as epiboly of ectodermal cells is taking place at the surface of the embryo, it brings about an elongation of the presumptive neural ecto-dermal cells above the notochordal area

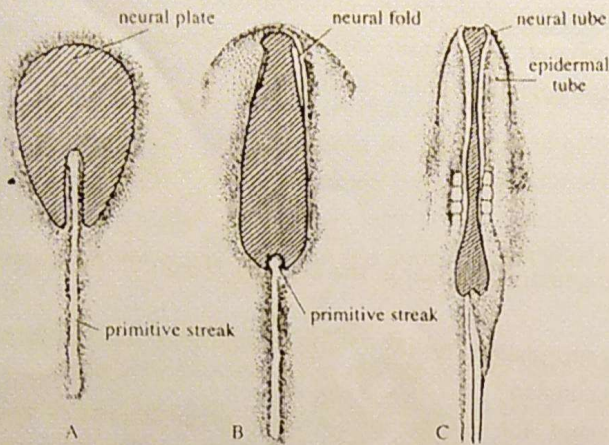


Figure: Neurulation in chick- (a) Embryo containing primitive streak, neural plate epidermis. (b) Antero-posterior extension of the neural plate, formation of neural folds and shortening of the primitive streak, (c) surface view of embryo 3 to 4 somite stage (26 to 28 hours of incubation).

As gastrulation comes to an end, the single-layered neural ectoderm rapidly becomes thick and stratified to form the neural plate. Starting from the anterior towards the posterior side, the neural plate gradually sinks down and its margins become elevated resulting in the formation of a neural groove bounded by the neural folds.

The groove continues to deepen and the neural folds meet above it, converting the original plate into a neural tube. The meeting of the neural folds is accompanied by the meeting of the epidermal ectoderm, which results in detaching the neural tube from the overlying ectoderm.

At 22 hours:

Formation of Neural groove and neural fold

- i) Neural plate becoming longitudinally folded establishes a neural groove
- ii) Bottom of the neural groove lies in the mid-dorsal line.
- iii) Flanking the neural groove at each side a ridge-like elevation (involving lateral portion of the neural plate) arises. These two elevations are called neural folds.
- iv) Neural folds originate due to extremely rapid cell proliferation in the area.
- v) Downward movement of neural plate cells to form the neural groove replaces the somatic mesoderm laterally from the notochordal area in order to accommodate invaginating neural tube.

Between 24 and 33 hours:

Fusion of neural folds to form neural tube

- i) At 24 hrs of incubation, the neural folds begin to converge mid-dorsally and completely fuse at 27 hours to form neural tube.