Abstract

Neurulation, i. e. formation of a neural tube, is a crucial event in embryogenesis of each vertebrate. This developmental process is rather stereotypical, generally comprising a transformation of a neural plate into a neural tube. In the majority of vertebrate groups, neurulation classically occurs by a folding process of bending neural folds, whereas in bony fishes (Teleostei), representing a crown group of ray-finned fishes (Actinopterygii), the neurulation occurs rather differently by a solid neural keel. The three stem groups of ray-finned fishes – bichirs, sturgeons and gars – might thus serve as unique models for understanding of evolutionary changes in the pattern of vertebrate neurulation. For that reason, detailed developmental series of bichir (*Polypterus senegalus),* sturgeon (*Acipenser ruthenus)* and gar (*Atractosteus tropicus)* were used, and their morphogenetic processes of neurulation were compared. I present here description of the outer morphology, and analyses of tissue and cellular changes, with a focus on intrinsic forces within the neural plate like apical constriction and convergent extension, as well as on some extrinsic forces. I also try to discuss possible mechanisms of an evolutionary transition from the bending of the neural plate to the neurulation via the neural keel, representing an unique evolutionary change in the vertebrate neurulation.