Abstract

Neurulation is an essential developmental process leading to the formation of neural tube that occurs during early embryogenesis of all vertebrates. In order to better understand neurulation of our own group, we should take into account also the modes of neurulation that take place in closely related vertebrate groups. This bachelor thesis is intended to summarize our knowledge on neurulation across vertebrates, but also in our sister groups like tunicates, amphioxus, or acorn worms. In vertebrates, neurulation typically proceeds via a common scheme that includes bending of a neural plate towards the dorsal midline, together with elevation of the neural folds. The neural tube is fully established when neural folds are brought into contact and fuse together. With some minor modifications, this scheme is common in the jaw-less fishes (Cyclostomata), cartilaginous fishes (Chondrichthyes) and also in the lobe-finned fishes (Sarcopterygii). However, in the ray-finned fishes (Actinopterygii) that represent nearly half of all recent vertebrate species, the neurulation proceeds rather differently. Whereas in the basal ray-finned fish lineages like in bichirs, sturgeons, or gars, the neural tube forms rather typically, in more derived teleost fishes and also in Amia, neural tube forms via the so-called neural cord or neural keel. Here, the neural tube does not form via epithelial rolling up, but it develops from the initially compact cells mass, with the lumen that is established additionally by the process of cavitation. In the thesis, more space is provided for model organisms like zebrafish (*Danio rerio*), frog (*Xenopus laevis*), chicken (*Gallus sp.*) or mouse (*Mus musculus*) whose neurulation is better understood, however, it also reveals available information from other, often underestimated groups. In general this thesis documents an unexpected and intriguing diversity in the processes of neurulation.

Key words: neurulation; neural tube; morphogenesis; vertebrates