

Abstract

Left-right asymmetry of epithalamus is widespread across vertebrate species and its form is established during embryonic development. The asymmetry involves not only morphology and differential neuronal connectivity, but also differential gene expression between the left and right sides of the epithalamus. A suitable model species for research on the development of epithalamic asymmetry is the zebrafish (*Danio rerio*). In zebrafish, the epithalamus consists of left and right habenulae containing differently sized habenular nuclei and a pineal complex consisting of a pineal and a left-sided parapineal organ. This asymmetry arises from the interaction of several pathways, such as the Nodal pathway, and the action of components of the nascent epithalamus, and affects the proper formation of later brain structures. Research of this process may provide insight into the origins of a number of neurological disorders and help in better understanding of the course of evolutionary history of this organ in vertebrates.