BIOMORPHOLOGICAL ADAPTATIONS OF THE PAIRED FINS OF FISH

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Nowadays a dynamic development of biology and medicine caused the usage of fish as important experimental animals. Because of numerous reasons (ease of genetic examination, keeping, reproduction etc.) zebrafish became the most popular laboratory fish. Many scientific researches were dedicated to its study. However, fish are the most numerous group of vertebrates in the world that has nearly 32900 species. And the basic knowledge about fish, such as anatomy, has many questions for answering.

One of such questions is the evolution of the paired fins of fish which are believed to be predecessors of limbs in terrestrial vertebrates. The various biological aspects of the paired fins of bony fish are generally poorly explored. Since the paired fins are less important for active swimming, their structure and functions can flexibly vary. In teleosts there are many pelvic fin modifications, namely dorsally placed pelvic fins (Bathophilus), unpaired structures (such as fused pelvic spine of triggerfish, fused pelvic fin sucker of gobies) or complete loss of pelvic fins. Pectoral fin structures include “wings” of flying fish, flying gurnards and sea robins, as well as derivative cephalic horns of batoids that are used for prey capture. Some species of fish (ex. sea robin, squirrel hake) have finger-like pectoral fins that possess chemoreceptors. Such changes in the structure and functions of the paired fins, probably, facilitated adaptation of bony fish to different habitat conditions.

In addition, the position of pelvic fins varies between species, ranging from abdominal to thoracic and even jugular levels. And the reason of such diverse position remains largely unexplored. Pelvic fins of Perciformes are supposed to shift rostrally during evolution. But when pelvic fins are placed under or in front of the pectoral fins some of their muscles begin not from the pelvic girdle, but from the cleithrum. In such a case, maybe they should be considered as additional pair of pectoral fins. Further investigation of paired fins innervation could give answer on this question.

Thus, the modification of the paired fins involved large and powerful limbs of tetrapods to become the dominant force in terrestrial locomotion. Further investigation of the anatomical structure of the paired fins of various species of fish, that belong to different orders and occupy different ecological niches, could contribute to the extension of anatomical knowledge, in general, and could find more answers on the question of evolution of the paired appendages/fins, in particular. This article presents the problems of biomorphological evolution of the paired fins of fish.

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