

Abstract

Almost 30 thousand species of the ray-finned fishes, which exist in the world today, represent approximately one half of all known vertebrates. The ray-finned fishes are divided into four distinct groups: bichirs, chondrosteans, neopterygians and teleost fishes. These groups differ significantly in their mode of embryogenesis, however, particular details are known only from few model species like danio or medaka, which all belong to the most diversified actinopterygian group, the teleost fishes. In this thesis, I summarize the current knowledge and compare the patterns of embryogenesis of all four groups of ray-finned fishes. Interestingly, their patterns of early ontogenesis are very dissimilar, such as bichirs and sturgeons undergo holoblastic cleavage of the whole egg, similar to amphibians, whereas teleost fishes evolved strictly meroblastic cleavage of the cytoplasm accumulated on the animal pole of yolk mass, which has profound effects on their further development. The meroblastic cleavage, which is described in details in zebrafish, serves as a template for studying early ontogenesis of all other teleost fishes comprising nearly 27 thousand species. The meroblastic cleavage remained preserved in all teleosts, aside from the fact that these fishes have developed many alternative reproductive strategies and the differences of their embryogenesis mostly occur during later stages of development only.

Key words: ray-finned fishes, teleost fishes, holoblastic cleavage, meroblastic cleavage, gastrulation, epiboly, embryonic development