

Book Review

**Rui Diogo, Janine M. Ziermann, Julia Molnar, Natalia Siomava, Virginia Abdala  
Muscles of Chordates: Development, Homologies, and Evolution**

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The Vertebrata is one of the most speciose groups of animals, comprising more than 58,000 living species. The evolutionary history of muscle development in the paired fins of teleost fish and the limbs of tetrapod vertebrates is still, to a large extent, uncertain. There has been a consensus, however, that in the vertebrate clade the ancestral mechanism of fin and limb muscle development involves the extension of epithelial tissues from the somite into the fin/limb bud. This mechanism has been documented in chondrichthyan, dipnoan, chondrosteian and teleost fishes. It has also been assumed that in amniotes, in contrast, individual progenitor cells of muscles migrate from the somites into the limb buds. Also in zebrafishes this presumably derived mechanism involving individual cell migration, is present. Consequently it has been proposed, based on data on sharks, zebrafishes, chickens, quails and mice that the derived mechanism was present in the sarcopterygians. This conclusion, however, may be premature in the light of further data available in the literature, which show a highly mosaic distribution of this character in the vertebrate clade. Furthermore, a developmental mode exists that is intermediate between the supposed ancestral and derived modes in teleosts, reptiles and possibly amphibians.

This book provides a detailed morphological account on the comparative anatomy, development, homologies and evolution of the muscles of vertebrates. It compiles the available information, obtained from dissections of thousands of specimens and from a detailed literature review that comprises references most of that are recently published or in press, for all skeletal muscles of chordates, including the muscles of amphioxus and tunicates and the muscles of the head and paired and median appendages and pays special attention to the configuration, evolution and variations of the skeletal muscle. Besides the authors use an unifying nomenclature for all skeletal muscles of chordates that takes into account all the data compiled for this book. The book synthesizes, summarizes, and provides high-quality illustrations to show what is known of the configuration, development, homology, and evolution of the muscles of all major extant chordate groups. Muscles as different as those used to open the siphons of sea squirts and for human facial communication have been

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compared, and their evolutionary links have been explained. Another unique feature of the book is that it covers, illustrates, and provides detailed evolutionary tables for each and every muscle of the head, neck, and all paired and median appendages of extant vertebrates. The point of force of this book includes more than 200 high-quality anatomical illustrations, including evolutionary trees that summarize the origin and evolution of all major muscle groups of chordates, data on the muscles of the head and neck and on the pectoral, pelvic, anal, dorsal, and caudal appendages of all extant vertebrate taxa. In the book the authors examine experimental observations from evolutionary developmental biology studies of chordate muscle development, allowing us to evolutionarily link the muscles of vertebrates with those of other chordates and discuss broader developmental and evolutionary issues and their implications for macroevolution, such as the links between phylogeny and ontogeny, homology and serial homology, normal and abnormal development, the evolution, variations, and birth defects of humans, and medicine. Therefore is discuss the importance of the study for muscles for macroevolution, the links between phylogeny and ontogeny homology and serial homology, revolution and evolutionary medicine. Consequently the book will be useful to students, teachers, and researchers working in fields such as functional morphology, ecomorphology, evolutionary developmental biology, zoology, molecular biology, evolution, and phylogeny. As the book includes crucial information about the anatomy, development, homologies, evolution and muscular structure of our own species, *Homo sapiens*, it will also be helpful to physicians and medical students.