

Preface

The vertebrates are members of the largest clade of chordates, the Vertebrata, and are characterized for having features such as backbones and spinal columns. More than 58,000 species of vertebrates have been described so far, making up about 5% of all described animal species. Several studies have provided information on the head, neck, pectoral and forelimb musculature of the Vertebrates, but most of them concentrated on a single taxon or a specific subgroup of muscles. The few more inclusive comparative analyses that were actually based on dissections of taxa representing sarcopterygian fish, amphibians, reptiles, monotremes and therian mammals, including modern humans, were published at least half a century ago, and some much earlier than that. Those authors did not have access to information that is now available about, for example, the cephalic and the pectoral muscles of the coelacanth *Latimeria chalumnae*, the role played by neural crest cells in the development and patterning of the vertebrate muscles, or the molecular and other evidence that has accumulated about phylogenetic relationships of Vertebrates. The main aims of the present volume are thus to summarize all the information obtained from our dissections of numerous specimens from vertebrate groups as varied as the Teleostei, Halecomorphi, Ginglymodi, Chondrostei, Cladistia, Dipnoi, Gymnophiona, Anura, Caudata, Testudines, Lepidosauria, Crocodylia, Aves, Monotremata, Marsupialia, Rodentia, Scandentia, Dermoptera and Primates, including *Homo sapiens*, to compare this new information with the data available in the literature, and then to collate and synthesize all of the new and existing data. To our knowledge, this is the most detailed account that has been published so far on the head, neck, pectoral and forelimb musculature of Vertebrates, because it includes information about the mandibular, hyoid, branchial, hypobranchial, epibranchial, pectoral, arm, forearm and hand muscles of each of the major vertebrate taxa. The book also includes hundreds of illustrations (drawings and photographs) of, as well as numerous tables showing the homologies between the muscles of all the major extant vertebrate taxa. It also provides a list of more than a thousand synonyms that have been used by other authors to designate these muscles in the literature, from more than two centuries ago until

the present date. Importantly, it also reviews data obtained in the fields of evolutionary developmental biology, embryology and genetics, and explains how this data helps to understand the evolution and homologies of vertebrate muscles. Chapters 1 and 2 provide an introduction to the main aims of the book and the methodology and material used. Chapter 3 deals with the muscles of non-osteichthyan vertebrates. Chapters 4 and 8 are focused on the head, neck, pectoral and pectoral fin/forelimb muscles of actinopterygians and basal sarcopterygians. Chapters 5 and 9 discuss the evolution and homologies of these muscles, from sarcopterygian fish such as coelacanth to mammals such as modern humans, while Chapters 6, 7 and 10 deal with the muscles of non-mammalian tetrapods. Chapter 11 provides a general discussion of the data presented in Chapters 3 to 10, addressing subjects such as the use of myological characters in phylogenetic reconstructions, the relationship between muscular splittings, fusions, paedomorphism, evolutionary reversions and anatomical complexity, the study of muscles in the context of evolutionary developmental biology, and the proposal of a unifying nomenclature for the head, neck, pectoral and forelimb muscles of the vertebrates as a whole. We thus hope that the information provided in this book will be useful to teachers, students, and researchers working in different fields such as functional morphology, ecomorphology, evolutionary developmental biology, embryology, molecular biology, zoology, evolution, and phylogeny. As the book includes crucial information about the anatomy, development, homologies, evolution and muscular abnormalities of our own species, *Homo sapiens*, it will also be helpful to physicians and medical students.

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