

Contents

Preface.....	ix
About the Authors.....	xi
Acknowledgments.....	xiii
Chapter 1 Introduction.....	1
Chapter 2 Methodology.....	5
Biological Material.....	5
Nomenclature.....	7
Phylogeny and Homology.....	11
Chapter 3 Non-Vertebrate Chordates and the Origin of the Muscles of Vertebrates.....	13
<i>Ciona intestinalis</i> and <i>Branchiostoma floridae</i> as Examples of Urochordates and Cephalochordates.....	14
Evolution and Homology of Chordate Muscles Based on Developmental and Anatomical Studies.....	17
Recent Findings on the "New Head Hypothesis" and the Origin of Vertebrates.....	22
Development and Evolution of Chordate Muscles and the Origin of Head Muscles of Vertebrates.....	24
General Remarks.....	25
Chapter 4 General Discussion on the Early Evolution of the Vertebrate Cephalic Muscles.....	27
General Remarks.....	45
Chapter 5 Cephalic Muscles of Cyclostomes and Chondrichthyans.....	49
<i>Myxine glutinosa</i> : Atlantic Hagfish.....	61
<i>Petromyzon marinus</i> : Sea Lamprey.....	63
<i>Hydrolagus collieri</i> : Spotted Ratfish.....	65
<i>Squalus acanthias</i> : Spiny Dogfish.....	67
<i>Leucoraja erinacea</i> : Little Skate.....	68
Evolution of Cephalic Muscles in Phylogenetically Basal Vertebrates.....	70
Metamorphosis, Life History, Development, Muscles, and Chordate Early Evolution.....	76
General Remarks.....	82
Chapter 6 Cephalic Muscles of Actinopterygians and Basal Sarcopterygians.....	85
Mandibular Muscles.....	85
Hyoid Muscles.....	96
Branchial Muscles.....	106
Hypobranchial Muscles.....	109
General Remarks.....	111
Chapter 7 Development of Cephalic Muscles in Chondrichthyans and Bony Fishes.....	113
General Remarks.....	116
Chapter 8 Head and Neck Muscle Evolution from Sarcopterygian Fishes to Tetrapods, with a Special Focus on Mammals.....	121
Origin and Evolution of the Mammalian Mandibular Muscles.....	122
Hyoid Muscles.....	211

Branchial, Pharyngeal, and Laryngeal Muscles	217
Hypobranchial Muscles.....	223
Emblematic Example of the Remarkable Diversity and Evolvability of the Mammalian Head: The Evolution of Primate Facial Expression Muscles, with Notes on the Notion of a Scala Naturae.....	223
General Remarks	227
Chapter 9 Head and Neck Muscles of Amphibians	229
Mandibular Muscles.....	229
Hyoid Muscles	234
Branchial Muscles	236
Hypobranchial Muscles.....	239
General Remarks	240
Chapter 10 Head and Neck Muscles of Reptiles.....	243
Mandibular Muscles	243
Hyoid Muscles	253
Branchial Muscles	255
Hypobranchial Muscles.....	259
General Remarks	264
Chapter 11 Development of Cephalic Muscles in Tetrapods.....	267
Development of Mandibular Muscles	267
Development of Hyoid Muscles.....	270
Development of Branchial Muscles.....	273
Development of Hypobranchial Muscles	273
Development of Cephalic Muscles in the Axolotl in a Broader Comparative Text	274
General Remarks	277
Chapter 12 Pectoral and Pelvic Girdle and Fin Muscles of Chondrichthyans and Pectoral-Pelvic Nonserial Homology	279
Muscles of Paired Appendages of <i>Squalus acanthias</i>	282
Muscles of Paired Appendages of <i>Leucoraja erinacea</i>	283
Muscles of Paired Appendages of <i>Hydrolagus collieri</i>	286
Plesiomorphic Configuration for Chondrichthyans and Evolution of the Cucullaris	287
Forelimb-Hindlimb Serial Homology Dogma	289
General Remarks	290
Chapter 13 Pectoral and Pelvic Muscles of Actinopterygian Fishes	293
Muscles of the Pectoral and Pelvic Appendages of Actinopterygians.....	293
General Remarks.....	304
Chapter 14 Muscles of Median Fins and Origin of Pectoral vs. Pelvic and Paired vs. Median Fins	305
Dorsal and Anal Fins	305
Caudal Fins.....	310
Evolution of Muscles of Median Fins.....	312
Similarities and Differences between the Musculature of Paired Fins.....	314
Similarities and Differences between the Musculature of the Median Fins.....	318
Can the Muscles of the Median Fins Correspond to Those of the Paired Fins?.....	318
Is the Zebrafish an Appropriate Model for the Appendicular Musculature of Teleosts?.....	319
General Remarks.....	320

Chapter 15	Development of Muscles of Paired and Median Fins in Fishes	321
	Development of the Paired and Median Muscles of the Zebrafish	321
	Developmental and Evolutionary Uniqueness of the Caudal Fin.....	328
	General Remarks.....	333
Chapter 16	Pectoral and Pelvic Appendicular Muscle Evolution from Sarcopterygian Fishes to Tetrapods.....	337
	Muscle Anatomy and Reduction of the Pectoral Fin of <i>Neoceratodus</i>	346
	Previous Anatomical Studies of <i>Latimeria</i> and <i>Neoceratodus</i>	353
	Evolution and Homology of Appendicular Muscles in Sarcopterygians	353
	General Remarks.....	355
Chapter 17	Forelimb Muscles of Tetrapods, Including Mammals	357
	Pectoral Muscles Derived from the Postcranial Axial Musculature.....	357
	Appendicular Muscles of the Pectoral Girdle and Arm.....	409
	Appendicular Muscles of the Forearm and Hand	413
	Marsupials and the Evolution of Mammalian Forelimb Musculature	417
	General Remarks.....	422
Chapter 18	Forelimb Muscles of Limbed Amphibians and Reptiles.....	425
	Pectoral Muscles Derived from the Postcranial Axial Musculature.....	425
	Appendicular Muscles of the Pectoral Girdle and Arm.....	471
	Appendicular Muscles of the Forearm and Hand	473
	Chameleon Limb Muscles, Macroevolution, and Pathology.....	479
	General Remarks.....	485
Chapter 19	Hindlimb Muscles of Tetrapods and More Insights on Pectoral–Pelvic Nonserial Homology	487
	Evolution and Homologies of Hindlimb Muscles, with Special Attention to Mammals.....	505
	Comparison between the Tetrapod Hindlimb and Forelimb Muscles	590
	General Remarks.....	593
Chapter 20	Development of Limb Muscles in Tetrapods.....	595
	Development of Pectoral and Arm Muscles.....	595
	Development of Ventral/Flexor Forearm Muscles	597
	Development of Dorsal/Extensor Forearm Muscles	598
	Development of Hand Muscles.....	599
	Development of Pelvic and Thigh Muscles.....	600
	Development of Ventral/Flexor Leg Muscles.....	602
	Development of Dorsal/Extensor Leg Muscles.....	602
	Development of Foot Muscles	604
	Morphogenesis and Myological Patterns	605
	Fore–Hindlimb Enigma and the Ancestral <i>Bauplan</i> of Tetrapods	608
	General Remarks.....	610
References		611
Index		635