1. Record Nr. UNINA9910437852503321

Autore	Xu Ke
Titolo	Myelinated Fibers and Saltatory Conduction in the Shrimp : The Fastest Impulse Conduction in the Animal Kingdom / / by Ke Xu, Susumu Terakawa
Pubbl/distr/stampa	Tokyo : , : Springer Japan : , : Imprint : Springer, , 2013
ISBN	4-431-53924-7
Edizione	[1st ed. 2013.]
Descrizione fisica	1 online resource (121 p.)
Disciplina	307
Soggetti	Neurobiology Neurosciences Biochemistry Cell physiology Cell membranes Animal Biochemistry Cell Physiology Membrane Biology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	""Foreword""; ""Preface""; ""About the Authors""; ""Contents""; ""Chapter 1: Introduction""; ""Chapter 2: The Penaeus Shrimp as an Experimental Marine Animal for Neurobiological Study""; ""2.1 Classification of Some Higher Species of Penaeus Shrimp""; ""2.2 Morphology of the Nervous System of the Penaeus Shrimp""; ""2.3 Myelinated Giant Fiber Preparation""; ""2.4 Axona€?Axonal Giant Synapse Preparation""; ""2.5 Giant Neuron Preparation""; ""2.6 Stretch Receptor Preparation""; ""2.7 Cardiac Ganglion Preparation""; ""2.8 Overall View"" ""Chapter 3: Morphological Studies on the Myelin Sheath of Nerve Fibers""""""3.1 Some Significant Events in the Morphological Studies of Nerve Fibers by Light Microscopy""; ""3.2 The Myelin Sheath of the Nerve Fibers of Vertebrates Studied by Electron Microscopy""; ""3.3 The Myelin-Like Sheath of the Nerve Fibers of Some Invertebrates Studied by Electron Microscopy""; ""3.4 The Myelin Sheath Was Concluded to Have Evolved in Vertebrates""; ""Chapter 4: Biochemical Studies on

Myelin of the Nervous System""; ""4.1 Myelin Composition in Vertebrates""
""4.2 Compositions of the Myelin Sheath in Penaeus Shrimp and Myelin-Like Sheath in Some Invertebrates""""""Chapter 5: Myelin Sheath with a New Type of Fine Structure Found in the Nervous System of Penaeus Shrimp, an Invertebrate""; ""5.1 Necessary Conditions for Identification of the Myelin Sheath""; ""5.2 Specific Morphological Structures of the Myelinated Fibers of the Penaeus Shrimp""; ""5.3 Identification of the Location of the Axolemma and the Sheath Component in the Myelinated Fibers of the Penaeus Shrimp""
""5.4 Specific Characteristics of the Fine Structure of the Myelin Sheath of the Penaeus Shrimp""""""5.5 Electrical Properties of the Myelin Sheath Measured in the Giant Fiber Preparation of Penaeus japonicus""; ""5.6 Overall View of the Myelin Sheaths of Vertebrate and Invertebrate (Penaeus Shrimp) Nerve Fibers""; ""Chapter 6: Two Unique Structures Discovered in the Myelinated Fibers of the Penaeus Shrimp""; ""6.1 Wide Extracellular Gap Space Filled with an Amorphous Gel Substance Under the Myelin Sheath of the Nerve Fibers of the ...""
""6.2 Unique Thin Nucleated Wall Containing Microtubule Bundles and Tightly Enclosing the Axon of the Myelinated Fibers of th...""""""6.3 Overall View of Two Specific Structures of the Myelinated Fibers of the Penaeus Shrimp""; ""Chapter 7: Studies on Impulse Conduction of Nerve Fibers""; ""7.1 Some Significant Events of Studying the Electrical Impulse of Nerve Fibers""; ""7.2 Mechanism of Impulse Conduction in Unmyelinated Nerve Fibers""; ""7.3 Experiments for Establishing the Saltatory Conduction Hypothesis with the Myelinated Fiber Preparations of Toad and Frog""
""7.4 Difference in the Distribution of Ion Channels in the Axoplasmic Membranes Between Unmyelinated and Myelinated Fibers o...""

Sommario/riassunto

In 1961, neurobiologists found that the conduction velocity of the nerve impulse in the giant nerve fiber of the Penaeus shrimp abdominal nerve cord was over 200 m/s, the highest speed of information transmission ever observed in the animal kingdom. The peculiar myelin sheath with its unique nodal structure and the electrical properties of the nerve fibers of the shrimp have continued to be investigated for a quarter of century and are now fully described in this book. The investigation dispels the commonly held belief that the fastest recorded impulse conduction is about 120 m/s in the thickest vertebrate myelinated nerve fibers. In the shrimp, researchers found a completely novel type of functional node in the giant fiber which they designated as the fenestration node. In portions of the myelinated fiber, the fenestration node furnished the sites of excitation. Also discovered was a new strategy for increasing impulse conduction in the shrimp. The book includes a section on the formation of the fenestration node and the discovery of a strategy that allows the shrimp to escape its predators by an action of the fastest velocity. The data presented in this volume on the myelin sheath of invertebrates present a new direction for this field and a rich source of information for neurobiologists worldwide.