# Contents

Peptidergic Modulation of Identified Function

Antagonistic Modulation of Neuromuscular Parameters in Crustaceans by the Peptides Proctolin and Allatostatin, Contained in Identified Motor Neurons ..........2
Werner Rathmayer, Christian Erxleben, Stijefan Djokaj, Aleksandr Gaydukov, Sabine Kreissl, Torsten Weiss

Convergence and Divergence of Cotransmitter Systems in the Crab Stomatogastric Nervous System ..................................................................................20
Eve Marder, Andrew M. Swensen, Dawn M. Blitz, Andrew E. Christie and Michael P. Nusbaum

Peptidergic Release Sites Involved in Modulation of the Stomatogastric Nervous System ..........................................................................................................................................................34
Petra Skiebe

Intracellular Signals that Mediate Synaptic Modulation by a FMRFamide-Like Neuropeptide in Crayfish ...........................................................................................................................................................................49
A. Joffre Mercier, Amit Badhwar, Andrea D. Weston and Markus Klose

Influence of Neuromodulators and Vesicle Docking Related Proteins on Quantal Release .................................................................................................................................................................................63
R. L. Cooper, R. Chase Southard, Ping He, and S. W. Whiteheart

Hormonal Control

The Crustacean Neuropeptides of the CHH/MIH/GIH Family: Structures and Biological Activities ......................................................................................................................................................................................84
Detlef Böcking, Heinrich Dircksen, and Rainer Keller

Crustacean Chromatophore: Endocrine Regulation and Intracellular Signalling Systems ..........................................................................................................................................................................................98
Luiz E. M. Nery and Ana M. L. Castrucci

Distributed Circadian Rhythmicity in the Crustacean Nervous System ..............113
Hugo Aréchiga and Leonardo Rodríguez-Sosa
Aminergic Modulation of Behavior

Neural Mechanisms of Dominance Hierarchies in Crayfish ........................................124
Joanne M. Drummond, Fadi A. Issa, Cha-Kyong Song, Jens Herberholz,
Shih-Rung Yeh and Donald H. Edwards

Aminergic Systems in the Squat Lobster Mundia quadrispina (Anomura,
Galatheidae): a Case Made for Comparative Neurobiology .................136
Brian L. Antonsen and Dorothy H. Paul

Amine Effects on Aggression in the Giant Tropical Freshwater Prawn
Macrobrachium rosenbergii ....................................................................143
Maria A. Sosa and Deborah J. Baro

Synaptic Connectivity of Amine-Containing Neurosecretory Cells of
Lobsters: Inputs to 5HT- and OCT- Containing Neurons .....................156
Michael Hörner, Ralf Heinrich, Stuart I. Cromarty and Edward A. Kravitz

Intrinsic Properties of Amine-Containing Neurosecretory Cells of Lobsters:
Spontaneous Activity and Autoinhibition ........................................173
R. Heinrich, M. Hörner, S.I. Cromarty and E.A. Kravitz

Quantitative Behavioral Techniques for the Study of Crustacean Aggression....186
Robert Huber, Alisdair G. Daws, Sarah A. Tuttle and Jules B. Panksepp

Aminergic Modulation at the Cellular and Molecular Level

Multiple Effects of Dopamine on an Identified Motor Neuron Analyzed by
Electrophysiological and Optical Imaging Techniques ..........................204
Harris-Warrick

A-Current Diversity: Differences in Channel Hardware or Second
Messengers? ..................................................................................217
Deborah J. Baro

Molecular Biology of Crustacea: Unique Opportunities in the Crustacean
Nervous System ..............................................................................232
Timothy S. McClintock, Alexander A. Gimelbrant, and Deborah J. Baro

Aminergic Modulation of Sensory-Motor Integration in the Walking System
of the Crayfish .................................................................236
E. Pearlstein, D. Cattaert, and F. Clarac
Synaptic Mechanisms

Determinants of Synaptic Strength and Stability at Crustacean Neuromuscular Junctions .......................................................... 248
Harold L. Atwood

Activity-Dependent Development and Plasticity of Crustacean Motor Terminals ................................................................. 266
Gregory A. Lnenicka and Eric J. Morley

Crustacean Neuromuscular Glutamatergic and GABAergic Channels with Some Comparison to Drosophila Channels .................................................. 282
J. Dudel, H. Adelsberger, and M. Heckmann

Correlation of the Synaptic and Mechanical Properties of Two Slow Fibre Phenotypes in a Crustacean Muscle ...................................... 292
J. M. Holmes, D. M. Neil, S. Galler and K. Hilber

Nitric Oxide and Cyclic GMP Modulate Synaptic Transmission in the Local Circuits of the Crayfish ....................................................... 305
Hitoshi Aonuma and Philip L. Newland

Learning and Memory

Crustaceans as Models to Investigate Memory Illustrated by Extensive Behavioral and Physiological Studies in Chasmagnathus .................................................. 314
Héctor Maldonado

Visual Learning in Crabs Investigated by Intracellular Recordings in Vivo ........................................................... 328
Daniel Tomsic

Olfaction

A Compound Nose: Functional Organization and Development of Aesthetasc Sensilla .................................................................................. 346
Charles D. Derby, Pascal Steullet, Holly S. Cate, and Paul J. H. Harrison

Molecular Physiology of G-Proteins in Olfactory Transduction and CNS Neurotransmission in the Lobster .......................................................... 359
Timothy S. McClintock and Fuqiang Xu

Properties and Functional Role of a Sodium-Activated Nonselective Cation Channel in Lobster Olfactory Receptor Neurons ........................................ 367
Asylbek B. Zhainazarov, Richard E. Doolin, and Barry W. Ache
Development and Growth Patterns of Olfactory Sensilla in Malacostracan Crustaceans .......................................................... 376
Mattias Ekerholm and Eric Hallberg

Olfactory Centers in the Brain of Freshwater Crayfish ....................... 386
David Sandeman and De Forest Mellon Jr.

Development

Cell Lineage of Crustacean Neuroblasts ................................... 406
Gerhard Scholtz and Matthias Gerberding

From Stem Cell to Structure: Neurogenesis in the CNS of Decapod Crustaceans ............................................................. 417
Steffen Harzscl

Adult Neurogenesis in the Central Olfactory Pathway of Decapod Crustaceans ............................................................. 433
Manfred Schmidt

Role of Modulatory Inputs in the Ontogeny of Neural Networks ........ 454
Valérie S. Fénelon, Yves Le Feuvre and Pierre Meyrand

Visual Systems

The Detection and Analysis of Optic Flow by Crabs: from Eye Movements to Electrophysiology .............................................. 468
Barnes, W. Jon. P., Horseman, B. Geoff. and Macauley, Martin W.S.

Signal Processing in the Crayfish Optic Lobe: Contrast, Motion and Polarization Vision .................................................... 486
Raymon M. Glantz and Clyde S. Miller

Spectral Sensitivity in Crustacean Eyes ...................................... 499
Thomas W. Cronin and Takahiko Hariyama

Evolution of Optical Design in the Malacostraca (Crustacea) ............ 512
Stefan Richter

Sensory Integration

Ventilatory Activity in Free-Moving Crayfish Is Indicative of Its Functional State and Perception of External Stimuli ....................... 526
Zhanna Shuranova and Yuri Burmistrov
Contents

Sound Production in Crustacea with Special Reference to the Alpheidae .......... 536
Barbara Schmitz

Sound Perception in Aquatic Crustaceans........................................... 548
Thomas Breithaupt

Neural Networks Controlling Vegetative Rhythms

Connections of the Head to Networks of the Stomatogastric System in Crayfish................................................................. 560
Hans-Georg Heinzel, Eva Dybek, Hartmut Böhm and David Sandeman

Performance of Neural Networks Controlling Vegetative Rhythms........... 567
Hartmut Böhm, Christian Gutzen, Stefan Hinterkeuser and Hans-Georg Heinzel

Sensory Feedback in the Operating Stomatogastric Nervous System of the Crab (Cancer pagurus) ......................................................... 573
Dirk Weigelt, Hartmut Böhm and Hans-Georg Heinzel

Circuitry Analysis

Motor Pattern Switching by an Identified Sensory Neuron in the Lobster Stomatogastric System......................................................... 582
Denis Combes, Pierre Meyrand and John Simmers

Synaptic Organization of Local Circuit Neurons in the Terminal Abdominal Ganglion of the Crayfish..................................................... 591
Toshiki Nagayama

Proprioception in the Tailfan of the Crayfish........................................ 601
Philip L. Newland

Active Shaping of Proprioceptive Message in Crayfish.......................... 610
Daniel Cattaert, Didier Le Ray, and Michelle Bévengut
The Crustacean Nervous System
Wiese, K. (Ed.)
2002, XXI, 623 p., Hardcover
ISBN: 978-3-540-66900-5