



ANNUAL REVIEW OF PHYSIOLOGY

VOLUME 61, 1999

JOSEPH F. HOFFMAN, *Editor*
Yale University School of Medicine

PAUL De WEER, *Associate Editor*
University of Pennsylvania School of Medicine



CONTENTS

PERSPECTIVES, *Joseph F. Hoffman, Editor*

- Pulling the Cart and Enjoying the Ride, *Carlton C. Hunt* 1

GASTROINTESTINAL PHYSIOLOGY, *Luis Reuss, Section Editor*

- Cellular and Molecular Basis for Electrical Rhythmicity in
Gastrointestinal Muscles, *Burton Horowitz, Sean M. Ward,
and Kenton M. Sanders* 19
- Ionic Conductances in Gastrointestinal Smooth Muscles and
Interstitial Cells of Cajal, *G. Farrugia* 45
- Excitation-Contraction Coupling in Gastrointestinal and Other
Smooth Muscles, *T. B. Bolton, S. A. Prestwich, A. V. Zholos,
and D. V. Gordienko* 85
- The Enteric Nervous System and Regulation of Intestinal Motility,
W. A. A. Kunze and J. B. Furness 117

CARDIOVASCULAR PHYSIOLOGY, *Eduardo Marban, Section Editor*

- Mechanisms of Cardiac Pain, *R. D. Foreman* 143
- Desensitization of G Protein-Coupled Receptors in the
Cardiovascular System, *M. Bünemann, K. B. Lee,
R. Pals-Rylaarsdam, A. G. Roseberry, and M. M. Hosey* 169
- Regulation of Natriuretic Peptide Secretion by the Heart,
G. Thibault, F. Amiri, and R. Garcia 193
- Myoblast Cell Grafting into Heart Muscle: Cellular Biology
and Potential Applications, *P. D. Kessler and B. J. Byrne* 219

COMPARATIVE PHYSIOLOGY, *George Somero, Section Editor*

- Heat-Shock Proteins, Molecular Chaperones, and the Stress
Response: Evolutionary and Ecological Physiology,
Martin E. Feder and Gretchen E. Hofmann 243

CELL PHYSIOLOGY, *Paul De Weer, Section Editor*

- Genetic Diseases and Gene Knockouts Reveal Diverse Connexin Functions, *Thomas W. White and David L. Paul* 283
- Localized Intracellular Calcium Signaling in Muscle: Calcium Sparks and Calcium Quarks, *Ernst Niggli* 311
- ATP-Sensitive Potassium Channels: A Model of Heteromultimeric Potassium Channel/Receptor Assemblies, *Susumu Seino* 337

ENDOCRINOLOGY, *Jean D. Wilson, Section Editor*

- Adrenomedullin and the Control of Fluid and Electrolyte Homeostasis, *Willis K. Samson* 363
- Pathophysiology of Endothelin in the Cardiovascular System, *Takashi Miyauchi and Tomoh Masaki* 391
- Gene Interactions in Gonadal Development, *Keith L. Parker, Andreas Schedl, and Bernard P. Schimmer* 417

NEUROPHYSIOLOGY, *Bruce P. Bean, Section Editor*

- Synchronous Activity in the Visual System, *W. Martin Usrey and R. Clay Reid* 435
- Timing in the Auditory System of the Bat, *Ellen Covey and John H. Casseday* 457
- Synaptic Mechanisms for Coding Timing in Auditory Neurons, *Laurence O. Trussell* 477
- The Role of Timing in the Brainstem Auditory Nuclei of Vertebrates, *D. Oertel* 497
- Timing of Synaptic Transmission, *B. L. Sabatini and W. G. Regehr* 521

RESPIRATORY PHYSIOLOGY, *Donald Massaro, Section Editor*

- Structure, Strength, Failure, and Remodeling of the Pulmonary Blood-Gas Barrier, *J. B. West and O. Mathieu-Costello* 543
- Evolution of Vertebrate Cardio-Pulmonary System, *C. G. Farmer* 573
- Mouse Models of Airway Responsiveness: Physiological Basis of Observed Outcomes and Analysis of Selected Examples Using These Outcome Indicators, *J. M. Drazen, P. W. Finn, and G. T. De Sanctis* 593
- Sodium Channels in Alveolar Epithelial Cells: Molecular Characterization, Biophysical Properties, and Physiological Significance, *Sadis Matalon and Hugh O'Brodoovich* 627

(Continued)

RENAL AND ELECTROLYTE PHYSIOLOGY, *Robert J. Alpern*,
Section Editor

- Sodium-Coupled Transporters for Krebs Cycle Intermediates,
Ana M. Pajor 663
- Modulation of Vasopressin-Elicited Water Transport by Trafficking
of Aquaporin2-Containing Vesicles, *Donald T. Ward*,
Timothy G. Hammond, and *H. William Harris* 683
- Electrogenic $\text{Na}^+/\text{HCO}_3^-$ Cotransporters: Cloning and Physiology,
Michael F. Romero and *Walter F. Boron* 699

SPECIAL TOPIC: MEMBRANE FUSION, *Reinhard Jahn*, *Special
Topic Editor*

- Electrophysiology of Synaptic Vesicle Cycling, *Henrique von
Gersdorff* and *Gary Matthews* 725
- Genetics of Synaptic Vesicle Function: Toward the Complete
Functional Anatomy of an Organelle, *Rafael Fernández-Chacón*
and *Thomas C. Südhof* 753
- Reconstitution of Regulated Exocytosis in Cell-Free Systems: A
Critical Appraisal, *Julia Avery*, *Reinhard Jahn*, and
J. Michael Edwardson 777

SPECIAL TOPIC: SENSORY TRANSDUCTION, *Bruce P. Bean*,
Special Topic Editor

- Mechanisms of Hair Cell Tuning, *R. Fettiplace* and *P. A. Fuchs* 809
- Ion Channels of Nociception, *Edwin W. McCleskey* and
Michael S. Gold 835
- Controversial Issues in Vertebrate Olfactory Transduction,
Geoffrey H. Gold 857
- Cellular Mechanisms of Taste Transduction, *M. Scott Herness*
and *Timothy A. Gilbertson* 873

INDEXES

- Subject Index 901
- Cumulative Index of Contributing Authors, Volumes 57-61 927
- Cumulative Index of Chapter Titles, Volumes 57-61 930