

PAST PRESIDENTS

Dr. John S. Kingsley	1910-1922
Dr. Harold D. Senior	1922-1926
Dr. William Proctor	1926-1927
Dr. Hermon C. Bumpus	1927-1932
Dr. Warren H. Lewis	1932-1937
Dr. Ulrich Dahlgren	1937-1946
Dr. Dwight Minnich	1946-1950
Dr. William H. Cole	1950-1951
Dr. Homer W. Smith	1951-1960
Dr. Eli K. Marshall	1960-1964
Dr. Roy P. Forster	1964-1970
Dr. William L. Doyle	1970-1975
Dr. Jack D. Myers	1975-1978
Dr. Charles E. Wilde	1978-1979
Dr. Raymond Rappaport	1979-1981
Dr. Bodil Schmidt-Nielsen	1981-1985
Dr. Franklin H. Epstein	1985-

PAST DIRECTORS

Dr. Ulrich Dahlgren	1920-1926
Dr. Herbert V. Neal	1926-1931
Dr. William H. Cole	1931-1940
Dr. Roy P. Forster	1940-1947
Dr. J. Wendell Burger	1947-1950
Dr. Warner F. Sheldon	1950-1956
Dr. Raymond Rappaport	1956-1959
Dr. Alvin F. Rieck	1959-1964
Dr. William L. Doyle	1964-1967
Dr. Charles E. Wilde	1967-1970
Dr. H. Victor Murdaugh	1970-1975
Dr. Richard M. Hays	1975-1979
Dr. Leon Goldstein	1979-1983
Dr. David H. Evans	1983-1992
Dr. David C. Dawson	1992-

1994-1995 OFFICERS

President.....	Dr. Franklin H. Epstein
Vice President.....	Dr. Rolf Kinne
Director.....	Dr. David C. Dawson
Secretary.....	Dr. David W. Towle
Treasurer.....	Mr. Peter F. Reilly
Clerk.....	Nathaniel I. Fenton, Esq.

EXECUTIVE COMMITTEE

Dr. James L. Boyer
 Dr. Gloria V. Callard
 Dr. David C. Dawson
 Dr. Franklin H. Epstein
 Dr. Rolf Kinne
 Dr. David W. Towle

SCIENTIFIC ADVISORY COMMITTEE

Dr. Martin Morad, Chairman
 Dr. James L. Boyer
 Dr. Ian P. Callard
 Dr. James B. Claiborne
 Dr. David H. Evans
 Dr. Raymond A. Frizzell
 Dr. Alexander Leaf

Administrative Director.....Dr. Barbara Kent

TRUSTEES

Class of 1995

Gloria V. Callard, Ph.D.
Professor, Department of Biology
Boston University

D. Joshua Cutler, M.D.
South Portland, Maine

David C. Dawson, Ph.D.
Professor, Department of Physiology
University of Michigan Medical School

Franklin H. Epstein, M.D.
Professor of Medicine
Harvard Medical School;
Director, Renal Unit
Beth Israel Hospital

Karl Karnaky, Jr., Ph.D.
Associate Professor
Dept. of Anatomy and Cell Biology
Medical University of South Carolina

Barbara Kent, Ph.D.
Administrative Director
MDI Biological Laboratory

Rolf Kinne, M.D., Ph.D.
Director, Max-Planck Institut
fuer Molekulare Physiologie
Dortmund, Germany

Evamaria Kinne-Saffran, M.D., Ph.D.
Senior Research Scientist
Max-Planck Institut fuer
Molekulare Physiologie
Dortmund, Germany

Edith Milbury
Bar Harbor, Maine

Class of 1996

Ian P. Callard, Ph.D.
Professor, Department of Biology
Boston University

James B. Claiborne, Ph.D.
Professor
Department of Biology
Georgia Southern Univ.

Thomas W. Clark, M.D.
Bass Harbor, Maine
and
Gwynedd, Pennsylvania

Marilyn Hoffman
Boston, Massachusetts
and
Washington, D.C.

David F. Opdyke, Ph.D.
Bar Harbor, Maine
and
Basking Ridge, New Jersey

Bodil Schmidt-Nielsen, Ph.D.
Salsbury Cove, Maine
and
Gainesville, Florida

Patricio Silva, M.D.
Associate Professor of Medicine
Harvard Medical School;
Chief, Division of Nephrology
New England Deaconess Hospital

David D. Thompson, M.D.
Hulls Cove, Maine
and
The New York Hospital
New York, New York

David W. Towle, Ph.D.
Professor
Department of Biology
Lake Forest College

Class of 1998

James L. Boyer, M.D.
Professor of Medicine
Chief, Div. of Digestive Diseases
Yale University School of Medicine

Robert M. Dowben, M.D.
Adjunct Professor of Physiology,
Brown University; Consultant in
Neurology, Presbyterian Hospital,
Dallas, TX; Senior Consultant, Rhode
Island Hospital

Freddy Homburger, M.D.
President and Director
Bio-Research Institute, Inc.
Cambridge, Massachusetts

Gregg Kormanik, Ph.D.
Professor and Chairman
Department of Biology
University of N.C. at Asheville

Peter F. Reilly
President
First National Bank of Bar Harbor

Leonard Silk, Ph.D.
Hulls Cove, Maine
and
Economics Columnist, The NY Times
New York, New York

S C I E N T I F I C P E R S O N N E L 1 9 9 4

Principal Investigator

Peter Agre, M.D.
Professor, Depts. of Biochemistry and Medicine
Johns Hopkins Univ. School of Medicine

Nazzareno Ballatori, Ph.D.
Associate Professor
Department of Environmental Medicine
Environmental Health Science Center
University of Rochester School of Medicine

Edward J. Benz, Jr., M.D.
Jack D. Myers Professor and Chairman of Medicine
Professor of Molecular Genetics and Biochemistry
Department of Medicine
University of Pittsburgh School of Medicine

James L. Boyer, M.D.
Professor of Medicine
Director, Liver Study Unit
Chief, Division of Digestive Diseases
Yale University School of Medicine

Gloria V. Callard, Ph.D.
Professor, Department of Biology
Boston University

Ian P. Callard, Ph.D.
Professor, Department of Biology
Boston University

Horacio F. Cantiello, D.V.M., Ph.D.
Asst. Professor of Medicine
Harvard Medical School
Assistant Biologist
Massachusetts General Hospital

D. Stephen Charnock-Jones, Ph.D.
Research Fellow
Dept. of Obstetrics and Gynaecology
University of Cambridge
Rosie Maternity Hospital

James B. Claiborne, Ph.D.
Professor, Department of Biology
Georgia Southern University

Lars Cleemann, Ph.D.
Assistant Professor of Pharmacology
Georgetown University

Associates

A. Truong

J. Appel
J. Staehli

R. Jones
J. Kaljuvee
C. Soroka, Ph.D.

M. Betka, Ph.D.
H. Krasnow
T. Speed

D. Schultz
C. Stenstrom

R. Jackson
A. Prat

S. Bellows

L. Gandia, Ph.D.
B. Lara
K. McDermott

Principal Investigator

Gary Conrad, Ph.D.
Professor, Division of Biology
Kansas State University

David C. Dawson, Ph.D.
Professor of Physiology
University of Michigan Medical School

Franklin H. Epstein, M.D.
William Applebaum Professor of Medicine,
Harvard Medical School;
Director, Nephrology Division,
Beth Israel Hospital

David H. Evans, Ph.D.
Professor, Department of Zoology
University of Florida

Bliss Forbush III, Ph.D.
Professor of Cellular and
Molecular Physiology
Yale University School of Medicine

John N. Forrest, Jr., M.D.
Professor, Department of Medicine
Yale University School of Medicine

Raymond A. Frizzell, Ph.D.
Prof., Dept. of Physiology and Biophysics
Univ. of Alabama at Birmingham

Stephen Gehnrich, Ph.D.
Assistant Professor of Biology
Salisbury State University

Leon Goldstein, Ph.D.
Professor and Chairman
Department of Physiology and Biophysics
Brown University

H. William Harris, M.D., Ph.D.
Associate Professor of Pediatrics
Director of Renal Research
Harvard Medical School

Associates

A. Conrad, Ph.D.
M. Janasek
S. Schwarting

L. Bries
S. Edmunds
S. Smith
P. Watson

E. Franco
K. Spokes

M. Gunderson

R. Behnke
S. Brill
A. Pernack
N. Ringstad

S. Aller
A. George
M. Horst
C. Kelmenson
S. Kelmenson
R. Lehrich
I. Lombardo
D. Opdyke
M. Ratner
K. Suggs

C. Semrad, Ph.D.
A. Takahashi, Ph.D.

J. Mills

S. Carlson
E. Davis
J.K. Haynes, Ph.D.
M. Musch, Ph.D.

C. Hesselet

Principal Investigator

John H. Henson, Ph.D.
Assistant Professor
Department of Biology
Dickinson College

Hartmut Hentschel, Ph.D.
Senior Scientist
Max-Planck Institut fur Molekulare Physiologie
Dortmund, Germany

Grant Kelley, M.D.
Assistant Professor
Section of Endocrinology
Yale Univ. School of Medicine

George W. Kidder III, Ph.D.
Professor
Department of Biological Sciences
Illinois State University

Rolf Kinne, M.D., Ph.D.
Director, Max-Planck-Institut
fur Molekular Physiologie
Dortmund, Germany

Evamaria Kinne-Saffran, M.D., Ph.D.
Senior Investigator, Max-Planck-Institut
fur Molekulare Physiologie
Dortmund, Germany

Arnost Kleinzeller, M.D., Ph.D., D.Sc.
Professor Emeritus
Department of Physiology
University of Pennsylvania

Thomas J. Koob, Ph.D.
Section Chief - Skeletal Biology
Shriners Hospital for Crippled Children

Gregg A. Kormanik, Ph.D.
Professor and Chairman
Department of Biology
University of North Carolina at Asheville

Thomas H. Maren, M.D.
Graduate Research Professor
Department of Pharmacology
University of Florida College of Medicine

Associates

S. Capuano
C. Roesner

A. McCoy

H. Kipp

J. Trotter, Ph.D.

R. Verity

L. Lippincott

Principal Investigator

David S. Miller, Ph.D.
Research Physiologist
Laboratory of Cellular & Molecular Pharmacology
NIH/NIHES

Martin Morad, Ph.D.
Professor and Chairman of Physiology
and Biophysics
School of Medicine
Georgetown University Medical Center

Alison Morrison-Shetlar, Ph.D.
Research Assistant Professor
Wesleyan University

Michael H. Nathanson, M.D., Ph.D.
Assistant Professor of Medicine
Yale University School of Medicine

Carolyn R. Newton, Ph.D.
Associate Professor and Chair
Department of Biology
Kalamazoo College

Robert L. Preston, Ph.D.
Professor, Department of Biological
Sciences
Illinois State University

Raymond Rappaport, Ph.D.
Research Scientist
Mount Desert Island Biological Laboratory

Charles Sidman, Ph.D.
Professor
Dept. of Mol., Gen., Biochem, and Microbiology
Univ. of Cincinnati College of Medicine

Patricio Silva, M.D.
Associate Professor of Medicine,
Harvard Medical School;
Chief, Division of Nephrology
New England Deaconess Hosp., Joslin Diabetes Center

Richard J. Solomon, M.D.
Associate Professor of Medicine
Harvard Medical School;
Clinical Director, Division of Nephrology
New England Deaconess Hospital

Associates

S. Letcher
J. Clark

J. Cleemann
J. Fan, Ph.D.
J. Garren

D. Soto
B. Wolpin

K. Mariwalla

L. Hatfield
C. Jude

B. Astatke
N. Huckel-Bauer
K. Katsma
G. Lapetina
P. Zimmermann

J. Rock

M. Taylor

L. Castelo
N. Katz
H. Solomon

Principal Investigator

James D. Stidham, Ph.D.
Professor of Biology
Presbyterian College

Hilmar Stolte, M.D.
Professor and Academic Director
Department of Internal Medicine
Hannover Medical School
Hannover, Germany

Kevin Strange, Ph.D.
Assistant Professor
Division of Nephrology
Children's Hospital, Boston

Erik R. Swenson, M.D.
Associate Professor of Medicine
University of Washington
VA Medical Center

David W. Towle, Ph.D.
Foster G. McGaw Professor
Department of Biology
Lake Forest College

Ian G. Welsford, Ph.D.
Assistant Professor of Biology
Bradley University

Jose A. Zadunaisky, M.D., Ph.D.
Professor of Physiology and Biophysics
Professor of Experimental Ophthalmology
Director, Sackler Institute of Graduate
Biomedical Studies
New York University Medical Center

Associates

J. Harris
K. Marks

J. Kielstein

P. Jackson
B. Morrison

M. Jordan
D. Shearer

H. Matanock

1 9 9 4 S E M I N A R S

Morning Transport

- July 11 "Regulation of protein traffic in epithelial cells" Keith E. Mostov, Ph.D., University of California-San Francisco
- July 18 "CFTR: Turning it on and turning it off" David C. Dawson, Ph.D., University of Michigan Medical School
- July 25 "Effect of purinergic agents on transport by shark rectal gland" Patricio Silva, M.D., Harvard Medical School, New England Deaconess Hospital and Joslin Diabetes Center
- August 1 "Functional cloning of a multispecific organic anion transporter from skate liver - A 25 year odyssey" James L. Boyer, M.D., Yale University School of Medicine
- August 8 "Can Fusion Tender Response? (Movin' and Groovin' with CFTR)" Raymond A. Frizzell, Ph.D., University of Alabama at Birmingham
- August 15 "Regulation of epithelial cell water permeability by antidiuretic hormone (ADH)" H. William Harris, M.D., Ph.D., Harvard Medical School and The Children's Hospital
- August 22 "Cellular volume control: The ins and outs of organic osmolytes" Kevin Strange, Ph.D., Harvard Medical School and The Children's Hospital

Noon

- July 15 "Protein kinase C regulation of xenobiotic transport in killifish proximal tubules" David S. Miller, Ph.D., NIH, NIEHS
 "ATP receptors on skate hepatocytes" Michael H. Nathanson, M.D., Ph.D., Yale University School of Medicine
- July 22 "Nitrogen budgets in developing elasmobranchs" Gregg A. Kormanik, Ph.D., University of North Carolina at Asheville
 "Role of gill membrane-bound carbonic anhydrase in elasmobranch acid-base regulation" Erik R. Swenson, M.D., University of Washington
- July 29 "Relatives of the microtubule motor protein kinesin in sea urchin cells" John H. Henson, Ph.D., Dickinson College
 "PKC isoforms in the shark rectal gland: Association of PKC ζ with the cytoskeleton and the mitotic spindle apparatus" Rudiger W. Lehrich and John N. Forrest, Jr., M.D., Yale University School of Medicine

August 5 "Function and structure in dogfish kidney" Hartmut Hentschel, Ph.D., Max-Planck-Institut fuer Molekulare Physiologie

"Water regulatory responses in slugs" Ian G. Welsford, Ph.D., Bradley University

August 12 "Signal transduction pathways mediating glucose stimulated insulin secretion" Grant Kelley, M.D., Yale University School of Medicine

"ATP channels: A new paradigm in cell signalling" Horacio F. Cantiello, D.V.M., Ph.D., Harvard Medical School and Massachusetts General Hospital

Evening

July 6 THE THIRTEENTH WILLIAM B. KINTER MEMORIAL LECTURE - "Role of metallothionein in the hepatotoxicity and nephrotoxicity of cadmium" Curtis D. Klaassen, Ph.D., University of Kansas Medical Center

July 13 "Molecular responses to toxic metals in yeast" Dennis J. Thiele, Ph.D., University of Michigan Medical School

July 20 "Solar UV radiation and oxidative stress in marine invertebrates: a spectrum of responses" Malcolm Shick, Ph.D., University of Maine

July 27 "Biology of CF gene therapy" James M. Wilson, M.D., Ph.D., University of Pennsylvania, The Wistar Institute and the University of Pennsylvania Medical Center

August 3 MiniSymposium - "Molecular Mechanisms of Toxicity" Sponsor, Maine Toxicology Institute (Eastern Maine Medical Center/University of Maine); Co-host, The Mount Desert Island Biological Laboratory; Moderator, James L. Boyer, Director, Center for Membrane Toxicity Studies at MDIBL

"Xenobiotic transport mechanisms in renal proximal tubules" David S. Miller, Ph.D., NIEHS

"Role for muscarinic receptors in cadmium toxicity" David H. Evans, Ph.D., University of Florida

"Reproductive toxicity of occupational and environmental chemicals" Stephen B. Hooser, D.V.M., Ph.D., University of Arizona

"Aspects of benzene toxicity: DNA adduct formation and effects on hematopoiesis" Evangelos Dimitriadis, Ph.D., State Toxicologist, Environmental Health

"Ah receptor-mediated toxicity of halogenated aromatic compounds: Relevance to human exposure" Tom Gasiewicz, Ph.D., University of Rochester School of Medicine

"Modulation of chemical genotoxicity by the N-acetyltransferase polymorphism" Charlene McQueen, Ph.D., University of Arizona

"Use of aquatic models to study environmental carcinogenesis"
Rebecca Van Beneden, Ph.D., University of Maine

"Role of phagocytic cells in the progression of chemical-induced
tissue injury" I. Glenn Sipes, Ph.D., University of Arizona

August 10 The THIRD JOHN W. BOYLAN MEMORIAL LECTURE - "Targeting of epitheli-
al proteins" Qais Al-Awqati, M.B., Ch.B., Columbia University
College of Physicians and Surgeons

August 17 "ATP hydrolysis controls opening and closing of CFTR (cystic fibro-
sis transmembrane conductance regulator) chloride channels" David
C. Gadsby, Ph.D., The Rockefeller University

August 24 THE FOURTH THOMAS H. MAREN LECTURE - "Aquaporin water channels"
Peter Agre, M.D., Johns Hopkins University School of Medicine

Special Seminars

July 29 "The Use of Animals in Research - A Bioethical Discussion" Rosa-
mund Rhodes, Ph.D., Philosopher and Bioethicist, Mount Sinai School
of Medicine. Compulsory for all fellowship recipients.

July 14 "Life on the Rocks" Prof. William Amos, Marine Biologist, Nature
Photographer and Science Writer, Lyndonville, Vermont. Public
lecture to enhance MDIBL's educational program for high school and
undergraduate students funded by the Burroughs Wellcome Fund and
the Hearst Foundation.

July 21 "What goes wrong with quantitative PCR" D. Stephen C. Jones,
Ph.D., University of Cambridge, England

August 4 "Future Science: Scientists of Tomorrow at Work Today" Public
seminar featuring presentations by local and national high school
and college students participating in exciting hands-on research
training programs at MDIBL and the Jackson Laboratory.

STUDENTS' "BASIC" LECTURE SERIES

(Participation required by students who
are recipients of fellowships/scholarships)

June 14 "The Sodium Glucose Cotransport Trek" Alison Morrison-Shetlar,
Ph.D. and Brian Wolpin, Wesleyan University; Daniel Soto, Pennsyl-
vania State University

June 21 "What Can You Learn With a Voltmeter?" George Kidder, Ph.D.,
Illinois State University and Antoine McCoy, Brown University

June 28 "Pumping Gas: Carbonic Anhydrase in Fish Kidney" Stephen Gehn-
rich, Ph.D., Salisbury State University and Linc Lippincott, Uni-
versity of Florida

- July 5 "The Venerable Worm: Physiology of the Many 'Flavors' of Amino Acids and Mercury" Robert L. Preston, Ph.D., Illinois State University and Paula Zimmermann, Peabody College
- July 12 "Just How is Blood Flow to the Shark Gill Controlled?" David H. Evans, Ph.D., University of Florida and Mark Gunderson, St. Olaf College
- July 19 "Abnormal Erythrocyte Membrane Proteins and Volume Regulation in Sickle Cell Disease" J.K. Haynes, Ph.D., Morehouse College
- July 26 "Epithelial Tissue and Osmoregulation in Fish: The Use of Isc to Measure Chloride Secretion" James D. Stidham, Ph.D., Presbyterian College, Jamal Harris, Morehouse College and Kate Marks, University of San Diego
- August 2 "Acid-Base Regulation in Fish" J.B. Claiborne, Ph.D., Georgia Southern University
- August 9 "Regulation of Genes by Silencers" Edward J. Benz, Jr., M.D., University of Pittsburgh School of Medicine

1994 PUBLICATIONS

- Ballatori, N., T.W. Simmons and J.L. Boyer. A volume-activated taurine channel in skate hepatocytes: membrane polarity and role of intracellular ATP. *Am J. Physiol.* 267:G285-G291, 1994.
- Callard, G.V., M. Betka and J. Jorgensen. Stage-related functions of Sertoli cells: Lessons from lower vertebrates. In: Bartke, A. (ed.), Function of Somatic Cells in the Testis. Springer Verlag, New York, pp. 27-54, 1994.
- Callard, I.P., G. Giannoukos, D.S. Charnock-Jones, S. Benson and M. Paolucci. Hormone regulation of vitellogenin genes and the evolution of viviparity. In: Perspectives in Comparative Endocrinology. (Research Journals Division, National Research Council of Canada) pp. 325-332, 1994.
- Claiborne, J.B., J.S. Walton and D. Compton-McCullough. Acid-base regulation, branchial transfers and renal output in a marine teleost fish (the long-horned sculpin; Myoxocephalus octodecimuspinosus) during exposure to low salinities. *J. Exp. Biol.* 193:79-95, 1994.
- Conrad, A.H., A.P. Stephens and G.W. Conrad. The effect of hexylene glycol-altered microtubule distributions on cytokinesis and polar lobe formation in fertilized eggs of Ilyanassa obsoleta. *J. Exp. Zool.* 269:188-204, 1994.
- Conrad, A.H., A.P. Stephens, A.Q. Paulsen, S.S. Schwarting and G.W. Conrad. Effects of silver ions (Ag^+) on contractile ring function and microtubule dynamics during first cleavage in Ilyanassa obsoleta. *Cell Motil. Cytoskel.* 27:117-132, 1994.
- Conrad, G.W., A.Q. Paulsen and C.A. Luer. Embryonic development of the cornea in the eye of the clearnose skate, Raja eglanteria. I. Stromal development in the absence of an endothelium. *J. Exp. Zool.* 269:263-276, 1994.
- Donald, J.A., T. Toop and D.H. Evans. Localization and analysis of natriuretic peptide receptors in the gills of gulf toadfish, Opsanus beta (Teleostei). *Am. J. Physiol.*, 1994, in press.
- Evans, D.H., E. Chipouras, T. Toop and J.A. Donald. The effect of Ca^{2+} , Cd^{2+} , and Ni^{2+} on detergent-permeabilized vascular smooth muscle from the shark, Squalus acanthias. *Toxicology* 83:1-8, 1993.
- Evans, D.H. The roles on natriuretic peptide hormones (NPs) in fish osmoregulation. In: Advances in Environmental and Comparative Physiology - Mechanisms of Systemic Regulation in Lower Vertebrates II: Acid-Base Regulation, Ion Transfer and Metabolism, ed. N. Heisler. Springer-Verlag, Heidelberg, 1994, in press.
- Fan, J., Y. Shuba and M. Morad. Regulation of cardiac sodium-calcium exchanger by beta-adrenergic agonists. Submitted for publication, 1995.
- Goldstein, L. and M.W. Musch. Volume-activated amino acid transport and cell signaling in skate erythrocytes. *J. Exp. Zool.*, 268:133-138, 1994.

Goldstein, L. and E.M. Davis. Taurine, betaine and inositol share a volume-sensitive transporter in skate erythrocyte cell membrane. *Am. J. Physiol.*, 267:R426-R431, 1994.

Kidder, G.W., III. Using a calcium electrode to measure mercury in aqueous solutions, *Bull. Environ. Contamin. Toxicol.*, in press.

Kormanik, G.A., Maternal-fetal transfer of nitrogen in chondrichthians. In: Nitrogen, metabolism and excretion. Eds. P. Walsh and P. Wright. CRC Press, Boca Raton, FL, 1995, in press.

Maylie, J. and M. Morad. Evaluation of T-and L-type Ca currents in shark ventricular myocytes. *Journal of Physiology*, 1994, in press.

Miller, D.S. and J.B. Pritchard. Confocal microscopic analysis of fluorescein compartmentation within crab urinary bladder cells. *Am. J. Physiol.*, 267:R16-R25, 1994.

Miller, D.S. and J.B. Pritchard. Nocodazole inhibition of organic anion secretion in teleost proximal tubules. *Am. J. Physiol.*, 267:R695-R704, 1994.

Musch, M.W., E.M. Davis and L. Goldstein. Oligomeric forms of skate erythrocyte band 3. *J. Biol. Chem.*, 269(31):19683-19686, 1994.

Musch, M.W., T.R. Leffingwell and L. Goldstein. Band 3 modulation and hypotonic-stimulated taurine efflux in skate erythrocytes. *Am. J. Physiol.*, 266:R65-R74, 1994.

Nielsen, S. and P. Agre. The aquaporin family of water channels in kidney. *Kidney International*, 1994, in press.

Rappaport, R. and B.N. Rappaport. Cleavage in conical sand dollar eggs. *Devel. Biol.* 164:258-266, 1994.

Schramm, U., G. Fricker, R. Wenger, and D.S. Miller. p-Glycoprotein-mediated secretion of a fluorescent cyclosporin analogue by teleost renal proximal tubules. *Am. J. Physiol.*, 1994, in press.

Swenson, E.R., A.R. Fine, T.H. Maren, E. Reale, E.R. Lacy and A. Smolka. Physiological and immunocytochemical evidence for a putative H^+/K^+ ATPase in renal acid secretion in the marine elasmobranch. *Am. J. Physiol.* 267:F639-F645, 1994.

Toop, T., J.A. Donald and D.H. Evans. Localisation and characteristics of natriuretic peptide receptors in the gills of the Atlantic hagfish, Myxine glutinosa (Agnatha). *J. Exp. Biol.*, 1994, in press.

Werner, A., H. Murer, and R.K.H. Kinne: Cloning and expression of a renal $Na-P_i$ cotransport system from flounder. *Am. J. Physiol.* 267:F311-F317, 1994.

Xu, J-C., C. Lytel, T. Zhu, E.J. Benz and B. Forbush, III. Molecular cloning and functional expression of the Na-K-Cl cotransporter are differentially distributed in rabbit kidney. *Proc. Nat. Acad. Sci.*, 91:2201-2205, 1994.

AUTHOR INDEX

Aller, Steve.....	44	Kaljuvee, Jurgen.....	85
Agre, Peter.....	10	Katz, Naomi.....	39,49,56
Ballatori, Nazzareno.....	85,69,72	Kelley, Grant.....	100
Behnke, Rachel.....	53	Kelmenson, Cynthia.....	24,28
Bellows, Shenna.....	63	Kidder, George.....	102
Bhakta, Kushal.....	4	Kinne, Rolf.....	20,32,36,58,75,89
Boyer, James.....	85,69,72	Kinne-Saffran, Evamaria.....	20,32, 36,58,75
Bries, Lori.....	18	Kipp, Helmut.....	75
Brill, Susan.....	44,53	Kleinzeller, Arnost.....	2
Callard, Gloria.....	111	Koob, Thomas.....	6
Callard, Ian.....	112	Kormanik, Gregg.....	92
Cantiello, Horacio.....	22	Krasnow, Helen.....	111
Capuano, Stephanie.....	2	Lara, Baldomero.....	12,14
Carlson, Sarah.....	68	Lehrich, Rudiger.....	24,28,36,44
Castelo, Leslie.....	49,39,47	Letcher, Susan.....	81
Charnock-Jones, D. Stephen.....	112	Lippincott, Linc.....	83,94,96
Churchwell, Kevin.....	69	Makker, Gautham.....	10
Claiborne, James.....	63	Marino, Christopher.....	28
Cleemann, Lars.....	12,14	Maren, Thomas.....	94,96
Conrad, Abigail.....	4,103	Mariwalla, Kavita.....	85,87
Conrad, Gary.....	4,103	Matanock, Heather.....	105
Davis-Amaral, Erin.....	68,71	McCoy, Antoine.....	102
Dawson, David.....	18	Miller, David.....	81
Edmunds, Stewart.....	18	Mills, Jason.....	83
Elger, Marlies.....	32,97	Morad, Martin.....	12,14
Epstein, Franklin.....	39,42,47,49, 51,56	Morrison-Shetlar, Alison.....	78
Evans, David.....	109,110	Musch, Mark.....	71
Fan, Jing.....	12,14	Nathanson, Michael.....	85,87,42
Fleming, Jason.....	60,105	Newton, Carolyn.....	89
Forbush, Biff.....	53	Pernak, Andrea.....	53
Forrest, John.....	2,17,22,24,28,32, 36,44	Preston, Gregory.....	10
Franco, Elizabeth.....	39,49,47	Rader, David.....	53
Frizzell, Raymond.....	17	Rappaport, Raymond.....	1
Gandia, Luis.....	12,14	Ratner, Martha.....	28
Garcia, Antonio.....	14	Ringstadt, Niels.....	53
Gehnrich, Stephen.....	83,96	Roesener, Colleen.....	2
Goldstein, Leon.....	68,71	Schwarting, Scott.....	4,103
Gunderson, Mark.....	109,110	Shearer, Darcy.....	64,66
Harris, H. William.....	11	Silva, Patricio...39,42,47,49,51,56	
Hatfield, Lorelei.....	89	Smith, Stephen.....	18
Henson, John.....	2	Solomon, Hadley.....	39,49
Hentschel, Hartmut.....	28,32,97	Solomon, Richard..39,42,47,49,51,56	
Hosselet, Christine.....	11	Soto, Daniel.....	78
Isenring, Paul.....	53	Spokes, Katherine.....	39,49,51
Jackson, G. Robert.....	22	Stenstrom, Chris.....	112
Jackson, Paul.....	69,72	Strange, Kevin.....	69,72
Janasek, Mitch.....	4	Suggs, Kyle.....	17,24,44
Jones, Robin.....	85	Swenson, Erik.....	94,96
Jordan, Mark.....	64,66	Takahashi, Akira.....	17
Jude, Craig.....	89	Taylor, Melissa.....	39,42,47,49,51
		Towle, David.....	64,66

Trotter, John.....	6
Truong, Anh.....	72
Verity, Rebecca.....	92

Watson, Peter.....	18
Welsford, Ian.....	60,105
Wolpin, Brian.....	78

S P E C I E S I N D E X

<u>Ambystoma tigrinum</u> (tiger salamander).....	11
<u>Anguilla rostrata</u> (American eel).....	83,96
<u>Asterias forbesi</u> (Forbes' Asterias).....	105
<u>Asterias vulgaris</u> (Boreal Asterias).....	66
<u>Buccinum undatum</u> (waved whelk).....	66
<u>Bufo marinus</u> (giant toad)....	11
<u>Cancer irroratus</u> (rock crab).....	66
<u>Carcinus maenas</u> (green crab).....	64,66
<u>Chrysemys picta</u> (painted turtle).....	112
<u>Cucumaria frondosa</u> (orange-footed cucumber)..	6,66
<u>Echinarachnius parma</u> (sand dollar).....	1
<u>Fundulus heteroclitus</u> (killifish).....	81
<u>Ilyanassa obsoleta</u> , Stimpson/ <u>Nassarius obsoletus</u> , Say (marine mud snail).....	4,103

<u>Limax maximus</u> . (slug).....	60
<u>Myoxocephalus octodecimspinosus</u> (long horned sculpin)...	63,100
<u>Mytilis edulus</u> (blue mussel).....	66,102
<u>Nereis virens</u> (clam worm)...	105
<u>Pagurus acadianus</u> (Acadian hermit crab).....	66
<u>Placopecten magellanicus</u> (deep sea scallop).....	78
<u>Pseudopleuronectes americanus</u> (winter flounder)...	10,58,78,97
<u>Raja erinacea</u> (little skate).....	68,69,71,72,75,78,85,87
<u>Rattus rattus</u> (black rat).....	12,14
<u>Squalus acanthias</u> (spiny dogfish).....	2,10,17,20,22,24,28,32,36,39,42,44,47,49,51,53,56,75,78,89,92,94,109,110,111
<u>Strongylocentrotus droebachiensis</u> (green sea urchin).....	66
<u>Xenopus laevis</u> (African claw-toed frog).....	18

KEYWORD INDEX

Acetylcholine receptor (AChR)...	105	Fluorescence microscopy.....	81
Acid-base.....	83	Genomic DNA.....	78
Actin filaments.....	2	Gill.....	94
Adenosine.....	49	Gill regulation.....	63
Adenosine deaminase.....	49	Glucose.....	100
Adrenal chromaffin cells.....	12,14	Glutamine.....	92
Ag ⁺	4	Helodermin.....	39
Ammonia.....	92	Helospection.....	39
Anion channels.....	69	Hepatocyte.....	85,87
Atrial natriuretic peptide (ANP).....	103	Histochemistry.....	32
Antidiuretic hormone.....	11	Immune molecules.....	89
Antiporter.....	64,66	Immunoblotting.....	105
Aorta.....	108	Immunolocalization.....	28
Aquaporins.....	19	Inhibitor.....	75
Aquaporin water channels.....	11	Insulin.....	99
Aster.....	1	Ion transport.....	60
ATP β , γ -methylene.....	49	Ionic currents.....	12
ATP channels.....	22	Ionic/osmotic gradients.....	60
ATP-regulated.....	72	Kidney.....	75,96
Benzmetanide.....	53	Lectins.....	32,36,89
Bicarbonate.....	94	Mannose-binding proteins.....	89
Brush border membrane fraction..	58	Mercurials.....	20
Calcium.....	42	Mercury.....	18,51,85,102
Calcium-dependent secretion.....	6	Metabolic alkalosis.....	94
Carbonic anhydrase.....	83,94,96	Microdissection.....	97
Ca ²⁺ current.....	14	Microtubules.....	2
cAMP regulation.....	17	Mitotic apparatus.....	1
cDNA library.....	78	mRNA.....	64,66
cDNA sequence.....	83	Muscarinic.....	110
Cell culture.....	36,12	Muscle activity.....	102
Cell volume.....	68,69	Mutable connective tissue.....	6
Cell volume regulation.....	71	Na ⁺ /H ⁺ exchange.....	63
Channels.....	68	Na/K ATPase.....	18
Chloride conductance.....	17	Na-K-Cl cotransporter.....	20,53
Chloride secretion.....	42,51,53,56	Nitric oxide.....	109
Cleavage.....	4	Northern blotting.....	112
Cl ⁻ /HCO ₃ ⁻ transfer.....	63	Oocytes.....	58
C-type natriuretic peptide (CNP).....	56,103	Osmotic water-permeability.....	10
Cystic fibrosis transmembrane conductance regulator (CFTR, from dogfish shark).....	22,28	Organic ion transport.....	81
Cytosolic calcium.....	85,87	Organic osmolytes.....	69
Division mechanism.....	1	Oxygen consumption.....	47
Electromyograph.....	102	Polymerase chain reaction (PCR).....	103
Embryo.....	92	Phospholipase C.....	100
Endothelin.....	110	Plasma membrane fraction.....	36
Epithelial transport.....	60	Protein kinase.....	47
Erythropoietin.....	71	Protein kinase A.....	22
F-actin.....	4	Protein kinase C.....	24
Flounder kidney.....	58	Proximal tubule.....	97
		Pump current.....	18
		Purinergic receptors.....	87
		Receptors.....	110

Rectal gland...	2,17,20,24,28,32,36,42,44,47,51,56
Renal proximal tubule.....	81
Polymerase chain reaction (RT-PCR).....	64,66
Salinity.....	63
Secretion.....	14
Signal transduction.....	24,44
Sodium-D-glucose.....	78
Sodium-D-glucose cotransporter...	75
Sodium-phosphate cotransport....	58
Soluble guanylyl cyclase.....	109
Soluble stiffening factor.....	6
Southern blotting.....	105
Spermatogenesis.....	111

Stereology.....	97
Steroids.....	112
Taurine.....	71
Taurine channel.....	72
Testis.....	111
Tubulin.....	111
Tyrosine kinase.....	44
Urea.....	68
Vasoactive intestinal peptide.....	39
Vasopressin.....	11
Vitellogenin.....	112
Volume regulation.....	72
Water-channels.....	10