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Society of General Physiologists

43rd Annual Symposium

31 DECEMBER 1989

DAMD17-89-Z-9031

G-Proteins and Signal Transduction

Organized by:

Neil M. Nathanson
University of Washington
School of Medicine

and

T. Kendall Harden
University of North Carolina
School of Medicine

Marine Biological Laboratory
Woods Hole, Massachusetts

September 6 — 9, 1989

September 6 — 9, 1989

Society of General Physiologists

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Wednesday, September 6, 1989

Evening

2:00—10:00 — Registration and Room Assignment .. Swope Center, Lobby
6:00—8:00 — Dinner ..... Swope Center, Dining Room
8:00—10:00 — Mixer ..... Swope Center, Meigs Room

Thursday, September 7, 1989

Morning

7:30-8:30 Breakfast ..... Swope Center

SYMPOSIUM SESSION I—8:30-12:30 ..... Lillie Auditorium

Regulation of Ion Channels by G-Proteins

Chairman: Gerry Oxford (University of North Carolina School of Medicine)

Opening Remarks: Douglas M. Fambrough, President,
Society of General Physiologists

Arthur Brown (Baylor University School of Medicine), *Networking multiple effectors by a single G-protein.*

Annette Dolphin (St. George's Hospital Medical School), *Interaction of pertussis toxin sensitive G-proteins with components of the calcium channel in sensory neurones.*

INTERMISSION ..... Coffee available in Swope Center

David Clapham, (Mayo Clinic), *G-protein control of ion channel function.*

Bertil Hille (University of Washington School of Medicine), *Peptidergic control of M-current in sympathetic ganglia.*

Afternoon

12:30-1:30 Lunch ..... Swope Center

2:00-6:00—Poster Session I and Mixer ..... Swope Center

Abstract numbers 1 - 46. Posters for Session I may be assembled after 8:00 p.m. on Wednesday, September 6, and must be removed by 8:00 a.m. on Friday, September 8.

3:00-4:00—SGP Business Meeting ..... Lillie Auditorium

Evening

6:00-7:00 Dinner ..... Swope Center

KEYNOTE ADDRESS 8:00-9:00 ..... Lillie Auditorium

Alfred Gilman

University of Texas Southwestern Medical School

G-Froteins and Adenylyl Cyclase

Friday, September 8, 1989

Morning

7:30-8:30 Breakfast ..... Swope Center

SYMPOSIUM SESSION II—8:30-12:00 ..... Lillie Auditorium

G-Proteins in PI Turnover and Other Second Messengers

Chairman: Eva Neer (Harvard University School of Medicine)

T. Kendall Harden (University of North Carolina School of Medicine), *G-protein-mediated regulation of phospholipase C.*

James Feramisco (University of California, San Diego School of Medicine), *Involvement of ras in cell differentiation and proliferation.*

INTERMISSION ..... Coffee available in Swope Center

Jackson B. Gibbs (Merck Sharpe and Dohme Research Laboratories), *Structure/function relationships of ras and GAP.*

Melvin I. Simon (California Institute of Technology), *G-Proteins: a family portrait.*

Afternoon

12:00-1:00 Lunch ..... Swope Center

2:00-6:00—Poster Session II and Mixer ..... Swope Center

Abstract numbers 47-94. Posters for Session II may be assembled after 8:00 a.m. on Friday, September 8.

Evening

6:00-7:00 Dinner ..... Swope Center

SYMPOSIUM III—7:00-10:30 ..... Lillie Auditorium

Receptors that Interact with G-Proteins

Chairman: Randall Reed (Johns Hopkins School of Medicine)

Robert J. Lefkowitz (Duke University School of Medicine), *The adrenergic receptors.*

Mark Brann (National Institutes of Health), *The specificity of coupling between cloned muscarinic receptors, dopamine receptors, and G-Proteins.*

INTERMISSION ..... Coffee available in Swope Center

Gary L. Johnson (University of Colorado School of Medicine), *Chimeric G-proteins alter the regulation of receptor activated signalling pathways.*

Peter N. Devreotes (Johns Hopkins University School of Medicine), *cAMP-mediated chemotaxis in Dictyostelium.*

Saturday, September 9, 1989

Morning

7:30-8:30 Breakfast ..... Swope Center

SYMPOSIUM SESSION IV—8:30-12:00 ..... Lillie Auditorium

Structure, Function, and Expression of G-Proteins #1

Chairman: Gary L. Johnson (University of Colorado School of Medicine)

Neil M. Nathanson (University of Washington School of Medicine) *Regulation and development of G-protein expression and function.*

Eva Neer (Harvard University School of Medicine), *Function of G-protein subunits.*

INTERMISSION ..... Coffee available in Swope Center

Randall Reed (Johns Hopkins School of Medicine), *A novel protein mediates olfactory signal transduction.*

Henry Bourne (University of California, San Francisco School of Medicine), *Structure and function of the alpha chain of Gs.*

Afternoon

12:00-1:00 Lunch ..... Swope Center

SYMPOSIUM V—1:00-4:30 ..... Lillie Auditorium

Structure, Function, and Expression of G-proteins #2

Chairman: Heidi Hamm, (University of Illinois School of Medicine)

James Hurley (University of Washington School of Medicine), *Cell-specific expression and function of rod and cone transducin.*

Lutz Birnbaumer (Baylor University School of Medicine), *Direct G-protein regulation of potassium and calcium channels.*

Allen Spiegel (National Institutes of Health), *Peptide antibodies as probes of G-protein structure and function.*

Paul Sternweis (University of Texas Southwestern Medical School), *Structure, function, and coupling of G-proteins and muscarinic receptors.*

Poster Numbers and Titles

Thursday, September 7, 1989

POSTER SESSION I—2:00 - 6:00 p.m.

1 A pertussis-sensitive G protein mediates both activation of 'S'-like K^+ current and suppression of Ca^{++} current by a family of neurotransmitter receptors in *Aplysia* Neurons. V. Brezina, S.S. Vogel, G.J. Chin and J.H. Schwartz, Howard Hughes Medical Institute, Columbia University, New York.

2. Norepinephrine and GTP-γS inhibit a calcium conductance and activate a non-selective cation conductance in rat parasympathetic cardiac neurons. D.J. Adams and Z. Xu, Department of Pharmacology, University of Miami School of Medicine, Miami, FL.

3. ADP-ribosylation and immunological characterization of GTP-binding proteins that mediate presynaptic inhibition. G.G. Holz, T.J. Turner and K. Dunlap, Department of Physiology, Tufts University School of Medicine, Boston, MA.

4. Muscarinic modulation of Ca current in bullfrog intracardiac parasympathetic neurons involves pertussis toxin sensitive GTP-binding proteins. A. Tse, R.B. Clark and W. Giles, Departments of Physiology and Medicine, University of Calgary, Calgary, Alberta, Canada.

5. Regulation of spontaneous opening of the muscarinic K^+ channel in rabbit atrium. M. Kaibara, T. Nakajima, H. Irisawa and W. Giles, Department of Medical Physiology and Medicine, University of Calgary, Calgary, Canada.

6. GTP-binding protein regulates the activity of Na^+ channels from the epithelial cell line A6. H.F. Cantiello, C.R. Patenaude and D.A. Ausiello, Renal Unit, Massachusetts General Hospital and Harvard Medical School, Boston, MA.

7. Cyclic AMP and IP_3 link G-protein-coupled chemoreceptors to ion channels in olfactory cilia. R.C. Bruch, D. Restrepo, and J.H. Teeter, Department of Neurobiology & Physiology, Northwestern University, Evanston, IL and Monell Chemical Senses Center, Philadelphia, PA.

8. Novel K^+channels in cardiac cells activated by arachidonic acid and phospholipids. D. Kim and D.E. Clapham, Department of Physiology and Biophysics, Chicago Medical School, North Chicago, IL and Department of Pharmacology, Mayo Foundation, Rochester, MN.

9. GTP-binding proteins mediate dopamine activation of a potassium current in identified rat lactotrophs. L.C. Einhorn and G.S. Oxford, Curriculum of Neurobiology, University of North Carolina, Chapel Hill, NC 27559.

10. Bradykinin-induced currents in rat DRG neurons and F-11 cells are insensitive to pertussis toxin. D.S. McGehee and G.S. Oxford, Department of Physiology, University of North Carolina, Chapel Hill, NC 27599.

11. Calcium channel modulation by G-proteins in marine *Paramecium*. J. Bernal and B. Ehrlich, Departments of Medicine and Physiology, University of Connecticut Health Center, Farmington, CT.

12. Activation of Acetylcholine-dependent K channels in the absence of agonist and G-nucleotides. H. Heidbuchel and E. Carmeliet, Labo voor Electrofvsiologie, K.U. Leuven, Leuven, Belgium.

13. A G-protein, G_{i-3}, regulates a chloride channel in renal cortical collecting duct cells. E.M. Schwiebert, D.B. Light, and B.A. Stanton, Department of Physiology, Dartmouth Medical School, Hanover, NH.

14. Kinetics of activation of the cardiac muscarinic K^+-channel by native and recombinant α-subunits of G-proteins. C. Joshi, M. Linder, D. Kim, A.G. Gilman, and D.E. Clapham, Departments of Physiology and Biophysics and Pharmacology, Mayo Foundation, Rochester, MN and Department of Pharmacology, University of Texas, Southwestern Medical Center, Dallas, TX.

15. GTP-γS potentiates carbamylcholine induced gap junction closure in pancreatic acinar cells. R. Somogyi and H.A. Kolb, Faculty of Biology, University of Konstanz, D-7750 Konstanz, FRG.

16. Pertussis toxin blocks the hyperpolarization and reduction in intracellular free calcium produced by dopamine or gamma-aminobutyric acid in rat melanotrophs. P.S. Taraskevich and W.W. Douglas, Department of Pharmacology, Yale University School of Medicine, New Haven, CT.

17. Carbachol increases basolateral K^+ permeability in T84 cells by increasing cell [Ca]. H. Chase Jr. and S. Wong, Department of Medicine, Columbia University, New York, NY.

18. Oscillations of intracellular Ca^{++} induced by cholinergic activation in a human secretory epithelium (T_{84}). D.C. Devor, Z. Ahmed and M.E. Duffey, Department of Physiology, School of Medicine, State University of New York, Buffalo, NY.

19. Mechanisms responsible for mechanical abnormalities in hypertrophied and failing myocardium. C.L. Perreault, O.H.L. Bing, W.W. Brooks, B.J. Ransil and J.P. Morgan, Department of Medicine, Harvard Medical School, Boston, MA.

20. Thapsigargin, but not caffeine, blocks the ability of TRH to release Ca^{++} from an intracellular store in GH_4C_1 pituitary cells. G.J. Law, J.A. Pachter, O. Thastrup and P.S. Dannies, Department of Pharmacology, Yale University School of Medicine, New Haven, CT 06510 and Dept. Chemistry BC, Royal Danish School of Pharmacy, Universitetsparken 1, DK-2100, Copenhagen, Denmark.

21. The effect of an endogenous factor on the isolated Ca^{++} release channel of the sarcoplasmic reticulum. A. Herrman-Frank, G. Meissner and E. Rousseau, Department of Biochemistry, University of North Carolina, Chapel Hill, NC and Department of Physiology and Biophysics, University of Sherbrooke, Sherbrooke, Canada.

22. Effects of thrombin on calcium transport in cultured cardiac myocytes. W. Chien, R. Mohabir, L.L. Leung and W.T. Clusin, Cardiology Division, Stanford University School of Medicine, Stanford, CA.

23. Sustained Ca^{++} engry and $[Ca^{++}]_i$ elevation in Carbachol- and $NaF/AlCl_3$-stimulated rat parotid acini. L.M. Mertz, F.J. Horn, B.J. Baum and I.S. Ambudkar, Clinical Investigation and Patient Care Branch, National Institute of Dental Research, National Institutes of Health, Bethesda, MD.

24. Tenidap (CP-66,248): An inhibitor of receptor-operated calcium channels in mast cells? P.L. Cleveland, G.C. Yaney, H.J. Showeli, and C. Fewtrell, Department of Pharmacology, Cornell University, Ithaca, NY and Department of Immunology and Infectious Diseases, Pfizer Central Research, Groton, CT.

25. Characterization of Latency in the $[Ca^{++}]_i$ response to IgE receptor crosslinking in tumor mast cells. P.J. Millard, T.A. Ryan, Liming Su, W.W. Webb and C. Fewtrell, Departments of Pharmacology and Physics and School of Applied and Engineering Physics, Cornell University, Ithaca, NY.

26. Receptor-activated calcium entry in exocrine cells does not occur via agonist-sensitive intracellular pools—the "Capacitative Model" revised. T.J. Shuttleworth, Department of Physiology, University of Rochester School of Medicine and Dentistry, Rochester, NY.

27. Calcium transients in frog skeletal muscle fibers measured with the fluorescent "magnesium" indicator, Mag-fura-2. M. Konishi, S. Hollingworth and S.M. Baylor, Department of Physiology, University of Pennsylvania, Philadelphia, PA and Department of Physiological Sciences, University of Newcastle upon Tyne, England.

28. Effects of intracellular dialysis with non-hydrolyzable GTP-analogues on exocytosis in bovine pituitary lactotrophs. S.K. Sikdar, R. Zorec and W.T. Mason, A.F.R.C. Institute of Animal Physiology & Genetics Research, Babraham, Cambridge CB2 4AT, U.K. and Institute of Pathophysiology, Ljubljana, Yugoslavia.

29. Single-channel and whole-cell recordings of two types of Ca^{++} currents in gastric smooth muscle cells: effects of the dihydropyridine, Bay K 8644. M.B. Vivaudou, J.J. Singer and J.V. Walsh, Jr, Department of Physiology, University of Massachusetts Medical School, Worcester, MA.

30. Structure-function studies on the $(Na^+ + K^+)$-ATPase. B. Kone, K. Takeyasu, V. Lemas and D. Fambrough, Departments of Biology and Medicine, The Johns Hopkins University, Baltimore, MD.

31. $[Na]_i$ and $[K]_o$ determine apparent affinity of the Na/K pump for ouabain in cardiac myocytes. J.R. Stimer, Shi Liu, L.A. Lobaugh and M. Lieberman, Department of Cell Biology, Division of Physiology, Duke University Medical Center, Durham, NC.

32. Effects of cellular and external Na and K on the rate of orthophosphate-promoted ouabain binding to resealed human red cell ghosts. M. Guerra, M. Steinberg and P.B. Dunham, Departments de Fisiologia, Universidad de la Laguna, Tenerife, Canary Islands, Spain, Department of Pharmacology, State University of New York Health Science Center, Syracuse, NY and Department of Biology, Syracuse University, Syracuse, NY.

33. Voltage dependence of the Na^+/K^+-pump of *Rana* oocytes. M.M. Wu and M.M. Civan, Departments of Bioengineering and Physiology & Medicine, University of Pennsylvania, Philadelphia, PA.

34. Permeabilization of synaptic terminals with α-toxin. G.J. Chin and S.S. Vogel, Howard Hughes Medical Institute and Department of Biochemistry and Molecular Biophysics, Columbia University, New York, NY.

35. Proton permeability of toad bladder aggrephore membranes: Role of the water channel in proton transport. H.W. Harris, Jr., D. Kikeri, A. Janoshazi, A.K. Solomon and M.L. Zeidel, Harvard Medical School, Boston, MA.

36. Kinetic properties of the human lymphocyte Na^+/H^+ exchanger. P. Strazzullo and M. Canessa, University of Naples, Naples, Italy and Endocrine Hypertension Division, Brigham and Woman's Hospital and Harvard Medical School, Boston, MA.

37. Antibodies against proteins of the Na/Cl Cotransporter. P.B. Dunham, B. Dyer, F. Jessen and E.K. Hoffman, Department of Biology, Syracuse University, Syracuse, NY and August Krogh Institute, University of Copenhagen, Copenhagen, Denmark.

38. Volume-sensitive K-Cl cotransport in inside-out vesicles made from LK sheep erythrocyte membrane. G.R. Kracke and P.B. Dunham, Department of Anesthesiology, University of Missouri-Columbia, Columbia, MO and Department of Biology, Syracuse University, Syracuse, NY.

39. The action of galanin on electrolyte transport and potassium channels activity in rabbit ileum. F.R. Homaidan, L.M. Nowak, M. Donowitz and G.W.G. Sharp, Department of Pharmacology, NYS College of Veterinary Medicine, Cornell University, Ithaca, NY and Departments of Gastroenterology and Physiology, The Johns Hopkins University, School of Medicine, Baltimore, MD.

40. Chloride channel-related proteins from *Necturus* gallbladder: Common antigenic determinants from different species. L.M. Tsai, R.J. Falk and A.L. Finn, Departments of Medicine and Physiology, University of North Carolina School of Medicine, Chapel Hill, NC.

41. Volume-sensitive K-Cl cotransport: Metabolic dependence and inhibition by vanadate and fluoride. S.T. Coker and W.C. O'Neill, Departments of Medicine and Physiology, Emory University School of Medicine, Atlanta, GA.

42. Membrane lipid fluidity influences the Cl permeability in exocrine secretory granules. K. Gasser, A. Goldsmith and U. Hopfer, Department of Physiology and Biophysics, Case Western Reserve University, Cleveland, OH.

43. Protein kinase C modulation of airway epithelial NaCl(K) cotransport. C.M. Liedtke and G. Wascovich, Department of Physiology, Case Western Reserve University, Cleveland, OH.

44. Ionic current and uni-directional potassium flux in the resting membrane of squid axons. D.C. Chang and J.R. Hunt, Department of Molecular Physiology and Biophysics, Baylor College of Medicine, Houston, TX.

45. In vitro study of the interactions of nitrosamine ligands with the nicotinic acetylcholine receptor from rectus abdominis muscle preparations of *Xenopus*. C.G. Whiteley, Department of Biochemistry, Rhodes University, Grahamstown, South Africa.

46. An experimental procedure for obtaining aequorin-loaded isolated mammalian cardiac myocytes. A.J. Meuse, C.L. Perreault, W. Grossman and J.P. Morgan, Department of Medicine, Harvard-Thorndike Laboratory and Beth Israel Hospital, Boston, MA.

Friday, September 8, 1989

POSTER SESSION II—2:00 - 6:00 p.m.

47. Structure of the rat gene encoding the dopamine D2 receptor. M.A. Marchionni, D.K. Grandy, M. Alfano, J.R. Bunzow and O. Civelli, Department of Molecular Biology, Cambridge NeuroScience Research, Cambridge, MA and Vollum Institute, Or. Hlth. Sci Univ., Portland, OR.
48. Bovine opsin expressed in Chinese hamster ovary cells selectively regulates adenylyl cyclase activity in response to light. E.R. Weiss, R. Heller-Harrison, E. Diez and G.L. Johnson. National Jewish Center for Immunology and Respiratory Medicine, Denver, CO.
49. Comparative studies of the phosphorylation of muscarinic cholinergic receptors by protein kinase C and the β-adrenergic receptor kinase. R.M. Richardson and M.M. Hosey, Department of Biological Chemistry & Structure, University of Health Sciences/The Chicago Medical School, North Chicago, IL.
50. Anti-peptide antibodies detect muscarinic cholinergic receptor subtypes in brain and heart. C.S.K. Mayanil and M.M. Hosey, Department of Biological Chemistry and Structure, Chicago Medical School, North Chicago, IL.
51. Identification and isolation of a bacterial exotoxin inhibitory protein (BEIP) from the ovotestis of *Aplysia californica* that inhibits ADP-ribosylation. M.R. Hellmich and F. Strumwasser, Laboratory of Neuroendocrinology, Marine Biological Laboratory, Woods Hole, MA.
52. Production and screening of an ovotestis cDNA library for bacterial exotoxin inhibitory protein (BEIP) genes. D.L. Glick, M.R. Hellmich, P. Tempst and F. Strumwasser, Laboratory of Neuroendocrinology, Marine Biological Laboratory, Woods Hole and Department of Genetics, Harvard Medical School, MA.
53. Calculation and presentation of receptor occupancy surfaces. M.E. Kargacin, C.R. Scheid and T.W. Honeyman, Department of Physiology, University of Massachusetts Medical School, Worcester, MA.
54. Regulation of cAMP synthesis by $G\alpha_s/G\alpha_i$ chimeras in Cos-1 and CHO cells. S. Osawa, L. Heasley and G.L. Johnson, National Jewish Center for Immunology and Respiratory Medicine, Denver, CO.
55. Pertussis toxin-sensitive G proteins are transported by fast axonal transport toward nerve terminals. S.S. Vogel, G.J. Chin and T.S. Reese, Marine Biological Laboratory, Woods Hole, MA; Howard Hughes Medical Institute, Columbia University, New York, NY; National Institute of Neurologicapand Communicative Disorders and Stroke, National Institutes of Health, Bethesda, MD.
56. Characterization of the human G_{i2} α-subunit gene promoter. L.S. Weinstein, I. Katz, A.M. Spiegel and A.D. Carter, Molecular Pathophysiology Branch, National Institute of Diabetes, Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD.
57. Stable expression of heavy metal-inducible G-protein α_i-2 and α_i-3 subunit genes in LLC-PK$_1$ cells. L. Ercolani, J. Stow, J. Boyle, and D.A. Ausiello, Renal Unit, Massachusetts General Hospital and Harvard Medical School, Boston, MA.
58. The G protein subunit α_{i1}, but not α_s, is myristylated in COS cells transfected with the genes for those subunits. T.L.Z. Jones, J.J. Merendino, W.F. Simonds and A.M. Spiegel, Molecular Pathophysiology Branch, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD.
59. Characterization of $p25^{rab3A}$, a member of the ras gene superfamily. E.S. Burstein, A. Moscucci, A. Wolfman and I.G. Macara, Environmenwl Health Sciences Center, University of Rochester, Rochester, NY.
60. The role of intracellular messengers in the regulation of muscarinic ACh receptors in rat cerebral cortex slices. C. Shaw, F. Van Huizen and M. Cynader, Department of Ophthalmology, University of British Columbia, Vancouver, British Columbia, Canada.
61. Second messengers in VIP-mediated relaxation of the cat lower esophageal sphincter (LES). S. Szewczak, J. Behar, C. Hillemeier, J.M. Marshall, B.Y. Rhim and P. Biancani, Rhode Island Hospital and Brown University, Providence, Rhode Island, and University of Michigan, Ann Arbor, MI.
62. Evidence for the involvement of G-proteins in progesterone-induced maturation of *X. laevis* oocytes. R.J. Cork, M. Taylor and K.R. Robinson, Department of Biological Sciences, Purdue University, West Lafayette, IN.
63. Effects of 4β-phorbol-12-myristate 13-acetate (PMA) on the hepatic α_1-adrenergic signal transduction system. J.F. Beeler and R.H. Cooper, Department of Pharmacology, University of South Carolina School of Medicine, Columbia, SC.
64. Comparison of roles of protein kinase C, inositol trisphosphate, and Ca^{++} in cholinergic and α_1-adrenergic agonist stimulation of lacrimal gland protein secretion. R.R. Hodges, D.M. Dicker, S.C. Yiu and D.A. Dartt, Immunology Unit, Eye Research Institute, and Ophthalmology Department, Harvard Medical School, Boston, MA.
65. Immortalized cystic fibrosis (CF) airway cells retain a defective cAMP stimulated Cl^- channel. D. Wolff, M. Canessa, J. Romero and L. Krueger, Endocrine-Hypertension Div., Harvard Medical School, Boston, MA and Division of Genetics, Hahnemann University, Philadelphia, PA.
66. Participation of a G protein modulation system on the assembly and sealing of tight junctions. B.M. Susana, G-M. Lorenza, C.R. Gerardo and C. Marcelino, Department of Physiology, Center of Research and Advanced Studies, Mexico City, Mexico.
67. G_i protein gates a cation channel in renal inner medullary collecting duct cells. D.B. Light, D.A. Ausiello and B.A. Stanton, Department of Physiology, Dartmouth Medical School, Hanover, NH and Renal Unit, Massachusetts General Hospital and Harvard School, Boston, MA.
68. Effects of insulin, phosphatase and cholera toxin on a Ca^{++}-dependent chloride channel in a distal nephron cell line (A6). Y. Marunaka and D.C. Eaton, Department of Physiology, Emory University School of Medicine, Atlanta, GA.
69. IGF1-stimulated Na^+ transport in A6 cells—A G-protein mediated response. B.L. Blazer-Yost and M. Cox, Department of Medicine, University of Pennsylvania School of Medicine and Veterans Administration Medical Center, Philadelphia, PA.
70. Dual modulation of Cl^- conductance by nucleotides in pancreatic and parotid zymogen granules (ZG). F. Thevenod, K. Gasser, A. Goldsmith and U. Hopper, Department of Physiology and Biophysics, Case Western Reserve University, Cleveland, OH.

71. The apparent rate of spontaneous G-protein activation in *Limulus* photoreceptors is extremely low. J. Lisman, M. Goldring, P. Robinson and A. Kirkwood, Department of Biology, Brandeis University.
72. G-proteins mediate IgE receptor-activated signal transduction pathways in rat basophilic leukemia (RBL) cells. V. Narasimhan, G. Labrecque, D. Holowka and B. Baird, Cornell University, Ithaca, NY.
73. Ion channel subconductance states: Analysis and structure-function implications. A.M.J. Vandongen and A.M. Brown, Department of Molecular Physiology and Biophysics, Baylor College of Medicine, Houston, TX.
74. "Perforated patch recording" from pancreatic islet B cells. L.C. Falke, K.D. Gillis, D.M. Pressel and S. Misler, The Jewish Hospital, Washington University Medical Center, St. Louis, MO.
75. Inhibition of epithelial anion channels by HEPES and related buffers. J.A. Tabcharani and J.W. Hanrahan, Department of Physiology, McGill University, Montreal, Quebec.
76. Whole cell currents in cultured outer medullary collecting duct (OMCD) cells. C. Pappas, A. Oyler and B. Koeppen, Department of Medicine and Physiology, University of Connecticut Health Center, Farmington, CT.
77. Single-channel properties of a chloride channel from lobster axon vesicles. G.L. Lukacas and E. Moczydlowski, Departments of Pharmacology and Cellular and Molecular Physiology, Yale University School of Medicine, New Haven, CT.
78. Patch clamp studies of single fusion events caused by the influenza virus fusion protein. A.E. Spruce, A. Iwata, J.M. White and W. Almers, Department of Physiology and Biophysics, University of Washington, Seattle, WA, Department of Pharmacology, University of California, San Francisco, CA.
79. A potassium selective ion channel in gastric smooth muscle cells is activated by flow and Ca^{++} at the extracellular surface. M.T. Kirber, R.W. Ordway, J.V. Walsh, Jr., and J.J. Singer, Department of Physiology, University of Massachusetts Medical School, Worcester, MA.
80. Fatty acids directly activate large conductance, calcium-activated K^+ channels in pulmonary artery smooth muscle cells from rabbit. R.W. Ordway, L.H. Clapp, J.J. Singer and J.V. Walsh, Jr., Department of Physiology, University of Massachusetts Medical School, Worcester, MA and Department of Pharmacology, United Medical and Dental Schools, St. Thomas' Campus, London, England.
81. Stretch-activated ion channels in mammalian vascular smooth muscle cells. M.T. Kirber, L.H. Clapp, J.V. Walsh, Jr. and J.J. Singer, Department of Physiology, University of Massachusetts Medical School, Worcester, MA and Department of Pharmacology, United Medical and Dental Schools, St. Thomas' Campus, London, England.
82. Ionic currents in smooth myocytes of the pregnant rat uterus. M. Yoshino, S.Y. Wang and C.Y. Kao, Department of Pharmacology, SUNY Downstate Medical Center, Brooklyn, NY.
83. Actions of C-6 modified tetrodotoxin on frog skeletal muscle fibers. L. Yang, S.L. Hu, C.Y. Kao and T. Yasumoto, Department of Pharmacology, SUNY Downstate Medical Center, Brooklyn, NY and Department of Food Chemistry, Faculty of Agriculture, Tohoku University, Sendai 980, Japan.
84. Trypsin activation and quinidine block of atrial muscarinic K^+ channels. G.E. Kirsch and A.M. Brown, Department of Molecular Physiology and Biophysics, Baylor College of Medicine, Houston, TX.
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87. Parathyroid hormone-stimulated calcium channels in kidney [CAL + DCT] cells. B.J. Bacskai and P.A. Friedman, Thayer School of Engineering, Dartmouth College and Department of Pharmacology, Dartmouth Medical School, Hanover, NH.
88. Comparison of transient behavior of native versus nystatin-induced apical channels in isolated frog skin. T. Hoshiko and S. Machlup, Department of Physiology & Biophysics and Department of Physics, Case Western Reserve University, Cleveland, OH.
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90. Monitoring mitochondrial and plasma membrane potentials in cultured cells with a new ^{99m}Tc-based lipophilic cation. M.L. Chiu, J.F. Kronauge and D. Piwnica-Worms, Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA.
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92. Systemic hydroxyurea treatment increases red cell water content in dogs: Implications for therapy of sickle cell disease. J.C. Parker and E.P. Orringer, Department of Medicine, The University of North Carolina at Chapel Hill, NC.
93. Regulation of contact sites between rhodopsin and transducin by guanine nucleotides. H.E. Hamm, Department of Physiology and Biophysics, University of Illinois College of Medicine, Chicago, IL.
94. G proteins and regulation of secretion: Amylase release in pancreatic cell line AR4 stimulated by substance P and Angiotensin II. Wing-Tai Cheung and M.R. Hanwy, MRC Molecular Neurobiology Unit, University of Cambridge Medical School, Cambridge, England.