CURRICULUM VITAE

Name: J. Silvio Gutkind

Date: April 2000

Date and Place of Birth: May 4, 1959; Buenos Aires, Argentina

Citizenship: Argentinean, Permanent Resident U.S.

Education:

1976-1980	Pharmacy Degree (M.Sc.), University of Buenos Aires, Argentina
1976-1983	Biochemistry Degree (M.Sc.), University of Buenos Aires, Argentina.
1985	Ph.D. in Pharmacy and Biochemistry, University of Buenos Aires, Argentina

Brief Chronology of Employment:

1998-present	Chief, Oral and Pharyngeal Cancer Branch, National Institute of Dental Research, NIH, Bethesda, USA
1997-present	Chief, Cell Growth Regulation Section, Oral and Pharyngeal Cancer Branch, National Institute of Dental Research, NIH, Bethesda, USA
1996-1997	Acting Chief, Oral and Pharyngeal Cancer Branch, National Institute of Dental Research, NIH, Bethesda, USA
1993-1997	Chief, Molecular Signaling Unit, Laboratory of Cellular Development and Oncology, National Institute of Dental Research, NIH, Bethesda, USA.
1992-1993	Head, Molecular Signaling Group, Laboratory of Cellular Development and Oncology, National Institute of Dental Research, NIH, Bethesda, USA.
1989-1992	Visiting Associate, Laboratory of Cellular Development and Oncology, National Institute of Dental Research, NIH, Bethesda, USA.
1988-1989	Fogarty Visiting Fellow, Laboratory of Cellular Development and Oncology, National Institute of Dental Research, NIH, Bethesda, USA.
1987-1988	Fogarty Visiting Fellow, NIDR, Guest Researcher at the Laboratory of Cellular and Molecular Biology, National Cancer Institute, NIH, Bethesda, USA.
1986-1987	International Fogarty Fellow, Laboratory of Clinical Science, National Institute of Mental Health, NIH, Bethesda, USA.
1983-1986	Research Assistant, Department of Pharmacology, School of Pharmacy and Biochemistry, University of Buenos Aires, Argentina.
1981-1983	Part-time Instructor, Department of Pharmacology, School of Pharmacy and Biochemistry, University of Buenos Aires, Argentina.

1979-1980 Part-time Instructor, Department of Organic Chemistry, School of Pharmacy and Biochemistry, University of Buenos Aires, Argentina.

Honors and other special scientific recognitions:

1999 EEO Special Achievement Award, NIDCR, NIH
1998 Appointment as member of the Senior Biomedical Research Services (SBRS)
1997 NIDR Director's Exemplary Service Award
1996 NIH Merit Award
1996 Santa Cruz Biotechnology Investigator Award, Supervisor
1989 Funds for Young Scientists, Travel Award, Organizing Committee of the 7th International Conference on Protein Phosphorylation, Kobe, Japan
1986 International Fogarty Fellowship, National Institutes of Health, USA
1983 Gold Medal Award and Diploma of Honor, first rank student of the School of Pharmacy and Biochemistry, University of Buenos Aires, Argentina.

Professional Membership and Associations:

American Association for the Advancement of Science
American Society of Microbiology

Patents:

5,384,243, issued January 24, 1995. J. Silvio Gutkind and Keith C. Robbins: Method for screening an agent for its ability to prevent cell transformation.

Editorial Responsibilities:

1998-present Member, Editorial Board, Journal of Biological Chemistry
1998-2000 Editor, Book on Signaling Networks and Cell Cycle Control, Humana Press
2000-present Co-Editor, Book on Head and Neck Cancer

Invited Lectures and Presentations:

2000- Georgetown University, Washington, DC, upcoming
American College of Oral and Maxiofacial Surgeons Symposium, Washington, DC, upcoming
Symposium on Novel Molecular Targets for Cancer Therapy, Buenos Aires, Argentina, upcoming
Iberoamerican Research Organization, Symposium on Signal Transduction, Concepcion, Chile, upcoming
G protein Coupled Receptor Symposium, Boston, MA, upcoming
Mosbacher Kolloquium 2000, Mosbach, Germany
University of California, San Diego, Department of Biology, San Diego, CA

Emory University, Atlanta, GA
Boston Society of Cancer Research and Harvard Dental School, Boston, NE
University of Cincinnati, Cincinnati, OH

1999- McGill University, Montreal, Canada
Society of Biological Psychiatry, Minisyposium on Signal Transduction, Washington, DC
Gordon Conference on G proteins, Ventura, CA
New York Academy of Science, New York, NY
Albert Einstein School of Medicine, New York, NY
Gordon Conference on Salivary Gland Function, Ventura, CA
Keystone Winter Symposia, "Oncogene Networks" and Session on "Cell Surface Receptors"
Karolinska Institute, Sweden
Washington University, Seattle, WA
Georgetown University, Washington, DC
Southwestern University, Dallas, TX
University of Miami, Miami, FL
Gordon Conference on Signal Transduction, Singapore
University of North Carolina, NC

1998- NCI, NIH-Frederick, MD
University of Pennsylvania, Philadelphia, PA
Children's Hospital, Washington DC
Annual Meeting of the American Dental Association, Minneapolis, Minnesota
Kimmel Cancer Institute, Thomas Jefferson University, Philadelphia, PA
German Society of Biochemistry and Molecular Biology, Jena, Germany
Eighth International Symposium on Oncogenes, Madrid, Spain
First International Meeting on Signal Transduction, Croatia
University of Michigan, Ann Arbor, MI
Signal Pharmaceuticals, San Diego, CA
10th International Conference on Second Messengers & Phosphoproteins, Jerusalem, Israel,
Cleveland Clinic, Cleveland, OH
New England Biolabs, Beverly, MA

1997- FDA, CBER, Bethesda, MD
Case Western Reserve University, Cleveland, OH
Signal Transduction Therapy Conference, San Diego, CA
Annual Meeting of the American Society of Bone and Mineralized Tissue Research, Cincinnati, OH
Novartis Pharmaceuticals, NJ
Stratagene, San Diego, CA
Georgetown University, Washington, DC
Harvard Medical School, Boston MA
USUHS, Bethesda, MD

1996- Holland Laboratory, American Red Cross, Rockville, MD
University of Pennsylvania, Philadelphia, Pennsylvania
Chair, Third Annual Signal Transduction Therapy Conference,
San Diego, California
Chair, Workshop "Signal Transduction from the Membrane to the Nucleus"
NIH Research Festival
Second International Colloquium on “Cellular Signal Recognition and Transduction”, Berlin, Germany
Georgetown University, Washington DC
Stony Brook, New York, NY.
Sixth International Symposium on Oncogenes, San Sebastian, Spain
Center of Molecular Biology "Severo Ochoa", Madrid, Spain
University of Santander, Santander, Spain
Congress of the Pan American Association of Biochemistry and Molecular Biology, Symposium on “Regulation of protein kinases involved in cell division”, Pucon, Chile

1995- Second Annual Signal Transduction Therapy Conference,
San Francisco, California
University of Concepcion, Workshop on Molecular Biology Techniques, Concepcion, Chile
University of Concepcion, Concepcion, Chile, Plenary lecture. "Molecular basis of cancer”:
FASEB meeting, Symposium on "Regulation of nuclear signaling by G-protein linked receptors", Atlanta, Georgia
Mount Sinai Medical Center, New York, New York
University of Vermont, Vermont, Vermont
Stratagene, La Jolla, California
Columbia University, New York, New York
Pfizer Inc., Groton, Connecticut, Central Research Seminar
March Foundation, Workshop on “G-Proteins: Structural features and their involvement in the regulation of cell growth”, Madrid, Spain

1994- Joint Seminar Program, Temple University and the Fels Research Institute, Philadelphia, Pennsylvania
Fourth International Symposium on Oncogenes, San Sebastian, Spain
University of Valladolid, Spain
INSERM, Paris, France
NIH research Festival, NIH, Bethesda, Maryland.
University of Pennsylvania Medical Center in Philadelphia, Pennsylvania

1993- Santiago Summer Symposia, Santiago, Chile
Third International Symposium on Oncogenes, Canary Islands, Spain
NIH research festival, NIH, Bethesda, Maryland
Meeting of the Argentine Society of Biochemical Investigation, Cordoba, Argentina

	National Institute of Genetic Engineering and Molecular Biology, Buenos Aires, Argentina.
	Foundation Campomar, Buenos Aires, Argentina
1992-	Cetus Corporation, Emeryville, California
	University of Maryland, Baltimore, Maryland
	Department of Pharmacology, University of Texas, Southwestern Medical Center, Dallas, Texas
	NIH research festival, NIH, Bethesda, Maryland.
1991-	National Institute of Health, NCI, Bethesda, Maryland.
	National Institute of Health, NIDR, Bethesda, Maryland
	National Institute of Health, NIMH, Bethesda, Maryland
	National Institute of Health, NIDDK, Bethesda, Maryland
1990-	Walter Reed Army Institute, Washington DC
	Second International Symposium on Oncogenes, Madrid, Spain
	University of Barcelona, Barcelona, Spain
	National Institute of Health, NIDDK, Bethesda, Maryland
1989-	Burroughs Welcome, Durham, North Carolina
	University of Nagasaki, Nagasaki, Japan
	Shionoi Co., Osaka, Japan

Symposia Organized:

1995 Workshop on Signaling through G proteins, NIH
1996 Workshop on Signal Transduction from the Membrane to the Nucleus, NIH
1996 Third Annual Signal Transduction Therapy Conference, San Diego, California
1996 Symposium on Regulation of Protein Kinases Involved in Cell Division, Congress of the Pan American Association of Biochemistry and Molecular Biology, Pucon, Chile
1998 Workshop on G proteins, 10th International Conference on Second Messengers & Phosphoproteins, Jerusalem, Israel
1999 Workshop on “Head and Neck Cancer Priority Setting”, organizing committee, NIH
1999 Keystone Winter Symposia, “Oncogene Networks” and Session on “Cell Surface Receptors”

Ad-hoc Reviewer:

Biochemical and Biophysical Acta
Blood
British Journal of Cancer
Cancer Research
Cell Growth and Differentiation
Clinical Cancer Research
Current Biology
EMBO Journal

FEBS letters
Journal of Biological Chemistry
Journal of Cell Biology
Journal of Cell Physiology
Journal of Clinical Investigation
Journal of Immunology
Journal of Neurochemistry
Molecular and Cellular Biology
Molecular and Cellular Neurobiology
Nature
Nature Biology
Nature Medicine
Oncogene
Oral Oncology
Trends in Biological Science
Proceedings of the National Academy of Science, USA
Science

Research Services:

1995	Member, Search Committee for Chief, Gene Targeting Facility, NIDR
1995	Member, Search Committee for Tenure Track Scientist, Smell and Taste Unit, NIDR
1995-1997	Member, Gene Targeting Facility Oversight Committee, NIDR
1995-present	Reviewer, Welcome Trust Foundation
1995-1996	Member, Sequencing Core Facility Oversight Committee, NIDR
1996	Reviewer, The Israel Science Foundation
1996	Member, Search Committee for Laboratory Chief, NAB, NIDR
1996-present	Preceptor, Howard Hughes Research Scholars
1996	Member, Search Committee for SBRS position, LCMB, NCI
1996	Chair, Search Committee for Tenure Track Scientist, NCI-Navy Clinical Oncology Branch
1996	Ad-hoc member, NIH Central Tenure Committee
1997	Reviewer, Grant Program, DER, NCI
1997-present	Reviewer, Italian Association for Scientific Research
1997-present	Reviewer, German-Israeli Foundation for Scientific Research & Development
1997-present	Reviewer, National Science Foundation
1997	Reviewer, Swiss National Science Foundation
1997-present	Reviewer, The Israel Science Foundation
1997-1999	Reviewer, Medical Research Council of Canada
1997	Member, Search Committee for Dental Officer, NIDR
1998-present	Member, CGAP

1998-present	Member, External Faculty, University of Chile
1998-present	Member, Reviewing Council, FONCYT, Argentina
1998-present	Chair, Head and Neck Cancer Consortium, NIH
1998-present	Member, NIH Central Tenure Committee
1999	Member, Search Committee, Director Division of Basic Sciences, NCI
1999-present	Senior Advisor, Howard Hughes Research Scholar Program
2000	Member, Search Committee, Structural Biology, NIDDK
2000	Member, Search Committee, NIAAA

Research Interests:

Molecular basis of signal transduction in cell proliferation, differentiation and neoplastic transformation; the use of this knowledge to develop molecular markers of disease progression and novel therapeutic approaches for oral malignancies.

Publications

1. Gutkind J.S., Enero M.A. Noradrenaline uptake inhibitors counteract the cardiovascular effects of clonidine but not those of guanabenz. *Commun. Biol.* **1:**319-326, 1983.
2. Gutkind J.S., Enero M.A. Treatment with clorgyline and pargyline differentially decreases clonidine-induced hypotension and bradycardia. *Naunyn Schmiedeberg's Arch. Pharmacol.* **327:**189-192, 1984.
3. Gutkind J.S., Bognar I., Enero M.A. Pharmacological characterization of guanabenz, clonidine-like anti-hypertensive drug. *J. Cardiol. (Argentina)* **53:**145-147, 1985.
4. Gutkind J.S., Kazanietz M.G., Enero M.A. Cardiovascular effects of alpha-adrenergic drugs: differences between clonidine and guanabenz. *Naunyn Schmiedeberg's Arch. Pharmacol.* **332:**370-375, 1986.
5. Gutkind J.S., Enero M.A. Effects of desipramine on the cardiovascular responses to clonidine and guanabenz. *Hypertension* **8:**184-186, 1986.
6. Kazanietz M.G., Gutkind J.S., Enero M.A. Interaction between β_2- and α_2-adrenoceptor responses in the vascular system: effect of clenbuterol. *Eur. J. Pharmacol.* **130:**119-124, 1987.
7. Castren E., Kurihara M., Gutkind J.S., Saavedra J.M. Specific angiotensin II binding sites in the rat stellate and superior cervical ganglion. *Brain Research* **422:**347-351, 1987.
8. Gutkind J.S., Enero M.A. Different pharmacological interaction of clonidine and guanabenz with antidepressive drugs. *Clin. Exper. Hypertension* **A9:**1531-1547, 1987.
9. Gutkind J.S., Kurihara M., Castren E., Saavedra J.M. Atrial natriuretic peptide receptors in sympathetic ganglia: Biochemical response and alterations in genetically hypertensive rats. *Biochem. Biophys. Res. Commun.* **149:**65-72, 1987.
10. Kurihara M., Castren E., Gutkind J.S., Saavedra J.M. Lower number of atrial natriuretic peptide receptors in thymocytes and spleen cells of spontaneously hypertensive rats. *Biochem. Biophys. Res. Commun.* **149:**1132-1140, 1987.
11. Saito K., Gutkind J.S., Saavedra J.M. Angiotensin II binding sites in the conduction system of the rat heart. *Am. J. Physiol.* **253:** (Heart Circ. Physiol. 22), H1618-H1622, 1987.
12. Gutkind J.S., Kurihara M., Castren E., Saavedra J.M. Increased concentration of angiotensin II binding sites in selected brain areas of spontaneously hypertensive rats. J. *Hypertension* **6:**79-84, 1988.
13. Kurihara M., Gutkind J.S., Saavedra J.M. Alteration of atrial natriuretic peptide binding sites in spontaneously hypertensive rats. *Am. J. Hypertension* **1:**12S-14S, 1988.

14. Kurihara M., Castren E., Gutkind J.S., Saito K., Saavedra J.M. Characterization of β-adrenergic receptors in sections from human blood lymphocyte pellets by quantitative auto-radiography. *Biological Psychiatry* **23:**746-749, 1988.
15. Nazarali A.J., Gutkind J.S., Saavedra J.M. Regulation of angiotensin II binding sites in discrete rat brain nuclei after water deprivation. *Cell. Molec. Neurobiol.* **7:**447-455, 1988.
16. Gutkind J.S., Castren E., Saavedra J.M. Decreased angiotensin II binding in the anterior pituitary gland of spontaneously hypertensive rats. *Life Science* **43:**441-451, 1988.
17. Gutkind J.S., Kurihara M., Castren E., Saavedra J.M. Autoradiographic quantification of vasoactive intestinal peptide binding sites in sections from human blood lymphocytes pellets. *Neuropsychopharmacol.* **1:**251-255, 1988.
18. Gutkind J.S., Kurihara M., Saavedra J.M. Increased angiotensin II receptors in brain nuclei of DOCA-salt hypertensive rats. *Am. J. Physiol.* **255:** (Heart Circ. Physiol. 24), H646-H650, 1988.
19. Castren E., Kurihara M., Gutkind J.S., Saavedra J.M. Atrial natriuretic peptide receptors in thymus and spleen of young spontaneously hypertensive rats. In *Advances in Atrial Peptide Research. ASH Symposium Series* volume II, 243-247, 1988.
20. Gutkind J.S., Kurihara M., Castren E., Saavedra J.M. Atrial natriuretic peptide receptors in rat sympathetic ganglia: alterations in genetically hypertensive rats. In *Advances in Atrial Peptide Research, ASH Symposium Series* volume II, 261-265, 1988.
21. Nazarali A.J., Gutkind J.S., Correa F.M.A., Saavedra J.M. Effect of chronic administration of the converting enzyme inhibitor enalapril (MK 421) on brain atrial natriuretic peptide receptors in Wistar-Kyoto and spontaneously hypertensive rats. *Brain Research* **475:**134-140, 1988.
22. Saavedra J.M., Castren E., Gutkind J.S., Kurihara M., Nazarali A.J. Atrial natriuretic peptide and the autonomous nervous system. In *Atrial Natriuretic Peptides*. Edited by R. Quirion and W.K. Samson. Boca Raton, Florida: CRC press, Inc., 209-220, 1989.
23. Gutkind J.S., Kazanietz M.G., Armando I., Puyo A, Enero M.A. Pressor response induced by clenbuterol treatment in immobilized normotensive rats. *J. Cardiovasc. Pharmacol.* **13:**793-798, 1989.
24. Kazanietz, M.G., Gutkind J.S., Puyo A., Armando I., Enero, M.A. Further evidence for interaction between vasodilators beta-2-adrenoceptor and vasoconstriction-alpha-2-adrenoceptor mediated responses in maintaining vascular tone in anesthetized rats. *J. Cardiov. Pharmacol.* **14:**874-880, 1989.
25. Nazarali A.J., Gutkind J.S., Correa F.M.A., Saavedra J.M. Selective decrease of angiotensin II receptors in the subfornical organ of spontaneously hypertensive rats after chronic treatment with a converting enzyme inhibitor. *Am. J. Physiol.* **256:**H1609-H1614, 1989.
26. Saavedra J.M., Castren E., Gutkind J.S., Nazarali A.J. Regulation of brain atrial natriuretic peptide and angiotensin receptors: Quantitative autoradiographic studies. *Internatl. Rev. of Neurobiol.* **31:**257-296, 1989.
27. Nazarali A.J., Gutkind J.S., Saavedra J.M. Calibration of [^{125}I]-polymer standards with [^{125}I]-brain paste standards for use in quantitative receptor autoradiography. *J. Neurosc. Methods* **30:**247-253, 1989.

28. Sugita K., Gutkind J.S., Katamine S., Robbins K.C. The actin domain of Gardner-Rasheed feline sarcoma virus inhibits kinase and transforming activities. *J. Virology* **63:**1715-1720, 1989.
29. Notario V., Gutkind J.S., Imaizumi M., Katamine S., Robbins K.C. Expression of the fgr proto-oncogene product as a function of myelomonocytic cell maturation. *J. Cell Biol*. **109:**3129-3136, 1989.
30. Gutkind J.S., Robbins K.C.: Mobilization of the c-fgr protein-tyrosine kinase as a consequence of neutrophil activation. *Proc. Natl. Acad. of Sci., USA,* **86:**8783-8787, 1989.
31. Gutkind J.S., Lacal P.M., Robbins K.C. Thrombin-dependent association of phosphatidylinositol-3 kinase with $p60^{c\text{-}src}$ and $p59^{fyn}$ in human platelets, *Mol. Cell. Biol.* **10:**3806-3809, 1990.
32. Benhamou M., Gutkind J.S., Robbins K.C., Siraganian R.P. Tyrosine phosphorylation coupled to IgE receptor-mediated signal transduction and histamine release. *Proc. Natl. Acad. Sci. USA* **87:**5327-5330, 1990.
33. Vukicevic S., Paralkar V.M., Cunningham N.S., Gutkind J.S., Reddi A.H. Autoradiographic localization of osteogenin binding sites in cartilage and bone during rat embryonic development. *Dev. Biol.* **140:**209-214, 1990.
34. Gutkind J.S., Lacal P.M., Benhamou M., Siraganian R.P., Robbins K.C. Evidence for protein-tyrosine kinase involvement in non-proliferative signal transduction. *Proc. II Internatl. Symp. on Oncogenes* Spain, 101-132, 1991.
35. Heidaran M.A., Pierce J.H., Lombardi D., Ruggiero M., Gutkind J.S., Matsui T., Aaronson S.A. Deletion or substitution within the α PDGF receptor kinase insert domain: effects on functional coupling with intracellular signaling pathways. *Mol. Cell. Biol.* **11:**134-142, 1991.
36. Yu, J.-C., Heidaran M.A., Pierce J.H., Gutkind J.S., Lombardi D., Ruggiero M., Aaronson S.A. Tyrosine mutations within the αPDGF kinase insert domain abrogate receptor-associated PI-3 kinase activity without affecting mitogenic or chemotactic signal transduction. *Mol. Cell. Biol.* **11:**3780-3785, 1991.
37. Gutkind J.S., Link D.C., Katamine S., Lacal P., Miki T., Ley T.J., Robbins K.C. A novel c-*fgr* exon utilized in Epstein-Barr virus infected B-lymphocytes but not normal monocytes. *Mol. Cell. Biol.* **11:**1505-1507, 1991.
38. Gusovsky F., Gutkind J.S.: Selective effect of activation of protein kinase-C isoenzymes on cAMP accumulation. *Mol. Pharmacol.* **39:**124-129, 1991.
39. Gutkind J.S., Novotny E., Brann M.R., Robbins, K.C. Muscarinic acetylcholine receptor subtypes as agonist dependent oncogenes. *Proc. Natl. Acad. Sci. USA* **88:**4703-4707, 1991.
40. Hermouet S., Merendino J. Jr., Gutkind J.S., Spiegel A.M. Activating and inactivating mutations of $G_{\alpha i2}$ have opposite effects on proliferation of NIH 3T3 cells. *Proc. Natl. Acad. Sci. USA* **88:**10455-10459, 1991.
41. Sartor O., Moriuchi R., Sameshima J., Severino M., Gutkind J.S., Robbins K.C. Diverse biologic properties imparted by the c-*fgr* proto-oncogene. *J. Biol. Chem.* **267:**3460-3465, 1992.

42. Volker S., Benhamou M., Gutkind J.S., Robbins K.C., Siraganian R.P. Fc,RI-induced protein tyrosine phosphorylation of pp72 in rat basophilic leukemia cells (RBL-2H3): Evidence for a novel signal transduction pathway unrelated to G protein activation and phosphatidylinositol hydrolysis. *J. Biol. Chem.* **267:**5434-5441, 1992.
43. Thompson P.A., Gutkind J.S., Robbins K.C., Ledbetter J.A., Bolen J.B. Identification of distinct populations of PI-3 kinase following T cell activation. *Oncogene* **7:**719-725, 1992.
44. Link D.C., Gutkind J.S., Robbins K.C., Ley T.J. Characterization of the 5' untranslated region of the human c-*fgr* gene and identification of the major myelomonocytic c-*fgr* promoter. *Oncogene* **7:**877-884, 1992.
45. Kalinec G., Nazarali A.J., Hermouet S., Xu N., Gutkind J.S. Mutated α subunit of the G_q protein induces malignant transformation in NIH 3T3 cells. *Mol. Cell. Biol.* **12:**4687-4693, 1992.
46. Gutkind J.S., Robbins K.C. Activation of transforming G protein-coupled receptors induces rapid tyrosine phosphorylation of cellular proteins, including $p125^{FAK}$ and the p130 v-*src* substrate. *Biochem. Biophys. Res. Commun.* **188:**155-161, 1992.
47. Wang L.-M,. Keegan A.D., Paul W.E., Heidaran M.A., Gutkind J.S., Pierce J.H. IL-4 activates a distinct signal transduction cascade from IL-3 in factor dependent myeloid cells. *EMBO J.* **11:**4899-1908, 1992.
48. Siraganian R.P., Benhamou M., Stephan V., Gutkind J.S., Robbins K.C. Tyrosine phosphorylation coupled to IgE receptor-mediated signal transduction and histamine release. Proc. XIV Internatl. Cong. Allergeology and Clinical Immunology. In *Progress in Allergy and Clinical Immunology. Vol. 2.* Edited by T. Miyamoto and M. Okuda. Toronto: Hogrefe and Huber, 354-359, 1992.
49. Stephens E.V., Kalinec G., Brann M.R., Gutkind J.S. Transforming G protein-coupled receptors transduce potent mitogenic signals in NIH 3T3 cells independent of cAMP-inhibition or conventional protein kinase C. *Oncogene* **8:**19-26, 1993.
50. Wang L.-M., Keegan A.D., Li W., Lienhard G.E., Pacini S., Gutkind J.S., Myers M.G., Sun X.-J, White M.F., Aaronson S.A., Paul W.E., Pierce J.H. Common elements in IL-4 and insulin signaling pathways in factor dependent hematopoietic cells. *Proc. Natl. Acad. Sci. USA* **90:**4032-4036, 1993.
51. Xu N., Bradley L., Ambdukar I., Gutkind J.S. A mutant α subunit of G_{12} potentiates the eicosanoid pathway and is highly oncogenic in NIH 3T3 cells. *Proc. Natl. Acad. Sci. USA* **90:**6741-6745, 1993.
52. Xu N., McCormick F., Gutkind J.S. The non-catalytic domain of *ras*-GAP inhibits transformation induced by G protein coupled receptors. *Oncogene* **9:**597-602, 1994.
53. Xu N., Voyno-Yasenetskaya T., Gutkind J.S. Potent transforming activity of the G_{13}α subunit defines a novel family of oncogenes. *Biochem. Biophys. Res. Commun.* **201:**603-609, 1994.
54. Calderon S.N., Izenwasser S., Heller B., Gutkind J.S., Mattson M., Su T.-P., Newman A.H. Novel 1-phenylcycloalkanecarboxylic acid derivatives are potent and selective $sigma_1$ ligands. *J. Med. Chem.* **37:**2285-2291, 1994.

55. Crespo P., Xu N., Daniotti J.L, Rapp U.R, Gutkind J.S. Signaling through transforming G protein-coupled receptors in NIH 3T3 cells involves c-Raf activation: Evidence for a protein kinase C independent pathway. *J. Biol Chem*. **269:**21103-21109, 1994.
56. Crespo P., Xu N., Simonds W.F., Gutkind, J.S. Ras-dependent activation of MAP kinase pathway mediated by G-protein βγ subunits. *Nature* **369:**418-420, 1994.
57. Yu, J-C., Gutkind, J.S., Mahadevan, D., Li, W., Meyers, K.A., Pierce, J.H., Heidaran, M.A. Biological function of PDGF-induced PI-3 kinase activity: Its role in αPDGF receptor-mediated mitogenic signaling. *J. Cell Biol*. **127:**479-488, 1994.
58. Coso O., Chiariello M., Kalinec G., Kyriakis J., Woodgett J., Gutkind J.S. Transforming G protein-coupled receptors potently activate JNK (SAPK): evidence for a divergence from the tyrosine-kinase signaling pathway. *J. Biol. Chem.* **270:**5620-5624, 1995.
59. Crespo P., Cachero, T.G., Xu N., Gutkind J.S. Dual effect of β-adrenergic receptors on MAP kinase: Evidence for a βγ-dependent activation and a $G\alpha_s$-cAMP-mediated inhibition. *J. Biol. Chem.* **270:**25259-25265, 1995.
60. Gutkind J.S., Crespo P., Coso O., Kalinec G., Xu N. Proliferative Signaling through Muscarinic Acetylcholine Receptors: a Model for Receptors Coupled to Heterotrimeric G Proteins. In *Molecular Mechanisms of Muscarinic Acetylcholine Receptor Function*. Edited by Jurgen Wess. R.G Landes, Publisher,103-141, 1995.
61. Crespo P., Mischak H., Gutkind, J.S. Overexpression of mammalian protein kinase C-ζ does not affect the growth characteristics of NIH 3T3 cells. *Biochem. Biophys. Res. Commun.* **213:**266-272, 1995.
62. Mahadevan D., Thaki N., Singh J., McPhie P., Zangrilli D., Wang L.-M., Guerrero C., LeVine H., Humblet C., Saldanha J., Gutkind J.S., Haske T. Structural studies on the PH domains of Dbl, Sos1, IRS-1 and βARK1 and their differential binding to Gβγ subunits. *Biochemistry J.* **34:**9111-9117, 1995.
63. Miyamoto S., Teramoto H., Coso O., Gutkind J.S., Burbelo P.D., Akiyama S.K., Yamada K.M. Integrin function: molecular hierarchies of cytoskeletal and signaling molecules. *J. Cell. Biol.***131:**791-805, 1995.
64. Coso O., Chiariello M., Yu J.-C., Crespo P., Teramoto, H., Xu N., Miki T., Gutkind J.S. The small GTP-binding proteins Rac1 and Cdc42 regulate the activity of the JNK(SAPK) signaling pathway. *Cell* **81:**1137-1148, 1995.
65. Coso O.A., Teramoto H., Simonds W.F., Gutkind J.S.: Signaling from G protein-coupled receptors to JNK/SPK involves βγ subunits of heterotrimeric G proteins acting on a Ras and Rac1-dependent pathway. *J. Biol. Chem.* **271:**3963-3966, 1996.
66. Xu N., Coso O.A., Mahadevan D., De Blasi A., Goldsmith P.K., Simonds W.F., Gutkind J.S. The PH domain of Ras-GAP is sufficient for in vitro binding to βγ subunits of heterotrimeric G proteins. *Cell. Mol. Neurobiol.* **16:**51-59, 1996.
67. Cuvillier O., Pirianov G., Kleuser B., Vanek P.G., Coso O.A., Gutkind J.S., and Spiegel S. Suppression of ceramide-mediated programmed cell death by sphingosine-1-phosphate. *Nature* **381:**800- 803, 1996.

68. Zhang S., Coso O.A., Collins R., Gutkind J.S., and Simonds W.F. A carboxyl-terminal mutant of the G-protein β subunit deficient in the activation of phospholipase C-β. *J. Biol. Chem.* **271:**20208-20211, 1996.
69. Kieser A., Adler H.S., Seitz T., Crespo P., Gutkind J.S., Kolch W., and Mischak H. Protein Kinase Cζ inhibits cellular transformation by upregulating *jun*-B and *egr*-1 expression. *Genes and Development* **10:**1455-1466, 1996.
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