LEE E. LIMBIRD

Curriculum Vitae

Birthplace and Date:	Philadelphia, Pennsylvania, November 27, 1948
Marital Status:	Married, husband - Thomas J. Limbird Two children Eric James Limbird Jessica Limbird
Education:	1970 - College of Wooster, B.A., Chemistry (Honors) 1973 - University of North Carolina, Ph.D., Biochemistry
Social Security #:	166-40-4169

Professional Appointments

7/16 – Present	Discipline Coordinator Biochemistry and Molecular Biology (new major at Fisk)
7/11 – Present	Dean for Graduate Studies Fisk University, Nashville, TN
8/10—Present	Professor of Biochemistry, Fisk University, Nashville, TN
8/10—9/2016	Dean, School of Natural Sciences, Mathematics, and Business, Fisk University, Nashville, TN
8/10—1/2017	Coordinator, Pre-Health Professions Programs Fisk University, Nashville, TN
9/08- 6/09	Director of Graduate Studies in Pharmacology, Meharry Medical College
1/08 – 6/09	Professor, Department of Cardiovascular Biology Meharry Medical College
7/07- 12/07	Associate Dean for Biomedical Sciences Interim Chair, Cardiovascular Biology Meharry Medical College
7/2005 - 6/30/07	Professor and Chair, Department of Biomedical Sciences Meharry Medical College
3/2005 -12/2007	Vice President for Research,

	Meharry Medical College
7/2006-present	Adjunct Professor, Department of Pharmacology Vanderbilt University
4/1998 – 12/2003	Associate Vice Chancellor for Research Vanderbilt University
4/1998 – 6/2005	Professor, Department of Pharmacology Vanderbilt University
1/1991 – 3/1998	Chair, Department of Pharmacology Vanderbilt University
12/1/95 – 7/2005	Adjunct Professor, Department of Pharmacology, School of Medicine, Meharry Medical College
1/1987 - 6/1987	Visiting Professor, Department of Molecular Genetics (Sabbatical leave with Dr. David W. Russell in the laboratory of Nobelists Drs. Michael Brown, & Joseph Goldstein) University of Texas Health Science Center, Dallas, TX
7/1985 – 6/2005	Professor, Department of Pharmacology Vanderbilt University
7/1982 - 6/1985	Associate Professor, Department of Pharmacology Vanderbilt University
7/1979 - 6/1982	Assistant Professor, Department of Pharmacology Vanderbilt University
7/1975 - 6/1979	Associate, Department of Medicine, Duke University
7/1977 - 6/1979	Assistant Professor, Department of Biochemistry, Duke University

Graduate and Postdoctoral Training

7/1973 - 6/1975	Cardiology Research Fellow (with R.J. Lefkowitz, 2012 Nobel Laureate in Chemistry)
9/1970 - 6/1973	Doctoral Candidate in Biochemistry

Predoctoral Experience

1968	Summer Research Fellowship with Upjohn Laboratories Kalamazoo, Michigan
1969	Summer Research Fellowship with Wyeth Laboratories Radnor, Pennsylvania
1970 (Spring)	Research Technician in the laboratory of Howard Rasmussen, University of Pennsylvania, Philadelphia, Pennsylvania

Honors

1968	Phi Beta Kappa
1968 and 1969	Lubrizol Prize in Chemistry
1970	Merck Award in Chemistry
1970	William A. Galpin Award for General Excellence in College Work. College of Wooster
1977	NIH Young Investigator Award
1979	NIH Research Career Development Award
1983	AAUW Recognition Award for Young Scholars
1987	John Jacob Abel Award in Pharmacology
1989	Merit Award from the National Institutes of Health
1989	Elected Chair of the 1993 Gordon Conference on Molecular Pharmacology
1989	Chair, NIH Pharmacology Study Section
1993	Chair, Gordon Conference on Molecular Pharmacology
1994	Established Investigator Award of the National Association for Research on Schizophrenia and Depression (NARSAD)
1994	Chair, Board of Counselors for the National Institutes of Health National Institute for Diabetes, Digestive and Kidney Disease

1995 - 2001	Councilor, American Society for Pharmacology & Experimental Therapeutics
1997	Margaret Pittman Lectureship, National Institutes of Health
1998	Teaching Award in Pharmacology from the Students in the Pharmacological Sciences Training Program
1998	Distinguished Alumnae Award, College of Wooster
1999	Treasurer, American Society for Pharmacology and Experimental Therapeutics
2002	Croker Lectureship, American Society for Pharmacology and Experimental Therapeutics
2003	Goodman & Gilman Award in Pharmacology, American Society for Pharmacology and Experimental Therapeutics
2004	John Exton Award for Innovative Research, Vanderbilt University School of Medicine
2004	Thomas Jefferson Award for University Service and Integrity, Vanderbilt University
2006	Commencement Speaker, Hooding Ceremony, School of Graduate Studies, University of North Carolina at Chapel Hill
2010	Member, Board of Trustees, College of Wooster, Wooster, OH ; Alumni Board representative, College of Wooster, Wooster, OH (2010-2016)
2011	Recipient of the Dr Dolores C. Shockley Award for Partnerships for Minority Career Development.
2012	Member, Burroughs Wellcome Fund Minority Postdoctoral Fellowship Advisory Committee (continuing appointment)
2013	Julius Axelrod Award of the American Society for Pharmacology and Experimental Therapeutics and the Society for Neuroscience

Editorial Boards

Associate Editor, Molecular Pharmacology, 7/1982 - 11/1985
Member, American Journal of Physiology (Endocrinology and Metabolism), 1982 - 1987
Member, Journal of Biological Chemistry, 1985 - 1990

Editorial Advisory Board, Trends in Pharmacological Sciences, (TIPS), 1990 - 1999
Member, Molecular Pharmacology, 1991 - 1997
Member, American Journal of Physiology (Molecular Cell Biology), 1990 – 1996
Member, Current Opinion in Pharmacology, 2001- present
Editorial Board, Handbook of Experimental Pharmacology, 2001-2004
Editorial Advisory Board, Molecular Interventions, 2001- 2006

National Committees

1983	National Institutes of Mental Health Task Force on Basic Biomedical Research
1987 - 1991	Member, NIH Pharmacology Study Section
1989 - 1991	Member, American Society for Pharmacology and Therapeutics (ASPET) Committee on Graduate Student Education
1988 - present	Member, ASPET Committee on FASEB Scientific Programs
1990 - 1992	Member, ASPET Membership Committee (Elected Office)
1991 - 1997	Member, Research Committee of the American Heart Association
1992 - 1997	Scientific Counselor of the National Institute of Arthritis, Digestive Diseases and Kidney (NIDDK)
1994 - 1996	Chair, Advisory Committee of Counselors of the NIDDK
1994 - 1997	Member, Executive Committee, ASPET Section for Molecular Pharmacology
1994 - 1997	Chair, Advisory Counselor Committee for the NIDDK
1994 - 1999	Member, Board of Visitors, National Advisory Council for the National Jewish Center for Immunology and Respiratory Medicine
1995 - 2002	Councilor, American Society for Pharmacology and Experimental Therapeutics (ASPET) (elected office)
1995 - 1998	ASPET Council and Long Range Planning Committee
1995 - 2002	Burroughs Wellcome Fund - National Advisory Committee
1996 - 2000	Searle Scholars Fund - National Advisory Committee
1998 - present	Dana Alliance for Brain Initiatives
1998 - present	AAMC-Advisory Panel on Research
1998 - 1999	National Research Council Committee for a Study on Promoting Access to Scientific and Technical Data for the Public Interest. Commission on Physical Sciences, Mathematics, and Applications.
1999 - 2002	IUPHAR (International Union of Pharmacology) Nomenclature Committee
2000 - 2001	Member, Board of Directors, Tennessee's Technology Development Corporation (TTDC)
2001 - 2004	Tennessee Governor's Task Force on Biotechnology
2001 - 2007	Scientific Counselor, National Institute of Drug Abuse (NIDA), NIH
2004- 2005	Chair, Blue Ribbon Panel, Intramural Research Programs, NIDDK, NIH
2005- 2009	Scientific Director , Specialized Neuroscience Programs (SNRP) of the National Institutes of Neurological Diseases

2006-2009	Member, Advisory Board, Cumberland Emerging Technologies (CET) Life Sciences Center
2009-Present	Member, National Advisory Board, Specialized Neuroscience Program (SNRP) at the University of Puerto Rico, Caribe
2010- 2012	Member, National Advisory Panel on Increasing Diversity on the Biomedical Workforce for the National Institute of Neurological Diseases (NINDS), NIH
2013- Present	Burroughs Wellcome Fund Advisory Committee for Minority Postdoctoral Development Awards

Societies

Phi Beta Kappa
American Chemical Society
American Association for the Advancement of Science
Society of Sigma Xi
American Physiological Society
American Society for Pharmacology and Experimental Therapeutics
American Society of Cell Biology
American Society of Biochemistry and Molecular Biology
Tennessee Academy of Science
New York Academy of Science

Endowed Lectureships (not included)

Current Funding at Fisk University :

PI: MARC U* Star Scholars – National Institutes of Health. Funding for four Fisk Undergraduates to participate in the **Maximizing Access to Research Careers Program,** with stipends and tuition support

PI: NSF Funded Implementation Award with resources for program development and faculty recruitment

PI: National Research Mentoring Network Subaward for the NIH-funded national BUILD and NRMN program

Co-PI: R25 (with David Cliffel, PhD, Vanderbilt) **Bridge to Biomedical PhD training programs.** Funding for five master's trainees to engage in research aligned with future PhD-granting programs in biomedical research

Teaching at Fisk University

Biochemistry I and Course-associated laboratory

Biochemistry II and Course-associated laboratory
Molecular Cell Biology and Course-associated Laboratory
Professional Skills for Graduate Study Success
Fall – for graduate trainees
Fall/Spring- Stage appropriate course for undergraduate trainees
Chemistry 582 D: Chemistry and Mechanism of Drug action
Maymester/Summer I : Interdisciplinary approaches to Addressing Biomedical Problems

Mentoring of Graduate Students and Postdoctoral Fellows

Graduate Students –

Thomas Connolly (1979 - 1983)
Current position: Retired (and planning his second career!!)
Merck, Sharp, and Dohme Research Laboratories
West Point, Pennsylvania

J. David Sweatt (1981 - 1986)
Current position: Professor and Chair
Department of Pharmacology,
Vanderbilt University

Jodi Nunnari (1984 - 1988)
Current position: Professor and Chair,
Department of Cell and Molecular Biology, UC Davis, Davis, California
Elected to the National Academy of Science, 2017

Lori L. Isom (1982 - 1987)
Current Position: Chair, Department of Pharmacology
University of Michigan, Ann Arbor, MI

J. David Clark (1985 - 1990; MD/Ph.D degree)
Current position: Professor, Dept. of Anesthesiology
Stanford University

Amy L. Wilson (1986 - 1991)
Current position: Professor, Department of Pharmacology
Case Western Reserve, Cincinnati, OH
Received the 2015 Award for Medical School Education from its National Organization

Jeffrey R. Keefer (1986 - 1993); MD/Ph.D. degree
Current position: Associate Professor in Pediatric Hematology,
Johns Hopkins School of Medicine

Matthew E. Kennedy (1989 - 1994)
Current position: Director, Early Discovery Neuroscience, Merck Laboratories

Brian Ceresa (1990 - 1995)
Current position: Professor,
University of Kentucky

Leigh B. MacMillan (1990 - 1996)
Current position: Science Journalist
Vanderbilt University, Department of News and Public Affairs

Steven E. Edwards (1992-1999)
Head of Informatics
National Institute of Environmental Health Sciences
Research Triangle Park, North Carolina

Matthew Wilson (1995-1999); MD/Ph.D.
Current position: Professor, Department of Medicine
Vanderbilt University

Nicole Schramm (1994-2000); Ph.D.
Current position: Research Professor
Duke University, Dept of Neuroscience

Ashley Brady (1997-2003); Ph.D.
Current position: Director of the ASPIRE program for Postdoctoral Fellows
Vanderbilt University

Richard Hu (2001-2003); B.S., M.S with Lee Limbird
Current position: Assistant Professor
Global Medicine, University of Washington, St. Louis

Hilary Highfield (MSTP) PhD obtained in 2004; MD in 2006
Current position: Associate Professor of Pathology,
Vanderbilt University Medical Center

Postdoctoral Fellows

Deborah Segaloff (1981-1984)
Professor, Department of Physiology and Biophysics
University of Iowa

Mary Repaske (1984 – 1986)
Current position: Retired

Bruce Baron (1984-1987)

Current position: Project Leader, Chemical Biology Program,
Aventis Pharmaceuticals

Cheryl Guyer (1986-1989)
Current position: Retired

Karen Siebert (1987-1988)
Current position: Director, Genetics and Pathology Laboratories
Washington University, St Louis

Renxue Wang (1992-1996)
Current position: Research Scientist, MRC Cancer Research Center, Vancouver, B.C., Canada

Magdalena Wozniak (1992-1996)
Current position: Retired
Division of Nephrology, Washington University

Parul Lakhlani (1993-1997)
Current position:
Physician, Lexington, KY

Christine Saunders (1994-1998)
Current position: Research Professor, Department of Molecular Physiology and Biophysics
Vanderbilt University

Laurent Prezeau (1995-1998)
Current position: Professor, INSERM, Montpellier

Jeremy Richman (1998-2001)
Current position: CEO and President
Avielle Foundation

Christopher Tan (1999-2003)
Current position: Director, Molecular Therapeutics for Infectious Diseases
Merck, New Jersey

Yongqin Zhang (2002-2003)
Current position: Postdoctoral Fellow, Robert Coffey, MD
Vanderbilt University, Department of Internal Medicine

Qin Wang, MD, PhD (2002-2005)
Current Position: Professor
Department of Physiology and Biophysics
University of Alabama, Birmingham

Publications

Books Written:

1. Limbird, L.E. Cell Surface Receptors: A Short Course on Theory and Methods. A textbook published by Martinus-Nijhoff Publishers, Boston, 1985.

2. Limbird, L.E. Cell Surface Receptors: A Short Course on Theory and Methods. A textbook published by Martinus-Nijhoff Publishers, Boston, Second Edition, 1996.

3. Limbird, L.E. Cell Surface Receptors: A Short Course on Theory and Methods. A textbook published by Martinus-Nijhoff Publishers, Boston, Third Edition, 2004.

Books Edited:

1. Goodman and Gilman's Pharmacological Basis of Therapeutics, Ninth (1995) and Tenth (2001) Editions. Lee E. Limbird, Editor-in-Chief (with Joel G. Hardman).

2. Alpha$_2$-Adrenergic Receptors. Lee E. Limbird, editor (David Bylund, Series Editor) Humana Press, 1988.

3. α2-Adrenergic Receptors. Structure, Function and Therapeutic Implications. Stephen M. Lanier and Lee E. Limbird, editors. Harwood Academic Publishers, 1996.

Invited Philosophical Comments and Published Interviews

1. "Physiology and Pharmacology: Disciplines for the 21st Century". The Physiologist October 1993. Presentation given at the Experimental Biology Meetings, San Francisco, California, November 17-20, 1993.

2. Session on Mentoring at Career Crossroads. "From postdoctoral research through tenure: Achieving independence in the academic environment". Advice to Young Scientists at American Society of Biochemistry and Molecular Biology Meeting, 1993.

3. “You’re Always Thirty Seconds Away from a Changed Life” an interview with Lee Limbird. Molecular Interventions 1: 145-149, 2001.

4. Chapter on the career of Lee E. Limbird, PhD from What’s Past is Prologue edited by Eric G. Nielson, MD, pp 17-28.

Articles Related to Leadership of Academic Health Centers

1. Holmes, E.W., Burks, T.F., Dzau, V., Hindery, M.A., Jones, R.F., Kaye, C.I., Korn, D., Limbird, L.E., Marchase, R.B., Perlmutter, R., Sanfilippo, F., and Strom, B.L. Measuring contributions to the research mission of medical schools. Academic Medicine, March, 75:303-13, 2000

2. Centralized oversight of physician-scientist faculty development at Vanderbilt: early outcomes. Brown AM, Morrow JD, Limbird LE, Byrne DW, Gabbe SG, Balser JR, Brown NJ. Academic Med. 83: 969-75, 2008

Meeting Review

1. Limbird, L. E. and Taylor, P. Endocrine Disruptors Signal the Need for Molecular and Quantitative Perspectives in Environmental Policy. Cell, 93:157-163, 1998.

Original Articles, Book Chapters and Invited Reviews:

1. Development of a Method for the Detection and Quantitation of the Isoenzymes of Creatine Phosphokinase and the Application of Combined Creatine Phosphokinase and Lactate Dehydrogenase Isoenzyme Analysis to the Recognition of Acute Myocardial Infarction. Ph.D. Thesis, 1973.

2. Isoenzyme analysis in the diagnosis of myocardial injury: Application of electrophoretic methods for the detection and quantitation of the creatine phosphokinase MB isoenzyme. J. Lab. and Clin. Med. 80:577, 1972.

3. Wagner, G.S., Roe, C.R., Limbird, L.E., Rosati, P.A. and Wallace, A.G. The importance of identification of the myocardial specific isoenzyme of creatine phosphokinase (MB form) in the diagnosis of acute myocardial infarction. Circulation 47:263, 1973.

4. Dixon, S.J., Limbird, L.E., Roe, C.R., Wagner, G.S., Oldham, N.H. and Sabiston, D.C. Recognition of post-operative myocardial infarction. Circulation 48:137, 1973.

5. Jarmakani, J.M., Limbird, L.E., Graham, T. and Marks, R.A. Effect of reperfusion on myocardial infarct and the accuracy of estimating infarct size from serum creatine phosphokinase in the dog. Cardiovascular Research 10:245-253, 1976.

6. Limbird, L.E. and Lefkowitz, R.J. Myocardial guanylate cyclase: Properties of the enzyme and effects of cholinergic agonists in vitro. Biochem. Biophys. Acta. (Enzymology) 377:185-196, 1975.

7. Lefkowitz, R.J., Caron, M.G., Limbird, L.E., Mukherjee, C. and Williams, L.T. "Membrane- Bound Receptors" in The Enzymes of Biological Membranes, A. Martonosi, editor, pp. 283- 310, 1976.

8. Lefkowitz, R.J., Limbird, L.E., Mukherjee, C. and Caron, M.G. The beta-adrenergic receptor and adenylate cyclase. Biomembrane Reviews (Biochem. Biophys. Acta) 457:1-39, 1976.

9. Lefkowitz, R.J. and Limbird, L.E. Biochemical techniques for the study of drug action. Progress in Cardiovascular Diseases 18:309-321, 1976.

10. Limbird, L.E. and Lefkowitz, R.J. Adenylate cyclase-coupled beta-adrenergic receptors: Effect of membrane lipid-perturbing agents on receptor binding and enzyme stimulation by catecholamines. Molecular Pharmacology 12:559-567, 1976.

11. Limbird, L.E., DeMeyts, P. and Lefkowitz, R.J. Beta-adrenergic receptors: Evidence for negative cooperativity. Biochem. Biophys. Res. Commun. 64:1160-1168, 1975.

12. Limbird, L.E. and Lefkowitz, R.J. Negative cooperativity among beta-adrenergic receptors. J. Biol. Chem. 251:5007-5014, 1976.

13. Limbird, L.E. and Lefkowitz, R.J. Biochemical and molecular characteristics of beta-adrenergic receptor binding sites. In: Proceedings of the NATO Advanced Study Institute on Surface Membrane Receptors. NATO ASI Series 11:387-404, 1976.

14. Lefkowitz, R.J., Mukherjee, C., Limbird, L.E., Caron, M.G., Williams, L.T., Mickey, J.V. and Tate, R. Regulation of adenylate cyclase-coupled beta-adrenergic receptors. Recent Progress in Hormone Research 32:597-632, 1976.

15. Limbird, L.E. and Lefkowitz, R.J. Resolution of beta-adrenergic receptor binding and adenylate cyclase activity by gel exclusion chromatography. J. Biol. Chem. 252:799-802, 1977.

16. Limbird, L.E. and Lefkowitz, R.J. Beta-adrenergic receptors: Agonist induced increase in apparent molecular size. Proc. Natl. Acad. Sci. USA 75:228-232, 1978.

17. Lefkowitz, R.J., Limbird, L.E., Williams, L.T. and Wessels, M. Beta-adrenergic receptors: Regulatory role of agonists. J. Supra-Molecular Structure 8:501-510, 1978.

18. Limbird, L.E., DeLean, A., Hickey, A.R., Pike, L.J. and Lefkowitz, R.J. Differential effects of GTP on the coupling of beta-adrenergic receptors to adenylate cyclase from frog and turkey erythrocytes: Application of new graphic methods for the analysis of receptor-effector coupling. Biochem. Biophys. Acta 586:298-314, 1979.

19. Limbird, L.E., Hickey, A.R. and Lefkowitz, R.J. Unique uncoupling of the frog erythrocyte adenylate cyclase system by manganese. Lose of hormone and guanine nucleotide-sensitive enzyme activities without loss of nucleotide-sensitive, high affinity agonist binding. J. Biol. Chem. 254:2677-2683, 1979.

20. Limbird, L.E., Hickey, A.R. and Lefkowitz, R.J. The molecular size of adenylate cyclase in the presence and absence of hormone and guanine nucleotide effectors. J. Cyclic Nuc. Res. 5:251-259, 1979.

21. Pike, L.J., Limbird, L.E., and Lefkowitz, R.J. Beta-adrenergic receptors determine affinity but not intrinsic activity of drugs for stimulation of adenylate cyclase. Nature 280:502-504, 1979.

22. Caron, M.G., Limbird, L.E. and Lefkowitz, R.J. Biochemical characterization of the beta- adrenergic receptor of the frog erythrocyte. Molecular and Cellular Biochemistry 28:45-66, 1979.

23. Limbird, L.E., Gill, D.M., Stadel, J.M., Hickey, A.R. and Lefkowitz, R.J. Loss of β adrenergic receptor-guanine nucleotide regulatory protein interactions accompanies decline in catecholamine responsiveness of adenylate cyclase in maturing rat erythrocytes. J. Biol. Chem. 255:1854-1861, 1980.

24. Limbird, L.E., Gill, D.M. and Lefkowitz, R.J. Agonist-promoted coupling of the beta-adrenergic receptor with the guanine nucleotide regulatory protein of the adenylate cyclase system. Proc. Natl. Acad. Sci. 77:775-779, 1980.

25. Limbird, L.E. and MacMillan, S.T. Mn++ uncoupling of the catecholamine-sensitive adenylate cyclase system of reticulocytes. Parallel effects of cholera toxin-catalyzed ADP-ribosylation on the system. Biochem. Biophys. Acta. 677:408-416, 1981.

26. Limbird, L.E., MacMillan, S.T. and Smith, S.K. Solubilization of human platelet α_2 adrenergic receptors: Evidence for agonist-promoted receptor-effector association. Advances in Cyclic Nucleotide Res. 14:189-198, 1981.

27. Smith, S.K. and Limbird, L.E. Solubilization of human platelet α-adrenergic receptors: Evidence that agonist occupancy of the receptors stabilizes receptor-effector interactions. Proc. Natl. Acad. Sci. 78:4026-4030, 1981.

28. Limbird, L.E. Activation and attenuation of adenylate cyclase: GTP-binding proteins as macromolecular messengers in receptor-cyclase coupling. Biochem. J. 195:1-13, 1981 (A Review).

29. Stadel, J.M., Schorr, R.G.L., Limbird, L.E. and Lefkowitz, R.J. Evidence that a beta-adrenergic receptor-associated guanine nucleotide regulatory protein conveys GTP-γS dependent adenylate cyclase activity. J. Biol. Chem. 256:8718-8723, 1981.

30. Lefkowitz, R.J., DeLean, A., Hoffman, B.B., Stadel, J.M., Kent, R., Michel, T. and Limbird, L.E. Molecular pharmacology of the adenylate cyclase-coupled - α and β-adrenergic receptors. Adv. in Cyclic Nucleotide Res. 14:145-162, 1981.

31. Limbird, L.E. Hormonal inhibition of adenylate cyclase: A possible mechanism for physiological antagonism. In: Antihormones, M.K. Agarwal, editor, pp. 661-669, 1982.

32. Limbird, L.E., Speck, J.L. and Smith, S.K. Sodium ion modulates agonist and antagonist interactions with the human platelet α_2-adrenergic receptor in membrane and solubilized preparations. Mol. Pharmacol. 41:607-619, 1982.

33. Limbird, L.E. α_2-Adrenergic systems: Models for exploring hormonal inhibition of adenylate cyclase. Trends in Pharmacological Sciences 4:135-138, 1983.

34. Smith, S.K. and Limbird, L.E. Apparent independence of the alpha-adrenergic system of the human platelet from the cholera toxin-catalyzed ADP-ribosylated 42,000 Mr subunit of the adenylate cyclase system. J. Biol. Chem. 257:10471-10478, 1982.

35. Limbird, L.E. Beta-adrenergic activation and alpha-adrenergic inhibition of adenylate cyclase: GTP-binding proteins as macromolecular messengers. Adv. Exp. Med. 161:91-111, 1983.

36. Connolly, T.M. and Limbird, L.E. The influence of Na^+ on the α_2-adrenergic receptor-adenylate cyclase system of human platelets. I. A method for removal of extra platelet Na+. Effect of Na^+ removal on aggregation, secretion and cAMP accumulation. J. Biol. Chem. 258:3907-3912, 1983.

37. Feldman, R., Limbird, L.E., Nadeau, J., FitzGerald, G.A., Robertson, D. and Wood, A.J.J. Dynamic regulation of leukocyte beta-adrenergic receptor-agonist interactions by physiological changes in circulating catecholamines. J. Clin. Invest. 72:164-170, 1983.

38. Limbird, L.E. and Speck, J.L. N-ethylmaleimide, temperature and digitonin solubilization eliminate guanine nucleotide but not Na^+ effects on human platelet α_2-adrenergic receptor-agonist interactions. J. Cyclic Nucleotide and Protein Phosphorylation Research 9:191- 202, 1983.

39. Limbird, L.E., Buhrow, S.A., Speck, J.L. and Staros, J.V. 5'-p-fluoro-sulfonylbenzoyl guanine as a probe for the GTP-binding protein in α_2-adrenergic receptor-adenylate cyclase systems. J. Biol. Chem. 258:10289-10293, 1983.

40. Limbird, L.E. Adrenergic receptors and regulation of adenylate cyclase activity: Methodological approaches and interpretation of data in terms of receptor-cyclase coupling. In: Principles of Recepterology, M.K. Agarwal, editor. W. DeGruyter, publisher, pp. 593-628, 1983.

41. Segaloff, D.L. and Limbird, L.E. Luteinizing hormone receptor appearance in cultured porcine granulosa cells requires the continued presence of follicle-stimulating hormone. Proc. Natl. Acad. Sci. USA 80:5631-5636, 1983.

42. Segaloff, D.L. and Limbird, L.E. The cAMP-dependent FSH induction of LH receptors in primary cultures of porcine granulosa cells is not due to the expression of an intracellular pool of LH receptors. Endocrinology 113:825-827, 1983.

43. Connolly, T.M. and Limbird, L.E. Removal of extra platelet Na^+ eliminates indomethacin- sensitive secretion from human platelet stimulated by epinephrine, ADP and thrombin. Proc. Natl. Acad. Sci. USA 80:5320-5324, 1983.

44. Segaloff, D.L., May, J.V., Schomberg, D.W. and Limbird, L.E. LH/hCG receptor induction in primary cultures of porcine granulosa cells. Biochem. Biophys. Acta 804:31-36, 1984.

45. Limbird, L.E. GTP and Na^+ modulate receptor adenylate cyclase coupling and receptor-mediated function. Invited review for Amer. J. Physiol. (Endocrinology and Metabolism, 10) 247:E59-E68, 1984.

46. Feldman, R., Limbird, L.E., Nadeau, J., Robertson, D. and Wood, A.J.J. Leukocyte β-receptor alterations in hypertensive subjects. Lancet 73:648-653, 1984.

47. Limbird, L.E. and Connolly, T.M. Studies of the molecular basis for regulation of human platelet adenylate cyclase and platelet activation by α_2-adrenergic receptors. In: Interactions of Platelets with the Vessel-Wall, American Physiological Society, 1985.

48. Feldman, R. and Limbird, L.E. Biochemical characterization of human adrenergic receptors. In: Human Adrenergic Receptors, P. Insel, editor, in press, 1984.

49. Connolly, T.M., Uderman, H.D. and Limbird, L.E. Removal of extra platelet Na^+ blocks stimulus-provoked arachidonic acid release and diminishes stimulus-provoked Ca^{++} availability. Adv. in Ion Transport Regulation Vol. 1, Prostaglandins and Membrane Ion Transport. P. Braquet, R.P. Garay, G.C. Frohlich and S. Nicosia, editors, pp. 51-56, 1984.

50. Limbird, L.E., Connolly, T.M., Sweatt, J.D. and Uderman, H.D. Human platelet α_2-adrenergic receptors: Effect of Na^+ on interaction with the adenylate cyclase system and on epinephrine-stimulated platelet secretion. Advances in Cyclic Nucleotide Research 19:235-242, 1985.

51. Feldman, R.D., Limbird, L.E., Nadeau, J., Robertson, D. and Wood, A.J.J. Alterations in leukocyte beta-receptor affinity with aging: A potential explanation for altered beta-adrenergic sensitivity in the elderly. New Engl. J. Med. 310:815-819, 1984.

52. Limbird, L.E., Connolly, T.M. and Sweatt, J.D. The human platelet alpha$_2$-adrenergic receptor system: The role of Na^+ in epinephrine-receptor interactions, arachidonic acid release and Ca^{++} mobilization. In: The Pharmacology of Adrenoceptors, E. Szabadi, C.M. Bradshaw and S.R. Nahorski, editors, MacMillan Press, Ltd., pp. 49-58, 1985.

53. Limbird, L.E., MacMillan, S.T. and Kalinoski, D.L. The resolution of agonist-alpha$_2$-adrenergic receptor complexes from unoccupied receptors or antagonist-α_2-receptor complexes using DEAE chromatography. J. Cycl. Nuc. and Prot. Phos. Res. 10:75-82, 1985.

54. Sweatt, J.D., Johnson, S.L., Cragoe, E.J. and Limbird, L.E. Evidence that a Na^+/H^+ exchange mechanism controls stimulus-provoked arachidonic acid release in human platelets. J. Biol. Chem. 260:12910-12919, 1985.

55. Limbird, L.E., Connolly, T.M., Sweatt, J.D., Cragoe, E.J. and Johnson, S.L. The role of sodium in epinephrine-provoked arachidonic acid release and dense granule secretion from human platelets. Symposia Medica Hoechst 553-575, 1985.

56. Limbird, L.E. and Sweatt, J.D. α_2-adrenergic receptors: apparent interaction with multiple effector systems. In: The Receptors, P.M. Conn, editor, Academic Press II:281-305, 1985.

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