

ROBERT BENNET GIBBS

Office Address: Department of Pharmaceutical Sciences
 University of Pittsburgh School of Pharmacy
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Date of Birth: May 8, 1959

EDUCATION

1977-1981	Univ. of Rochester, Rochester, NY	BS Neuroscience
1977-1981	Univ. of Rochester, Rochester, NY	BA Philosophy
1981-1987	Univ. California, Irvine, Irvine, CA	Ph.D. Biological Sci.

APPOINTMENTS AND POSITIONS

11/04-12/10	Chair of Graduate Program Council, University of Pittsburgh School of Pharmacy
9/1/04-	Professor of Pharmaceutical Sciences, University of Pittsburgh School of Pharmacy
7/1/99-	Secondary appointment in the Department of Cell Biology and Physiology, University of Pittsburgh School of Medicine
7/1/97-8/31/04	Associate Professor of Pharmaceutical Sciences, University of Pittsburgh School of Pharmacy, with a secondary appointment to the Department of Neurobiology, University of Pittsburgh School of Medicine
1/1/97-	Director of the Cell Imaging Core for the Center for Reproductive Physiology
7/93-6/97	Assistant Professor of Pharmacy & Therapeutics, University of Pittsburgh School of Pharmacy, with a secondary appointment to the Department of Neurobiology, University of Pittsburgh School of Medicine
7/90 - 6/93	Assistant Professor, The Rockefeller University, Laboratory of Neurobiology & Behavior
1989-1990	Research Associate, The Rockefeller University, Laboratory of Neurobiology & Behavior
1987 - 1989	Postdoctoral Fellow, The Rockefeller University, Laboratory of Neurobiology & Behavior

HONORS AND AWARDS

1981 - 1982 Regents Fellowship, University of California, Irvine
1984 - 1986 Individual NRSA Predoctoral Fellowship MH08989
1987 - 1989 Individual NRSA Postdoctoral Fellowship NS08195
May, 1997 Co-chaired session entitled, "Hormonal Effects on Learning and Memory" at the annual meeting of the Society for Behavioral Neuroendocrinology in Baltimore MD.
Nov 2009 Recipient of David E. & Betty H. Brenneman Award
March 2010 Hormones & Behavior – Top Reviewer of 2009

MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

1982- Society for Neuroscience
1982- International Brain Research Organization
1993- American Association for the Advancement of Science
1997- Society for Behavioral Neuroendocrinology
2004- American Association of Colleges of Pharmacy

TEACHING RESPONSIBILITIES

UNIVERSITY OF PITTSBURGH, 1994 to present

Doctoral Major Advisor/Co-Advisor

Ahmad Hashash Graduated September 1996
Masters Student
Department of Pharmaceutical Sciences
Duquesne University School of Pharmacy
Co-Advisor with Dr. David Johnson
Thesis: Effects of Chronic Estrogen Treatment on Basal and K⁺-Evoked Release of Acetylcholine in Rat Hippocampus as Assessed by the In Vivo Microdialysis Technique

Alexis Burke Graduated June 1999
Masters Student
Department of Pharmaceutical Sciences
Duquesne University School of Pharmacy
Co-Advisor with Dr. David Johnson
Thesis: The Effects of Estrogen Replacement on Scopolamine and Lorazepam Induced Deficits on Passive Avoidance Memory Acquisition and Retention

Payal Aggarwal Graduated April 2000
M.S. Student
Department of Pharmaceutical Sciences
University of Pittsburgh School of Pharmacy
Thesis: Examination of the Neuroprotective Effects of Estrogen on Basal Forebrain Cholinergic Neurons in Rats Following Excitotoxic Injury

Doctoral Major Advisor/Co-Advisor (Cont'd)

Rebecca Hammond
 Ph.D. Student
 Department of Pharmaceutical Sciences
 University of Pittsburgh School of Pharmacy
 Thesis: The Role of GPR30 in Mediating Estrogen Effects on Neurons and Cognitive Performance

Ziv Kirshner
 Ph.D. Student
 Department of Pharmaceutical Sciences
 University of Pittsburgh School of Pharmacy
 Thesis:

Thesis/Dissertation Committee Member

Heather Cameron Ph.D. Student The Rockefeller University	Graduation	May 1995
Xinru Hu M.S. Student Department of Pharmaceutical Sciences University of Pittsburgh School of Pharmacy	Graduated	May 1998
Young Song Ph.D. Student Department of Pharmaceutical Sciences University of Pittsburgh School of Pharmacy	Graduated	April 2000
Christopher Bolcato M.S. Student Department of Pharmaceutical Sciences University of Pittsburgh School of Pharmacy	Graduated	July 2003
Michael Tortorici Ph.D. Student Department of Pharmaceutical Sciences University of Pittsburgh School of Pharmacy	Graduated	May 2007
Nicholas Fitz Ph.D. Student Department of Pharmacology & Toxicology Duquesne University School of Pharmacy	Graduated	August 2008
Phebian Abitoye M.S. Student Department of Pharmacology & Toxicology Duquesne University School of Pharmacy	Graduated	May 2008

Thesis/Dissertation Committee Member (Cont'd)

Samreen Arshad Graduated May 2007
M.S. Student
Department of Pharmacology & Toxicology
Duquesne University School of Pharmacy

Jenny Zhang Graduated August 2007
PhD Student
Department of Pharmaceutical Sciences
University of Pittsburgh School of Pharmacy

Mark Donnelly
PhD Student
Department of Pharmaceutical Sciences
University of Pittsburgh School of Pharmacy

Chibueze Ihunnah
Ph.D. Student
Department of Pharmaceutical Sciences
University of Pittsburgh School of Pharmacy

Graduate Course Development

Course 3026 – Pharmacy Literature Review “Topics in Neuroscience” (1994-)
Course 3038, 3039 – Essentials of Competitive Grant Writing (2003-)

Undergraduate Course Development

Advanced Pharmacy Practice 1700 “Brain Function and Disease” (1995 -1997)
Profession of Pharmacy

Team Taught Graduate Courses

Course 3429 “Neuropsychology Module” (1997-1998)
Course 3009 “Advances in Pharmaceut. Sciences” (1997-)
Course 2001 “Pharmaceutical Analysis” (1998-)
Course 3024, 3025 "Pharmaceutical Sciences Seminar" (1998-)
Course 3000 (Journal Club) "Topics in Neuroscience" (2000-)
Course 3023 “Foundations of Pharmaceut. Sci.” (2009-)

Team Taught Undergraduate Courses

Contemporary Pharmacy Practice 1490 “Over-the-Counter Drugs” (1996-1997)

Post-Baccalaureate Pharm.D. Courses

Advanced Pharmacotherapy 3405 Neuropsychology Module

Residents Research Series

“What is an hypothesis?” Fall 2004, 2005

Team-Taught Entry-Level Pharm. D. Courses

Course 5110, 5111

Profession of Pharmacy (1997-)
“Ethical Decision Making”
“Pharmaceutical Sciences Research”

Course 5319

Advanced Pharmacotherapy - Neurology
and Psychiatric Module (1998-2001; 2011-
co-coordinator)

Graduate Student Trainees

Ahmad Hashash, 1995-1996
Alexis Burke, 1996-1998
Payal Aggarwal, 1997-2000
Rose Mantella, 1999-2000
Fulvio Plescia, (visiting scholar) 2006
Mauro Gagliano, (visiting scholar) 2006
Antonio Agazio (visiting scholar) Summer 2008
Rebecca Hammond, 2007 – 2012
Ziv Kirshner, 2011 –

Undergraduate Student Trainees

Amy McMichael, Summer Term, 1994
Greg Keidan, Summer Term, 1995
Teresa Lutka, Summer Term, 1995
Christine Martynowski, Summer, Fall and Spring Terms, 1995-1996
Sarah Sung, Summer Term, 1997
Cathy Peng, Summer Term, 1997
Stacy Szymanski Summer Term, 1999
Mylaina Gordon Summer Term, 2000
Brandon Nornhold Summer Term, 2001
Rachel Gabor (Juniata College), Summer Term, 2001, 2002, 2003
Kristal Milo Summer Term, 2002
Nora Watson (Cornell University; Ithaca, NY), Summer Term, 2002
Jasmine Talameh, Spring Term, 2003, Summer 2004, GEAR-UP student
Nicole Lazar, GEAR-UP Student, Summer Term, 2003
Wes Hartman Spring term 2005
Josh Galilei Summer term 2005, GEAR-UP student
Emily Hayes-Rowan Summer term 2005
Marta Sheremeta – Fall and spring terms 2005-2006
Chante Richardson – Spring Term 2006
David Ninaci – 2007-2008
Alex Buckley – Fall 2007
Beth Foreman – Spring 2008
Katherine Sommerer – Summer 2009
Elizabeth Kline – Spring 2010, Spring 2011 (First Experiences Program)
Aditee Shinde – Spring & Summer 2010 (First Experiences Program)
Alex Terihay – Summer 2010 (T32-supported summer intern)
Samara Wright – Spring 2011 (First Experiences Program)
Jessica Lewis – Summer 2011 (T32-supported summer intern)
Melanie Wespetal – Summer 2011 (GEAR-UP student)

Postdoctoral Training

Julie Pongrac, Ph.D. (1999-2000)

Graduate-Level Workshops

Electronic Imaging Workshop (1998-1999)

Computer Resources for Managing References and Bibliographies (2000-)

Statistics Workshop (organized only; 1999)

Preparing Posters with Power Point (2002-)

Continuing Education Courses

Introduction to the Neurobiology of Seizure Disorders – 1 Credit

Lecture presented at Seven Springs Mountain Resort, May 30, 1998.

Partnership for Education - Health Sciences Consortium (1999-2001)

Provide opportunity for high school students to visit my laboratory and to learn about research and career opportunities in Neuroscience.

Portfolio Advisory Group (1994-1996)

UNIVERSITY OF CALIFORNIA, IRVINE, 1982-1986

Team Taught Undergraduate Course

Psychobiology Laboratory 105 - 1982-1986

THE ROCKEFELLER UNIVERSITY, 1987-1993

Team Taught Graduate Course

Neuroendocrinology - 1990-1991

Graduate Educational Research

Noriyuki Koibuchi, Postdoctoral Fellow, Dokkyo University, Japan – 1990-1991

Nicole Chastrette, Postdoctoral Fellow, The Rockefeller University – 1991-1992

H. James Okano, Graduate Student, Jintendo University School of Medicine, Japan
(visiting graduate student at The Rockefeller University 1991-1993)

PROFESSIONAL DEVELOPMENT

2004-2005 AACP Leadership Fellowship Program (ALFP)

2010-2011 SOP Leadership Development Program

SERVICE

NIH STUDY SECTION PARTICIPATION

1997	Member of a Special Interest Panel for the review of pilot study applications for the National Institute on Aging, NIH
10/98	Reviewer for NIH Study Section BDCN-2
12/98	Member of NIH Site Visit Team
3/98	Reviewer for NIH Study Section to review applications for NIA funded Older American Independence Centers
2001-2003	Reviewer for NIH Study Section MDCN-2
2002	Reviewer for NIA-N Study Section
2003-2006	Reviewer for NIH Study Section NDBG (formerly MDCN-2)
2003	Reviewer for NIH Special Emphasis Panel to review Morrison P01
2004	Reviewer for NIH Special Emphasis Panel to review Morrison P01-A1
2004	Reviewer for NIH Special Study Section ZRG1 IFCN-D-02 S

COMMITTEES

SCHOOL OF PHARMACY

1993-1994	Pharm. D. Admissions Committee
1993-1995	Code of Conduct Committee
1994-1995	Math and Scientific Comprehension Subcommittee
1993-2000	Admissions Committee
1994-	Scientific Review Committee (Chair, 1996-)
1995-	Seminar Committee (Chair, 1995-)
1996-1997	TA Task Force Committee
1996-2001	Graduate Program Committee
1996-2001	Overseeing access and administration of Current Contents on Diskette database for the School
1998-2001	Department Executive Committee
1998-2000	Research Planning Committee
2001	Research Retreat Planning Committee
2001	Search Committee for Surgery Position in Pharmacy & Therapeutics
2001	Gear-Up Mini-Graduate School (Director/Organizer)
1994-2003	Departmental Seminar Series (Organizer)
2001-2004	Distinguished Lecture Series (Organizer)
2001-	Wide Format Printer (Manager/Coordinator)
2002-	Gear-Up Organization Committee
2003	Tops Orientation Committee
2004-2009	Graduate Program Council (Chair)
2004-2005	Leadership team
2005-	IT Advisory committee
2006	Student seminar series (Spring term; organizer)
2007-	Promotions and Tenure Committee
2007-	Drug Delivery Faculty Search Committee
2008-	Critical Care Faculty Search Committee
2008-2009	Self study – Standards 4-8

SCHOOL OF PHARMACY COMMITTEES (CONT'D)

- 2011- Faculty Search Committee – Comparative Effectiveness Research
- 2011- PharmD Admissions Committee
- 2011- Faculty Search Committee – Dept. of Pharmacy & Therapeutics
- 2011- Faculty Search Committee (Chair) – Dept of Pharmaceutical Sciences
- 2012- Strategic Planning Steering Committee

UNIVERSITY OF PITTSBURGH

- 1995-1998 Faculty Assembly
- 1996-1998 Senate Council
- 1996 Senate Nominating Committee for Senior Vice Chancellor of the Health Sciences
- 1997 Member of a Grievance Panel convened by the Office of the Provost
- 1999-2002 Faculty Assembly
- 2000-2002 Senate Council
- 2002-2004 Senate Computer Usage Committee (Ad Hoc member)
- 2003-2006 Biohazard Committee
- 2003-2009 University Council on Graduate Studies
- 2007 Advancing Research in the Public Schools
- 2011- Postdoctoral Advisory Committee

PROFESSIONAL MEETINGS / SOCIETIES

- 2005-2006 Chair of the local organizing committee for the annual meeting of the Society for Behavioral Neuroendocrinology, Pittsburgh, PA, June 17-19, 2006.
- 2005-2006 Member of the program committee for the quadrennial meeting of the International Neuroendocrine Federation, Pittsburgh, PA, June 19-22, 2006.
- 2007 Co-organizer of “Expert Meeting on Hormones, Cognitive Function, and Dementia”, Beaumanor Hall, Woodhouse Leicestershire, United Kingdom, March 19-20, 2007.

REVIEWER

Editorial Boards

Hormones & Behavior

Ad-Hoc Reviewer for Specific Journals

- 1994- Journal of Neuroscience
- 1994- Experimental Neurology
- 1995- Neuroscience
- 1995- Brain Research
- 1996- J. Neurobiology
- 1996- Brain Research Bulletin
- 1997- Hormones & Behavior
- 1998- Neurobiology of Aging
- 1999- Neuroendocrinology
- 2000- Biological Psychology
- 2001- American Journal of Psychiatry
- 2002- Behavioral Neuroscience
- 2002- Neurobiology of Learning and Memory
- 2003- Endocrinology

Ad-Hoc Reviewer for Specific Journals (Cont'd)

2003- Behavioral Neuroscience
2004- Animal Cognition
2004- Psychoneuroendocrinology
2005- J. Neuroendocrinology
2006- PNAS
2006- Cerebellum
2009- Expert Review of Endocrinology & Metabolism
2009- Behavioural Pharmacology
2009- Behavioural Processes
2009- Physiology & Behavior
2009- Neurochemistry International
2010- Biochimica et Biophysica Acta
2010- Neuroscience and Biobehavioral Reviews
2010- Molecules

Granting Agency Reviewer

1994- National Science Foundation
1998-2005 National Institutes of Health
2002 Louisiana Board of Regents Support Fund - Research and Development Program
2002 Department of Veteran's Affairs Medical Research Service

Outside Thesis Reviewer

Sophie Elise Ping
Ph.D. Student
University of Melbourne

PRESENTATIONS

INVITED LECTURES, outside University of Pittsburgh

Estrogen and Fos Expression in Brain

The Japanese Endocrine Society

Hokkaido University, Hokkaido, Japan; October 1989

Use of In Situ Hybridization Techniques to Detect Low-Abundant mRNAs in Brain

Istituto Superiore de Sanita in Rome, Italy; September 1990

Interactions Between Estrogen and NGF-Related Systems in Brain

New York Academy of Sciences

New York, NY; November 10, 1992

Interactions Between Estrogen and NGF-Related Systems in Brain

Presented as part of a colloquium entitled, "Colloquium in Biopsychology: Hormonal Restructuring of the Adult Brain"

Hunter College, New York, NY; March 30, 1993

Interactions Between Estrogen and NGF-Related Systems in Brain

Presented as part of a workshop entitled, "Sex Hormones, Aging, and Mental Illness" sponsored by the National Institute of Mental Health

Washington, DC; September 26, 1994

Interactions Between Estrogen and NGF-Related Systems in Brain

Department of Pharmaceutical Sciences

Duquesne University School of Pharmacy

Pittsburgh, PA; December 14, 1994

Interactions Between Estrogen and NGF-Related Systems in Brain

Department of Physiology

University of Maryland School of Medicine; February 17, 1995

Estrogen and Cholinergic Function: Implications for Brain Aging and Cognitive Decline

Wyeth Ayerst, Inc., Radner, PA, May 8, 1997

Estrogen and Cholinergic Function: Implications for Brain Aging and Cognitive Decline

Novo Nordisk, Inc., Copenhagen, DM, May 15, 1997.

Effects of Estrogen and Aging on Cholinergic Neurons in the Basal Forebrain

The Third Annual Graylyn Conference

Women's Cognitive Health: The Role of Estrogen

Sponsored by the Women's Health Center of Excellence at the Wake Forest University-Baptist Medical Center, Winston-Salem, NC, October 15-17, 1997

Effects of Estrogen on Brain Cholinergic Neurons and Growth Factors: Implications for Estrogen Replacement Therapy in Postmenopausal Women

Department of Pharmaceutical Sciences

Duquesne University School of Pharmacy

Pittsburgh, PA; September 24, 1998.

INVITED LECTURES: (Continued)

Effects of estrogen on basal forebrain cholinergic neurons and behavior: Implications for estrogen replacement therapy in postmenopausal women

The Novartis Foundation
London, UK; September 7, 1999.

Effects of estrogen and progesterone on brain function and cognition: Implications for hormone replacement therapy in postmenopausal women

Wyeth Ayerst, Inc., Radner, PA, December 9, 1999

Potential mechanisms for the effects of estrogen on cognitive processes: Role of basal forebrain cholinergic projections

US/Japan International Symposium on Neuroplasticity, Development and Steroid Hormone Action
University of Hawaii at Manoa
Oahu, Hawaii; September 26-29, 2000.

Estrogen and brain cholinergic neurons: Implications for effects of hormone replacement therapy on age-related cognitive decline in women

Department of Pharmacology and Therapeutics
University of South Florida College of Medicine
Tampa, FL; March 27-28, 2001.

Mechanisms of Tibolone Action in the Brain

Tibolone Mechanism of Action Experts' Meeting
Organon Pharmaceuticals, Inc.
Dallas, Texas; November 16-17, 2001

Effects of Estrogen on Cognition - Preclinical Studies

WHIMS Scientific Advisory Board Meeting
Wyeth Pharmaceuticals, Inc.
Philadelphia, PA; March 17, 2000

Estrogen and cognitive performance: Basic and clinical findings

Presented at ASPET symposium titled, "Trophic Effects of Estrogen in the Brain: Protection for Memory, Aging and Neurodegenerative Disease
Federation of American Societies for Experimental Biology (FASEB) 2003
San Diego, CA; April 12, 2003

Estrogen, cholinergic function, and cognition

85th Annual Meeting of The Endocrine Society
Philadelphia, PA; June 19, 2003

Estrogen and progesterone: Effects on cholinergic neurons and cognitive performance

The Ninth Annual Graylyn Conference on Women's Cognitive Health
Sponsored by the Women's Health Center of Excellence at the Wake Forest University-Baptist Medical Center, Winston-Salem, NC, October 29-31, 2003.

INVITED LECTURES: (Continued)

Hormone therapy and cognitive performance: Reconciling animal studies with clinical data
Bench to Bedside: Estrogen as a Case Study
Sponsored by the National Institute on Aging Neuroscience and Neuropsychology of
Aging Program. Co-sponsored by NIMH and the Alzheimer's Association.
Washington, D.C., September 28-29, 2004.

Estrogen therapy and cognitive performance: Myths and mysteries
Department of Psychology and Neuroscience Program
University of Illinois at Champaign
Champaign, IL; April 18, 2005

Estrogen, Brain Aging, and Cognition: Where do we go from here?
Behavioral Neuroscience and Neurology
Oregon Health & Science University
Portland, OR; April 29, 2005

Hormones and Cognition: What the Animals are Telling Us
The Tenth Annual Graylyn Conference on Women's Cognitive Health
Sponsored by the Women's Health Center of Excellence at the Wake Forest University-
Baptist Medical Center, Winston-Salem, NC, October 26-28, 2005.

Cholinergic Neurons, Hormone Therapy, and Age-Related Cognitive Decline: Preclinical
Studies
The Fifth International Conference on Geriatric Psychoneuropharmacology
University of Pittsburgh, Pittsburgh, PA, November 2-5, 2005.

Estrogen and Cognition: Reconciling Clinical Trials with Preclinical Data
Seminar in Neuroscience
School of Graduate Studies
SUNY Downstate Medical Center
Brooklyn, NY; December 7, 2005

Gonadal Hormones, Brain Aging, and Cognition
University of Minnesota College of Pharmacy
Minneapolis, MN; October 26, 2006

Gonadal Hormones, Brain Aging, and Cognition
West Virginia University College of Pharmacy
Morgantown, WV; November 8, 2006

Hormones and Cognition: What the Animals are Telling Us
Graduate Program in Neuroscience
Department of Neurobiology and Behavior
SUNY Stony Brook
Stony Brook, NY; December 15, 2006

INVITED LECTURES: (Continued)

Estradiol and Cognition: Lessons from Animal Studies

Hormones, Cognitive Function, and Dementia

Expert Meeting

Beaumanor Hall, Woodhouse

Leicestershire, United Kingdom

March 19-20, 2007

Hormones and Cognition: The Real Story

Neuropathology Department

Case Western Reserve University

Cleveland, OH; May 21, 2007

Mechanisms of Estrogen Effects on Cognitive Aging

10th Annual Symposium of the Center for Neuroendocrine Studies

University of Massachusetts, Amherst

Amherst, MA; October 5, 2007

Role of Estrogen in Cholinergic Function in Relation to Effects on Cognitive Performance

38th Annual Meeting of the American Aging Association

Hotel Valley Ho

Scottsdale, AZ; May 29-June 1, 2009

Cholinergic Basis of the Critical Period Hypothesis

NIH Sponsored Workshop, "Window of Opportunity of Estrogen Therapy for Neuroprotection"

Stanford Center on Longevity

Palo Alto, CA; January 15-17, 2010

Estrogen Therapy and Cognition: Making Sense of Recent Findings and Translating

Information Into Effective Therapeutic Strategies

Grand Rounds Presentation

Department of Psychiatry

University of Vermont

Burlington, VT; May 21, 2010

Mechanisms that Underlie Estrogen Effects on Cholinergic Function and Cognitive

Performance

Department of Psychiatry

University of Vermont

Burlington, VT; May 21, 2010

INVITED LECTURES, within University of Pittsburgh

Interactions Between Estrogen and NGF-Related Systems in Brain

Center for Reproduction at the University of Pittsburgh Medical Center

December 15, 1994.

Estrogen and Cholinergic Function: Implications for Brain Aging and Cognitive Decline

Department of Neurology

University of Pittsburgh School of Medicine; November 8, 1995.

Estrogen and Cholinergic Function: Implications for the Treatment of Alzheimer's Disease

Department of Endocrinology

University of Pittsburgh School of Medicine, October 2, 1996.

Effects of Estrogen on Brain Cholinergic Neurons and Growth Factors: Implications for Estrogen Replacement Therapy in Postmenopausal Women

Department of Cell Biology & Physiology

University of Pittsburgh School of Medicine

Pittsburgh, PA; October 28, 1998.

Effects of Estrogen on Brain Function and Behavior: Implications for Estrogen Replacement Therapy in Postmenopausal Women

Department of Endocrinology

Magee-Womens Research Institute

Pittsburgh, PA; May 4, 1999.

Effects of estrogen and progesterone on brain function and cognition: Implications for hormone replacement therapy in postmenopausal women

Center for Reproductive Physiology

University of Pittsburgh School of Medicine

Pittsburgh, PA; December 20, 1999.

Estrogen and Cognition: Applying Basic Science to a Clinical Perspective

Department of Endocrinology

Magee-Womens Research Institute

Pittsburgh, PA; Nov. 2003.

Research and the Guiding Hypothesis

Clinical Research Seminar Series

University of Pittsburgh School of Medicine

Pittsburgh, PA; November 8, 2005.

Research and the Guiding Hypothesis

Department of Endocrinology

University of Pittsburgh School of Medicine

Special lecture

Pittsburgh, PA; November 22, 2005.

Basic Mechanisms in Clinical Research

University of Pittsburgh School of Dentistry

Pittsburgh, PA; December 13, 2005.

INVITED LECTURES (Cont'd), within University of Pittsburgh

Hypotheses and Specific Aims

Clinical Research Seminar Series

University of Pittsburgh School of Medicine

Pittsburgh, PA; January 22, 2007.

RESEARCH INTERESTS

My research focuses on mechanisms that contribute to brain aging and cognitive decline. Studies have focused primarily on the effects of ovariectomy and estrogen replacement on the functional status of specific neural systems in the aging brain, particularly basal forebrain cholinergic neurons, neurotrophins, and neurotrophin receptors. Behavioral tests are used to correlate effects on neural systems with changes in learning, memory and attentional processes. The goal of these studies is to understand the different mechanisms by which estrogenic therapies can help to reduce the risk and severity of age-related cognitive decline in women, and to identify hormone treatment strategies that are likely to be effective in the prevention and treatment of cognitive impairment associated with neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease. My most recent work focuses on explaining why beneficial effects of estrogen therapy appear to decline with age and time following menopause, identifying potential benefits of combining estrogen therapy with cholinesterase inhibitor therapies, and characterizing the role of the novel estrogen receptor GPR30 in mediating effects of estradiol on basal forebrain cholinergic function and cognitive performance.

PUBLICATIONS

PEER REVIEWED ARTICLES

Students* under my direction are indicated by an asterisk

1. Cotman, C.W., M. Nieto-Sampedro, and R.B. Gibbs. Enhancing the self-repairing potential of the CNS after injury. Central Nervous System Trauma, 1984; 1(1): 3-14.
2. Gibbs, R.B., E.W. Harris, and C.W. Cotman. Replacement of damaged cortical projections by homotypic transplants of entorhinal cortex. J. Comp. Neurol., 1985; 237: 47-64.
3. Thompson, R., R.B. Gibbs, G.A. Ristic, C.W. Cotman, and J. Yu. Learning deficits in rats with early neurotoxic lesions to the globus pallidus, substantia nigra, median raphe, or pontine reticular formation. Physiol. Behav., 1986; 37: 141-151.
4. Thompson, R., R.B. Gibbs, G.A. Ristic, C.W. Cotman, and J. Yu. Lack of correlation between cortical levels of choline acetyltransferase and learning scores in rats with globus pallidus lesions. Brain Research, 1986; 367: 402-404.
5. Anderson, K.J., R.B. Gibbs, P.M. Salvaterra, and C.W. Cotman. Ultrastructural characterization of identified cholinergic neurons transplanted to the hippocampal formation of the rat. J. Comp. Neurol., 1986; 249: 279-292.
6. Gibbs, R.B., S.K.R. Pixley, and C.W. Cotman. Transplantation of septal neurons maintained in long-term culture. Brain Research, 1986, 382: 409-415.
7. Gibbs, R.B., K.J. Anderson, and C.W. Cotman. Factors affecting innervation in the CNS: Comparison of three cholinergic cell types transplanted to the hippocampus of adult rats. Brain Research, 1986; 383: 362-366.
8. Gibbs, R.B. and C.W. Cotman. Factors affecting survival and outgrowth from transplants of entorhinal cortex. Neuroscience, 1987; 21(3): 699-706.
9. Gibbs, R.B., D.L. Needels, J. Yu, and C.W. Cotman. Effects of entorhinal lesions on trophic activities present in rat entorhinal cortex and hippocampus as studied using primary cultures of entorhinal and septal tissues. J. Neurosci. Res., 1987; 18: 274-288.

PEER REVIEWED ARTICLES (Continued)

10. Gibbs, R.B., J. Yu, and C.W. Cotman. Entorhinal transplants and spatial memory abilities in rats. Behav. Brain Res., 1987; 26: 29-35.
11. Anderson, K.J., R.B. Gibbs, and C.W. Cotman. Transmitter phenotype is a major determinant in the specificity of synapses formed by cholinergic neurons transplanted to the hippocampus. Neuroscience, 1988; 25: 19-25.
12. Joyce, J.N., R.B. Gibbs, C.W. Cotman, and J.F. Marshall. Regulation of acetylcholine muscarinic receptors by embryonic septal grafts showing cholinergic innervation of host hippocampus. Prog. in Brain Res., 1989; 78: 109-115.
13. Joyce, J.N., R.B. Gibbs, C.W. Cotman, and J.F. Marshall. Regulation of muscarinic receptors in hippocampus following cholinergic denervation and reinnervation by septal and striatal transplants. J. Neurosci., 1989; 9: 2776-2791.
14. Gibbs, R.B., J.T. McCabe, C.R. Buck, M.V. Chao, and D.W. Pfaff. Expression of NGF receptor in the rat forebrain detected with *in situ* hybridization and immunohistochemistry. Molec. Brain Res., 1989; 6: 275-287.
15. Russell, M.J., V.K. Vijayan, R.B. Gibbs, J.W. Geddes, C.H. Jacobson, and C.W. Cotman. Long-term survival of neural transplants to senescence in rats. Exp. Neurol., 1990; 108: 105-108.
16. Gibbs, R.B., C.V. Mobbs, and D.W. Pfaff. Sex steroids and Fos expression in the rat brain and uterus. Molec. and Cell. Neurosci., 1990; 1: 29-40.
17. Gibbs, R.B. A. Lombardino, and D.W. Pfaff. Sex steroids and Fos expression in the CNS of prepubertal and newborn rats. Molec. and Cell. Neurosci., 1990; 1: 250-261.
18. Gibbs, R.B., M.V. Chao, and D.W. Pfaff. Effects of fimbria/fornix and angular bundle transection on expression of the p75^{NGFR} mRNA by cells in the medial septum and diagonal band of Broca: Correlations with cell survival, synaptic reorganization and sprouting. Molec. Brain Res., 1991; 11: 207-219.
19. Koibuchi, N.*, R.B. Gibbs, M. Suzuki, and D.W. Pfaff. Thyroidectomy induces Fos expression by TRH-containing neurons located in the adult rat hypothalamus. Endocrinology, 1991; 129(6): 3208-3216.
20. Chastrette, N.*, D.W. Pfaff, and R.B. Gibbs. Effects of daytime and nighttime stress on Fos-like immunoreactivity in the paraventricular nucleus of the hypothalamus and other brain regions. Brain Research, 1991; 563: 339-344.
21. Gibbs, R.B. and D.W. Pfaff. Effects of estrogen and fimbria/fornix transection on p75^{NGFR} and ChAT expression in the medial septum and diagonal band of Broca. Exp. Neurology, 1992; 16: 23-39.
22. Okano, H.J.*, D.W. Pfaff, and R.B. Gibbs. Role of local environmental factors in determining tissue-specific effects of estrogen: Examination of uterine tissues transplanted to brain. Molec. & Cell. Endocrinol., 1992; 87: 179-192.
23. Gibbs, R.B., M.M. McCarthy, D.W. Pfaff. Nerve growth factor affects defense-related behaviors, but not lordosis, in ovariectomized, estrogen-treated rats. Brain Research, 1993; 610: 256-266.

PEER REVIEWED ARTICLES (Continued)

24. Okano, H.J.*, D.W. Pfaff, and R.B. Gibbs. RB and cdc2 expression in brain: Correlations with ³H-thymidine incorporation. J. Neurosci., 1993; 13(7): 2930-2938.
25. Pfaus, J.G., S.P. Kleopoulos, C.V. Mobbs, R.B. Gibbs, and D.W. Pfaff. Fos and Jun expression in the female rat forebrain following hormone treatment and sexual stimulation. Brain Research, 1993; 624: 253-267.
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Annual Meeting of the Society for Neuroscience, San Diego, CA; November, 2001

Soc. For Neurosci. Abstr. 2001; 27., Program Number 312.12.

Zambon, N.J., Nagle, R., Pokala, V., Gibbs, R.B., Johnson, D.J.

Low-dose 192IgG saporin selectively destroys basal forebrain cholinergic neurons and impairs acquisition of a spatial memory task.

Annual Meeting of the Society for Neuroscience, San Diego, CA; November, 2001

Soc. For Neurosci. Abstr. 2001; 27., Program Number 534.13.

ABSTRACTS AND SCIENTIFIC PRESENTATIONS (Continued)

Pongrac, J.L., Gibbs, R.B., and DeFranco, D.B.

Estrogen augments cholinergic function when administered directly to primary cultures of rat basal forebrain

Annual Meeting of the Society for Neuroscience, San Diego, CA; November, 2001

Soc. For Neurosci. Abstr. 2001; 27, Program Number 549.7.

Gibbs, R.B., Nagel, S.C., Miranda, P.H., and McDonnell, D.P.

GnRH neurons and cholinergic neurons in the mouse basal forebrain contain estrogen receptor transcriptional activity.

Annual Meeting of the Society for Neuroscience, Orlando, FL; November, 2002

Soc. For Neurosci. Viewer/Itinerary Planner 2002, Program Number 574.1.

Butt, A.E., Hamilton, D.A., Duerkop, M.S., King, D.D., Gibbs, R.B., and Sutherland, R. Spatial memory impairments in rats with 192 IgG-saporin lesions of the nucleus basalis magnocellularis.

Annual Meeting of the Society for Neuroscience, Orlando, FL; November, 2002

Soc. For Neurosci. Viewer/Itinerary Planner 2002, Program Number 378.5.

Rudick, C.N., Gibbs, R.B., and Woolley, C.S..

Estrogen-induced disinhibition of CA1 pyramidal cells depends on basal forebrain cholinergic neurons

Annual Meeting of the Society for Neuroscience, Orlando, FL; November, 2002

Soc. For Neurosci. Viewer/Itinerary Planner 2002, Program Number 740.6.

Gibbs, R.B.

Estrogen, cholinergic function, and cognition

85th annual meeting of The Endocrine Society, Philadelphia, PA; June 19, 2003

Lazar, N, Edwards, D., Gibbs, R.B.

Effects of Tibolone vs Standard Hormone Replacement Therapy on Monoamines and Monoamine Metabolites in the Brains of Cynomologous Monkeys

25th Annual Pharmacy Student Research Conference – Eastern States, Univ. Virginia, October 2003.

Gibbs, R.B., Gabor, R., Cox, T., and Johnson, D.A.

Effects of raloxifene and estradiol on hippocampal acetylcholinesterase release and spatial learning in the rat

Annual Meeting of the Society for Neuroscience, New Orleans, LA; November, 2003

Soc. For Neurosci. Viewer/Itinerary Planner 2003, Program Number 626.13.

Ukairo, O.T., Arshad, S., Gibbs, R.B., and Johnson, D.A.

Selective cholinergic lesion of the medial septum impairs retention but not acquisition of a passive avoidance memory task

Annual Meeting of the Society for Neuroscience, New Orleans, LA; November, 2003

Soc. For Neurosci. Viewer/Itinerary Planner 2003, Program Number 425.16.

Fitz, N.F., Gibbs, R.B., and Johnson, D.A.

Arousal enhances delayed match to position T-maze performance independent of septo-hippocampal cholinergic projections

Annual Meeting of the Society for Neuroscience, New Orleans, LA; November, 2003
Soc. For Neurosci. Viewer/Itinerary Planner 2003, Program Number 425.17.

ABSTRACTS AND SCIENTIFIC PRESENTATIONS (Continued)

Lu, C., Singh, S., Menon, R., Gibbs, R.B., Walker, W., and Menon, R.K.

The signal peptide of insulin-like factor 6 (Insl6) directs Insl6 into the ER but not for secretion

86th annual meeting of The Endocrine Society, New Orleans, LA; June 16, 2004

Thomas, K., Sung, D.Y., Chen, J., Johnson, K., Walker, W., and Gibbs, R.B.

Spatial and temporal patterns of expression SP1 transcription factor variants during spermatogenesis

86th annual meeting of The Endocrine Society, New Orleans, LA; June 16, 2004.

Gibbs, R.B.

Estrogen, but not testosterone, enhances acquisition of a spatial memory task in male rats

Annual Meeting of the Society for Neuroscience, San Diego, CA; October, 2004
Soc. For Neurosci. Viewer/Itinerary Planner 2004, Program Number 777.2.

Shibata, M., Gibbs, R.B., Shahab, M., and Plant, T.M.

Further studies of kisspeptin/GPR54 signaling in the control of the onset of puberty in the rhesus monkey (*Macaca mulatta*)

6th Puberty Conference, Evian, France; May, 2005

Plant, T.M., Shibata, M., Gibbs, R.B., Shahab, M.

GnRH Neurons in the Peripubertal male rhesus monkey (*Macaca mulatta*) express GPR54: Implications for the control of primate puberty

87th annual meeting of The Endocrine Society, San Diego, CA; June, 2005

Gibbs, R.B., Fitz, N.F., and Johnson, D.A.

Cholinergic lesions produce selective effects on cognitive performance in rats

Annual Meeting of the Society for Neuroscience, Washington, DC; November, 2005
Soc. For Neurosci. Viewer/Itinerary Planner 2005, Program Number 881.1.

Gibbs, R.B.

Hormone therapy and cognition: What the animals are telling us

The Tenth Annual Graylyn Conference on Women's Cognitive Health
Winston-Salem, NC, October 26-28, 2005.

Gibbs, R.B.

Cholinergic Neurons, Hormone Therapy, and Age-Related Cognitive Decline: Preclinical Studies

The Fifth International Conference on Geriatric Psychoneuropharmacology
Pittsburgh, PA, November 2-5, 2005.

Abitoye, P.A., Li, P., Gibbs, R.B. and Johnson, D.A.

Steroid sulfatase inhibitor (p-o-sulfamoyl) - tetradecanoyl tyramine (du-14) enhances memory retention in rats with cholinergic lesion

Annual Meeting of the Society for Neuroscience, Atlanta, GA; November, 2006

Soc. For Neurosci. Viewer/Itinerary Planner 2006, Program Number 163.15.

ABSTRACTS AND SCIENTIFIC PRESENTATIONS (Continued)

Fitz, N.F., Gibbs, R.B. and Johnson, D.A.

The role of septo-hippocampal cholinergic lesion, place versus response strategy and acquisition of a delayed matching to position T-maze task

Annual Meeting of the Society for Neuroscience, Atlanta, GA; November, 2006

Soc. For Neurosci. Viewer/Itinerary Planner 2006, Program Number 751.20.

Gibbs, R.B., Fitz, N.F., and Johnson, D.A.

Task-selective effects of ovariectomy on learning - impaired acquisition of a 12-arm radial maze task

Annual Meeting of the Society for Neuroscience, Atlanta, GA; November, 2006

Soc. For Neurosci. Viewer/Itinerary Planner 2006, Program Number 80.28.

Gibbs, R.B.

Estradiol enhances DMP acquisition via a mechanism not mediated by turning strategy, but which requires intact basal forebrain cholinergic projections

11th Annual Meeting of the Society for Behavioral Neuroendocrinology, Asilomar Conference Center, Pacific Grove, CA; June, 2007.

Ramaswamy, S., Gibbs, R.B., and Plant, T.M.

Localization of Kisspeptin Cells and Axonal

Fibers in the Pituitary of the Male Rhesus Monkey (*Macaca mulatta*)

Annual Meeting of the Society for the Study of Reproduction (SSR), Kailua-Kona, Hawaii; May 2008.

Ramaswamy, S., Guierriero, K., Gibbs, R.B. and Plant T.M.

Intimate and extensive interactions between kisspeptin and GnRH neurons in the median eminence of the rhesus monkey (*macaca mulatta*) indicate that kisspeptin control of GnRH release may be exerted at the level of GnRH terminals

Annual Meeting of The Endocrine Society, San Fransisco, CA., June 2008.

Hammond, R., Nelson, D., and Gibbs, R.B.

Distribution of GPR30 in rat forebrain and co-localization with cholinergic neurons

40th annual Pharmaceutics Graduate Student Research Meeting, Ann Arbor, MI; June, 2008.

Gibbs, R.B., Mauk, R., Nelson, D. and Johnson, D.A.

Donepezil restores estradiol's ability to enhance learning in aged rats

Annual Meeting of the Society for Neuroscience, Washington, DC; November, 2008

Soc. For Neurosci. Viewer/Itinerary Planner 2008, Program Number 794.20.

Hammond, R., Nelson, D., Ninaci, D., Mauk, R., and Gibbs, R.B.

Expressiion of GPR30 in the rat forebrain: Relevance to estrogen effects on basal forebrain cholinergic neurons and cognitive performance

Annual Meeting of the Society for Neuroscience, Washington, DC; November, 2008

Soc. For Neurosci. Viewer/Itinerary Planner 2008, Program Number 794.24.

Hammond, R., Mauk, R., Ninaci, D., Nelson, D., and Gibbs, R.B.

GPR30 co-localizes with basal forebrain cholinergic neurons and enhances spatial learning
13th Annual Meeting of the Society for Behavioral Neuroendocrinology, Michigan State University, East Lansing, MI; June, 2009.

ABSTRACTS AND SCIENTIFIC PRESENTATIONS (Continued)

Hammond, R., Gibbs, R.B.

GPR30: Effects on Basal Forebrain Cholinergic Function and Spatial Learning
FASEB Summer Research Conference: The Physiology of Integrated Nuclear and Extranuclear Steroid Signaling, Snowmass Village, CO; August 2010.

Gibbs, R.B., Chipman, A.M., and Nelson, D.

Donepezil enhances effects of estradiol on DMP acquisition in rats with partial loss of septal cholinergic neurons
Annual Meeting of the Society for Neuroscience, San Diego, CA; October, 2010
Soc. For Neurosci. Viewer/Itinerary Planner 2010, Program Number 710.23.

Hammond, R., Shinde, A., and Gibbs, R.B.

Effects of basal forebrain cholinergic lesions and estradiol on relative levels of estrogen receptor mRNAs in the rat forebrain
Annual Meeting of the Society for Neuroscience, San Diego, CA; October, 2010
Soc. For Neurosci. Viewer/Itinerary Planner 2010, Program Number 611.16.

Dwarki, K., Ramaswamy, S., Gibbs, R.B. and Plant T.M.

The arrest of GnRH pulsatility during infancy that guarantees the quiescence of the primate gonad during juvenile development is correlated with a reduction in immunopositive kisspeptin neurons in the arcuate nucleus of the male rhesus monkey (*Macaca mulatta*).
Annual Meeting of The Endocrine Society, Boston, MA, June 2011. Poster P2-262.

Hammond, R., Nelson, D., and Gibbs, R.B.

Treatment with a GPR30 antagonist impairs acquisition of a spatial learning task
Annual Meeting of the Society for Neuroscience, Washington, DC; November, 2011
Soc. For Neurosci. Viewer/Itinerary Planner 2011, Program Number 933.07

Gibbs, R.B., Chipman, A., Hammond, R., and Nelson, D.

Galanthamine plus estradiol treatment enhance cognitive performance in aged ovariectomized rats
Annual Meeting of the Society for Neuroscience, Washington, DC; November, 2011
Soc. For Neurosci. Viewer/Itinerary Planner 2010, Program Number 612.17

GRANT PROPOSALS FUNDED

Functional characteristics of brain implants.

NIH NRSA Predoctoral Fellowship #MH08989 (1983-1986).

\$28,656 Robert Gibbs (Fellow), Carl Cotman (Supervisor).

Hormonal effects on CNS tissue transplants and on the regulation of trophic activities in the brain. NIH, NRSA Postdoctoral Fellowship #NS08195 (1987-1989).

\$38,992 Robert Gibbs, Ph.D. (Fellow), Donald Pfaff (Supervisor).

Effects of estrogen on NGF and NGF receptors in brain.

NIH 1 RO1 NS28896 (4/1/91-3/31/94).

Total: \$241,529 (Direct costs) R. Gibbs Principal Investigator.

Effects of estrogen on basal forebrain cholinergic function in aged rats.

University of Pittsburgh Pharmacy Association (1994)

\$3,000 R. Gibbs Principal Investigator.

Estrogen, basal forebrain cholinergic neurons, and aging.

NIH P50-AG05133 (S. DeKosky Principal Investigator)

Pilot study as part of the University of Pittsburgh Alzheimer's Disease Research Center grant (5/1/95-4/30/96)

\$10,000 (Direct costs). R. Gibbs Principal Investigator.

Effects of estrogen on NGF-related systems in brain. (Renewal)

NIH 2 RO1 NS28896 (4/1/94-3/31/98)

Total: \$345,039 Direct costs for 4/94-3/98. R. Gibbs Principal Investigator.

Effects of Estrogen on Cholinergic Activity and NGF Responses in Brain.

National Science Foundation IBN-9630851 (7/96-6/99)

Total: \$146,043 (Direct costs). R. Gibbs Principal Investigator.

Cell Imaging Core of the Center for Reproductive Physiology.

NIH 2 P30 HD08610 (4/96-3/00) T.M. Plant Principal Investigator

Total: \$235,965 Direct Costs for 4/96-3/00; R. Gibbs, Core Director.

Effects of Estrogen on NGF-Related Systems in Brain. (Renewal)

NIH 3 RO1 NS28896 (9/21/97-5/31/01)

Total: \$440,509 Direct Costs for 9/97-5/01. R. Gibbs Principal Investigator.

Estrogen, Cholinergic and GABAergic Activity, and Memory.

National Science Foundation IBN-9905676 (7/99-6/02)

\$145,000 Direct + Indirect for 7/99 – 6/02. R. Gibbs Principal Investigator.

\$4,050 Supplement to support Rachel Gabor summer research internship 5/01 - 7/01.

Effects of Estrogen on NGF-Related Systems in Brain. (Supplement)

NIH 3 RO1 NS28896 (9/1/99 – 5/31/00)

\$50,000 Direct. R. Gibbs Principal Investigator.

GRANT PROPOSALS FUNDED (Continued)

PACAP and Gonadotropin Secretion
NIH 1 RO1 HD36034 (9/1/99 - 11/30/99)
S. Winters Principal Investigator.
\$1,971 Direct for R. Gibbs

Specialized Cooperative Center for Reproduction Research: Physiology and Pathophysiology of
the Primate Gonad
NIH 1 U54 HD08610 (4/1/00 - 3/31/05)
T. Plant P.I.
R. Gibbs - Director of Cell Imaging Core D
\$181,392 Direct requested for 5 years

DHEAS, Sulfatase Inhibition & Cognition in Lesioned Rat.
NIH 1 RO1 AG16261 (7/1/00-6/30/04)
D. Johnson Principal Investigator
R. Gibbs Co-Investigator
\$70,801 Direct requested for R. Gibbs for 4 years

Effects of Raloxifene on Acquisition of a Spatial Memory Task: Correlations with Basal
Forebrain Cholinergic Function and Glutamate Binding
Eli Lilly, Inc. (4/1/01 - 3/31/03)
\$36,356 Direct. R. Gibbs, Principal Investigator.

Development and Differentiation in the Reproductive Axis
1 U54 HD41749-01 (7/01 - 7/06)
D. Mann (Morehouse University) Principal Investigator
R. Gibbs Co-Investigator
\$145,224 Direct requested for R. Gibbs for 5 years

Comparison of Tibolone with Standard Hormone Replacement Therapy on Measures of Brain
Function
Organon Pharmaceuticals, Inc. (11/02 - 4/04)
\$30,000 Direct. R. Gibbs, Principal Investigator

Estrogen-Induced Hippocampal Seizure Susceptibility
NIH 2 RO1 NS037324 (7/02 - 6/04)
C. Woolley Principal Investigator
R. Gibbs Co-investigator
\$20,000 Direct requested for R. Gibbs

Cholinergic Lesions and Age-Related Cognitive Impairment
NIH 1 RO1 AG021471-01A1 (7/03 – 6/08)
R. Gibbs principal investigator
\$1,125,000 Direct for 5 years

GRANT PROPOSALS FUNDED (Continued)

A New Tool for Targeted Antisense Knockdown in Brain
NIH 1 R21 NS046292-01A1 (01/05 – 12/06)
R. Gibbs principal investigator
\$231,250 Direct for 2 years

Novel Rehabilitative Approaches for Recovery from TBI
NIH 1R01 HD046700-01A1 (12/04 -11/08)
A. Kline, principal investigator
\$22,172 Direct requested for R. Gibbs for 4 years

Effects of systemic administration of aromatase inhibitors on aromatase activity in rat brain, and on basal forebrain cholinergic neurons and cognitive performance.
AFPE Scholarship to support Jasmine Talameh (7/05 – 6/06)
R. Gibbs principal investigator
\$5,000 for 1 year

Molecular and structural bases of hypothalamic puberty
NIH 5R01 HD013254-21
T. Plant principal investigator
\$5,790 Direct per year for 5 years

Physiology and pathophysiology of the primate gonad
NIH 2U54HD008610-31
T. Plant principal investigator
\$5,845 Direct per year for 5 years

LSM 510 Confocal Microscope
NIH 1S10RR022515-01 (4/06 – 3/07)
R. Gibbs principal investigator
\$296,279 Direct

Cholinergic Lesions and Age-Related Cognitive Impairment
NIH 3R01AG021471-05S1 (9/08 – 6/09)
R. Gibbs principal investigator
\$60,196 Direct

Restoration of Estradiol Effects on Learning by Cholinergic Enhancement
NIH 1R21AG031794 (10/08 – 9/11)
R. Gibbs principal investigator
\$225,500 Direct for 2 years

Environmental Enrichment and Cholinergic Mechanisms After TBI
NIH 1R01NS060005 (2/09 – 1/13)
A. Kline principal investigator
\$13,993 Direct for year 1

GRANT PROPOSALS FUNDED (Continued)

G-1 and Estrogenic Effects on Cholinergic Function and Cognitive Performance

CRDF Proposal (7/31/09 – 7/30/11)

R. Gibbs principal investigator

\$16,000 Direct for 2 years

Role of GPR30 in Estrogen-Mediated Effects of Cholinergic Function and Cognition

NSF Proposal 0948796 (5/1/10 – 4/30/13)

Division: IOS

R. Gibbs principal investigator

\$264,019 Direct for 3 years