
BIOGRAPHICAL SKETCH

NAME: Andrea C. Gore

eRA COMMONS USER NAME: acgore

POSITION TITLE: Professor and Vacek Chair in Pharmacology, College of Pharmacy

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
Princeton University, Princeton, NJ	AB	05/1985	Biology (<i>cum laude</i>)
University of Wisconsin, Madison, WI	PhD	12/1990	Neuroscience
Mt. Sinai School of Medicine, New York, NY	Postdoc	1955	Molecular Neuroendocrinology

A. Personal Statement

I am a basic and biomedical scientist, studying the interplay between the nervous system and the endocrine system in the control of reproduction. We are investigating the roles of sex hormones in the development of the brain, and how these hormones are involved in brain sex differences. In addition, we are conducting research on reproductive aging in females, and how the loss of ovarian estrogens with menopause leads to neurobiological impairments. Another line of research is focused on how exposures to endocrine-disrupting chemicals (EDCs) in the environment perturb normal hormone actions and cause reproductive dysfunction in the exposed individuals, as well as inter- and transgenerational effects. My expertise in the neurobiology of reproduction during development and aging fits well within the PRC's research on reproductive health, and our work on EDC exposures and transgenerational effects fit the intergenerational research category. Moreover, exposures of humans to EDCs is disproportionately higher in certain vulnerable populations, especially those of lower socioeconomic status and minority populations. Therefore I expect my work will contribute to the PRC's priorities of reproductive health in particular, but it is also applicable to demographic and population health. Although I am a new member of the PRC, I have been interacting with members over the past 5 years, especially through my participation in the Aging Network that includes several PRC faculty and students. I look forward to expanding upon these interactions by forging new connections to better translate my experimental lab research, conducted in rats, to improving reproductive health in humans.

Published Books and Scientific Statements (selected):

1. Gore AC (2002) GnRH: The Master Molecule of Reproduction. Kluwer Academic Publishers, Norwell, MA (ISBN 0-7923-7681-1)
2. Gore AC (ed.) (2007) Endocrine-disrupting Chemicals: From Basic Research to Clinical Practice. Part of *Contemporary Endocrinology* book series, P. Michael Conn, editor. Humana Press (ISBN 1-58829-830-2)
3. Gore AC and Dickerson SM (2012) Endocrine Disruptors and the Developing Brain. Morgan & Claypool Life Sciences Publishers (ISBN 9781615040872 paperback; ISBN 9781615040889 ebook)
4. Gore AC, Chappell VA, Fenton SE, Flaws JA, Nadal A, Prins GS, Toppari J, Zoeller RT (2015) EDC-2: The Endocrine Society's Second Scientific Statement on Endocrine-disrupting Chemicals. Endocrine Reviews 36: E1-E150.

B. Positions and Honors**Positions and Employment**

Summer 1984 Research Technician (Analytical Chemistry), Dillinger Huetten, Dillingen, Saar, West Germany
1991-1995 Postdoctoral Fellow, Mount Sinai School of Medicine (James L. Roberts, Advisor)
1995-2003 Assistant (1995-2001), Associate (2002-2003) Professor, Neurobiology, Geriatrics, and Neurobiology of Aging Laboratories, Mount Sinai School of Medicine
2003-2007 Associate Professor, Pharmacology & Toxicology, The University of Texas at Austin
2007-present Professor, Pharmacology & Toxicology, The University of Texas at Austin (have held endowed professorship/chair since 2008)

Other Experience and Professional Memberships**Service to NIH and NSF**NIH ICER study section, standing member 2010-2014 (served as vice chair); *ad hoc* 2007-2009

NSF review panelist, standing member, 2002-2006, *ad hoc* 2001 and 2007-present
NIH-AAAS, "Reproducibility in Science" invited workshop participant, June 2, 2014
NIH (NICHD), invited participant in Vision Workshop to formulate roadmap for the next decade, March, 2011
NIH special emphasis panels, site visit teams, and *ad hoc* memberships: NIH 2016/01 SYN (2016); NIH ZRG1 MDCN-R (R15 review, 2016); NIH ZES1 JAB-J (K99/R00, NIEHS, 2015); CDIN, *ad hoc* (2012); NIH (NIA) ZAG1 ZIJ-2, PO1 grant review (2011, 2012); NIH (NIEHS) ZES1-LWJ-G-CG (chair; 2010); NIH ZRG1-EMNR-C 58, 2009; NIH ZRG1 EMNR-E, 2009; NIH ZRG1 EMNR-A, 2005; NIH special emphasis panel, "Fetal basis of adult disease," (2003); NIH site visit committee, Oregon Regional Primate Research Center (1998, 2003); NIH special emphasis panel, "Sex based differences in the immune response" (2001); NIH BCE (Biochemical Endocrinology; 2001); NIH IFCN-2 (Integrative, Functional and Comparative Neuroscience; 1998).

Honors

1981 National Merit Finalist
1985 Graduated *cum laude*, Princeton University
1985 Elected to *Sigma Xi*, Princeton Chapter
1985-1986 Wisconsin Alumni Research Foundation Fellow, University of Wisconsin
1986-1989 Neuroscience Training Grant Fellow, University of Wisconsin
1992-1995 NIH, National Research Services Postdoctoral Award
1995-1997 Charles H. Revson Foundation Fellow
1996 Women in Endocrinology Janet W. McArthur Achievement Award
1997-1999 Brookdale Foundation Fellow
1998-2000 American Federation for Aging Research Fellow
2001 Brookdale Foundation Advancement in Leadership Fellow
2001 Faculty Council Award for Academic Excellence, Mount Sinai School of Medicine
2005-present "Faculty of 1000 Biology" invited contributor
2007 "Top 100 Science Stories of 2007," *Discover Magazine*
2008 University Cooperative Society's Research Excellence Award for Best Research Paper, University of Texas
2008 Elected Fellow, American Association for the Advancement of Science (AAAS)
2011 Texas Exes Teaching Award Finalist
2012 Elected Chair, Gordon Research Conference on Environmental Endocrine Disruptors; inducted into GRC "Hall of Fame" for excellence in chairing the conference
2013 Distinguished Scientist Award, Society for Experimental Biology and Medicine
2014 Plenary speaker, ICE/ENDO 2014
2015 Leadership Texas, Class of 2015
2015-present Vacek Chair in Pharmacology, University of Texas
2016 Outstanding Public Service Award, the Endocrine Society
2016 Edith Clarke Woman of Excellence Award, University of Texas

C. Contributions to Science

1. Environmental Endocrine-disrupting Chemicals (EDCs) and the Developing Brain

My laboratory is funded by the NIEHS (1R01 ES020662) to study sexually dimorphic effects of environmental EDC exposures on brain development, neurobiological function, and underlying molecular mechanisms for these effects. The most important outcomes of this research program are that prenatal EDCs permanently reprogram the developing hypothalamus in a sexually dimorphic manner. By behaviorally characterizing our animals, we have learned that social and sociosexual behaviors are particularly vulnerable to EDCs, with substantial differences between the sexes. From our molecular work, we have identified steroid hormone receptor expression as highly sensitive to EDCs, with consistent effects of prenatal exposure on ER α , ER β , progesterone receptor and androgen receptor. Neuropeptides, especially kisspeptin, are also changed in their expression.

Publications:

1. Walker DM, Kermath BA, Woller MJ, Gore AC (2013) Disruption of reproductive aging in female and male rats by gestational exposure to estrogenic endocrine disruptors. Endocrinology 154: 2129-2143. PMC3740483.
2. Walker DM, Goetz BM, Gore AC (2014) Dynamic postnatal developmental and sex-specific neuroendocrine effects of prenatal PCBs in rats. Molecular Endocrinology 28: 99-115. PMC3874456.
3. Reilly MP, Weeks CD, Topper VY, Thompson LM, Crews D, Gore AC (2015). The effects of prenatal PCBs on adult social behavior in rats. Hormones and Behavior 73: 47-55. PMC4546928.

4. Topper VY, Walker DM, Gore AC (2015) Sexually dimorphic effects of gestational endocrine-disrupting chemicals on microRNA expression in the developing rat hypothalamus. Molecular and Cellular Endocrinology 414: 42-52. PMC4553128.

2. Transgenerational Effects of EDCs on Brain and Behavior

A second grant from NIEHS (1R01 ES0232254) is investigating transgenerational epigenetic effects of EDCs on the rat brain, how exposure to a class of EDCs has effects up to 6 subsequent generations, and whether a second “hit” of EDC exposure – 3 generations removed from the original exposure – may interact with the prior EDC life history. Current work follows up from our previous evidence that transgenerational exposures can result in profound behavioral changes several generations later. We are using much lower-dose exposures and looking at combinations of EDCs in current work, and conducting a broader spectrum of behavioral tests.

Publications:

1. Crews D*, Gore AC**, Hsu TS, Dangleben NL, Spinetta M, Schallert T, Anway MD, Skinner MK (2007) Transgenerational epigenetic imprints on mate preference. Proceedings of the National Academy of Science 104: 5942-5946. *Co-first authors; *Corresponding author. PMID: PMC1851596
2. Walker DM, Gore AC (2011) Transgenerational neuroendocrine disruption of reproduction. Nature Reviews Endocrinology 7: 197-207. PMC3976559.
3. Crews D, Gore AC (2011) Life imprints: Living in a contaminated world. Environmental Health Perspectives 119: 1208-1210. PMC3230404.
4. Gillette R, Miller-Crews I, Skinner M, Gore AC, Crews D (2014) Sexually dimorphic effects of ancestral exposure to vinclozolin on stress reactivity in rats. Endocrinology 155: 3853-3566. PMC4164929.

3. Neurobiology of Reproductive Function Across the Life Cycle

I have a longstanding interest in the neuroendocrine control of reproductive development, the attainment of adult reproductive function, and reproductive senescence. Our recent publications have profiled gene expression in the developing hypothalamus during postnatal development through aging, and we have made some surprising discoveries, including the finding that despite dramatic sex differences in hormone profiles, there are surprisingly few hypothalamic genes that are sexually dimorphic.

Research on the aging brain, funded by the NIA (PO1 AG16765), has centered around two principle questions: 1) what role (if any) does the hypothalamus play in reproductive aging, and 2) how do estrogens influence the brain differently in aging vs. young adult brains, and is there a critical window post-estrogen deprivation (e.g., menopause or ovariectomy) beyond which the brain becomes refractory to estrogens. This question is clinically important for women making decisions about perimenopausal hormone replacement therapies. We developed a preclinical rat model and have access to hypothalamic from aging monkeys.

Publications:

1. Naugle MM, Gore AC (2014). GnRH neurons of young and aged female rhesus monkeys co-express GPER but are unaffected by long-term hormone replacement. Neuroendocrinology 100: 334-346. PMC4329056.
2. Naugle MM, Nguyen LT, Merceron TK, Filardo E, Janssen WGM, Morrison JH, Rapp PR, Gore AC (2014) G-protein coupled estrogen receptor, estrogen receptor α , and progesterone receptor immunohistochemistry in the hypothalamus of aging female rhesus macaques given long-term estradiol treatment. Journal of Experimental Zoology A Ecol Genet Physiol 321A: 399-414. PMC4282650.
3. Yin W, Maguire S, Pham B, Garcia AN, Dang NV, Liang J, Wolfe A, Hofmann HA, Gore AC (2015) Testing the critical window hypothesis of timing and duration of estradiol treatment on hypothalamic gene in reproductively mature and aging female rats, Endocrinology 156: 2918-2933. PMC4511137.
4. Naugle MM, Lozano SA, Guarraci FA, Kim JE, Lindsey LF, Morrison JH, Janssen WGM, Yin W, Gore AC. Age and long-term hormone treatment effects on the ultrastructural morphology of the median eminence of female rhesus macaques. Neuroendocrinology 103: 650-664. PMC4860175.

4. Leadership in Journal, Society, University, and Career Development Activities

Beyond my research, I am extremely active in meeting organization, dissemination of scientific knowledge, and education of the public. For example, I have published 25 chapters, reviews, commentaries, and editorials on EDCs, and I have been invited to speak on this topic at two NIH institutes (NICHD, NIEHS), and many conferences and universities. I organized and chaired the Endocrine Society’s first Forum on EDCs (2005), the Gordon Research Conference on EDCs (2012), and served on advisory committees for meetings at Pocantico, NY, “Building the path forward for the next generation of sustainable chemicals” (2012), Cavallo Point, CA, “Designing endocrine disruption out of the next generation of materials” (2011), and UCSF-CHE Summit on Environmental Challenges to Reproductive Health & Fertility, San Francisco, CA (2007). For my aging

research, I have given talks at the “Frontiers in Reproduction” workshop at Woods Hole, MA, and symposia talks at the Endocrine Society and the Society for Neuroscience. I was recently honored with the Endocrine Society’s 2016 award for Outstanding Public Service for these activities.

I serve as the Editor-in-Chief of the Endocrine Society’s flagship journal, *Endocrinology* and I was previously Associate Editor of *Experimental Biology and Medicine*. I have extensive committee service for the Society for Experimental Biology and Medicine and the Endocrine Society. I am also active on my campus in faculty governance and am currently chair-elect of our Faculty Council (faculty senate), to be chair in 2015-2016. Finally, I am extremely involved in career development and mentorship activities. Several times a year I give presentations on setting up and managing a lab; I speak on journal publishing (how to publish, how to review a paper, etc); and I am a mentor to graduate students, fellows, and junior faculty members around the country on their K-awards.

Publications and Activities:

1. Endocrine Society, Basic Science Chair of ENDO 2007, Toronto, Canada
2. Editor-in-Chief, *Endocrinology* (2013-2017)
3. Gordon Research Conference on Environmental Endocrine Disruptors, Elected Chair and organized the 2012 meeting
4. Gore AC, Crews D, Doan L, La Merrill MA, Patisaul H, Zota A (2014) Introduction to EDCs: A guide for public interest organizations and policy-makers. IPEN and The Endocrine Society.

Complete List of Published Work in MyBibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/45448158/?sort=date&direction=descending>

D. Research Support

Ongoing Research Support

R01ES023254 (A. Gore and D. Crews, PIs) 09/01/13-07/31/18

National Institute of Environmental Health Sciences

Ancestral Exposures/Modern Responses to EDCs

This grant studies effects of two classes of EDCs, and their interactions, across 6 generations. Behavioral phenotyping, molecular epigenetics and microRNA and gene expression effects will be performed in animals up to the F6 generation.

Role: Principal Investigator

Responsibilities: As co-PIs, Dr. David Crews and I share responsibility for the overall direction of the research, and work with the research team on experimental design, execution, analysis, interpretation, and preparation of research manuscripts.

R01ES020662 (A. Gore and D. Crews, PIs) 09/09/11-04/30/17

National Institute of Environmental Health Sciences

Sexually dimorphic effects of endocrine disruptors on brain & behavior

The goal of this grant is to determine how developmental exposure to environmental endocrine disruptors (EDCs) causes changes in gene expression, epigenetic modifications, and protein expression, in the hypothalamus, amygdala and hippocampus of male and female offspring.

Role: Principal Investigator

Responsibilities: As co-PIs, Dr. David Crews and I share responsibility for the overall direction of the research, and work with the research team on experimental design, execution, analysis, interpretation, and preparation of research manuscripts.

P01AG16765 (M.G. Baxter, PI) 12/01/98-02/29/17

National Institute on Aging

Estrogen influences on neuroendocrine aging

The goals of this program project are to ascertain effects of estrogen on hypothalamic gene and protein expression in aging female rats.

Role: Project 2 Leader

Responsibilities: As the leader of Project 2, I am responsible for the overall direction of the research, and work with the research team on experimental design, execution, analysis, interpretation, and preparation of research manuscripts.

T32DA018926 (R.A Harris, PI) 08/01/04-07/31/20

National Institute on Drug Abuse
Pre-Doctoral Training in Interdisciplinary Neuroscience

The goal of this training grant is to provide state-of-the-art training for the next generation of neuroscientists who are equipped to solve these health problems.

Role: Training Faculty

Responsibilities: Training faculty participate in supervision of graduate students in the program.

Completed Research Support

R01AG028051 (A. Gore, PI)

02/01/07-01/31/13

National Institute on Aging

Hypothalamic control of reproductive aging

The major goals of this project are to study age-related changes in the hypothalamus in middle aged, ovarian intact rats, as a model for menopause.

Role: Principal Investigator

Responsibilities: As the leader of Project 2, I am responsible for the overall direction of the research, and work with the research team on experimental design, execution, analysis, interpretation, and preparation of research manuscripts.

R13ES021654 (A. Gore, PI)

06/01/12-05/31/13

National Institute of Environmental Health Sciences

2012 Environmental Endocrine Disruptors Gordon Research Conference

Support for a Gordon Research Conference on Environmental Endocrine Disruptors, which I chaired in 2012.

Role: Principal Investigator

Responsibilities: I was the Chair of the 2012 Gordon Research Conference, I was responsible for program organization, planning, funding, and logistics.