

CURRICULUM VITAE

Teresa Kaye Woodruff, Ph.D., DSc., DSc.

Provost and Executive Vice President for Academic Affairs

Michigan State University

tkw@msu.edu

PROFESSIONAL APPOINTMENTS

Michigan State University, East Lansing MI

Provost and Executive Vice President for Academic Affairs

Northwestern University, Chicago IL

Feinberg School of Medicine

The Thomas J. Watkins Professor of Obstetrics and Gynecology

McCormick School of Engineering

Professor, Department of Biomedical Engineering

Weinberg College of Arts and Science

Professor, Department of Molecular Biosciences

Dean of The Graduate School and Associate Provost for Graduate Education

EDUCATION

Genentech, Inc., South San Francisco CA

Postdoctoral Fellow, Department of Cell Culture Research and Development (1989-1991)

Northwestern University, Evanston, IL

Ph.D., Sigma Xi, Department of Biochemistry, Molecular Biology and Cell Biology (1985-1989)

Olivet Nazarene University, Kankakee, IL

B.S. (Phi Delta Lambda) Zoology and Chemistry (1981-1985), summa cum laude

ACADEMIC APPOINTMENTS

Aug. 2020 Provost and Executive Vice President for Academic Affairs, Michigan State University
Aug. 2020 MSU Foundation Professor of Obstetrics Gynecology, Reproductive Biology, and Biomedical Engineering
2017-2020 Dean, Associate Provost for Graduate Education, The Graduate School, Northwestern University
2013-2020 Professor, Department of Biomedical Engineering, Robert R. McCormick School of Engineering and Applied Science, Northwestern University
2012-2020 Professor, Department of Medical Social Sciences, Feinberg School of Medicine, Northwestern University
2008-2020 Collaborative Faculty Member, Oregon National Primate Research Center
2007-2020 Thomas J. Watkins Memorial Professor of Obstetrics and Gynecology, Feinberg School of Medicine, Northwestern University
2006-2020 Professor, Department of Obstetrics and Gynecology, Feinberg School of Medicine, Northwestern University
2004-2006 Professor, Department of Medicine and Department of Neurobiology and Physiology, Northwestern University
1997-2004 Associate Professor, Department of Medicine and Department of Neurobiology and Physiology, Northwestern University (tenured)
1995-1997 Research Associate Professor, Department of Medicine and Department of Neurobiology and Physiology, Northwestern University
1993-1995 Research Scientist, Department of Discovery Research, Genentech
1991-1993 Scientist, Department of Cell Culture Research and Development, Genentech

ACADEMIC LEADERSHIP ROLES

2015-2020 Director, Center for Reproductive Science, Northwestern University
2012-2020 Vice Chair for Research, Department of Obstetrics and Gynecology, Northwestern University
2007-2020 Founder and Director, The Oncofertility Consortium, Northwestern University
2006-2020 Founder and Chief, Division of Fertility Preservation, Northwestern University
2006-2020 Founder and Director, Women's Health Research Institute, Northwestern University
2006-2015 Associate Director, Center for Reproductive Science, Northwestern University
2002-2007 Associate Director of Basic Sciences, Robert H. Lurie Comprehensive Cancer Center, Northwestern

CAREER CAPSULE

Dr. Woodruff leads efforts to provide fertility sparing or preservation options to young men and women with fertility-threatening conditions through the development of physician guidelines, patient awareness and education materials, and a comprehensive bench to bedside research portfolio that is advancing our understanding of ovarian follicle function. She is an advocate for women in science and a leader in federal policy changes that now include sex as a biological variable. She has current and past leadership roles spanning three decades including Associate Provost for Graduate Education and Dean of The Graduate School at Northwestern, and founder and director of the Oncofertility Consortium and the Women's Health Research Institute. She has served numerous professional societies including as president of the Endocrine Society and editor-in-chief of *Endocrinology*, is civically active including serving on the Board of Trustees for the Adler Planetarium, as an elected member of the Economic Club of Chicago and as a former Chicago Charter School board member. She currently serves as the Provost and Executive Vice President for Academic Affairs at Michigan State University.

ACADEMIC ACCOMPLISHMENTS

Teresa K. Woodruff, Ph.D. graduated *summa cum laude* from Olivet Nazarene University and was named the Maggie Sloan Crawford Graduate, the highest award given to a graduating senior. In 2015, she returned to deliver the Olivet graduation commencement address and in 2016 was awarded the highest honor to an alumnus, the "O" Award. She completed graduate work at Northwestern University, where she cloned and characterized inhibin and activin, the two most powerful gonadal peptide hormones of the reproductive axis. She illuminated how these master hormones act at the molecular level, eventually solving the structure of activin along with its receptor and regulating proteins. This work was recognized by the Endocrine Society Weitzman Award, given to a scientist of exceptional promise under the age of 40. At the time of her graduate research, the inability to mature the ovarian follicle *in vitro* was a major gap in reproductive science. When she returned to Northwestern as a faculty member, Woodruff led a highly collaborative effort that resulted in the development of a hydrogel ovary, a 3-dimensional support system that provides the critical bio-integrity for the follicle and its enclosed oocyte. Live births in mice resulted from these studies. This accomplishment was named the most important breakthrough of the decade 1998-2008 by *Nature Medicine*. She coined the term "oncofertility" to describe the application of this work toward the fertility needs of young cancer patients and created the Oncofertility Consortium through a NIH Interdisciplinary Roadmap Grant. Oncofertility is now globally recognized as a medical discipline with insurance and reimbursement available to patients and providers in many stages and countries. Three independent discoveries have been cited as 'Discoveries of the Year' by Discovery Magazine and by the Chinese Academy of Medicine. Woodruff was elected to the National Academy of Medicine (2018) and the American Academy of Arts and Science (2020). She is also an innovator and holds more than 10 U.S. patents, for which she was elected to the National Academy of Inventors (2017). Widely recognized for her commitment to teaching and mentoring, Woodruff was presented the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring by Barack Obama in an Oval Office ceremony (2011) and the Beacon Award from Frontiers in Reproduction (2013). She received the Distinguished Alumnae Award (2008) and Alumni Association Merit Award (2012) from Northwestern University. She holds honorary degrees (D.Sc.) from Bates College, Lewiston, Maine (2010) and the University of Birmingham, School of Medicine, Birmingham, UK (2016). Her work on behalf of women in science is recognized by The Distinguished Woman in Medicine and Science Award (2009), the American Committee for the Weizmann Institute of Science Vision and Impact Award (2012), the American Women in Science (AWIS) Innovator Award (2008), the American Medical Women Association (AMWA) Gender Equity Award (2009), and the "Speaking of Women's Health" Distinguished Service Award (2007). In 2017, she was named

a Guggenheim Fellow. She currently serves as the Dean of the Graduate School and Associate Provost for Graduate Education at Northwestern University. She is civically active and is an elected member of The Economic Club of Chicago and The Chicago Network. Woodruff served on the school board of the Chicago-based Young Women's Leadership Charter School, served as president of the Endocrine Society and championed the new NIH policy that mandates the inclusion of females in fundamental research. In 2013 she was named to Time magazine's "Most Influential Persons" list (voted 112th).

EXCEPTIONAL HONORS

- 2020 Elected Fellow, American Academy of Arts and Sciences
- 2018 Elected Fellow, National Academy of Medicine
- 2017 Elected Fellow, National Academy of Inventors
- 2017 Elected Fellow, American Institute for Medical and Biological Engineering
- 2016 Honorary Scientiae Doctoris (D.Sc.) *honoris causa*; University of Birmingham, School of Medicine, Birmingham, UK
- 2011 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring; Presented in the Oval Office by President Barack Obama
- 2010 Honorary Scientiae Doctoris (D.Sc.) *honoris causa*; Bates College, Lewiston, Maine

NOTABLE LECTURES

- 2018 Woman Pioneer in Health Sciences, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia
- 2016 Commencement Address, University of Birmingham, School of Medicine, Birmingham, UK
- 2012 Commencement Speaker, Olivet Nazarene University, Kankakee, IL
- 2011 Founders' Day White Coat Address, Feinberg School of Medicine, Northwestern University, Chicago IL
- 2010 Commencement Address, Bates College, Lewiston, Maine
- 2006 Commencement Address Young Women's Leadership Charter School of Chicago

AWARDS AND HONORS

- 2021 Gerald D. Aurbach Award for Outstanding Translational Research, Endocrine Society
- 2021 Distinguished Fellow, Society for the Study of Reproduction (SSR)
- 2020 Elected Fellow, American Academy of Arts and Sciences
- 2019 Delbert A. Fisher Scholar Award, Endocrine Society
- 2018 Inaugural "Heroes of Medicine", Halo Award
- 2018 19th Royan International Research Award, Royan Institute, Tehran, Iran
- 2018 Distinguished Research Award, American Society for Reproductive Medicine
- 2018 Trainee Mentoring Award, Society for the Study of Reproduction
- 2017 Elected Fellow, John Simon Guggenheim Memorial Foundation
- 2017 Outstanding Achievement in Women's Health Research, 25th Anniversary, Academy of Women's Health
- 2017 Transatlantic Medal, Society for Endocrinology, UK
- 2017 Outstanding Leadership in Endocrinology Laureate Award, Endocrine Society
- 2016 Elected, American Institute for Medical and Biological Engineering, College of Fellows
- 2016 Lay "O" Award, Alumni Board of Olivet Nazarene University
- 2013 Visionary Leadership Award, University of San Francisco, California
- 2013 Beacon Award, Frontiers in Reproduction, Marine Biological Laboratories, Woods Hole MA
- 2012 Visionary Award, Fertile Action (National Advocacy Organization)
- 2012 Vision and Impact Award Honoring Women Who Change Lives, American Committee, Weizmann Institute
- 2012 Alumni Association Merit Award, Northwestern University
- 2010 Tripartite Legacy Award, Feinberg School of Medicine, Northwestern University
- 2010 First Annual Girl Power Award, Young Women's Leadership Charter School of Chicago
- 2009 Mentor of the Year, Women Faculty Organization, Northwestern University
- 2009 Gender Equity Award, American Medical Women's Association (AMWA)
- 2009 Distinguished Woman in Medicine and Science, Feinberg School of Medicine, Northwestern

CURRICULUM VITAE T.K. WOODRUFF

- 2008 Innovator Award, Association of Women in Science (AWIS)
- 2008 Alumnae Award, The Alumnae Association of Northwestern University
- 2007 Thomas J. Watkins Endowed Professorship, Feinberg School of Medicine, Northwestern
- 2007 Distinguished Service Award, Speaking of Women's Health
- 2006 Elected Fellow, American Association for the Advancement of Science (AAAS)
- 2000 Richard E. Weitzman Memorial Award, The Endocrine Society
- 2000 Distinguished Teaching Award, Northwestern University
- 1988 NRSA Training Award, National Institutes of Health
- 1988 Cornelia Post Channing Memorial Award, VII Ovarian Workshop, Seattle WA
- 1988 Elected Graduate Honor Society, Sigma Xi, Northwestern University
- 1987 Graduate Fellow Award, Abbott Laboratories, Chicago IL
- 1985 Outstanding Biochemistry Student Award, American Institute of Chemists
- 1985 Merit of Excellence Award, Associated Colleges of the Chicago Area
- 1985 Maggie Sloan Award (highest honor given to a graduating senior woman), Olivet Nazarene University
- 1985 Elected Phi Delta Lambda Undergraduate Honor Society

SERVICE/PROFESSIONAL SOCIETIES (SELECTED)

- 2018-2019 American Association of University Women, Nomination Committee
- 2017-2020 Editor-in-Chief, *Endocrinology*
- 2015-2017 Specialized Cooperative Centers Program in Reproduction and Infertility Research, Ovarian Focus Group Chair (and 2009-2011) 2013-2014 Endocrine Society, President Council, The Office of Research on Women's Health, Office of the Director, NIH
- 2012-2013 Endocrine Society, President-elect
- 2011- American Society for Reproductive Medicine, Member
- 2010-2011 Society for the Study of Reproduction, Public Affairs Committee, Board Liaison
- 2009-2011 Specialized Cooperative Centers Program in Reproduction and Infertility, Steering Committee Chair
- 2009-2011 Women in Endocrinology, Nominating Committee
- 2009-2010 Society for the Study of Reproduction, Outreach Committee, Board Liaison
- 2008-2011 Society for the Study of Reproduction, Board of Directors
- 2008-2011 American Chemical Society
- 2008-2011 Endocrine Society, Publications Core Committee Council Liaison
- 2008-2011 Endocrine Society, Endocrine Society Council
- 2007-2011 American Society for Reproductive Medicine, Research Committee
- 2007 Ovarian Workshop, Chair
- 2006-2014 American Society for Biochemistry and Molecular Biology, Member
- 2006-2009 Institute for Bionanotechnology in Medicine, Advisory Board
- 2006 Society for Gynecologic Investigation, Member
- 2006-2007 The Endocrine Society, Scientific and Educational Programs Core Committee
- 2006 The Endocrine Society, Basic Science Taskforce Chair
- 2005 The Endocrine Society, Basic Science Taskforce
- 2004 Ovarian Workshop, Meeting Organizer, Chairman
- 2003-2006 The Endocrine Society, Annual Steering Committee
- 2003-2005 Society for the Study of Reproduction, Program Committee
- 2003 Women in Endocrinology, Awards Committee
- 2002 American Association of University Women, Member
- 2002 Ovarian Workshop, Chairman
- 2002 Society for the Study of Reproduction, Clinical Outreach Committee Chair
- 2001-2009 Institute for Bionanotechnology in Medicine, Member
- 2001-2003 Society for the Study of Reproduction, Clinical Outreach Committee

CURRICULUM VITAE T.K. WOODRUFF

| | |
|-----------|--|
| 2000-2006 | Ovarian Workshop, Nominations Committee |
| 2000-2002 | The Endocrine Society, Membership Committee |
| 2000 | Society for the Study of Reproduction, Nominations Committee |
| 1998-2003 | Women in Endocrinology, Executive Committee |
| 1994-1998 | World Health Organization Designated Laboratory |

TEACHING ACTIVITIES

Undergraduate Advising and Teaching

| | |
|-----------|---|
| 2008-2009 | Medill School of Journalism: Reporting on Breakthroughs in Science |
| 2008-2009 | Global Health Studies 310 "Oncofertility: A Global Perspective" |
| 2008 | In Religion Course: Ethics and Oncofertility |
| 2007 | In Bioethics Course: Religion and Oncofertility |
| 2006-2007 | Global Health Studies 310: 'Contraceptive Use and Need in the Developing World' |
| 2005-2007 | Systems Physiology (Biol Sci 210) |
| 1999-2002 | Women's Residential College |
| 1999-2002 | Freshman Advising |
| 1998-2003 | Systems Physiology (Biol Sci 325) |
| 1998 | Freshman Seminar/Advising (Biol Sci A08): Implications of the Genetic Revolution to Human Endeavors |

Graduate Teaching

| | |
|------|--|
| 2017 | Created Masters in Reproductive Science and Medicine (MS-RSM) |
| 2018 | Created Assisted Reproductive Technologies tract in the MS-RSM |
| 2019 | Created the Oncofertility tract in the MS-RSM |

Non-Institutional teaching

| | |
|-----------|---|
| 2015-2020 | Introduction to Reproduction – an online curriculum leading to a certificate through Coursera introducing reproductive health content; geared to college age students |
| 2007-2020 | Myoncofertility.org in collaboration with Kemi Jona, Ph.D., School of Education and Social Policy, Northwestern University |
| 2001-2003 | Director, Frontiers in Reproduction, Marine Biological Laboratories, Woods Hole, MA |
| 1999-2004 | Lecturer, Frontiers in Reproduction, Marine Biological Laboratories, Woods Hole, MA |

UNIVERSITY COMMITTEES AND BOARDS (SELECTED)

| | |
|---------------|---|
| 2019-2020 | One Book One Northwestern Faculty Co-Chair |
| 2016-2018 | Institute for Sexual and Gender Minority Health and Wellbeing Steering Committee |
| 2016-Present | Committee on Faculty Diversity and Excellence (Provost Committee) |
| 2016-Present | Provost's Advisory Council on Women Faculty |
| 2015- Present | Chemistry of Life Processes Institute Faculty Executive Committee |
| 2014- Present | Skin Disease Research Executive Committee |
| 2014-2018 | Center for Interdisciplinary Exploration and Research in Astrophysics Advisory Board |
| 2012- | Council of One Hundred (C100) - Northwestern University Mentoring and Diversity Board |
| 2009-2011 | Northwestern University Strategic Plan Committee – Provost Committee |
| 2008-2010 | Cardiovascular Research Institute Internal Advisory Council |
| 2007-2015 | Executive Board, Center for Genetic Medicine |
| 2007- | Tenure Committee, Department of Obstetrics and Gynecology |
| 2007-2017 | Executive Board, Cells to Society |
| 2006-2010 | Science Outreach Web Portal Committee, Office of Vice President for Research |
| 2006-2008 | Northwestern University Research Council, Feinberg School of Medicine |
| 2006-2007 | Highest Order of Excellence II Committee – Provost Strategic Planning Committee |

CURRICULUM VITAE T.K. WOODRUFF

2006-2007 Shared Facilities Advisory Committee, Office of Sponsored Research
2005-2008 Vice President for Research Advisory Committee
2005-2008 Life Science Council, Weinberg College of Arts and Sciences
2005-2007 Science and Engineering Committee on Multicultural Affairs
2004 Research Systems Planning Advisory Committee (Central Administration)
2002-2004 Committee on Women in the Academic Community (Provost Committee)
2002-2004 Executive Committee, Medical Scientist Training Program
2002 Northwestern University Biotechnology (NUBL) Steering Committee
2001-2002 Chemical and Biological Safety Committee
1996-1998 Animal Care and Use Committee
2016-2017 Director, Developmental Therapeutics and PDX Core Facility
2002-2008 Associate Director for Basic Research
2002-2008 Cancer Center Executive Committee
2000-2002 Director, Hormone Action and Signal Transduction in Cancer Program
1998-2000 Co-Director, Immunoassay Facility
Continuous Ad hoc tenure committees; faculty and chair search committees

COMMUNITY SERVICE AND PUBLIC OUTREACH (SELECTED)

2018-2020 Board of Trustees, Adler Planetarium
2018 Science Panel, Nerdetta Podcast, National Public Radio (NPR)
2017-2018 Treasurer, Les Cheneaux Island Association (elected)
2016-2018 Little Traverse Trail Steward and Monitor, Cedarville Nature Preserve
2015- The Economic Club of Chicago – member: Reception Committee, Membership Committee
2013-2015 FDA Cellular, Tissue and Gene Therapies, Advisory Committee Member
2008-2012 Young Women’s Leadership Charter School, Board Member
2009 Junior Science Café: Making Me! Eggs and Sperm, Oh My!
2007-2020 Oncofertility Saturday Academy, Mentor
2007-2009 Illinois Math and Science Academy Mentor
2006-2007 Beyond Media, Executive Board Member
1996-1998 Partners in Education, Volunteer, Fourth Presbyterian Church
1996 Prison Education Ministry, Volunteer

EDITORIAL ACTIVITIES

2017-2020 Editor-in-Chief, *Endocrinology*
2010-2020 Founding Editorial Board, *Journal of Adolescent and Young Adult Cancer*
2008-2009 Associate Editor, *Fertility and Sterility*
2006-2009 Editorial Board, *Endocrine Reviews*
2004-2006 Review Editor, *Molecular and Cellular Endocrinology*
2002-2004 Editorial Board, *Molecular Endocrinology*
2000-2003 Editorial Board, *Journal of Clinical Endocrinology and Metabolism*
1999-2003 Editorial Board, *Gynecologic Endocrinology*
1998-2002 Editorial Board, *Endocrinology*

RESEARCH SUPPORT

Bill & Melinda Gates Foundation Woodruff (PI) 11/5/18-10/31/20
OPP1203053 \$1,000,000 (Total Costs)

High-throughput Ovulation Screening Assay for Contraception Discovery Applications

This project aims to develop new technologies to address the current short-comings of contraceptive discovery. The toolkit available for development of new contraceptives does not meet the needs of the human population in the 21st century, specifically for those in developing countries. Through the development of a high-throughput screening assay and an advanced microfluidic culture platform we will transform the process of contraceptive discovery, increasing both its speed and throughput.

Bill & Melinda Gates Foundation Woodruff (PI) 11/10/18-10/31/20
OPP1200269 \$500,216 (Total Costs)

Novel Genes Involved in Follicle Autonomous Activation and Ovulation

The goal of this project is to study both the beginning and the end of the spectrum of folliculogenesis in order to identify new gene pathways relevant to of non-hormonal birth control.

NIH/NICHD Woodruff (PI) 02/23/10 – 03/31/23
R13HD063248 \$178,000 (Total Costs)

Oncofertility Consortium Annual Conference

The Oncofertility Consortium hosts the Oncofertility Consortium Annual Conference which attracts an international audience of the oncofertility community and is a place where new ideas for research projects develop, networks of clinical care converge, and the interdisciplinary community of oncologists, reproductive endocrinologists, research scientists, allied health professionals, humanities scholars, students, advocates, and patients participate in this cutting edge field.

NIH/NIGMS O'Halloran (PI) 07/01/15-04/30/20
R01GM115848 \$155,333 (Total Costs)

Regulatory Roles of Zinc Fluxes in Metalloprotein Occupancy and Cell Cycle Progression

These studies will identify metal trafficking pathways, mechanisms and zinc-receptor proteins that mediate these essential regulatory zinc fluxes and furthermore establish how and when key metalloregulatory proteins undergo changes in zinc occupancy in this emerging signal transduction pathway.

Role: **Co-PI** (through 10/5/18), **Other Significant Contributor** (since 10/5/18)

NIH/NIEHS Woodruff (PI) 09/15/19-08/31/22
UH3ES029073 \$2,559,558 (Total Costs)

PCOS and androgen-related disease modeling and drug testing in Multi-organ Integrated Microfluidic Reproductive Platform

For this UG3-UH3 transition we plan to maintain our original milestones as originally proposed. These proposed milestones will aim to develop next-generation technologies that will be used to create a transformative model of polycystic ovary syndrome as well as novel screening tool for identifying chemicals and compounds for endocrine disruption.

NIH/NICHD Woodruff (PI) 05/15/19-04/30/24
T32HD094699 \$861,791 (Total Costs)

Northwestern Center for Reproductive Science Predoctoral Training Program in Reproductive Science, Medicine, and Technology

The Northwestern Center for Reproductive Science Predoctoral Training Program in Reproductive Science, Medicine, and Technology (CRS Training Program) seeks to generate and grow a sophisticated workforce in reproductive science and medicine who will make the discoveries necessary to enable a healthy future for all people. It aims to do this by combining

CURRICULUM VITAE T.K. WOODRUFF

rigorous didactics and bench research with training opportunities in the technologies of the future, generating a new kind of scholar who can succeed in a fast-paced, competitive scientific environment.

COMPLETED RESEARCH SUPPORT (Selected - Complete list of prior funding can be found online.)

NIH/NCATS Lloyd-Jones(PI) 4/1/16-7/14/19

UL1TR001422 \$242,090 (Total Costs)

Northwestern University Clinical and Translational Science Institute (NUCATS)

Role: **Module Director**

NIH/NIEHS/NCATS Woodruff (PI) 07/01/12–12/31/17

UH2ES022920/**UH3TR001207** \$4,756,222 (Total Costs)

Ex Vivo Female Reproductive Tract Integration In a 3D Microphysiologic System

Establish independent in vitro culture systems for human follicle, fallopian tube, uterus and vagina using the 3DKUBE platform (UH2), 2) Develop PK models for drug delivery and hormone diffusion in perfused in vitro 3DKUBE cultures of reproductive tract tissues (UH2), and 3) Link the OvaryKUBE, TubeKUBE, UteroKUBE, and VagiKUBE into an integrated system FemKUBE that recapitulates the physiologic function of the human reproductive tract (UH3) and responds to known agonists and antagonists.

Bill & Melinda Gates Foundation Woodruff (PI) 11/01/16-04/30/18

OPP1161206 \$100,000 (Total Costs)

An innovative in vitro ovulation assay has been invented that will be used to identify new contraceptive agents. The system is amenable to high throughput platforms that can be used in large drug screens. The goal is to identify non-steroidal agents and thereby reducing the need for daily contraceptive management.

NIH/NICHD Woodruff (PI) 04/01/16 – 03/31/19

P50 HD076188 \$2,942,166 (Total Costs)

Center for Reproductive Health After Disease

The major goal of this application is to address the basic science need to understand human follicle and egg biology and pursue cutting-edge options for preserving reproductive health, while providing physicians, patients, their families, and the public with information about the risks posed by diseases and treatments to reproductive health that will lead to informed dialogue about options for preserving reproductive function.

Role: **Director (Admin Core, Education Core), PI (Project 1), Co-I (Project 2, Project 3)**

NIH/NIEHS Woodruff (PI) 09/01/17-08/31/19

UG3ES029073 Woodruff (PI) 09/01/18-08/31/19

3UG3ES029073-02S1 Woodruff (PI) 09/01/18-08/31/19

\$3,024,749 (Total Costs)

PCOS and androgen-related disease modeling and drug testing in Multi-organ Integrated Microfluidic Reproductive Platform

The goal of this project is to further our work by implementing a next generation microfluidic system that has been created for the express purpose of a high throughput robotics setting that will enable drug testing of integrated organ systems that mimic a variety of reproductive diseases.

Ferring Pharmaceuticals Woodruff (PI) 02/02/16 - 02/02/18

Agmt 01/11/2016 \$400,000 (Total Costs)

Non-invasive test of egg developmental potential

These studies will test the hypothesis that the quantity of Zn released at fertilization can be used to predict embryo quality and develop methods for quantitative assessment of this Zn release using proprietary non-invasive methods that are compatible with clinical IVF practices.

CURRICULUM VITAE T.K. WOODRUFF

NIH/NIA Woodruff (PI) 07/06/11 – 07/05/15
F30AG040916 \$81,030 (Total Costs)
Mechanical Regulation of Luteal Cell Function in a Tissue-Engineered Model of Ovarian Aging
 The goal of this project is to understand how age-related ovarian fibrosis alters hormone production.

NIH/NICHD Mayo (PI) 09/30/09 - 08/31/14
P01 HD021921 \$6,830,650 (Total Costs)
Signaling Pathways Regulating Ovarian Follicle Formation
 The main goal of this program grant is to investigate signaling pathways by which hormones or other regulatory factors act on the ovary to promote steroidogenesis and the maturation of follicle and germ cells necessary to sustain female fertility. Project III Woodruff (PI) - Transition metal regulation of oocyte maturation Core B Woodruff (PI) - Ovarian Histology.

NIH/NICHD Woodruff (PI/Center Director) 04/23/03 - 3/31/13
5U54 HD041857 \$6,456,973 (Total Costs)
Center for Reproductive Research at Northwestern University
 The goal of this grant is to understand the structure-function relationships between molecules important to the reproductive axis. Administrative Core Woodruff (PI) - Structure-Function Relationship in Reproductive Biology Project I Woodruff (Co-PI) - Follicle Development in Aneuploidy and Aging: 3D Culture Model Project IV Woodruff (PI) - The In-vitro Models of Human Ovarian Follicle-Health and Disease.

NIH/NICHD Woodruff (PI/mentor) 04/01/11 - 03/31/13
3U54 HD041857-09S1 \$163,197 (Total Costs)
Center for Reproductive Research at Northwestern University – Diversity Supplement.

NIH Woodruff (PI) 10/01/07 - 06/30/13
1U54 RR024347
5UL1DE019587 \$6,512,494 (Total Costs)
5RL1HD058295
U54: The Oncofertility Consortium: Fertility Preservation for Women; R01C: Preservation and Growth of Human Follicles
 The main goal of this grant is to focus on the fertility threat posed by cancer treatment and to serve as an authoritative voice for research, clinical practice, and training. **Role: Director/PI**

W.M. Keck Foundation O'Halloran and Woodruff (Co-PIs) 2013-2015
 \$1,668,665 (Total Costs)
The Inorganic Structure of Life: Signaling Pathways in the Mammalian Oocyte
 The purpose of this grant is to develop new technologies that permit examination of inorganic metals in the regulation of oocyte dynamics. **Role: Co-Investigator**

Ferring Pharmaceuticals Woodruff (PI) 07/01/12 - 06/30/13
INF_0088 \$84,000 (Total Costs)
Virtual Grand Rounds at the Oncofertility Consortium
 The goal of this award is to support virtual grand rounds, a live conference feed, and CME credits in conjunction with the Oncofertility Consortium's efforts.

CURRICULUM VITAE T.K. WOODRUFF

- NMF/Evergreen Invitational Woodruff (PI) 09/01/11 - 08/31/13
Agmt 8/29/12 \$39,161 (Total Costs)
Innovative Educational Approaches to Help Women Navigate the Menopause Management Maze
 The goal of this award is to develop a decision aid for women facing the complexity of health care options related to managing menopause.
- Univ. of Pennsylvania/NCI Woodruff (PI/mentor) 07/01/11 - 06/26/13
TL1CA133837 \$56,097 (Total Costs)
Fertility Preservation in Newly Diagnosed Female Cancer Patients
 The goal of this grant is to support fellow Sara Barnato, MD, in research related to preserving fertility options for newly diagnosed female cancer patients.
- NIH Dunaif (PI) 09/27/07 - 07/31/12
K12 HD055884 \$2,500,000 (Total Costs)
Career Development in Women's Health (CDWH)
 The goal of this grant is to establish a BIRCWH Program at Northwestern University. **Role: Co-Director**
- NIH/NICHD Woodruff (PI) 09/30/09 - 09/29/11
3U54 HD041857-07S1 \$220,679 (Total Costs)
Center for Reproductive Research at Northwestern University – ARRA Administrative Supplement
 The goal of this award was to provide resources to accelerate the pace of research of the Center for Reproductive Research at Northwestern University including additional staff assistance and equipment.
- Regional Offices of Women's Health Woodruff (PI) 01/01/11 - 06/30/11
DHHS \$1,950 (Total Costs)
Fit Your Fitness to You: Interactive forum on selecting the right exercise for your personal needs
 The goal of this grant is to support an interactive forum on women's health.
- Alumnae of Northwestern University Woodruff (PI) 09/01/10 - 08/31/11
Alumnae Grant \$12,900 (Total Costs)
Oncofertility Summer Academy
 The goal of this grant is to support the Oncofertility Summer Academy.
- Baxter Healthcare Corporation Shea (PI) 09/01/09 – 08/31/11
 \$110,000 (Total Costs)
Biomaterials and Growth Factors Combination to Facilitate Ovarian Grafts Revascularization and Increase Follicle Survival.
 The goal of this grant was to use biomaterials and growth factor combinations to increase follicle survival. **Role: Co-PD/PI**
- NIH/NICHD Levine (PI) 05/01/04 – 04/30/10
5T32HD007068-30 \$1,481,389 (Total Costs)
Training Program in Reproductive Biology
 The purpose of this program is to train five predoctoral and three postdoctoral fellows in specific areas of reproductive biology, with the framework of an integrated, multidisciplinary program offering a uniquely broad perspective of the reproductive sciences. **Role: Co-Investigator**
- NIH/NICHD Woodruff (PI) 02/01/04 – 01/31/10
5R01HD044464 \$1,529,744 (Total Costs)
Regulation of Reproductive Function by Activin
 The objective of this research proposal is to understand the role of activin in the control of pituitary FSH synthesis.

CURRICULUM VITAE T.K. WOODRUFF

NIH/NICHD Woodruff (PI) 07/05/04 – 06/30/10
5R01HD037096-10 \$1,449,331 (Total Costs)

Inhibin Actions on Reproductive Target Tissues

The objective of this research proposal is to understand the biosynthetic pathways leading to inhibin secretion.

NIH/NIDCR Woodruff (PI) 07/01/09 – 06/30/10
3ULDE019587-03 \$40,000 (Total Costs)

The Effects of GDF9 Levels on TZP Reorganization and Oocyte Competence in Growing Follicles Cultured Alginate

The goals of this pilot study are 1) to evaluate the organization and maintenance of TZPs in growing follicles cultured in our 3D alginate system in mice, primates, and humans and 2) to determine if higher levels of secreted GDF9 correlate with well-organized somatic cell-oocyte interactions, successful follicle growth, and oocyte competency.

Northwestern Memorial Fund Woodruff (PI) 09/01/09 – 08/31/10
NMFF \$27,809 (Total Costs)

Developing an Infectious Disease Module for the Women's Health Science

The goal of this grant is to support the Infectious Disease Summer Academy.

NIH/NICHD Jameson (PI) 09/27/02 – 06/30/07
U01HD043425 \$2,647,192 (Total Costs)

Identify Sex Determination Genes by ENU Mutagenesis

National Institutes of Health / National Institute of Child Health and Human Development

The main goal of this project was to identify key genes that regulate gonadal development and phenotypic sex.

Role: Co-PI

INTELLECTUAL PROPERTY (Issued U.S. or worldwide patents)

- 10,479,980** Artificial ovary. Monica M. Laronda, Alexandra L. Rutz, Ramille N. Shah, Teresa K. Woodruff
- 10,352,925** Composition and methods for the detection of zinc. Emily L. Que, Thomas V. O'Halloran, Teresa K. Woodruff
- 9,695,399** 3D Microphysiologic System. Teresa K. Woodruff; Joanna E. Burdette (UIC); Ji-Yong Julie Kim; Jie Zhu; Sevim Yildiz Arslan; Spiro Getsios; Shuo Xiao
- 9,427,161** Curved Passive Acoustic Driver for Magnetic Resonance Elastography. Samantha By; Timothy Carroll; Gaurav Gadodia; Sumeeth Jonathan; Frank Miller; Mayank Vijayvergia; Teresa K. Woodruff
- 8,772,029** Modulation of oocyte meiotic progression and oocyte activation. Miranda Bernhardt; Alison M. Kim; Betty Kong; Thomas V. O'Halloran; Emily Que; Teresa K. Woodruff.
- 8,580,231** Compositions and methods comprising magnetic resonance contrast agents. Jiyoun Lee; Thomas J. Meade; Preeti A. Sukerkar; Teresa K. Woodruff.
- 6,455,262** Receptor polypeptides and their production and uses. Edward T. Fox; Jennie P. Mather; Mary B. Sliwkowski; Teresa K. Woodruff
- 5,693,534** Enhancement of fertilization capability of oocytes. Baha M. Alak; Richard L. Stouffer; Don P. Wolf; Teresa K. Woodruff

CURRICULUM VITAE T.K. WOODRUFF

- 5,563,059** Use of human inhibin and human activin to increase the number of mature primate oocytes. Baha M. Alak; Richard L. Stouffer; Don P. Wolf; Teresa K. Woodruff
- 5,545,616** Method for predicting and/or preventing preterm labor. Teresa K. Woodruff.
- 5,286,654** Detection and purification of activin polypeptide. Edward T. Fox; Jennie P. Mather; Mary B. Sliwowski; Teresa K. Woodruff
- 5,216,126** Receptor polypeptides and their production and uses. Edward T. Fox; Jennie P. Mather; Mary B. Sliwowski; Teresa K. Woodruff
- 5,102,868** Method for inhibiting follicular maturation. Teresa K. Woodruff; Jennie P. Mather

ACADEMIC AND RESEARCH ADVISING

Research Assistant/Associate Professors (And Current Positions)

- 2008-2018 So-Youn Kim, Ph.D., Assistant Professor, University of Nebraska Medical Center
- 2007-2017 Jie Zhu, M.D. Center Director, University of Michigan
- 2007-2012 Min Xu, MD. Ph.D., Assistant Professor, University of Michigan
- 2009-2014 Francesca Duncan, Ph.D. Assistant Professor, Dept OB/GYN, Northwestern University

Postdoctoral Fellows (And Current Positions)

- 2015-Present Hoi Chang Lee, Ph.D. Northwestern University
- 2018-2020 Hunter B. Rogers, Ph.D., Equity Research Associate, William Blair, Chicago
- 2016-2018 Yuriko Iwahata, M.D. Assistant Professor, St. Marianna University
- 2016-2018 Hideyuki Iwahata, Ph.D., Assistant Professor, St. Marianna University
- 2016-2018 Jaewang Lee, Ph.D., Assistant Prof, Depart of Biomedical Laboratory Sciences, Eulji University, S. Korea
- 2014-2016 Nan Zhang, Ph.D., Embryologist, REI Clinic, Northwestern Medicine
- 2013-2016 Shuo Xiao, Ph.D., Assistant Professor, University of South Carolina
- 2013-2015 Ru Ya, Ph.D., Research Associate, Marquette University
- 2013-2016 Monica Laronda, Ph.D., Assistant Professor, Northwestern University
- 2010-2011 Sarah Rodriguez, Ph.D. Lecturer, Northwestern University
- 2010-2013 Zexu Jiao, Ph.D. Embryologists, UT Austin
- 2010-2011 Miranda Bernhardt, Ph.D., Research Assistant Professor Washington State University
- 2009-2010 Lisa Campo-Engelstein, Ph.D., Associate Professor, Albany Medical College
- 2009-2014 Jessica Hornick, Ph.D., Research Associate, Northwestern University
- 2009-2011 Eugene Galdones, Ph.D. Eugene Galdones Photography
- 2007-2011 Ariella Shikanov, Ph.D., Associate Professor, University of Michigan
- 2010-2011 Alison M. Kim, Ph.D., Senior Director, Research and Innovation, American Gastroenterological Association
- 2008-2010 Jennifer Hirshfeld-Cytron, M.D., Fertility Centers of Illinois
- 2007-2010 Susan Barrett, Ph.D., Medical Liaison, Zeiss
- 2006-2009 Shiyong Jin, Ph.D., Assistant Professor, The Buck Institute
- 2006-2009 Lei Lei, Ph.D., Assistant Professor, The Buck Institute
- 2006-2008 Laxmi Kondapalli, M.D., Clinical Assistant Professor, Ob/Gyn, University of Colorado
- 2006-2007 Sarah Bristol-Gould, Ph.D., Medical Science Liaison, Novartis Oncology
- 2005-2008 Fujio Migishima, Ph.D., Kitasato University School of Medicine, Japan
- 2004-2008 Niti Jetly, Ph.D., Chembiotech, India
- 2004-2007 Thuy-Vy Do, Ph.D., Research Assistant Professor, University of Kansas Medical Center
- 2003-2009 Monica Antenos, Ph.D., Research Scientist/Lab Manager, University of Guelph
- 2003-2008 Joanna Burdette, Ph.D., Professor, Associate Dean for Research, University of Illinois at Chicago

CURRICULUM VITAE T.K. WOODRUFF

2003-2005 Jaesook Roh, Ph.D., Professor, University of Hanyang, South Korea
2003 Suleena Kalra, M.D., Associate Professor, University of Pennsylvania
2000-2005 Thomas Thompson, Ph.D., Professor, University of Cincinnati
1999-2001 Daniel Bernard, Ph.D., Professor, McGill University, Ontario, Canada
1997-2000 Eileen Wang, M.D., Associate Professor, University of Pennsylvania

Visiting Scholars

2017-2018 Geum Joon Cho, Korea University, South Korea
2016-2017 Eunjung Kim, Seoul National University, South Korea
2011-2015 Yogesh Makanji, Ph.D., Monash University, Italy
2013 Marie Lebbe, Ph.D., University of Birmingham, UK
2011-2012 Shenming Zeng, Ph.D., College of Animal Science and Technology, China Agricultural University
2005-2006 Fugio Migishima, Kitatsato University School of Medicine, Japan

Graduate Students (And Current Positions)

2016-Present Yu-Ying Chen
2016-2020 Emma Gargus (MSTP)
2015-Present Jiyang Zhang
2015-2020 Maxwell Edmonds (MSTP)
2014-2018 Hunter B. Rogers, Ph.D., William Blair, Chicago
2014-2018 Kelly McKinnon, Ph.D., Postdoctoral Fellow, Laronda Lab, Northwestern University
2014-2016 Peter Rios, Ph.D., Research Assistant Professor, UIC (co-mentored with Lonnie Shea)
2010-2014 Marilia Cordeiro, Ph.D., Postdoctoral Fellow Edinburgh
2010-2013 Robin Skory, M.D. Ph.D., (MSTP) Fellow, University of Pennsylvania
2009-2013 Betty Kong, M.D. Ph.D., (MSTP) Clinical Faculty, Northwestern University
2008-2013 Anaar Eastoak-Siletz, Ph.D., General Surgery Resident, UCLA (co-mentored with Lonnie Shea)
2009-2013 Beatriz Penalver Bernabé, Ph.D., Assistant Professor, UIC (co-mentored with Lonnie Shea)
2008-2013 David Tagler, Ph.D., Biomedical Engineer, Veterans Health Administration
2008-2011 Miranda Bernhardt, Ph.D., NIEHS, Raleigh-Durham, North Carolina
2006-2008 Elizabeth Parrish, Ph.D., Regulatory Program Manager, Genentech, Inc.
2006-2010 Alison Kim, Ph.D., Senior Director, Research and Innovation, American Gastroenterological Association
2006-2010 Candace Tinggen, Ph.D., Program Officer, NIH, Bethesda, Maryland
2005-2010 Shou-Yen Jack Lin, Ph.D., Scientist, CytomX Therapeutics
2003-2008 Erin West, Ph.D., Senior Scientist II, Abbott Laboratories (co-mentored with Lonnie Shea)
2003-2007 Thomas Lerch, Ph.D., Principal Scientist, Pfizer
2002-2008 Pamela Kreeger, Ph.D., Professor, University of Wisconsin (co-mentored with Lonnie Shea)
2002-2005 Robert Cook, Ph.D., Kelsey-Seybold Clinic
2001-2003 Jacqueline Jeruss, M.D. Ph.D., Associate Professor, University of Michigan
1999-2002 Stephanie Pangas, Ph.D., Associate Professor, Baylor College of Medicine
1999-2005 Hilary Kenny, Ph.D., Research Associate Professor, University of Chicago
1999-2005 Magdalena Suszko, Ph.D., Principal Scientist, Abbott Laboratories
1998-2003 Jose Santiago, Ph.D., Senior Director, Abbott Laboratories
1998-2003 Stacey Chapman Tobin, Ph.D., Biomedical Writer and Editor, The Tobin Touch, Inc.

Masters Students

2018-2020 Emily Hayes, MS-RSM
2017-2019 Julia Balough, MS-RSM
2016-2018 Megan Runge, MS-RSM
2016-2018 Yi Luan, MS-RSM

CURRICULUM VITAE T.K. WOODRUFF

2016-2017 Yaqi Zhang, MS Biotechnology
 2016-2017 Rhitwika Sensharma, MS Biotechnology
 2016-2017 Mingjun Liu
 2015-2016 Jiyang Zhang, MS Biotechnology
 2014-2015 Kuan-Wei Chen
 2013-2015 Mingyang Jiang, MS Biotechnology
 2013-2015 Catherine Nguyen, MS Biotechnology
 2012-2014 Yuanming Xu, MS Biotechnology
 2011-2012 Lu Bai, MS Communication
 1999-2003 Jolee Gitch, MS

*Undergraduate Students (*Honors)*

2017-2019 Emily Zaniker*
 2012-2013 Chloe Harrington
 2011-2013 Jared Cho
 2011-2013 Raymond Lee
 2009-2013 Jessina Thomas*
 2010-2011 Lidia Spaho*
 2010 Kiran Sreenivas
 2009-2011 Cristina Thomas*
 2009 Andrew Russell*
 2009 Katarzyna Kadela*
 2008 Margaret Nevriy*
 2006-2008 Anna Banc *
 2006-2007 Cory Waxman*
 2006 Rachel Oliver
 2005-2007 Victoria Ulyanov*

2005-2007 Supreeti Behuria*
 2005-2007 Monica Gomberg*
 2005-2007 Nimarta Singh*
 2005 Quantez Freeman
 2004-2006 Carrie Nieman*
 2004-2006 Anjali Malipatil*
 2003-2005 Sarah Kurley*
 2002-2004 Daniel Balkin*
 2002-2003 Sudhi Kurup*
 2000-2001 Jennifer Chuy*
 2000-2002 Cathy Randall*
 2000-2002 Denise Lo*
 1999-2001 Eva Ma*
 1999-2000 Wei-Woon*
 1997-1999 Diego Abdelnur
 1995-1997 Elbert Lee

Research Technicians

2019-Present Camille Mulcahy
 2017-Present Kristine Moss
 2017-Present Sarah Wagner
 2019-Present Leah Simon, MS
 2018-2019 Allison Grover
 2013-2019 Keisha Barreto
 2016-2017 Christine Will
 2016-2017 Nikolina Madjer
 2014-2017 Danijela Dokic, MD
 2014-2017 Alexandra Rashedi
 2015-2017 Chanel Murray
 2005-2010 Tyler Wellington
 2007 Rika Migishima
 2005-2006 Samantha Thaver
 2001-2003 Jaroslav Jelen
 1996-1999 Huiru Chong

2012-2017 Megan Romero
 2013-2014 Alexander Gunn
 2012-2016 Kelly Whelan
 2011-2014 Katy Ebbert
 2011-2014 Jennifer Pahnke
 2010-2012 Lizbeth Gutierrez
 2010-2012 Dragan Mackovic
 2006-2011 Sarah Kiesewetter
 2007-2010 Jennifer Jozefik
 2005-2010 Lara Hildebrand
 2008-2010 Erin Jackson

 2005-2006 Michelle Harwerth
 2003-2005 Andrew Lisowski
 2002-2005 Christina Hutten
 2001-2002 Maura Lane
 1995-1999 Brad Draper

PUBLICATIONS

1. Adam SA, Nakagawa T, Swanson MS, Woodruff TK, Dreyfuss G. mRNA polyadenylate-binding protein: gene isolation and sequencing and identification of a ribonucleoprotein consensus sequence. *Mol Cell Biol.* 1986;6(8):2932-43. PubMed PMID: 3537727; PMCID: PMC367862.
2. Woodruff TK, Meunier H, Jones PB, Hsueh AJ, Mayo KE. Rat inhibin: molecular cloning of alpha- and beta-subunit complementary deoxyribonucleic acids and expression in the ovary. *Mol Endocrinol.* 1987;1(8):561-8. doi: 10.1210/mend-1-8-561. PubMed PMID: 3153478.
3. Woodruff TK, D'Agostino J, Schwartz NB, Mayo KE. Dynamic changes in inhibin messenger RNAs in rat ovarian follicles during the reproductive cycle. *Science.* 1988;239(4845):1296-9. PubMed PMID: 3125611.
4. D'Agostino J, Woodruff TK, Mayo KE, Schwartz NB. Unilateral ovariectomy increases inhibin messenger ribonucleic acid levels in newly recruited follicles. *Endocrinology.* 1989;124(1):310-7. doi: 10.1210/endo-124-1-310. PubMed PMID: 2491806.
5. Woodruff TK, D'Agostino J, Schwartz NB, Mayo KE. Decreased inhibin gene expression in preovulatory follicles requires primary gonadotropin surges. *Endocrinology.* 1989;124(5):2193-9. doi: 10.1210/endo-124-5-2193. PubMed PMID: 2495926.
6. Woodruff TK, D'Agostino J, Schwartz NB, Mayo KE. Modulation of rat inhibin mRNAs in preovulatory and atretic follicles. In: Hirshfield AN, editor. *Growth Factors and the Ovary.* Boston, MA: Springer US; 1989. p. 291-5.
7. Mather JP, Attie KM, Woodruff TK, Rice GC, Phillips DM. Activin stimulates spermatogonial proliferation in germ-Sertoli cell cocultures from immature rat testis. *Endocrinology.* 1990;127(6):3206-14. doi: 10.1210/endo-127-6-3206. PubMed PMID: 2249646.
8. Woodruff TK, Lyon RJ, Hansen SE, Rice GC, Mather JP. Inhibin and activin locally regulate rat ovarian folliculogenesis. *Endocrinology.* 1990;127(6):3196-205. doi: 10.1210/endo-127-6-3196. PubMed PMID: 2123449.
9. Woodruff TK, Mayo KE. Regulation of inhibin synthesis in the rat ovary. *Annu Rev Physiol.* 1990;52:807-21. doi: 10.1146/annurev.ph.52.030190.004111. PubMed PMID: 2184777.
10. Woodruff TK, Mather JP. Inhibin and activin are follicular maturation regulators. In: Adashi EY, Mancuso S (eds). *Major Advances in Human Female Reproduction.* New York: Raven Press; 1990. v.73; p.123-129.
11. Woodruff TK, Ackland J, Rahal JO, Schwartz NB, Mayo KE. Expression of ovarian inhibin during pregnancy in the rat. *Endocrinology.* 1991;128(3):1647-54. doi: 10.1210/endo-128-3-1647. PubMed PMID: 1900234.
12. Woodruff TK, Battaglia J, Borree J, Rice GC, Mather JP. Labeling inhibin and identifying inhibin binding to cell surface receptors. *Methods Enzymol.* 1991;198:347-58. PubMed PMID: 1649953.
13. Brannian JD, Woodruff TK, Mather JP, Stouffer RL. Activin-A inhibits progesterone production by macaque luteal cells in culture. *J Clin Endocrinol Metab.* 1992;75(3):756-61. doi: 10.1210/jcem.75.3.1517365. PubMed PMID: 1517365.
14. Mather JP, Woodruff TK, Krummen LA. Paracrine regulation of reproductive function by inhibin and activin. *Proc Soc Exp Biol Med.* 1992;201(1):1-15. PubMed PMID: 1326766.

15. Petraglia F, Woodruff TK, Botticelli G, Botticelli A, Genazzani AR, Mayo KE, Vale W. Gonadotropin-releasing hormone, inhibin, and activin in human placenta: evidence for a common cellular localization. *J Clin Endocrinol Metab.* 1992;74(5):1184-8. doi: 10.1210/jcem.74.5.1569165. PubMed PMID: 1569165.
16. Woodruff TK, Borree J, Attie KM, Cox ET, Rice GC, Mather JP. Stage-specific binding of inhibin and activin to subpopulations of rat germ cells. *Endocrinology.* 1992;130(2):871-81. doi: 10.1210/endo.130.2.1310280. PubMed PMID: 1310280.
17. Jakeman L, Mather J, Woodruff T. In vitro ligand binding of 125I-recombinant human activin A to the female rat brain. *Endocrinology.* 1992;131(6):3117-9. Epub 1992/12/01. doi: 10.1210/endo.131.6.1446646. PubMed PMID: 1446646.
18. Woodruff TK, Lyon R, Hansen S, Mather JP. 125I-recombinant human activin A accumulates in the ovary of the immature female rat following intravenous injection. In: Bouchard P, Caraty A, Bennink HJTC, and Pavlou SN (Eds). *GnRH, GnRH Analogs, Gonadotropins and Gonadal Peptides.* CRC Press; 1993. p. 529-534.
19. Woodruff TK, Battaglia J, Mather JP. Regulation of human granulosa cells by recombinant human activin A and recombinant human inhibin A. In: Mornex R, Jaffiol C, Leclere J (Eds). *Progress in Endocrinology: The Proceedings of the Ninth International Congress on Endocrinology, Nice 1992.* 1992. The Parthenon Publishing Group: p. 605-607.
20. Mather JP, Krummen LA, Woodruff TK. Activin, inhibin and follistatin: Paracrine regulators of testicular function. In: Mornex R, Jaffiol C, Leclere J (Eds). *Progress in Endocrinology: The Proceedings of the Ninth International Congress on Endocrinology, Nice 1992.* 1992. The Parthenon Publishing Group: p.1-5.
21. Baly DL, Allison DE, Krummen LA, Woodruff TK, Soules MR, Chen SA, Fendly BM, Bald LN, Mathers JP, Lucas C. Development of a specific and sensitive two-site enzyme-linked immunosorbent assay for measurement of inhibin-A in serum. *Endocrinology.* 1993;132(5):2099-108. doi: 10.1210/endo.132.5.8477659. PubMed PMID: 8477659.
22. Cataldo NA, Woodruff TK, Giudice LC. Regulation of insulin-like growth factor binding protein production by human luteinizing granulosa cells cultured in defined medium. *J Clin Endocrinol Metab.* 1993;76(1):207-15. doi: 10.1210/jcem.76.1.7678423. PubMed PMID: 7678423.
23. Krummen LA, Woodruff TK, DeGuzman G, Cox ET, Baly DL, Mann E, Garg S, Wong WL, Cossum P, Mather JP. Identification and characterization of binding proteins for inhibin and activin in human serum and follicular fluids. *Endocrinology.* 1993;132(1):431-43. doi: 10.1210/endo.132.1.7678220. PubMed PMID: 7678220.
24. Stouffer RL, Woodruff TK, Dahl KD, Hess DL, Mather JP, Molskness TA. Human recombinant activin-A alters pituitary luteinizing hormone and follicle-stimulating hormone secretion, follicular development, and steroidogenesis, during the menstrual cycle in rhesus monkeys. *J Clin Endocrinol Metab.* 1993;77(1):241-8. doi: 10.1210/jcem.77.1.8325947. PMID: 8325947.
25. Woodruff TK, Battaglia J, Bowdidge A, Molskness TA, Stouffer RL, Cataldo NA, Giudice LC, Orly J, Mather JP. Comparison of functional response of rat, macaque, and human ovarian cells in hormonally defined medium. *Biol Reprod.* 1993;48(1):68-76. PubMed PMID: 8418917.
26. Wong WL, Garg SJ, Woodruff T, Bald L, Fendly B, Lofgren JA. Monoclonal antibody based ELISAs for measurement of activins in biological fluids. *J Immunol Methods.* 1993;165(1):1-10. Epub 1993/09/27. PubMed PMID: 8409460.

27. Woodruff TK, Krummen L, Chen SA, Lyon R, Hansen SE, DeGuzman G, Covello R, Mather J, Cossum P. Pharmacokinetic profile of recombinant human (rh) inhibin A and activin A in the immature rat. II. Tissue distribution of [125I]rh-inhibin A and [125I]rh-activin A in immature female and male rats. *Endocrinology*. 1993;132(2):725-34. doi: 10.1210/endo.132.2.8425491. PubMed PMID: 8425491.
28. Woodruff TK, Krummen L, McCray G, Mather JP. In situ ligand binding of recombinant human [125I] activin-A and recombinant human [125I]inhibin-A to the adult rat ovary. *Endocrinology*. 1993;133(6):2998-3006. doi: 10.1210/endo.133.6.8243328. PubMed PMID: 8243328.
29. Woodruff TK, Krummen LA, Chen S, DeGuzman G, Lyon R, Baly DL, Allison DE, Garg S, Wong WL, Hebert N, et al. Pharmacokinetic profile of recombinant human (rh) inhibin A and activin A in the immature rat. I. Serum profile of rh- inhibin A and rh-activin A in the immature female rat. *Endocrinology*. 1993;132(2):715-24. doi: 10.1210/endo.132.2.8425490. PubMed PMID: 8425490.
30. Woodruff TK, Krummen LA, Lyon RJ, Stocks DL, Mather JP. Recombinant human inhibin A and recombinant human activin A regulate pituitary and ovarian function in the adult female rat. *Endocrinology*. 1993;132(6):2332-41. doi: 10.1210/endo.132.6.8504739. PubMed PMID: 8504739.
31. Woodruff TK, Krummen L, Baly D, Garg S, Allison D, Sadick M, Wong W, Mather J, Soules M. Quantitative two-site enzyme-linked immunosorbent assays for inhibin A, activin A and activin B. *Hum Reprod*. 1993;8 Suppl 2:133-7. Epub 1993/11/01. PubMed PMID: 8276947.
32. Petraglia F, Garg S, Florio P, Sadick M, Gallinelli A, Wong WL, Krummen L, Comitini G, Mather JP, Woodruff TK. Activin A and activin B measured in maternal serum, cord blood serum and amniotic fluid during human pregnancy. *Endocr J* 1993. 1:323-327.
33. Mather JP, Krummen L, Roberts P, Baly D, Woodruff TK. Inhibin, activin and their binding proteins: Paracrine regulators of testicular function. In: Whitcomb R (Eds). *Understanding Male Infertility: Basic and Clinical Approaches*. 1993. Raven Press: p. 67-80.
34. Woodruff TK, Krummen L, Baly D, Wong WL, Garg S, Sadick M, Davis G, Soules MR, Mather JP. Inhibin and activin measured in human serum. *Human Reproduction*. 1993. Oxford; Washington, DC.
35. Krummen LA, Moore A, Woodruff TK, Covello R, Taylor R, Working P, Mather JP. Localization of inhibin and activin binding sites in the testis during development by in situ ligand binding. *Biol Reprod*. 1994;50(4):734-44. PubMed PMID: 8199254.
36. Stouffer RL, Dahl KD, Hess DL, Woodruff TK, Mather JP, Molskness TA. Systemic and intraluteal infusion of inhibin A or activin A in rhesus monkeys during the luteal phase of the menstrual cycle. *Biol Reprod*. 1994;50(4):888-95. PubMed PMID: 8199268.
37. Woodruff TK, Molskness TA, Dahl KD, Mather JP, Stouffer RL. The effect of exogenous recombinant human activin A on pituitary and ovarian hormone secretion and ovarian folliculogenesis in female rats and monkeys. In: Filicori M, Flamigni C (Eds). *Ovulation Induction: Basic Science and Clinical Advances*. 1994. Elsevier Science: BV p. 57-63
38. Gallinelli A, DeVita D, Aguzzoli L, Forio P, Ferrari AR, Genazzani AD, Sgherzi MR, DiCarlo C, Woodruff TK, Petraglia F. Placental activin and inhibin: new hormones in human pregnancy. In: Cosmi EV, Di Renzo (Eds). *Current Progress in Perinatal Medicine; The Proceedings of the 2nd World Congress of Perinatal Medicine, Rome and Florence, 19-24 September, 1993*. 1994. The Parthenon Publishing Group: p.469-477.

39. Petraglia F, De Vita D, Gallinelli A, Aguzzoli L, Genazzani AR, Romero R, Woodruff TK. Abnormal concentration of maternal serum activin-A in gestational diseases. *J Clin Endocrinol Metab.* 1995;80(2):558-61. doi: 10.1210/jcem.80.2.7852520. PubMed PMID: 7852520.
40. Woodruff TK, Mather JP. Inhibin, activin and the female reproductive axis. *Annu Rev Physiol.* 1995;57:219-44. doi: 10.1146/annurev.ph.57.030195.001251. PubMed PMID: 7778866.
41. Petraglia F, Aguzzoli L, Gallinelli A, Florio P, Zonca M, Benedetto C, Woodruff TK. Hypertension in pregnancy: changes in activin A maternal serum concentration. *Placenta.* 1995;16(5):447-54. Epub 1995/07/01. PubMed PMID: 7479615.
42. Alak BM, Smith GD, Woodruff TK, Stouffer RL, Wolf DP. Enhancement of primate oocyte maturation and fertilization in vitro by inhibin A and activin A. *Fertil Steril.* 1996;66(4):646-53. PubMed PMID: 8816632.
43. Coerver KA, Woodruff TK, Finegold MJ, Mather J, Bradley A, Matzuk MM. Activin signaling through activin receptor type II causes the cachexia-like symptoms in inhibin-deficient mice. *Mol Endocrinol.* 1996;10(5):534-43. doi: 10.1210/mend.10.5.8732684. PubMed PMID: 8732684.
44. Gallinelli A, Gallo R, Genazzani AD, Matteo ML, Caruso A, Woodruff TK, Petraglia F. Episodic secretion of activin A in pregnant women. *Eur J Endocrinol.* 1996;135(3):340-4. PubMed PMID: 8890726.
45. Molskness TA, Woodruff TK, Hess DL, Dahl KD, Stouffer RL. Recombinant human inhibin-A administered early in the menstrual cycle alters concurrent pituitary and follicular, plus subsequent luteal, function in rhesus monkeys. *J Clin Endocrinol Metab.* 1996;81(11):4002-6. doi: 10.1210/jcem.81.11.8923851. PubMed PMID: 8923851.
46. Roberts VJ, Bentley CA, Guo Q, Matzuk MM, Woodruff TK. Tissue-specific binding of radiolabeled activin A by activin receptors and follistatin in postimplantation rat and mouse embryos. *Endocrinology.* 1996;137(10):4201-9. doi: 10.1210/endo.137.10.8828478. PubMed PMID: 8828478.
47. Woodruff TK, Besecke LM, Groome N, Draper LB, Schwartz NB, Weiss J. Inhibin A and inhibin B are inversely correlated to follicle-stimulating hormone, yet are discordant during the follicular phase of the rat estrous cycle, and inhibin A is expressed in a sexually dimorphic manner. *Endocrinology.* 1996;137(12):5463-7. doi: 10.1210/endo.137.12.8940372. PubMed PMID: 8940372.
48. Robertson D, Burger HG, Sullivan J, Cahir N, Groome N, Poncelet E, Franchimont P, Woodruff TK, Mather JP. Biological and immunological characterization of inhibin forms in human plasma. *J Clin Endocrinol Metab.* 1996;81(2):669-76. Epub 1996/02/01. doi: 10.1210/jcem.81.2.8636287. PubMed PMID: 8636287.
49. Besecke LM, Guendner MJ, Sluss PA, Polak AG, Woodruff TK, Jameson JL, Bauer-Dantoin AC, Weiss J. Pituitary follistatin regulates activin-mediated production of follicle-stimulating hormone during the rat estrous cycle. *Endocrinology.* 1997;138(7):2841-8. doi: 10.1210/endo.138.7.5279. PubMed PMID: 9202226.
50. Draper LB, Chong H, Wang E, Woodruff TK. The uterine myometrium is a target for increased levels of activin A during pregnancy. *Endocrinology.* 1997;138(7):3042-6. doi: 10.1210/endo.138.7.5231. PubMed PMID: 9202250.
51. Lindheimer MD, Woodruff TK. Activin A, inhibin A, and pre-eclampsia. *Lancet.* 1997;349(9061):1266-7. doi: 10.1016/S0140-6736(05)62502-0. PubMed PMID: 9142057.

52. Petraglia F, Di Blasio AM, Florio P, Gallo R, Genazzani AR, Woodruff TK, Vale W. High levels of fetal membrane activin beta A and activin receptor IIB mRNAs and augmented concentration of amniotic fluid activin A in women in term or preterm labor. *J Endocrinol.* 1997;154(1):95-101. PubMed PMID: 9246942.
53. Shou W, Woodruff TK, Matzuk MM. Role of androgens in testicular tumor development in inhibin-deficient mice. *Endocrinology.* 1997;138(11):5000-5. doi: 10.1210/endo.138.11.5499. PubMed PMID: 9348231.
54. Stock AE, Woodruff TK, Smith LC. Effects of inhibin A and activin A during in vitro maturation of bovine oocytes in hormone- and serum-free medium. *Biol Reprod.* 1997;56(6):1559-64. PubMed PMID: 9166710.
55. Woodruff TK, Sluss P, Wang E, Janssen I, Mersol-Barg MS. Activin A and follistatin are dynamically regulated during human pregnancy. *J Endocrinol.* 1997;152(2):167-74. PubMed PMID: 9071973.
56. Draper LB, Matzuk MM, Roberts VJ, Cox E, Weiss J, Mather JP, Woodruff TK. Identification of an inhibin receptor in gonadal tumors from inhibin alpha-subunit knockout mice. *J Biol Chem.* 1998;273(1):398-403. PubMed PMID: 9417095.
57. Woodruff TK. Cellular localization of mRNA and protein: in situ hybridization histochemistry and in situ ligand binding. *Methods Cell Biol.* 1998;57:333-51. PubMed PMID: 9648114
58. Woodruff TK. Regulation of cellular and system function by activin. *Biochem Pharmacol.* 1998;55(7):953-63. PubMed PMID: 9605419.
59. Guo Q, Kumar TR, Woodruff T, Hadsell LA, DeMayo FJ, Matzuk MM. Overexpression of mouse follistatin causes reproductive defects in transgenic mice. *Mol Endocrinol.* 1998;12(1):96-106. Epub 1998/01/24. doi: 10.1210/mend.12.1.0053. PubMed PMID: 9440814.
60. Santiago JY, Woodruff TK. Participation of inhibin and activin in the pathology of epithelial ovarian cancer. 1999. *The Journal of the Robert H. Lurie Comprehensive Cancer Center VII*:11-18.
61. Frias AE, Jr., Li H, Keeney GL, Podratz KC, Woodruff TK. Preoperative serum level of inhibin A is an independent prognostic factor for the survival of postmenopausal women with epithelial ovarian carcinoma. *Cancer.* 1999;85(2):465-71. PubMed PMID: 10023716.
62. Kumar TR, Palapattu G, Wang P, Woodruff TK, Boime I, Byrne MC, Matzuk MM. Transgenic models to study gonadotropin function: the role of follicle-stimulating hormone in gonadal growth and tumorigenesis. *Mol Endocrinol.* 1999;13(6):851-65. doi: 10.1210/mend.13.6.0297. PubMed PMID: 10379885.
63. Wang EY, Draper LB, Lee E, Polak A, Sluss P, Weiss J, Woodruff TK. Identification of naturally occurring follistatin complexes in human biological fluids. *Biol Reprod.* 1999;60(1):8-13. PubMed PMID: 9858480.
64. Woodruff TK. Hope, hypothesis, and the inhibin receptor. Does specific inhibin binding suggest there is a specific inhibin receptor? *Endocrinology.* 1999;140(1):3-5. doi: 10.1210/endo.140.1.6547. PubMed PMID: 9886799.
65. Brown CW, Houston-Hawkins DE, Woodruff TK, Matzuk MM. Insertion of *Inhbb* into the *Inhba* locus rescues the *Inhba*- null phenotype and reveals new activin functions. *Nat Genet.* 2000;25(4):453-7. doi: 10.1038/78161. PubMed PMID: 10932194.

66. Chen W, Woodruff TK, Mayo KE. Activin A-induced HepG2 liver cell apoptosis: involvement of activin receptors and smad proteins. *Endocrinology*. 2000;141(3):1263-72. doi: 10.1210/endo.141.3.7361. PubMed PMID: 10698204.
67. Chong H, Pangas SA, Bernard DJ, Wang E, Gitch J, Chen W, Draper LB, Cox ET, Woodruff TK. Structure and expression of a membrane component of the inhibin receptor system. *Endocrinology*. 2000;141(7):2600-7. doi: 10.1210/endo.141.7.7540. PubMed PMID: 10875264.
68. Klein NA, Battaglia DE, Woodruff TK, Padmanabhan V, Giudice LC, Bremner WJ, Soules MR. Ovarian follicular concentrations of activin, follistatin, inhibin, insulin-like growth factor I (IGF-I), IGF-II, IGF-binding protein-2 (IGFBP-2), IGFBP-3, and vascular endothelial growth factor in spontaneous menstrual cycles of normal women of advanced reproductive age. *J Clin Endocrinol Metab*. 2000;85(12):4520-5. doi: 10.1210/jcem.85.12.7056. PubMed PMID: 11134102.
69. Pangas SA, Woodruff TK. Activin signal transduction pathways. *Trends Endocrinol Metab*. 2000;11(8):309-14. PubMed PMID: 10996525.
70. Woodruff TK. Activin. 2000. *Cytokine Reference*. Academic Press; Elsevier. p. 819-828.
71. Bernard DJ, Woodruff TK. Genetic approaches to the study of pituitary follicle-stimulating hormone regulation. In: Matzuk M, Brown CW, Kumar TR (Eds). *Contemporary Endocrinology: Transgenics in Endocrinology*. 2001. Humana Press Inc. p. 297-317.
72. Bernard DJ, Chapman SC, Woodruff TK. An emerging role for co-receptors in inhibin signal transduction. *Mol Cell Endocrinol*. 2001;180(1-2):55-62. PubMed PMID: 11451572.
73. Bernard DJ, Chapman SC, Woodruff TK. Mechanisms of inhibin signal transduction. *Recent Prog Horm Res*. 2001;56:417-50. PubMed PMID: 11237224.
74. Bernard DJ, Woodruff TK. Inhibin binding protein in rats: alternative transcripts and regulation in the pituitary across the estrous cycle. *Mol Endocrinol*. 2001;15(4):654-67. doi: 10.1210/mend.15.4.0630. PubMed PMID: 11266515.
75. Chapman SC, Woodruff TK. Modulation of activin signal transduction by inhibin B and inhibin-binding protein (INhBP). *Mol Endocrinol*. 2001;15(4):668-79. doi: 10.1210/mend.15.4.0616. PubMed PMID: 11266516.
76. Bernard DJ, Chapman SC, Woodruff TK. Inhibin binding protein (InhBP/p120), betaglycan, and the continuing search for the inhibin receptor. *Mol Endocrinol*. 2002;16(2):207-12. doi: 10.1210/mend.16.2.0783. PubMed PMID: 11818494.
77. Chapman SC, Bernard DJ, Jelen J, Woodruff TK. Properties of inhibin binding to betaglycan, InhBP/p120 and the activin type II receptors. *Mol Cell Endocrinol*. 2002;196(1-2):79-93. PubMed PMID: 12385827.
78. Kenny HA, Bernard DJ, Horton TH, Woodruff TK. Photoperiod-dependent regulation of inhibin in Siberian hamsters: II. Regulation of inhibin production and secretion by pregnant mare serum gonadotropin. *J Endocrinol*. 2002;174(1):85-94. PubMed PMID: 12098666.
79. Kenny HA, Bernard DJ, Horton TH, Woodruff TK. Photoperiod-dependent regulation of inhibin in Siberian hamsters: I. Ovarian inhibin production and secretion. *J Endocrinol*. 2002;174(1):71-83. PubMed PMID: 12098665.

80. Narula A, Kilen S, Ma E, Kroeger J, Goldberg E, Woodruff TK. Smad4 overexpression causes germ cell ablation and leydig cell hyperplasia in transgenic mice. *Am J Pathol.* 2002;161(5):1723-34. doi: 10.1016/S0002-9440(10)64449-5. PubMed PMID: 12414519; PMCID: PMC1850786.
81. Pangas SA, Rademaker AW, Fishman DA, Woodruff TK. Localization of the activin signal transduction components in normal human ovarian follicles: implications for autocrine and paracrine signaling in the ovary. *J Clin Endocrinol Metab.* 2002;87(6):2644-57. doi: 10.1210/jcem.87.6.8519. PubMed PMID: 12050229.
82. Pangas SA, Woodruff TK. Production and purification of recombinant human inhibin and activin. *J Endocrinol.* 2002;172(1):199-210. PubMed PMID: 11786387.
83. Wang EY, Woodruff TK, Moawad A, National Institute of Child H, Human Development M-FMUN. Follistatin-free activin A is not associated with preterm birth. *Am J Obstet Gynecol.* 2002;186(3):464-9. PubMed PMID: 11904608.
84. Woodruff TK. Role of inhibins and activins in ovarian cancer. *Cancer Treat Res.* 2002;107:293-302. PubMed PMID: 11775457.
85. Pangas SA, Woodruff TK. Physiology and pathophysiology of inhibin. *Clinical Laboratory International.* 2002. 26:14-17.
86. Chapman SC, Woodruff TK. Cytokines, growth factors, and their receptors. In: Fauser BCJM (Eds). *Reproductive Medicine: Molecular, Cellular and Genetic Fundamentals.* 2002. CRC Press-Parthenon Publishers, p. 295-312.
87. Bernard DJ, Burns KH, Haupt B, Matzuk MM, Woodruff TK. Normal reproductive function in InhBP/p120-deficient mice. *Mol Cell Biol.* 2003;23(14):4882-91. PubMed PMID: 12832474; PMCID: PMC162213.
88. Chapman SC, Woodruff TK. Betaglycan localization in the female rat pituitary: implications for the regulation of follicle-stimulating hormone by inhibin. *Endocrinology.* 2003;144(12):5640-9. doi: 10.1210/en.2003-0670. PubMed PMID: 14500575.
89. Houmard BS, Hansen KA, Woodruff TK, Sluss PM, Bremner WJ, Soules MR, Klein NA. Age-related analysis of inhibin A and B relative to the intercycle monotropic FSH rise in normal ovulatory women. *Ann Endocrinol (Paris).* 2003;64(2):86. PubMed PMID: 12773938.
90. Jeruss JS, Santiago JY, Woodruff TK. Localization of activin and inhibin subunits, receptors and SMADs in the mouse mammary gland. *Mol Cell Endocrinol.* 2003;203(1-2):185-96. PubMed PMID: 12782414.
91. Jeruss JS, Sturgis CD, Rademaker AW, Woodruff TK. Down-regulation of activin, activin receptors, and Smads in high-grade breast cancer. *Cancer Res.* 2003;63(13):3783-90. PubMed PMID: 12839974.
92. Kreeger PK, Woodruff TK, Shea LD. Murine granulosa cell morphology and function are regulated by a synthetic Arg-Gly-Asp matrix. *Mol Cell Endocrinol.* 2003;205(1-2):1-10. PubMed PMID: 12890562.
93. Pangas SA, Saudye H, Shea LD, Woodruff TK. Novel approach for the three-dimensional culture of granulosa cell-oocyte complexes. *Tissue Eng.* 2003;9(5):1013-21. doi: 10.1089/107632703322495655. PubMed PMID: 14633385.
94. Chapman SC, Kenny HA, Woodruff TK. Activin, inhibin and follistatin in ovarian physiology. In: Leung PCK, Adashi EY (Eds). *The Ovary, second edition.* 2003. Elsevier, Chapter 16: p.273-287.
95. Suszko MI, Lo DJ, Suh H, Camper SA, Woodruff TK. Regulation of the rat follicle-stimulating hormone beta-subunit promoter by activin. *Mol Endocrinol.* 2003;17(3):318-32. doi: 10.1210/me.2002-0081. PubMed PMID: 12554780.

96. Thompson TB, Woodruff TK, Jardetzky TS. Structures of an ActRIIB:activin A complex reveal a novel binding mode for TGF-beta ligand:receptor interactions. *EMBO J.* 2003;22(7):1555-66. doi: 10.1093/emboj/cdg156. PubMed PMID: 12660162; PMCID: PMC152900.
97. Wang EY, Ma EY, Woodruff TK. Activin signal transduction in the fetal rat adrenal gland and in human H295R cells. *Endocrinol.* 2003;178(1):137-48. PubMed PMID: 12844345.
98. Bernard DJ, Woodruff TK, Plant TM. Cloning of a novel inhibin alpha cDNA from rhesus monkey testis. *Reprod Biol Endocrinol.* 2004;2:71. doi: 10.1186/1477-7827-2-71. PubMed PMID: 15471543; PMCID: PMC526212.
99. Bristol SK, Woodruff TK. Follicle-restricted compartmentalization of transforming growth factor beta superfamily ligands in the feline ovary. *Biol Reprod.* 2004;70(3):846-59. doi: 10.1095/biolreprod.103.021857. PubMed PMID: 14656728.
100. Cook RW, Thompson TB, Jardetzky TS, Woodruff TK. Molecular biology of inhibin action. *Semin Reprod Med.* 2004;22(3):269-76. doi: 10.1055/s-2004-831902. PubMed PMID: 15319829.
101. Klein NA, Houmard BS, Hansen KR, Woodruff TK, Sluss PM, Bremner WJ, Soules MR. Age-related analysis of inhibin A, inhibin B, and activin a relative to the intercycle monotropic follicle-stimulating hormone rise in normal ovulatory women. *J Clin Endocrinol Metab.* 2004;89(6):2977-81. doi: 10.1210/jc.2003-031515. PubMed PMID: 15181087.
102. Phillips DJ, Woodruff TK. Inhibin: actions and signalling. *Growth Factors.* 2004;22(1):13-8. PubMed PMID: 15176454.
103. Thompson TB, Cook RW, Chapman SC, Jardetzky TS, Woodruff TK. Beta A versus beta B: is it merely a matter of expression? *Mol Cell Endocrinol.* 2004;225(1-2):9-17. doi: 10.1016/j.mce.2004.02.007. PubMed PMID: 15451562.
104. Tomic D, Miller KP, Kenny HA, Woodruff TK, Hoyer P, Flaws JA. Ovarian follicle development requires Smad3. *Mol Endocrinol.* 2004;18(9):2224-40. doi: 10.1210/me.2003-0414. PubMed PMID: 15192076.
105. Lin L, Woodruff TK, Acherman JC. Gonads, Gonadatropic Axis: Physiology & Diseases. In *Yearbook in Pediatric Endocrinology.* 2004. Karger. p.143-156.
106. Lin L, Woodruff TK, Acherman JC. Reproductive Endocrinology. In *Yearbook in Pediatric Endocrinology.* 2005. Karger. p. 89-118.
107. Bristol-Gould SK, Hutten CG, Sturgis C, Kilen SM, Mayo KE, Woodruff TK. The development of a mouse model of ovarian endosalpingiosis. *Endocrinology.* 2005;146(12):5228-36. doi: 10.1210/en.2005-0697. PubMed PMID: 16141389.
108. Burdette JE, Jeruss JS, Kurley SJ, Lee EJ, Woodruff TK. Activin A mediates growth inhibition and cell cycle arrest through Smads in human breast cancer cells. *Cancer Res.* 2005;65(17):7968-75. doi: 10.1158/0008-5472.CAN-04-3553. PubMed PMID: 16140969.
109. Cook RW, Thompson TB, Kurup SP, Jardetzky TS, Woodruff TK. Structural basis for a functional antagonist in the transforming growth factor beta superfamily. *J Biol Chem.* 2005;280(48):40177-86. doi: 10.1074/jbc.M504591200. PubMed PMID: 16186117.

110. Kreeger PK, Fernandes NN, Woodruff TK, Shea LD. Regulation of mouse follicle development by follicle-stimulating hormone in a three-dimensional in vitro culture system is dependent on follicle stage and dose. *Biol Reprod.* 2005;73(5):942-50. doi: 10.1095/biolreprod.105.042390. PubMed PMID: 15987824; PMCID: PMC2662519.
111. Lee J, Zylka MJ, Anderson DJ, Burdette JE, Woodruff TK, Meade TJ. A steroid-conjugated contrast agent for magnetic resonance imaging of cell signaling. *J Am Chem Soc.* 2005;127(38):13164-6. doi: 10.1021/ja051294x. PubMed PMID: 16173742.
112. Park Y, Maizels ET, Feiger ZJ, Alam H, Peters CA, Woodruff TK, Unterman TG, Lee EJ, Jameson JL, Hunzicker-Dunn M. Induction of cyclin D2 in rat granulosa cells requires FSH-dependent relief from FOXO1 repression coupled with positive signals from Smad. *J Biol Chem.* 2005;280(10):9135-48. doi: 10.1074/jbc.M409486200. PubMed PMID: 15613482; PMCID: PMC1564190.
113. Suszko MI, Balkin DM, Chen Y, Woodruff TK. Smad3 mediates activin-induced transcription of follicle-stimulating hormone beta-subunit gene. *Mol Endocrinol.* 2005;19(7):1849-58. doi: 10.1210/me.2004-0475. PubMed PMID: 15761025.
114. Thompson TB, Lerch TF, Cook RW, Woodruff TK, Jardetzky TS. The structure of the follistatin:activin complex reveals antagonism of both type I and type II receptor binding. *Dev Cell.* 2005;9(4):535-43. doi: 10.1016/j.devcel.2005.09.008. PubMed PMID: 16198295.
115. Woodruff TK, Mayo KE. To beta or not to beta: estrogen receptors and ovarian function. *Endocrinology.* 2005;146(8):3244-6. doi: 10.1210/en.2005-0630. PubMed PMID: 16009972.
116. Berkholtz CB, Lai BE, Woodruff TK, Shea LD. Distribution of extracellular matrix proteins type I collagen, type IV collagen, fibronectin, and laminin in mouse folliculogenesis. *Histochem Cell Biol.* 2006;126(5):583-92. doi: 10.1007/s00418-006-0194-1. PubMed PMID: 16758163; PMCID: PMC2659665.
117. Berkholtz CB, Shea LD, Woodruff TK. Extracellular matrix functions in follicle maturation. *Semin Reprod Med.* 2006;24(4):262-9. doi: 10.1055/s-2006-948555. PubMed PMID: 16944423; PMCID: PMC2648384.
118. Bristol-Gould S, Woodruff TK. Folliculogenesis in the domestic cat (*Felis catus*). *Theriogenology.* 2006;66(1):5-13. doi: 10.1016/j.theriogenology.2006.03.019. PubMed PMID: 16620931.
119. Bristol-Gould SK, Kreeger PK, Selkirk CG, Kilen SM, Cook RW, Kipp JL, Shea LD, Mayo KE, Woodruff TK. Postnatal regulation of germ cells by activin: the establishment of the initial follicle pool. *Dev Biol.* 2006;298(1):132-48. doi: 10.1016/j.ydbio.2006.06.025. PubMed PMID: 16930587.
120. Bristol-Gould SK, Kreeger PK, Selkirk CG, Kilen SM, Mayo KE, Shea LD, Woodruff TK. Fate of the initial follicle pool: empirical and mathematical evidence supporting its sufficiency for adult fertility. *Dev Biol.* 2006;298(1):149-54. doi: 10.1016/j.ydbio.2006.06.023. PubMed PMID: 16925987.
121. Burdette JE, Kurley SJ, Kilen SM, Mayo KE, Woodruff TK. Gonadotropin-induced superovulation drives ovarian surface epithelia proliferation in CD1 mice. *Endocrinology.* 2006;147(5):2338-45. doi: 10.1210/en.2005-1629. PubMed PMID: 16484319.
122. Kenny HA, Woodruff TK. Follicle size class contributes to distinct secretion patterns of inhibin isoforms during the rat estrous cycle. *Endocrinology.* 2006;147(1):51-60. doi: 10.1210/en.2005-0242. PubMed PMID: 16195413.

123. Kreeger PK, Deck JW, Woodruff TK, Shea LD. The in vitro regulation of ovarian follicle development using alginate-extracellular matrix gels. *Biomaterials*. 2006;27(5):714-23. doi: 10.1016/j.biomaterials.2005.06.016. PubMed PMID: 16076485; PMCID: PMC2648392.
124. Lin SJ, Lerch TF, Cook RW, Jardetzky TS, Woodruff TK. The structural basis of TGF-beta, bone morphogenetic protein, and activin ligand binding. *Reproduction*. 2006;132(2):179-90. doi: 10.1530/rep.1.01072. PubMed PMID: 16885528.
125. Nieman CL, Kazer R, Brannigan RE, Zoloth LS, Chase-Lansdale PL, Kinahan K, Dilley KJ, Roberts D, Shea LD, Woodruff TK. Cancer survivors and infertility: a review of a new problem and novel answers. *J Support Oncol*. 2006;4(4):171-8. PubMed PMID: 16669459.
126. Sjöholm K, Palming J, Lystig TC, Jennische E, Woodruff TK, Carlsson B, Carlsson LM. The expression of inhibin beta B is high in human adipocytes, reduced by weight loss, and correlates to factors implicated in metabolic disease. *Biochem Biophys Res Commun*. 2006;344(4):1308-14. doi: 10.1016/j.bbrc.2006.04.030. PubMed PMID: 16650820.
127. Suszko MI, Woodruff TK. Cell-specificity of transforming growth factor-beta response is dictated by receptor bioavailability. *J Mol Endocrinol*. 2006;36(3):591-600. doi: 10.1677/jme.1.01936. PubMed PMID: 16720726.
128. Xu M, Kreeger PK, Shea LD, Woodruff TK. Tissue-engineered follicles produce live, fertile offspring. *Tissue Eng*. 2006;12(10):2739-46. doi: 10.1089/ten.2006.12.2739. PubMed PMID: 17518643; PMCID: PMC2648391.
129. Xu M, West E, Shea LD, Woodruff TK. Identification of a stage-specific permissive in vitro culture environment for follicle growth and oocyte development. *Biol Reprod*. 2006;75(6):916-23. doi: 10.1095/biolreprod.106.054833. PubMed PMID: 16957022.
130. Antenos M, Stemler M, Boime I, Woodruff TK. N-linked oligosaccharides direct the differential assembly and secretion of inhibin alpha- and betaA-subunit dimers. *Mol Endocrinol*. 2007;21(7):1670-84. doi: 10.1210/me.2007-0050. PubMed PMID: 17456790.
131. Backhus LE, Kondapalli LA, Chang RJ, Coutifaris C, Kazer R, Woodruff TK. Oncofertility consortium consensus statement: guidelines for ovarian tissue cryopreservation. *Cancer Treat Res*. 2007;138:235-9. PubMed PMID: 18080669.
132. Burdette JE, Oliver RM, Ulyanov V, Kilen SM, Mayo KE, Woodruff TK. Ovarian epithelial inclusion cysts in chronically superovulated CD1 and Smad2 dominant-negative mice. *Endocrinology*. 2007;148(8):3595-604. doi: 10.1210/en.2007-0030. PubMed PMID: 17431007.
133. Burdette JE, Woodruff TK. Activin and estrogen crosstalk regulates transcription in human breast cancer cells. *Endocr Relat Cancer*. 2007;14(3):679-89. doi: 10.1677/ERC-07-0054. PubMed PMID: 17914098.
134. Kipp JL, Kilen SM, Bristol-Gould S, Woodruff TK, Mayo KE. Neonatal exposure to estrogens suppresses activin expression and signaling in the mouse ovary. *Endocrinology*. 2007;148(5):1968-76. doi: 10.1210/en.2006-1083. PubMed PMID: 17255206.
135. Kipp JL, Kilen SM, Woodruff TK, Mayo KE. Activin regulates estrogen receptor gene expression in the mouse ovary. *J Biol Chem*. 2007;282(50):36755-65. doi: 10.1074/jbc.M705143200. PubMed PMID: 17951260.

136. Lee J, Burdette JE, MacRenaris KW, Mustafi D, Woodruff TK, Meade TJ. Rational design, synthesis, and biological evaluation of progesterone-modified MRI contrast agents. *Chem Biol.* 2007;14(7):824-34. doi: 10.1016/j.chembiol.2007.06.006. PubMed PMID: 17656319.
137. Lerch TF, Shimasaki S, Woodruff TK, Jardetzky TS. Structural and biophysical coupling of heparin and activin binding to follistatin isoform functions. *J Biol Chem.* 2007;282(21):15930-9. doi: 10.1074/jbc.M700737200. PubMed PMID: 17409095.
138. Lerch TF, Xu M, Jardetzky TS, Mayo KE, Radhakrishnan I, Kazer R, Shea LD, Woodruff TK. The structures that underlie normal reproductive function. *Mol Cell Endocrinol.* 2007;267(1-2):1-5. doi: 10.1016/j.mce.2006.10.018. PubMed PMID: 17140726; PMCID: PMC1919436.
139. Mayo K, Jameson L, Woodruff TK. Eggs in the nest. *Endocrinology.* 2007;148(8):3577-9. doi: 10.1210/en.2007-0590. PubMed PMID: 17639032.
140. Nieman CL, Kinahan KE, Yount SE, Rosenbloom SK, Yost KJ, Hahn EA, Volpe T, Dilley KJ, Zoloth L, Woodruff TK. Fertility preservation and adolescent cancer patients: lessons from adult survivors of childhood cancer and their parents. *Cancer Treat Res.* 2007;138:201-17. PubMed PMID: 18080667; PMCID: PMC2907098.
141. West ER, Shea LD, Woodruff TK. Engineering the follicle microenvironment. *Semin Reprod Med.* 2007;25(4):287-99. doi: 10.1055/s-2007-980222. PubMed PMID: 17594609; PMCID: PMC2648402.
142. West ER, Xu M, Woodruff TK, Shea LD. Physical properties of alginate hydrogels and their effects on in vitro follicle development. *Biomaterials.* 2007;28(30):4439-48. doi: 10.1016/j.biomaterials.2007.07.001. PubMed PMID: 17643486; PMCID: PMC2034204.
143. Woodruff TK. The emergence of a new interdisciplinary: oncofertility. *Cancer Treat Res.* 2007;138:3-11. PubMed PMID: 18080653.
144. Woodruff TK, Shea LD. The role of the extracellular matrix in ovarian follicle development. *Reprod Sci.* 2007;14(8 Suppl):6-10. doi: 10.1177/1933719107309818. PubMed PMID: 18089604; PMCID: PMC2648348.
145. Xu M, Woodruff TK, Shea LD. Bioengineering and the ovarian follicle. *Cancer Treat Res.* 2007;138:75-82. PubMed PMID: 18080658.
146. Antenos M, Zhu J, Jetly NM, Woodruff TK. An activin/furin regulatory loop modulates the processing and secretion of inhibin alpha- and betaB-subunit dimers in pituitary gonadotrope cells. *J Biol Chem.* 2008;283(48):33059-68. doi: 10.1074/jbc.M804190200. PubMed PMID: 18826955; PMCID: PMC2586270. **Selected as "editors' choice" *Science.* Dec, 2008.
147. Crain DA, Janssen SJ, Edwards TM, Heindel J, Ho SM, Hunt P, Iguchi T, Juul A, McLachlan JA, Schwartz J, Skakkebaek N, Soto AM, Swan S, Walker C, Woodruff TK, Woodruff TJ, Giudice LC, Guillette LJ, Jr. Female reproductive disorders: the roles of endocrine-disrupting compounds and developmental timing. *Fertil Steril.* 2008;90(4):911-40. doi: 10.1016/j.fertnstert.2008.08.067. PubMed PMID: 18929049; PMCID: PMC4086418.
148. Do TV, Kubba LA, Antenos M, Rademaker AW, Sturgis CD, Woodruff TK. The role of activin A and Akt/GSK signaling in ovarian tumor biology. *Endocrinology.* 2008;149(8):3809-16. doi: 10.1210/en.2007-1584. PubMed PMID: 18450971; PMCID: PMC2488253.

149. Do TV, Kubba LA, Du H, Sturgis CD, Woodruff TK. Transforming growth factor-beta1, transforming growth factor-beta2, and transforming growth factor-beta3 enhance ovarian cancer metastatic potential by inducing a Smad3-dependent epithelial-to-mesenchymal transition. *Mol Cancer Res.* 2008;6(5):695-705. doi: 10.1158/1541-7786.MCR-07-0294. PubMed PMID: 18505915; PMCID: PMC2927222.
150. Sinkevicius KW, Burdette JE, Woloszyn K, Hewitt SC, Hamilton K, Sugg SL, Temple KA, Wondisford FE, Korach KS, Woodruff TK, Greene GL. An estrogen receptor-alpha knock-in mutation provides evidence of ligand-independent signaling and allows modulation of ligand-induced pathways in vivo. *Endocrinology.* 2008;149(6):2970-9. doi: 10.1210/en.2007-1526. PubMed PMID: 18339713; PMCID: PMC2408815.
151. Suszko MI, Antenos M, Balkin DM, Woodruff TK. Smad3 and Pitx2 cooperate in stimulation of FSHbeta gene transcription. *Mol Cell Endocrinol.* 2008;281(1-2):27-36. doi: 10.1016/j.mce.2007.10.003. PubMed PMID: 18022758.
152. Woodruff TK. Making eggs: is it now or later? *Nat Med.* 2008;14(11):1190-1. doi: 10.1038/nm1108-1190. PubMed PMID: 18989303; PMCID: PMC5134835.
153. Woodruff TK, Walker CL. Fetal and early postnatal environmental exposures and reproductive health effects in the female. *Fertil Steril.* 2008;89(2 Suppl):e47-51. doi: 10.1016/j.fertnstert.2007.12.029. PubMed PMID: 18308062; PMCID: PMC2527475.
154. Zoloth L, Backus L, Woodruff TK, Henning A, Raucher M. Like/as: metaphor and meaning in bioethics narrative. *Am J Bioeth.* 2008. 8(6):W3-5.
155. Zoloth L, Backus L, Woodruff TK. Waiting to be born: The ethical implications of the generation of "Nuborn" and "NUAge" mice from pre-pubertal ovarian tissue. *Am J Bioeth.* 2008. 8(6): 21-29.
156. Gerrity M, Woodruff TK. Fertility preservation for cancer patients. *Expert Review of Obstetrics and Gynecology.* 2008;3(6):697-700. doi: 10.1586/17474108.3.6.697.
157. Jeruss JS, Woodruff TK. Preservation of fertility in patients with cancer. *N Engl J Med.* 2009;360(9):902-11. doi: 10.1056/NEJMra0801454. PubMed PMID: 19246362; PMCID: PMC2927217.
158. Roh J, Bae J, Lee K, Mayo K, Shea L, Woodruff TK. Regulation of Wilms' tumor gene expression by nerve growth factor and follicle-stimulating hormone in the immature mouse ovary. *Fertil Steril.* 2009;91(4 Suppl):1451-4. doi: 10.1016/j.fertnstert.2008.07.012. PubMed PMID: 18774569; PMCID: PMC2749456.
159. Shikanov A, Xu M, Woodruff TK, Shea LD. Interpenetrating fibrin-alginate matrices for in vitro ovarian follicle development. *Biomaterials.* 2009;30(29):5476-85. doi: 10.1016/j.biomaterials.2009.06.054. PubMed PMID: 19616843; PMCID: PMC2906124.
160. Sinkevicius KW, Woloszyn K, Laine M, Jackson KS, Greene GL, Woodruff TK, Burdette JE. Characterization of the ovarian and reproductive abnormalities in prepubertal and adult estrogen non-responsive estrogen receptor alpha knock-in (ENERKI) mice. *Steroids.* 2009;74(12):913-9. doi: 10.1016/j.steroids.2009.06.012. PubMed PMID: 19631674; PMCID: PMC2752961.
161. Tingen C, Kim A, Woodruff TK. The primordial pool of follicles and nest breakdown in mammalian ovaries. *Mol Hum Reprod.* 2009;15(12):795-803. doi: 10.1093/molehr/gap073. PubMed PMID: 19710243; PMCID: PMC2776475.

162. Tingen CM, Bristol-Gould SK, Kiesewetter SE, Wellington JT, Shea L, Woodruff TK. Prepubertal primordial follicle loss in mice is not due to classical apoptotic pathways. *Biol Reprod.* 2009;81(1):16-25. doi: 10.1095/biolreprod.108.074898. PubMed PMID: 19264701; PMCID: PMC3093983.
163. Trombly DJ, Woodruff TK, Mayo KE. Roles for transforming growth factor beta superfamily proteins in early folliculogenesis. *Semin Reprod Med.* 2009;27(1):14-23. doi: 10.1055/s-0028-1108006. PubMed PMID: 19197801; PMCID: PMC2947191.
164. Trombly DJ, Woodruff TK, Mayo KE. Suppression of Notch signaling in the neonatal mouse ovary decreases primordial follicle formation. *Endocrinology.* 2009;150(2):1014-24. doi: 10.1210/en.2008-0213. PubMed PMID: 18818300; PMCID: PMC2646529.
165. West ER, Zelinski MB, Kondapalli LA, Gracia C, Chang J, Coutifaris C, Critser J, Stouffer RL, Shea LD, Woodruff TK. Preserving female fertility following cancer treatment: current options and future possibilities. *Pediatr Blood Cancer.* 2009;53(2):289-95. doi: 10.1002/pbc.21999. PubMed PMID: 19301373; PMCID: PMC3081672.
166. West-Farrell ER, Xu M, Gomberg MA, Chow YH, Woodruff TK, Shea LD. The mouse follicle microenvironment regulates antrum formation and steroid production: alterations in gene expression profiles. *Biol Reprod.* 2009;80(3):432-9. doi: 10.1095/biolreprod.108.071142. PubMed PMID: 19005169; PMCID: PMC2764303.
167. Woodruff TK. Preserving fertility during cancer treatment. *Nat Med.* 2009;15(10):1124-5. doi: 10.1038/nm1009-1124. PubMed PMID: 19812566; PMCID: PMC3124896.
168. Xu M, Banc A, Woodruff TK, Shea LD. Secondary follicle growth and oocyte maturation by culture in alginate hydrogel following cryopreservation of the ovary or individual follicles. *Biotechnol Bioeng.* 2009;103(2):378-86. doi: 10.1002/bit.22250. PubMed PMID: 19191350; PMCID: PMC2778231.
169. Xu M, Barrett SL, West-Farrell E, Kondapalli LA, Kiesewetter SE, Shea LD, Woodruff TK. In vitro grown human ovarian follicles from cancer patients support oocyte growth. *Hum Reprod.* 2009;24(10):2531-40. doi: 10.1093/humrep/dep228. PubMed PMID: 19597190; PMCID: PMC2743446. **An in vitro matured oocyte is featured as the cover of the Nature Medicine special issue on Reproductive Biology: <http://www.nature.com/nm/journal/v14/n11/index.html>
170. Xu M, West-Farrell ER, Stouffer RL, Shea LD, Woodruff TK, Zelinski MB. Encapsulated three-dimensional culture supports development of nonhuman primate secondary follicles. *Biol Reprod.* 2009;81(3):587-94. doi: 10.1095/biolreprod.108.074732. PubMed PMID: 19474063; PMCID: PMC2731985.
171. Dolin G, Roberts DE, Rodriguez LM, Woodruff TK. Medical hope, legal pitfalls: Potential legal issues in the emerging field of oncofertility. *Santa Clara Law Review.* 2009. 49(3): 673-716.
172. Redig AJ, Woodruff TK, Jeruss JS. Oncofertility in clinical practice. *American Journal of Hematology/ Oncology.* 2009;8(8).
173. Woodruff TK. Rock the cradle. *Nat Med.* 2009;15(11):1244-. doi: 10.1038/nm1109-1244.
174. Barrett SL, Shea LD, Woodruff TK. Noninvasive index of cryorecovery and growth potential for human follicles in vitro. *Biol Reprod.* 2010;82(6):1180-9. doi: 10.1095/biolreprod.109.082933. PubMed PMID: 20200211; PMCID: PMC2874500.

175. Barrett SL, Woodruff TK. Gamete preservation. *Cancer Treat Res.* 2010;156:25-39. doi: 10.1007/978-1-4419-6518-9_3. PubMed PMID: 20811823; PMCID: PMC3086457.
176. Bristol-Gould S, Desjardins M, Woodruff TK. The Illinois Women's Health Registry: advancing women's health research and education in Illinois, USA. *Womens Health (Lond).* 2010;6(2):183-96. doi: 10.2217/whe.10.10. PubMed PMID: 20187725; PMCID: PMC2848073.
177. Dolin G, Roberts DE, Rodriguez LM, Woodruff TK. Medical hope, legal pitfalls: potential legal issues in the emerging field of oncofertility. *Cancer Treat Res.* 2010;156:111-34. doi: 10.1007/978-1-4419-6518-9_9. PubMed PMID: 20811829; PMCID: PMC2949971.
178. Faurot M, Woodruff TK. The oncofertility saturday academy: a paradigm to expand the educational opportunities and ambitions of high school girls. *Cancer Treat Res.* 2010;156:321-44. doi: 10.1007/978-1-4419-6518-9_25. PubMed PMID: 20811845; PMCID: PMC3071562.
179. Gardino SL, Jeruss JS, Woodruff TK. Using decision trees to enhance interdisciplinary team work: the case of oncofertility. *J Assist Reprod Genet.* 2010;27(5):227-31. doi: 10.1007/s10815-010-9413-8. PubMed PMID: 20386978; PMCID: PMC2881204.
180. Gardino SL, Russell AE, Woodruff TK. Adoption after cancer: adoption agency attitudes and perspectives on the potential to parent post-cancer. *Cancer Treat Res.* 2010;156:153-70. doi: 10.1007/978-1-4419-6518-9_11. PubMed PMID: 20811831; PMCID: PMC3086473.
181. Jin S, Lei L, Shea LD, Zelinski MB, Stouffer RL, Woodruff TK. Markers of growth and development in primate primordial follicles are preserved after slow cryopreservation. *Fertil Steril.* 2010;93(8):2627-32. doi: 10.1016/j.fertnstert.2009.11.029. PubMed PMID: 20074723; PMCID: PMC2873131.
182. Jin SY, Lei L, Shikanov A, Shea LD, Woodruff TK. A novel two-step strategy for in vitro culture of early-stage ovarian follicles in the mouse. *Fertil Steril.* 2010;93(8):2633-9. doi: 10.1016/j.fertnstert.2009.10.027. PubMed PMID: 20004373; PMCID: PMC2873094.
183. Kim AM, Tingen CM, Woodruff TK. Sex bias in trials and treatment must end. *Nature.* 2010;465(7299):688-9. doi: 10.1038/465688a. PubMed PMID: 20535184.
184. Kim AM, Vogt S, O'Halloran TV, Woodruff TK. Zinc availability regulates exit from meiosis in maturing mammalian oocytes. *Nat Chem Biol.* 2010;6(9):674-81. doi: 10.1038/nchembio.419. PubMed PMID: 20693991; PMCID: PMC2924620.
185. Lei L, Jin S, Gonzalez G, Behringer RR, Woodruff TK. The regulatory role of Dicer in folliculogenesis in mice. *Mol Cell Endocrinol.* 2010;315(1-2):63-73. doi: 10.1016/j.mce.2009.09.021. PubMed PMID: 19799966; PMCID: PMC2814883.
186. Lei L, Jin S, Mayo KE, Woodruff TK. The interactions between the stimulatory effect of follicle-stimulating hormone and the inhibitory effect of estrogen on mouse primordial folliculogenesis. *Biol Reprod.* 2010;82(1):13-22. doi: 10.1095/biolreprod.109.077404. PubMed PMID: 19641178; PMCID: PMC2796699.
187. Moore BC, Kohno S, Cook RW, Alvers AL, Hamlin HJ, Woodruff TK, Guillette LJ. Altered sex hormone concentrations and gonadal mRNA expression levels of activin signaling factors in hatchling alligators from a contaminated Florida lake. *J Exp Zool A Ecol Genet Physiol.* 2010;313(4):218-30. doi: 10.1002/jez.595. PubMed PMID: 20166196; PMCID: PMC4037923.

188. Silber SJ, Woodruff TK, Shea LD. To transplant or not to transplant - that is the question. *Cancer Treat Res.* 2010;156:41-54. doi: 10.1007/978-1-4419-6518-9_4. PubMed PMID: 20811824; PMCID: PMC3086495.
189. Smith RM, Woodruff TK, Shea LD. Designing follicle-environment interactions with biomaterials. *Cancer Treat Res.* 2010;156:11-24. doi: 10.1007/978-1-4419-6518-9_2. PubMed PMID: 20811822; PMCID: PMC3071535.
190. Smitz J, Dolmans MM, Donnez J, Fortune JE, Hovatta O, Jewgenow K, Picton HM, Plancha C, Shea LD, Stouffer RL, Telfer EE, Woodruff TK, Zelinski MB. Current achievements and future research directions in ovarian tissue culture, in vitro follicle development and transplantation: implications for fertility preservation. *Hum Reprod Update.* 2010;16(4):395-414. doi: 10.1093/humupd/dmp056. PubMed PMID: 20124287; PMCID: PMC2880913.
191. Tingen C, Rodriguez S, Campo-Engelstein L, Woodruff TK. Research funding. Politics and parthenotes. *Science.* 2010;330(6003):453. doi: 10.1126/science.1196881. PubMed PMID: 20966235.
192. Tingen CM, Kim AM, Wu PH, Woodruff TK. Sex and sensitivity: the continued need for sex-based biomedical research and implementation. *Womens Health (Lond).* 2010;6(4):511-6. doi: 10.2217/whe.10.45. PubMed PMID: 20597615.
193. Woodruff TK. Setting the course: leadership at the NICHD. *Biol Reprod.* 2010;83(1):163-4. doi: 10.1095/biolreprod.110.086223. PubMed PMID: 20505167.
194. Woodruff TK. The Oncofertility Consortium--addressing fertility in young people with cancer. *Nat Rev Clin Oncol.* 2010;7(8):466-75. doi: 10.1038/nrclinonc.2010.81. PubMed PMID: 20498666; PMCID: PMC3124936.
195. Woodruff TK, Zoloth L, Campo-Engelstein L, Rodriguez S. Oncofertility: ethical, legal, social, and medical perspectives. Preface. *Cancer Treat Res.* 2010;156:v-vii. PubMed PMID: 21213472.
196. Zhu J, Braun EL, Kohno S, Antenos M, Xu EY, Cook RW, Lin SJ, Moore BC, Guillette LJ, Jr., Jardtetzky TS, Woodruff TK. Phylogenomic analyses reveal the evolutionary origin of the inhibin alpha-subunit, a unique TGFbeta superfamily antagonist. *PLoS One.* 2010;5(3):e9457. doi: 10.1371/journal.pone.0009457. PubMed PMID: 20209104; PMCID: PMC2832003.
197. Kondapalli LA, Woodruff TK. Development and maturation of the normal female reproductive cycle. L. Brad Draper (1995-1999) *Environmental Impacts on Reproductive Health and Fertility.* 2010. Cambridge University Press. Cambridge, UK.
198. Cooper AR, Baker VL, Sterling EW, Ryan ME, Woodruff TK, Nelson LM. 2010. The time is now for a new approach to primary ovarian insufficiency. *Fertil Steril.* Feb 24.
199. Shiyong J, Shikanov A, Shea LD, Woodruff TK. 2010. A novel two-step strategy for in vitro culture of early-stage ovarian follicles in the mouse. *Fert Ster* 93(8): 2633-9.
200. Köhler TS, Kondapalli LA, Shah A, Chan S, Woodruff TK, Brannigan RE. 2010. Results from the survey for preservation of adolescent reproduction (SPARE) study: gender disparity in delivery of fertility preservation message to adolescents with cancer. *J Assist Reprod Genet.* 2011.
201. Campo-Engelstein L, Rodriguez S, Tingen C, Woodruff TK. Practical parthenote policy and the practice of science. *Am J Bioeth.* 2011;11(3):W1-2. Epub 2011/03/15. doi: 10.1080/15265161.2011.563162. PubMed PMID: 21400373.

202. Antenos M, Lei L, Xu M, Malipatil A, Kiesewetter S, Woodruff TK. Role of PCSK5 expression in mouse ovarian follicle development: identification of the inhibin alpha- and beta-subunits as candidate substrates. *PLoS One*. 2011;6(3):e17348. doi: 10.1371/journal.pone.0017348. PubMed PMID: 21408162; PMCID: PMC3050889.
203. Bernhardt ML, Kim AM, O'Halloran TV, Woodruff TK. Zinc requirement during meiosis I-meiosis II transition in mouse oocytes is independent of the MOS-MAPK pathway. *Biol Reprod*. 2011;84(3):526-36. doi: 10.1095/biolreprod.110.086488. PubMed PMID: 21076080; PMCID: PMC3043131.
204. Cooper AR, Baker VL, Sterling EW, Ryan ME, Woodruff TK, Nelson LM. The time is now for a new approach to primary ovarian insufficiency. *Fertil Steril*. 2011;95(6):1890-7. doi: 10.1016/j.fertnstert.2010.01.016. PubMed PMID: 20188353; PMCID: PMC2991394.
205. Duncan FE, Jozefik JK, Kim AM, Hirshfeld-Cytron J, Woodruff TK. The gynecologist has a unique role in providing oncofertility care to young cancer patients. *US Obstet Gynecol*. 2011;6(1):24-34. PubMed PMID: 21927621; PMCID: PMC3171692.
206. Hirshfeld-Cytron J, Gracia C, Woodruff TK. Nonmalignant diseases and treatments associated with primary ovarian failure: an expanded role for fertility preservation. *Women's Health*. 2011;20(10):1467-77. doi: 10.1089/jwh.2010.2625. PubMed PMID: 21827325; PMCID: PMC3186446.
207. Hirshfeld-Cytron JE, Duncan FE, Xu M, Jozefik JK, Shea LD, Woodruff TK. Animal age, weight and estrus cycle stage impact the quality of in vitro grown follicles. *Hum Reprod*. 2011;26(9):2473-85. doi: 10.1093/humrep/der183. PubMed PMID: 21669966; PMCID: PMC3157625.
208. Kim AM, Bernhardt ML, Kong BY, Ahn RW, Vogt S, Woodruff TK, O'Halloran TV. Zinc sparks are triggered by fertilization and facilitate cell cycle resumption in mammalian eggs. *ACS Chem Biol*. 2011;6(7):716-23. doi: 10.1021/cb200084y. PubMed PMID: 21526836; PMCID: PMC3171139.
209. Kim SY, Zhu J, Woodruff TK. A truncated, activin-induced Smad3 isoform acts as a transcriptional repressor of FSHbeta expression in mouse pituitary. *Mol Cell Endocrinol*. 2011;342(1-2):64-72. doi: 10.1016/j.mce.2011.05.036. PubMed PMID: 21664424; PMCID: PMC3164581.
210. Kohler TS, Kondapalli LA, Shah A, Chan S, Woodruff TK, Brannigan RE. Results from the survey for preservation of adolescent reproduction (SPARE) study: gender disparity in delivery of fertility preservation message to adolescents with cancer. *J Assist Reprod Genet*. 2011;28(3):269-77. doi: 10.1007/s10815-010-9504-6. PubMed PMID: 21110080; PMCID: PMC3082660.
211. Kong BY, Skory RM, Woodruff TK. Creating a continuum of care: integrating obstetricians and gynecologists in the care of young cancer patients. *Clin Obstet Gynecol*. 2011;54(4):619-32. doi: 10.1097/GRF.0b013e318236ea2c. PubMed PMID: 22031251; PMCID: PMC3211041.
212. Lin SJ, Hu Y, Zhu J, Woodruff TK, Jardetzky TS. Structure of betaglycan zona pellucida (ZP)-C domain provides insights into ZP-mediated protein polymerization and TGF-beta binding. *Proc Natl Acad Sci U S A*. 2011;108(13):5232-6. doi: 10.1073/pnas.1010689108. PubMed PMID: 21402931; PMCID: PMC3069177.
213. Moore BC, Milnes MR, Kohno S, Katsu Y, Iguchi T, Woodruff TK, Guillette LJ, Jr. Altered gonadal expression of TGF-beta superfamily signaling factors in environmental contaminant-exposed juvenile alligators. *J Steroid Biochem Mol Biol*. 2011;127(1-2):58-63. doi: 10.1016/j.jsbmb.2011.01.004. PubMed PMID: 21251980.

214. Parrish EM, Siletz A, Xu M, Woodruff TK, Shea LD. Gene expression in mouse ovarian follicle development in vivo versus an ex vivo alginate culture system. *Reproduction*. 2011;142(2):309-18. doi: 10.1530/REP-10-0481. PubMed PMID: 21610168; PMCID: PMC3145246.
215. Redig AJ, Brannigan R, Stryker SJ, Woodruff TK, Jeruss JS. Incorporating fertility preservation into the care of young oncology patients. *Cancer*. 2011;117(1):4-10. PubMed PMID: 21235031; PMCID: PMC3057679.
216. Shikanov A, Smith RM, Xu M, Woodruff TK, Shea LD. Hydrogel network design using multifunctional macromers to coordinate tissue maturation in ovarian follicle culture. *Biomaterials*. 2011;32(10):2524-31. doi: 10.1016/j.biomaterials.2010.12.027. PubMed PMID: 21247629; PMCID: PMC3040241.
217. Shikanov A, Xu M, Woodruff TK, Shea LD. A method for ovarian follicle encapsulation and culture in a proteolytically degradable 3 dimensional system. *J Vis Exp*. 2011(49). doi: 10.3791/2695. PubMed PMID: 21445043; PMCID: PMC3197327.
218. Rodriguez S, Campo-Engelstein L, Tingen C, Woodruff TK. An obscure rider obstructing science: the conflation of parthenotes with embryos in the Dickey-Wicker amendment. *Am J Bioeth*. 2011;11(3):20-8. Epub 2011/03/15. doi: 10.1080/15265161.2010.546472. PubMed PMID: 21400380.
219. Shikanov A, Zhang Z, Xu M, Smith RM, Rajan A, Woodruff TK, Shea LD. Fibrin encapsulation and vascular endothelial growth factor delivery promotes ovarian graft survival in mice. *Tissue Eng Part A*. 2011;17(23-24):3095-104. doi: 10.1089/ten.TEA.2011.0204. PubMed PMID: 21740332; PMCID: PMC3226061.
220. Songsasen N, Woodruff TK, Wildt DE. In vitro growth and steroidogenesis of dog follicles are influenced by the physical and hormonal microenvironment. *Reproduction*. 2011;142(1):113-22. doi: 10.1530/REP-10-0442. PubMed PMID: 21502334; PMCID: PMC3245627.
221. Tingen CM, Kiesewetter SE, Jozefik J, Thomas C, Tagler D, Shea L, Woodruff TK. A macrophage and theca cell-enriched stromal cell population influences growth and survival of immature murine follicles in vitro. *Reproduction*. 2011;141(6):809-20. doi: 10.1530/REP-10-0483. PubMed PMID: 21389078; PMCID: PMC4077622.
222. Waimey KE, Krausfeldt AD, Taylor RL, Wallach HD, Woodruff TK. Understanding Technology and Human Interaction to Catalyze Oncofertility and Adolescent and Young Adult Oncology Research. *J Adolesc Young Adult Oncol*. 2011;1(4):160-3. doi: 10.1089/jayao.2012.0001. PubMed PMID: 23610736; PMCID: PMC3621401.
223. Woodruff TK, Shea LD. A new hypothesis regarding ovarian follicle development: ovarian rigidity as a regulator of selection and health. *J Assist Reprod Genet*. 2011;28(1):3-6. doi: 10.1007/s10815-010-9478-4. PubMed PMID: 20872066; PMCID: PMC3045494.
224. Xu M, Fazleabas AT, Shikanov A, Jackson E, Barrett SL, Hirshfeld-Cytron J, Kiesewetter SE, Shea LD, Woodruff TK. In vitro oocyte maturation and preantral follicle culture from the luteal-phase baboon ovary produce mature oocytes. *Biol Reprod*. 2011;84(4):689-97. doi: 10.1095/biolreprod.110.088674. PubMed PMID: 21123815; PMCID: PMC3062036.
225. Bernhardt ML, Kong BY, Kim AM, O'Halloran TV, Woodruff TK. A zinc-dependent mechanism regulates meiotic progression in mammalian oocytes. *Biol Reprod*. 2012;86(4):114. doi: 10.1095/biolreprod.111.097253. PubMed PMID: 22302686; PMCID: PMC3338659.

226. Duch J, Zeng XH, Sales-Pardo M, Radicchi F, Otis S, Woodruff TK, Nunes Amaral LA. The possible role of resource requirements and academic career-choice risk on gender differences in publication rate and impact. *PLoS One*. 2012;7(12):e51332. doi: 10.1371/journal.pone.0051332. PubMed PMID: 23251502; PMCID: PMC3520933.
227. Duncan FE, Hornick JE, Lampson MA, Schultz RM, Shea LD, Woodruff TK. Chromosome cohesion decreases in human eggs with advanced maternal age. *Aging cell*. 2012;11(6):1121-4. doi: 10.1111/j.1474-9726.2012.00866.x. PubMed PMID: 22823533; PMCID: PMC3491123.
228. Duncan FE, Hornick JE, Woodruff TK. Bipolar-to-monopolar spindle collapse in human eggs. *Mol Reprod Dev*. 2012;79(9):587. doi: 10.1002/mrd.22069. PubMed PMID: 22777649; PMCID: PMC3884583.
229. Hornick JE, Duncan FE, Shea LD, Woodruff TK. Isolated primate primordial follicles require a rigid physical environment to survive and grow in vitro. *Hum Reprod*. 2012;27(6):1801-10. doi: 10.1093/humrep/der468. PubMed PMID: 22456922; PMCID: PMC3357191.
230. Jiao ZX, Xu M, Woodruff TK. Age-associated alteration of oocyte-specific gene expression in polar bodies: potential markers of oocyte competence. *Fertil Steril*. 2012;98(2):480-6. doi: 10.1016/j.fertnstert.2012.04.035. PubMed PMID: 22633262; PMCID: PMC3409302.
231. Kong BY, Bernhardt ML, Kim AM, O'Halloran TV, Woodruff TK. Zinc maintains prophase I arrest in mouse oocytes through regulation of the MOS-MAPK pathway. *Biol Reprod*. 2012;87(1):11, 1-2. doi: 10.1095/biolreprod.112.099390. PubMed PMID: 22539682; PMCID: PMC3406555.
232. Campo-Engelstein L, Tingen C, Rodriguez S, Woodruff TK. Conceiving ethical gamete and embryo research in a post-Dickey-Wicker USA. *Sci Public Policy*. 2012;39(1):129-32. doi: 10.3152/030234212X13214603531888.
233. McDade TW, Woodruff TK, Huang YY, Funk WE, Prewitt M, Kondapalli L, Gracia CR. Quantification of anti-Mullerian hormone (AMH) in dried blood spots: validation of a minimally invasive method for assessing ovarian reserve. *Hum Reprod*. 2012;27(8):2503-8. doi: 10.1093/humrep/des194. PubMed PMID: 22674205; PMCID: PMC3398679.
234. Sheth KR, Sharma V, Helfand BT, Cashy J, Smith K, Hedges JC, Kohler TS, Woodruff TK, Brannigan RE. Improved fertility preservation care for male patients with cancer after establishment of formalized oncofertility program. *J Urol*. 2012;187(3):979-86. doi: 10.1016/j.juro.2011.10.154. PubMed PMID: 22264454.
235. Smeyers C, Wallach H, Woodruff TK. Repropedia: a reproductive lexicon to fill the gap in reproductive terminology. *Biol Reprod*. 2012;87(4):98. doi: 10.1095/biolreprod.112.104000. PubMed PMID: 22954794; PMCID: PMC3507548.
236. Tagler D, Tu T, Smith RM, Anderson NR, Tingen CM, Woodruff TK, Shea LD. Embryonic fibroblasts enable the culture of primary ovarian follicles within alginate hydrogels. *Tissue Eng Part A*. 2012;18(11-12):1229-38. doi: 10.1089/ten.TEA.2011.0418. PubMed PMID: 22296562; PMCID: PMC3360509.
237. Zhu J, Lin SJ, Zou C, Makanji Y, Jardetzky TS, Woodruff TK. Inhibin alpha-subunit N terminus interacts with activin type IB receptor to disrupt activin signaling. *J Biol Chem*. 2012;287(11):8060-70. doi: 10.1074/jbc.M111.293381. PubMed PMID: 22267736; PMCID: PMC3318740.
238. Ahn RW, Barrett SL, Raja MR, Jozefik JK, Spaho L, Chen H, Bally MB, Mazar AP, Avram MJ, Winter JN, Gordon LI, Shea LD, O'Halloran TV, Woodruff TK. Nano-encapsulation of arsenic trioxide enhances efficacy against murine

- lymphoma model while minimizing its impact on ovarian reserve in vitro and in vivo. *PLoS One*. 2013;8(3):e58491. doi: 10.1371/journal.pone.0058491. PubMed PMID: 23526987; PMCID: PMC3603968.
239. Hornick JE, Duncan FE, Shea LD, Woodruff TK. Multiple follicle culture supports primary follicle growth through paracrine-acting signals. *Reproduction*. 2013;145(1):19-32. doi: 10.1530/REP-12-0233. PubMed PMID: 23108112; PMCID: PMC3884596.
240. Jiao ZX, Woodruff TK. Detection and quantification of maternal-effect gene transcripts in mouse second polar bodies: potential markers of embryo developmental competence. *Fertil Steril*. 2013;99(7):2055-61. doi: 10.1016/j.fertnstert.2013.02.003. PubMed PMID: 23465709; PMCID: PMC3672332.
241. Jiao ZX, Woodruff TK. Follicle microenvironment-associated alterations in gene expression in the mouse oocyte and its polar body. *Fertil Steril*. 2013;99(5):1453-9 e1. doi: 10.1016/j.fertnstert.2012.12.009. PubMed PMID: 23312223; PMCID: PMC4270088.
242. Kim SY, Cordeiro MH, Serna VA, Ebbert K, Butler LM, Sinha S, Mills AA, Woodruff TK, Kurita T. Rescue of platinum-damaged oocytes from programmed cell death through inactivation of the p53 family signaling network. *Cell Death Differ*. 2013;20(8):987-97. doi: 10.1038/cdd.2013.31. PubMed PMID: 23598363; PMCID: PMC3705595.
243. Laronda MM, Burdette JE, Kim J, Woodruff TK. Recreating the female reproductive tract in vitro using iPSC technology in a linked microfluidics environment. *Stem Cell Res Ther*. 2013;4 Suppl 1:S13. doi: 10.1186/scrt374. PubMed PMID: 24565375; PMCID: PMC4029530.
244. Lebbe M, Woodruff TK. Involvement of androgens in ovarian health and disease. *Mol Hum Reprod*. 2013;19(12):828-37. doi: 10.1093/molehr/gat065. PubMed PMID: 24026057; PMCID: PMC3843026.
245. Mutharasan P, Galdones E, Penalver Bernabe B, Garcia OA, Jafari N, Shea LD, Woodruff TK, Legro RS, Dunaif A, Urbanek M. Evidence for chromosome 2p16.3 polycystic ovary syndrome susceptibility locus in affected women of European ancestry. *J Clin Endocrinol Metab*. 2013;98(1):E185-90. doi: 10.1210/jc.2012-2471. PubMed PMID: 23118426; PMCID: PMC3537106.
246. Skory RM, Bernabe BP, Galdones E, Broadbelt LJ, Shea LD, Woodruff TK. Microarray analysis identifies COMP as the most differentially regulated transcript throughout in vitro follicle growth. *Mol Reprod Dev*. 2013;80(2):132-44. doi: 10.1002/mrd.22144. PubMed PMID: 23242557; PMCID: PMC3730266.
247. Tagler D, Makanji Y, Anderson NR, Woodruff TK, Shea LD. Supplemented alphaMEM/F12-based medium enables the survival and growth of primary ovarian follicles encapsulated in alginate hydrogels. *Biotechnol Bioeng*. 2013;110(12):3258-68. doi: 10.1002/bit.24986. PubMed PMID: 23801027; PMCID: PMC3808526.
248. Waimey KE, Duncan FE, Su HI, Smith K, Wallach H, Jona K, Coutifaris C, Gracia CR, Shea LD, Brannigan RE, Chang RJ, Zelinski MB, Stouffer RL, Taylor RL, Woodruff TK. Future Directions in Oncofertility and Fertility Preservation: A Report from the 2011 Oncofertility Consortium Conference. *J Adolesc Young Adult Oncol*. 2013;2(1):25-30. doi: 10.1089/jayao.2012.0035. PubMed PMID: 23610740; PMCID: PMC3604786.
249. Woodruff TK. Reproductive endocrinology: fertility in female survivors of childhood cancer. *Nat Rev Endocrinol*. 2013;9(10):571-2. doi: 10.1038/nrendo.2013.170. PubMed PMID: 23999232.
250. Woodruff TK. From the bench to bedside to babies: translational medicine made possible by funding multidisciplinary team science. *J Assist Reprod Genet*. 2013;30(10):1249-53. doi: 10.1007/s10815-013-0082-2. PubMed PMID: 23975192; PMCID: PMC3824858.

251. Wu JS, Kim AM, Bleher R, Myers BD, Marvin RG, Inada H, Nakamura K, Zhang XF, Roth E, Li SY, Woodruff TK, O'Halloran TV, Dravid VP. Imaging and elemental mapping of biological specimens with a dual-EDS dedicated scanning transmission electron microscope. *Ultramicroscopy*. 2013;128:24-31. doi: 10.1016/j.ultramic.2013.01.004. PubMed PMID: 23500508; PMCID: PMC3658130.
252. Xu J, Xu M, Bernuci MP, Fisher TE, Shea LD, Woodruff TK, Zelinski MB, Stouffer RL. Primate follicular development and oocyte maturation in vitro. *Adv Exp Med Biol*. 2013;761:43-67. doi: 10.1007/978-1-4614-8214-7_5. PubMed PMID: 24097381; PMCID: PMC4007769.
253. Kong BY, Woodruff TK. The maternal-to-zygotic transition: A asynchronous split. *Mol Reprod Dev*. 2013; 80(1):1.
254. Brito IR, Lima IM, Xu M, Shea LD, Woodruff TK, Figueiredo JR. Three-dimensional systems for in vitro follicular culture: overview of alginate-based matrices. *Reprod Fertil Dev*. 2014;26(7):915-30. doi: 10.1071/RD12401. PubMed PMID: 23866836.
255. De Vos M, Smitz J, Woodruff TK. Fertility preservation in women with cancer. *Lancet*. 2014;384(9950):1302-10. doi: 10.1016/S0140-6736(14)60834-5. PubMed PMID: 25283571; PMCID: PMC4270060.
256. Duncan FE, Derman B, Woodruff TK. A small field for fertile science: the low visibility of reproductive science in high impact journals. *J Assist Reprod Genet*. 2014;31(5):511-20. doi: 10.1007/s10815-014-0205-4. PubMed PMID: 24652516; PMCID: PMC4016373.
257. Duncan FE, Woodruff TK. Keeping reproductive science visible, viable, and valuable-a call to rethink how we publish. *J Assist Reprod Genet*. 2014;31(5):509-10. doi: 10.1007/s10815-014-0206-3. PubMed PMID: 24677209; PMCID: PMC4016381.
258. Eddie SL, Kim JJ, Woodruff TK, Burdette JE. Microphysiological modeling of the reproductive tract: a fertile endeavor. *Exp Biol Med (Maywood)*. 2014;239(9):1192-202. doi: 10.1177/1535370214529387. PubMed PMID: 24737736; PMCID: PMC4156579.
259. Hong YP, Gleber SC, O'Halloran TV, Que EL, Bleher R, Vogt S, Woodruff TK, Jacobsen C. Alignment of low-dose X-ray fluorescence tomography images using differential phase contrast. *J Synchrotron Radiat*. 2014;21(Pt 1):229-34. doi: 10.1107/S1600577513029512. PubMed PMID: 24365941; PMCID: PMC3874022.
260. Jiao ZX, Xu M, Woodruff TK. Age-related increase in aneuploidy and alteration of gene expression in mouse first polar bodies. *J Assist Reprod Genet*. 2014;31(6):731-7. doi: 10.1007/s10815-014-0210-7. PubMed PMID: 24658923; PMCID: PMC4048374.
261. Kong BY, Duncan FE, Que EL, Kim AM, O'Halloran TV, Woodruff TK. Maternally-derived zinc transporters ZIP6 and ZIP10 drive the mammalian oocyte-to-egg transition. *Mol Hum Reprod*. 2014;20(11):1077-89. doi: 10.1093/molehr/gau066. PubMed PMID: 25143461; PMCID: PMC4209882.
262. Laronda MM, Duncan FE, Hornick JE, Xu M, Pahnke JE, Whelan KA, Shea LD, Woodruff TK. Alginate encapsulation supports the growth and differentiation of human primordial follicles within ovarian cortical tissue. *J Assist Reprod Genet*. 2014;31(8):1013-28. doi: 10.1007/s10815-014-0252-x. PubMed PMID: 24845158; PMCID: PMC4130945.
263. Makanji Y, Tagler D, Pahnke J, Shea LD, Woodruff TK. Hypoxia-mediated carbohydrate metabolism and transport promote early-stage murine follicle growth and survival. *Am J Physiol Endocrinol Metab*. 2014;306(8):E893-903. doi: 10.1152/ajpendo.00484.2013. PubMed PMID: 24569591; PMCID: PMC3989738.

264. Makanji Y, Zhu J, Mishra R, Holmquist C, Wong WP, Schwartz NB, Mayo KE, Woodruff TK. Inhibin at 90: from discovery to clinical application, a historical review. *Endocr Rev.* 2014;35(5):747-94. doi: 10.1210/er.2014-1003. PubMed PMID: 25051334; PMCID: PMC4167436.
265. Pavone ME, Hirshfeld-Cytron J, Tingen C, Thomas C, Thomas J, Lowe MP, Schink JC, Woodruff TK. Human ovarian tissue cortex surrounding benign and malignant lesions. *Reprod Sci.* 2014;21(5):582-9. doi: 10.1177/1933719113506498. PubMed PMID: 24096576; PMCID: PMC3984482.
266. Shea LD, Woodruff TK, Shikanov A. Bioengineering the ovarian follicle microenvironment. *Annu Rev Biomed Eng.* 2014;16:29-52. doi: 10.1146/annurev-bioeng-071813-105131. PubMed PMID: 24849592; PMCID: PMC4231138.
267. Smith RM, Shikanov A, Kniazeva E, Ramadurai D, Woodruff TK, Shea LD. Fibrin-mediated delivery of an ovarian follicle pool in a mouse model of infertility. *Tissue Eng Part A.* 2014;20(21-22):3021-30. doi: 10.1089/ten.TEA.2013.0675. PubMed PMID: 24802617; PMCID: PMC4229702.
268. Stein DM, Victorson DE, Choy JT, Waimey KE, Pearman TP, Smith K, Dreyfuss J, Kinahan KE, Sadhwani D, Woodruff TK, Brannigan RE. Fertility preservation preferences and perspectives among adult male survivors of pediatric cancer and their parents. *J Adolesc Young Adult Oncol.* 2014;3(2):75-82. doi: 10.1089/jayao.2014.0007. PubMed PMID: 24940531; PMCID: PMC4048980.
269. Tagler D, Makanji Y, Tu T, Bernabe BP, Lee R, Zhu J, Kniazeva E, Hornick JE, Woodruff TK, Shea LD. Promoting extracellular matrix remodeling via ascorbic acid enhances the survival of primary ovarian follicles encapsulated in alginate hydrogels. *Biotechnol Bioeng.* 2014;111(7):1417-29. doi: 10.1002/bit.25181. PubMed PMID: 24375265; PMCID: PMC4232184.
270. Woodruff TK. Sex, equity, and science. *Proc Natl Acad Sci U S A.* 2014;111(14):5063-4. doi: 10.1073/pnas.1404203111. PubMed PMID: 24715722; PMCID: PMC3986183.
271. Woodruff TK, Kibbe MR, Paller AS, Turek FW, Woolley CS. Commentary: "Leaning in" to support sex differences in basic science and clinical research. *Endocrinology.* 2014;155(4):1181-3. doi: 10.1210/en.2014-1068. PubMed PMID: 24506076.
272. Yoon DY, Mansukhani NA, Stubbs VC, Helenowski IB, Woodruff TK, Kibbe MR. Sex bias exists in basic science and translational surgical research. *Surgery.* 2014;156(3):508-16. doi: 10.1016/j.surg.2014.07.001. PubMed PMID: 25175501.
273. Arslan SY, Yu Y, Burdette JE, Pavone ME, Hope TJ, Woodruff TK, Kim JJ. Novel three dimensional human endocervix cultures respond to 28-day hormone treatment. *Endocrinology.* 2015;156(4):1602-9. doi: 10.1210/en.2014-1840. PubMed PMID: 25635622; PMCID: PMC4399320.
274. Cordeiro MH, Kim SY, Ebbert K, Duncan FE, Ramalho-Santos J, Woodruff TK. Geography of follicle formation in the embryonic mouse ovary impacts activation pattern during the first wave of folliculogenesis. *Biol Reprod.* 2015;93(4):88. doi: 10.1095/biolreprod.115.131227. PubMed PMID: 26246221; PMCID: PMC4711906.
275. Duncan FE, Pavone ME, Gunn AH, Badawy S, Gracia C, Ginsberg JP, Lockart B, Gosiengfiao Y, Woodruff TK. Pediatric and teen ovarian tissue removed for cryopreservation contains follicles irrespective of age, disease diagnosis, treatment history, and specimen processing methods. *J Adolesc Young Adult Oncol.* 2015;4(4):174-83. doi: 10.1089/jayao.2015.0032. PubMed PMID: 26697267; PMCID: PMC4684654.

276. Eddie SL, Quartuccio SM, Zhu J, Shepherd JA, Kothari R, Kim JJ, Woodruff TK, Burdette JE. Three-dimensional modeling of the human fallopian tube fimbriae. *Gynecol Oncol.* 2015;136(2):348-54. doi: 10.1016/j.ygyno.2014.12.015. PubMed PMID: 25527363; PMCID: PMC4358821.
277. Hornick JE, Duncan FE, Sun M, Kawamura R, Marko JF, Woodruff TK. Age-associated alterations in the micromechanical properties of chromosomes in the mammalian egg. *J Assist Reprod Genet.* 2015;32(5):765-9. doi: 10.1007/s10815-015-0453-y. PubMed PMID: 25758987; PMCID: PMC4429432.
278. Kim SY, Ebbert K, Cordeiro MH, Romero M, Zhu J, Serna VA, Whelan KA, Woodruff TK, Kurita T. Cell autonomous phosphoinositide 3-kinase activation in oocytes disrupts normal ovarian function through promoting survival and overgrowth of ovarian follicles. *Endocrinology.* 2015;156(4):1464-76. doi: 10.1210/en.2014-1926. PubMed PMID: 25594701; PMCID: PMC4399322.
279. Klein SL, Schiebinger L, Stefanick ML, Cahill L, Danska J, de Vries GJ, Kibbe MR, McCarthy MM, Mogil JS, Woodruff TK, Zucker I. Opinion: Sex inclusion in basic research drives discovery. *Proc Natl Acad Sci U S A.* 2015;112(17):5257-8. doi: 10.1073/pnas.1502843112. PubMed PMID: 25902532; PMCID: PMC4418862.
280. Kniazeva E, Hardy AN, Boukaidi SA, Woodruff TK, Jeruss JS, Shea LD. Primordial follicle transplantation within designer biomaterial grafts produce live births in a mouse infertility model. *Sci Rep.* 2015;5:17709. doi: 10.1038/srep17709. PubMed PMID: 26633657; PMCID: PMC4668556.
281. Kong BY, Duncan FE, Que EL, Xu Y, Vogt S, O'Halloran TV, Woodruff TK. The inorganic anatomy of the mammalian preimplantation embryo and the requirement of zinc during the first mitotic divisions. *Dev Dyn.* 2015;244(8):935-47. doi: 10.1002/dvdy.24285. PubMed PMID: 25903945; PMCID: PMC4617753.
282. Laronda MM, Jakus AE, Whelan KA, Wertheim JA, Shah RN, Woodruff TK. Initiation of puberty in mice following decellularized ovary transplant. *Biomaterials.* 2015;50:20-9. doi: 10.1016/j.biomaterials.2015.01.051. PubMed PMID: 25736492; PMCID: PMC4350019.
283. Que EL, Bleher R, Duncan FE, Kong BY, Gleber SC, Vogt S, Chen S, Garwin SA, Bayer AR, Dravid VP, Woodruff TK, O'Halloran TV. Quantitative mapping of zinc fluxes in the mammalian egg reveals the origin of fertilization-induced zinc sparks. *Nat Chem.* 2015;7(2):130-9. doi: 10.1038/nchem.2133. PubMed PMID: 25615666; PMCID: PMC4315321.
284. Salama M, Woodruff TK. New advances in ovarian autotransplantation to restore fertility in cancer patients. *Cancer Metastasis Rev.* 2015;34(4):807-22. doi: 10.1007/s10555-015-9600-2. PubMed PMID: 26589603; PMCID: PMC4722873.
285. Silva GM, Rossetto R, Chaves RN, Duarte AB, Araujo VR, Feltrin C, Bernuci MP, Anselmo-Franci JA, Xu M, Woodruff TK, Campello CC, Figueiredo JR. In vitro development of secondary follicles from pre-pubertal and adult goats cultured in two-dimensional or three-dimensional systems. *Zygote.* 2015;23(4):475-84. doi: 10.1017/S0967199414000070. PubMed PMID: 24666604; PMCID: PMC4177015.
286. Skory RM, Xu Y, Shea LD, Woodruff TK. Engineering the ovarian cycle using in vitro follicle culture. *Hum Reprod.* 2015;30(6):1386-95. doi: 10.1093/humrep/dev052. PubMed PMID: 25784584; PMCID: PMC4447886.

287. Wood CD, Vijayvergia M, Miller FH, Carroll T, Fasanati C, Shea LD, Brinson LC, Woodruff TK. Multi-modal magnetic resonance elastography for noninvasive assessment of ovarian tissue rigidity in vivo. *Acta Biomater.* 2015;13:295-300. doi: 10.1016/j.actbio.2014.11.022. PubMed PMID: 25463483; PMCID: PMC4295766.
288. Woodruff TK. Oncofertility: a grand collaboration between reproductive medicine and oncology. *Reproduction.* 2015;150(3):S1-10. doi: 10.1530/REP-15-0163. PubMed PMID: 26130814; PMCID: PMC4710491.
289. Woodruff TK, Green S, Paller A, Schlosser BJ, Spring B, Castle M, Stock MC, Carnethon MR, Clark CT, Gerard E, Turek FW, Wisner KL, Wakschlag LS, Kibbe MR, Mendelson MA, Simon MA, Hansen NM, Kenton K, Garcia PM, Zee P, Ramsey-Goldman R, Sutton SH, Van Horn L. Sex-based biomedical research policy needs an implementation plan. *Womens Health (Lond).* 2015;11(4):449-52. doi: 10.2217/WHE.15.28. PubMed PMID: 26237204.
290. Xiao S, Duncan FE, Bai L, Nguyen CT, Shea LD, Woodruff TK. Size-specific follicle selection improves mouse oocyte reproductive outcomes. *Reproduction.* 2015;150(3):183-92. doi: 10.1530/REP-15-0175. PubMed PMID: 26116002; PMCID: PMC4527888.
291. Xiao S, Zhang J, Romero MM, Smith KN, Shea LD, Woodruff TK. In vitro follicle growth supports human oocyte meiotic maturation. *Sci Rep.* 2015;5:17323. doi: 10.1038/srep17323. PubMed PMID: 26612176; PMCID: PMC4661442.
292. Xu Y, Duncan FE, Xu M, Woodruff TK. Use of an organotypic mammalian in vitro follicle growth assay to facilitate female reproductive toxicity screening. *Reprod Fertil Dev.* 2015. doi: 10.1071/RD14375. PubMed PMID: 25689754; PMCID: PMC4540697.
293. Zhu J, Mishra RK, Schiltz GE, Makanji Y, Scheidt KA, Mazar AP, Woodruff TK. Virtual High-Throughput Screening To Identify Novel Activin Antagonists. *J Med Chem.* 2015;58(14):5637-48. doi: 10.1021/acs.jmedchem.5b00753. PubMed PMID: 26098096; PMCID: PMC4635973.
294. Ataman LM, Rodrigues JK, Marinho RM, Caetano JP, Chehin MB, Alves da Motta EL, Serafini P, Suzuki N, Furui T, Takae S, Sugishita Y, Morishige KI, Almeida-Santos T, Melo C, Buzaglo K, Irwin K, Wallace WH, Anderson RA, Mitchell RT, Telfer EE, Adiga SK, Anazodo A, Stern C, Sullivan E, Jayasinghe Y, Orme L, Cohn R, McLachlan R, Deans R, Agresta F, Gerstl B, Ledger WL, Robker RL, de Meneses ESJM, Silva LH, Lunardi FO, Lee JR, Suh CS, De Vos M, Van Moer E, Stoop D, Vloeberghs V, Smitz J, Tournaye H, Wildt L, Winkler-Crepaz K, Andersen CY, Smith BM, Smith K, Woodruff TK. Creating a global community of practice for oncofertility. *J Glob Oncol.* 2016;2(2):83-96. doi: 10.1200/JGO.2015.000307. PubMed PMID: 27284576; PMCID: PMC4894337.
295. Castle M, Cleveland C, Gordon D, Jones L, Zelinski M, Winter P, Chang J, Senegar-Mitchell E, Coutifaris C, Shuda J, Mainigi M, Bartolomei M, Woodruff TK. Reproductive science for high school students: A shared curriculum model to enhance student success. *Biol Reprod.* 2016;95(1):28. doi: 10.1095/biolreprod.116.139998. PubMed PMID: 27335072; PMCID: PMC5029436.
296. Castle M, Kick L, Haseley H, Wallach H, Woodruff TK. Introduction to reproduction: online education for the millennial learner. *Biol Reprod.* 2016;95(1):29. doi: 10.1095/biolreprod.116.140004. PubMed PMID: 27335073; PMCID: PMC5029437.
297. *Duncan* FE, Que EL, Zhang N, Feinberg EC, O'Halloran TV, Woodruff TK. The zinc spark is an inorganic signature of human egg activation. *Sci Rep.* 2016;6:24737. doi: 10.1038/srep24737. PubMed PMID: 27113677; PMCID: PMC4845039.

298. Duncan FE, Zelinski M, Gunn AH, Pahnke JE, O'Neill CL, Songsasen N, Woodruff RI, Woodruff TK. Ovarian tissue transport to expand access to fertility preservation: from animals to clinical practice. *Reproduction*. 2016;152(6):R201- R10. doi: 10.1530/REP-15-0598. PubMed PMID: 27492079; PMCID: PMC5088055.
299. Finlayson C, Fritsch MK, Johnson EK, Rosoklija I, Gosiengfiao Y, Yerkes E, Madonna MB, Woodruff TK, Cheng E. Presence of germ cells in disorders of sex development: Implications for fertility potential and preservation. *J Urol*. 2016. doi: 10.1016/j.juro.2016.08.108. PubMed PMID: 27840018.
300. Finlayson C, Johnson EK, Chen D, Dabrowski E, Gosiengfiao Y, Campo-Engelstein L, Rosoklija I, Jacobson J, Shnorhavorian M, Pavone ME, Moravek MB, Bonifacio HJ, Simons L, Hudson J, Fechner PY, Gomez-Lobo V, Kadakia R, Shurba A, Rowell E, Woodruff TK. Proceedings of the working group session on fertility preservation for individuals with gender and sex diversity. *Transgend Health*. 2016;1(1):99-107. doi: 10.1089/trgh.2016.0008. PubMed PMID: 28111635; PMCID: PMC5243122.
301. Fuchs A, Kashanian JA, Clayman ML, Gosiengfiao Y, Lockart B, Woodruff TK, Brannigan RE. Pediatric oncology providers' attitudes and practice patterns regarding fertility preservation in adolescent male cancer patients. *J Pediatr Hematol Oncol*. 2016;38(2):118-22. doi: 10.1097/MPH.0000000000000488. PubMed PMID: 26630536; PMCID: PMC4758901.
302. Goetsch AL, Wicklund C, Clayman ML, Woodruff TK. Reproductive endocrinologists' utilization of genetic counselors for oncofertility and preimplantation genetic diagnosis (PGD) treatment of BRCA1/2 mutation carriers. *J Genet Couns*. 2016;25(3):561-71. doi: 10.1007/s10897-015-9908-7. PubMed PMID: 26567039; PMCID: PMC4867141.
303. Kim SY, Ebbert K, Cordeiro MH, Romero MM, Whelan KA, Suarez AA, Woodruff TK, Kurita T. Constitutive activation of PI3K in oocyte induces ovarian granulosa cell tumors. *Cancer Res*. 2016;76(13):3851-61. doi: 10.1158/0008-5472.CAN-15-3358. PubMed PMID: 27197196; PMCID: PMC5081136.
304. Kim SY, Kim SK, Lee JR, Woodruff TK. Ovary is necessary to the health of uterus. *J Gynecol Oncol*. 2016;27(3):e35. doi: 10.3802/jgo.2016.27.e35. PubMed PMID: 27029755; PMCID: PMC4823365.
305. Kim SY, Kim SK, Lee JR, Woodruff TK. Toward precision medicine for preserving fertility in cancer patients: existing and emerging fertility preservation options for women. *J Gynecol Oncol*. 2016;27(2):e22. doi: 10.3802/jgo.2016.27.e22. PubMed PMID: 26768785; PMCID: PMC4717227.
306. Laronda MM, McKinnon KE, Ting AY, Le Fever AV, Zelinski MB, Woodruff TK. Good manufacturing practice requirements for the production of tissue vitrification and warming and recovery kits for clinical research. *J Assist Reprod Genet*. 2016. doi: 10.1007/s10815-016-0846-6. PubMed PMID: 27900615.
307. Manson JE, Woodruff TK. Reproductive health as a marker of subsequent cardiovascular disease: The role of estrogen. *JAMA Cardiol*. 2016;1(7):776-7. doi: 10.1001/jamacardio.2016.2662. PubMed PMID: 27626902; PMCID: PMC5120648.
308. Mansukhani NA, Yoon DY, Teter KA, Stubbs VC, Helenowski IB, Woodruff TK, Kibbe MR. Determining if sex bias exists in human surgical clinical research. *JAMA Surg*. 2016;151(11):1022-30. doi: 10.1001/jamasurg.2016.2032. PubMed PMID: 27551816; PMCID: PMC5142632.
309. Quinn GP, Woodruff TK, Knapp CA, Bowman ML, Reinecke J, Vadaparampil ST. Expanding the oncofertility workforce: Training allied health professionals to improve health outcomes for adolescents and young adults. *J*

- Adolesc Young Adult Oncol. 2016;5(3):292-6. doi: 10.1089/jayao.2016.0003. PubMed PMID: 26978683; PMCID: PMC5031089.
310. Treff NR, Krisher RL, Tao X, Garnsey H, Bohrer C, Silva E, Landis J, Taylor D, Scott RT, Woodruff TK, Duncan FE. Next Generation Sequencing-Based Comprehensive Chromosome Screening in Mouse Polar Bodies, Oocytes, and Embryos. *Biol Reprod.* 2016;94(4):76. doi: 10.1095/biolreprod.115.135483. PubMed PMID: 26911429.
311. Walter JR, Xu S, Paller AS, Choi JN, Woodruff TK. Oncofertility considerations in adolescents and young adults given a diagnosis of melanoma: Fertility risk of Food and Drug Administration-approved systemic therapies. *J Am Acad Dermatol.* 2016;75(3):528-34. doi: 10.1016/j.jaad.2016.04.031. PubMed PMID: 27543212; PMCID: PMC5142834.
312. Woodruff TK, Smith K, Gradishar W. Oncologists' Role in Patient Fertility Care: A Call to Action. *JAMA Oncol.* 2016;2(2):171-2. doi: 10.1001/jamaoncol.2015.5609. PubMed PMID: 26822528; PMCID: PMC5120650.
313. Zeng XH, Duch J, Sales-Pardo M, Moreira JA, Radicchi F, Ribeiro HV, Woodruff TK, Amaral LA. Differences in Collaboration Patterns across Discipline, Career Stage, and Gender. *PLoS Biol.* 2016;14(11):e1002573. doi: 10.1371/journal.pbio.1002573. PubMed PMID: 27814355; PMCID: PMC5096717.
314. Zhang N, Duncan FE, Que EL, O'Halloran TV, Woodruff TK. The fertilization-induced zinc spark is a novel biomarker of mouse embryo quality and early development. *Sci Rep.* 2016;6:22772. doi: 10.1038/srep22772. PubMed PMID: 26987302; PMCID: PMC4796984.
315. Zhu J, Xu Y, Rashedi AS, Pavone ME, Kim JJ, Woodruff TK, Burdette JE. Human fallopian tube epithelium co-culture with murine ovarian follicles reveals crosstalk in the reproductive cycle. *Mol Hum Reprod.* 2016;22(11):756-67. doi: 10.1093/molehr/gaw041. PubMed PMID: 27542947; PMCID: PMC5099996.
316. Besharati M, Woodruff T, Victorson D. Young Adults' Access to Fertility Preservation Services at National Cancer Institute Community Oncology Research Program Minority/Underserved Community Sites: A Qualitative Study. *J Adolesc Young Adult Oncol.* 2016;5(2):187-200. Epub 2016/01/27. doi: 10.1089/jayao.2015.0034. PubMed PMID: 26812462.
317. Hurwitz LB, Lauricella AR, Hightower B, Sroka I, Woodruff TK, Wartella E. "When You're a Baby You Don't Have Puberty": Understanding of Puberty and Human Reproduction in Late Childhood and Early Adolescence. *The Journal of Early Adolescence*, 2016. doi:0272431616642323.
318. Finlayson C, Fritsch MK, Johnson EK, Rosoklija I, Gosiengfiao Y, Yerkes E, Madonna MB, Woodruff TK, Cheng E. Presence of Germ Cells in Disorders of Sex Development: Implications for Fertility Potential and Preservation. *J Urol.* 2017;197(3 Pt 2):937-43. doi: 10.1016/j.juro.2016.08.108. PubMed PMID: 27840018; PMCID: PMC5309153.
319. Johnson EK, Finlayson C, Rowell EE, Gosiengfiao Y, Pavone ME, Lockart B, Orwig KE, Brannigan RE, Woodruff TK. Fertility Preservation for Pediatric Patients: Current State and Future Possibilities. *J Urol.* 2017, Feb 9. Epub 2017/02/13. doi: 10.1016/j.juro.2016.09.159. PubMed PMID: 28189577.
320. Laronda MM, McKinnon KE, Ting AY, Le Fever AV, Zelinski MB, Woodruff TK. Good manufacturing practice requirements for the production of tissue vitrification and warming and recovery kits for clinical research. *J Assist Reprod Genet.* 2017;34(2):291-300. doi: 10.1007/s10815-016-0846-6. PubMed PMID: 27900615.

321. Mendoza AD, Woodruff TK, Wignall SM, O'Halloran TV. Zinc availability during germline development impacts embryo viability in *Caenorhabditis elegans*. *Comp Biochem Physiol C Toxicol Pharmacol.* 2017;191:194-202. doi: 10.1016/j.cbpc.2016.09.007. PubMed PMID: 27664515; PMCID: PMC5210184.
322. Que EL, Duncan FE, Bayer AR, Philips SJ, Roth EW, Bleher R, Gleber SC, Vogt S, Woodruff TK, O'Halloran TV. Zinc sparks induce physiochemical changes in the egg zona pellucida that prevent polyspermy. *Integr Biol (Camb).* 2017;9(2):135-44. doi: 10.1039/c6ib00212a. PubMed PMID: 28102396.
323. Woodruff TK. A win-win for women's reproductive health: A nonsteroidal contraceptive and fertoprotective neoadjuvant. *Proc Natl Acad Sci U S A.* 2017, Feb 28. doi: 10.1073/pnas.1700337114. PubMed PMID: 28213496.
324. Xiao S, Coppeta JR, Rogers HB, Isenberg BC, Zhu J, Olalekan SA, McKinnon KE, Dokic D, Rashedi AS, Haisenleder DJ, Malpani SS, Arnold-Murray CA, Chen K, Jiang M, Bai L, Nguyen CT, Zhang J, Laronda MM, Hope TJ, Maniar KP, Pavone ME, Avram MJ, Sefton EC, Getsios S, Burdette JE, Kim JJ, Borenstein JT, Woodruff TK. A microfluidic culture model of the human reproductive tract and 28-day menstrual cycle. *Nature Commun.* 2017, March 28;8. doi: 10.1038/ncomms14584.
325. Xiao S, Zhang J, Liu M, Iwahata H, Rogers HB, Woodruff TK. Doxorubicin has dose-dependent toxicity on mouse ovarian follicle development, hormone secretion, and oocyte maturation. *Toxicol Sci.* 2017, March 17. Epub 2017/03/23. doi: 10.1093/toxsci/kfx047. PubMed PMID: 28329872 ; PMCID: PMC5460835.
326. Walter JR, Xu S, Woodruff TK. A Call for Fertility Preservation Coverage for Breast Cancer Patients: The Cost of Consistency. *J Natl Cancer Inst.* 2017;109(5).
327. Lebbe M, Taylor AE, Visser JA, Kirkman-Brown J, Woodruff TK, Arlt W. The steroid metabolome in the isolated ovarian follicle and its response to androgen exposure and antagonism. *Endocrinology.* 2017, Feb 23. doi: 10.1210/en.2016- 1851. PubMed PMID: 28323936.
328. Carvalho BR, Kliemchen J, Woodruff TK. Ethical, moral and other aspects related to fertility preservation in cancer patients. *JBRA Assisted Reproduction.* 2017;21(1):45.
329. Bortoletto P, Confino R, Smith BM, Woodruff TK, Pavone ME. Practices and Attitudes Regarding Women Undergoing Fertility Preservation: A Survey of the National Physicians Cooperative. *J Adolesc Young Adult Oncol.* 2017. doi: 10.1089/jayao.2017.0016. PubMed PMID: 28459598.
330. Olalekan SA, Burdette JE, Getsios S, Woodruff TK, Kim JJ. Development of a Novel Human Recellularized Endometrium that responds to a 28 day Hormone Treatment. *Biol Reprod.* 2017. doi: 10.1093/biolre/iox039. PubMed PMID: 28449068.
331. Laronda MM, Rutz AL, Xiao S, Whelan KA, Duncan FE, Roth EW, Woodruff TK, Shah RN. A bioprosthetic ovary created using 3D printed microporous scaffolds restores ovarian function in sterilized mice. *Nat Commun.* 2017;8:15261. Epub 2017/05/17. doi: 10.1038/ncomms15261. PubMed PMID: 28509899.
332. Salama M, Woodruff TK. Anticancer treatments and female fertility: clinical concerns and role of oncologists in oncofertility practice. *Expert Rev Anticancer Ther.* 2017:1-6. Epub 2017/05/26. doi: 10.1080/14737140.2017.1335199. PubMed PMID: 28537815.
333. de Roo SF, Rashedi AS, Beerendonk CCM, Anazodo A, de Man AM, Nelen W, Woodruff TK. Global oncofertility index-data gap slows progress. *Biol Reprod.* 2017. doi: 10.1093/biolre/iox051. PubMed PMID: 28575176.

334. Iwahata H, Iwahata Y, Woodruff TK. Pregnancy and Cancer. *Glob J Reprod Med.* 2017; 1(4): 555566.
335. Giwa S, Lewis JK, Alvarez L, Langer R, Roth AE, Church GM, Markmann JF, Sachs DH, Chandraker A, Wertheim JA, Rothblatt M, Boyden ES, Eidbo E, Lee WPA, Pomahac B, Brandacher G, Weinstock DM, Elliott G, Nelson D, Acker JP, Uygun K, Schmalz B, Weegman BP, Tocchio A, Fahy GM, Storey KB, Rubinsky B, Bischof J, Elliott JAW, Woodruff TK, Morris GJ, Demirci U, Brockbank KGM, Woods EJ, Ben RN, Baust JG, Gao D, Fuller B, Rabin Y, Kravitz DC, Taylor MJ, Toner M. The promise of organ and tissue preservation to transform medicine. *Nat Biotechnol.* 2017;35(6):530-42. Epub 2017/06/08. doi: 10.1038/nbt.3889. PubMed PMID: 28591112.
336. Rashedi AS, de Roo SF, Ataman LM, Edmonds ME, Silva AA, Scarella A, Horbaczewska A, Anazodo A, Arvas A, Ramalho de Carvalho B, Sartorio C, Beerendonk CCM, Diaz-Garcia C, Suh CS, Melo C, Andersen CY, Motta E, Greenblatt EM, Van Moer E, Zand E, Reis FM, Sánchez F, Terrado G, Rodrigues JK, Marcos de Meneses e Silva J, Smitz J, Medrano J, Lee JR, Winkler-Crepaz K, Smith K, Ferreira Melo e Silva LH, Wildt L, Salama M, del Mar Andrés M, Bourlon MT, Vega M, Chehin MB, De Vos M, Khrouf M, Suzuki N, Azmy O, Fontoura P, Campos-Junior PHA, Mallmann P, Azambuja R, Marinho RM, Anderson RA, Jach R, Antunes RdA, Mitchell R, Fathi R, Adiga SK, Takae S, Kim SH, Romero S, Grieco SC, Shaulov T, Furui T, Almeida-Santos T, Nelen W, Jayasinghe Y, Sugishita Y, Woodruff TK. Survey of Third-Party Parenting Options Associated With Fertility Preservation Available to Patients With Cancer Around the Globe. *J Glob Oncol.* 2017;JGO.2017.009944. doi: 10.1200/JGO.2017.009944.
337. Miller EJN, Cookingham LM, Woodruff TK, Ryan GL, Summers KM, Kondapalli LA, Shah DK. Fertility preservation training for obstetrics and gynecology fellows: a highly desired but non-standardized experience. *Fertil Res Pract.* 2017;3:9. Epub 2017/07/12. doi: 10.1186/s40738-017-0036-y. PubMed PMID: 28690863; PMCID: PMC5496430.
338. Rashedi AS, Roo SFd, Ataman LM, Edmonds ME, Silva AA, Scarella A, Horbaczewska A, Anazodo A, Arvas A, Carvalho BRd, Sartorio C, Beerendonk CCM, Diaz-Garcia C, Suh CS, Melo C, Andersen CY, Motta E, Greenblatt EM, Moer EV, Zand E, Reis FM, Sánchez F, Terrado G, Rodrigues JK, Silva JMdMe, Smitz J, Medrano J, Lee JR, Winkler-Crepaz K, Smith K, Silva LHFMe, Wildt L, Salama M, Andrés MdM, Bourlon MT, Vega M, Chehin MB, Vos MD, Khrouf M, Suzuki N, Azmy O, Fontoura P, Campos-Junior PHA, Mallmann P, Azambuja R, Marinho RM, Anderson RA, Jach R, Antunes RdA, Mitchell R, Fathi R, Adiga SK, Takae S, Kim SH, Romero S, Grieco SC, Shaulov T, Furui T, Almeida-Santos T, Nelen W, Jayasinghe Y, Sugishita Y, Woodruff TK. Survey of Fertility Preservation Options Available to Patients With Cancer Around the Globe. *J Glob Oncol.*0(0):JGO.2016.008144. doi: 10.1200/jgo.2016.008144.
339. Kong BY IS, Woodruff TK, Paller AS, Xu S. LB590 The potential impact on future fertility for biologics and emerging therapies for psoriasis and atopic dermatitis. *J Invest Dermatol.* 2017;137(10):B4.
340. Jakus AE, Laronda MM, Rashedi A, Robinson CM, Lee C, Jordan SW, Orwig KE, Woodruff TK, Shah RN. "Tissue Papers" from Organ-Specific Decellularized Extracellular Matrices." *Adv Funct Mater.* 27.34 (2017): 1700992. This publication has received coverage from 25 news outlets, including Smithsonian Magazine, The Scientist Magazine, and World Economic Forum. It is in the top 5% of all research outputs scored by Altmetric.
341. Stouffer RL, Woodruff TK. Nonhuman Primates: A Vital Model for Basic and Applied Research on Female Reproduction, Prenatal Development, and Women's Health. *ILAR J.* 2017:1-14. doi: 10.1093/ilar/ilx027.
342. Woodruff TK, Khosla S. New hope for symptom management during natural and iatrogenic menopause transitions. *Biol Reprod.* 2017;97(2):177-8. Epub 2017/10/19. doi: 10.1093/biolre/iox079. PubMed PMID: 29044424.
343. Woodruff TK. Fertility Lost-Fertility Found: Narratives from the Leading Edge of Oncofertility. *Narrat Inq Bioeth.* 2017;7(2):147-50. Epub 2017/10/24. doi: 10.1353/nib.2017.0044. PubMed PMID: 29056645.

344. Armstrong AG, Kimler BF, Smith BM, Woodruff TK, Pavone ME, Duncan FE. Ovarian tissue cryopreservation in young females through the Oncofertility Consortium's National Physicians Cooperative. *Future Oncol.* 2018;14(4):363-78. doi: 10.2217/fon-2017-0410. PubMed PMID: 29345507.
345. Woodruff TK. Endocrinology at the beginning of our second century: Connectivity and conversations. *Endocrinology.* 2018;159(1):1 doi: 10.1210/en.2017-03153. PubMed PMID: 29300999.
346. Kim, SY, Luan, Y, & Woodruff, TK. Hormone Effects on Follicular Growth and Differentiation. In M. K. Skinner (Ed.), *Encyclopedia of Reproduction.* 2018; vol. 2, pp. 172–175. Academic Press: Elsevier. <http://dx.doi.org/10.1016/B978-0-12-801238-3.64638-X>.
347. Ataman LM, Ma Y, Duncan FE, Uzzi B, Woodruff TK. Quantifying the growth of oncofertility. *Biol Reprod.* 2018;99(2):263-5. doi: 10.1093/biolre/i0y068.
348. Duncan FE, Romar R, Gadea J, Kimelman D, Wallach HD, Woodruff TK, Jimenez-Movilla M. The use of a virtual journal club to promote cross-cultural learning in the reproductive sciences. *JARG.* 2018; Article in Press.
349. Woodruff TK. Values We Share in Publishing Endocrinology: People and Process. *Endocrinol.* 2018;159(2):1019-20. doi: 10.1210/en.2018-00059. PubMed PMID: 29579173.
350. Duncan FE, Feinberg E, Brannigan RE, Edmond M, Ataman L, Woodruff TK. Fertility Preservation. Book Chapter in Yen and Jaffe's *Reproductive Endocrinology: Physiology, Pathophysiology, and Clinical Management* 8e. 2018; 857-886.
351. Woodruff TK. Tweets and Transformative Technologies: Enabling Our Endocrine Future. *Endocrinol.* 2018;159(3):1417-8. doi: 10.1210/en.2018-00114. PubMed PMID: 29617756.
352. Woodruff TK. Endocrinology-It Takes All of Us. *Endocrinol.* 2018;159(4):1873-4. doi: 10.1210/en.2018-00229. PubMed PMID: 29718328.
353. Woodruff TK. "Peering" Into Our Endocrinology Future. *Endocrinol.* 2018;159(5):2034-5. doi: 10.1210/en.2018-00324. PubMed PMID: 29718166.
354. Woodruff TK. Structure-Function Relationships in Endocrinology. *Endocrinol.* 2018;159(6):2376-7. doi: 10.1210/en.2018-00425. PubMed PMID: 29788042.
355. Woodruff TK. A Rule, a Roadmap, and a Request for Early Career Reviewers of the Endocrinology Community. *Endocrinol.* 2018;159(7):2701-2. doi: 10.1210/en.2018-00543. PubMed PMID: 29931065.
356. Kim SY, Nair DM, Romero M, Serna VA, Koleske AJ, Woodruff TK, Kurita T. Transient inhibition of p53 homologs protects ovarian function from two distinct apoptotic pathways triggered by anticancer therapies. *Cell Death Differ.* 2018. Epub 2018/07/11. doi: 10.1038/s41418-018-0151-2. PubMed PMID: 29988075.
357. Woodruff TK. Communicating Endocrine Science: Part I. *Endocrinol.* 2018;159(8):2991-2. doi: 10.1210/en.2018-00624. PubMed PMID: 30052930.

358. Rios PD, Kniazeva E, Lee HC, Xiao S, Oakes RS, Saito E, Jeruss JS, Shikanov A, Woodruff TK, Shea LD. Retrievable hydrogels for ovarian follicle transplantation and oocyte collection. *Biotechnol Bioeng*. 2018;115(8):2075-86. doi: 10.1002/bit.26721. PubMed PMID: 29704433; PMCID: PMC6045426.
359. Gargus E, Deans R, Anazodo A, Woodruff TK. Management of primary ovarian insufficiency symptoms in survivors of childhood and adolescent cancer. *JNCCN*. 2018;16(9): 1137-49.
360. Woodruff TK. Impact of Endocrinology. *Endocrinol*. 2018;159(10):3579-80.
361. Woodruff TK. Reading and Writing. *Endocrinol*. 2018;159(11):3657-8.
362. Anazodo A, Ataman-Millhouse L, Jayasinghe Y, Woodruff TK. Oncofertility-An emerging discipline rather than a special consideration. *Pediatr Blood Cancer*. 2018:e27297. doi: 10.1002/pbc.27297. PubMed PMID: 29972282.
363. Prakash VS, Mansukhani NA, Helenowski IB, Woodruff TK, Kibbe MR. Sex Bias in Interventional Clinical Trials. *Journal of Women's Health*. 2018;27(11): 1342-8.
364. Hurwitz LB, Lovato SB, Lauricella, AR, Woodruff TK, Patrick E, Wartella E. 'A New You, That's Who': an evaluation of short videos on puberty and human reproduction. *Palgrave Communications*. 2018;4(1): article 89.
365. Smith BM, Duncan FE, Ataman L, Woodruff TK, et al. The National Physicians Cooperative: Transforming fertility management in the cancer setting and beyond. *Future Oncology*. 2018;14(29): 3059-72.
366. Luan Y, Edmonds ME, Woodruff TK, Kim S-Y. Inhibitors of apoptosis protect the ovarian reserve from cyclophosphamide. *Journal of Endocrinology*. 2019;240(2): 243-56.
367. Voitowich NC, Woodruff TK. Implementation of the NIH Sex-Inclusion Policy: Attitudes and Opinions of Study Section Members. *J Womens Health (Larchmt)*. 2019 Jan;28(1):9-16. doi: 10.1089/jwh.2018.7396
368. Woodruff TK. New Year's Resolutions-New Year Reviewers-New Year of Review. *Endocrinology*. 2019 Jan 1;160(1):36-37.
369. Voitowich NC, Woodruff TK. No female mice or cells? NIH reviewers still might score grant OK. *Nature*. 2019;565 (7737): 25.
370. Salama M, Ataman-Milhouse L, Sobral F, Woodruff TK, et al. Barriers and Opportunities of Oncofertility Practice in Nine Developing Countries and the Emerging Oncofertility Professional Engagement Network. *Journal of Global Onc*. 2018;4: 1-7.
371. Karczmar AL, Woodruff TK. Including Sex and Gender in the Scientific Conversation. *Clinical Chemistry*. 2019;65(1):36-8
372. Wang Y, Chen H, Ju K, Kopp MF, Johnson SB, Farrell KK, Yuan G, Ataman LM, Zheng W, Woodruff TK, Xiao S. Female oncofertility attitude and knowledge: a survey of reproductive health professionals in Shanghai, China. *Future Oncol*. 2019;15(4): 371-79. PMID: 30620219. doi: 10.2217/fon-2018-0428.
373. Que EL, Duncan FE, Lee HC, Hornick JE, Vogt S, Fissore RA, O'Halloran TV, Woodruff TK. Bovine eggs release zinc in response to parthenogenetic and sperm-induced egg activation. *Theriogenology*. 2019;127: 41-8.

374. Ma Y, Oliveira DFM, Woodruff TK, Uzzi B. Women who win prizes get less money and prestige. *Nature*. 2019;565(7739): 287-8.
375. Moravek MB, Appiah LC, Anazodo A, Burns KC, Gomez-Lobo V, Hoefgen HR, Jaworek Frias O, Laronda MM, Levine J, Meacham LR, Pavone ME, Quinn GP, Rowell EE, Strine AC, Woodruff TK, Nahata L. Development of a Pediatric Fertility Preservation Program: A Report From the Pediatric Initiative Network of the Oncofertility Consortium. *J Adolescent Health*. 2019;64(5): 563-73. PMID: 30655118. doi:10.1016/j.jadohealth.2018.10.297.
376. Woodruff TK. Well Students = Well Field: An Equation for Success. *Endocrinology*. 2019;160(2):375-76.
377. Salama M, Woodruff TK. From bench to bedside: Current developments and future possibilities of artificial human ovary to restore fertility. *Acta Obstet Gynecol Scand*. 2019;00:1–6. <https://doi.org/10.1111/aogs.13552>
378. Woodruff TK. Teaching Endocrinology – The Highest Calling. *Endocrinology*. 2019;160(3): 534-35.
379. Oliveira DFM, Ma Y, Woodruff TK. Comparison of National Institutes of Health Grant Amounts to First-Time Male and Female Principal Investigators. *JAMA*. 2019;321(9): 898-90.
380. Woodruff TK. Teaching Endocrinology Redux. *Endocrinology*. 2019 Apr 1;160(4):770-771
381. Cho GJ, Kim SY, Lee HC, Lee KM, Han SW, Oh MJ, Woodruff TK. Risk of Adverse Obstetric Outcomes and the Abnormal Growth of Offspring in Women with a History of Thyroid Cancer. *Thyroid*. 2019;29(6): 879-85. PMID: 30957663 doi: 10.1089/thy.2018.0283.
382. Woitowich NC, Woodruff TK. Research community needs to better appreciate the value of sex-based research. *Proceedings of the National Academy of Sciences of the United States of America*. 2019;116(15): 7154-56.
383. Chen D, Kyweluk MA, Sajwani A, Gordon EJ, Johson, EK, Finlayson CA, Woodruff TK. Factors Affecting Fertility Decision-Making Among Transgender Adolescents and Young Adults. *LGBT Health*. 2019;6(3): 107-15.
384. Von Wolff M, Andersen CY, Woodruff TK, Nawroth F. FertiPROTEKT, Oncofertility Consortium and the Danish Fertility-Preservation Networks – Can We learn Learn From Their Experiences? *Clinical Medicine Insights Reproductive Health*. 2019. doi: 10.1177/1179558119845865. PubMed PMID: 31068758; PMCID: PMC6495450.
385. Woodruff TK. Ingredients of Scientific Success: People, Ideas, Tools, and Teams. *Endocrinol*. 2019;160(6): 1409-10.
386. Woodruff TK. Your Morning Briefing: Endrocrinology Five Things. *Endocrinol*. 2019;160(5): 1175-76.
387. Anazodo A, Laws P, Logan S, Saunders C, Travaglia J, Gerstl B, Bradford N, Cohn R, Birdsall, Barr R, Suzuki N, Takae S, Marinho R, Xiao S, Chen QH, Mahajan N, Patil M, Gunasheela D, Smith K, Sender L, Melo C, Almeida-Santos T, Salama M, Appiah L, Su I, Lane S, Woodruff TK, Pacey A, Anderson RA, Shenfield F, Sullivan E, Ledger W. The Development of an International Oncofertility Competency Framework: A Model to Increase Oncofertility Implementation. *Oncologist*. 2019. PMID: 31147490 doi: 10.1634/theoncologist.2019-0043.
388. Peñalver Bernabé B, Thiele I, Galdones E, Siletz A, Chandrasekaran S, Woodruff TK, Broadbelt L, Shea LD. Dynamic genome-scale cell-specific metabolic models reveal novel inter-cellular and intra-cellular metabolic communications during ovarian follicle development. *BMC Bioinformatics*. 2019;20(1): 307. doi: 10.1186/s12859-019-2825-2. PMID: 31182013 PMCID: PMC6558917.

389. Woodruff TK. An Intellectual App for Successful Scientists. *Endocrinology*. 2019;160(7): 1679-1680.
390. Lee J, Lee HC, Kim SY, Cho GJ, Woodruff TK. Poorly-Controlled Type 1 Diabetes Mellitus Impairs LH-LHCGR Signaling in the Ovaries and Decreases Female Fertility in Mice. *Yonsei Med J*. 2019 Jul;60(7):667-678. doi: 10.3349/ymj.2019.60.7.667.
391. Wu Y, Wang Y, Liu Q, Zhu LJ, Gao H, Cui M, Liu J, Zhao P, Liu J, Chen L, Wang J, Zeng W, Woodruff TK, Zeng S. Conserved microRNA mediates heating tolerance in germ cells versus surrounding somatic cells. *RNA Biol*. 2019 Oct;16(10):1494-1503. doi: 10.1080/15476286.2019.1639311. Epub 2019 Jul 15.
392. Woodruff TK. Words to Work By. *Endocrinology*. 2019 Aug 1;160(8):1830-1831
393. Woodruff TK, Oliveira DFM, Ma Y. Sex Differences in Grant Funding-Reply. *JAMA*. 2019 Aug 13;322(6):579-580. doi: 10.1001/jama.2019.7848.
394. Salama M, Anazodo A, Woodruff TK. Preserving fertility in female patients with hematological malignancies: A multidisciplinary oncofertility approach. *Ann Oncol*. 2019 Aug 16. pii: mdz284. doi: 10.1093/annonc/mdz284.
395. Woodruff TK. Publishing Past, Present, and Future. *Endocrinology*. 2019 Sep 1;160(9):2115-2116
396. Garwin SA, Kelley MS, Sue AC, Que EL, Schatz GC, Woodruff TK, O'Halloran TV. Interrogating Intracellular Zinc Chemistry with a Long Stokes Shift Zinc Probe ZincBY-4. *J Am Chem Soc*. 2019 Oct 23;141(42):16696-16705. doi: 10.1021/jacs.9b06442.
397. Woodruff TK. Transcriptional Upregulation: The AND in Our DNA. *Endocrinology*. 2019 Oct 1;160(10):2464-2465.
398. Wiwatpanit T, Murphy AR, Lu Z, Urbanek M, Burdette JE, Woodruff TK, Kim JJ. Scaffold-free endometrial organoids respond to excess androgens associated with polycystic ovarian syndrome. *J Clin Endocrinol Metab*. 2019 Oct 16. pii: dgz100. doi: 10.1210/clinem/dgz100.
399. Woodruff TK. Inside, Outside, Upside Down. *Endocrinology*. 2019 Nov 1;160(11):2618-2619.
400. Woodruff TK. Lifting Life's Little Anchors: The Latitude and Longitude of Science. *Endocrinology*. 2019 Dec 1;160(12):2861-2862
401. Woodruff TK. Lessons from bioengineering the ovarian follicle: a personal perspective. *Reproduction*. 2019 Dec 158(6):F113-F126.
402. Woodruff TK. Tell Me Your Superpower! *Endocrinology*. 2020 Feb 22. pii: bqaa021. doi: 10.1210/endocr/bqaa021.
403. Wiwatpanit T, Murphy AR, Lu Z, Urbanek M, Burdette JE, Woodruff TK, Kim JJ. J Clin. Scaffold-Free Endometrial Organoids Respond to Excess Androgens Associated With Polycystic Ovarian Syndrome. *Endocrinol Metab*. 2020 Mar 1;105(3). pii: dgz100. doi: 10.1210/clinem/dgz100.
404. Bourlon MT, Anazodo A, Woodruff TK, Segelov E. Oncofertility as a Universal Right and a Global Oncology Priority. *JCO Glob Oncol*. 2020 Mar;6:314-316. doi: 10.1200/GO.19.00337.

405. Salama M, Ataman L, Taha T, et al. Building Oncofertility Core Competency in Developing Countries: Experience From Egypt, Tunisia, Brazil, Peru, and Panama. *JCO Glob Oncol*. 2020;6:JGO.17.00121. 2020 Mar 2. doi:10.1200/JGO.17.00121
406. Salama M, Ataman-Millhouse L, Sobral F, et al. Barriers and Opportunities of Oncofertility Practice in Nine Developing Countries and the Emerging Oncofertility Professional Engagement Network. *JCO Glob Oncol*. 2020;6:JGO.18.00180. 2020 Mar 2. doi:10.1200/JGO.18.00180
407. Gargus ES, Rogers HB, McKinnon KE, Edmonds ME, Woodruff TK. Engineered reproductive tissues *Nat Biomed Eng*. 2020;4(4):381-393. doi:10.1038/s41551-020-0525-x
408. Nahata L, Woodruff TK, Quinn GP, et al. Ovarian tissue cryopreservation as standard of care: what does this mean for pediatric populations?. *J Assist Reprod Genet*. 2020;37(6):1323-1326. doi:10.1007/s10815-020-01794-7
409. Rashedi AS, de Roo SF, Ataman LM, et al. Survey of Third-Party Parenting Options Associated With Fertility Preservation Available to Patients With Cancer Around the Globe. *JCO Glob Oncol*. 2020;6:JGO.2017.009944. 2020 Mar 2. doi:10.1200/JGO.2017.009944
410. Rashedi AS, de Roo SF, Ataman LM, et al. Survey of Fertility Preservation Options Available to Patients With Cancer Around the Globe. *JCO Glob Oncol*. 2020;6:JGO.2016.008144. Published 2020 Mar 2. doi:10.1200/JGO.2016.008144
411. McKinnon KE, Getsios S, Woodruff TK. Distinct follicular and luteal transcriptional profiles in engineered human ectocervical tissue dependent on menstrual cycle phase. 2020 Apr 21. *Biol Reprod*. 2020;ioaa056. doi:10.1093/biolre/ioaa056
412. Lee HC, Edmonds ME, Duncan FE, O'Halloran TV, Woodruff TK. Zinc exocytosis is sensitive to myosin light chain kinase inhibition in mouse and human eggs. *Mol Hum Reprod*. 2020;26(4):228-239. doi:10.1093/molehr/gaaa017
413. McKinnon KE, Sensharma R, Williams C, Ravix J, Getsios S, Woodruff TK. Development of Human Ectocervical Tissue Models with Physiologic Endocrine and Paracrine Signaling. 2020 May 13. *Biol Reprod*. 2020;ioaa068. doi:10.1093/biolre/ioaa068
414. Tholeti P, Uppangala S, Bhat V, et al. Oncofertility: Knowledge, Attitudes, and Barriers Among Indian Oncologists and Gynecologists [published online ahead of print, 2020 May 22]. *J Adolesc Young Adult Oncol*. 2020 May 22;10.1089/jayao.2020.0034. doi:10.1089/jayao.2020.0034
415. Folsom SM, Woodruff TK. Good news on the active management of pregnant cancer patients. *F1000Res*. 2020;9:F1000 Faculty Rev-487. 2020 Jun 1. doi:10.12688/f1000research.22472.1
416. Hu Q, Duncan FE, Nowakowski AB, et al. Zinc Dynamics during Drosophila Oocyte Maturation and Egg Activation. *iScience*. 2020 Jun 16;23(7):101275. doi:10.1016/j.isci.2020.101275
417. Gargus ES, Jakubowski KL, Arenas GA, Miller SJ, Lee SSM, Woodruff TK. Ultrasound Shear Wave Velocity Varies Across Anatomical Region in *Ex Vivo* Bovine Ovaries. *Tissue Eng Part A*. 2020;10.1089/ten.tea.2020.0037. doi:10.1089/ten.tea.2020.0037

418. Edmonds ME, Woodruff TK. Testicular organoid formation is a property of immature somatic cells, which self-assemble and exhibit long-term hormone-responsive endocrine function. *Biofabrication*. 2020;12(4):045002. 2020 Jul 9. doi:10.1088/1758-5090/ab9907
419. McKinnon KE, Getsios S, Woodruff TK. Distinct follicular and luteal transcriptional profiles in engineered human ectocervical tissue dependent on menstrual cycle phase. *Biol Reprod*. 2020 Aug 21;103(3):487-496. doi: 10.1093/biolre/ioaa056. PMID: 32614039.
420. Bertoldo MJ, Smitz J, Wu LE, Lee, HC, Woodruff TK, Gilchrist RB. Prospects of Recruiting Young Eggs for Oncofertility. *Trends Endocrinol Metab*. 2020 Oct;31(10):708-711. doi: 10.1016/j.tem.2020.07.004. Epub 2020 Aug 14. PMID: 32807599.
421. McKinnon KE, Sensharma R, Williams C, Ravix J, Getsios S, Woodruff TK. Development of human ectocervical tissue models with physiologic endocrine and paracrine signaling†. *Biol Reprod*. 2020 Aug 21;103(3):497-507. doi: 10.1093/biolre/ioaa068. PMID: 32401296; PMCID: PMC7608514.
422. Jackson-Bey T, Colina J, Isenberg BC, Coppeta J, Urbanek M, Kim JJ, Woodruff TK, Burdette JE, Russo A. Exposure of human fallopian tube epithelium to elevated testosterone results in alteration of cilia gene expression and beating. *Hum Reprod*. 2020 Sep 1;35(9):2086-2096. doi: 10.1093/humrep/deaa157. PMID: 32756960; PMCID: PMC7550267.
423. Xu J, Wang Y, Kauffman AE, Zhang Y, Li Y, Zhu J, Maratea K, Fabre K, Zhang Q, Woodruff TK, Xiao S. A Tiered Female Ovarian Toxicity Screening Identifies Toxic Effects of Checkpoint Kinase 1 Inhibitors on Murine Growing Follicles. *Toxicol Sci*. 2020 Oct 1;177(2):405-419. doi: 10.1093/toxsci/kfaa118. PMID: 32697846.
424. Edmonds ME, Forshee MD, Woodruff TK. Extra Cellular Matrix-Based and Extra Cellular Matrix-Free Generation of Murine Testicular Organoids. *J Vis Exp*. 2020 Oct 7;(164). doi: 10.3791/61403. PMID: 33104061.
425. Gross JP, Kim SY, Gondi V, Pankuch M, Wagner S, Grover A, Luan Y, Woodruff TK. Proton Radiotherapy to Preserve Fertility and Endocrine Function: A Translational Investigation. *Int J Radiat Oncol Biol Phys*. 2021 Jan 1;109(1):84-94. doi: 10.1016/j.ijrobp.2020.07.2320. Epub 2020 Aug 3. PMID: 32758642.
426. Rogers HB, Zhou LT, Kusuhara A, Zaniker E, Shafaie S, Owen BC, Duncan FE, Woodruff TK. Dental resins used in 3D printing technologies release ovo-toxic leachates. *Chemosphere*. 2021 May; 270:129003. doi: 10.1016/j.chemosphere.2020.129003. Epub 2020 Dec 7. PMID: 33515896; PMCID: PMC7957323.

EDITED or AUTHORED BOOKS:

1. Woodruff TK, Snyder K. (Eds). (2007). *Oncofertility*. New York, NY: Springer
2. Woodruff TK, Zoloth L, Campo-Engelstein L, Rodriguez SB. (Eds). (2010). *Oncofertility: Ethical, Legal, Social, and Medical Perspectives*. New York, NY: Springer Publishing Company.
3. Woodruff TK, Gracia C. (Eds). (2012). *Oncofertility Medical Practice: Clinical Issues and Implementation*. New York, NY: Springer Publishing Company.
4. Woodruff TK, Clayman ML, Waimey KE. (Eds). (2013). *Oncofertility Communication: Sharing Information and Building Relationships across Disciplines*. New York, NY: Springer Publishing Company.

5. Woodruff TK, Gosiengfiao YC. (Eds). (2017). Pediatric and Adolescent Oncofertility: Best Practices and Emerging Technologies. Cham, Switzerland: Springer International Publishing.
6. Goetsch A, Kimelman D, Woodruff TK. (Co-authors). (2017). Fertility Preservation and Restoration for Patients with Complex Medical Conditions. New York, NY: Springer Publishing Company.
7. Woodruff TK, Shah DK, Vitek WS (Eds). (2019). Textbook of Oncofertility Research and Practice: A Multidisciplinary Approach. New York, NY: Springer Publishing Company.

LECTURES (Selected)

- 2020 Plenary Speaker, Universal Egyptian Assisted Reproductive Technology Summit
- 2020 Plenary Speaker, The International Embryo Technology Society, New York City, NY
- 2019 Invited Speaker, Society for the Study of Reproduction, San Jose, CA
- 2019 Invited Speaker, ESHRE, Vienna, Austria
- 2019 Invited Speaker, Endocrinology Division, Mayo Clinic, Rochester, MN
- 2019 Plenary Speaker, OSU Regional Oncofertility Conference, Columbus, OH
- 2019 Invited Speaker, Dr. Kelle H. Moley Lecture, Washington University, St. Louis, MO
- 2019 Keynote Speaker, Frontiers in Biomedical Sciences Seminar, Fort Collins, CO
- 2019 Invited Speaker, South African Society for Reproductive Medicine, Cape Town, South Africa
- 2019 Clark T. Sawin Memorial History of Endocrinology Lecture, Endocrine Society New Orleans, LA
- 2019 Invited Speaker, WIN Women's History Month, The Federal Reserve Board, Chicago, IL
- 2019 Grand Rounds, Department of Laboratory Medicine, Memorial Sloan Kettering, New York, NY
- 2019 Invited Speaker, Dittmar Dinner, Northwestern University, Evanston, IL
- 2019 Keynote Speaker, Society for Laboratory Automation and Screening International Conference, Washington, D.C.
- 2019 Invited Speaker, The Contemporary Club, Chicago, IL
- 2018 Plenary Lecture, European Society for Pediatric Endocrinology Meeting, Athens, Greece
- 2018 Invited Lecturer, NIEHS Council Meeting, Research Triangle Park, NC
- 2018 Invited Lecturer, Edwards, Steptoe and Kershaw Symposium: 40th Anniversary of IVF, Manchester, UK
- 2018 Grand Rounds, The Mayo Clinic, Rochester, MN
- 2018 Lipsett Lecturer, Endocrine Fellowship Graduation, National Institutes of Health, Bethesda, MD
- 2018 Trainee Mentoring Award Lecture, Society for the Study of Reproduction, New Orleans, LA
- 2017 Transatlantic Medal Lecture, Society for Endocrinology, Harrogate, UK
- 2017 Keynote Speaker, American Association for Laboratory Science National Meeting, Austin, TX
- 2017 Keynote Speaker, Drexel Discovery, Philadelphia, PA
- 2017 Speaker, Bill & Melinda Gates Grand Challenges Annual Meeting, Washington, DC
- 2017 Grand Rounds Speaker, Northwestern University Department of Obstetrics and Gynecology, Chicago, IL
- 2017 Keynote Speaker, American Society for Reproductive Immunology, Chicago, IL
- 2017 Speaker, 2017 AACC Annual Meeting & Clinical Laboratory Exposition, San Diego, CA
- 2017 Speaker, SSR 50th Anniversary Meeting, Washington, DC
- 2017 Guest Speaker, Korean Society for Fertility Preservation, Seoul National University Hospital
- 2017 Keynote Speaker, "A Celebration of Life" Magee-Women's Research Day Pittsburgh, Pittsburgh, PA
- 2017 Vivian Pinn Research Keynote Speaker, The 25th Anniversary Women's Health Congress, Washington, DC
- 2017 Plenary, University of Michigan Contemporary Issues in Multidisciplinary Breast Cancer
- 2017 Keynote Address, University of Kentucky, Resident Research Day, Lexington, KY
- 2017 The Inaugural Brommel-Hahs Lectureship, Northeastern Illinois University, Chicago, IL
- 2017 Grand Rounds, University of Toronto, St. Michael's Hospital, Toronto, Ontario, Canada
- 2017 Grand Rounds, The University of Oklahoma College of Medicine, Norman, OK
- 2017 The MacLean Lecture, Reproductive Ethics, The University of Chicago, Chicago, IL
- 2016 Keynote Speaker, Japan Society for Fertility Preservation, Tokyo, Japan

CURRICULUM VITAE T.K. WOODRUFF

- 2016 Honorary Doctor of Science Scientific Lecture, University of Birmingham, UK
- 2016 Speaker, American Society for Reproductive Medicine (ASRM) Salt Lake City, Utah
- 2016 Speaker, American College of Surgeons Clinical Congress 2016, Washington, D.C.
- 2016 Speaker, Molecular and Cellular Sciences Seminar Series, Rosalind Franklin University, IL
- 2016 Keynote Speaker, American Association of Medical Colleges (AAMC) GREAT/GRAND Lecture, Washington, DC
- 2016 Plenary Speaker, VI International Congress of Gynecologic Oncology, Lima, Peru
- 2016 Guest Speaker, Dermatology Grand Rounds, Feinberg School of Medicine, Northwestern University, Chicago, IL
- 2016 Plenary, National Conference: Hot Topics in Gynecologic Oncology, Krakow, Poland
- 2016 Speaker, 17th International Congress of Endocrinology/15th Annual Meeting of the Chinese Society of Endocrinology (ICE/CSE 2016), Beijing, China
- 2016 Keynote Speaker, Conference of the Indian Fertility Preservation Society, Bengaluru, India
- 2016 Guest Lecturer, West Region CME Committee Presentation, Central DuPage Hospital, IL
- 2016 Plenary, Biennial Cancer Survivorship Research Conference, Washington, DC
- 2016 Guest Lecturer, Canadian National Oncofertility Workshop, Toronto, Canada
- 2016 Guest Speaker, Skender Foundation Conversation with the Doctor, Chicago, IL
- 2016 Guest Speaker, UW School of Medicine Annual Pregnancy and Cancer Retreat, Seattle, WA
- 2016 Keynote Address, University of Illinois at Chicago Women's Health Research Day, Chicago, IL
- 2016 Plenary Lecturer, Endocrine Society, Boston, MA
- 2016 Keynote Address, Obstetrical Society of Philadelphia and The Philadelphia Perinatal Society,
- 2016 Keynote Speaker, 5th Annual Presidential Career Symposium (APCS) for the Texas Medical Center (TMC), Baylor College of Medicine, Houston, TX
- 2015 Keynote, 53rd Annual Meeting of Japan Society of Clinical Oncology, Kyoto, Japan
- 2015 Plenary Speaker, Queen's University, Kingston, ON, Canada
- 2015 Keynote, Puerto Rico Breast Cancer Conference, San Juan, Puerto Rico
- 2015 Keynote, National Institute Medical Sciences and Nutrition, Mexico City, Mexico
- 2015 Invited Speaker, Gordon Research Conferences, Holderness School, Holderness, NH
- 2015 Plenary Speaker, North American Society for Pediatric and Adolescent Society, Orlando, FL
- 2015 Donald C. Johnson Lecture in Reproduction, University of Kansas Medical Center, Lawrence, KS
- 2015 Speaker, Mini Symposium on Gonadal Peptides, Cochin Hospital, Paris, France
- 2015 "Sex in Three Cities" Lecture Series, Society for Reproduction and Fertility, Edinburgh Scotland; London, England; Nottingham, England
- 2015 Grand Rounds Speaker, Cincinnati Children's Hospital Medical Center, Cincinnati, OH
- 2014 Seminar Speaker, Texas A&M University, College Station, TX
- 2014 Luigi Mastroianni, Jr., M.D. Memorial Lecture Speaker, University of Pennsylvania, PA
- 2014 Speaker, NIH/ORWH Methods and Techniques Workshop, Bethesda, MD
- 2014 Speaker, ACRWH Office of Research on Women's Health Meeting, Bethesda, MD
- 2014 Lecturer, Stanford University Gendered Innovation Workshop, Stanford, CA
- 2014 Presidential Address and Plenary, Endocrine Society/International Congress of Endo Annual Meeting, Chicago, IL
- 2014 Invited Speaker, Gordon Research Conferences, Stonehill College, Easton, MA
- 2014 Speaker, American Association for Clinical Oncology (ASCO): New Scientific Horizons in Fertility Preservation for Cancer Patients, Chicago, IL
- 2013 Scientific Writers Conference, Guest Lecturer, New York City, NY
- 2013 Sociedad Mexicana de Nutrición y Endocrinología (SMNE), Cancun, Mexico
- 2013 Speaker, Michigan Society for Reproductive Endocrinology and Infertility, Birmingham, MI
- 2013 Keynote Speaker: Sociedade Portuguesa de Medicina de Reprodução, Coimbra, Portugal
- 2013 Keynote Speaker, National Women's Survivors Convention, Nashville, TN
- 2013 Beacon Lecture, Frontiers in Reproduction, Woods Hole, MA
- 2013 Ob/Gyn-Endocrinology Grand Rounds, University of Colorado, Denver, CO
- 2013 Speaker, Banner MD Anderson Cancer Center Oncology Grand Rounds, Gilbert, AZ

CURRICULUM VITAE T.K. WOODRUFF

- 2013 Speaker, Pró-Criar Annual Symposium, Belo Horizonte, Brazil
- 2013 Lecturer, Center for Reproductive Research, University of Virginia, Charlottesville, VA
- 2013 Barron Guest Lecturer, University of Florida, Gainesville, FL
- 2013 Speaker, Conference on Preservation of Fertility in Cancer Patients, Hong Kong
- 2012 Speaker, International Congress on Reproductive Medicine, Moscow, Russian Federation
- 2012 Invited Speaker, Koch Institute for Integrative Cancer Research at MIT, Boston, MA
- 2012 Plenary Speaker, NICHD 50th Anniversary, Bethesda, MD
- 2012 Speaker, National Academies Innovation Conference, Chicago, IL
- 2012 NUMATS Awards Ceremony, Keynote Speaker, Evanston, IL
- 2012 Best Practices Forum, Northwestern University, Chicago, IL
- 2012 Plenary Talk, Women in Science Symposium, Chicago, IL
- 2012 5th Annual Women's Cardiovascular Health Symposium Talk, Chicago, IL
- 2011 Keynote Address, Annual Paul Harding Research Day, London, Ontario, Canada
- 2011 Invited Speaker, 58th Annual Society for Gynecologic Investigation Meeting, Miami, FL
- 2011 Invited Speaker, Breast Cancer Survivorship Research Workshop, Chapel Hill, NC
- 2010 Inaugural Address of Amsterdam Reproductive Science Center, Amsterdam, The Netherlands
- 2010 Invited Speaker, International Symposium Female Fertility Preservation, Sao Paulo, Brazil
- 2010 Keynote Address, Fertility Society of Australia, Adelaide, Australia
- 2010 Invited Speaker, Women's Health Special Interest Group, Bethesda, MD
- 2010 Address to the Congressional Caucus on Women's Health and the NIH, US Congress, Washington, D.C.
- 2010 Session Speaker, Society for the Study of Reproduction: Annual Meeting, Milwaukee, WI
- 2010 Speaker, Conference des les Peptides Gonadiques, Paris, France
- 2010 Speaker, Gordon Research Conference, Les Diablerets, Switzerland
- 2010 Speaker, McGill Research Day, McGill University, Toronto, ON
- 2010 John I. Brewer Lecture, American Congress of Obstetricians and Gynecologists, San Francisco, CA
- 2010 Grand Rounds, Department of Physiology, University of Iowa, Iowa City, IA
- 2010 Grand Rounds, Department of Obstetrics and Gynecology, University of Iowa, Iowa City, IA
- 2010 Speaker, Praxis of Team Science, Chicago, IL
- 2010 Speaker, Michigan Registered Nurses Association Annual Meeting, Ypsilanti, MI
- 2010 Speaker, York University Assoc, of Graduate Students in the Biological Sciences, York University, Montreal, Canada
- 2010 Whitney Memorial Lecture, Arkansas University for Medicine, Little Rock, AR
- 2010 Deans Grand Challenge Lecture, McCormick School of Engineering, Northwestern University, Evanston IL
- 2009 Changing the Face of Medicine: Celebrating America's Women Physicians, Northwestern University, Chicago, IL
- 2009 Invited Speaker, Genentech, South San Francisco, CA
- 2009 Jacob Probststein Memorial Lecture, Washington University, St. Louis, MO
- 2009 Keynote Address, Northwestern Memorial Hospital Women's Leadership Group, Chicago, IL
- 2009 Annual American Gynecological Club Conference, Chicago, IL
- 2009 Speaker, Society for the Study of Reproduction: Annual Meeting, Pittsburgh, PA
- 2009 Speaker, Endocrine Society Annual Meeting, Washington, DC
- 2009 Speaker, Chimisee Gordon Conference, Bavaria, Germany
- 2009 Plenary Speaker, 15th World Congress on IVG, Geneva, Switzerland
- 2009 Inaugural Seminar, Laura Bush Women's Health Center, Texas Tech University, Lubbock, TX
- 2009 Seminar Speaker, University of Texas-Southwest, Dallas, TX
- 2009 Invited Speaker, Pri-Med Midwest, Current Issues in Primary Care, Rosemont, IL
- 2009 Invited Speaker, Oregon National Primate Research Center, Portland, OR
- 2009 Speaker, Society of Gynecologic Oncologists Annual Meeting, San Antonio, TX
- 2009 Speaker, European Society of Human Reproduction and Embryology, Brussels, Belgium
- 2008 Plenary Lecture, First World Congress on Reproductive Biology, Kailua-Kona, HI
- 2008 Speaker, Realizing the Promise of Healthcare IT, Scottsdale Institute, Scottsdale, AZ

CURRICULUM VITAE T.K. WOODRUFF

- 2008 Speaker, Second World Congress on Mild Approaches in Assisted Reproduction, London, UK
2008 Gabriel Bialy Lecture in Reproductive Biology, Southern Illinois University, Carbondale, IL
2007 9th Annual Lynn Sage Breast Cancer Symposium, Chicago, IL
2007 Distinguished Speaker Seminar Series, Abbott Laboratories, Abbott Park, IL
2007 Smithsonian National Zoo, Park, Conservation and Research Center, Front Royal, VA
2007 16th Ovarian Workshop, San Antonio, TX
2007 Plenary Endocrine Society 89th Annual Meeting, Toronto, Ontario, Canada
2007 15th Annual Medical Science Graduate Student's Association Symposium, Calgary, Canada
2007 Speaker, Summit on Hormones and the Environment, San Francisco, CA
2006 A.V. Nalbandov Lecture, University of Illinois, Chicago, IL
2006 Speaker, Oncology Nursing Conference, Chicago, IL
2006 Designated Fertile Hope Center of Excellence, Chicago, IL
2006 Speaker Conference on the Extracellular Matrix of the Female Reproductive Tract, Maui, HI
2006 Speaker, European Society for Human Reproduction and Embryology, Siena, Italy
2006 Speaker, Perinatal Research Society, Lake Arrowhead, CA
2006 Speaker, 2nd Annual Chicago Supporting Oncology Conference, Chicago, IL
2006 Speaker, The Economic Club of Chicago, Chicago, IL
2005 Speaker, 7th Annual Illinois Women's Health Conference, Rosemont, IL
2004 Speaker, Developments in Gonadotropin Control, Paris, France
2003 Speaker, Updates in Infertility Treatment, Marco Island, FL
2003 Speaker, 5th World Workshop on Inhibin, Activin and Follistatin, Siena, Italy
2003 Klotz Lecture, Société Française d'Endocrinologie, Paris, France
2003 Speaker, National Institute for Research in Reproductive Health (NIRRH), Mumbai, India
2003 Speaker, Mumbai Obstetrics and Gynecology Association, Mumbai, India
2003 Speaker, All India Institute for Medical Science, New Delhi, India
2002 Keynote, French Endocrine Society Meeting, Tours, France
2002 Speaker, XIVth Ovarian Workshop, Baltimore, MD
2002 Speaker, Conference on Mammalian Gametogenesis and Embryogenesis, New London, CT
2001 Speaker, Society for the Study of Reproduction, Ottawa, Ontario, Canada
2000 Speaker, Inhibin/Activin Meeting, Melbourne, Australia
2000 Speaker, Endocrine Society Meeting, Toronto, Ontario, Canada
2000 Speaker, Midwestern ADSA Annual Meeting, Des Moines, IA
1999 Speaker, The American College of Pathologists, Annual Meeting, Chicago, IL
1999 Endocrine Society: Hot Topic Talk, San Diego, CA
1999 Organizer, North American Inhibin and Activin Congress, Evanston, IL
1998 Speaker, Reproductive Tract Biology Gordon Conference, Plymouth, NH
1997 Speaker, Endocrine Society Meeting, Minneapolis, MN
1996 Speaker, Ovarian Workshop, London, Ontario, Canada
1996 Speaker, American Society of Andrology, Minneapolis, MN
1994 Speaker, Symposium on Ovulation Induction, Siena, Italy
1993 Speaker, Montreal Fertility Meeting, Montreal, Canada
1993 Speaker, International Symposium of Inhibin and Inhibin-Related Proteins, Siena, Italy
1993 Speaker, Central Control of Gonadal Function, Rheingau, Germany
1992 Speaker, International Symposium of Inhibin and Inhibin-Related Proteins, Paris, France
1992 Speaker, Ninth International Congress on Endocrinology, Nice, France
1992 Speaker, Society of Gynecological Investigation, San Antonio, TX
1991 Speaker, The Weitzman Institute of Science, Rehovot, Israel
1991 Speaker, Israel Fertility Society Meeting, Tel Aviv, Israel
1991 Speaker and Instructor Chinese Academy of Sciences, Beijing, China

CAREER METRICS

Major Scientific Discoveries (h-index: 91)

1. Cloning of inhibin and establishment of the peptide hormone control of reproduction Science. 1988 Mar 11;239(4845):1296-9.
2. Structural basis of activin interaction with its receptor and binding ligand EMBO J. 2003 Apr 1;22(7):1555-66; Dev Cell. 2005 Oct;9(4):535-43; Proc Natl Acad Sci U S A. 2011 Mar 29;108(13):5232-6
3. First human MII egg from in vitro grown ovarian follicle Sci Rep. 2015 Nov 27;5:17323; Tiss Eng 2006 12;10:2739-2746 (Named top paper in reproductive science by Nature Medicine and is in the top 1% of all Engineering articles of the same age – Scopus).
4. First demonstration of inorganic zinc signal that controls maturation of the oocyte and transition from meiosis to mitosis at fertilization; discovery of the ‘zinc spark’ at fertilization in mouse and human Nat Chem. 2015 Feb;7(2):130-9; Nat Chem Biol. 2010 Sep;6(9):674-81; Sci Rep. 2016 6:24737 (Named top 100 discoveries of 2016 by Discover Magazine).
5. Founding of oncofertility as a new medical discipline NEJM. 2009;360:902-911 (in top 2% of all Medicine articles of same age – Scopus); Lancet. 2014 Oct 4;384(9950):1302-10.
6. Creation of a microfluidic ovarian reproductive tract ‘menstrual cycle in a dish’ and the first functional soft organ bioprosthesis, and ovarian bioprosthesis (Altmetric for each paper is >1000) Nat. Commun. 2017;8:14584; Nat Commun. 2017. (Both discoveries named top 100 discoveries of 2017 by Discover Magazine; The ovarian bioprosthesis was named to the top 5 medical discoveries of 2017 by the Chinese Academy of Medicine).
7. Advocate for inclusion of females in basic and clinical research; Nature. 2010;465:688-689; Proc Natl Acad Sci USA. 2014;111:5063-5064; Science. 2010;330:453

Evidence of Mentorship

1. Trained >24 Graduate Students, >27 Postdoctoral Fellows
2. Founded the Oncofertility Saturday Academy (now taught in four states) and the Women’s Health Science Academy for minority women
3. Co-directed Frontiers in Reproduction; Woods Hole, MA
4. Founded the Masters in Reproductive Science and Medicine Program, Northwestern University

Evidence of Academic Leadership

1. President, Endocrine Society
2. Associate Director, Robert H. Lurie Comprehensive Cancer Center Basic Science Program
3. Founder and director, Women’s Health Research Institute
4. Founder and director, Oncofertility Consortium (98 centers nationally, 19 pediatric centers, 15 global centers)
5. Director, Center for Reproductive Science
6. Vice Chair for Research, Dept OB/GYN
7. Founding Editorial Board, Journal Adolescent Young Adult Oncology
8. Dean, The Graduate School and Associate Provost for Graduate Education, Northwestern University
9. Advocated for inclusion of females in basic science (leading to new NIH policy, 2015)
10. Member, Office Research Women’s Health Council, NIH/OD
11. Coined the term ‘oncofertility’ which is now a medical specialty

Evidence of National/Global Recognition

- 2017 The Society for Endocrinology Transatlantic Medal
- 2016 Leadership Award, Endocrine Society
- 2013 Named to Time Magazine Most Influential People List (listed 112th)
- 2012 American Committee for the Weizmann Institute of Science

2011 Presidential Award for Math Science Engineering Mentoring Awarded by President Obama in an Oval Office Ceremony

Honorary Degree recipient and Commencement Addresses

2020 Elected Fellow, American Academy of Arts and Sciences

2018 Elected Fellow, National Academy of Medicine

2017 Elected Fellow, National Academy of Inventors

2016 University of Birmingham (D.Sc.)

2012 Olivet Nazarene University (Alma Mater)

2010 Bates College, Lewiston Maine (D.Sc.)

2006 Young Women's Leadership Charter School

Evidence of Civic Engagement

2019 Elected member, The Chicago Network

2018-2020 Board of Trustees, Adler Planetarium

2015 Elected member, Economic Club of Chicago

2008-2011 School Board Young Women's Leadership Charter School, Chicago Public Schools

SUMMARY OF RESEARCH, EDUCATION, AND POLICY ACCOMPLISHMENTS

Research: Cloned and structurally characterized the peptide hormones controlling mammalian reproduction. Dr. Woodruff's scientific successes started early in her career—in 1986, as a graduate student in the laboratory of Dr. Kelly Mayo at Northwestern University, she cloned the subunits that form the peptide hormones inhibin and activin, placing her at the forefront of modern reproductive molecular biology (*Mol Endocrinol.* 1987;1:561-568). She thrived within the strong collaborative environment of the Mayo and Schwartz labs—Neena B. Schwartz discovered inhibin in 1977 at Northwestern—allowing her to rapidly describe inhibin subunit regulation during the rat estrus cycle, publishing her results in *Science* in 1988 (239:1296-1299). These peptide hormones are powerful, without which individuals are sterile. After completing her doctorate in 1989, Dr. Woodruff continued her work on inhibin at Genentech in South San Francisco, where she applied her expertise to the development of inhibin and activin assays (*Hum Reprod.* 1993;8:133-137; *Endocrinology.* 1993;132:2099-2108), technologies that are still in use today for the diagnosis of Down's syndrome pregnancies and assessing the ovarian reserve. She is named as inventor on five patents based on her work at Genentech. Dr. Woodruff continued her research into the physiology of inhibin and activin in pituitary and ovarian function in rodents (*Endocrinology.* 1993;132:2332-2341) and was the first to evaluate the effects of recombinant human ligands as drugs in primate models (*J Clin Endocrinol Metab.* 1993;77:241-248). Dr. Woodruff returned to Northwestern University in 1995 and focused her lab's efforts on understanding inhibin and activin actions and interactions within the pituitary-gonadal axis, specifically characterizing the regulation of subunit assembly and ligand processing in the ovary, the ligands' role in paracrine regulation of folliculogenesis, and their signal transduction pathways in the regulation of follicle-stimulating hormone. More recently, she detailed the structure of activin in a productive collaboration with Theodore Jardetzky, now at Stanford University. Together they solved the crystal structures of activin with its receptor (*EMBO J.*, 22:1555, 2003) and with its bionutralizing binding protein follistatin (*Dev. Cell*, 9:535, 2005). These structures not only revealed important clues about ligand function, but have also provided invaluable tools for designing therapeutics and diagnostics that are being applied to inhibin/activin-dependent diseases. Recent work includes the use of in silico designed activin antagonists based on the structure of activin bound to its receptor, with potential applications in treatment of cancer-related cachexia (*J. Med Chem* 58:5637; 2015). Dr. Woodruff's lab continues to dissect the mechanisms controlling inhibin biosynthesis, assembly, and secretion, and to characterize the activin signal transduction pathways.

Co-discovered inorganic signals controlling oocyte maturation and fertilization. One of the key questions in reproductive science is "what makes a good egg?" With inorganic chemist Dr. Tom O'Halloran, Dr. Woodruff discovered a novel role of inorganic metals, specifically zinc, in the regulation of oocyte maturation (*Nature Chem Biol.* 2010;6:674-681, 2010) and at the moment of fertilization (*ACS Chem Biol.* 2011;6:716-723). These studies led to an entirely new area of biology that provides an extracellular clue ('zinc spark') about the health of the oocyte that may be useful for IVF clinics. The first

indication that zinc might directly regulate mammalian oocyte maturation used single-cell elemental analytical methods at the Argonne National Laboratory and allowed a precise determination of changes in total zinc concentrations in individual eggs across the last 12-14 hours of oocyte maturation. The studies established that zinc is the most abundant transition metal in the fully-grown mouse oocyte, egg and early embryo, and that its concentration is nearly ten-fold higher than that of iron or copper. Next, they showed that the oocyte accumulates zinc by over 50% during the 12-16 hours required for the maturation to the terminal stage of development before fertilization (MII stage). Second, they showed that this massive increase in the zinc quota during meiotic maturation is necessary to drive meiosis I exit and to establish MII arrest in the mouse egg. Woodruff and O'Halloran demonstrated this in a number of ways, including induction of zinc insufficiency in maturing oocytes via small molecule chelators. This treatment prevents maturation and results in premature meiotic arrest at telophase I. They next showed the zinc transporters Zip6 and Zip10 were key in the zinc uptake phase and that transcriptional control of the normal zinc homeostasis pathways by the zinc-specific metalloregulatory protein MTF-1 is down regulated as the oocyte matures. These mechanistic studies explain how the influx of over 20 billion zinc ions was accomplished in a short period of time. Third, Woodruff and O'Halloran discovered the phenomenon of the 'zinc spark' and established the molecular origin and physiological mechanism of these zinc release events. Using single cell x-ray fluorescence, they showed that 10 billion zinc ions are released from the egg during these 'zinc spark' events. In experiments published in 2015 in *Nature Chemistry*, Woodruff and O'Halloran developed a series of novel chemical probes, four-dimensional confocal fluorescence microscopy experiments, Scanning Transmission Electron Microscope, and synchrotron-based x-ray bionanoprobe measurements to create quantitative maps of zinc distribution at the subcellular level. These results reveal that the zinc sparks arise from vesicular fusion of thousands of compartments. In an imaging tour de force, they published an image of the 'zinc spark' at the precise moment that the sperm enters the egg. This unprecedented real-time imaging demonstrated that the zinc spark occurs within seconds of sperm entry, and thus represents one of the earliest markers of embryo quality (Sci Rep. 2016;6:24737). The discoveries have led to a testable new concept in biology, namely the idea that zinc fluxes in the egg function as a master switch in early mammalian development.

Developed the field of oncofertility, changing medical practice to preserve fertility before lifesaving but sterilizing therapeutic intervention. Dr. Woodruff's interdisciplinary research efforts in three-dimensional ovarian follicle culture led her to think about potential applications of the technology—specifically, how it could be used to help young women with fertility-threatening conditions or undergoing gonadotoxic treatments (NEJM. 2009;360:902-911; Nature Rev Clin Oncol. 2010;7:466-475; Lancet. 2014;384(9950):1302-10.). Advances in cancer treatment have significantly increased the rate of survival among pediatric cancer patients, which has brought issues of survivorship—including the ability to have a family—to the forefront. In the early 2000s, options for preserving fertility for young women diagnosed with cancer were limited to emergency IVF, which requires a delay in cancer treatment for hormone stimulation and egg retrieval. Yet many young cancer patients may not have a partner or may have moral objections that preclude embryo creation, and very young patients are unable to undergo hormone stimulation to produce eggs for freezing. Other women may have aggressive disease that requires immediate treatment for hormone-responsive cancers. Around 2005, other groups were reporting the retrieval and heterotopic transplantation of ovarian tissue as treatment for infertility—Dr. Woodruff asked whether ovarian follicle or tissue culture methods being developed in her lab might fill an unmet need in fertility preservation for young women with cancer. She recognized a significant gap in knowledge and communication between patients and providers with regard to fertility preservation for cancer patients. In 2007, Dr. Woodruff was awarded a prestigious NIH Roadmap Grant to form the Oncofertility Consortium, an interdisciplinary team of oncologists, fertility specialists, social scientists, educators and policy makers dedicated to the clinical care of women at risk of losing their fertility because of cancer treatment. To describe this effort, she coined the term oncofertility, a word that is now officially recognized in the English language. Since the formation of the Consortium, Dr. Woodruff and her colleagues have literally written the book on oncofertility, with six volumes describing the progress in basic science research, medical practice considerations, perspectives from the humanities and the law, and communication methods that impact the care of cancer patients facing iatrogenic infertility. True to her collaborative style, with the Oncofertility Consortium, Dr. Woodruff extended her work beyond the disciplinary borders of reproductive biology to work with a range of experts to effectively translate bench research to bedside patient care. As part of the Oncofertility Consortium, Dr. Woodruff helped form the National

Physicians Cooperative (NPC) to facilitate sharing of fertility preservation protocols and techniques between reproductive endocrinology practices and ensure that clinicians and patients receive the most accurate and up-to-date information about available treatment options, even as the technologies continue to evolve. She also established a patient navigation system to help connect oncologists to fertility specialists, providing a more efficient system for referring cancer patients who are interested in fertility preservation. She worked with humanities scholars to better understand patient and provider perspectives and challenges, to identify gaps in knowledge about the available fertility preservation options for cancer patients, and to develop new tools to improve communication between providers and patients. Dr. Woodruff examined the ethical considerations of fertility management paradigms for young cancer patients with Professor Laurie Zoloth (Am J Bioeth. 2008;8:W3 & 21) as well as legal perspectives of oncofertility with Professor Dorothy Roberts (Santa Clara Law Review. 2009;49:673). Her collaboration with education scientist Kemi Jona led to the creation of the patient-directed website myoncofertility.org. The global, transdisciplinary Oncofertility Consortium has been upheld as an example of successful inter-institutional team science in practice, and has been used as a test case for research and education in the science of team science field (J Assist Reprod Genet. 2010;27:227-231). Dr. Woodruff designed the Oncofertility Consortium logo, a trademarked advocacy ribbon that reflects the growing concern for the reproductive future of cancer patients. The intertwining spring green and hearty purple represents blossoming hope and uncompromised dedication to improving fertility preservation options for cancer patients. The lower tip of the ribbon emerges showing an emergence of eggs or embryos, as well as sperm, welcoming the translation of current research to the improvement of fertility options for all cancer patients. The ribbon has a slightly bowed shape, providing subliminal imagery of a fertile state. Oncofertility is now a recognized medical discipline around the globe.

Engineering Reproductive Solutions. A hallmark of the work done by Woodruff is the inclusion of bioengineering to solve specific biological problems. Many of the biological questions are also linked to unmet human need. The structure-function relationships between inhibins, activins and their receptor/binding proteins and the use of hydrogels to support individual follicle growth are two examples described above. More recently, she has used the encapsulated in vitro follicle growth assay (eIVFG) to invent and test a microfluidic system that supports 28 day reproductive cycles in an ex vivo setting. The ovarian follicles or intact ovaries (mouse) are interconnected to human explants from fallopian tubes, uterus and cervix with liver organoids to provide a metabolic management tissue (Nat. Commun. 2017;8:14584). This “menstrual cycle in a dish” is described as an EVATAR and male versions of the system are under development. Further, Woodruff and team have created decellularized and 3D printed ovarian bioprosthesis that are the first-generation replacement organs for women who lose gonadal function (Nat. Commun. 2017, e-pub. May 16).

Advocacy and Policy: Dr. Woodruff is a national advocate for women’s health research and mentor in science education. In 2006, Dr. Woodruff was named director of the newly formed Women’s Health Research Institute at Northwestern University. In this role, she was able to spearhead a number of initiatives that would address challenges in women’s health research—including the lack of sex equity in biomedical research, the attrition of women from STEM fields, and the need for greater knowledge of basic science concepts among patients—all of which impact women’s health and well-being (Biol Reprod. 2016;95(1):29). A large part of Dr. Woodruff’s work within the Institute has been to raise awareness of the need for sex-based clinical research in order to improve healthcare for women. Treatment guidelines are largely based on evidence from trials conducted in large populations of male patients, and drug development programs often exclude female participants from clinical trials, even if a treatment will be offered to both men and women. Investigators may not routinely examine clinical outcomes by sex, age or stage of menstrual cycle due to the cost of duplicating the study in both sexes, the ‘complication’ introduced by the menstrual cycle, or the presumption that males are a reasonable model for females. Dr. Woodruff’s passion for improving women’s health research led to a number of high-profile editorials on the need for sex-based equity science and medicine (Nature. 2010;465:688-689; Proc Natl Acad Sci USA. 2014;111:5063-5064; Endocrinology. 2014;155:1181-1183) and the need to relieve restrictions on work with human eggs (Science. 2010;330:453). Dr. Woodruff’s efforts to highlight the issue of sex-based clinical research received greater exposure when Leslie Stahl recently interviewed her on a 60 Minutes report (<http://www.cbsnews.com/news/sex-matters-drugs-can-affect-sexes-differently/>). Most importantly, on January 25, 2016, the NIH announced their new sex inclusion policy that mandates males and females be considered as part of basic science research. This is a fundamental change that was led,

in part, by the efforts of Dr. Woodruff to provide evidence that the absence of sex as a biological variable is harmful to science and ultimately to men and women.

Education: Dr. Woodruff has worked to find novel ways to reduce attrition of women from the STEM fields. She created the Women's Health Science Program (WHSP) for High School Girls & Beyond to provide science education programs to 9th -12th grade female students in Chicago Public Schools (Cancer Treat Res. 2010;16:321-344). WHSP intervenes earlier in the educational pipeline, targeting young women who are considering careers in science and medicine and preparing them with valuable knowledge and skills to successfully become the next generation of women science leaders. WHSP also provides personal and social support during a time when girls make important decisions about their future educational and career trajectories. WHSP runs four academies: the Oncofertility Saturday Academy (OSA), Cardiology Summer Academy (CSA), Infectious Disease Summer Academy (IDSA), and Physical Science Weekend Academy (PSWA). Underscoring her understanding of the importance of building connections, Dr. Woodruff designed the program such that the students build relationships amongst each other that persist beyond their time in the program, which they call the 'science sisterhood,' as well as with the scientists, clinicians, and other professionals associated with WHSP. In addition, parents are encouraged to play an active role in WHSP to support their daughters' interests and pursuits in science. In this way, parents, as members of the general public, are educated along with their daughters about the scientific process and how it translates to human health. The WHSP program has been disseminated nationally, and four additional universities now offer the Oncofertility Saturday Academy curriculum (Biol Reprod. 2016;95(1):28.). For this work, Dr. Woodruff was awarded the Presidential Award for Excellence in Science Mentoring in an Oval Office ceremony in 2011. Dr. Woodruff has been widely recognized for her extensive work on behalf of women in science and research, receiving The Distinguished Woman in Medicine and Science Award (2009), the Distinguished Alumnae Award (2008) and Alumni Association Merit Award (2012) from Northwestern University. She has also been honored nationally with awards from the Weizmann Institute and Women in Science (2012), and has received the American Women in Science (AWIS) Innovator Award (2008), the American Medical Women Association (AMWA) Gender Equity Award (2009), and the "Speaking of Women's Health" Distinguished Service Award (2007) and the 25th anniversary Academy of Women's Health Research Award (2017).

Leadership: As dean of The Graduate School (TGS) and the associate provost for graduate education at Northwestern, Woodruff developed and implemented a strategic plan (Vision 2025) including evaluation of the organizational model for graduate support. She streamlines the organizational chart to fit mission and created buy in from stakeholders to ensure smooth transitions and operational transparency. She created a new communication unit to coordinate external and internal communications and is the co-lead on a public-private partnership to develop a campus-wide master plan for graduate housing, graduate student wrap-around services, and graduate administrative offices. Recognizing the need for better coordination between faculty and TGS, she created the first ever venue for the graduate faculty assembly (via Northwestern's Faculty Senate) and updated nomenclature for graduate faculty within the Faculty Handbook. To ensure a broad and equitable environment for the pursuit of advanced degrees, Dr. Woodruff and team instituted the first Diversity and Inclusion Advisory Council and created the first Graduate Alumni Homecoming Gathering, an annual alumni engagement event. Under Woodruff's leadership, TGS has achieved all major fundraising milestones for graduate education. Woodruff holds fiduciary responsibility for TGS in excess of \$170M. She has partnered with graduate deans across the Association of American Universities (AAU), the Council of Graduate Schools (CGS), and Big Ten universities and associated organizations. Her role on equity matters (Title IX), conflict of interest, and research integrity involves partnership across the University to enable faculty, student, and staff success. Woodruff has served on strategic planning councils under two Northwestern presidents. She currently services on the President's Program Review Council that evaluates all academic and administrative units within the University to enable continuous improvement and a culture of self-assessment, transparency, vertical integration, and change management opportunity. Woodruff is frequently asked to service on search committees, most recently the Executive Vice President for Research. She served on the Weinberg College of Arts and Sciences Undergraduate Curriculum Review Committee and holds undergraduate teaching awards. She was a steering committee member for the precursor organization to the program in Biological Sciences, which instituted common curricular requirements across biological sciences. As the associate director for the Lurie Cancer

Center, she directed a philanthropic gift portfolio of \$10M and created cross-campus programs in engineering, chemistry, and general life sciences. As vice chair for research in Obstetrics and Gynecology, Woodruff sets the scientific agenda for a \$15M award portfolio. In her time as vice chair, the Obstetrics and Gynecology department has risen in the NIH funding to number two in the nation, and it is ranked number seven in US News and World Report. As founding director of multiple centers, institutes, and global organizations, Woodruff has been at the forefront of academic science and institutional leadership. Her leadership roles include the director for the Center of Reproductive Science, founder and director of the Women's Health Research Institute, founder and director of the Oncofertility Consortium, and president of the Endocrine Society. She is well known in the city of Chicago for her civic leadership and served as a board member of the Young Women's Leadership Charter School from 2008-2011. Woodruff is currently an active member of the Adler Planetarium Board of Trustees, the Economic Club of Chicago, and The Chicago Network.

WEB PROPERTIES

Lab Website: <https://www.woodrufflab.org>

Oncofertility Website: <http://oncofertility.northwestern.edu>

Oncofertility Patient Websites (English and Spanish): myoncofertility.org and es.myoncofertility.org

Oncofertility Microsite for Providers: <http://www.savemyfertility.org/save>

Women's Health Research Institute Website: <http://www.womenshealth.northwestern.edu>

Sex Inclusion Policy and Implementation Toolbox: <http://www.womenshealth.northwestern.edu/sex-inclusion>

Illinois Women's Health Registry:

<http://www.womenshealth.northwestern.edu/programs/illinois-womens-health-registry>

Illinois Men's Health Registry: <http://www.womenshealth.northwestern.edu/programs/illinois-mens-health-registry>

Women's Health Science Programs (Oncofertility Saturday Academy, Cardiovascular Summer Academy, Infectious Diseases Summer Academy, Physical Science Weekend Academy):

<http://www.womenshealth.northwestern.edu/programs/womens-health-science-program>

Center for Reproductive Science Website: <http://www.crs.northwestern.edu>

Repropedia: A lexicon of reproductive terms written for the public and API that can link our terms to your website:

<https://www.repropedia.org>

REPROTOPIA: Reproductive health education resources across the entire life spectrum:

<https://reprotopia.northwestern.edu>

Hidden No More: Women in Higher Education at Northwestern: <https://www.northwestern.edu/hidden-no-more/>

Blogs and Social Media:

Woodruff Lab Blog: <https://www.woodrufflab.org/blog>

Oncofertility Blog: <http://oncofertility.northwestern.edu/blog>

Women's Health Blog: <https://www.womenshealth.northwestern.edu/blog>

LinkedIn: <https://www.linkedin.com/in/teresa-woodruff/>

Woodruff Lab Facebook: <https://www.facebook.com/woodrufflab/>

CURRICULUM VITAE T.K. WOODRUFF

Center for Reproductive Science Facebook: <https://www.facebook.com/NUCenterforReproSci/>

Apps: iSaveFertility App for iPhone (Download at the App Store)

Curriculum (Massive Open Online Course: MOOC):

Introduction to Reproduction: <https://www.coursera.org/learn/reproductive-health>