Center for Reproductive Health After Disease

Northwestern University U54 Annual Meeting
Specialized Cooperative Centers Program in Reproduction and Infertility Research (SCCPIR)

Searle Auditorium
Robert H. Lurie Medical Research Center
303 E. Superior Street, Chicago, IL
Northwestern University
Tuesday, January 14, 2014

Grant U54HD076188 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Specialized Cooperative Centers Program in Reproduction and Infertility Research (SCCPIR)
Welcome to the first annual meeting of Northwestern University’s Center for Reproductive Health After Disease U54. Our Center was awarded funding last year through the Fertility and Infertility Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). This new center includes work done under the previous U54, Center for Reproductive Research at Northwestern University: Structure Function Relationships in Reproductive Biology, and the NIH Roadmap grant, The Oncofertility Consortium. This meeting is an opportunity to review the progress of our grant and obtain feedback from advisory board members and NIH representatives. We look forward to discussing our research and educational progress with you.

We welcome and thank you for participating!

Teresa K. Woodruff, PhD
Vice Chair for Research
Thomas J. Watkins Professor
Department Of Obstetrics and Gynecology
Northwestern University Feinberg School of Medicine

Kate Waimey Timmerman, PhD
Program Director
Oncofertility Consortium

Brigid Martz, CCRP
Research Project Coordinator
National Physicians Cooperative
Oncofertility Consortium

Special thanks to Zoran Illic, Mike Curtis, and Lauren Ataman for helping to make this meeting happen.
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<td>Measuring and Modifying the Human Follicle Environment to Improve In Vitro Egg Quality</td>
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<td>12:15 – 12:45 PM</td>
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<td>Pilot Project: Provider and Patient Integration of Fertility Goals and Cancer Treatment Decision-making</td>
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<td>12:45 – 1:15 PM</td>
<td>National Physicians Cooperative Core: Human Ovarian Tissue, Oocyte and Data Repository</td>
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<td>1:15 – 1:45 PM</td>
<td>Education Core: Providing Reproductive and Endocrine Awareness to Diverse Communities</td>
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<td>Closed Session: Center for Reproductive Health After Disease Board Meeting</td>
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U54 Projects/Cores and Personnel

The overall hypothesis of the Northwestern University Center for Reproductive Health After Disease is that effective options can be provided to young women with malignant or non-malignant disease who must undergo life-preserving cancer treatments and other medical interventions that will affect their reproductive health. The Center pursues both basic scientific research and clinical research goals, as well as creates educational and community outreach initiatives to share the Center’s findings. These include:

Project I: Measuring and Modifying the Human Follicle Environment to Improve In Vitro Egg Quality

To offer hope of fertility to women with cancer and other diseases where sterility is the consequence of treatment, complex issues of ovarian function must be addressed including the problem of follicle growth and development in vitro. The group asks whether an environment can be constructed that sustains high-quality human egg development in a statistically and clinically relevant number. The project also includes identifying secreted biomarkers of coordinated follicle and oocyte maturity, developing physical culture conditions to support growth of follicles from bovine and human mono-ovulatory species, and determining the role of chromosome segregation in the production of high-quality gametes and after exposure to chemotherapies.

Project I Personnel

Teresa K. Woodruff, PhD, Director of the Oncofertility Consortium

Teresa K. Woodruff, PhD is the Thomas J. Watkins Professor of Obstetrics & Gynecology, Feinberg School of Medicine and Professor of Molecular Biosciences, Weinberg College of Arts and Sciences. Ph.D. 1989, Northwestern University. As a reproductive endocrinologist, Dr. Woodruff has spent the better part of her research career focusing on female reproductive health and infertility. To that end, she was made Chief of the newly created Division of Reproductive Science in Medicine at the Feinberg School of Medicine. Combining this effort with her work on two R01 NIH grants, a P01 grant and core facility, and her work as director of two NIH funded center grants: The Center for Reproductive Research (U54) and the Oncofertility Consortium (UL1), Dr. Woodruff has established a team of oncologists, fertility specialists, social scientists, educators and policy makers to translate her research to the clinical care of women who will lose their fertility due to cancer treatment. To describe this effort, she coined the term oncofertility, and she has co-edited four books on the topic. The Oncofertility Consortium spans the nation, with over 60 research and clinical centers working to solve the intractable problem of infertility due to cancer treatment. With the Center for Reproductive Health after Disease, she continues to take the same cross-disciplinary approach to develop new options for fertility preservation and protection of endocrine function, and expands the work to include women with non-malignant diseases or undergoing treatments that threaten their reproductive health. Dr. Woodruff serves as a Co-I on Project I, specifically addressing the challenges of producing high-quality human oocytes, using innovative biomaterials and optimizing methods for in vitro follicle culture.
Jessica Hornick, PhD, Postdoctoral Fellow, Obstetrics and Gynecology
As a post-doctorate fellow in the Woodruff Lab, Jessica investigates how chromosome micromechanics change with age in mouse oocytes and how chromosome cohesion dynamics change with advanced maternal age in human eggs. She also conducts high-resolution live imaging of meiotic spindle dynamics in the bovine oocyte in order to characterize a new model for human oocyte biology. She has also worked as a technician at Fetal Cytogenetics and attended the Advanced Quantitative Microscopy course at the Marine Biological Laboratory at Woods Hole.

Shuo Xiao, PhD, Postdoctoral Fellow, Obstetrics and Gynecology
Shuo joined Dr. Woodruff’s lab in 2013 as a postdoctoral fellow. After earning his BS and MS in public health from Peking University Health Science Center, he received his Ph.D. degree from the University of Georgia in 2013, which focused on the female reproductive system, particularly on embryo implantation and reproductive toxicology. His interests in Woodruff’s lab include how to grow different stages of follicle from large mammalian species and the environmental heavy metal exposure on follicle development and egg quality.

Alexander Gunn, Research Technician, Obstetrics and Gynecology
Alex is a research technician who joined the Woodruff Lab in Summer 2013. He graduated from Northwestern with a BA in Biological Science and Anthropology. He has worked as a Research Assistant for Dr. Jacek Topczewski at Ann & Robert E. Lurie Medical Research Center. In the lab, Alex maintains the microscopes and employs a variety of cellular and molecular biology techniques to the ongoing research projects.
Project II: Engineered Environments for Ovarian Follicle Transplantation

The transplantation of individual follicles has been conceptualized preclinically, yet the potential for clinical success has not been demonstrated. To achieve follicle transplantation with optimal survival and longevity of the transplanted follicles this project is developing biomaterial-based structural support and drug delivery technologies, which will provide critical factors to support follicle growth and survival post-transplantation. Project II also determines the effects that age and obesity have on the ovarian microenvironment and follicle function and examines if selective isolation of early-stage follicles for transplantation may allow standardization of the transplantation procedure and remove the risk of reseeding disease.

Project II Personnel

Lonnie D. Shea, PhD, Professor in Chemical and Biological Engineering
Lonnie D. Shea is a professor in the Department of Chemical and Biological Engineering at Northwestern University. He received his PhD in Chemical Engineering and Scientific Computing while working with Jennifer Linderman at the University of Michigan and was a postdoctoral fellow with David Mooney in the Department of Biologic and Materials Science in the Dental School at the University of Michigan. He joined the faculty at Northwestern in 1999 and established a research group working at the interface of tissue engineering, gene therapy, and drug delivery. He received an NSF CAREER Award in 2000, which helped start the work on developing new technologies based on combining biomaterials and gene/drug delivery. The overall objective is to create controllable microenvironments for directing or molecularly dissecting tissue growth. These systems are being applied to clinical problems such as ovarian follicle maturation for treating infertility, islet transplantation for diabetes therapies, nerve regeneration for treating paralysis, and most recently, cancer diagnostics. Dr. Shea has received funding from NIH, NSF, and multiple foundations, and has published in excess of 120 manuscripts on his research. He is director of the NIH Biotechnology Training Grant at Northwestern University. Dr. Shea is a fellow of the American Institute of Medical and Biological Engineering, and is a member of the editorial boards for Molecular Therapy, Biotechnology and Bioengineering, and Drug Delivery and Translational Research.

Eiji Saito, PhD, Postdoctoral Fellow, Chemical and Biological Engineering
Eiji received his PhD in Biomedical Engineering from the University of Michigan, and then joined Professor Shea’s group in June 2013. In his PhD, Eiji researched developing implantable 3D porous scaffolds using computer based design and fabrication techniques. He is currently working on developing designed porous hydrogel scaffolds to transplant ovarian follicles and improve their survival in vivo.
Ekaterina Kniazeva, PhD, Postdoctoral Fellow, Chemical and Biological Engineering

Ekaterina received her undergraduate degree in general engineering from Harvey Mudd College. She then pursued her M.S. and Ph.D. in biomedical engineering in Dr. Andrew J. Putnam’s Cell Signaling in Engineered Tissues laboratory at University of California, Irvine. Her dissertation was titled “The Effects of Endothelial Cell Contractility and Extracellular Matrix Density on Capillary Morphogenesis and Maintenance in 3D Biomaterials”. As a postdoctorate fellow in Dr. Lonnie Shea’s lab at Northwestern, she is currently working on large scale isolation and transplantation of primordial follicles within biomaterial grafts. Ekaterina is originally from Estonia and speaks fluent Russian.
Project III: Medically-based Protection of the Ovarian Reserve

Powerful cancer treatments, such as radiation and chemotherapy, are saving more lives but also impair reproductive function, destroy oocytes, and causing sterility and hormone deficiencies in women. This project will clarify the mechanism of oocyte death and identify molecular targets for treatments that can protect the ovary from damage caused by cancer therapies, thereby reducing their impact on the future fertility and endocrine health of cancer survivors.

Project III Personnel

So-Youn Kim, PhD, Research Assistant Professor, Obstetrics and Gynecology

So-Youn joined Woodruff Lab as a post-doctoral fellow in 2008. She earned her PhD from Yonsei University of Korea in 2005, working on the molecular function of SREBP-1c in glucose metabolism and on the activin pathway in the pituitary and ovary. Her interest in the oocyte death pathway against chemo- and radiation therapy has led her to work on oocyte-specific conditional knockout models to discover which molecules are key regulators for oocyte death. In addition, she’s exploring follicle activation using PI3K mouse model to learn the balance between activation and inhibition.

Takeshi Kurita, PhD, Research Associate Professor, Obstetrics and Gynecology

Dr. Kurita had studied reproductive biology for the past 15 years by integrating genetically modified mouse models in combination with tissue manipulation and transplantation techniques. His laboratory focuses on the function of the p63 transcription factor in female reproductive organs, including the ovary, and investigation of the regulation and function of Trp63 in normal development and diseases of female reproductive organs. His expertise and experience in cell biology, embryology, endocrinology, and mouse genetics have resulted in 25 original articles.

Katy Ebbert, Research Technician, Obstetrics and Gynecology

Katy is a research technician who joined Woodruff Lab in 2011. She graduated from Northwestern University with a BA in Biological Sciences, concentrating in Genetic and Molecular Biology. She has worked as a Research Assistant at New England BioLabs and as a Research Assistant for Dr. Peggy Saks at Northwestern University. In the lab, she works with transgenic animal based research employing a multitude of molecular and organ culture techniques on conditionally mutated ovaries and assists with laboratory organization and maintenance.
Pilot Project: Provider and Patient Integration of Fertility Goals and Cancer Treatment Decision-making

For women of childbearing age who have developed or are at high risk for developing breast cancer, fertility may become an important part of health care decision making. Tamoxifen treatment is often recommended for chemoprevention and adjuvant use for these women but has low adherence and persistence rates. This project determines whether fertility concerns impact tamoxifen adherence rates in women of childbearing age by examining retrospective patient data and developing models of adherence. The project will validate such models using prospective patient information and design educational interventions.

Pilot Project Personnel

Jacqueline S. Jeruss, MD, PhD, Assistant Professor in Surgery and National Physicians Cooperative Clinical Co-Director

Dr. Jeruss, the National Physicians Cooperative’s Clinical Co-Director of Oncology, is an Associate Professor within the Department of Surgery and a member of the Robert H. Lurie Comprehensive Cancer Center at Northwestern University. Dr. Jeruss is a surgeon-scientist focused on the care of patients with breast cancer, the study of novel cancer therapeutics, and the intersection between cancer and fertility preservation. For the NPC, Dr. Jeruss represents the interests and concerns of oncologists. She assists in the management of the NPC by providing clinical guidance with respect to oncology issues. She is working to obtain relevant oncology data to further the overall research of fertility after disease.

Jessica Shepard, Research Assistant

Jessica Shepard is the lab manager for Dr. Jacqueline Jeruss. She earned a bachelor’s degree in chemistry and biology from Lawrence University in 2006 and a master’s degree in public health epidemiology from Boston University in 2010. While in graduate school, she worked for the Massachusetts Breast Cancer Coalition focusing on educational community outreach, specifically concentrating on health disparities in African American women. Jessica first came to Northwestern in 2010 where she worked as a study coordinator for the nuMoM2b study under Dr. William Grobman in the department of obstetrics and gynecology. In this role, she studied the underlying and interrelated mechanisms of several common adverse pregnancy outcomes in nulliparous women.

Alfred W. Rademaker, PhD, Director, Biostatistics Collaboration Center (BCC), Professor in Preventive Medicine

Dr. Rademaker is a biostatistician, Professor of Preventive Medicine at Northwestern, and Director of the Biostatistics Core for the Robert H. Lurie Comprehensive Cancer Center. Dr. Rademaker has over 25 years of experience in the design, conduct, and analysis of randomized controlled trials, particularly longitudinal trials with repeated measurements. He has published more than 70 articles in peer-reviewed journals.
Administrative Core: Research Facilitation Through Team Science

The Administrative Core organizes and supports the interdisciplinary Center investigators and provides governance and a communication and data sharing plan for all Projects and Cores. The Core functions to reduce barriers, encourage research, solve problems, maintain documents and provide a robust intellectual environment with shared vision, and an altruistic approach to credit and results. Core A further develops a coordinated program that creates synergy among the projects and ensures that the new ideas that are created at the boundaries of traditional disciplines are not lost but fed back into the system.

Administrative Core Personnel
Teresa K. Woodruff, PhD, Director of the Oncofertility Consortium
See Above.

Joseph Boes, MA, Manager of Research Administration, Department of Obstetrics and Gynecology
Joseph leads the overall finance, research, and administrative operations for both units including comprehensive pre- and post-award support, strategic planning, staff management, and facilitation of collaborations. Joseph holds a B.A. from the University of Iowa and an M.A. from the University of Chicago where he was exposed to the academic research environment. Diverting his career path from pursuing a faculty position, but maintaining an interest in the academic mission and pursuit of knowledge, Joseph began his career in research administration with the Division of Organ Transplantation. Through his experience at Northwestern, Joseph has managed awards and submitted applications for a variety of funding mechanisms, including federal series P, R, U, N, K, F, and T mechanisms as well as industry sponsored clinical trials and foundation support.

Kate Timmerman, PhD, Program Director, Oncofertility Consortium
Dr. Timmerman has spent her career focused on facilitating interdisciplinary science. She graduated from Oberlin College with a BA in Neuroscience and earned her doctorate in Neuroscience from the University of California, Davis. She then completed a postdoctoral fellowship at the University of Chicago before transitioning out of the laboratory. Dr. Timmerman first joined the Oncofertility Consortium in 2010 as the Director of Science Communication, where she translated interdisciplinary research results to diverse clinical, research, and public audiences. As the Program Director of the Oncofertility Consortium and its Center for Reproductive Health After Disease, she supports researchers and clinicians in the Consortium. She also writes and assists in the pre- and post-award grant process, advances policy initiatives, and develops partnerships with organizations to support the Consortium’s mission.
National Physicians Cooperative (NPC) Core: Human Ovarian Tissue, Oocyte and Data Repository

The NPC Core represents the evolution of the National Physicians Cooperative, which is comprised of more than 50 clinical sites that provide ovarian tissue for research under an institutional review board (IRB)-approved protocol of Ovarian Tissue Cryopreservation (OTC). The Core serves as the central repository for these tissues and new ovarian tissues obtained by the network of NPC member sites and will collect fertility preservation patient treatment data from the NPC network for research purposes.

NPC Core Personnel
Jacqueline S. Jeruss, MD, PhD, Assistant Professor in Surgery and National Physicians Cooperative Clinical Co-Director
See Above.

Mary Ellen Pavone, MD, Assistant Professor in Obstetrics and Gynecology-Reproductive Endocrinology & Infertility
Dr. Pavone, the National Physicians Cooperative’s Clinical Co-Director of Reproductive Endocrinology, is an Assistant Professor of Obstetrics and Gynecology and director of the Reproductive Tissue Bank (RTB) at Northwestern University. As a physician-scientist Dr. Pavone conducts both basic and clinical research in the field of women’s health, including fertility preservation and infertility. She provides clinical direction for the NPC from the interest of reproductive endocrinology and guidance to sites about enrollment and regulatory affairs. Dr. Pavone also directs processes and standards for maintenance, transport, and tissue referral.

Brigid Martz, CCRP, Research Project Coordinator, National Physicians Cooperative, Oncofertility Consortium
Brigid Martz is the Research Project Coordinator for the National Physicians Cooperative (NPC) of the Oncofertility Consortium. Ms. Martz is a certified clinical research professional responsible for performing regulatory oversight of Ovarian Tissue Cryopreservation protocols open across national NPC sites. She works closely with NPC co-Directors, Drs. Jeruss and Pavone, to streamline protocols and procedures for current and future NPC research endeavors and serves as the main contact for NPC membership inquiries.

Suzanne Banuvar, Clinical Research Associate, Department of Obstetrics and Gynecology
Education Core: Providing Reproductive and Endocrine Awareness to Diverse Communities

The Education Core communicates basic concepts in reproductive health and the research efforts of the Center to clinicians, patients and their families, and the public. Furthermore, the Core develops outreach materials to children in order to provide them with a basic understanding of reproductive and endocrine health, and give them a greater appreciation for the overall well being of their communities.

Education Core Personnel
Ellen Ann Wartella, PhD, Professor of Psychology and Human Development and Social Policy
Ellen Wartella is Al-Thani Professor of Communication, Professor of Psychology and Professor of Human Development and Social Policy at Northwestern University. She is a leading scholar of the role of media in children’s development and serves on a variety of national and international boards and committees on children’s issues. She is co-PI of the Children’s Digital Media Center project funded by the National Science Foundation (2001-2011) and was co-PI on the National TV Violence Study (1995-1998). She has published widely in communication and psychology journals on children’s media issues.

Eric Adrian Patrick, MFA, Associate Professor, Department of Radio/Television/Film
Eric Patrick began working in Studio Arts in the late 1980s. Art practice still informs his filmmaking. He combines animation, live action, photographic effects, sound collage and performance to create experimental narratives. He has been the recipient of a Guggenheim Fellowship, and his work has won numerous awards both domestically and internationally, including awards at The Black Maria Film Festival, The Humboldt International Film Festival, Semana de Cine Experimental de Madrid, South by Southwest Film Festival, The Ann Arbor Film Festival, and Festival de Cinema Independent de Barcelona. He was an animator for the Peabody award winning and Emmy nominated Nickelodeon program Blues Clues, and has written several articles about independent animation.

Alexis Lauricella, PhD, Research Associate, Center on Media and Human Development
Alexis R. Lauricella is a Research Associate working with Dr. Ellen Wartella at Northwestern University. Dr. Lauricella earned her Ph.D. in Developmental Psychology and her Master’s in Public Policy from Georgetown University. Her research focuses on children’s learning from media and parents’ and teachers’ attitudes toward and use of media with young children. Recent publications include empirical research articles in Journal of Applied Developmental Psychology, Journal of Children and Media, Media Psychology, Merrill Palmer Quarterly and reports for the Fred Rogers Center and the Center on Media and Human Development.
External Advisory Board

- Mary Zelinski, PhD, Associate Scientist in the Division of Reproductive Sciences, Oregon Health & Science University
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- Richard Stouffer, PhD, Senior Scientist and Head of the Division of Reproductive & Developmental Sciences, and Professor of Obstetrics & Gynecology, and Physiology & Pharmacology in the OHSU School of Medicine
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- Leonard Sender, MD, Director of the Adolescent and Young Adult (AYA) Cancer Programs at CHOC Children’s Hospital and at UC Irvine Medical Center’s Chao Family Comprehensive Cancer Center
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- Lisa Begg, PhD, RN, Director of Research Programs, Office of Research on Women’s Health, Office of the NIH Director, National Institutes of Health/DHH
This program is supported by the Northwestern University Center for Reproductive Health After Disease grant U54HD076188 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Specialized Cooperative Centers Program in Reproduction and Infertility Research (SCCPIR).