Tuesday, January 10, 2017
Searle Seminar Room
Robert H. Lurie Medical Research Center
303 E. Superior Street, Chicago, IL
Northwestern University
1:00-5:00pm CST

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Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) National Center for Translational Research in Reproduction and Infertility (NCTRI)
Welcome to the fourth annual meeting of the Northwestern University Center for Reproductive Health After Disease. The goal of this meeting is to review the overall Center activities including projects, cores, productivity and impact. Our Center was awarded funding in 2013 through the Fertility and Infertility Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). Highlights from this year include a major focus on education and outreach, including the first ever Fellow Education Day at the 10th Annual Oncofertility Consortium Conference, the launch of Reprotopia, a website dedicated solely to the educational products of the Center, and the expansion of the national and global networks, who are now empowered to self-organize and take the lead on many independent projects since joining the NPC and the Global Partners Network. This year it became evident that we are truly training the next generation of scientific leaders and many of our postdocs have moved on to independent faculty positions as a result of the work and training they received under the auspices of this award. Members of the community, from junior to senior levels of expertise, are now poised to advance the goals of the Center and move forward with teaching the next generation of learners at their home institutions. These are remarkable achievements for our fourth year of work and we look forward to reviewing this progress with you.

We thank our outstanding advisory board members and NIH staff for your time in reviewing our annual progress and look forward to your advise, course correction and of course any complements! A special thanks to Zoran Illic, Bryan Runkel, Barbara Cushing, and Chelsea Castleberry for making this meeting happen!

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

Lauren Ataman, MPPA
Administrative Director, Oncofertility Consortium
Northwestern University, Feinberg School of Medicine

Brigid Smith, CCRP
Clinical Director, Oncofertility Consortium
Northwestern University, Feinberg School of Medicine
Agenda

1:00 – 1:15pm Welcome and Overview
*Teresa K. Woodruff, PhD*

1:15 – 1:30pm Overall Center and Administrative Core
*Teresa K. Woodruff, PhD*

1:30 – 2:00pm Project I: Measuring and Modifying the Human Follicle Environment to Improve In Vitro Egg Quality
*Teresa K. Woodruff, PhD*

2:00 – 2:30pm Project II: Engineered Environments for Ovarian Follicle Transplantation
*Lonnie Shea, PhD*

2:30 – 3:00pm Project III: Medically-based Protection of Ovarian Reserve
*Takeshi Kurita, PhD*

3:00 – 3:15pm Education Core: Childhood Reproductive Education Project
*Lisa Hurwitz, PhD (ABD)*

3:15 – 3:30pm Break

3:30 – 4:00pm Pilot Presentation: Radiation Therapy-induced Cellular Senescence and the Extra-follicular Ovarian Environment
*Francesca Duncan, PhD*

4:00 – 4:15pm National Physicians Cooperative Core: Human Ovarian Tissue, Oocyte and Data Repository
*Mary Ellen Pavone, MD, MSCI*

4:15 – 5:00pm Closed Session: Center for Reproductive Health After Disease Leadership Board Meeting
*Mary Zelinski, PhD, Chair*
Many young men, women, and children have non-malignant conditions or must undergo treatment with drugs or procedures that can damage their reproductive function. The Center for Reproductive Health After Disease extends the overall scope of the Oncofertility Consortium to ensure that these individuals are provided options for protecting their reproductive health and that providers are aware of these disease and treatment threats on reproductive function. We continue to focus on cancer as well, and our powerful Oncofertility Consortium National Physicians Cooperative ensures that providers have information needed to provide immediate reproductive care to young people facing a cancer diagnosis. Finally, our Center is not limited to the preservation of fertility but will also address the long-term endocrine health of individuals who lose gonadal function. By assembling a diverse, cross-disciplinary team of investigators, the Center pursues both basic scientific research and clinical research goals, as well as creates and implements educational and community outreach initiatives to share the Center's findings with providers, patients, their families, and the public.

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. Project I 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
Hoi Chang Lee, Ph.D. Postdoctoral Fellow, Northwestern University
Jaewang Lee, Ph.D. Postdoctoral Fellow, Northwestern University
Hide Iwahata, MD Postdoctoral Fellow, Northwestern University
Emma Gargus, Graduate Student, Northwestern University
Kelly McKinnon, Graduate Student, Northwestern University
Shuo Xiao, Ph.D. Postdoctoral Fellow now Assistant Professor, University of South Carolina
Monica Laronda, Ph.D. Postdoctoral Fellow now Assistant Professor, Ann & Robert H. Lurie Children’s Hospital of Chicago
Keisha Barreto, Research Technician, Northwestern University

http://www.oncofertility.northwestern.edu
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, 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 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 the disease.

**Project II Personnel**

Lonnie Shea, PhD, Professor, University of Michigan
Ekaterina Kniazeva, PhD, Research Associate, Northwestern University
Beatriz Peñalver Bernabé, PhD, Postdoctoral Fellow now University of Chicago
Peter Rios, PhD, Graduate Student now Visiting Research Assistant Professor, University of Illinois Chicago

**Project III: Medically-based Protection of Ovarian Reserve**

Powerful cancer treatments, such as radiation and chemotherapy, are saving more lives but also impair reproductive function, destroy oocytes, and are 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**

Takeshi Kurita, PhD, Associate Professor, Ohio State University
So-Youn Kim, PhD, Research Assistant Professor, Northwestern University
Megan Romero, Research Technician, Northwestern University
Devi Nair, PhD, Postdoctoral Researcher, Ohio State University

http://www.oncofertility.northwestern.edu
Pilot Project: Radiation Therapy-induced Cellular Senescence and Extra-follicular Ovarian Environment

Radiation is one of the most effective therapies to eliminate unwanted cells, such as cancer cells, but it can simultaneously damage non-targeted tissues resulting in medically-induced complications. The ovary – and particularly the gametes within it - is highly radiosensitive, and thus, premature reproductive aging due to follicle loss is a potential unintended and devastating outcome of radiation treatment. Here we will investigate how radiation therapy and methods that have been developed to protect the ovary from this damage affect the extra-follicular ovarian microenvironment, testing the novel hypothesis that radiation-driven cellular senescence in the stroma is a prime mechanism underlying compromised reproductive function.

Personnel
Francesca Duncan, PhD, Executive Director, Center for Reproductive Science, Northwestern University
Susmita Jasti, PhD, Senior Scientist, University of Kansas Medical Center
Shawn Briley, Research Assistant, University of Kansas Medical Center

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.

Selected List of Activities from Year 4:

- Global Expansion- 32 countries currently represented
  - Publication of second global paper examining oncofertility services worldwide
- 10th Annual Oncofertility Consortium Conference
- Publication of 5th and 6th oncofertility book in series

Administrative Core Personnel

Teresa K. Woodruff, PhD, Director of the Oncofertility Consortium
Lauren Ataman, MPPA, Research Project Manager and Administrative Director of the Oncofertility Consortium

http://www.oncofertility.northwestern.edu
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.

Selected List of Activities from Year 4:

- Launch of Reprotopia: Reproductive Health Education for All
  - [http://reprotoopia.northwestern.edu/](http://reprotoopia.northwestern.edu/): A website that includes educational resources across the entire life spectrum, from K to Gray and in wellness and during times of illness
  - Featured projects include:
    - ‘A New You, That’s Who’ Childhood Reproductive Education
    - Women’s Health Science Program and Oncofertility Saturday Academy
    - Introduction to Reproduction MOOC
    - Master’s in Reproductive Science and Medicine
    - MyOncofertility: A Patient Education Resource
    - Repropedia: A Reproductive Lexicon

- Completion of “A New You, That’s Who” songs and animations. These are now being tested on children for their feedback. Songs and animations available here: (Password for all is ovum).
  - Puberty: [https://vimeo.com/133180455](https://vimeo.com/133180455)
  - Anatomy: [https://vimeo.com/135069917](https://vimeo.com/135069917)
  - Menstruation: [https://vimeo.com/137268002](https://vimeo.com/137268002)

Education Core Personnel

Ellen Wartella, PhD, Professor of Psychology and Human Development and Social Policy, Northwestern University

Eric Adrian Patrick, MFA, Associate Professor, Department of Radio/Television/Film, Northwestern University

Alexis Lauricella, PhD, Research Associate, Center on Media and Human Development, Northwestern University

Lisa Hurwitz, Doctoral Student, Media, Technology and Society Program, Northwestern University

[http://www.oncofertility.northwestern.edu](http://www.oncofertility.northwestern.edu)
The NPC Core represents the evolution of the National Physicians Cooperative, which is comprised of more than 70 clinical sites that provide fertility preservation services and 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 membership has grown to 71 sites in 29 different states. Of the 71 NPC member sites, 30 of those offer ovarian tissue cryopreservation to their patients under IRB-approval.

Selected List of Activities from Year 4:

- Research Projects
  - Ovarian Tissue Cryopreservation
    - The Human Ovarian Tissue, Oocyte and Data Repository includes 319 research ovarian tissues from 367 consented patients.
  - Testicular Tissue Cryopreservation
    - 6 sites have open Testicular Tissue Cryopreservation protocols with a total of 57 research testicular tissue collected.

NPC Core Personnel

Mary Ellen Pavone, MD, Assistant Professor in Obstetrics and Gynecology- Reproductive Endocrinology & Infertility, Northwestern University

Brigid M. Smith, CCRP, Research Project Manager, Clinical Director of the Oncofertility Consortium

Kristin Smith, Patient Navigator, Northwestern Medicine and Oncofertility Consortium

NPC Directors:
Mary Ellen Pavone, MD, REI Director, NPC
Yasmin Gosiengfiao, MD, Pediatric Oncology Director, NPC
Laxmi Kondapalli, MD, Outreach Director, NPC
Barb Lockart, RN, APN, Nurse Coordinator, Pediatric Initiative Network and NPC
Bob Brannigan, MD, Urology Director, NPC
Kristin Smith, Patient Engagement Director
Bill Gradishar, MD, Adult Oncology Director

NPC Leadership Board:
Teresa Woodruff, PhD
Francesca Duncan, PhD
Jackie Jeruss, MD, PhD
Mary Zelinski, PhD
Kyle Orwig, PhD
Clarisa Gracia, MD, PhD
Jeff Chang, MD
Irene Su, MD
Jim Smith, MD
Val Gillis, PA
Leslie Appiah, MD

http://www.oncofertility.northwestern.edu
Advisory Board Members

External Advisory Board
- Mary Zelinski, PhD, Chair, Associate Scientist in the Division of Reproductive Sciences, Oregon Health & Science University
- Christos Coutifaris, MD, PhD, EAB Chair, Nancy and Richard Wolfson Professor of Obstetrics and Gynecology, Department of Obstetrics and Gynecology, University of Pennsylvania
- 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
- Lisa Campo-Engelstein, PhD, Assistant Professor - Center for Biomedical Ethics Education and Research, Assistant Professor of Obstetrics & Gynecology, Albany Medical College
- Johan Smitz, MD, PhD, Head of Hormone/Tumourmarker Laboratory, Promotor of Ovarian Follicle Biology Laboratory, UZBrussels
- Richard Schultz, PhD, Charles and William L. Day Distinguished Professor of Biology, Associate Dean for the Natural Sciences, University of Pennsylvania
- R. Jeffrey Chang, MD, Professor Emeritus of Reproductive Medicine, Director, Division of Reproductive Endocrinology and Infertility, University of California-San Diego
- Gabriel Hortobagyi, MD, Professor of Medicine, Department of Breast Medical Oncology, Division of Cancer Medicine, The University of Texas MD Anderson Cancer Center
- Clarisa Gracia, MD, Associate Professor of Obstetrics and Gynecology, Director, Fertility Preservation, University of Pennsylvania
- 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
- Matthew Zachary, Founder and Chief Executive Officer, Stupid Cancer, Inc.
- Jennifer Mersereau, MD, Assistant Professor, Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology and Infertility, University of North Carolina School of Medicine

Internal Advisory Board
- Jay Walsh, PhD, IAB Chair, Vice President for Research, Northwestern University
- Rex Chisholm, PhD, Vice Dean Scientific Affairs and Graduate Education, Northwestern University
- Barbara O'Keefe, PhD, Dean of the School of Communication, Northwestern University
- Kelly Mayo, PhD, Associate Dean for Research and Graduate Studies, Weinberg College of Arts and Sciences, Northwestern University

Community Advisory Board
- Yasmin Gosienflujo, MD, Assistant Professor in Pediatrics-Hematology, Oncology and Stem Cell Transplantation, Northwestern University
- Sharon Green, MHA, Executive Director, Women’s Health Research Institute, Northwestern University
- Melissa Resh, MEd, Resident Principal, Chicago Public Schools
- Laura Jane Hyde, Chief Executive Officer, Gilda’s Club Chicago
- Joy Lewin, Senior Director Global Marketing, Reproductive Health, Ferring Pharmaceuticals
- Courtney Bulger, Patient Advocate
- Craig Orapello, MBA, Strategic Account Manager, EMD Serono, Inc.

Technology Board
- Bob Taylor, PhD, Director, Northwestern University Information Technology
- Harlan Wallach, Digital Media Architect Lead, IT Academic & Research Technologies, Northwestern University Information Technology

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NIH Officers

- Louis De Paolo, PhD, Chief of the Fertility and Infertility Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
- Stuart Moss, PhD, Health Scientist Administrator, NICHD
- Susan Taymans, PhD, Program Director, NICHD
- 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
Oncofertility Consortium Online Resources

**Oncofertility Homepage:** This site is the homepage for all of the oncofertility online resources. Oncofertility news, events, research updates, clinical guidelines, partner pages, and a variety of other resources are available on this website.

http://www.oncofertility.northwestern.edu

**Reprotozia:** A website that provides individuals of all ages with authoritative reproductive health education from K to Gray. Since reproductive health is vastly important to overall well being, the Oncofertility Consortium and its partners have created a variety of useful websites, courses, and other tools to educate the public about the importance of reproduction and science and to demystify the sometimes-taboo topic. Reprotopia packages all of these initiatives and programs in one, easy to navigate website so users, including young children, teenagers, parents, and educators, can learn about reproductive health across the entire life spectrum, in wellness and during times of illness.

http://reprotopia.northwestern.edu/

**Oncofertility Blog:** This blog provides information about oncofertility research, patient stories, and related news stories.

http://blog.oncofertility.northwestern.edu/

**MyOncofertility.org:** This resource provides an interactive educational environment for patients, parents or partners to learn about advanced fertility management and provide answers to common questions. This website provides around-the-clock information to young cancer patients and includes animations for patients to understand the impact of cancer treatment on fertility.

http://www.myoncofertility.org/

**Northwestern University Patient Navigator Website:** The Patient Navigator website allows patients, parents or partners to connect with Kristin Smith, Northwestern University’s patient navigator. Kristin guides patients through a hopeful process – preserving their future ability to have children in the face of life-saving, fertility-threatening treatments and can be reached through the FERTline hotline or the ‘Contact Us’ button on the Patient Navigator Website.

http://preservefertility.northwestern.edu/

**National Fertility Hotline:** The FERTline navigators have expertise discussing options in fertility management with professionals, patients, and their families. Navigators can provide referral services to one of the 60 national Oncofertility sites for rapid assessment and care in conjunction with oncology treatments.

866-708- FERT(3378)

**iSaveFertility App:** The Oncofertility Consortium has a free app, iSaveFertility (https://itunes.apple.com/us/app/isavefertility/id436397171?mt=8) available through iTunes which provides healthcare professionals with a mobile toolkit to help them discuss fertility preservation options with cancer patients and their families.

**Repropedia:** A reproductive health lexicon. Repropedia is a reproductive dictionary created by an international team of scientists and clinicians led by investigators at Northwestern University.

www.repropedia.org

**Introduction to Reproduction Massive Open Online Course (MOOC):** This is a crash-course in human reproductive health through fact and biology-based information on a variety of topics. "Sex 101" covers reproductive anatomy, key biological changes during puberty, sexual biology and contraceptive methods, reproductive disorders, and a special introduction to the exciting field of Oncofertility.

https://www.coursera.org/learn/reproductive-health