

# Oncofertility: The Preservation of Fertility Options for Young People with Cancer

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# Preservation of Fertility After Cancer

- **Life preserving treatments**

- Chemotherapy

- Radiation

- Surgery

- **Can threaten fertility**



## Who is at risk?

- More than **1.4 million people** are diagnosed in the U.S. with cancer annually.
- 10 million new cases of cancer are diagnosed **globally** each year.
- **10%** of these individuals are in their reproductive years (up to 45 years old).
- Approximately **11% of breast cancer patients** are diagnosed before the age of 40 years old.



Jeruss and Woodruff, *NEJM*, 2009

West, et al. *Pediatric Blood Cancer*, 2009

## How big is the fertility problem?

- In 2006, estimated **1,700,000 female** cancer survivors in US who were <40 at diagnosis.
- **20% reduction** in achieving first pregnancy in pediatric survivors.
- **50% decrease** in women diagnosed as young adults.
- Estimate that **748,000 currently** have had their childbearing interrupted (plus another **38,500** per year).

Green D et al, *J Clin Oncol*, 2006  
Shover, personal communication



# Fertility concerns beyond cancer treatment?

- Patients with **rheumatologic diseases** such as lupus, RA, and ulcerative cells
- **MS** patients receiving new generation treatments
- Patients undergoing **bone marrow or stem cell transplants** for an indication
- Individuals with **genetic mutations** that lead to loss of fertility and early menopause (e.g. Turners Syndrome, Fragile X Carriers)
- Individuals who carry a **mutation** that predisposes that individual to certain types of cancer and anticipated treatment-induced risk of infertility (BRCA, MLH, MSH, APC, MEN)

Hirshfield, Gracia and Woodruff, *submitted*

## *The Mission of the Oncofertility Consortium*

To focus on the **fertility threat** poised by cancer treatment and serve as an **authoritative voice** for patients while creating **corridors of discovery** between research disciplines, clinical practice and training that can be created at the intersection of oncology, pediatrics, reproductive science, policy research, reproductive health law, bioethics, communication science, and cognitive and learning science.

*...exploring and expanding options for the reproductive future of cancer survivors*

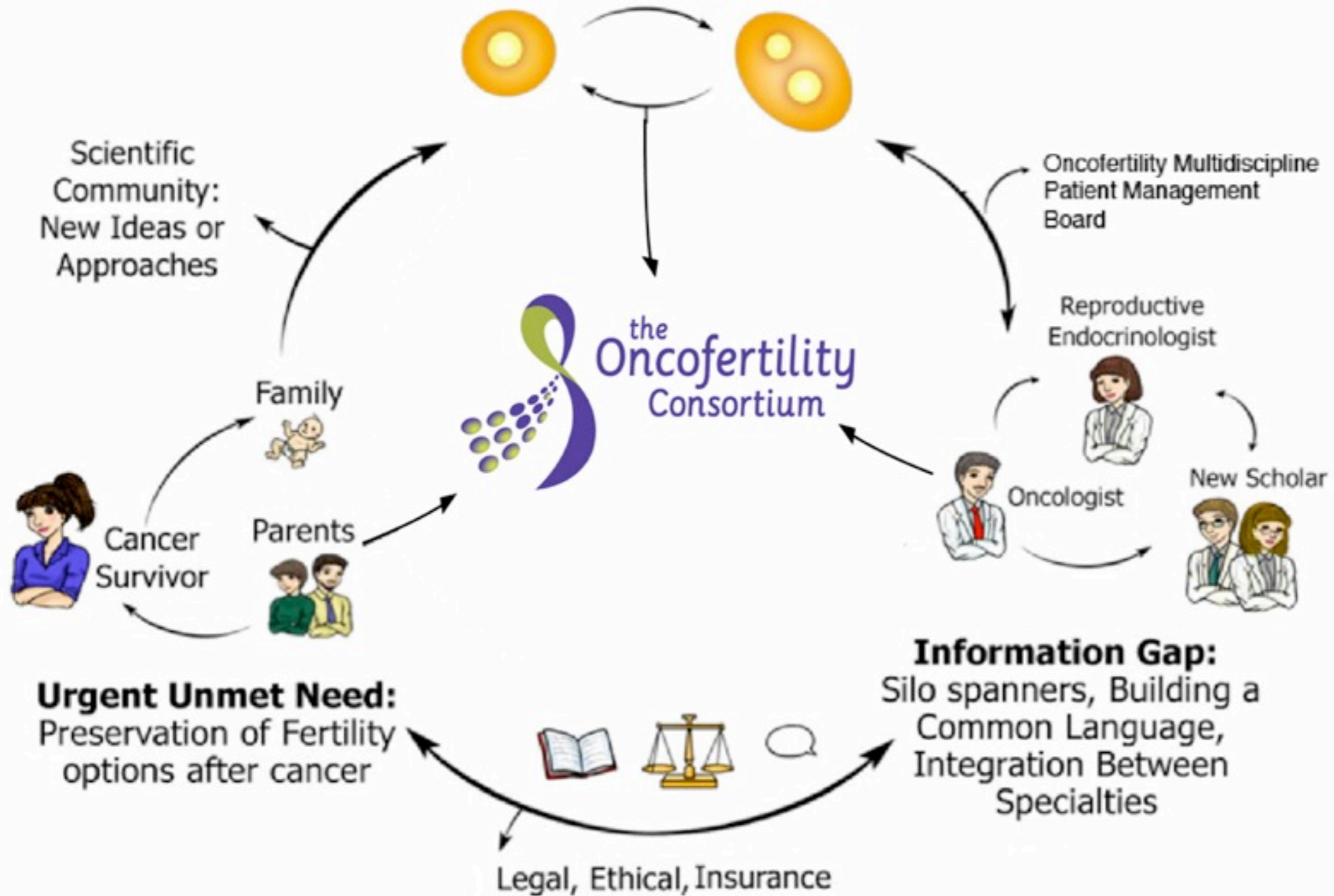


This work was supported by the Oncofertility Consortium  
NIH UL1DE019587



### Fundamental Question:

What regulates follicle growth and oocyte maturation?  
How can eggs and follicles be preserved without damage?



Woodruff, TK *Nature Review* 2010

*The Ribbon*



<http://oncofertility.northwestern.edu/branding-materials>

# ASCO and ASRM practice guidelines

## ● ASCO

- Discuss at the earliest possible moment potential fertility impairment
- Prompt referral to qualified specialist if patient is interested
- Promote clinical trials to advance state of knowledge

## ● ASRM

*“Parents may act to preserve fertility of cancer patients who are minors if the child assents and the intervention is likely to provide net benefits to the child”*

## ● **Oncologists - limited time to act**

- multidisciplinary approach (allied health professional)
- survivorship is paramount
- small window of opportunity



# Options for men and boys

**FAMILIES**  
**after cancer**  
A discussion with cancer survivors and fertility experts

Panelists include

**LANCE ARMSTRONG**  
FOUR-TIME TOUR DE FRANCE CHAMPION,  
CANCER SURVIVOR & FATHER OF THREE

**KRISTIN ARMSTRONG**  
WIFE AND MOTHER OF THREE

**DINA BAIR**  
CANCER SURVIVOR AND WGN NEWS ANCHOR

**LINDSAY NOHR**  
CANCER SURVIVOR AND FOUNDER OF FERTILE HOPE

**ZEV ROSENWAKS, M.D.**  
NEW YORK WEILL CORNELL'S THE CENTER FOR REPRODUCTIVE MEDICINE AND INFERTILITY

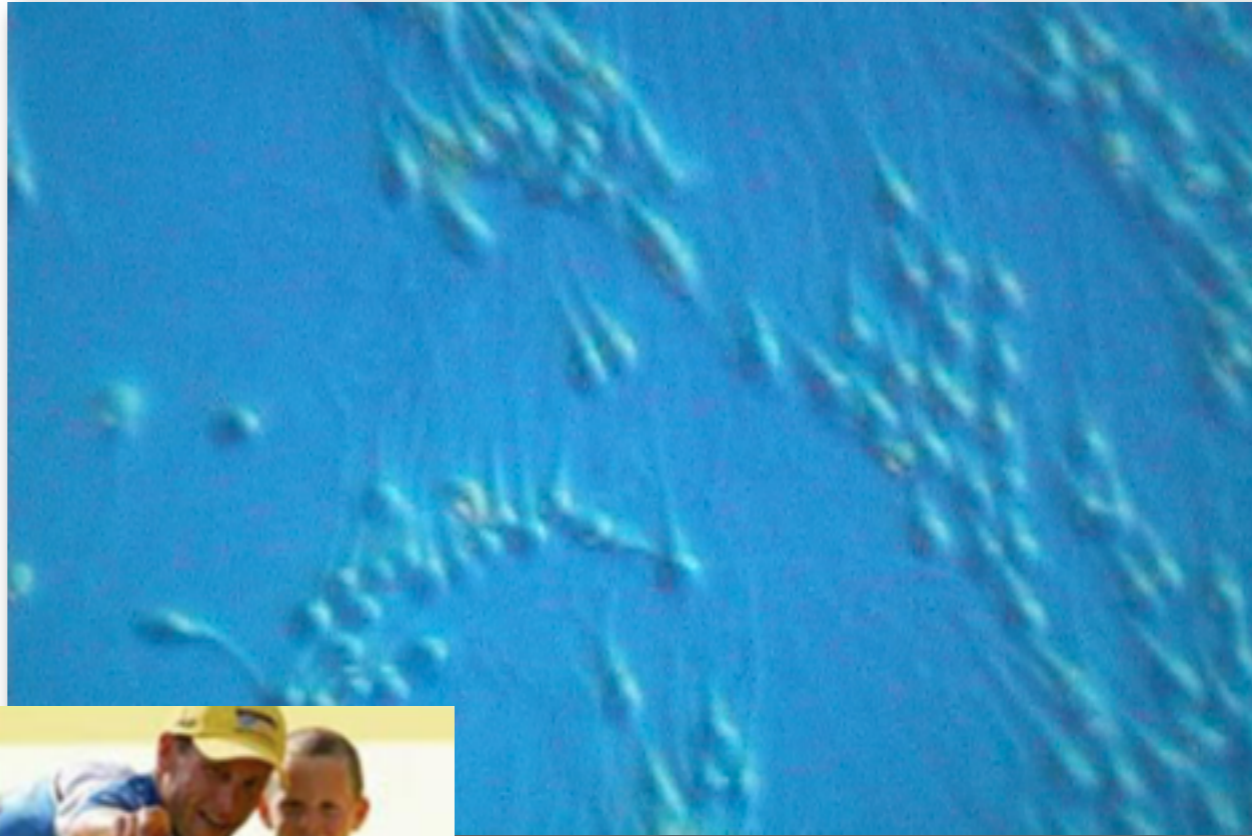
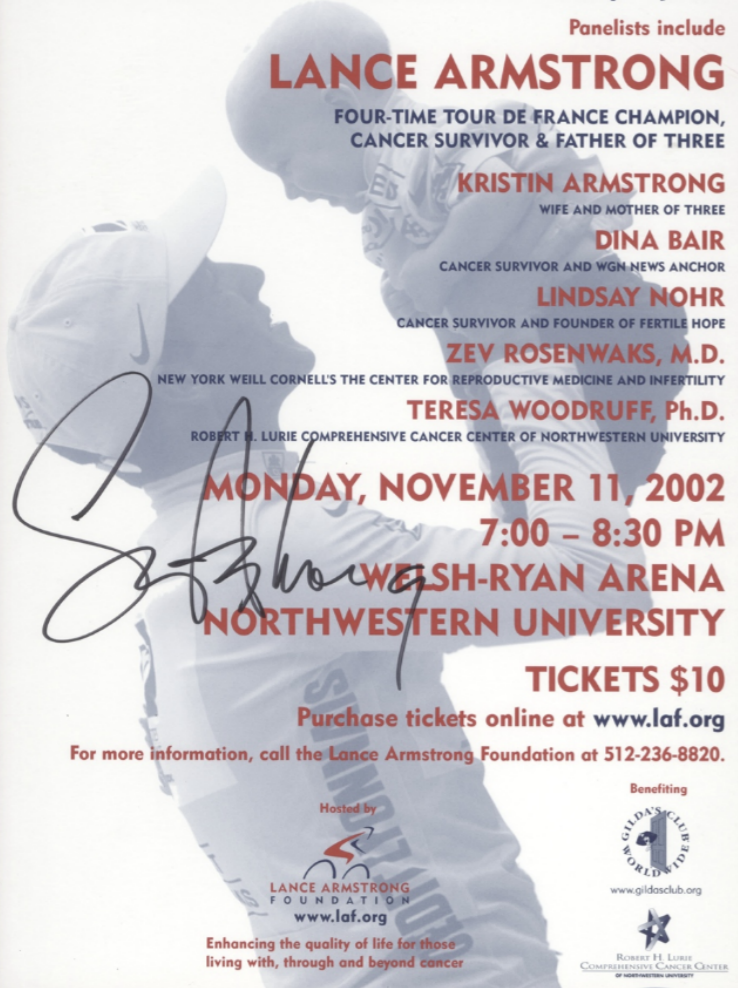
**TERESA WOODRUFF, Ph.D.**  
ROBERT H. LURIE COMPREHENSIVE CANCER CENTER OF NORTHWESTERN UNIVERSITY

**MONDAY, NOVEMBER 11, 2002**  
**7:00 - 8:30 PM**  
**WELSH-RYAN ARENA**  
**NORTHWESTERN UNIVERSITY**

**TICKETS \$10**  
Purchase tickets online at [www.laf.org](http://www.laf.org)  
For more information, call the Lance Armstrong Foundation at 512-236-8820.

Hosted by  
**LANCE ARMSTRONG FOUNDATION**  
[www.laf.org](http://www.laf.org)  
Enhancing the quality of life for those living with, through and beyond cancer

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**GILDA'S CLUB WORLDWIDE**  
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OF NORTHWESTERN UNIVERSITY



- Sperm Bank
- Testis Biopsy
- Donor Sperm
- Adoption

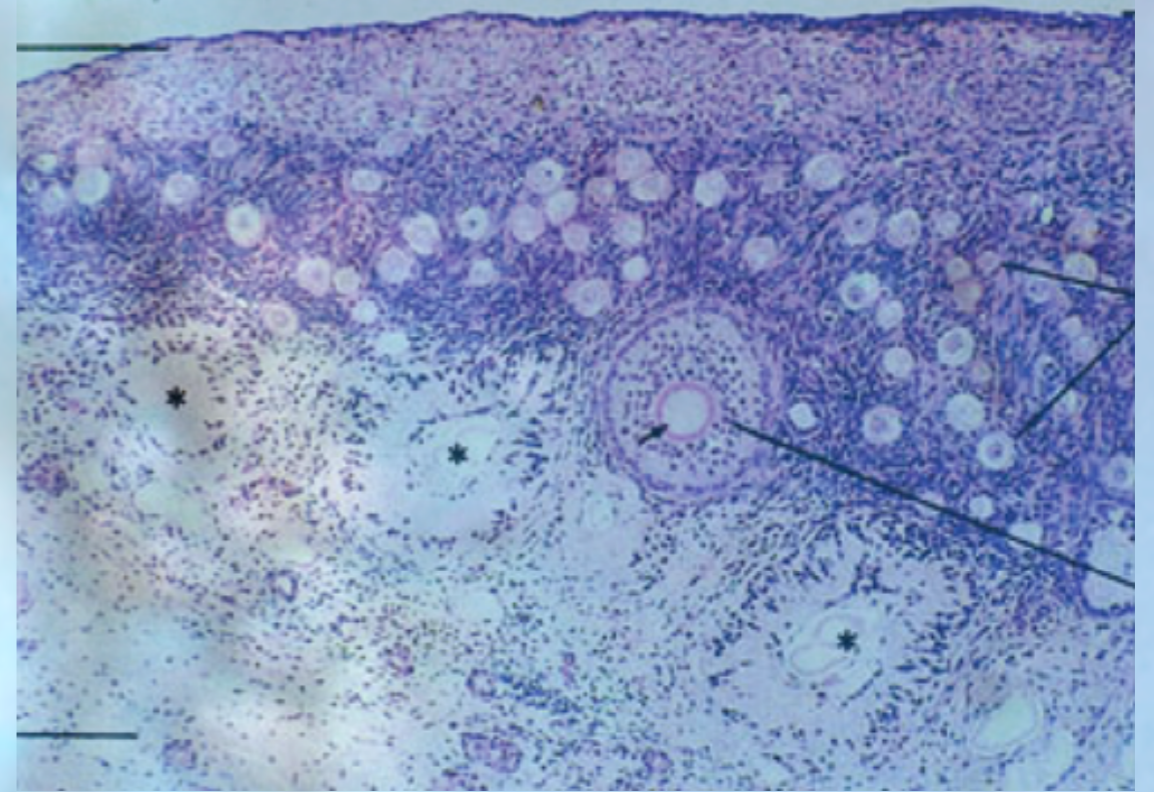


# Options for women and girls

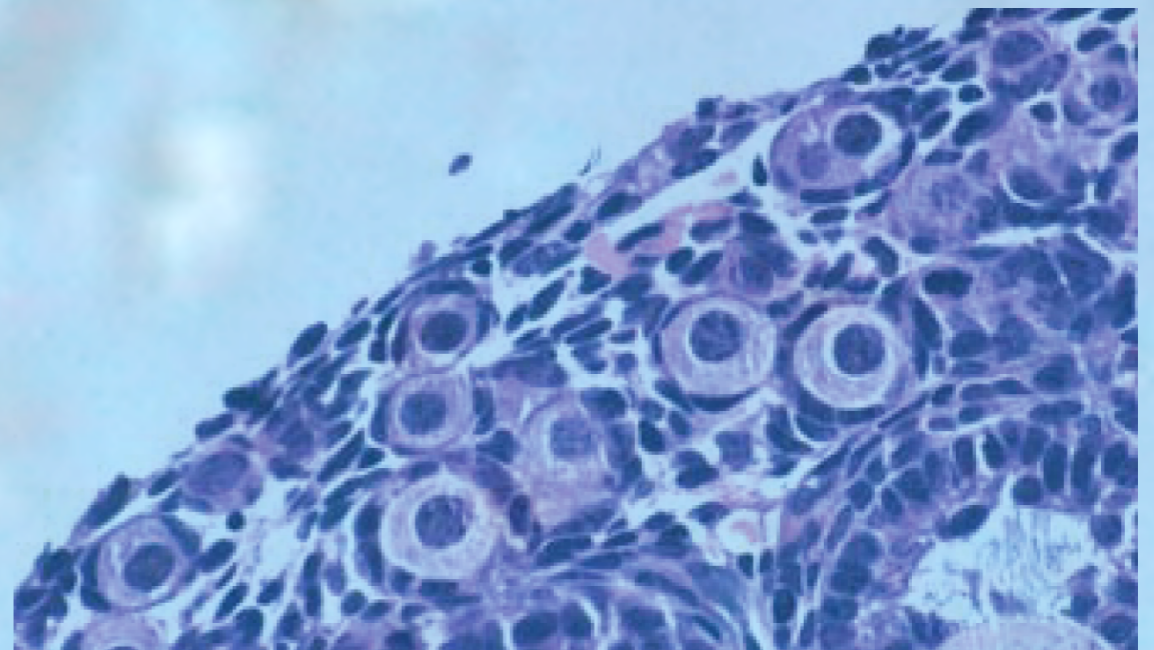
- Embryo/Egg Bank
- Adoption, Surrogacy
- Natural Pregnancy
- Ovarian Cryopreservation



# Options for women and girls

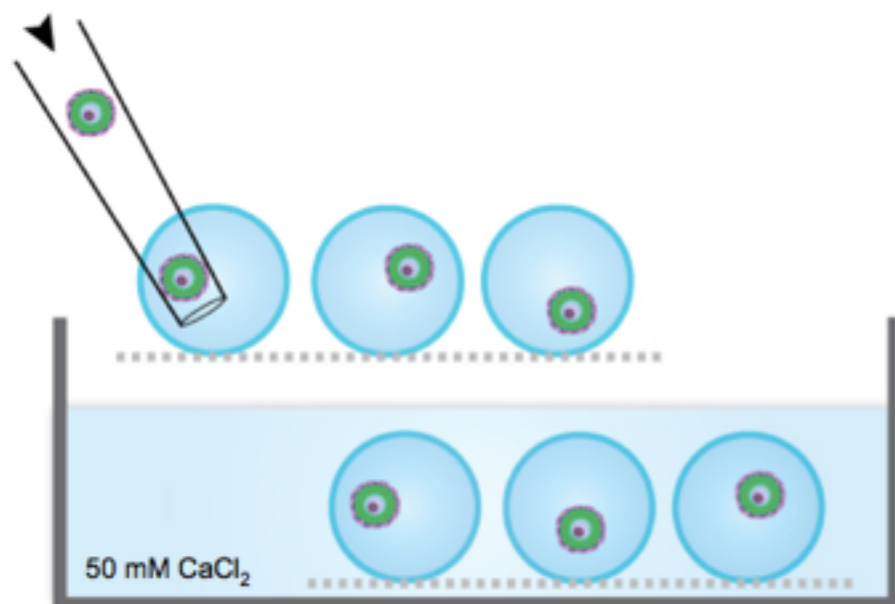
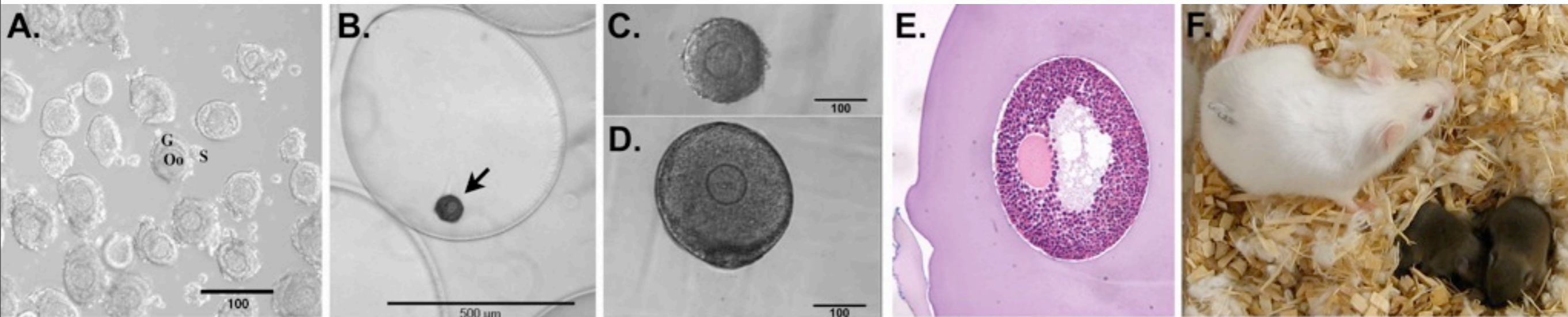


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# In Follicle Maturation Provides Tool for Discovery



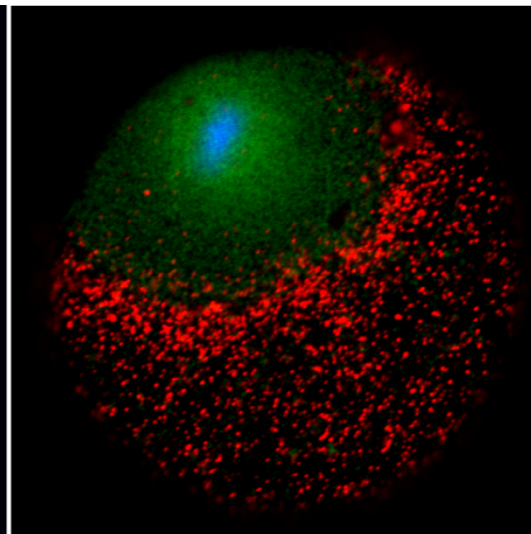
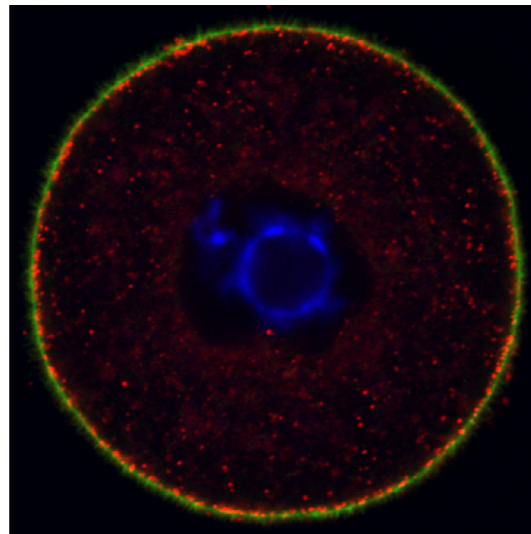
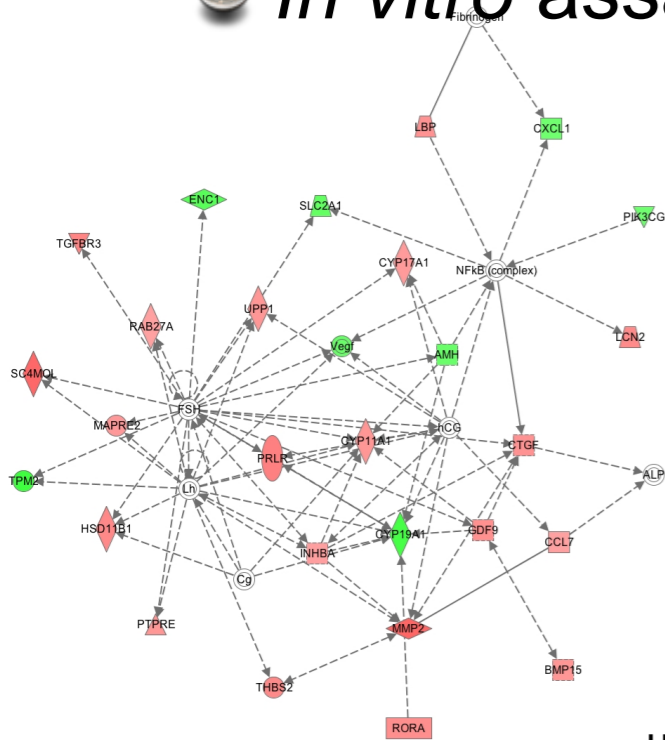
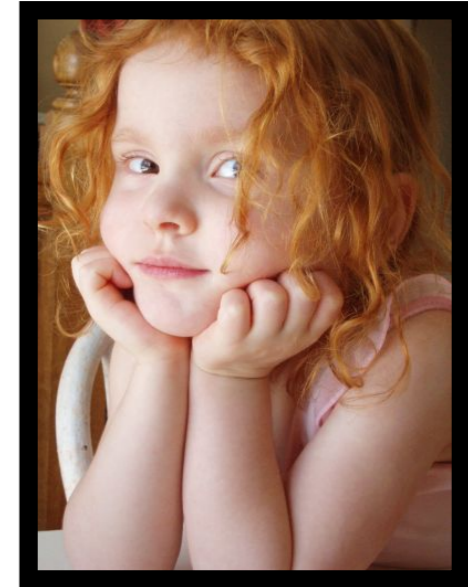
To see training videos and view additional references please visit: <http://oncofertility.northwestern.edu/>

Pangas et al., **Tissue Eng.** 2003; Kreeger, et al., **BOR**, 2005; **Biomaterials**, 2006; West et al., **Biomaterials**, 2007; Xu et al., **Biomaterials**, 2006; **BOR**, 2009



# New discoveries...basic

- Egg quality (aging)
- Ovarian context (rigidity)
- Gene networks
- Mechanisms of ovulation and lutenization
- *In vitro* assay for new chemotherapeutics

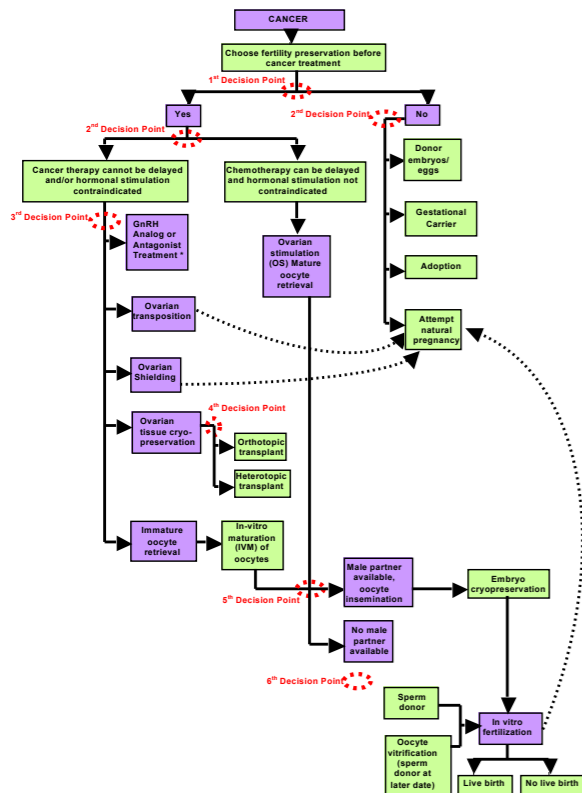
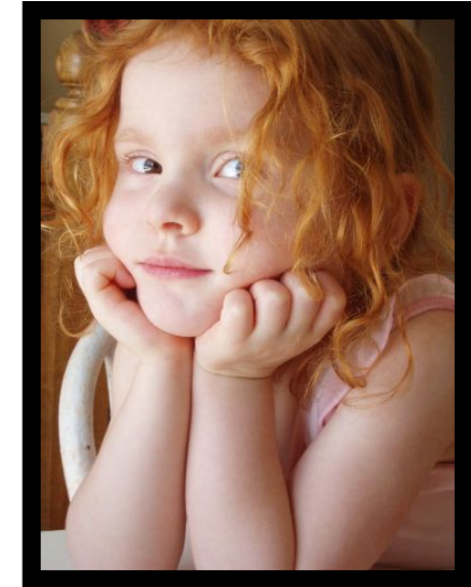


unpublished, Barnhart, Barrett, Duncan, Galdones, Kim, Xu



# New discoveries...societal

- Legal concerns
- Religious constraints
- Ethics discussion
- Historical context
- Patient-Provider communication and decisions



Dolin et al., **SCLR**. 2009  
 Zoloth L et al., **AJB**, 2008  
 Campo-Engelsten, L **JCO**, 2010  
 Gardino et al, **JARG**, 2010  
 Woodruff, **Nature Review Clin. Oncol.** 2010



## Take home message

- **Practice guidelines** exist and recommend that the fertility threat associated with cancer treatment be discussed with all young cancer patients
- **Options** exist!
- The **Oncofertility Consortium** was funded to:
  - solve and intractable problem
  - engage basic biology and social science
  - create **a global community of practice** that is coordinated and sustainable



Our goal is to build the global program as a team and in so doing...  
*...expand options for the reproductive future of cancer survivors*



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NIH UL1DE019587



## Final thought...

When oncologists and fertility scientists and clinicians work together,  
patient needs are met and can  
***change a devastating diagnosis into life-affirming interventions.***



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Thank you!

