

A Lab Breakthrough

Improvements in oocyte freezing offer a new option for IVF success.

By Jessica A. Macdonald, DVIF&G Laboratory Supervisor

Until recently, the ability to freeze unfertilized eggs, also known as cryopreservation, was not an option for patients. The delicate characteristics of the human oocyte (the early female reproductive cell) were such that attempts to cryopreserve eggs and subsequently thaw, fertilize, and implant them in the uterus were unsuccessful. Cryopreservation was restricted to semen and embryos. Fortunately our knowledge of oocyte physiology and laboratory techniques is improving, making the technology required for oocyte freezing a reality.



A basic understanding of the principles of cryobiology is fundamental. The success of cryopreservation is due to the application of theoretical considerations and empiric observation derived from studies on different types of cells. Recently I had the opportunity to travel to the University of Bologna in Bologna, Italy to study the techniques revolutionized by Eleonora Porcu, M.D. and her team of embryologists.

She and her colleagues have developed a number of approaches to maximize survival rates. The greatest success has been achieved with protocols that slowly expose oocytes to freezing solutions and then rapidly thaw them. Regardless of the protocol, the use of cryoprotectants is critical to the survival of the cell. Like the anti-freeze in your car that works to protect the engine from freeze damage, cryoprotectants are chemicals that function to protect the fragile oocyte cells. Most cryoprotectants include an alcohol, a carbohydrate, and a solvent. Dehydration should occur. If it doesn't, the water may crystallize during the freezing protocol and damage the cell during thaw. Cryoprotectant concentrations and the time the egg is exposed to each element are equally crucial to the process. Dr.

Porcu has determined that increased concentrations of sucrose greatly improve survival success rates. Using this method, she reports oocyte survival success rates approaching 80 percent, and pregnancy rates approaching 20 percent.

Just as critical as the freeze, the thawing process must be performed delicately to slowly re-hydrate the cell, mindful of exposure times and cryoprotectant concentrations. If the oocytes are placed directly into a culture media free of cryoprotectant after thawing, the rapid changes in concentration (osmolarity) could cause the cell to swell and burst. Removal of the cryoprotectant is achieved through progressive dilutions that free the cell out from the

high cryopreservant concentration to a solution that is virtually free of cryopreservants. Patience is a key virtue in the embryology lab.

The oocyte undergoes a number of physiological changes that make the thawed oocyte less likely to fertilize with conventional in vitro fertilization (IVF). In addition to spindle changes that need equilibration time prior to fertilization, the oocyte also requires Intracytoplasmic Sperm Injection (ICSI) to achieve fertilization. ICSI is a procedure occurring under the microscope in which a single sperm is injected directly into the egg. In addition, the subsequent development of the embryo derived from cryopreserved oocytes is at a slower rate than an embryo derived from fresh oocytes. It is not uncommon to see four cells on day three rather than the 8-cell embryo we are accustomed to transferring.

In spite of the remarkable progress that is made in the field of oocyte cryopreservation, there are limitations to the current technology. Most patients who are offered the option of oocyte freezing are young, healthy women with presumably good quality eggs. Oocytes from older women are already more vulnerable during routine IVF procedures and may not be ideal for cryopreservation consideration. Therefore, it is important that each facility draft its own program guidelines that address such issues.

Please see the DVIF&G website for our program guidelines. Go to www.dvifg.com and click on "Patient Information."

Oocyte freezing has many advantages and practical applications for IVF treatment. As with the semen and embryos, the cryopreservation of oocytes is highly desirable. First, it offers an alternative to storing excess genetic material for those opposed to freezing

"Oocyte freezing may offer hope for oocyte donation and preservation of fertility for women facing ovarian failure."

embryos for religious or ethical reasons. For example, in predominantly Catholic countries such as Italy, oocyte freezing has become routine due to legislation mandates allowing only three oocytes to become fertilized and then transferred. Second, oocyte freezing offers a solution to IVF cycles lost due to failure to produce semen samples or lack of sperm found during aspirations. Instead of throwing away eggs or fertilizing them by donor sperm backups as in the past, patients can now preserve the retrieved oocytes for fertilization at a later date. In essence, it opens the door for the possibility of performing IVF without the couple being present.

In addition to the moral, ethical, and religious concerns involving embryo freezing, oocyte freezing may offer hope for oocyte donation and preservation of fertility for women facing ovarian failure. The American Society for Reproductive Medicine (ASRM) recently released a policy stating, "Egg and ovarian tissue freezing should not be marketed or offered to healthy women as a means to defer reproductive aging." However, women who require radiation

and/or chemotherapy who are at high risk for ovarian failure may want to utilize the treatment as a means to preserve their own genetic material.

Oocyte freezing could also make possible the formation of donor "egg banks" similar to the current donor sperm banks available. Such banks create the potential for a reduction in the extensive costs of oocyte donation and allow for a responsible supply of donated material. Oocyte freezing also will shorten the time interval oocyte recipients need to wait prior to using a donor since the need for donor monitoring and workup is eliminated.

Christopher Chen, M.D. of Singapore was the first to report a pregnancy originating from frozen/thawed oocytes in 1986. Until 1995 there were only 5 reported births. Now over 100 live births have been reported, and the number continues to grow as more women consider this option as a means of assisted reproduction.



If you have questions regarding oocyte freezing or any other procedure performed in DVIF&G's state-of-the-art lab, please call Jessica A. Macdonald, DVIF&G Laboratory Supervisor, at (856) 988-0072.

DVIF&G Hosts Weight Control Support Group

On May 7th Melissa Bennett, a registered dietitian, Certified Diabetes Educator, and board-certified medical nutrition therapist with DVIF&G, facilitated a weight control support group for patients at the practice. Held in the DVIF&G Marlton office, the support group offered patients the opportunity to share their experiences with others and to learn how to reach a healthy weight and maintain it.

The support group also featured former patients who have successfully lost weight and kept it off. "By sharing their tips for successful weight loss, they inspired the others in attendance to follow their lead," says Ms. Bennett.

Unknown to most women, being at a healthy weight can affect their chances of conceiving. Research has shown that overall health can boost fertility. Medical nutrition therapy is an integral part of DVIF&G's infertility treatment plan. By learning to eat a well-balanced diet, a woman can achieve a healthy weight, improve metabolic control, and increase self-esteem. Medical nutrition therapy promotes overall good health, an impor-

"When it is dark enough, you can see the stars."

— Charles A. Beard

tant factor in conception.

Being overweight can increase the risk of developing diabetes, heart disease, and high blood pressure, and other medical problems. Being at a healthy weight decreases the likelihood of developing these serious health problems. Achieving and maintaining a healthy weight is important for all women, both before and after they conceive.

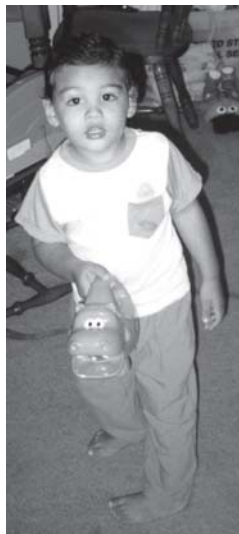
If you're interested in attending future weight support group meetings at DVIF&G, please call (856) 988-0072.

How We Evaluate New Medical Technologies

DVIF&G believes that it is very important to be able to offer our patients the best and most up-to-date technologies available. We review all new medical technologies, pharmaceuticals, and devices, as well as new uses of established technologies as they become available in order to help us treat our patients. Our technology review includes, but is not limited to:

- Reviewing medical research and scientific evidence on the safety and effectiveness of the medical technology.
- Considering position statements and clinical practice guidelines on how these technologies should be used in our medical setting.
- Determining whether these technologies are experimental or investigational.

We communicate these new and exciting technologies in "News You Can Use" at our website at www.dvifg.com. If you have any questions regarding any medical technologies that we offer, please call us at (856) 988-0072.



Share Your Baby Pictures

If you would like to share your baby's photos with other DVIF&G patients, you can upload them at www.startfertility.com or www.dvifg.com, the DVIF&G website. Just fill out the necessary information, upload your photo, and your child's picture will be included. What a great way to share your joy and to give others hope.

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Happy Birthday to . . .

Tyler Joseph Mendys, born on March 11, 2005, to Beata and Robert Mendys.

Julianne Emma Nanni, born on March 17, 2005, to Jennifer and Anthony Nanni.

Faith Taylor, born on March 23, 2005, to Erin and Jay Taylor.

Darrius Doss, Jr., born on March 13, 2005, to Sharon Diggs and Darrius Doss.

Cristina Adriana Rico, born on April 5, 2005, to Christina and Raymundo Rico.

Ty Robert Boland, born on April 7, 2005, to Heather and Robert Boland.

Anthony Colangelo, born on April 8, 2005, to Lisa and Leonard Colangelo.

All the babies and parents are doing well. Thank you, DVIF&G!



Conceptions

Conceptions is published quarterly for a select group of OB/GYNs and their patients. To receive extra copies of the newsletter or to be placed on our mailing list, please call Carla Scott at (856) 988-0072 or e-mail her at: info@startfertility.com.

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www.startfertility.com

Happy Birthday to . . .



Brennah Strehle, born on December 12, 2003, to Joy and William Strehle.
Nicholas Perna, born on November 22, 2004, to RoseAnne and Ralph Perna.
Julie Anne SantoFerraro and **Emma Nicole SantoFerraro**, born on January 31, 2004, to Jamie and Dale SantoFerraro.
Ryan Michael Dennison and **Lauren Grace Dennison**, born on March 8, 2004, to Sue and Michael Dennison.
Olivia Maska, born on April 26, 2004, to Deanne and Jeff Maska.
Braden Phillip Dwyer, born on May 3, 2004, to Rebecca and Hugh Dwyer.
Rylie Finn, born on September 4, 2004, to Christine and Dorsey Finn.
Isaiah Peterson, born on September 19, 2004, to MariLiz and Heshimy Peterson.
Kailey Elizabeth Mayoros and **Brenden Scott Mayoros**, born on September 19, 2004, to Kim and William Mayoros.
Abigail Innocenzo and **Isabel Innocenzo**, born on October 26, 2004, to Jeanine and Paul Innocenzo.
Lana Minato, born on November 10, 2004, to Pearl and Alan Minato.

Kedar Wilson and **Keyirrah Wilson**, born on December 6, 2004, to Dana and Bernard Wilson.
Selina Joy Figueroa, born on January 8, 2005, to Carmen and Mario Figueroa.
Alexis Terry Hider, born on January 10, 2005, to Valerie and Terry Hider.
Samuel David Pabon, born on January 18, 2005, to Maria and David Pabon.
Emily Elizabeth Ammerman, born on January 26, 2005, to Sudie and Thomas Ammerman.
Victor Yiu and **Brian Yiu**, born on January 30, 2005, to Sui Yuen and Chi Yiu.
Danielle Davenport, born on February 1, 2005, to Michelle and John Davenport.
Kylie Jane Tatusko, born on February 1, 2005, to Deanna and Peter Tatusko.
Mikayla Poe, born on February 4, 2005, to Jennifer and Eric Poe.
Jackson Bauer, born on February 15, 2005, to Bridgette and Bradley Bauer.
Genieve Marie McMullen, born on February 23, 2005, to Maria and Michael McMullen.
Julia D'Orazio and **Jessica D'Orazio**, born on February 25, 2005, to Christine and Stephen D'Orazio.
Brendan Charles Rowan, born February 27, 2005, to Maryette and Charles Rowan.
John Stephen Archer, Jr., born on March 6, 2005, to Tracy and John Archer.
Rylee Faith Vogelmann, born on March 7, 2005, to Andrea and Michael Vogelmann.

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