

## EGG FREEZING AND STORAGE

Oocyte cryopreservation (egg freezing) is considered to be a developing or experimental technique for fertility preservation in women. According to the guidelines, issued in a report by the American Society for Reproductive Medicine (ASRM) Practice Committee, available data are insufficient to classify egg freezing as an established medical treatment, and the procedure should not be offered as a means of deferring reproductive ageing.

This is a rapidly progressive area in which success rates for thawing, fertilization and subsequent pregnancy have been demonstrated.

### Who would benefit from Egg Freezing?

Five main groups of women seek this reproductive service;

- Women with cancer, as chemotherapy and radiation treatment can often have a harmful effect on fertility, rendering many of these women menopausal following completion of their treatment
- Women who are at risk of early menopause or who have a genetic disorder which could limit fertility (eg; Turner's Syndrome)
- Couples who for religious or ethical reasons are opposed to freezing embryos resulting from IVF treatments and are more comfortable with storing unfertilized eggs instead
- Single women who have not yet met their life partner and wish to have children at a later date. These women are aware that maternal fertility declines with age and are choosing to undergo IVF treatment sooner, and store their unfertilized eggs for later
- Couples who have no sperm retrievable on the day of their egg collection

Other instances where egg freezing may be beneficial;

- Donor cryo-banking – some women may wish to donate their eggs anonymously for use by other couples undergoing IVF treatment.
- Problems with synchronization of donor and recipient cycle, although the most common practice in this case is to freeze embryos.

### How would my eggs be retrieved and how many can I expect?

In egg freezing, a woman's mature eggs are developed and removed using standard IVF techniques. This typically involves three stages of treatment, namely; Pituitary Suppression, ovarian stimulation, then egg retrieval. Each of these treatments will be discussed in detail with your clinician. The egg retrieval itself is performed by an ultrasound guided needle passed through the top of the vagina. The needle is passed into each follicle in the ovary and the fluid is withdrawn into a test tube. The fluid from each follicle is examined under a microscope and the eggs are collected for cryopreservation. The procedure will only take 15-30 minutes and is performed under sedation or anaesthetic. You will therefore be required to rest in the recovery room for approximately an hour afterwards.

As with all medications and medical procedures, there are side effects and potential risks involved with all of the medications that may be received, as well as potential risks involved with egg retrieval procedures. You will also require monitoring with serial blood sampling and transvaginal ultrasonography during your cycle. It is common to experience some cramping and discomfort after egg retrieval as well as some vaginal spotting or bleeding. A heat pack, hot water bottle or analgesic should be sufficient to manage the discomfort, but should the pain become severe or the bleeding heavy please contact the clinic. You will need about 2 days off work.

### How many eggs can I expect to get?

The number of eggs retrieved in a single stimulation cycle is a very individual outcome. It very much depends on your health, your age, and how well you respond to the drug treatment. In addition, with human oocytes it is a case of "more is not necessarily better" with regards to egg numbers and subsequent quality of those eggs. With these factors in mind,

your clinician will tailor your drug/treatment cycle according to your specific requirements and/or previous responses.

### How does cryopreservation work ?

Our ability to freeze any cell depends on many factors, but most significantly on how much water the cell contains. Because water expands in volume as it turns to ice, cells must be dehydrated prior to freezing to prevent the cell from rupturing. The addition of a cryoprotectant, which does not expand upon freezing, can greatly reduce the risk of cell rupture.

Scientists have been freezing and thawing sperm with success for over 100 years. In many ways, sperm are ideal for freezing as they exist as individual cells, they are the smallest human cells and they contain very little water. It is thought that sperm can be stored perhaps indefinitely after being added to a solution of cryoprotectant, and then frozen to -196°C.

Traditional cryopreservation protocols impose "slow" cooling rates of about -1°C to -2°C per minute in specifically designed temperature controlled cryopreservation chambers, whereas a more recent technique in cryopreservation is called 'vitrification'. Vitrification refers to a form of cryopreservation where cooling rates are so rapid (> - 20,000°C per minute) that ice does not have a chance to form, and the mixture of cryoprotectant and egg forms a "glass-like" gel. At CFC we are routinely using vitrification as the preferred method of egg freezing.

### What are the present limitations?

In contrast to the sperm, the oocyte is the largest human cell and it contains much more water. The oocyte is also much more sensitive and is very intolerant of the chemical and physical stresses that are created during freezing and thawing. Further, the availability of oocytes is much more limited. When an oocyte is ovulated, or retrieved from the ovary during an IVF cycle, ideally it is ready to be fertilized by a single sperm. In anticipation of fertilization, the oocyte prepares to discard half of its DNA in a process called meiosis. Any changes in the physical or chemical environment around the oocyte can disrupt meiosis, leading to an oocyte with too much or too little DNA. Hence, even after we overcome the hurdles of sensitivity and cell water content, these other obstacles to freezing and thawing oocytes successfully, remain. While the overall aim of egg cryopreservation is to get the egg to

survive upon thawing, certain damage or consequences of the procedure may not kill the cell but render it as 'less viable'. A major issue is that eggs do not fertilise well after thawing. This is due to the partial disruption of the membrane which causes a block to the conventional fusion and penetration of sperm with the egg surface. So, artificial forms of assisted insemination have to be used to achieve acceptable fertilization outcomes with thawed eggs. This procedure is referred to as intracytoplasmic sperm injection (ICSI), and is a very commonplace procedure in all infertility centres worldwide. It involves the direct injection of a single sperm into an egg, thereby avoiding most of the usual barriers to fertilization.

## What are the success rates using vitrified (cryopreserved) eggs?

Wider application and success with oocyte freezing depends on continued improvements with the technology and on careful selection of oocytes to freeze. While many researchers are continuing to improve the freezing process, much of the success so far has been with the use of good quality or young oocytes.

A recent clinical study (Cobo et al, 2008\*) documented the following success rates using vitrified eggs:

- 96.1% of vitrified eggs survived the warming procedure (666/693 oocytes)
- 73.1% of warmed eggs were fertilized (487/666)
- 63.2% biochemical pregnancy rate per transfer (74/117 embryos transferred)
- 38.5% implantation rate per embryo transferred (45/117 embryos transferred)
- 24% live birth rate per embryo transferred (28 healthy babies born out of 117 embryos transferred).
- 4% live birth rate per oocyte thawed

A recent review of obstetric and perinatal outcomes (Chian et al, 2008\*\*) in 200 infants conceived following egg vitrification cycles, found no increased incidents of anomalies when compared to infants conceived naturally or through IVF.

## How long can I continue to cryopreserve my eggs?

City Fertility Centre follows national guidelines as recommended by The National Health and Medical Research Council (NHMRC 2004) regarding egg storage. The maximum storage time in which eggs can be kept in storage is 10 years at City Fertility Centre. If after the maximum 10 year storage period, the eggs have not been used, donated to another couple or donated for research and no alternative arrangements have been made by the owner of the stored eggs (and the owner remains untraceable), disposal will be arranged.

In Victoria, state legislation requires women wishing to extend the storage of their eggs beyond 10 years to apply to VARTA for a storage extension. Please contact your clinic for advice on this process.

If your cryopreserved eggs are reaching the 10 year storage limit and you wish to extend the storage time, a written letter of application must be made to the Scientific Director of City Fertility Centre.

If you should decide to dispose of your cryopreserved eggs at City Fertility Centre please contact the IVF Nurse Co-ordinators to discuss options available to you. Signed consent forms are required prior to disposal.

We ask all patients with cryopreserved eggs to keep City Fertility Centre informed of their current contact details. There is a 6 monthly storage fee.

Storage fees will cease if you consent to dispose of your eggs.

## What options are available if I choose not to keep my eggs cryopreserved?

The following options are available to you if you should decide to no longer keep your eggs cryopreserved:

- Removal from cryopreservation (thawed and discarded)
- Donation to another couple
- Donation for research

Whatever option you should decide, appropriate consent forms with your signature are required prior to releasing

your cryopreserved eggs. Please contact the IVF Nurse Co-ordinators to discuss these options.

## What happens to stored eggs in the event of separation or divorce?

In the unfortunate event that a couple decide to separate or divorce and eggs are in storage, the female partner is advised to contact the centre at which the eggs are stored. The eggs will remain in storage until the female partner has come to a decision regarding the fate of her eggs.

## What happens to stored eggs in the event of death?

If both partners die whilst eggs are in storage, the eggs will be discarded. In the event of death of the female partner the prior legal consent of the deceased would be fulfilled. For remaining eggs to be used by the surviving male partner, City Fertility Centre would require a court order regarding the eggs prior to any further treatment commencing at our centres. It is advised you obtain legal advice in regard to egg ownership and disposal.

## Counselling

We appreciate that for some patients the decision to have their eggs cryopreserved or to release cryopreserved eggs from storage may be a difficult decision to make. The counselling staff at City Fertility Centre are available at any time to assist couples to make a decision regarding their treatment.

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**CITY FERTILITY CENTRE**  
*your partners in life*

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