

The James Cook University Hospital
Department of Reproductive Medicine

EGG FREEZING

What is egg freezing?

Egg (oocyte) freezing is a method of preserving a woman's eggs in a liquid nitrogen "deep freeze" for possibly many years until she is ready to use them to try to conceive. This technique is known as cryopreservation.

Eggs are the largest single cell in the human body and until recently, freezing and thawing them without damage was a scientific challenge. New techniques to successfully freeze and thaw eggs give the chance of genetic motherhood to some women that was previously not available.

For egg freezing we use vitrification – a flash-freezing process – which research indicates may improve pregnancy rates by increasing the survival rates of the eggs after thawing from 65% to 95%.

It is always preferable for women not to delay conceiving if possible. The chances of women achieving a successful pregnancy are higher when a woman conceives before the age of 35 years.

For whom is egg freezing suitable?

Egg freezing may be of benefit to five groups of women:

- **cancer patients**

If a young woman develops cancer, her hospital consultant may want to treat her with either powerful drugs (chemotherapy) or radiation (radiotherapy), but these treatments to cure cancer may harm her ovaries and damage her future fertility.

A cancer patient who is in a relationship may choose to have fertility treatment (IVF) to retrieve some of her eggs which can then be fertilised using her partner's sperm to create embryos, which may then be stored for possible future use. However, creating embryos is not an alternative for single women and freezing eggs provides a viable alternative.

If it is not essential to begin the cancer treatment immediately, we can stimulate her ovaries and collect some of her eggs to be frozen for possible future use.

This technique is suitable for most types of cancer and our staff, together with the patient's cancer specialist, will be able to give the best advice for each woman. Fertility preservation for cancer patients will usually delay cancer treatment by two to four weeks.

- **women at risk of premature ovarian failure**

Any woman who suffers from a medical condition such as severe endometriosis or recurrent ovarian cysts which, in the opinion of her doctor, is likely to result in premature ovarian failure or the removal of her ovaries, may consider egg freezing as a form of fertility preservation.

- **women at risk of early menopause**

Premature menopause is often genetically inherited and any woman who is aware that her mother, aunt, or maternal grandmother started their menopause in their 20s, 30s, or early 40s, may also consider egg freezing to extend the period of her life in which she may be able to conceive, using her own eggs.

- **single women who wish to preserve their fertility ('social' egg freezing)**

If a woman is not in a relationship but would like the option of genetic motherhood in the future she may wish to cryopreserve some of her eggs. If she is unable to conceive naturally in the coming years she may then try to conceive using the thawed/frozen eggs, at a time when her own fertility may have reduced and the quality of her fresh eggs may have diminished.

As with IVF using 'fresh eggs', success rates are significantly influenced by a woman's age. We strongly recommend that a woman considering 'social' egg freezing begins treatment before her 38th birthday.

- **women who have ethical concerns about freezing embryos**

Any couple requiring fertility treatment but who have ethical or religious objections to the creation and subsequent freezing of embryos can instead preserve any eggs that have been retrieved but are not required for fertilisation in the woman's current treatment cycle.

How are eggs collected and frozen?

A woman having egg freezing treatment will receive the fertility drugs routinely used in IVF. The length of a treatment cycle will depend on the drug protocol recommended by her fertility specialist, and will include hormonal drugs to stimulate the ovaries to produce several egg-containing follicles. After two to three weeks of ovarian stimulation injections, the eggs are collected under sedation and with pain relief, by a fertility specialist using ultrasound guidance.

The eggs are then assessed by one of our embryologists and prepared for vitrification. The embryologist removes the 'cloud' of cells from around the egg and places it in a tiny droplet of cryoprotectant. This is then inserted into liquid nitrogen which rapidly cools the eggs at a rate of -20,000 degrees C per minute.

This flash freezing technique changes the liquid cryoprotectant to a glass-like solid in which the egg is cryopreserved at -197 degrees C.

Current licensing laws

Currently eggs may be stored for a maximum of 10 years, although this period may be extended in exceptional circumstances.

How are the eggs used to try to conceive?

Once a woman is ready to try to conceive using her stored eggs, one of our embryologists will remove them from the flask containing the liquid nitrogen, remove the cryoprotectant, warm the eggs and then fertilise them with partner or donor sperm using the intra-cytoplasmic sperm injection (ICSI) technique. Using this method, a single sperm is injected into the centre of the egg using a glass needle that is one-tenth of the width of a human hair. Fertilisation rates are the same as those for 'fresh' eggs at 60-80%.

One or two of the resulting embryos are usually transferred back into her uterus following several days in culture after the ICSI procedure. She will know if she is pregnant within 16 days.

How successful is egg vitrification?

Egg freezing is a comparatively recent development in fertility treatment and fertility preservation. Hundreds of babies have been born worldwide from eggs that have been frozen but, as with all fertility treatment, no clinic can guarantee that the procedure will result in a successful pregnancy. Centres experienced in egg freezing report similar success rates with frozen eggs as with frozen embryos (approximately 20-60% per embryo transfer).

What are the risks?

Egg freezing treatment requires a woman to use ovary stimulating drugs used in standard IVF treatment, which carry a small risk of developing ovarian hyperstimulation syndrome (OHSS). Egg collection is carried out without general anaesthesia and is thereby classed as a low risk procedure. There is also a very small risk that none of the eggs will survive the freeze/thaw process, although published survival rates range indicate that 95% do survive.

Hundreds of healthy babies have been born safely after egg freezing, but this is still an emerging technology and the long term outcomes of the techniques are still under review. Research to date suggests that the risks of miscarriage, foetal abnormalities or birth defects are no higher than in conventional IVF or ICSI. Any woman considering egg freezing will have the opportunity to talk over the possible risks and current success rates with members of the clinical or scientific teams and with an independent counsellor before beginning treatment.

Getting more information

For more information about egg freezing, please telephone the Department of Reproductive Medicine on 01642 282733 and arrange an appointment to come in and discuss the technique with members of the clinical and scientific teams.