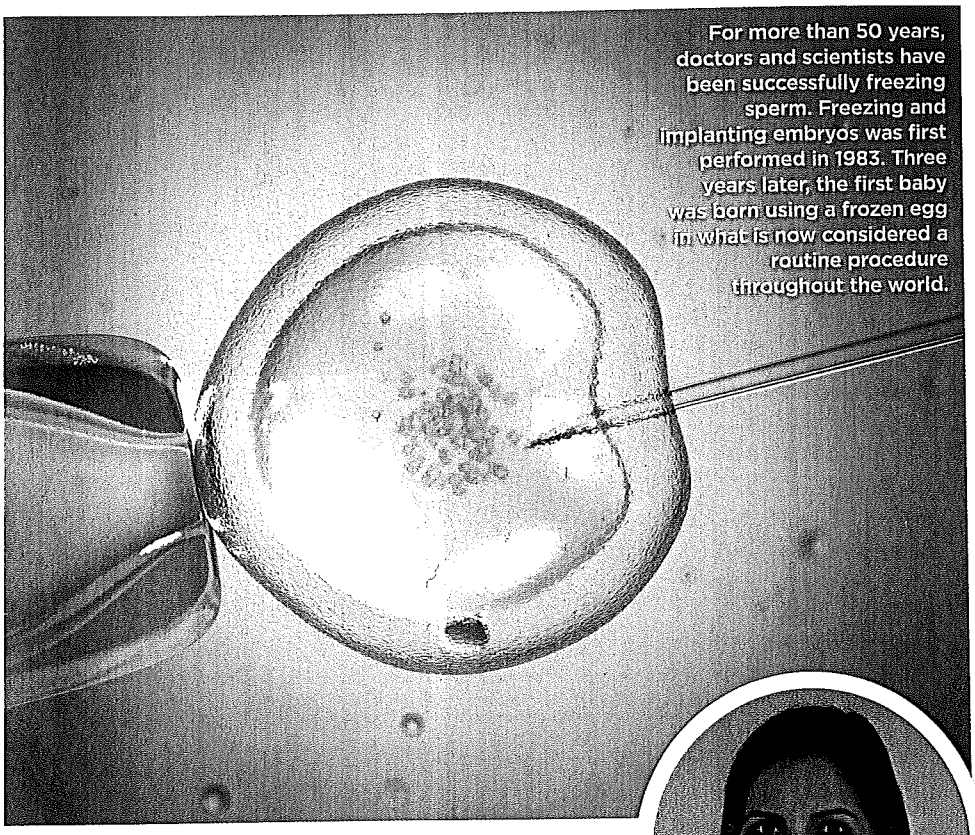

For more than 50 years, doctors and scientists have been successfully freezing sperm. Freezing and implanting embryos was first performed in 1983. Three years later, the first baby was born using a frozen egg in what is now considered a routine procedure throughout the world.

Freezing Time

Dr. Anate Aelion Brauer talks about fertility preservation, sharing insight, expertise and her personal journey to motherhood.

I ALWAYS KNEW I wanted a family, but at age 26 my time was split between spending 16-hour days in the library cubicle cramming for medical school exams, directing our beloved medical school follies and spending any extra time catching up with friends. The goal of finding "Mr. Right," settling down and starting a family was nowhere on my immediate radar.

I was raised in an era of gender equality — "Settle your career first, the husband and children will all fall into place later," my mother, also a physician, often preached to me.

It took 11 years of training, plus an amazing, family-centered husband and my own struggles conceiving to finally grasp the fact that our social and professional calendars don't always sync with our biological one. If I could only turn back time a decade and have a few words with that girl in the cubicle — I would definitely tell her: "Preserve your fertility!"

Here you will find answers to common questions you may have about the emerging and rapidly progressing field of fertility preservation.

What is fertility preservation?

Fertility preservation is the effort to help patients retain their fertility, or ability to procreate, by freezing eggs or embryos for use at a later date. This treatment may be applicable for medical reasons such as in the case of a cancer diagnosis that requires treatments that may negatively impact a woman's egg supply, or for social reasons, in the event that a woman chooses to delay childbearing due to career demands or absence of a life partner.

If I am currently without a partner and would like to have a child in the near future, what are my options?

The easiest option, if a woman is prepared to have a child on her own and without delay, is to undergo a natural cycle intrauterine insemination with donor sperm. This process involves choosing a donor, and then undergoing monitoring for a natural ovulation with ultrasound and blood work in order to time the insemination (placing sperm directly into the uterus) of donor sperm. The actual procedure of insemination is a simple office procedure that takes under 10 minutes and is generally very well tolerated.

If a woman is currently without a partner, or is not ready to become a mother, she has the option of freezing her eggs for use in the future.

How are the eggs frozen?

In the past, a "slow freezing" technique was used. With this method, the tissue being frozen is exposed to cryoprotectants, which are solutions that displace water from the cells, and reduce the damage from the freezing and thawing process. Then, over one to two hours, the temperature is decreased to that of liquid nitrogen. While this process has been adequate for sperm and embryos, eggs seem to be more sensitive to this method.

Over the past several years, a new freezing method has been developed. Vitrification involves exposing the eggs to a higher concentration of cryoprotectants, and then very rapidly freezing the eggs over just minutes. The process has been shown to be superior to slow freezing, in terms of egg survival, fertilization, implantation and clinical pregnancy rates. When this technique is used to freeze eggs, the survival rate after thawing or warming the egg is approximately 90 percent.

What does the entire process involve, from freezing to implantation?

A treatment cycle involves stimulating the woman's ovaries with fertility medications

HEADSHOT COURTESY OF DR. ANATE AELION BRAUER. IN VITRO IMAGE: SEBASTIAN KAULITZKI/SHUTTERSTOCK.COM

containing follicle stimulating hormone (FSH). In a natural cycle, a woman's body releases one egg each menstrual cycle. By stimulating the ovaries with fertility medication, we are usually able to have multiple eggs reach maturation during a single treatment cycle. The daily injections are self-administered for a period of seven to 10 days. Once there has been a good response and the follicles or eggs look "ready," one final injection is given to promote the final steps of egg maturation. The eggs are harvested 35 hours later through a procedure known as an "egg retrieval," performed under mild sedation, and takes about 10 to 15 minutes to complete. The number of eggs harvested or retrieved varies from woman to woman, and may be anywhere from zero to 45, depending on a woman's age and how her body responds to the fertility medications.

After the eggs are removed from the body, they are examined by the embryologists in the laboratory, at which time they are evaluated for viability and maturity, and are then frozen for storage. Depending on the number of eggs available to freeze after the first cycle, some women elect to undergo an additional cycle to freeze even more eggs.

Who should consider fertility preservation?

Healthy women in their early to mid 30s who are not planning to start a family in the next few years should consider egg freezing. Women who are younger than 30, but have a family history of premature menopause, should also consider this technology. Women who are 40 and older are in an age group where fertility is already likely to be compromised, and therefore are less likely to benefit from egg freezing. However, they should consider ovarian reserve testing in order to better assess the viability of this option. Any woman with a cancer diagnosis who is scheduled to undergo chemotherapy or radiation therapy, or a surgical procedure that would compromise ovarian viability, should consider egg freezing after obtaining medical clearance by their oncologist. In most cases, egg freezing must be done expeditiously in order to allow the woman to undergo timely treatment for her cancer.

How long can eggs remain frozen?

Eggs can remain frozen indefinitely. A woman, however, should consider a reasonable timeline for thawing her eggs and creating embryos should she not achieve pregnancy on her own. One should consider the health risks of carrying a pregnancy at an older age.

By the Numbers

FACTS AND FIGURES BEHIND FERTILITY PRESERVATION

$8,000-$10,000
Average cost of egg freezing

$500-$1,000
Average annual cost of storing eggs

SUCCESS RATES

< 35: **45-50%**
35-37: **35-45%**
38-40: **25-35%**
41-42: **15-20%**
> 42: less than **15%**

**Pregnancy rates for fresh and frozen eggs are similar, but depend on the age at which the eggs were frozen.*

How much does this cost? Is it covered by insurance?

The average cost of egg freezing is approximately $8,000 to $10,000. Most IVF labs charge an additional fee to maintain storage of the frozen eggs, usually approximately $500 to $1,000 annually. Egg freezing for medical reasons is usually covered by insurance. Insurance companies are less likely to cover egg freezing for social reasons; however, some employers may offer clauses within insurance policies that cover this technology. In addition, many specialty pharmacies and fertility medication companies offer programs that help cut costs of medications, which accounts for a portion of the fees.

As a woman ages, does it affect her ability to have a healthy pregnancy even if it's with a frozen egg from her younger self?

Chances of a successful pregnancy depend on the age of the egg, not the age of the woman or her uterus at the time the embryo is transferred.

For example, the age used to calculate genetic risk of having a fetus with Downs syndrome or another chromosomal abnormality in the beginning of a pregnancy will be the age of the egg, not the chronological age of the woman herself. There are risks, however, to carrying a pregnancy later in life. Risk for many disorders of pregnancy, including pre-eclampsia and gestational diabetes, increases with age. Such disorders may be threatening to the health of the mother, leading to earlier delivery and complications of prematurity in the baby.

Is egg freezing safe?

Several studies have been done to evaluate the safety of egg freezing and the conclusion is that rates of chromosomal abnormalities in embryos derived from frozen eggs are similar to those derived from fresh eggs in a young population. In addition, data from more than 900 babies born from frozen eggs demonstrates no increase in congenital abnormalities when compared with natural deliveries in a general U.S. population.

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