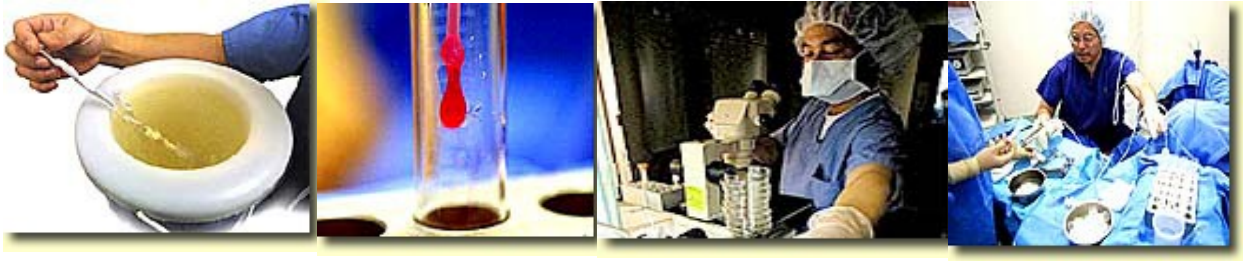


Fertility in Reserve
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Fertility in Reserve

After years of technical obstacles, scientists have found ways to freeze eggs for later use, helping women whose ability to have babies is threatened by disease or aging.

The bad news piled up on Shannon Lee faster than she could absorb it. At 31, she had been diagnosed with breast cancer. Not only would she need a double mastectomy, the subsequent radiation and chemotherapy could leave her sterile, ending her dream of having a baby.

But Lee's doctor also gave her hope. Confident that she would beat the cancer, he urged her to undergo an experimental procedure in which some of her eggs would be removed prior to chemotherapy, then stored for fertilization at a later date, thereby preserving the possibility that she could have a child. Heartened, Lee had 12 eggs extracted and frozen at an infertility clinic.

"It's something I had to do," the Buena Park woman said. "I may not need the eggs, but it's nice to know they're there."

Although the technology is in its early stages, egg freezing--called egg cryopreservation--is now an option for women like Lee who face an imminent loss of fertility. And soon, experts say, the procedure should become a popular alternative for an even larger pool of women, those who risk losing their eggs to normal aging before getting the chance to have a baby.

"There is growing optimism about egg freezing," says Dr. Patrick Blohm, a Jacksonville, Fla., doctor who is among the most successful U.S. researchers pursuing egg freezing. "We're still not there yet, but we're getting close. There is momentum behind it now."

At least a half-dozen reproductive health clinics nationwide have established egg freezing programs, some of them as part of research projects. Many other clinics perform egg freezing on a limited basis, such as for young cancer patients.

"These people have nothing to lose," Blohm says of women whose fertility is threatened by illness. "We still have not opened up egg freezing to the masses, but we're not too far away from doing that. We are encouraged that some major hurdles have been overcome."

A handful of infertility clinics nationwide are already touting the service as an exciting new option for any woman who wants it. But that kind of marketing, as well as highly publicized announcements of a few births after egg freezing, has been criticized by some doctors as premature. Published reports put the number of births worldwide after egg freezing at 30, but some doctors say recent progress has pushed that number closer to 100.

"I think many of us are taking a wait-and-see attitude," says Dr. Richard Paulson, an infertility specialist at USC who does not offer egg freezing. "It's an unproven technology, and the success is hit or miss as compared to

embryo cryopreservation, which has an established track record and for which national statistics are available."

But Dr. William Keye Jr., president of the American Society of Reproductive Medicine, says perfecting the ability to freeze unfertilized eggs will be a major milestone in reproductive health care.

"This will be the last group for whom we don't have good answers," Keye said. "I think we will finally have something to offer them."

The Ability to Put Fertility on Hold

Infertility doctors largely agree that egg freezing could have vast medical and social implications.

Men have long been able to freeze sperm, but preserving oocytes--eggs--has proved to be a far different, and difficult, task. Girls are born with 40,000 to 200,000 eggs, a supply that begins to dwindle when menstruation begins. Medicines to treat cancer, rheumatoid arthritis and some other diseases can destroy eggs. And an estimated 3% of women have a genetic disorder called premature ovarian failure, in which the ovaries shut down 10 to 20 years before what is considered normal.

Often, women who are about to lose their fertility undergo in vitro fertilization, in which eggs are removed from the ovaries and fertilized and the resulting embryos frozen. But many single women do not have that option unless they agree to use sperm from an anonymous donor or an acquaintance, and others do not want to create embryos that may not be used.

Besides providing hope to these women, routine egg freezing has significant practical benefits. Women who wish to postpone childbearing because of career demands could bank their eggs in their 20s or early 30s, when the eggs are healthier, for later use. Recent research has found that egg quality begins to decline in the mid-30s.

"There is massive interest among women who are around 38 and haven't found their life partner and who want to lay down a few eggs for later in life," says Michael Tucker, an Atlanta embryologist who made headlines in 1997 when he announced the birth of twins after freezing eggs and fertilizing them with a needle via intracytoplasmic sperm injection. That development was considered a critical advance, and Tucker says the announcement spurred thousands of inquiries from single women.

Karen, an unmarried businesswoman who asked to remain unidentified, had eggs frozen at a Southern California infertility clinic last year.

"I've been so busy with my career," she says. "Relationships have been there, but none where I wanted to have a baby with someone. But family is very important to me, and all of a sudden I'm 37 years old. I thought I had better stop time right now."

Egg freezing also could eventually curb the use of donor eggs, often required by older women who wish to become pregnant. For couples who will still require donor eggs (if egg quality is poor, for example), cryopreservation could reduce its expense and inconvenience. Couples often pay about \$20,000 for a single donor's fresh eggs, but those costs could be reduced by as much as two-thirds if the eggs could be frozen and divvied up among several couples, says Tucker.

And routine egg cryopreservation could help resolve the growing dilemma of what to do with tens of thousands of unwanted frozen embryos stored in infertility clinics worldwide. Some people consider embryos human life and feel it's morally wrong to discard them.

Lee, for example, was in a serious relationship when diagnosed with cancer and could have had her eggs fertilized and frozen as embryos. But both she and her boyfriend (they later married) were uncomfortable with that option.

"My husband didn't like it that we were basically creating a child and then would be killing it if we didn't use it. An egg isn't a life yet," says Lee.

Lee, who completed cancer treatments a few months ago, still hopes the cancer therapy did not destroy her fertility and that she and her husband, Todd, can have a baby the natural way. But, she says, she was willing to hedge her bet despite the \$9,000 cost of egg freezing.

Proper Thawing Is Critical to Egg Survival

The growing enthusiasm for egg freezing rests largely on recent progress in thawing eggs. In the past year, several researchers have reported that 60% to 80% of eggs survive the critical thawing process. That is comparable to the survival rate of thawed embryos, says Blohm, who has produced several births from frozen eggs. Prior to 1994, only 10% to 20% of eggs survived thawing.

Unlike sperm, the egg is a large, fluid-filled cell that can become riddled with damaging ice crystals when frozen. Now, however, researchers are experimenting with a flash-freezing process, called vitrification, that prevents ice crystal formation.

Other researchers are injecting sugar solutions into eggs before freezing to better preserve them. A recent report in the journal *Fertility and Sterility* showed that, in a study of 158 eggs, 63% of eggs with a sugar solution survived freezing and subsequent thawing, compared with only 13% in a control group.

Doctors have also been able to dramatically improve the fertilization rate of thawed eggs by using intracytoplasmic sperm injection, Tucker says. The outer shell of the egg, the zona, often becomes impenetrable after freezing, but the procedure bypasses that problem because the sperm is injected into the egg using a needle.

"We've always known what the limitations of egg freezing were, but we've now learned a lot more about how to circumvent the problems," says Tucker.

Thawing and fertilizing frozen eggs is just half the battle, however. Much less is known about the success of implanting the ensuing embryos in the uterus and producing a baby. Only a portion of thawed, fertilized eggs become viable embryos, says David Hill of the ART Reproductive Center in Beverly Hills.

"It's a numbers game," Hill says. "The more eggs you have to start with, the more likely you'll have a normal, healthy, cleaving embryo by the time it's all done."

Patients Should Note Procedure Is Still New

Women interested in egg freezing should be aware of its unproven track record, experts caution.

People considering egg freezing should ask the doctor about his or her thawing and fertilization success rates and if he or she has produced any babies.

"It does appear that there are some sites that do it better than other sites," says Susan Lazendorf, an infertility specialist at the Jones Institute for Reproductive Medicine in Norfolk, Va. "It should be made clear to a patient that there are no real known success rates. And the best bet is, if you have a partner identified, to go ahead and make embryos."

While predicting that egg freezing will become as useful as embryo freezing "in the very near future," Blohm says the procedure should still be considered experimental until data can show that birth defects are not higher among children born from frozen eggs.

"We have to have data that supports the safety of the process before we open it up to wider use," he says.

In contrast, cancer patients should be alerted to the option despite the unknowns, says Dr. Beth Ary of the Reproductive Specialty Center in Newport Beach.

"We have protocols involving males [with cancer] where they are informed that they can store sperm," says Ary, who later this month will freeze the eggs of a woman with colon cancer. "Most of these [female] cancer patients would like to have known about egg cryopreservation and IVF. Our big issue now is educating cancer doctors about this."

There is less agreement among infertility specialists on whether egg freezing--as the technology stands now--should be encouraged among single women who wish to store eggs as a way of putting fertility on hold. Egg extraction is a low-risk procedure, although it does involve minor surgery and temporary use of strong

medications. And it is expensive.

Dr. David Diaz, of West Coast Fertility Centers in Fountain Valley, is one of the few doctors who now urge single women to consider egg banking if they are concerned about advancing age. A woman can have a blood test to determine if her ovaries are losing function.

"Age is very much a factor in what we do," Diaz says. "Women often come in at 40 and want to freeze their eggs, but we really need to see them much earlier."

Increasingly, infertility doctors may accept these women for egg freezing because the science is advancing and the demand is high, says Lazendorf.

"I think a lot of patients are storing their eggs now and are hoping for improvements in technology so they can use them," she says. "They are waiting for the technology to catch up."

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