

In vitro UK pioneer Edwards wins medicine Nobel (Update 4)

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British Professor Robert Edwards, in this file photo dated Thursday, May. 19, 2005, whose pioneering work led to the birth of the world's first 'test tube baby', seen in London, England. Test-tube baby pioneer Robert Edwards of Britain has won the 2010 Nobel Prize in medicine it is announced Monday Oct. 4, 2010. (AP Photo/Matt Dunham)

The Nobel Prize in medicine went to a man whose work led to the first test tube baby, an achievement that helped bring 4 million infants into the world and raised challenging new questions about human reproduction.

Robert Edwards of Britain, now an 85-year-old professor emeritus at the University of Cambridge, lived to see the far-reaching ramifications of his hugely controversial early research.

"Today, Robert Edwards' vision is a reality and brings joy to infertile people all over the world," the Nobel Committee said in Stockholm. It began with the birth on July 25, 1978, of the first test-tube baby, Louise Brown, to a couple who had been trying to conceive for nine years.

With in vitro fertilization, or IVF, an egg is removed from a woman, mixed with sperm in a laboratory, allowed to divide for four or five days, then implanted in the womb to grow into a baby. Today the odds of a couple having a baby after a single cycle of IVF treatment are about 1 in 5, roughly the same odds as a fertile couple trying to have children naturally.

Edwards and research partner Patrick Steptoe, who died in 1988, faced opposition to their IVF experiments. Some religious leaders called it morally wrong. Some government officials thought it more important to limit fertility than treat infertility, and some scientists were worried about the safety of embryos.

"In retrospect, it is amazing that Edwards not only was able to respond to the continued criticism of IVF, but that he also remained so persistent and unperturbed in fulfilling his scientific vision," the Nobel Committee said.

Society still wrestles with issues that arose from his work, such as:

- Is it appropriate to obtain stem cells from embryos - embryos created through IVF? Some people object because the embryos are destroyed to get the cells.

- Should women who donate eggs be paid? The Vatican's top bioethics official, Monsignor Ignacio Carrasco de Paula, said Monday that Edwards opened "a new and important chapter in the field of human reproduction." But he also said IVF is responsible for the destruction of embryos and the creation of a "market" in donor eggs.

- Should there be an age limit on women using IVF? In 2006, a 67-year-old Spanish woman made headlines when she gave birth after using the technology to conceive twins. The uproar continued when she herself died only two years later.

Even so, Edwards' research deserves a Nobel, said bioethicist Laurie Zoloth of Northwestern University. "For millions of families, it created the possibility of a truly joyful and extraordinary event."

William Ledger, head of reproductive medicine at Sheffield University, said, "The only sadness is that Patrick Steptoe has not lived to see this day because it was always a joint team effort."

The Nobel is not given posthumously. It was not immediately clear why it took so long to honor such groundbreaking research. Initially, there was concern about the health of test-tube babies, "so it was, of course, very, very important that Louise Brown was healthy and that subsequent babies also were healthy," prize committee member Christer Hoog said.

Despite the absence of Steptoe, committee secretary Goran Hansson said Edwards "deserves a Nobel Prize on his own" because he made the fundamental discoveries that made IVF therapy possible.

A statement from Bourn Hall in Cambridge, England, the world's first IVF clinic, which was founded by the two researchers, said Edwards was too ill to give interviews.

"I spoke to his wife, and she was delighted. And she was sure he would be delighted, too," Hansson told reporters in Stockholm after announcing the \$1.5 million (10 million kronor) award.

Lori B. Andrews of the Chicago-Kent College of Law says making embryos in a lab created a host of ethical issues that have never been fully resolved.

For one thing, clinics routinely fertilize more eggs than are implanted, at least at first. The resulting extra embryos can be frozen for storage, Andrews noted, but couples can change their minds about what they want to do with them.

These days, she said, a child can have up to five parents: the sperm donor, the egg donor, a surrogate mother who brings the child to term in her womb, and the couple intending to raise the child.

Some laws say the legal mother is the woman who gives birth, but nowadays "we can no longer depend on biology to determine the mother," Andrews said.

As for surrogate mothers, "I think there's ethical issues any time we mix human reproduction and cash payments," Zoloth said. "What does it mean to mix human reproduction and a buyer and a seller and a parent and a child in the same discussion?"

In Bristol, England, Louise Brown, the first IVF success, is now 32. In a statement issued by the Bourn Hall clinic, she said she and her mother are "so glad that one of the pioneers of IVF has been given the recognition he deserves." Brown gave birth in 2007 to a son who was conceived naturally.

Johanna Nannung is a Stockholm woman who has a personal reason to

praise the award. Her daughter, Olivia, was born after she and her husband underwent four years of IVF treatments.

"It was incredible. Olivia is the most wonderful and fantastic thing that has ever happened to me. In my life I have always seen myself with a family and children. It's worth more than everything," she said.

The medicine award was the first of the 2010 Nobels to be announced. It will be followed by physics on Tuesday, chemistry on Wednesday, literature on Thursday, the peace prize on Friday and economics on Monday Oct. 11.

Candidates for the physics prize are hard to predict given the wide latitude of subjects encompassed by the award. But that does not stop experts from guessing, often by looking at winners of other physics honors, like Israel's Wolf Prize. Several Wolf Prize winners have later won the Nobel Prize.

This year, the Wolf physics award was shared by U.S. professor John F. Clauser, Alain Aspect of France and Anton Zeilinger of Austria for their work in quantum physics.

The most popular choices in a poll by the American Institute of Physics were Nick Holonyak, Shuji Nakamura and Robert Hall for the development of the LED laser.

Thomson Reuters, which analyzes high-impact scientific papers to make predictions, singled out U.S. researchers Charles Bennett, Lyman Page and David Spergel for discoveries derived from a NASA spacecraft on the age and composition of the universe.

Robert Edwards, the father of IVF

British scientist Robert Edwards believes that the most valuable thing in life is children -- and spent his career making the dream of having a baby come true for millions of people worldwide.

On Monday, he was awarded the Nobel Prize for Medicine, for his work on developing in vitro fertilisation (IVF), the science behind what became known as "test tube babies".

Edwards, now a frail 85, finally saw his work recognised by the Nobel committee five decades after he first began experimenting and started on a path that would take him into conflict with the Catholic Church and fellow scientists.

He soon grasped that fertilisation outside the body could be a new way of treating infertility.

Building on earlier research which showed that egg cells from rabbits could be fertilised in test tubes when sperm was added, Edwards developed the same technique for humans.

In a laboratory in Cambridge, eastern England, in 1968, he first saw life created outside the womb in the form of a human blastocyst, an embryo that has developed for five to six days after fertilisation.

"I'll never get forget the day I looked down the microscope and saw something funny in the cultures," Edwards has recalled.

"I looked down the microscope and what I saw was a human blastocyst gazing up at me.

"I thought: 'We've done it.'"

But Edwards and his fellow researcher, gynaecological surgeon Patrick

Stephens, were forced to defend their work in the face of severe opposition, especially from the Catholic Church.

At a conference on biomedical ethics in Washington in 1971, the Nobel laureate James Watson, who with Francis Crick had discovered DNA, said IVF research would necessitate infanticide.

Addressing the conference, Edwards strongly defended his work and received a standing ovation.

He remains convinced that the Catholic Church is wrong to object to IVF, saying clergy who condemn the technique are "totally mistaken".

"Catholics are told not to do it and yet Catholics go and do it. All the popes have done for themselves is teach their people to disobey them," he has said.

His work was motivated by his belief that: "The most important thing in life is having a child. Nothing is more special than a child."

Edwards himself has five daughters and 11 grandchildren.

The culmination of his painstaking research came in 1978, with the birth of the world's first test tube baby, Louise Brown.

Two years ago, Edwards spoke of his pride in his achievement as he celebrated Brown's 30th birthday.

"I think the whole thing is incredible," he said then, speaking fondly of Louise's mother Lesley and now dead father John.

"When I go round the world I say this family were ordinary people... they were not brilliant people like Nobel Prize winners or anything. They

were just ordinary."

The Bourn Hall Clinic, the fertility centre which Edwards founded with Steptoe in Cambridge, has overseen the birth of more than 10,000 test tube babies.

Worldwide, births following IVF treatment are now commonplace. Nearly four million children worldwide are estimated to have been born thanks to the technique.

IVF: A factfile

Following is a factfile on in-vitro fertilisation (IVF), whose pioneer, Robert Edwards, was honoured on Monday with the Nobel Prize for Medicine.

- IVF entails taking an egg from a woman and fertilising it in the lab dish with sperm donated from a man. The egg divides, is allowed to develop into an early-stage embryo in a nurturing fluid and is then inserted in the uterus. Usually several embryos are implanted in order to boost the chances of a live birth.
- More than 3.75 million IVF babies have been born since the first baby, Louise Brown, was born 32 years ago. More than a quarter of a million add to the total each year. Between 20 and 30 percent of fertilised eggs lead to a life birth, although the rate varies according to the mother's age.
- Most IVF treatments take place in women aged between 30 and 39. Europe accounts for more than half of these treatments. The Nordic countries, led by Denmark, have the highest availability.
- Multiple pregnancies are one of the biggest problems in IVF. Multiple births run a much higher risk of being underweight and experience

developmental problems. The trend has been declining somewhat. In 2000, 26.9 percent of embryo transfers resulted in twins or occasionally triplets, which fell to 20.8 percent in 2006. The rate is far higher in developing countries.

- IVF has led to the development of intracytoplasmic sperm injection (ICSI), which entails taking a single sperm and injecting into the egg. It is used when the egg cannot be easily penetrated by the donated sperm. The success rate is almost the same as for IVF.

- One in six couples worldwide experience some form of infertility problem at least once during their reproductive lifespan. Infertility is linked to physiological causes as well as lifestyle factors such as smoking, body-weight, stress and age.

SOURCE: European Society of Human Reproduction and Embryology (ESHRE), Nobel Assembly

Recent winners of Nobel Medicine Prize

Here is a list of the 10 most recent winners of the Nobel Medicine Prize, awarded here Monday:

2010: Robert G. Edwards (Britain)

2009: Carol Greider and Jack Szostak (US), Elizabeth Blackburn (Australia-US)

2008: Françoise Barré-Sinoussi and Luc Montagnier (France), Harald zur Hausen (Germany)

2007: Mario Capecchi (US), Oliver Smithies (US), and Martin Evans (Britain)

2006: Andrew Z. Fire (US), Craig C. Mello (US)

2005: Barry J. Marshall (Australia), J. Robin Warren (Australia)

2004: Richard Axel (US), Linda B. Buck (US)

2003: Paul C. Lauterbur (US) and Peter Mansfield (Britain)

2002: Sydney Brenner and John E. Sulston (Britain), H. Robert Horvitz (US)

2001: Leland Hartwell (US), Timothy Hunt and Paul Nurse (Britain)

Citation excerpts for 2010 Nobel medicine prize

Excerpts from the citation awarding the 2010 Nobel Prize in physiology or medicine to Robert Edwards for the development of human in vitro fertilization, or IVF, therapy.

"His (Edwards') achievements have made it possible to treat infertility, a medical condition afflicting a large proportion of humanity including more than 10 percent of all couples worldwide. As early as the 1950s, Edwards had the vision that IVF could be useful as a treatment for infertility. He worked systematically to realize his goal, discovered important principles for human fertilization, and succeeded in accomplishing fertilization of human egg cells in test tubes (or more precisely, cell culture dishes). Other scientists had shown that egg cells from rabbits could be fertilized in test tubes when sperm was added, giving rise to offspring. Edwards decided to investigate if similar methods could be used to fertilize human egg cells.

"It turned out that human eggs have an entirely different life cycle than those of rabbits. In a series of experimental studies conducted together with several different co-workers, Edwards made a number of fundamental discoveries. He clarified how human eggs mature, how different hormones regulate their maturation, and at which time point the eggs are susceptible to the fertilizing sperm. He also determined the conditions under which sperm is activated and has the capacity to fertilize the egg. In 1969, his efforts met with success when, for the first time, a human egg was fertilized in a test tube.

"In spite of this success, a major problem remained. The fertilized egg did not develop beyond a single cell division. Edwards suspected that eggs that had matured in the ovaries before they were removed for IVF would function better, and looked for possible ways to obtain such eggs in a safe way. His efforts were finally crowned by success on 25 July, 1978, when the world's first "test tube baby" was born.

"During the following years, Edwards and his co-workers refined IVF technology and shared it with colleagues around the world. Approximately four million individuals have so far been born following IVF. Many of them are now adults and some have already become parents. A new field of medicine has emerged, with Robert Edwards leading the process all the way from the fundamental discoveries to the current, successful IVF therapy. His contributions represent a milestone in the development of modern medicine."

More information: <http://www.nobelprize.org>

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