Embryo transfer: It's a boy

First baby born in womb-to-womb relay of developing embryo (inset).

The birth of a healthy baby boy conceived by one woman, and born to another, marks another medical first in the rapidly evolving technology of helping infertile women become pregnant.

"He's a perfectly normal, full-term, healthy little guy," said John E. Buster, an obstetrician at the University of California at Los Angeles, at a Feb. 3 news conference announcing the birth. Buster leads the ovum-transfer research project at UCLA, which has so far produced two pregnancies in 18 transfers (SN: 7/30/83, p. 69). The second infant is expected to be born within several weeks.

The successful transfer may be more important biologically than medically, several reproduction researchers around the country told SCIENCE NEWS, because it confirms theories about human reproduction predicted from studies of animals.

"The potential usefulness of this technique is much more limited [than standard in vitro techniques]," says Dan Riddick, who heads infertility research at the University of Connecticut in Farmington.

"Standard" in vitro fertilization, first performed successfully in humans more than five years ago (SN: 7/22/78, p. 51), involves surgically removing a ripe egg from a woman's ovary, and fertilizing it with her partner's sperm in a laboratory dish filled with nutrients. After a few days growth, the emerging embryo is inserted into the mother's womb. If each step is successful, as it is 15 to 20 percent of the time for experienced research teams, the embryo clings to the uterine wall and continues its development into a healthy infant.

Although valuable for many women, the standard technique has several drawbacks, Buster says: It involves surgery and general anesthesia; it requires that the developing embryo be exposed to the artificial environment of the laboratory dish which, no matter how carefully controlled, falls far short of a nurturant womb; and, in most cases, it requires that the mother have functioning ovaries.

In contrast, he says, the technique his team has pioneered, performed without surgery, minimizes the embryo's exposure to the outside world and can permit women whose infertility is caused by malfunctioning ovaries or a block in the fallopian tubes to experience pregnancy for the first time. The new technique is not meant to replace in vitro fertilization techniques, but to supplement them, he says, and might also prove desirable for women who fear passing to their children certain inherited diseases.

Buster likens the technique to artificial insemination, but critics say the risk of pregnancy to an egg donor raises new ethical issues that are nonexistent in semen donation. Maria Bustillo, another member of the UCLA team, says that the specially designed catheter used to wash out the donor uterus guarantees retrieval of the egg in "nearly all" cases, and probably prevents implantation of any egg that might be missed.

Fertility and Genetics Research, Inc., of Chicago, which initiated and funded the project, has filed patents on both the catheter and the transfer procedure, a move some researchers see as a curb on the free flow of scientific information. "I think it's a dangerous precedent," University of Connecticut's Riddick told SCIENCE NEWS.

Australian researcher Carl Wood described another milestone in treating infertility in the Jan. 12 NATURE. He reported a successful birth in a woman who was unable to produce either eggs or the hormones of pregnancy. Unlike the UCLA procedure, fertilization of the donor egg occurred in a laboratory dish. Wood then inserted the resulting embryo in the infertile woman, whose pregnancy was then sustained with hormone supplements.

— D. Franklin

Monopole monopoly ends?

A magnetic monopole is, or would be, an object that carries only a single pole of magnetic charge. All ordinary magnets carry at least two poles, one north and one south; cutting one apart yields only two new dipole magnets. Monopoles therefore have to be an unusual kind of subatomic particle. Up to now there was only one experimental event that was a candidate to be a monopole. Now there are five more. The new ones are not a confirmation of the earlier one, as they were found by a different method.

For 50 years monopoles were a curiosity of theoretical physics. Now monopoles have become essential to the new unified theories of physics, which can't live without them.

The first object that might be a monopole was found by Blas Cabrera of Stanford University using a special magnetometer he had designed (SN: 5/15/82, p. 323). The five new candidates come from an experiment by S. N. Anderson and six others from the University of Washington at Seattle and Eastern Washington University in Cheney. The findings were reported at last week's meeting of the American Physical Society in San Antonio, Tex. The experimenters set up nuclear emulsions deep in the Homestake mine in South Dakota. Tracks appeared in the emulsion that seemed to come from ternary fission (into three pieces) of heavy nuclei. Ternary fission is extremely rare, and these events far exceeded statistical expectations.

The inference is that something outside the nuclei influenced them to fission in this way. That could be monopoles or monopolonium, a system in which two monopoles are bound together. The experimenters intend to keep working the experiment on the assumption that it may be monopoles and to see whether they can confirm it.

—D. E. Thomsen

Ws and Zs with surprises

So regularly do experiments in particle physics nowadays find exactly what theorists predict that when one finds a surprise, bells go off all over the place. Physicists at the CERN laboratory in Geneva are now somewhat puzzled by some odd events during the discovery and confirmation of the existence of the W and Z particles.

Existence of the Ws (positive and negative) and the Z (neutral) is predicted by the Glashow-Weinberg-Salam theory, which unifies two previously separate domains of physics and so forms an important stage in the development of a theory to unify all of physics. Early in 1983 two experiments running at CERN's Super Proton Antiproton Synchrotron, UA1 and UA2, found the first Ws and Zs (SN: 2/5/83, p. 84; 6/18/83, p. 388).

Since then the experiments have continued to run for further study of the Ws and Z and to look for whatever else might turn up in their energy range. Each experiment is a collaboration of more than 100 physicists from all over the world. Darrell Smith of the University of California at Riverside was detailed to report their latest results at last week's meeting of the American Physical Society in San Antonio, Tex.

The good news is that the Ws and Z are confirmed: Between them the experiments have 90 recordings of Ws and 12 of Zs. Their masses and other properties conform well to expectation. What does not conform is three examples of decay of the Z: two into an electron, a positron and a high energy photon; one into positive and negative muons and a photon. Physicists are puzzled by the existence and possible significance of these unexpected decay modes and especially by the high energies of the photons. Further study will be undertaken.

—D. E. Thomsen