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COVER: Model of the enzyme lactate dehydrogenase, made by Michael G. Rossmann of Purdue University, illustrates both the complexity and visual elegance of enzymes, which cannot be seen with even the most powerful microscope. Enzymes are more than just fascinating-looking chemicals, however. They play important catalytic roles in the body and are now also being isolated and used to benefit clinical medicine in a number of provocative ways. See p. 58. (Photo: Purdue University and Robert Marston & Associates, Inc.)

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Baby in a Bottle

A "test tube" baby is due to be born at Oldham General Hospital, 190 miles outside of London. And following the tradition of certain British (and U.S.) newspapers, the event has loosed an avalanche of publicity — with papers bidding for exclusives on the event and ferociously attempting to outscop each other.

But the pending birth deserves more than a Fleet Street carnival. If successful, it will be the first birth (as reported in the scientific literature) of a human being fertilized in a tissue culture dish rather than in a woman's body. And it raises a number of profound questions: Is this really the world's first test-tube baby? Will it be normal? What are the ethical, legal and societal implications of this form of reproduction?

The expected child is reportedly the genetic progeny of a young childless couple, Gilbert Brown and Lesley Brown, with Patrick Steptoe, an Oldham General Hospital gynecologist, serving as laboratory midwife. The Browns have been childless for nine years due to blockage of Lesley Brown's Fallopian tubes. The blockage prevents eggs from being fertilized and from entering the womb. The Browns saw consultant after consultant about their fertility problem, with no resolution until finally they were directed to Steptoe. Along with Robert Edwards, a Cambridge University physiologist, Steptoe had for some years been attempting human test-tube fertilization for couples with the same infertility problem.

Steptoe and Edwards collected semen from a husband, removed an egg from the wife at the time of ovulation, and put the semen and egg together in a tissue culture dish in hopes that one of the sperm would fertilize the egg. The fertilized egg would be left in the dish for several days to grow, then it would be removed and put in the wife's womb at the time when it would normally implant in the lining of the womb. To date, none of Steptoe and Edwards's many attempts of this nature have resulted in a live birth.

The question now is, will this attempt be successful? Pierre Soupart, an obstetrician and experimental embryologist at Vanderbilt University, thinks that it might, because *in vitro* fertilization has already been successful with rabbits, mice and cattle, and because both he and other researchers have managed to fertilize human eggs in tissue culture. On the other hand, Luigi Mastroianni, chief of obstetrics at the University of Pennsylvania Medical School and head of one of the leading *in vitro* fertilization labs in the United States, is more cautious about whether the British attempt will succeed. Researchers in his lab have still not managed to reproduce monkeys by *in vitro* fertilization (SN:

2/24/73, p. 124). "We need to evaluate the scientific information surrounding this experiment in Great Britain," he says, "to see whether we all agree that it has been done." (It remains to be shown that the pregnancy is not due to natural methods.)

If human test-tube procreation has been achieved, will the resulting child be normal? Soupart thinks it probably will be, since all lab animals born by this technique to date have been normal. So does Andre Hellegers, professor of obstetrics at Georgetown University Medical School and director of Georgetown's Kennedy Institute of Ethics. "My strong suspicion," he says, "is that they [Steptoe and Edwards] must have done amniocentesis so that they would know that it [the test-tube fetus] was at least not chromosomally abnormal. I would not be surprised if they did amniocentesis and had a look at it, so that they would know that at least structurally it was normal. I am very sure they must have followed it with ultrasound so that they had some idea of whether its growth was normal."

But suppose the baby isn't normal? "If the child is born defective, one might well ask what right the parents had to do it," asserts Daniel Callahan, director of the Institute of Society, Ethics and Life Sciences. "It certainly was not for the benefit of the child but of the parents. I would be interested in knowing whether this thing went through a review procedure in England, or was it researchers going off and doing it on their own?" Another ethical implication of this procreation attempt, Hellegers points out, is whether it is right to separate fertilization from procreation, and if so, if it is proper to discard embryos that don't take.

Then there's the legal question. If the technique doesn't work, should the doctors who did it be held legally responsible? Just this week, in fact, a trial opened in New York City on a \$1.5 million suit brought by Doris and John E. Del Zio, who attempted to have a child via test-tube fertilization with the help of Landrum Shettles of Columbia-Presbyterian Hospital. The culture containing their egg and sperm was allegedly thrown away without either their or Shettles's permission by Raymon Vande Wiele, director of obstetrics at the hospital. The Del Zios have filed a suit against the hospital and Vande Wiele, claiming they suffered "severe personal injury."

Ethical and legal implications aside, scientists tend to agree that *in vitro* fertilization of humans is not likely to usurp sexual procreation in human society, and that those who request it will be couples whose infertility problems can not be corrected by other methods. It will also be some time, Mastroianni predicts, before the technique becomes readily available to such couples. □