

My Mother, the Embryo

IVF's Latest: She-Males, Fetal Eggs, and Children of the Unborn

This summer marks the 25th anniversary of the birth of Louise Brown, the first child conceived through in vitro fertilization. About a million children around the world have since followed her path from the test-tube to the crib, and the anguish of countless infertile couples has been alleviated by IVF techniques. But along with a reminder of the promise of IVF, this summer has also given us new reasons to reflect on the darker potential of the technology—and to recall the prescience of those who warned of abuses and dangers a quarter century ago, and who pointed out the capacity of the new techniques for grotesque confusions of sexuality, procreation, and the relations among the generations.

This May brought news that researchers at the University of Pennsylvania had managed to coax embryonic stem cells from mice to differentiate into mouse egg cells. Should this process prove repeatable in humans, the consequences could be far-reaching. Since stem cell lines can multiply

again and again, this might offer researchers a nearly inexhaustible source of eggs for use in research, avoiding the complex and often unpleasant technique of retrieving eggs from women using super-ovulation drugs and an invasive extraction process.

The new procedure would also mean that, by providing the egg cells to be fertilized, embryos could serve as biological mothers of IVF children. These embryos, moreover, could be male or female—indeed the eggs created in the University of Pennsylvania experiment were drawn from an embryonic stem cell line derived from a male embryo. The result was a biological novelty: male egg cells. This offers not only the prospect of an unborn mother, but of a male unborn mother.

If combined with human cloning techniques (to create an embryo, and therefore embryonic stem cells, with the genetic identity of a pre-existing person), this new approach could also allow two men to procreate sexually—one offering the egg, the

other the sperm; and it could potentially allow one man to sexually procreate on his own, offering both egg and sperm. The same new avenues to single-sex procreation could be open to women once researchers succeed in transforming embryonic stem cells into sperm as well as eggs.

Then, in late June, came news that scientists in Israel and Holland might soon offer another way for the unborn to parent children. The researchers, reporting their findings at the annual meeting of the European Society for Human Reproduction and Embryology (ESHRE) in Madrid, announced that they had successfully removed immature ovaries from four-month-old aborted fetuses and coaxed them to develop to the point where the ovarian follicles began to produce the female sex hormones necessary to develop eggs. The researchers theorized that these undeveloped ovaries could be further stimulated in the test-tube to go through the later stages of development and to create fully mature eggs, which might be used in IVF procedures. The resulting child would be the offspring of an aborted fetus. The lead researcher in the study, Israeli gynecologist Dr. Tal Biron-Shental, offered a pragmatic reply to the ethical concerns surrounding such a prospect. "I am fully aware of the controversy about this," she told reporters, "but probably, in some places, it will be ethically acceptable." Yes, probably, in some places, it will.

And if male mothers and children of the unborn are not enough, American researchers at the same ESHRE conference reported on an experiment in which they created mixed-sex embryos, quickly dubbed "she-males" by the popular press. The team, led by Norbert Gleicher of the Center for Human Reproduction in Chicago, removed cells from three-day-old

male human embryos and inserted them into female embryos, creating a so-called "human chimera" with a mix of both sexes. The purpose of the experiment was to test a potential substitute for gene-therapy, which would work by injecting healthy embryonic cells into embryos with genetic defects. Male cells were used in female embryos only to make it easier to track the foreign cells once they were inserted.

The Gleicher research quickly came under attack, for both scientific and ethical reasons. Dr. Françoise Shenfield of ESHRE told reporters that "the aim is to create a chimera to correct a defect, but it seems a little illogical because nobody has any idea how much of the embryo would be normal." Australian IVF expert Alan Trounson told Britain's *New Scientist* magazine that the technique seemed to him "completely flawed."

The notion of a male-female chimera even shocked some of Gleicher's colleagues, who were reticent about allowing the results to be reported at the ESHRE conference. As Boston University bioethicist George Annas told the *Washington Post*, "It's one thing if the right-to-life community has problems with your work, but if scientists hear you talk about your work for the first time and say it's outrageous, that says something."

Dr. Shenfield noted that "this research happened in America, but I can't imagine it being accepted anywhere in Europe, I'm happy to say." Indeed, Britain's Human Fertilization and Embryology Authority announced that it would not approve experiments like Gleicher's in that country. Unfazed, Gleicher has applied for a patent on his work in the United States.

All of this should not keep us from wishing Louise Brown a happy birthday, though it surely might cause us to worry

about the bizarre combinations and confusions made possible by her novel conception a quarter century ago, and about the

sort of world her children might someday inhabit as the confounding of human origins proceeds apace.