

Human Embryo Research: Science and Ethics

Two days of public hearings last week by the Ethics Advisory Board to the Department of Health, Education and Welfare marked the first steps toward the possible lifting of a three-year moratorium of U.S. research involving *in vitro* fertilization of human ova.

The 14-member board, created by the same federal order that halted HEW funding of such experiments in 1975, agreed last May to review the "ethical acceptability" of a proposal by Pierre Soupart of Vanderbilt University. Soupart's proposal — to study chromosome abnormalities in human embryos fertilized *in vitro* and to attempt to preserve them by freezing — is the only one of its kind pending in the United States.

But the birth of Louise Brown — reportedly the first child conceived in the laboratory (SN: 8/5/78, p. 84) — suddenly changed the board's duties from theoretical to practical and tossed Soupart's proposal into the back seat for the time being. The "recommendations on broad principles" requested by HEW Secretary Joseph A. Califano Jr. before such research can be approved will not come until early next year, according to the board's chairman, San Francisco lawyer James C. Gaither. Even then, the future of such research in the United States depends on Califano's decision.

Researchers, ethicists, public interest groups, such as the Washington-based People's Business Commission, and private citizens, including a childless Tennessee couple who hope to benefit from the techniques, testified before the board at the National Institutes of Health in Bethesda, Md., on the scientific and moral issues of human fertilization research.

Carefully separating the processes of *in vitro* fertilization, embryo transfer and implantation, the witnesses with science backgrounds told the board they favored the approval of human *in vitro* fertilization studies. Such research has applications beyond treating infertility, said Luigi Mastroianni Jr. of the University of Pennsylvania School of Medicine, particularly in studying chromosome abnormalities, cell differentiation and the effects of contraceptives and toxins. Though animal studies can provide much information, human research is needed; inbreeding and species differences make some animal results inapplicable to humans, Barton Childs of Johns Hopkins University School of Medicine said. "Where it is possible to obtain information from studying other species, we should," Clifford Grobstein of the University of California at San Diego said. "But we have to face the fact that some information we now need comes from humans."

Scientists disagreed about research involving transfer and implantation of human embryos. Despite the success of Robert Edwards and Patrick Steptoe (the British researchers responsible for the recent birth following *in vitro* fertilization), further animal studies are necessary to assess the risks of abnormalities and to increase the success rate of transfer, Mastroianni maintained. (Estimates of Edwards's and Steptoe's failures at transfer range from 60 to 200.) Embryo transfer using laboratory animals should continue, he said, until "we can have a statistically valid indication of the normality of fetuses" produced by *in vitro* methods.

Joseph Shulman of the National Institute of Child Health and Human Development disagrees, saying existing data do not support an increased risk of abnormalities associated with *in vitro* methods and that further delay will "consign thousands of couples to permanent infertility." More animal studies are impractical, according to Kenneth Gould of Yerkes Primate Center: There is "no way

[to produce enough offspring] to satisfy a statistician."

Neither *in vitro* fertilization nor embryo transfer should be allowed, Paul Ramsey, professor of religion at Princeton University testified, "not now, not ever." The dangers of such research, he said, include "further trauma" on the "matter of morality of abortion," the risk of abnormalities, an "assault... against marriage and family" (such as exploitation of surrogate mothers and "wombs-for-hire") and the spectre of "Huxley Hatcheries" — replacing natural reproduction with laboratory procedures. In addition, Ramsey said, there is the unpredictable possibility of psychological damage to the child and "undetectable damage" from using eggs and sperm that would have been rejected for reproduction had they remained in the body.

The board plans four more public hearings across the country to review present policies for handling human tissues, legal implications of such research, ethical procedures in other countries and the role of federal support. □

Air samples reveal new threat to ozone

Atmospheric chemists have predicted that man-made chemicals will thin the earth's ozone shield, and the sun's harsh rays will then increase skin cancer prevalence and alter global climate. Now by jet, laboratory experiments and computer, the chemists are challenging and substantiating that gloomy prediction.

The good news from actual sampling of atmospheric chemicals around the world is that the level of nitrous oxide (N_2O) is not increasing. This finding indicates that nitrogen fertilizers are not contributing substantially to ozone depletion, according to Hanwant B. Singh of SRI International in Menlo Park, Calif. Singh and colleagues have just completed a three-year study of the atmospheric distribution of trace chemicals likely to deplete stratospheric ozone. Dagmar Rais Cronn also reported to the meeting of the American Chemical Society in Miami last week that Washington State University investigators see no increase in nitrous oxide with time. Those researchers are measuring the vertical distribution of chemical species.

The bad news is that the samplers have found yet another man-made chemical nibbling at the ozone shield. "Methyl chloroform is increasing at a very rapid rate," says Cronn. That chemical is used in solvents, for example for degreasing metals. Singh estimates that methyl chloroform has a 10-year lifetime and 10 to 15 percent of the chemical rises to the stratosphere. In their survey, Singh and colleagues found

the level of methyl chloroform in the atmosphere to be increasing about 20 percent per year. Singh told reporters that with this rapid increase, use of the chemical should be controlled. Phillip L. Hanst of the Environmental Protection Agency says EPA is now worrying about methyl chloroform. The agency is planning a conference in a few months to consider whether regulation is necessary.

Concern also persists about chlorofluorocarbons, even after the ban on most of their uses as propellants in the United States. The ban only covers about a quarter of world chlorofluorocarbon use. The samplers found that the global production approximately equals the quantity they calculate from their measurements, thus ruling out any significant sinks for removing fluorocarbons from the atmosphere. Mario J. Molina and Luisa T. Molina of the University of California at Irvine report laboratory results indicating that solar radiation rapidly destroys hypochlorous acid, which had been considered a potential inert reservoir for active chlorine. Singh reports the atmosphere is able to cleanse itself of the ozone-threatening chemicals only a tenth as well as previously believed. "This scavenging ability possibly is being further destroyed by man-made activities," Singh says. And Mario J. Molina concludes, "Even with existing regulations fully in effect, the predicted eventual loss of ozone [in 50 to 100 years] is still about 15 percent." □