

Embryologists Dismayed by Sanctions Against Geneticist

Geneticist Mark Hughes was a great catch for the National Institutes of Health in 1994 when NIH wooed him away from his lab at Baylor College of Medicine in Houston. Hughes had just authored a paper in the *New England Journal of Medicine* on a technique for delicately lifting DNA from a single cell of a human embryo, just a few days old, and testing it for cystic fibrosis. His genetic research on embryos had also been featured as

"The panel supports federal funding of certain areas of preimplantation embryo research within the framework of [strict] guidelines. ..."

—Report of the NIH Human Embryo Research Panel, 1994

Mixed message. Panel said research on eight-cell embryo is acceptable (*above*); Congress said no (*right*).



University of California, San Francisco, says, "This will have a damping effect on researchers' morale. ... It has created the specter of a witch-hunt." Pedersen and others warn that Hughes's treatment will dissuade good researchers from entering the field and further drive reproductive research into the private sector, where it is unregulated.

Hughes himself was straddling the public and private worlds in an effort to stay within the federal rules governing his research. After NIH recruited him, he set up a lab as part of an in vitro fertilization (IVF) program at Suburban Hospital in Bethesda, Maryland, a private hospital across the street from the NIH

"None of the funds made available in this act may be used for ... research in which a human embryo or embryos are destroyed, discarded, or knowingly subjected to risk of injury or death greater than allowed for research on fetuses in utero. ..."

—HHS Appropriation, 1996

a runner-up in *Science*'s annual list of scientific breakthroughs for 1992. With high expectations, Hughes became a contract investigator at Georgetown University, where he was funded by NIH's National Center for Human Genome Research to continue developing methods for extracting DNA from single cells for genetic diagnosis. NIH director Harold Varmus also asked Hughes to serve on a blue-ribbon NIH panel writing guidelines for a new policy on human embryo research—Hughes's specialty (*Science*, 19 August 1994, p. 1024).

Just 2 years later, in October 1996, NIH ended its relationship with Hughes, cut off his funding, and hung him out to dry. When *Chicago Tribune* reporter John Crewdson reported this move on 9 January, NIH spokesperson Anne Thomas explained to *Science* that the relationship with Hughes had been "terminated" because Hughes—"contrary to NIH policy, contrary to NIH instruction"—had been using NIH resources to test DNA from eight-cell human embryos. Thomas said the work violated a clause Congress added to NIH's appropriation bill last year, barring federal funds for most research on human embryos (see quote above).

This is the first time NIH has enforced the congressional ban, sending waves of concern through the field of embryology. Roger Pedersen, a leading fertility researcher at the

campus. There, in separate facilities, he conducted his NIH-funded single-cell DNA studies and his embryology work, with the full knowledge of Georgetown and NIH, according to Hughes. He says, "I kept the embryology as far away as possible" from the NIH-funded work. Last year, after he became director of Georgetown's Institute of Molecular and Human Genetics, Hughes says he used independent time to continue this research. "About once a month," the Suburban lab would receive a sample of DNA from a human embryo and screen it for mutations that cause severe diseases such as Tay-Sachs, cystic fibrosis, or spinal muscular atrophy. Patients at risk for such diseases paid to have DNA from their artificially conceived embryos flown from clinics around the country to Suburban for testing. If no threatening mutation was found, the embryo would be implanted.

Hughes got into trouble, according to NIH, because postdocs in his Suburban lab, who were funded by NIH, told officials that they feared they were violating the ban on

embryo research. Hughes concedes that the postdocs had NIH support, but says once the concern arose, he did the IVF work himself. After an investigation, however, genome center officials concluded that Hughes did use NIH resources in his Suburban Hospital lab, and that he had diverted a refrigerator destined for Georgetown to this lab. On 21 October, Hughes and NIH agreed to end their relationship. All NIH funding ceased.

Now, as a result of the publicity, Hughes is also in hot water with Georgetown, a Catholic university which has a policy forbidding research that could lead to the discarding of an embryo. A university spokesperson issued a statement last week noting that, "We take this matter very seriously and are continuing internal discussions about what to do."

All this has dismayed Hughes's colleagues, who fear it will add to a climate of fear that is forcing good work out of the public sector and into private IVF clinics, where peer review is weaker. "This is very counterproductive," says Alan Handyside, a British IVF pioneer now at St. Thomas Hospital, London, and a co-author of papers with Hughes. "The quality of research will suffer." Adds Hughes: "The unfortunate fact is that ... the brightest people, who really should be doing this sort of thing, aren't, because it's not legitimized science."

John Eppig, an expert in mouse biology at the Jackson Laboratory in Bar Harbor, Maine, and a member of the 1994 panel on embryo research guidelines, agrees. This field "would develop in a better way if there were public support" and open peer review. Eppig adds that he also worries about "ethically questionable practices" at some IVF clinics. For example, one researcher who asked not to be named said that he considers "obscene" the practice of implanting many fertilized embryos to boost the likelihood of pregnancy, then using "pregnancy reduction," or selective abortion, to reduce the number of live births. Researchers find it odd that pregnancy reduction is permitted, while research like Hughes's—aimed at making the use of multiple embryos unnecessary—is banned.

The system's treatment of Hughes, beyond chilling the research climate, has offended some of his colleagues. Handyside says none of these revelations should have come as a surprise to Georgetown or NIH, given the "high profile" of Hughes's research. Handyside believes that when NIH recruited Hughes, it anticipated that embryo research policy would be relaxed and that he would be able to explore his single-cell genetic screening techniques with NIH funding. The blue-ribbon panel urged a cautious go-ahead, but instead, the politics went the other way. "Quite simply," Handyside says, "the tide has gone out and left Mark stranded."

—Eliot Marshall