a former librarian, describes herself as "a passionate supporter of science."

Seltzer won the 12 September primary by just 35 votes, causing Long Island activists to point to the lab as a critical factor. "There was a lot of resentment toward Forbes," says Brookhaven chemist Joanna Fowler, who backed Seltzer. Adds one DOE official, "If he hadn't done what he did to Brookhaven, he would have won this election."

Strong reaction. New York Democrats ousted incumbent Michael Forbes.

Seltzer, who billed herself during the primary campaign as the "real Democrat," faces an uphill battle against Republican Felix Grucci Jr. because of the district's heavy Republican majority. Forbes will appear on the November ballot as the candidate of a minor party.

–ANDREW LAWLER

MEDICAL ETHICS

Moratorium Urged on Germ Line Gene Therapy

A report issued this week by the American Association for the Advancement of Science (AAAS, publisher of *Science*) has called for a total moratorium* on attempts to cure genetic diseases by altering the genome in ways that would be passed from one generation to the next. Human germ line gene therapy would be unsafe and unethical, the report concludes. And it urges the government to create an independent panel to monitor public and private research and prevent such risky experiments.

The authors of the report, ethicists Mark Frankel and Audrey Chapman of the AAAS staff in Washington, D.C., reached these conclusions after consulting for 2 years with a score of advisers in gene therapy, ethics, sociology, and theology. They found wide support for a moratorium on germ line gene therapy. But they went further, proposing a moratorium on therapies that might change human DNA accidentally, including methods already being used by some reproductive medicine clinics.

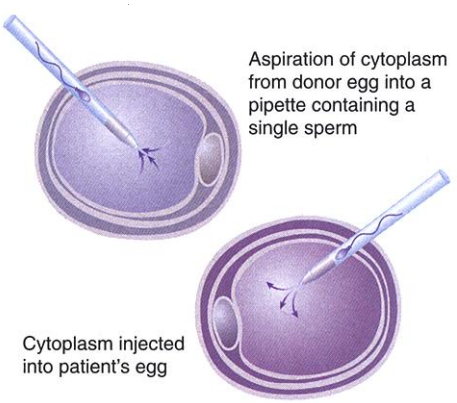
The DNA editing methods that make it possible to revise mammalian genomes are "developing impressively," said Theodore Friedmann, director of the gene therapy program at the University of California, San Diego, and adviser to the AAAS authors. It would be exciting to try to "fix" genetic diseases by editing the human genome, Friedmann said, but he is convinced that the risks—not just to the individuals immediately affected but to future generations—outweigh the potential benefits.

The AAAS report reflects this concern, although it supports expanded basic research in this field as well as clinical gene therapy for cells other than sperm and eggs. Public funding of germ line gene therapy "is not warranted," it concludes. And it urges careful monitoring of private labs, noting that private firms might try to sell genetic "enhancement" therapies to improve the beauty, brains, and brawn of children. The report proposes that a national group of experts and laypeople, open to the public and housed at an institution that does not fund biomedical research, be established to keep tabs on the field.

At present, no public or private labs are proposing to do germ line gene therapy. But reproductive medicine clinics are conducting experiments that might be affected if these recommendations were adopted. For example, the report questions a type of therapy that involves removing cytoplasmic material from a donor egg and injecting it into a recipient to improve the egg's viability. The process also transfers mitochondrial DNA, which means that a child born by this process may inherit mitochondrial DNA from both eggs. The AAAS report classifies this as a type of "inheritable genetic modification" and argues that it should not be done at present.

Jacques Cohen, director of the Institute of Reproductive Medicine and Science at the St. Barnabas Medical Center in Livingston, New Jersey, which developed and is using the technique, agrees that it is "highly experimental." But he argues that it is "an incredible stretch" to classify it as germ line gene therapy. He says he has found no harmful effects from the technique, which has enabled infertile women to give birth to healthy babies—15 at last count.

–ELIOT MARSHALL



Risky therapy? Ethicists question a fertility technique that transfers cytoplasm from one human egg to another.

* "Human Inheritable Genetic Modifications: Assessing Scientific, Ethical, Religious, and Policy Issues," by Mark S. Frankel and Audrey R. Chapman, (www.aaas.org/spp/dspp/sfrl/germline/main.htm

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PLANETARY SCIENCE

Twins for the Themis Asteroid Family

Many planets enjoy the company of a moon or two, but asteroids usually travel in solitude. Now a high-tech telescopic search has revealed that the asteroid Antiope is actually two bodies of similar size circling each other. It's not the first asteroid found to be a pair, but the uniquely twinned Antiope presents a severe problem: How could the continual banging about among asteroids create bodies of similar size in orbit about each other?

The first discovery of a satellite pair didn't give theoreticians such trouble. In 1994, the Galileo spacecraft found little 1.5-kilometer Dactyl orbiting 56-kilometer Ida, and the most obvious explanation was a large collision. Ida is a member of an asteroid "family" of large fragments traveling in much the same orbit about the sun, all of which must have formed when a collision shattered a much larger ancestral asteroid. Dactyl could be just a small relic of the same event that Ida happened to capture. The discovery in 1999 of 13-kilometer Petit-Prince circling 214-kilometer Eugenia proved more difficult to explain because Eugenia is the largest of its family; any candidate satellites among the debris would have been blasted out of its gravitational grasp.

Now, in a meeting abstract newly posted to the Web (www.aas.org/publications/baas/v32n3/dps2000/590.htm), astronomer William Merline of the Southwest Research Institute (SwRI) in Boulder, Colorado—the discoverer of Petit-Prince—and his colleagues report the discovery of two more asteroid pairs. Using adaptive optics that undo the atmosphere's blurring effects, they imaged a small companion of the asteroid Pulcova. More surprisingly, they also split the supposed 120-kilometer Antiope—a member of the Themis asteroid family—into two equal-size bodies separated by 170 kilometers. "I'm stunned and astonished," says planetary physicist Jay Melosh of the University of Arizona, Tucson. "It's not anything that was expected."

Theoreticians contacted by *Science* are at a loss to explain the twinning of Antiope. Planetary dynamicist William Bottke of SwRI, Boulder (who is not a co-discoverer), does hazard a guess. Many small collisions may have reduced an ancestral Antiope to a collection of rubble, he speculates. If so, a glancing blow by another asteroid might have spun Antiope like a top, causing it to fly apart into two equal-size rubble piles still orbiting about their center of mass. But a lot of computer modeling will be needed to support such speculation. As Melosh says, "We have a very interesting new puzzle in the solar system."

–RICHARD A. KERR