

Future Health, Future Choices

By KATHLEEN FACKELMANN

The year: 2020. The setting: Chicago. A young associate named Susan steps into the conference room of a law firm. She faces a gauntlet of the firm's best attorneys. They tell Susan that she'll make partner if she measures up during the next year.

They also tell her about a new drug shown to boost cognitive performance. Of course, they say, the drug does have side effects; it can cause cancer in 20 or 30 years. "It's up to you," they tell her.

Susan takes the drug. Was it a free choice?

Susan would not be unusual if she felt that she had to take the drug or lose her job, says bioethicist Thomas H. Murray of Case Western Reserve University in Cleveland.

The above scenario is fiction—for now, at any rate—but Murray points out that scientists are already refining drugs aimed at enhancing cognitive performance. Those drugs are meant to stop or reverse the added thinking characteristic of Alzheimer's disease, but they may also enhance the executive functions of the average brain.

Biomedical advances are progressing at a dizzying speed. If the pace continues, the future will bring with it a host of increasingly difficult ethical dilemmas spawned by pharmaceutical research and medical technology.

Arthur L. Caplan, director of the Center for Bioethics at the University of Pennsylvania in Philadelphia, envisions a bold new world of genetic engineering. Researchers have already transplanted genetically engineered human cells into people suffering from inherited diseases, but Caplan imagines a genetic therapy that takes place before conception.

Consider a man and woman, both of whom carry the mutant gene for the lethal Tay-Sachs disease. They don't want to pass on two mutant genes, and thus the disease, to their children. They visit a genetics clinic, where technicians harvest primitive cells destined to become sperm or eggs. From each of these germ cells, the technicians snip out the flawed Tay-Sachs gene and replace it with a healthy gene. In the end, the firm offers the couple several embryos guaranteed not to carry the genetic blueprint for Tay-Sachs disease.

The benefits of such therapy need no further explanation. However, the technique would alter the set of genes passed to future generations. Critics fear such tinkering might introduce unforeseen consequences.

"We'll be in a debate about whether it is right to take risks with our descendants in order to prevent disease," Caplan predicts. However, he believes the impetus will be to forge ahead in such germ-line gene therapy.

Scientists have identified a number of disease-causing genes. Such work has led to blood tests that can reveal who is free of the tainted inheritance and who carries one or two copies of the genes. The near future will bring an array of simple and cheap tests for genetic flaws.

"It's pretty clear that genetic tests of various kinds will be widely employed in the future," Murray says.

In some cases, the tests provide life-saving information, but in others, genetic information will be used for less noble purposes. Murray foresees its use in custody battles, for example.

Here's a possible scenario: A lawyer finds out that his client's ex-wife has had a blood test for the *BRCA1* gene. The test is positive, suggesting that she has a heightened risk of breast cancer. The lawyer argues that the husband should get custody of the couple's children, "Who is more fit as a parent in the long run?"

This fictional case raises a concern about the all-too-real threats to privacy of medical information, Murray says. Such worries will proliferate as insurers and providers of health care start to store and swap computerized medical data, he adds.

Leaving the world of genetic testing behind, for the moment, imagine a therapist's couch—one generated by a computer. Caplan believes future psychiatrists will use virtual reality as part of a treatment plan for many disorders, including phobias. Patients who are deathly afraid of snakes, for example, could confront their fear in a computer-generated world, he says.

The technique could also be used to generate a simulation of happiness. "I think the possibility of bliss therapy will be there," he says. Such uses will bring up all sorts of ethical issues, especially if people begin to rely on virtual reality as a form of escape. "Would it blur the line between the real and the imaginary?" Caplan asks.

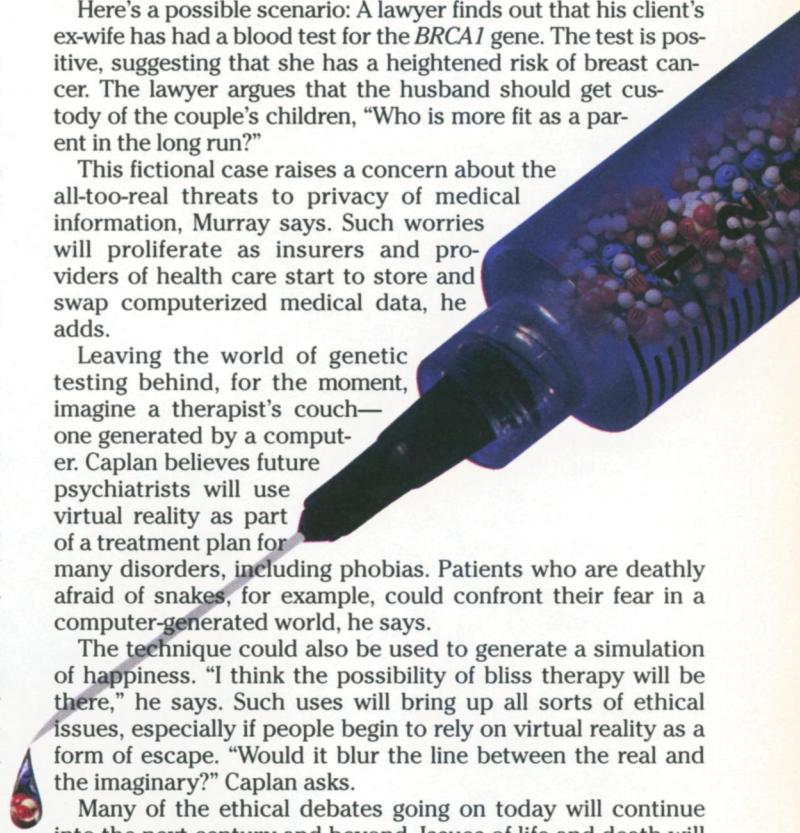
Many of the ethical debates going on today will continue into the next century and beyond. Issues of life and death will always be with us, points out bioethicist George J. Annas of Boston University. However, advances in medical technology may change the focus of the issues.

Although Caplan predicts that "we will have an artificial heart and possibly an artificial liver" in the future, the question of who should get a transplant will remain. "Would we give [an artificial organ] to an Alzheimer's patient?" he wonders.

Moreover, he points out, firms that spent decades developing synthetic organs will probably insist on a high price tag, posing another problem—that of unequal access to medical care.

Annas envisions a future in which the ethical debate broadens. It should consider health questions that affect all people, not just high-tech treatments for the privileged few. He predicts that people in the United States will join with others around the globe to fight for widespread use of inexpensive treatments, better infection control, and clean air and water. After all, he points out, we can't seal our borders against pollution or a new viral killer.

Annas says he may be too optimistic in predicting such a global view of medical ethics. Yet that view may be a necessity if human beings are to flourish in the century ahead. □



1959 Mechanism of bacterial drug resistance discovered	1959 Theory of innate grammar capacities	1960 Jane Goodall's chimpanzee observations begin	1960 Laser demonstrated	1962 Rachel Carson's <i>Silent Spring</i> published	1963 Discovery of a quasar
1959 Microchip invented		1960 Seafloor spreading hypothesis developed	1962 Compounds formed from noble gases	1962 Studies explore differences between brain hemispheres	1964 Genetic explanation offered for animal altruism