may be too dismissive. She remains intrigued by Jerne's theory, which she describes as a "seminal bit of thinking" and adds that at one time, "99% of physicists would have told you they were uninterested in Einstein's theory." Imanishi-Kari herself says that her peers seem to regard idiotype mimicry as a "taboo" subject: "People don't like to talk about it. ... Today, in the 1990s, we talk about selection," she says. "It's semantics."

Ronald Germain of NIH says, "Science has trends just as any aspect of life does," and the terminology of idiotype networks "doesn't catch people's imagination" any longer. Instead, the bandwagon has moved on to genetics—identifying and cloning genes of the immune system, which many researchers now assume are the "predominant structures" that control immune responses. Imanishi-Kari agrees that the boom in molecular biology in the '80s attracted "lots of people who thought that everything was dictated by the structure of the genes."

Today a few researchers are still exploring the implications of Jerne's theory. Some—including Mark Greene and colleagues at the University of Pennsylvania—say they have been inspired by Jerne's ideas to study antibody structures in the hope of designing new drugs. And John Kearney at the University of Alabama continues to rely on Jerne's ideas in exploring the neonatal immune system. But—in the United States, at least—they are in the minority.

European immunologists, however, have remained more enamored of Jerne's general ideas, notes Germain. "Europeans like models," he says, and Jerne's theory provides a framework for what is now called "connectivity" in the immune system. Immunologist Martin Weigert of Princeton University notes, for example, that Antonio Coutinho at the Pasteur Institute is applying a version of Jerne's concept to show how idiotype interactions may expand the immune system in newborns. Coutinho and others are developing a "second generation of network theories," says Weigert: "We are asking more specific questions, looking at interactions between antibodies in unique and special circumstances." In contrast, Germain says, most U.S. scientists tend to be "pragmatic. ... They want to know, 'What does this gene do?' " Because Jerne's model has yielded few physiological results, Germain says, Americans have turned away from it.

Indeed, they have turned so far that concepts such as "idiotypy" and "network regulation," so pivotal 10 years ago, could vanish from the immunologists' lexicon. Charles Janeway, the Yale University researcher who co-edits the popular textbook *Immunobiology*, says he's losing interest himself. The first edition of his book had three sections on Jerne's theory of idiotypes; his second edition had one section. The third edition, which will come out next year, Janeway says, "will have nothing." That deletion, more than any decree from Washington, may convey the scientific community's judgment on the topic of idiotypic mimicry. While armies of lawyers in Washington were poring over the data, scientists simply lost interest in the science behind them.

–Eliot Marshall

Immunologists on Immunology

Advances in immunology spawn an ever-growing range of potential applications in medicine, but how are the prospects shaping up? As part of a special issue on the field (5 April 1996), *Science* asked immunologists to give us their views in an on-line questionnaire. Find out the results in the analysis on *Science*'s Web site at http://www.aaas.org/science/immunology/analysis96.htm.

NASA LIFE SCIENCES

Panel Backs Joint Bion Mission

An independent task force recommended last week that NASA continue to participate in a space life sciences program with Russia that has drawn fire from animal-rights activists and some members of Congress. The panel praised the quality of the research in this fall's Bion mission and dismissed accusations that the effort mistreats rhesus monkeys and is of dubious scientific value. At the same time, it suggested that NASA look at the ethical issues raised by the use of animals in all its life sciences research before participating in a second Bion flight in 1998.

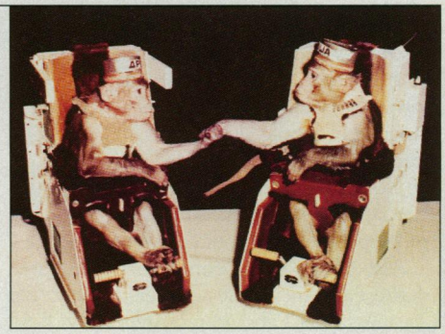
Although the panel, led by Ronald Merrell, chair of Yale University's surgery department, gave Bion a green light, Congress is sending a very different signal. On 26 June the House voted to ban 1997 funding for the project (*Science*, 5 July, p. 25). NASA officials say that step, if endorsed by the Senate, would cripple their ability to analyze data from the Bion 11 flight, scheduled for this fall, and would force NASA to abandon work on Bion 12. "We have to see if we can turn this around in Congress," says Ken Souza, associate director for life sciences at Ames Research Center in California. "If not, it will kill" U.S. participation in Bion.

The program is a joint U.S., French, and Russian endeavor to gather physiological data from monkeys on the effects of weightlessness that could prove useful to astronauts on long missions. Russia has flown eight capsules with rhesus monkeys since 1973. "There are now courses ... and textbooks on space biology, none of which would have been the case without Bion," Souza told the panel. The Merrell panel backed his analysis. "The science integrity [of the project] is unquestioned," said Merrell at the end of the day-long deliberations. "It is solid and of high caliber, and is highly likely to produce useful results."

Animal-rights activists maintain, however, that the experiments could be done on humans rather than monkeys and that Bion has yielded few results that benefit astronauts. "This is garbage science," says Mary Beth Sweetland, director of research, investigations, and rescue at People for the Ethical Treatment of Animals (PETA), who testified at the panel meeting. "We've learned about all we can from these animals. The data will be stored in cardboard boxes, and no one is going to give a damn."

PETA also has argued that restraining the two monkeys aboard Bion for 14 days following three sets of surgeries to implant medical devices such as a skull cap is cruel and unethical. But the panel disagreed. Franklin Loew, a panel member and dean of veterinary medicine at Cornell University, led a subcommittee that concluded that "NASA standards meet existing requirements."

The one loud note of dissension came from Tom Beauchamp, a philosophy professor and senior research scholar at Georgetown University. He criticized NASA for failing to provide evidence that it conducted a serious review of the ethical issues associated with using monkeys for the Bion experiments. At his urging, the panel recommended a broad study of NASA's entire life sciences research program, including a look at the care and treatment of animals.



INSTITUTE FOR BIOMEDICAL PROBLEMS, MOSCOW

Thumbs up. Two rhesus monkeys after a Bion mission, which won praise from NASA panel.

In the meantime, the countdown to Bion 11 continues. The first surgeries for the 10 October launch were conducted last month, according to Eugene Ilyin, who heads the program at the Institute for Biomedical Problems in Moscow and sat in on the Merrell panel meeting. Ilyin is clearly worried, however, about the fate of Bion 12. Given Russia's cash-strapped space program, he says, "if any partner pulled out, it would pose a serious problem."

–Andrew Lawler