Oncogene researcher Robert Weinberg of the Massachusetts Institute of Technology (MIT) shares this view. "The public did not invest in making these things to accelerate my career but in order to move the field forward," says Weinberg, who says he distributes all reagents, mice included, no strings attached as soon as they are published.

Science's investigation, however, reveals that while no makers of knockouts simply refuse to share them, some researchers substitute their own policies for those of NIH: not sharing mice until long after publication, or sharing mice selectively. Insiders in the field—none of whom would allow themselves to be named—repeatedly mentioned Nobel Prize–winning immunologist Susumu Tonegawa as someone whose mice are not freely available immediately after publication. Tonegawa is an HHMI investigator at MIT who receives substantial NIH funding. He currently has three multiyear NIH grants, totaling $1.2 million (65% of which is for direct costs); all three grants are for work involving genetically altered mice.

A number of researchers interviewed by *Science* cited a knockout called TAP1 as an example of a mouse made by Tonegawa that they had trouble obtaining from him. The TAP1 molecule (for "transporter associated with antigen processing") plays a key role in the immune response against invaders such as viruses. Tonegawa's lab published the knockout in *Cell* in December 1992.

Interviews by *Science* turned up several researchers who had tried to get the TAP1 mouse from Tonegawa and been refused. One researcher says Tonegawa refused to provide the mouse for an experiment in an area outside Tonegawa's interest. "He said 'No way,' " this researcher says.

When *Science* contacted Tonegawa, he provided a list of 30 researchers whom he said had received the TAP1 mouse from his lab or the labs of his associates. *Science* at-

IIT: Serving Up Ethics for Lunch

Vivian Weil is a philosopher, not a chef. Yet she serves up one of the more provocative campus dining experiences: Bring your own lunch, and she'll provide ethical dilemmas for table talk. Welcome to the Illinois Institute of Technology's (IIT's) Research Ethics Sack Lunch program, which meets on the first Monday of every month at the Center for Study of Ethics in the Professions, which Weil directs. She started the sack lunches 4 years ago after a year-long stint at the National Science Foundation (NSF) studying ethics and values. Twenty showed up for the first lunch in February 1992; the numbers have stayed pretty much the same since.

Weil's sack lunch is only one element of IIT's multifaceted approach to raising awareness of research ethics among both students and faculty. For 4 years running, with funding from an NSF grant, Michael Davis, a research associate at Weil's center, organized and ran a week-long workshop to help faculty members teach ethics, called the Ethics Across the Curriculum Program. That program in turn led IIT faculty members to work ethics into their other courses.

DEWEY HENTGES

Table talk. In Vivian Weil's Research Ethics Sack Lunch Program, the conversation focuses on issues of conduct in daily lab life.

The IIT workshops, says Weil, were sparked by young faculty members who felt an obligation to teach ethics but realized their training hadn't prepared them. "They felt that it was not legitimate for them to teach it," she says, "but with the right preparation they could and would."

The faculty members, selected from a pool of applicants, receive stipends for participating. Over the 4 years the program ran in the summer session, some 50 IIT faculty members attended. Attendees at the workshop are given readings from classical texts in ethics and moral philosophy, as well as articles and clippings on business, engineering, and research ethics—on the Challenger o-ring seal incident, for example.

Three weeks later, the participants return for a half-day session in which they present and discuss problems that they'll either put in homework assignments or exams or discuss in class. A week later, they come back for another half day to discuss how they will grade the problems, what weight they'll give them, and why. "The idea," says Weil, "was how to get them over the hump on how they're going to do it." And the participants aren't finished until the end of the next semester, she says, "when they turn in a report that gives their student evaluations and describes what they did in class and evaluates it."

Based on these experiences, the IIT faculty is working ethics into courses ranging from mathematics to bioengineering to thermodynamics. Mukund Acharya, for example, who teaches a lab course on measuring systems, says he now devotes one of his sessions to a discussion of the ramifications of decisions taken about measurements in an industrial setting using a fictitious case study.

"We look at a small company that's manufacturing load cells which are going to be used in weighing machines," says Acharya. "One of the young engineers discovers a small flaw that can be corrected in one of the prototypes they're developing. He brings this to the attention of his boss, who says 'We'll take care of it in due course. There's no need to alarm our customers by discussing it. For the prototypes we're sending out, it won't be a big deal anyway.' "

Acharya presents the scenario, then has students discuss the issues from the point of view of the young engineer, the boss, the company, and the customers. "We look at all the different perspectives," he says; "try to figure out what's right. If the boss tells you to keep quiet, do you? Do you go to someone else in the company? ... It invariably ends up with the students having a fairly lively discussion."

Ethics Across the Curriculum serves to make students more aware of ethical issues; Weil's sack lunches serve the same purpose for the faculty. Participants spend the lunches discussing cases they've come across, and the lunches serve to expose faculty members to ethics issues and perspectives from fields outside their own. Few of the discussions, says Weil, are about classical scientific misconduct. "We're much more interested," she says, "in the ordinary kinds of problem that never rise to public scandals but can be damaging nonetheless. ... Of course, we know that misconduct occurs. But ... we think it's much more important to look at what supports responsible research and produces an atmosphere of trust."

–G.T.