In particular, Trivelpiece said it is necessary to do more than just react to the federal research budget when the President sends it to Congress. R&D programs might fare better, he said, if the research community put more effort into influencing budget decisions each spring, 9 months before Congress sees it, when the President's budget is in its early planning stage. Said Trivelpiece, "a lot of money gets moved around in the Administration . . . and I think it can be influenced."

But to maintain support for research or to expand it, the scientific camp must win over the American public, advised Samuel C. Florman, vice president of Kriesler Borg Florman Construction Co. of Scarsdale, New York. The author of *Blaming Technology: The Existential Pleasures of Engineering* said researchers must "loosen" their approach to explaining science to the Congress and the public.

In the meantime, Florman predicted that the research community should "be prepared for a period of benign neglect." In the first year of a new Administration, he noted, "very few people are going to be thinking about R&D." ■ MARK CRAWFORD

Whistle-Blowers Air Cases at House Hearings

Congressmen focus on MIT researcher who alleged errors in the report of a study associated with biologist David Baltimore; Baltimore not asked to testify

THE troublesome issue of fraud and misconduct in science were in the congressional spotlight once again this month when two members of the House held back-to-back hearings. The first was conducted by Representative Ted Weiss (D–NY), chairman of the House Government Operations Committee's subcommittee on human resources and intergovernmental relations. The second hearing, called by John Dingell (D–MI), chairman of the oversight and investigations subcommittee of the House Energy and Commerce Committee, aired at great length a newly publicized dispute involving Margot O'Toole, a researcher in a study headed by biologist David Baltimore.

The Weiss hearing featured reruns of two highly publicized cases: one involving allegations by Jerome G. Jacobstein against Jeffrey L. Borer of Cornell Medical College over a study reporting the effects of stress on cardiac function; the other concerning Stephen Breuning, lately of the University of Pittsburgh, who was found to have fabricated a number of studies on the effects of psychoactive drugs with retarded children. A few days after the hearings, Breuning was indicted on charges of filing false claims with the government and of obstructing justice.

The hearings focused on whistle-blowing primarily from the whistle-blower's standpoint, and none of the scientists against whom allegations have been made were invited to testify. A Weiss staff member said the purpose was not to "find out who's right, but what happens to people who make allegations." The hearings also furnished the occasion for enthusiastic attacks on the National Institutes of Health (NIH) misconduct policy office.

The most extensive testimony was on the O'Toole case, which began 3 years ago as a technical dispute between two researchers at Massachusetts Institute of Technology. This has been escalated into a cause celebre as a result of the efforts of NIH's self-appointed fraud researchers, Walter Stewart and Ned Feder of the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases.

The dispute centers on a study conducted under the auspices of Baltimore, the Nobel Prize–winning biologist who heads the Whitehead Institute at MIT. Margot O'Toole, a former postdoctoral researcher in a laboratory associated with Baltimore's, has contended there are serious errors in a paper based on the study, which was published in *Cell* in April 1986.* Although O'Toole never reported her concerns to the NIH and had finally resolved to drop the matter, Stewart and Feder brought it to the attention of the NIH misconduct policy office. No fraud has been alleged, but NIH has announced it will appoint a panel of three immunologists to examine the matter.

According to lengthy and detailed congressional testimony by O'Toole, her problems began soon after she came to work for Thereza Imanishi-Kari in MIT's Center for Cancer Research. O'Toole from the start experienced difficulties in obtaining expected results in experiments involving the effects of gene transfers on the immune systems of mice. She testified that she asked Imanishi-Kari for her own records on these experiments on various occasions, but the latter refused or was unable to locate them.

Imanishi-Kari eventually became "impatient" with her, attributing her failures to "incompetence," and told her to stop trying to do the experiments, said O'Toole.

In May 1986, after the *Cell* paper had appeared, O'Toole came across some records that formed part of the original data for the study. She said: "I became convinced that several of the major assertions of the paper were actually contradicted by the experimental results."

The issue is extremely complex, and arcane even for immunologists. In essence, the published paper reported that when a foreign gene (transgene) is introduced into cells of a mouse immune system, the transgene is not expressed in most cases, but it influences the type of antibodies manufactured by the mouse's own genes. O'Toole believed that the data indicated that, in fact, in most cases the products of both types of genes are still expressed.

O'Toole brought her findings to the attention of a variety of authorities at MIT and Tufts University, including her Tufts thesis adviser Henry Wortis and Herman Eisen, director of NIH trainees at MIT. The general upshot from a series of meetings seems to have been that the scientists involved all conceded that her criticisms were sound. However, they did not think them significant enough to warrant a retraction or correction of the paper. Wortis concluded that "alternative interpretations of the experimental data can be made. . . ." Eisen said there were some errors but not "flagrant" ones.

The message from MIT seemed to be that O'Toole should either make formal charges of fraud or drop the matter. At a meeting with the authors in June 1986, she said Baltimore advised her to drop it "for my own good." She did, and "left science saddened and disil-

*"Altered repertoire of endogenous immunoglobulin gene expression in transgenic mice containing a rearranged Mu heavy chain gene," by David Weaver, Moema H. Reis, Christopher Albanese, Frank Costantini, David Baltimore, and Thereza Imanishi-Kari, *Cell*, **45**, 247 (1986).

Representative John D. Dingell. *"This committee has a special affection for whistle-blowers."*

lusioned." She is now unemployed.

The matter might have rested there but for the action of Charles Maplethorpe, who was working in Imanishi-Kari's lab from 1981 to 1985. Maplethorpe, who appeared as a witness at the Dingell hearing, testified that he had experienced conflicts with Imanishi-Kari and that his suspicions about her work were aroused when she refused to share her data with him. He said he told an assistant to the MIT president "that I suspected Dr. Imanishi-Kari was committing fraud." He was given a copy of the university's fraud guidelines but, being just about to receive his doctorate, did not press the matter further. "I felt there was no question but that if I were to make a formal charge of fraud it would not be taken seriously and I would be the person the worse off for it." However he later heard about Stewart and Feder's activities and contacted them in the spring of 1986.

Stewart and Feder picked up the ball and ran with it, persuading a reluctant O'Toole to furnish them with her data. They also notified the NIH misconduct policy office, which decided to defer any action until they had completed their analysis. Stewart and Feder eventually came up with a paper in which they concluded that "in many cases the data appeared to suggest quite clearly that . . . some of the most important conclusions in the [*Cell*] paper were wrong." Their paper has been rejected by a number of journals including *Cell* and *Science*.

In March 1987 Baltimore, clearly impatient with Stewart and Feder's investigative efforts, wrote to NIH suggesting "in the interest of clearing the air" that it appoint a couple of immunologists to review the *Cell* paper. He said Stewart and Feder "must promise to cease all discussion of this issue and to send an apology to all concerned if the review group finds that the norms of scientific research were not transgressed."

Last January NIH finally appointed a three-member panel of immunologists to review the dispute. They included Frederick Alt of Columbia College of Physicians and Surgeons and James Darnell of Rockefeller University. Subsequently, according to a Dingell subcommittee staff member, Stewart and Feder alerted the committee to the fact that Alt had been a postdoctoral student of Baltimore's and Darnell had coauthored a textbook with him. The panel is now being reconstituted to avoid the appearance of a conflict of interest.

It is not clear at this point whether the scientific objections O'Toole raised warranted correction of the *Cell* paper or if they fell within the normal range of variability for a pioneering area of research. Baltimore, in a statement released before the hearings, said "the problem is simply one of interpretation." He said that the data at issue were "a small portion of the data that led to the conclusions reached in the paper," and that subsequent research by others has produced "no serious contradictions" of the work.

Leonore Herzenberg of the Stanford University School of Medicine, who has collaborated with Baltimore and knows both O'Toole and Imanishi-Kari, told *Science* she believes the dispute got escalated all out of proportion to its significance. Both researchers, she says, are "very bright, very honest, very good, but also very stubborn people." Herzenberg says "It seems that Margot raised questions about whether the assays being used were working. Thereza apparently felt they were and, as happens all the time with students, told her to go back and make it work." In this case, says Herzenberg, O'Toole may well have been right. She and her husband Leonard Herzenberg have since made findings that "disagree with the broadness of the conclusion" in the *Cell* paper. "In retrospect, our findings lend weight to the approaches O'Toole was suggesting." But she feels all this has been part of the normal "self-correcting" process of science, and does not constitute a matter requiring separate retraction or correction. "It has no business being aired in public," she said in a telephone interview.

Congressmen at the Dingell hearing clearly felt that O'Toole had been unjustly driven out of science (she chose to resign her position) for speaking the truth. Mary Miers of the NIH misconduct policy office was berated by congressmen who said the office should have intervened in the situation earlier, even though it had not been contacted by O'Toole. Miers was also criticized for having put two researchers with connections to Baltimore on the review panel. Miers admitted "I didn't do my homework" on that one, but said she still believed the panel would have been objective.

Throughout the hearings, Public Health Service officials were attacked for alleged incompetence, slowness to act, and for putting the foxes (awardee institutions) in charge of misconduct in the chicken coop. Officials were excoriated for the alleged "cover-up" in the 1981 case involving fraud by Harvard researcher John Darsee, for "shoddy" work on the Jacobstein-Borer case, and for foot-dragging on the Breuning case.

Officials defended themselves on the grounds that misconduct policy is still an "evolving area," and promised that procedures would improve with the implementation of regulations requiring that grant-receiving institutions provide "assurances" that they have established policies for dealing with misconduct allegations.

Congressmen repeatedly asked witnesses if there should be some new independent mechanism set up to deal with fraud allegations, and John Conyers (D–MI), who is preparing a bill on white-collar crime, went so far as to suggest that fraud should be criminalized. But witnesses were reluctant to endorse any change that would take matters out of the hands of scientists.

The impression emerged from the hearings that outright fraud is probably very rare, and that a more serious problem is the gauntlet of hostility and skepticism that a would-be whistle-blower must be prepared to run. Feder and Stewart, for example, claimed to have talked with "more than 20 scientists who have alleged misconduct to us privately, but have been reluctant to make their allegations through NIH or institutional channels." They did not offer details.

It is clear that such cases cause tremendous anguish to those involved. Jacobstein (who was partially vindicated when NIH concluded Borer had done some sloppy work) testified that "as a whistle-blower I have been ignored by my friends, vilified by my enemies, despised, hated, contemned. . . ." O'Toole said she had been "shattered" by her experience, and Imanishi-Kari told the *New York Times* that her own career had been seriously harmed and her private life "destroyed." It might well be asked whether any policy to handle whistle-blowers' allegations could ease the trauma for the individuals involved when professional lives, egos, and money are so much at stake. ■ CONSTANCE HOLDEN