nent used to stabilize one of the older experimental Navstar satellites failed. The loss of that satellite—which had lasted 6 years beyond its 4-year design life—resulted in a reduction in coverage in the Middle East and elsewhere. To keep the satellite from tumbling, ground controllers ordered it to spin at a high speed. That prevented it from pointing its antennas toward Earth, however. Then, just hours before the United States launched its assault on Iraq on 17 January, ground controllers figured out a way to make the antennas point at Earth briefly once a day, when the satellite is over the Middle East.

Another problem reared its head on 12 December, when a control circuit for one of the solar panels aboard a newly launched Navstar satellite failed. The satellite continued to broadcast a useful navigation signal, and a second control circuit was available to replace the failed unit, but Air Force officials have delayed any further Navstar launches until they can determine whether the flaw is present in other satellites awaiting launch.

Nonetheless, Pentagon officials remain effusive about the program. Vice Admiral Jerry Tuttle, the U.S. Navy's director of space, command and control, echoes a common prediction when he says that the system "will revolutionize tactics in every warfare area." Adds Tuttle: "I would love to be back in the fleet to develop tactics around GPS."

■ VINCENT KIERNAN

Vincent Kiernan writes for Space News *in Springfield, Virginia.*

Caltech Deals With Fraud Allegations

"We have become aware that certain of the original data referred to in the article by Urban et al. *(*Cell **52**, *257-271, 1989) are unavailable, and thus we are unable to verify that all of the conclusions in that paper are correct. Therefore, we would like to retract that paper. We are now repeating those experiments. No one regrets this episode more than we."*

Those few words in the 25 January issue of *Cell* made painfully public what many immunologists have known for months: there has been trouble in the lab of Caltech biologist Leroy Hood. Two postdoctoral fellows, working in a particularly hot area of immune system research, are under investigation for two apparently unrelated instances of possible research fraud. Hood himself is in no way implicated, though he was a coauthor on both papers. The *Cell* paper is the second to be retracted by the Hood group in recent months—the first was retracted last September from the *Journal of Experimental Medicine*. At this stage, it is unclear whether there will be more retractions.

To protect the interests of the two postdocs, neither Hood nor Caltech officials will divulge any details of the investigations. But scientists outside the lab who have followed events since last summer say both Hood and the university have handled the matter in an exemplary way. Indeed, if the National Institutes of Health upholds the findings of Caltech's two investigations, the Hood experience could well become a model for other laboratories grappling with allegations of fraud.

The problem first came to light last summer, when a researcher in Hood's group was unable to repeat an experiment performed by one of the postdocs. When he examined the data more closely, he found what looked like evidence of a doctored Southern blot. He took his suspicions to Hood, who notified the chairman of the biology division the next day.

According to Paul Jennings, Caltech's vice president and provost, the university immediately conducted an inquiry to see whether an investigation was warranted. Once they determined it was, they notified the Office of Scientific Integrity (OSI) at NIH, the other sponsoring agencies, as well as the journals that published the work, and the coauthors. Caltech then launched a formal investigation, which was just completed and sent for review to Caltech's president, Thomas Everhart, along with recommended actions.

Very early in the investigation Hood realized, and Jennings agreed, that the paper containing the questionable Southern blots, originally published in the December 1989 issue of the *Journal of Experimental Medicine*, would have to be retracted. Hood also withdrew one or more manuscripts that had been submitted for publication more recently. At about that time, in late summer, he personally wrote to many of his colleagues in the immunology community, alerting them to the possible problem, the ongoing investigation, and the pending retraction.

In the course of the first investigation, Caltech uncovered evidence suggesting there might be trouble with the work of another postdoc. The problem includes, it seems, the missing data referred to in the *Cell* retraction. The two postdocs were working on related aspects of the same project, but sources inside the lab say there is no evidence of collusion. Again, Caltech quickly conducted a preliminary inquiry and then launched a formal investigation, which is now half finished. Under NIH guidelines it must be completed by 15 April.

But Hood did not wait for the results of the investigation to retract the *Cell* paper, which deals with a potential method of blocking autoimmune reactions, such as those involved in multiple sclerosis. Hood is not certain that the conclusions of that important paper are wrong but feels uncomfortable about it, given the questions about the postdoc's performance. His group is now repeating those experiments.

Concerning the first investigation, Caltech president Everhart is expected to announce the committee's findings and recommend disciplinary actions or sanctions, if any, within a couple of weeks. The report of the investigating committee was also sent to the OSI at NIH. OSI usually accepts the findings of the home institution, although it has the option of launching its own investigation. If misconduct is found, OSI adds its own recommendations for sanctions and then forwards the report and recommendations to the Public Health Service for additional review.

These are the first fraud investigations to be conducted at Caltech, and Jennings describes them as "tremendously difficult" for all concerned, as "people's reputations are at stake." Outside observers say, however, that they don't expect the fallout for Hood or his group to be severe because both he and the university moved so decisively.

Says James Allison, an immunologist at the University of California at Berkeley: "Lee moved in exactly the right way for science and for his reputation. It certainly doesn't help [his reputation]. But because he acted very promptly and decisively, he minimized the damage."

Adds Berkeley colleague Gerald Rubin, head of the genetics division: "I think a lot of people have learned from the pain and suffering David Baltimore went through. Baltimore was faulted because he was too eager to defend his co-workers. That got him into trouble."

■ LESLIE ROBERTS