

Misconduct: Caltech's Trial by Fire

Two apparently unrelated cases of alleged scientific fraud in Leroy Hood's huge lab were, by most accounts, handled deftly by Hood and the university

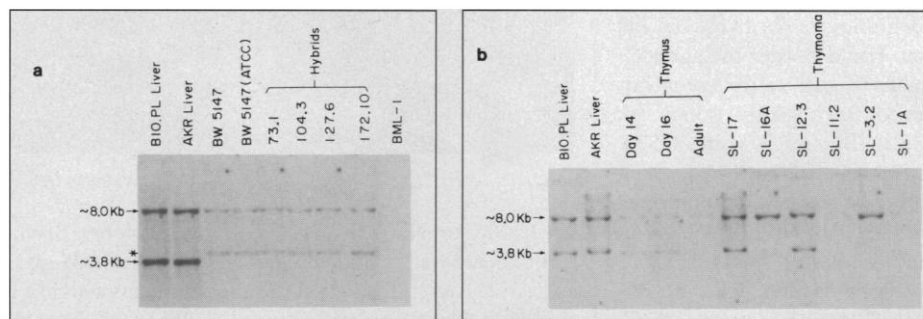
CALTECH, UNLIKE A NUMBER OF OTHER premier universities, had not been hit with a single case of research fraud—until last year. But when trouble came, it came in spades. Last summer university officials acknowledged that two research fellows in the lab of one of its stars, biologist Leroy Hood, were under investigation for two apparently unrelated cases of fraud. Now those investigations are complete, and both postdocs have been found to have fabricated data—a conclusion that has rocked the prestigious campus. Three papers have been retracted; the most recent just last July. Hood was a coauthor on the papers but was never accused of any wrongdoing.

In stark contrast to the way the principal investigators and their institutions handled the so-called Baltimore case, Hood and Caltech seemed to have dealt with these two cases in an exemplary manner, say Hood's supporters. University officials pulled out their new fraud guidelines, crafted just the year before, immediately launched two extensive investigations, and notified all concerned. Hood swiftly retracted three questionable papers even before the investigations were complete. "That is the right way to do it, instead of waiting and waiting," says James Allison, an immunologist at the University of California, Berkeley—a reference to the Baltimore case, in which a suspect paper was retracted only after several years of wrenching debate, congressional hearings, and Secret Service investigations.

But among all the praise, there is one vocal dissenter: Eli Sercarz, an immunologist and Hood collaborator at the University of California, Los Angeles. Sercarz followed the events closely as they unfolded, and he contends that Caltech acted precipitously in distancing itself from at least one of the accused, denying him due process.

"You're damned if you do, damned if you don't," says a prominent geneticist, who requested anonymity. He notes that David Baltimore, now president of Rockefeller University, has been widely criticized for being too loyal to his colleague, Thereza Imanishi-Kari, while Sercarz is criticizing Hood for the exact opposite.

All of which underscores the fact, he says, that the academic community is still largely



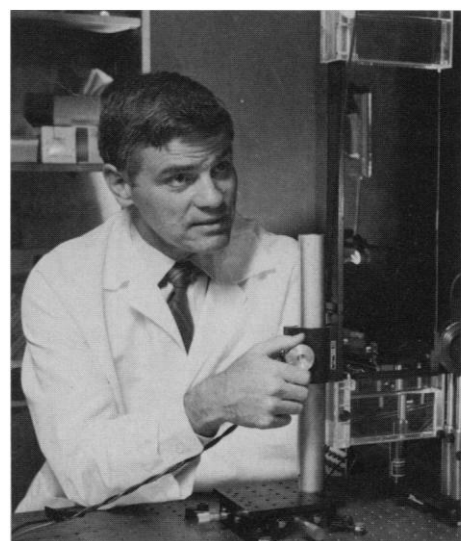
Smoking gun. Identical spots indicate that some lanes had been duplicated but are labeled as being different.

working in the dark, without uniform standards on how best to protect the often conflicting interests of everyone concerned. "We don't have rules for behavior in these circumstances," agrees Stanford immunologist Irv Weissman. The Office of Scientific Integrity (OSI) at the National Institutes of Health has general guidelines but leaves it to each institution to craft its own procedures—none of which can possibly anticipate every quirk and twist likely to arise. Faced with myriad judgment calls along the way, university administrators are essentially winging it, learning as they go. And for Caltech, it was trial by fire.

(The two postdocs accused of fraud declined repeated requests for interviews, though one of them, Vipin Kumar, provided a short written statement. This account is based on interviews with several people involved or close to the investigations, some of whom requested anonymity, and two written statements from Caltech.)

Doctored figure prompts two probes

Vipin Kumar and James Urban joined the Hood lab several years ago; Kumar from a postdoc at Harvard, Urban from the University of Chicago. They began working, at first together but then independently, in an especially hot area of immunology research, looking at the molecular biology of and possible treatments for autoimmune diseases such as multiple sclerosis. Pressure was intense, as it is throughout the huge Hood lab, which numbers 65—especially because Hugh McDewitt's group at Stanford was pursuing the same tack. Both Kumar and Urban were ambitious, logging long hours and winning



Lab chief. Hood quickly retracted suspect papers and notified other universities of potential problems.

high marks from Hood in the process.

But not everyone shared Hood's opinion—and several people in the group went to him with their suspicions, not about fraud, per se, but about sloppy science, says Hood. He investigated each accusation and turned up nothing solid, chalking the problems up to personality conflicts and inexperience. "I had complete faith," he recalls. Indeed, Hood would be the last one to suspect fraud, one source said, alluding to both his honesty and, perhaps, his naivete. "Lee doesn't like to believe things like that. It is the last thing he would expect someone to do."

That faith began to crumble in late May of 1990, when Dennis Zaller, a senior member of Hood's group who is now at Merck, Sharpe, & Dohme Research Laboratories, and a colleague went to Hood with what they

thought was clear evidence of wrongdoing. Zaller had been trying to extend some of Kumar's work, and in the process tried to repeat one of his experiments. He couldn't. He then showed Kumar's original paper, which had been published in the December 1989 *Journal of Experimental Medicine* (*JEM*), to Mike Nishimura of the Hood group. Nishimura was struck by what everyone in the lab, including Hood, and the *JEM* peer reviewers had missed the first time around: a key figure appeared to be falsified.

Says Zaller: "If you look at the [Southern] blot it is unmistakable." It was supposed to show DNA from several different cell lines that all had essentially the same pattern—namely, a rearrangement in the T cell receptor gene locus. But Zaller and Nishimura could tell by looking at the artifacts, the little spots that crop up on gels, that Kumar had used data from just a few cell lines—one lane in each—duplicated repeatedly and labeled as if they came from many more cell lines.

A stunned Hood immediately informed the chairman of the biology division and other university officials, who began an inquiry into the allegations—the first step to see whether a full investigation is warranted. While the inquiry was getting under way, Hood enlisted the senior scientists in his group to perform an internal review of all of Kumar's work; Hood later gave their report to the investigation committee. He also asked others in the lab to try to repeat the *JEM* experiment. They couldn't.

But that wasn't the only devastating finding. In the process of reviewing Kumar's data, the Hood group looked into some of Urban's work as well, as he was a coauthor on some of Kumar's papers. To their dismay, they quickly spotted what looked like a problem in his work, too—a problem that appeared to be unrelated to Kumar's alleged misdeed. Hood found himself in the unenviable position of telling university officials that his lab might have a second case of misconduct on its hands. Caltech vice president and provost Paul Jennings launched a separate inquiry, which got under way on 20 August 1990.

The Kumar investigation

When Hood confronted Kumar, asking him to provide the original data and explain how he had constructed the Southern blot, Kumar reportedly did not deny doctoring the figure but did deny any intentional fraud. Instead, he insisted that he had only been trying to create a more attractive image and that he did not know this sort of duplication was unacceptable practice, explains UCLA's Sercarz, his staunch defender.

Indeed, Sercarz says Kumar sought advice from Urban, his "mentor" in the lab, on the propriety of duplicating lanes but apparently misunderstood what Urban told him. Says one Caltech source: "His rationale was essentially, 'I was young and naive.'"

Sercarz, for one, buys that argument, explaining that "Vipin had never prepared a paper before." In India, where he studied at the Institute of Science in Bangalore, his adviser wrote most of his thesis, says Sercarz. And when Kumar went to Harvard for his first postdoc, says Sercarz, his professor, Debajit Biswas, prepared all the papers and figures—a fact Biswas confirms. Says Sercarz: "Vipin arrived at Caltech a very, very, green fellow. Vipin did not know what to do with lanes that were irregular. He wanted to rationalize it to produce an esthetic figure." Sercarz notes that Kumar made no effort to hide the telltale artifacts. In fact, he used the Caltech photographer to prepare the figure. "The behavior of someone deliberately falsifying something is different than that," he contends.

But the inquiry committee, which met with Kumar, did not buy that defense. "If that argument had carried the day, the outcome of the investigation would have been very different," says Jennings. The committee, chaired by the head of the biology division, decided just one week later, on 8 June, that a full-blown investigation was warranted. Jennings set up a committee of four members of the biology division to investigate. It began working on 13 June.

rather than wait for the results of the investigation, Hood should retract the *JEM* paper, since Kumar had admitted duplicating the lanes, though he denied fraud.

The investigation had come at an extremely awkward time for both Kumar and Caltech. Nearing the end of his postdoc, Kumar had applied for several jobs, with strong recommendations from Hood. After considerable soul-searching, Hood and Jennings decided they had no choice but to notify the universities to which Kumar had applied, along with the journals that had published the suspect work, coauthors, the National Multiple Sclerosis Society, which had given him a fellowship, and, as required, NIH, which had funded the work, and the National Science Foundation, which supports Hood. "We tried to do it as confidentially as possible," says Jennings, but before long the community was abuzz. Washington University in St. Louis, which had already offered Kumar a job, withdrew its offer.

Kumar took the developments hard, having what Sercarz and others describe as a nervous breakdown that required hospitalization for several days. After that, Sercarz, who knew Kumar well through his collaborative work with the Hood group, took Kumar into his lab to continue his research while the investigation proceeded, though he officially retained his position at Caltech.

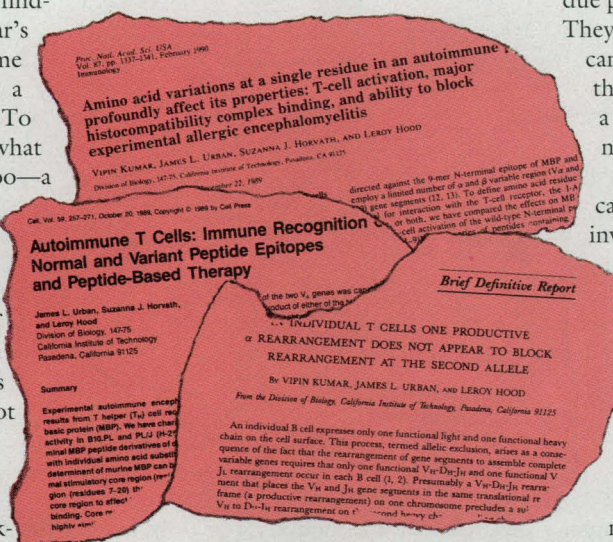
It was Hood's letter to immunologists at the universities where Kumar had applied that Sercarz feels was inappropriate. Argues Sercarz: "It is a precipitous action to deny due process before there is an investigation. They took away this man's livelihood—how can that be fair? The matter was spread throughout the country before there was a real investigation. It was unfair to tarnish his reputation."

Responds Hood: "It was a complicated call, how much to get other people involved. We talked a lot about it at Caltech. Everyone who could have been affected should have been notified. Fraud can't be brushed under the rug. If he had been cleared, I would have written a letter to everyone explaining what had happened."

Jennings, too, defends the letter. "Our rationale was that we had general responsibility to the scientific community for the stewardship of scientific research. I still think it was the appropriate thing to do. The letter went out on a need-to-know basis. We presumed that people would act fairly and wait to see how the investigation came out."

The Kumar findings

The Kumar investigation was completed in late March. Caltech officials will not release



Retracted papers.

During the investigation, Kumar was relieved of his duties in Hood's lab, though he retained his appointment there. Says Jennings: "We did not want to act until the investigation was complete." About that time, Hood and Jennings decided that,

The Urban investigation

Kumar denies that most of his data were gone, insisting that all the data were available for the JEM

the reports on either of the investigations to the public or the press. They did, however, release two short statements to *Science* describing the resolution of both cases. The statement on Kumar mentions only the fabricated Southern blot in the *JEM* paper, which the investigation committee decided was research fraud—the most serious offense in Caltech's judgment, and one that implies intent to deceive, explains Jennings. But one source talks of the "pervasiveness of the problem" uncovered. "There was a lot of work that was not well done; a few too many

ous scientific misconduct, a slightly lesser offense than fraud as it does not imply intentional deceit, explains Jennings. The *Cell*

Retractions. These three notices alerted the community to the problems.

[illegible]

work, as in Kumar's. The problems with Urban proved trickier

until 16 November, with a committee of five faculty members, four from inside the department and one from without. Those familiar with the case say the committee found no sign of collusion between the two postdocs but multiple problems in Urban's

The only real gripe that *Science* uncovers about Caltech's handling of the two cases—or that Caltech officials have heard, other than Kumar's objections—come from Sercarz, who feels that Caltech's procedures, like OSTs, deny the accused due process. Aside from criticizing Hood for the letter he sent to everyone Kumar had approached for a job while a postdoc in Hood's lab, Sercarz faults Caltech for the length of the investigations—which both took about a year—shortcoming Jennings and Hood concede. And he argues that Caltech should have allowed the accused and his accusers to meet face to face and to cross examine each other. Sercarz and others have leveled similar complaints at OST's own procedures (see *Science*, 6 September, p. 1084). Kumar, too, says in

Lingering concerns

"It's a sad day," said Stanford's Weissman, when informed of the final verdict for both Kumar and Urban. "Jim Urban applied for a job as a postdoc. On paper and in person, he was extremely positive. I offered him a place in my lab but he didn't come. He was very, very promising." Another talks of "how sad it is to watch two careers crumble."

The Caltech reports have now gone to OSI at NIN, which is reviewing them to see whether further investigations are warranted. If it accepts Caltech's findings, the Public Health Service will in all likelihood impose additional sanctions, says Alan Price of the fraud office. These could range from banning Kumar or Urban from serving on Public Health Service advisory committees to depriving them from receiving federal funds for

According to one source, Urban accepted responsibility for his actions—essentially admitting that he had done bad science—although he did deny intentional fraud. His “only excuse was pressure, says that source, “but he did not push it. In the end, he seemed relieved.” Because Urban had already left Caltech, the only possible sanction was a letter of reprimand, which was sent on 24 June. Urban had informed Chicago officials about the investigation, and at their request, Caltech informed them of the resolution as well. Urban, a pathologist by training, resigned from the University of

“We have no way to evaluate how much he actually did because some of his lab notebooks were missing.” They also confirmed problems with the figure that had prompted the inquiry. Says one source: “It was quasi-made up but more or less reflected what the real data were. It was not an obvious at-

his statement to *Science*, "during the investigation procedure, there were many violations of due process by Caltech."

On a more fundamental level, Sercarz also questions whether a university with an interest in protecting its reputation can really be impartial. "No one knows what the ideal procedure is. But when the principal investigator [lab chief] is someone powerful like Lee Hood, the university may want to decrease his involvement in the alleged misconduct and blame everything on the postdoc. That could lead to a distortion. In general, having an external committee of experts might make the investigation more impartial."

It is now up to OSI to determine whether Kumar got a fair shake or whether, as Sercarz believes, there are lingering questions.

The aftermath

The Hood group is now recovering from what has been a very tough year. Says Hood: "It was a traumatic experience for everyone involved, not just for the accused but for all around them." Like everyone else, they are wondering how it could have happened—and how to prevent it from happening again.

Hood and his co-workers are now trying to replicate some of the crucial experiments performed by Urban and Kumar. Says Hood: "We can't redo it all. It is a tremendous amount of work." He has also instituted tighter controls in his lab. The committees didn't find any "major shortcomings" in Hood's procedures, says Jennings—in fact, Jennings calls them "pretty good"—but there was obviously room for improvement. "You would hope the procedures would pick up the problem," says Jennings. Hood has now formalized the review process, so that each paper is now reviewed by three people inside the lab. There is considerably more emphasis on dealing with raw data, not merely a synopsis of findings. And Hood now also requires everyone to keep a bound lab notebook—and has made clear that it is the property of Caltech, not of the scientist.

When the dust settles, Caltech officials plan to take a look at how well they handled their trial by fire, to see if any of their investigatory procedures should be changed. In the interim, faculty members are debating whether to offer a course for new graduate students on the rules of scientific conduct. Explains Jennings: "The community has always figured that you just know how to do these things, such as how to handle data. But maybe people would benefit from a course spelling out the rules on keeping research data. It would be an opportunity to ensure more formal acquaintance with issues and procedures we used to take for granted."

■ LESLIE ROBERTS

Draft of Gallo Report Sees the Light of Day

A copy of the investigation into early AIDS research by Robert Gallo and his colleagues has leaked to the press

PORTIONS OF A CLOSELY HELD DRAFT REPORT written by the National Institutes of Health's Office of Scientific Integrity (OSI), titled "Comprehensive Review of Dr. Robert Gallo's 1983-84 HIV Research (OSI 89-67)," finally became public this week. *Chicago Tribune* reporter John Crewdson, in a long article in last Sunday's edition, published excerpts from a copy of the report that he had been given access to. Those excerpts confirm what *Science* reported last month: The draft report accuses Gallo's colleague Mikulas Popovic of misconduct for misstatements and inaccuracies that appear in a 1984 *Science* paper (11 May, p. 497) describing the first successful attempt to infect a permanently growing cell line with the virus that causes AIDS—a crucial step in the development of a blood test to detect the presence of the virus. The draft report concludes that Gallo, chief of the National Cancer Institute laboratory of tumor cell biology, shares some of the blame

for the alleged misstatements. While his actions "do not meet the formal definition of misconduct," the draft report states, "they warrant significant censure."

NIH officials lost no time in condemning the leak of the report. "Speculation about the outcome of the investigation on the basis of the draft document deprives the subject of basic fairness, because only the final report will reflect the responses of Drs. Gallo and Popovic to the preliminary findings," said John Diggs, NIH deputy director for extramural affairs. It will be Diggs' responsibility to decide what to do with the report once it is completed, since NIH director Bernadine Healy has recused herself from all OSI activities (*Science*, 9 August, p. 618).

Insiders say OSI has decided that the report requires substantial rewriting—and indeed that is being done as *Science* goes to press. But reports that the conclusions are being left essentially the same could not be

Czechmate?

For more than 6 years, the answers to some key questions about who in Robert Gallo's lab did what in editing a landmark—and now controversial—1984 *Science* paper resided in a box in Prague, Czechoslovakia. Mikulas Popovic, Gallo's collaborator and first author of the paper, took several early drafts of the manuscript to Prague in the summer of 1984 and left them with his sister, apparently for safekeeping.

These early drafts contain specific references, penned by Popovic, of work he had done with a virus sample sent to Gallo's lab in 1983 by Luc Montagnier of the Pasteur Institute. Handwritten annotations on these drafts indicate that Gallo had deleted the references from the paper. "Originally, as I understood it, data would be included about the French virus in the manuscript," Popovic told *Science* in an interview last month. "Later Dr. Gallo said, 'No we will publish later in a collaborative paper.'" Gallo has confirmed this account, adding that he intended to publish two papers about the French virus jointly with Montagnier. Gallo's lawyer, Joseph Onek, says this plan fell through because the French researchers wanted to publish a more complete paper on their own. By the time Popovic secreted the drafts in Prague, Gallo and Montagnier were engaged in a bitter fight in part over how much work Gallo's lab had done with the French virus.

The drafts of the *Science* paper came to the attention of the Office of Scientific Integrity (OSI) only as a result of a slip-up. In March of this year, OSI accidentally sent Popovic a tape of a meeting of the three-member scientific panel advising OSI on the investigation. Popovic discovered from the tape that OSI's report would be highly critical of him, in part for omitting references to the French virus from the paper. Popovic and his lawyer, Barbara Mishkin, realized that OSI did not have copies of all drafts of the 1984 paper—as they assumed—so they gave them the originals. ■ J.P.