

## FORENSIC EPIDEMIOLOGY

# Vaccine Theory of AIDS Origins Disputed at Royal Society

**LONDON, ENGLAND**—For 2 days this week, the staid Royal Society hosted a spirited, sometimes raucous, meeting on the origin of the AIDS epidemic, the first such gathering ever held. At center stage was a controversial theory that a contaminated polio vaccine tested in Africa more than 40 years ago sparked the epidemic. The theory took a hit when researchers revealed that tests of old samples of the vaccine provided no supporting evidence, and the main proponent of the theory, British writer Edward Hooper, endured a verbal battering himself from several prominent scientists. But Hooper, unbowed, got in plenty of jabs of his own.

Most AIDS researchers believe that HIV infected humans through the hunting and handling of chimpanzees, some of which harbor a closely related virus called SIVcpz. This “natural transfer” theory holds that a “cut hunter” was infected, and then urbanization, the use of dirty needles in medical campaigns, increased geographic mobility, and other effects of modernization in Africa caused the epidemic to explode.

Expanding on a theory that first received widespread attention in a 1992 article in *Rolling Stone* magazine, Hooper last year laid out a challenge to this conventional wisdom in a thick tome, *The River*, that pins the genesis of the AIDS epidemic on a long-forgotten oral polio vaccine (OPV) made by Hilary Koprowski and colleagues. Between 1957 and 1960, Koprowski, former head of the Wistar Institute in Philadelphia, Pennsylvania, tested his vaccine on a million people in what is now the Democratic Republic of Congo, Burundi, and Rwanda. Hooper posits that the vaccine became contaminated with SIVcpz because researchers used kidney cells from infected

chimpanzees during the manufacturing process. As circumstantial evidence, Hooper contends that the earliest cases of AIDS closely match the sites of these vaccinations. And he argues in *The River* that the Wistar Institute could help settle the case by testing the few remaining samples of the vaccine—as recommended 8 years ago by an outside committee of experts that looked at the issue in the wake of the *Rolling Stone* article.

Now, three independent labs have done just that. At the Royal Society meeting, Claudio Basilico, the head of the expert

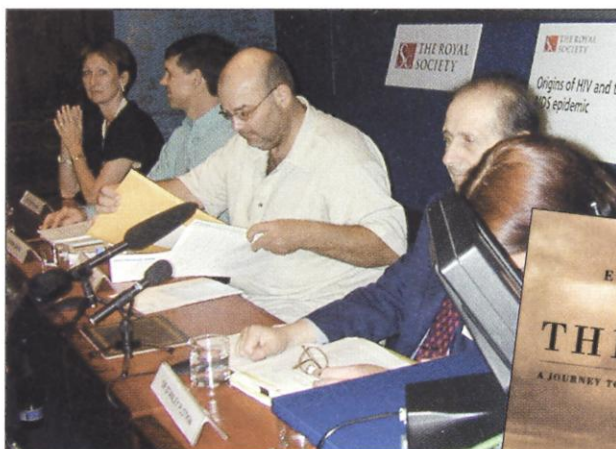
and mitochondrial DNA. All the samples tested negative for simian and human viruses, and the mitochondrial DNA clearly came from monkey, not chimpanzee, cells. “The experiments were well done and the data were solid,” said Northwestern University’s Steven Wolinsky, who conducts similar tests with HIV in his studies of viral evolution.

Hooper did not challenge the results; he simply dismissed them. “This means nothing at all for the polio vaccine theory,” said Hooper at a jam-packed press conference held a few minutes later. He noted that the samples didn’t come from the exact lots of the polio vaccines tested in Africa. Indeed, Koprowski himself has acknowledged that no such samples still exist. Retrovirologist Robin Weiss of Chester Beatty Laboratories in London, who co-organized the meeting with Wain-Hobson, complimented Hooper for pushing the Wistar to do these tests. “I think it was worth doing,” said Weiss. But, he added, “I’m slightly surprised that Hooper pooh-poohs it now.”

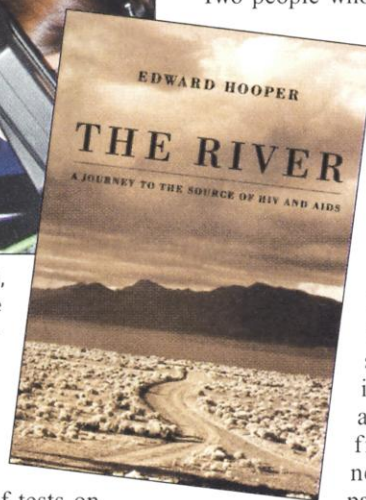
Undaunted by the test results, Hooper asserted that his thesis is actually “looking considerably more impressive today.” He said he recently had discovered “two smoking guns”:

Two people who worked in Africa on the project whose firsthand accounts support the idea that Koprowski or his collaborators used chimpanzee kidney cells to make the vaccine. But Stanley Plotkin, a professor emeritus at the University of Pennsylvania in Philadelphia who helped Koprowski make and test the vaccine, said he has spent the past year contacting former collaborators, and 16 scientists have testified, in writing, that they never worked with chimpanzee cells. “I’m sure Mr. Hooper will be disappointed by the results of this meeting,” said Plotkin. “There is no gun. There is no bullet. There is no shooter. There is no motive. There is only smoke created by Mr. Hooper.”

Several scientists who once worked on Koprowski’s OPV continued in that vein. During one particularly heated session, they began attacking Hooper’s conclusions and accusing him of misrepresenting their thoughts in his book. The ad hominem at-



**Press confrontation.** Beatrice Hahn, Brian Martin, Edward Hooper, and Stanley Plotkin (l. to r.) debate Hooper’s theory, detailed in *The River*, that oral polio vaccines spread HIV to humans in Africa.



committee and chair of microbiology at New York University Medical Center, described the results of tests on seven old vaccine samples found in Wistar’s freezers. Koprowski has insisted that he used kidneys from monkeys, not chimpanzees, to make the vaccine, so one lab analyzed primate mitochondrial DNA in the samples. Another looked for SIV or HIV genetic material. And the third lab, headed by Simon Wain-Hobson of the Pasteur Institute—who has been sympathetic to Hooper’s point of view and even helped do some research for him—ran tests for both virus

1857

How a cancer drug works

1860

A fix for Louisiana's ailing wetlands

1869

Energetic marine bacteria

tacks from both the scientists and Hooper prompted a call to order from the session chairman Neal Nathanson, who last month retired from the top AIDS job at the National Institutes of Health. "I insist on some civility or we'll simply close the meeting right now," said Nathanson.

Several other scientists challenged the OPV theory with data rather than rhetoric. Bette Korber, an evolutionary geneticist at the Los Alamos National Laboratory in New Mexico, added details to a recent paper she published in *Science* (9 June, p. 1789) that dated the origin of the main type of HIV now in humans to between 1915 and 1941. Korber's computer modeling of different HIV strains has now answered a question raised by those data: If the HIV epidemic began in the first half of the century, why did it take until the 1980s to surface? She concludes that the virus appears to have spread extremely slowly at first, gaining momentum only after infecting thousands of people. In two separate presentations using independent techniques, Anne-Mieke Vandamme of Belgium's Rega Institute and Paul Sharp of the University of Nottingham came up with timelines similar to Korber's.

Hooper has hypothesized that chimpanzees from a colony in eastern Congo, on which Koprowski tested his polio vaccine, may also have been the main source of kidneys used to make the vaccine. But Beatrice Hahn of the University of Alabama, Birmingham, has shown that all five of the SIVcpz strains found to date that closely resemble the HIVs in humans come from chimps in western Africa; the only other SIVcpz discovered so far, which she believes came from the region where Koprowski had his chimp colony, is very different. Hahn has since found no evidence of SIVcpz in urine and fecal samples from 24 wild chimps in Uganda and 28 others in Côte d'Ivoire—two regions outside the range of west African chimps. And she reported finding SIVcpz antibodies in urine samples from a chimp in an eastern African country—which Hahn said would be "irresponsible" to name at this point—that appears to resemble the odd sixth sample. "Every piece of evidence we currently have would support the cut hunter theory," said Hahn. "That alone blows OPV out of the water."

But supporters of Hooper's theory remained unconvinced. Brian Martin, a social scientist from Australia's University of Wollongong, argued that if people scrutinized the natural transfer theory as closely as they

have examined Hooper's scenario, it would prove to be just as unsatisfying. "There is one thing I will predict as a social scientist," said Martin. "Whatever happens at this conference, this controversy will continue."

—JON COHEN

## NATIONAL SECURITY

### Relief, Rebukes Follow Agreement on Lee

What began as an explosive case of alleged nuclear espionage petered out in an Albuquerque, New Mexico, courtroom this week. Once last-minute legal wrangling is complete, physicist Wen Ho Lee is expected to be freed after 9 months in jail. The ignominious collapse of the government's case and Lee's release have embarrassed federal prosecutors. However, the news was a relief to Asian-American researchers and others who say Lee's status as a suspect had heightened racial tensions at the national labs.

Lee acknowledged in the draft agreement that he had mishandled classified government data while working at the Department of Energy's (DOE's) Los Alamos National Laboratory in New Mexico. But that single felony count is a far cry from the 59-count indictment brought last December, when government officials warned darkly that Lee had given secrets about the design of sophisticated nuclear weapons systems to China. The charges sparked an outcry from Asian Americans, who complained that Lee was singled out due to his ethnicity. His solitary confinement, the use of shackles during his jail term, and limitations on his family visits outraged both Asian Americans and many scientific organizations (*Science*, 8 September, p. 1669).

The government's case suffered a final blow last month during a bail hearing when an FBI agent admitted that he had been wrong to assert that Lee's behavior was deceptive. The two sides then moved to reach a plea agreement, which was to be finalized

13 September in Albuquerque's Federal District Court.

Secretary of Energy Bill Richardson, who took intense political heat during the controversy even though Lee's actions occurred before his appointment in 1998, said on 11 September that he remains concerned about the whereabouts of tapes Lee made containing nuclear weapons data. "The plea bargain enables us to get that information," he said. And in Congress, the deal eased pressure on New Mexico lawmakers, who for months have struggled to defend the Los Alamos lab against harsh attacks.

"This is a good plea arrangement," said Senator Pete Domenici (R-NM), a powerful lab ally. But the case "uncovered systemic and deep-rooted [security] problems at our labs and within the entire DOE management structure." Domenici is a strong backer of the new National Nuclear Security Administration, a semiautonomous agency within DOE formed in response to a range of concerns about security at the department's weapons facilities.

Relief was also evident among Asian-American scientists. "We finally have come to something sensible," says Bryan Kashiwa, a Los Alamos fluid dynamics researcher, about the plea agreement. "It's the best deal he could get," added Cheuk-Yin Wong, a veteran physicist at Oak Ridge National Laboratory in Tennessee. But Wong warned that DOE must revise its security procedures to avoid future debacles at its network of national labs. Although Wong thinks Lee should be punished for mishandling the data, he says, "we still have a long way to go to eliminate injustice."

That view is widely shared by other Asian Americans. "This is the end of a nightmare for the Lee family," says Henry Tang, chair of the Committee of 100, a group of influential Asian Americans. "But we feel the issue of ethnic profiling at the national labs should clearly be investigated. As Americans—not Asian Americans—we are very concerned that what appears to be a procedural violation at a national lab could land you in prison for life."

Such criticism prompted Richardson in



**End of the road.** Los Alamos neighbors prepare to welcome home Wen Ho Lee.