

NEWS

Journal reveals plans to fight fraud

WASHINGTON DC

In a notable move aimed at curbing fraud in scientific publications, the journal *Science* said last week that it will probably begin targeting certain "high-risk" papers for extra scrutiny.

The move comes in response to a report from an external committee convened by the journal to assess its handling of the papers behind the Woo Suk Hwang fraud scandal. And it turns on its head — for a handful of papers at least — the traditional presumption that manuscripts submitted to a journal are researched and written honestly.

"Until now, it has been assumed as a default that scientists are honest. The burden of proof is to show that they are not. Now, at least for a select number of papers where the risk factor is high, there is a new burden, to show that these papers are honest," says Sheldon Krinsky, a bioethicist at Tufts University in Medford, Massachusetts.

Hwang, a South Korean researcher working at Seoul National University, published high-profile papers in *Science*^{1,2} in 2004 and 2005 that claimed to have generated embryonic stem cells by somatic-cell nuclear transfer. This is a key step to generating replacement tissues from a patient's own cells. Both papers turned out

to have been fabricated, and *Science* retracted them in January³.

The review committee, headed by John Brauman, a chemist at Stanford University in California, released its report into *Science*'s conduct last week. Although *Science* had followed high-standard editorial procedures "with exceptional care" in the Hwang case, Brauman says, "we suggested that the journal institute a policy we describe as risk assessment" in an effort to clamp down on fraud.

Writing in an editorial⁴, *Science*'s editor-in-chief Donald Kennedy said that the journal is now developing criteria for deciding which papers deserve particularly careful scrutiny. "Papers that are of substantial public interest, present results that are unexpected and/or counterintuitive, or touch on areas of high political controversy may fall into this category," he wrote.

Such papers, perhaps ten a year, would receive "special attention" that could include greater requirements for including primary data and more intensive evaluation of digital images. The journal would also demand explicit descriptions of each author's contribution to a paper.

Even as Kennedy announced the plans, *Science* reported doubts about the results of

another high-profile paper it recently published in a controversial area of developmental biology. Pending the outcome of an investigation by the University of Missouri, Columbia, this will also probably be retracted.

In a paper⁵ that sparked debate from the moment it was published, R. Michael Roberts and colleagues, researchers at the university, claimed that mouse embryonic cells have distinct developmental fates from the first cell division onwards. This flies in the face of the broadly held view that in mammals such cells can still develop into any cell in the body. The paper was published on 17 February this year, and the university launched an investigation in April that is still continuing.

Kennedy cautioned in a press briefing that the social costs associated with loss of trust among scientists might be greater than those of the occasional retraction. But he said he would collaborate with *Nature* and other journals to draw up a common set of standards aimed at deterring fraud. Philip Campbell, *Nature*'s editor-in-chief, declined to comment in detail on the committee's findings, but said: "We at *Nature* welcome the external review conducted by *Science* and are considering its recommendations."

Molecular HIV evidence backs accused medics

International experts in DNA forensics say that a paper published online by *Nature* this week provides a firm alibi for the six medical workers facing the death penalty in Libya. The workers have been charged with deliberately infecting more than 400 children with HIV in 1998.

In the study, an international team led by researchers from Oxford and Rome used the genetic sequences of the virus isolated from the patients to reconstruct the exact phylogeny, or 'family tree', of the outbreak. Analysing the mutations that accumulated over time allowed the researchers to work out when different outbreaks occurred. They showed that the strain of HIV with which the children had been infected was already present and spreading locally in the

mid-1990s, long before the medics arrived in Libya in 1998.

The trial of the six medical workers ended in Tripoli on 4 November, and a verdict is expected on 19 December. Despite mounting international pressure to free them, defence lawyers are pessimistic about the outcome, and *Nature* has fast-tracked publication to make this new evidence available before the verdict (see *Nature* 444, doi:10.1038/nature444836a; 2006).

There was already a body of scientific evidence indicating that the outbreak was caused not by deliberate transmission, but by poor hygiene at the Al-Fateh hospital in Benghazi, where the outbreak took place (see *Nature* 443, 888–889; 2006). Analysis of hospital records suggested that the outbreak began before the medics arrived. And



Six medical workers are accused of deliberately infecting children with HIV.

almost half of the HIV-infected children were also infected with hepatitis B or C, pointing to poor hospital practices as the cause.

The new results provide independent genetic confirmation of these findings. As well as showing that the outbreaks

preceded the medics' arrival, the study suggests that the HIV strain is related most closely to strains from West Africa, suggesting a natural introduction, probably via the many migrant workers in Libya, says co-author Tulio de Oliveira of the University of Oxford, UK.



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High-impact papers, such as those submitted by Woo Suk Hwang, would be subjected to extra scrutiny.

But many commentators seem to feel that the recommendations don't go far enough. "There should be very strict criteria not only for high-impact or controversial papers but for everybody," says Thereza Imanishi-Kari,

an immunogeneticist at Tufts. Imanishi-Kari's career stalled when her work became the subject of a high-profile US government investigation in the 1990s. She was exonerated. Krimsy also favours increased scrutiny

of papers: "What could the negative impacts be? A less trusting community of scientists? A new McCarthyism? I don't think that's likely." He adds that a further criterion should trigger extra scrutiny of papers: where an author or authors have an unusually high degree of commercial interest in the results.

Meanwhile, Arthur Caplan, director of the Center for Bioethics at the University of Pennsylvania in Philadelphia, says he would like to see the criteria expanded to include papers in areas with a history of fraud and those in highly specialized areas where relatively few other scientists would be equipped to detect such problems. He adds: "I think you have to be blunt and say that papers coming from certain countries also raise red flags. China has not yet been convincing and South Korea has problems."

But Kennedy said in the press briefing that he would guard against any targeting of foreign scientists. "We don't want to engage in profiling. It would really be unfair if we started looking extra hard at some of the papers from emerging scientific powers in countries such as South Korea."

Meredith Wadman

1. Hwang, W. S. et al. *Science* **303**, 1669-1674 (2004).
2. Hwang, W. S. et al. *Science* **308**, 1777-1783 (2005).
3. Cernoski, D. *Nature* **439**, 122-123 (2006).
4. Kennedy, D. *Science* **314**, 1353 (2006).
5. Deb, K., Sivaguru, M., Yong, H. Y. & Roberts, R. M. *Science* **311**, 992-996 (2006).

Other phylogenetic analyses of HIV have been used in court cases involving allegations of HIV infection. The first was in 1991, when a Florida dentist was shown to have contaminated his patients. The technique has since been accepted as evidence in dozens of cases involving rape, hospital infection transmissions and people with HIV knowingly exposing others in Sweden, France and elsewhere.

Thomas Leitner of Los Alamos National Laboratory in New Mexico has provided forensic HIV evidence in more than 30 such cases over the past 15 years. He describes the de Oliveira paper as "compelling evidence that the outbreak had started before the accused could have started it", a view shared by every expert that *Nature* contacted (see 'Expert opinion').

Leitner points out that calculating evolutionary timescales is tricky, but that because HIV has such a fast mutation rate, even recent events can be pinpointed quite accurately. "De Oliveira et al. have tested and evaluated the clock and its uncertainty using several methods," he says. "I find their analysis well done and timely, and hope it will affect the judgement in the Libyan court." ■ Declan Butler

Expert opinion

The following scientists have all previously testified in court cases involving HIV molecular evidence. They assess the new data.

"This study is an impressive statistical analysis. It shows clearly that the hypothesis of deliberately injecting children with HIV in 1998 should be rejected."

Philippe Lemey, expert on HIV evolution, Rega Institute for Medical Research, Belgium.

"This is exactly the kind of objective phylogenetic analysis needed in this case. The results clearly show that the health workers were not responsible for the introduction of these HIV strains."

David Hillis, expert on viral phylogenies, the University of Texas, Austin.

"This kind of analysis has been approved by courts around the world. This is a case of [hospital] infection with multiple, independent sources, a pattern most easily explained by sloppy or inappropriate practices at the hospital."

Fernando González Candelas, evolutionary geneticist, the University of Valencia, Spain.

"The existing epidemiological data are already enough to demonstrate that the accused medical staff cannot be the source of the contamination. De Oliveira's analysis is completely independent,

and yields the same conclusion. The court cannot pretend to be impartial if it refuses to hear any competent scientist from abroad."

Michel Milinkovitch, evolutionary geneticist, the Free University of Brussels, Belgium.

"They have used state-of-the-art methods to estimate divergence and dates of events in this outbreak. The analysis shows compelling evidence that the outbreak had started before the accused could have started it."

Thomas Leitner, expert in HIV evolution, Los Alamos National Laboratory, New Mexico.