



Q&A: A HEALTHY VISION
Tom Frieden, director of the US Centers for Disease Control and Prevention, speaks to *Nature*.
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CDC

Woo Suk Hwang convicted, but not of fraud

Cloning pioneer Woo Suk Hwang was sentenced to two years in prison at the Seoul Central District Court on 26 October, after being found guilty of embezzlement and bioethical violations but cleared of fraud.

Supporters of Hwang, a former professor at Seoul National University in South Korea, were pleased with the sentence, which is suspended for three years and half the length sought by prosecutors. The prosecution plans to appeal.

Hwang was once fêted for creating human stem-cell lines using cloned embryos derived from patients suffering from spinal-cord injury and other disorders (W. S. Hwang *et al.* *Science* 303, 1669–1674; 2004 and W. S. Hwang *et al.*

Science 308, 1777–1783; 2005). The accomplishment, which promised an endless supply of stem cells genetically matched to patients, turned out to be bogus.

Hwang admitted in January 2006 to falsifying data, while maintaining that he had the ability to do what he had claimed. In South Korea, scientific fraud would be illegal only if Hwang had used fraudulent data to gain grants. Prosecutors argued that he duped two companies, SK Group and NongHyup, into supplying research funds. But according to media reports, the court rejected the allegations on the grounds that the firms provided money without expecting to benefit.

The court did, however, find

Hwang guilty of buying human eggs in violation of the country's bioethics law and of embezzling 830 million won (US\$700,000) of government money.

The Korea Times reported that the light sentence was motivated by judge Ki-ryul Bae's sympathy for Hwang's apparent dedication to Korean biotechnology and his stated remorse. Hwang will now be able to focus on his research career, which he has been rebuilding since he was indicted in May 2006 (see *Nature* 461, 1035; 2009).

Many researchers are not ready to welcome Hwang back. "It was not just one moment of weakness — the degree of manipulation of the goodwill of people, particularly

fellow scientists, made it more," says Alan Colman, a stem-cell scientist at the Institute of Medical Biology in Singapore. "The sad thing is that it's clear he is a talented experimentalist." Colman argues that Hwang should not be eligible for research funding from public sources for a prolonged period.

Researcher Ryuzo Torii of the Shiga University of Medical Science in Japan used large amounts of grant money, time and monkey eggs trying to reproduce Hwang's technique in non-human primates in 2004 and 2005. He says that forgiving Hwang and recognizing him as a researcher would be "a mistake".

David Cyranoski

US physicists propose astrophysics goals

Cosmic-ray experiments would suffer, unless budgets increased, under a list of priorities for high-energy physics given to the US Department of Energy (DOE) by independent advisers last week.

The DOE should instead fund one massive dark-matter detector, one major dark-energy experiment and a high-energy gamma-ray detector, according to the report, which was presented on 23 October in Washington DC.

For current budget trends, the report did not endorse Auger North, a US\$127-million array of 4,400 cosmic-ray detectors in southeastern Colorado. This is due partly to the success of its southern counterpart, the Pierre Auger Observatory in Argentina, which is close to tracing the origin of high-energy cosmic rays to massive black holes in galactic centres, says Steve Ritz, chair of the 15-person committee that wrote the report. "You no longer need to invoke new physics to explain [high-energy cosmic rays]," says Ritz, an astrophysicist at the University of California, Santa Cruz.

The report is the first in which US high-energy physicists have set priorities for particle astrophysics. The committee considered four budget scenarios, ranging from the relatively grim DOE budget for the 2008 fiscal year in years going forwards,



Southern cosmic-ray observatory may not get a partner.

to budgets that would more than double over the next decade. The DOE takes the advice "very seriously", says Dennis Kovar, the agency's associate director of science for high-energy physics.

Even in the tightest scenario, dark-matter experiments fared well — both because they are relatively cheap and because there are hints that discovery of these undetected particles, which make up nearly a quarter of the Universe's mass-energy, could be imminent. If budget trends continue, however, the report says that only one next-generation detector can be chosen from among competing groups, which propose

ten-tonne vats of liquid argon or xenon, or cryogenic silicon detectors set deep underground.

Dark energy — the mysterious vacuum force that makes up most of the rest of the Universe's mass-energy — remains a priority, although the experiments are expensive (see page 1182). Unless budgets increase, the report suggests, the DOE will have to choose between supporting a space-based project, the Joint Dark Energy Mission, or a major ground-based telescope: either the 8.4-metre Large Synoptic Survey Telescope (LSST) or BigBOSS, a 4-metre telescope.

"We don't have the luxury of a lot of redundancy," says Patricia Burchat, a physicist at Stanford University in California and a member of the LSST project. "We can't afford it." Ritz says that so far, the agency hasn't looked at the trade-offs between ground- and space-based approaches to dark energy.

For high-energy gamma-ray astrophysics, the report supports the Advanced Gamma-ray Imaging System, an array of about 50 telescopes spread over a square kilometre — but only if the consortium merges with a similar European proposal, the Cherenkov Telescope Array.

Eric Hand

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