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# Korean stem-cell crisis deepens

The pressure on stem-cell pioneer Woo Suk Hwang over the way he obtained human eggs for his research is intensifying — particularly in South Korea, where he had been a national hero. In the past week, several new claims have emerged that Hwang may have used eggs that were paid for, as well as eggs from junior members of his laboratory.

Hwang's team, based at Seoul National University, has produced a string of landmark papers in stem-cell research, including the first stem cells obtained from a cloned human embryo (W. S. Hwang *et al. Science* 303, 1669–1674; 2004) and the first patient-matched embryonic stem cells (W. S. Hwang *et al. Science* 308, 1777–1783; 2005).

Recently, his research has been overshadowed by allegations about the way he obtained eggs, but until now these have come from outside his home country. In 2004, *Nature* published a claim that Hwang's group had used eggs from one of his graduate students — a charge Hwang has constantly denied (see *Nature* 429, 3; 2004). The student later withdrew her claim. Then two weeks ago, Hwang's close friend and collaborator Gerald Schatten of the University of Pittsburgh, Pennsylvania, broke off ties. He accused Hwang of possible ethical irregularities and misrepresentations regarding egg donation, although he gave no other details (see *Nature* 438, 262–263; 2005).

Now further claims of possible impropriety are arising closer to home. On 21 November, Sun Il Roh, a fertility expert at MizMedi Hospital in Seoul, gave a press conference at which he admitted that 20 eggs that he had procured and given to Hwang for his 2004 study were paid for. According to Korean newspaper reports, Roh said he paid 1.5 million won (US\$1,430) of his own money to each of the 20 women whose eggs were used in the experiment. Quoted in the *JoongAng Daily*, he says: "This is not a large amount of money, considering that they had to receive injections every day for 8–10 days." But Roh, who was a co-author on Hwang's 2005 paper, insists that Hwang did not know the status of the eggs he received. Roh did not respond to *Nature's* requests for an interview.

Although buying eggs for research was not illegal when the eggs were procured in 2003, the practice is hugely controversial, and has been illegal in Korea since last January. Supplementary material to Hwang's 2004 paper clearly states that all egg donors were volunteers.

On 22 November, as *Nature* went to press, Seoul-based Munhwa Broadcasting Corporation (MBC) was to run an investigative



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Fertility specialist Sun Il Roh admits at a press conference to having paid women to donate eggs.

programme that it said would show further evidence that Hwang used eggs from junior members of his lab. Obtaining eggs from a graduate student is problematic because of the risk that personal pressure could be applied.

According to an MBC producer, the programme was to produce medical records of egg donors from MizMedi Hospital. The records allegedly show that at least one of the donors was a researcher in Hwang's lab. MBC says the researcher in question is not the student who last year told *Nature* she had donated eggs at MizMedi, before withdrawing the claim.

Furthermore, an informer, who MBC says is closely linked to Hwang's lab, allegedly provided the station with experimental notes containing the donor's name, patient number and the date the eggs were used. MBC claims these details match the MizMedi medical reports.

The *Chosun Ilbo* on Tuesday cited another source claiming that eggs from two researchers in Hwang's lab were used. One was "a graduate student who invented a new way of removing the nucleus from eggs and is now working at a research institute in a US university", it said.

Hwang has not replied to *Nature's* repeated requests for an interview.

The effects of the allegations on the stem-cell field and on Hwang's research are unclear. On 15 November, after the news of Schatten's separation, the Korean government laid out plans to invest 11.5 billion won in the World Stem Cell

Hub, an international research network to have been led by Hwang. But it also proposed to detach the hub from Seoul National University and make it an independent body. Many potential overseas collaborators have said their plans are on hold until the allegations are resolved.

How these events will affect Hwang's team's ability to publish is another open topic. "It's pretty clear that the editor of any journal would be on heightened alert if they received a piece of work from them, and would probably scrutinize it very carefully for the ethics of the work at the very least," says Gregory Curfman, executive editor of *The New England Journal of Medicine*.

"If it turned out that deliberate falsifications had been communicated to us in connection with that paper we would certainly have to make an announcement of that," says Donald Kennedy, editor-in-chief of *Science*, which published the work. "We would certainly say something about the caution with which we would treat future communications from that group."

Most are holding out for a revelatory statement from Schatten or Hwang, who has been rumoured to be planning a press conference this week. "I hope Dr Hwang will give us the whole story," says Kennedy. "There's a different onus on Schatten — he has issued a dramatic statement and he's leaving it like a dead seal on our collective desks."

David Cyranoski

Additional reporting by Erika Check