

The added scrutiny will apply only to proposals that have already passed muster with review panels and are recommended for funding, she emphasized. At that point, however, senior managers will be expected to blow the whistle if they think the abstract doesn't reflect both what a scientist wants to do and why that work is worth funding. Division directors "might possibly" even reject a proposal at the last minute based on an adverse reaction to an abstract, she added.

Marrett doesn't think the new approach will mean any more work for busy staffers. "First of all, it's not that most of the recommended awards are obscure," she noted. "Second, it's something we're already supposed to have been doing. And third, it's not that hard to rewrite the abstract. Sometimes all it takes is putting the nontechnical description of the project ahead of the technical description."

The increased transparency, she said, won't affect the two criteria that NSF uses to judge the quality of each proposal—

intellectual merit and broader impacts. Nor will scientists need to describe short-term, practical spinoffs if none are anticipated, she said, giving as an example an astronomy grant designed to "advance our understanding of the physical world. ... It's not about identifying the consequences of the research for society."

It's not clear how NSF's changes might influence debate over the FIRST bill, which is expected to be taken up next month by the full science committee. No Democrat signaled support for the full bill during a voice vote at last week's subcommittee, although the panel accepted nine minor amendments from the minority side. And Democrats say there is still plenty in the bill that should concern researchers, including provisions to clamp down on scientific misconduct and to limit to five the number of publications cited by grant applicants. "The collective message sent by these provisions is that we don't trust scientists," said Representative Eddie Bernice Johnson (D-TX), the full committee's top Democrat,

at the markup. "Is this really the message the Science Committee wants to be sending?"

Still, Representative Dan Lipinski (D-IL), the top Democrat on the subcommittee, thinks that "the accountability provisions are tremendously better now." Speaking with *Science* after the markup, Lipinski said, "I thought what they had before would have been very harmful to the entire peer-review process at NSF. I don't think NSF will be happy because it will be a little bit more work. But it will not hamper or change the way NSF does its peer-review process."

Science lobbyists are hoping that a similar bill being drafted by the Democrat-controlled Senate Commerce, Science, and Transportation Committee will be more to their liking. Even so, Congress is not required to complete work on any reauthorization bill this year. For now, however, the negotiations appear to be taking place in an atmosphere that has warmed slightly since the war of words began 1 year ago.

—JEFFREY MERVIS

## STEM CELLS

# Irreproducibility Dogs New Reprogramming Method

**TOKYO**—Less than 2 months ago, Haruko Obokata suddenly became a media sensation in Japan. The 30-year-old stem cell scientist was widely celebrated when she and colleagues published two papers in *Nature* describing a new and surprising way of creating prized stem cells: by simply subjecting mature cells to stress.

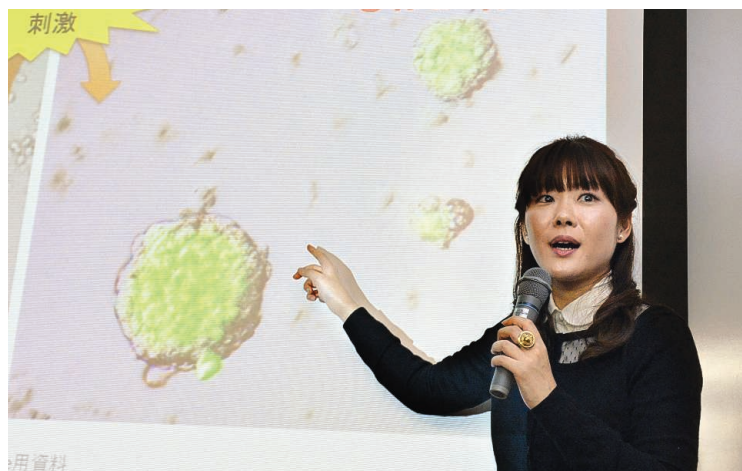
Obokata is still in the spotlight, but the script has changed. Allegations that the papers contain images recycled from Obokata's Ph.D. thesis, among other problems, have fed doubts about the claims. Although dozens of researchers have tried, no one outside the team has reported being able to make the cells, called stimulus-triggered acquisition of pluripotency (STAP) cells, with Obokata's methods. And *Science* has learned that aside from her group, only one of the other labs involved in the papers says it is able to generate STAP cells. One group has tried without success. Others had not even attempted to reproduce the technique until the doubts emerged.

It would not be unusual for the lead author to perform most of the work for the papers, says Martin Pera, a stem cell scientist at University of Melbourne in Australia. But given how revolutionary—

their possible role in regenerative medicine, required extracting them from embryos or forcing adult cells to overexpress certain genes. But in an article and a letter online in *Nature* on 29 January, Obokata and her colleagues at the RIKEN Center for Developmental Biology (RIKEN CDB) in Kobe, Japan, and at other institutions in Japan and the United States described an astonishingly simple alternative. All it took to make pluripotent stem cells, they reported, was briefly bathing blood cells from newborn mice in a mildly acidic solution and then tweaking the culture conditions.

Within days, questions about images in the two papers started appearing on blogs and the PubPeer website. RIKEN CDB's Tokyo-based parent organization, RIKEN, launched an investigation on 13 February. New allegations about these and previous Obokata papers continued to emerge.

On 14 March, the investigative committee



**Media darling.** Haruko Obokata explained her radically new method for making stem cells to a packed press conference in January.

and straightforward—the technique was supposed to be, he says, "the uncertainty concerning reproducibility is puzzling."

Earlier methods for deriving pluripotent stem cells, the all-purpose cells valued for

chair and other RIKEN officials announced the interim results at a standing-room-only press conference in Tokyo. RIKEN president and Nobel laureate Ryoji Noyori opened the event with a deep bow. “I apologize for the great trouble and concerns caused to so many in society by the STAP papers published in *Nature* by RIKEN researchers,” he said.

The investigating committee concluded that there had been “inappropriate handling of data” for two of the items under investigation, but these were “not judged to constitute research misconduct,” according to a RIKEN press release. But the officials emphasized that they are relying on the scientific community to ultimately decide whether STAP cells can be derived following the method Obokata and her colleagues described. “The mission of the investigating committee is to determine whether or not there has been misconduct; whether STAP cells exist is something for the scientific community to determine,” said committee chair Shunsuke Ishii, a RIKEN molecular geneticist, at the press conference, which lasted a marathon 4 hours. He added that to the best of their knowledge, no outside group has reported success in generating STAP cells.

Among the authors, only Charles Vacanti, an anesthesiologist and tissue engineering specialist based at Brigham and Women’s Hospital in Boston, says his lab can make STAP cells. Obokata worked under Vacanti for several years, starting in 2008, and developed the STAP technique based on some of his earlier work. Another co-author, Teruhiko Wakayama, who moved in 2012 from RIKEN CDB to the University of Yamanashi, Kofu, confirmed in an e-mail to *Science* that he had made STAP cells while working alongside Obokata at RIKEN but has not been able to reproduce them at his new lab.

Two other co-authors, Hitoshi Niwa and Yoshiki Sasai of RIKEN CDB, had not attempted to generate the cells independently in their labs before the papers were published. “I’m confused,” says Hans Schöler, a stem cell researcher at the Max Planck Institute for Molecular Biomedicine

in Münster, Germany. Niwa and Sasai are highly regarded scientists, he says, and their names as authors lent the papers substantial credibility. RIKEN CDB Director Masatoshi Takeichi said at the press conference that Niwa’s lab is now working to reproduce the results independently of Obokata.

Wakayama’s own doubts have grown. A stem cell biologist known for work cloning

“I want to believe ...  
[but] I no longer know to  
what extent Obokata’s  
story is the truth.”

—TERUHIKO WAKAYAMA,  
UNIVERSITY OF YAMANASHI, KOFU

mice, says he was brought onto the team to produce the chimeric mice described in the paper. He used cells provided by Obokata, he says. “I want to believe” in STAP cells, Wakayama says. However, he says, the photos that convinced him that the cells were real are now believed to have come from a completely different experiment reported in Obokata’s doctoral dissertation. “I do not think this is a simple mistake,” Wakayama

the investigating committee had resolved two of six specific issues in the papers. One problematic image is an artifact of image compression and “not falsification or improper conduct,” the interim report states. But the claims that figures in the article were used in Obokata’s thesis seem to be on target. Obokata and one of her co-authors told the committee that these figures were used by mistake. Ishii emphasized that this issue is still under investigation and any judgments about misconduct will come after further deliberation.

In a written statement released to the press, Obokata, Niwa, and Sasai apologized for the confusion resulting from the uncertainties and inaccuracies in the papers and wrote: “We are contacting other co-authors regarding the possibility of retracting these papers.”

Vacanti is reluctant. “In the absence of compelling evidence that the data presented is incorrect, I do not believe that the manuscripts should be retracted,” he wrote in a statement.

A *Nature* spokesperson told *Science* by e-mail that the journal’s own investigation “is still in progress.” Not all the authors would necessarily have to agree to a retraction, the spokesperson wrote.

The *Nature* papers are not the only Obokata publications under fire. Allegations surfaced last week that large portions of one

chapter of her doctoral thesis, submitted to Waseda University in 2011, appear to have been copied from a National Institutes of Health website and that footnotes to other chapters were copied and pasted from other publications. Local media have reported that Obokata said she intends to withdraw the dissertation. A Waseda public relations official confirmed that a faculty member had received such an e-mail but said that the university, which is investigating, has not

received a formal request from Obokata. If the thesis is retracted, Obokata will lose her doctoral degree.

The glare of the spotlight is not always comfortable.

—DENNIS NORMILE AND GRETCHEN VOGEL



**Apologetic.** RIKEN leaders present the interim results of an investigation into the *Nature* stem cell papers on 14 March. The committee found “inappropriate handling of data.”

says, adding, “I no longer know to what extent Obokata’s story is the truth.” On 10 March, Wakayama called for the papers to be retracted, at least temporarily, until errors are corrected and results confirmed.

At the press conference, Ishii said that