



Prime Minister Justin Trudeau (right) and Canada's finance minister deliver the budget to Parliament.

► per year to Can\$4.8 billion.

The Stem Cell Network, a non-profit organization in Ottawa that helps to translate research into clinical applications, will receive Can\$18 million over three years, as part of the 2019 budget. Two cancer charities will receive a combined Can\$160 million; Genome Canada, a non-profit organization in Ottawa that supports genomic research, will get about Can\$100 million over five years; and the TRIUMF physics research lab and cyclotron in Vancouver will get Can\$196 million over five years.

But for basic science funded by competitive

peer-reviewed grants, this is a disappointing budget, says Jim Woodgett, director of research at the University of Toronto's Lunenfeld-Tanenbaum Research Institute. Such a selective approach to funding abandons the Fundamental Science Review plan, he adds. "Science thrives with open grant competition. It is asphyxiated by picking winners."

The budget does include a promise to stop awarding funding on the basis of lobbying or political calculation. The government proposes setting up the Strategic Science Fund, which will "operate using a principles-based

framework for allocating federal funding that includes competitive, transparent processes". An independent panel of experts will use the framework to choose recipient organizations, and determine how much money they will get, in a competitive allocation process. The fund would begin operating in 2022.

This would be a big step towards improving how government money is allocated for science, says Katie Gibbs, executive director of the science campaign group Evidence for Democracy in Ottawa. "There are a lot of different third-party organizations that get funding directly from the budget, and this is a step to hopefully increase transparency and accountability in how they are chosen and funded."

The budget is also moving in the right direction for science students. The government's plan allocates Can\$114 million over five years to increase the number of graduate scholarships available from the country's three main research-funding agencies. The money will provide an additional 500 master's scholarships and 167 doctoral scholarships per year. The lack of support for students in last year's otherwise positive budget had been considered a "glaring omission", says Gibbs.

Tina Gruosso, co-president of Science and Policy Exchange, an advocacy group in Montreal run by graduate students and post-doctoral fellows, says students are happy with the support for scholarships. "It is a good step forward for the next generation of students and young researchers," she says, although there was no extra funding for postdoctoral fellowships.

The budget also proposes expanding parental leave for student researchers, providing Can\$37.4 million over five years to extend coverage from 6 to 12 months for students funded by any of the three main research agencies. ■

CHRIS WATTE/REUTERS

BIOTECHNOLOGY

WHO panel enters CRISPR-baby debate

World Health Organization advisory committee calls for registry of studies that involve editing the human genome.

BY SARA REARDON

The World Health Organization (WHO) should create a global registry of studies that involve editing the human genome, and research funders and publishers should require scientists to participate in it, a group advising the WHO said on 19 March.

The WHO created the panel in December after a scientist in China used the gene-editing

tool CRISPR to modify the genomes of twin baby girls. In its statement, the panel also opposed the clinical application of research that alters the genome of human eggs, sperm or embryos — called the germ line — in ways that can be passed down to future generations.

"The committee agrees it is irresponsible at this time for anyone to proceed with clinical applications of human germline genome editing," says Margaret Hamburg, the

panel's co-chair and foreign secretary of the US National Academy of Medicine.

But she emphasizes that the WHO panel is not calling for a permanent moratorium on such research. "We are trying to look at the broader picture and a framework for responsible stewardship," says Hamburg, a former commissioner of the US Food and Drug Administration. "I don't think a vague moratorium is the answer for what needs to be done."

The advisory panel, which is developing an international framework to govern the use of gene-editing technologies in people, will issue final recommendations to the WHO's director-general in 18 months.

Hamburg did not offer hints as to whether the WHO is considering ways to create a binding international agreement governing gene editing, or to ensure that governments enforce existing laws. The advisory committee's charge includes understanding the differences between how countries regulate such research, she says: "It's a daunting task, but it's the beginning of a process, and we don't really know all

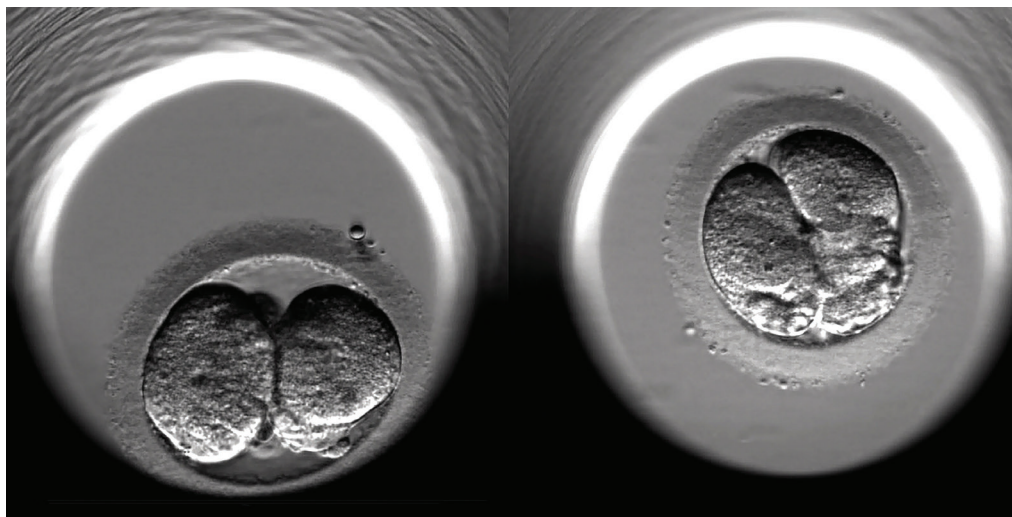
the strategies that might be used.”

The WHO decided to weigh in on genome editing after Chinese biophysicist He Jiankui said in November that he had modified the genomes of two girls to make them resistant to HIV. His use of the technology was nearly universally condemned, and the Southern University of Science and Technology in Shenzhen, China, fired him in January. Late last month, China's health ministry issued draft regulations to restrict the use of gene editing in people.

But scientists are split on whether a complete moratorium on the clinical use of germline editing is appropriate. Two weeks ago, a group of ethicists and scientists — including some of the inventors of CRISPR — published a Comment in *Nature* calling for “a fixed period during which no clinical uses of germline editing whatsoever are allowed” (E. S. Lander *et al. Nature* 567, 165–168; 2019).

In an accompanying Correspondence, the leaders of the US National Academy of Medicine, the US National Academy of Sciences and the UK Royal Society opposed such a plan, arguing that “we must achieve broad societal consensus before making any decisions, given the global implications of heritable genome editing” (V. J. Dzau *et al. Nature* 567, 175; 2019).

The registry recommended by the WHO committee is an attempt to bridge the gap until the world agrees on a framework to govern gene editing in people. The panel says



Changes to the genomes of human embryos (pictured) can be passed down to future generations.

that the registry should cover studies of the clinical applications of human genome editing — including both changes to the germ line and techniques that alter a person's genes in ways that won't be inherited. The latter has not generally been controversial.

The transparency recommended by the WHO panel is the right approach, says Helen O'Neill, a molecular geneticist at University College London who works on CRISPR. “Speaking to researchers about their research

and being very open is the best way forward, to open it to discussion rather than polarizing the debate,” she says. “It just says who is doing what and how can we talk about this.”

O'Neill would like to see the WHO panel take its time developing recommendations for international governance. She says that the negative reaction to He's work, and the media attention, should deter other scientists from undertaking similar experiments before the governance question is settled. ■

POLITICS

Universities spooked by Trump free-speech order

US institutions must certify that they protect free speech to receive research funding.

BY SARA REARDON

US President Donald Trump signed an executive order on 21 March that requires universities to certify that they protect free speech, or risk losing federal research funds.

Public institutions will have to certify that they are following free-speech protections laid out in the First Amendment of the US Constitution, and private institutions must promise to follow their stated policies on free speech.

The order applies to 12 research agencies, including the National Institutes of Health, the National Science Foundation, the Department of Energy and NASA. It affects only money for research, not financial aid for students.

“We're dealing with billions and billions and billions of dollars,” Trump said in a speech just

before signing the order. “Taxpayer dollars should not subsidize anti-First Amendment institutions.” He said that the order was the first in a series of steps that his administration intends to take to “defend students' rights”.

Details of how the Trump administration will implement and enforce the order are still fuzzy, but academic organizations are concerned that the policy could create more problems than it will solve.

The order is “a solution in search of a problem”, and seems designed to undermine trust in higher education and science, said Julie Schmid, executive director of the American Association of University

“What the administration is trying to protect is not, in fact, free inquiry.”

Professors in Washington DC, in a statement.

“It is also troubling that in his remarks the president sought to drive a wedge between students and faculty, casting his executive order as a ‘clear message to the professors’ that their funding was now at risk while also raising the specters of ‘political indoctrination’ and ‘coercion,’” Schmid wrote.

Peter McPherson, president of the Association of Public and Land-Grant Universities in Washington DC, called the order “plainly unnecessary” in a statement. “Public universities are already bound by the First Amendment and work each day to defend and honor it,” he said.

But Sigal Ben-Porath, a political philosopher at the University of Pennsylvania in Philadelphia, says that the order might not have significant practical implications. ▶