

departments running, will limit research at the university. “Right after the legislature failed to override the governor’s cuts, I went into lab and prepped all the tubes I’d need to finish every single sample, which is literally 3,000 tubes,” she says. “I’m worried that they might cut the person who orders all our tubes and equipment.”

Brandon Briggs, a geomicrobiologist at UA Anchorage, is also feeling the pressure. “All this uncertainty has definitely decreased productivity,” he says. “Instead of writing the next paper, I’ve been going to board meetings and trying to reassure students who’ve just been told their scholarships are gone.”

That’s because Dunleavy defunded a scholarship programme for Alaskans attending UA. “As of July 1, four thousand students got a letter notifying them that their scholarships will not be renewed this fall,” says Briggs.

The budget cuts have already altered some researchers’ plans. Milligan-Myhre, who studies a native Alaskan fish called the three-spined stickleback (*Gasterosteus aculeatus*), has dropped out of a “once in a lifetime” ecological experiment. Dozens of researchers

from across the globe plan to combine various stickleback populations in ten lakes that have previously been treated to kill all invasive fish. The idea is to track how differences in the lakes’ ecosystems influence a host of traits in the fish — from the composition of their gut microbiomes to characteristics of their brain tissue — over decades, revealing evolution in action.

“This is just a terrible situation. And it’s just going to continue.”

to devote to this project because I’ve got to be writing my butt off the next few months,” she says. “I need to get as many papers out as I can to prep my CV for job applications, because I have no job security. [The university] can fire me with 60 days’ notice.”

The funding crisis also threatens some of UA’s flagship climate-research facilities, such as the International Arctic Research Center in Fairbanks or the nearby Bonanza Creek Long Term Ecological Research site. Although the

majority of their funding comes from outside sources, such as the US National Science Foundation, Juday says that a core level of institutional support holds the centres together.

“It’s like a bucket,” he says. “If you take away the bucket, then you can’t fill up the bucket” with grants from other funders.

Hajo Eicken, a glaciologist who heads the International Arctic Research Center, says that the budget cuts threaten programmes aimed at helping Alaska’s communities to cope with climate change. These include efforts to improve weather forecasts in remote areas and to protect roads and other infrastructure from damage caused when permafrost thaws. “A big part of our mission is making our research matter for Alaskans,” says Eicken. “These programmes provide tremendous value to the people of Alaska, and they’re under significant threat.”

And more cuts could be coming. Dunleavy, who was elected in November 2018 to a four-year term, has said that he plans to trim the state’s budget further in the coming years.

“This is just a terrible situation,” says Milligan-Myhre. “And it’s just going to continue.” ■

DISEASE RESEARCH

‘Mosaic’ HIV vaccine to be tested in thousands of people

The experimental vaccine targets virus strains from around the world.

BY EMILIANO RODRÍGUEZ MEGA

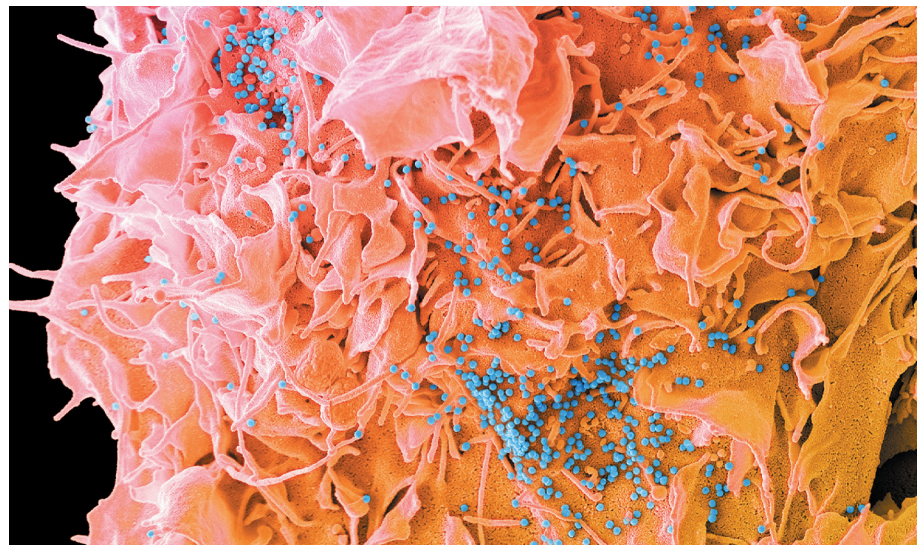
An experimental HIV vaccine that targets more strains of the virus than any other developed so far will start a late-stage clinical trial later this year. The ‘mosaic’ vaccine, which incorporates genetic material from HIV strains from around the world, also seems to have the longest-lasting effects of those that have been tested in people.

Small trials of the mosaic vaccine in people showed that it prompted an immune response against HIV, such as the production of antibodies. But starting in September, scientists will administer it to thousands of people across the Americas and Europe to assess whether the vaccine provides any protection against HIV infection. The phase III trial will test the vaccine in transgender individuals and in men who have sex with men.

These communities are disproportionately affected by HIV, with about two-thirds of new infections in the United States occurring among gay and bisexual men, according to the US Centers for Disease Control and Prevention in Atlanta, Georgia. The researchers

running the trial, which they have named Mosaico, discussed the project during the 10th International AIDS Society Conference on HIV Science in Mexico City at the end of July.

Adding an effective HIV vaccine to the arsenal of preventive measures currently available to protect people from infection, which include condoms and an antiretroviral ▶



The HIV virus (blue), shown attacking an immune cell, mutates rapidly, confounding efforts to combat it.

STEVE GSCHMEISSNER/SCIENCE PHOTO LIBRARY

► regimen called PrEP, could make a huge difference, says Susan Buchbinder, an epidemiologist at the University of California, San Francisco, who is on the Mosaico team.

Some of the preventive methods — such as PrEP, which requires people to take a daily pill — can be difficult for people to maintain or even access, says epidemiologist Jorge Sánchez at the Centre for Technological, Biomedical and Environmental Research in Lima, one of Mosaico's research sites. A vaccine that requires just a few injections every other year could be a good alternative, he says.

But researchers have struggled since the 1980s to find an effective HIV vaccine. One of the main challenges is the incredible diversity of HIV strains circulating in the world. So far, scientists haven't had much luck in developing a vaccine that can target such a diverse pathogen, says virologist Dan Barouch at the Beth Israel Deaconess Medical Center in Boston, Massachusetts.

More than 100 HIV vaccines have been tested in people over the past three decades, but only one has demonstrated any kind of protection. In 2009, researchers announced the results of a study conducted in Thailand that showed that shortly after participants received an experimental vaccine, they were almost 60% less likely to become infected with HIV than those given a placebo. But the effects

waned within a year — and by the end of the 3.5-year study, vaccinated individuals were only 31% less likely to become infected.

Small laboratory tests of the Mosaico vaccine in people showed that it elicited strong immune responses for at least two years after researchers administered it.

CAUTIOUSLY OPTIMISTIC

The latest Mosaico study will enrol 3,800 participants across 8 countries, including Argentina, Italy, Mexico, Poland and the United States. Half of the participants will get four vaccine injections over the course of a year, and the other half will receive a placebo.

The injections contain a disabled common-cold virus that carries synthetic versions of three HIV genes. The researchers who built the genes based them on sequences from HIV strains found in several regions around the world. As an added boost to help the body produce antibodies against HIV, the Mosaico team added two synthetic proteins — based on proteins produced by HIV strains common in Africa, the Americas, Europe and Australasia — to the last two doses in the series. The incorporation of this “protein boost” is what makes this a truly global vaccine, says Barouch.

The Mosaico team hopes that the vaccine will help to protect at least 65% of study participants. The scientists expect to get results by 2023. The

study is sponsored by a consortium led by Janssen Vaccines & Prevention, part of Johnson & Johnson of New Brunswick, New Jersey.

Some researchers are reserving judgement on Mosaico. HIV viruses can mutate rapidly, which can stymie immune responses, says Tomáš Hanke, an immunologist at the University of Oxford, UK. To get around this problem, he's attempting to create a mosaic vaccine that incorporates parts of HIV proteins in which mutations rarely occur.

HIV researcher Ma Luo at the University of Manitoba in Canada suspects that finding an effective vaccine will take longer than the Mosaico researchers think, but applauds their efforts. Learning from human trials is valuable, she says, no matter what the outcome. ■

CORRECTIONS

The News Feature ‘After the flames’ (*Nature* **571**, 312–315; 2019) incorrectly stated that Francisco Franco is still a curator at the Butantan Institute.

The News Feature ‘Deep-sea dilemma’ (*Nature* **571**, 465–468; 2019) erroneously claimed that the ‘gummy squirrel’ sea cucumber *Psychropotes longicauda* is not found outside the CCZ. In fact, this species is widespread in the deep sea.

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