POLITICS

US government curtails fetal-tissue research

The policy bars studies by federal scientists and requires ethics review for government-funded work.

BY SARA REARDON

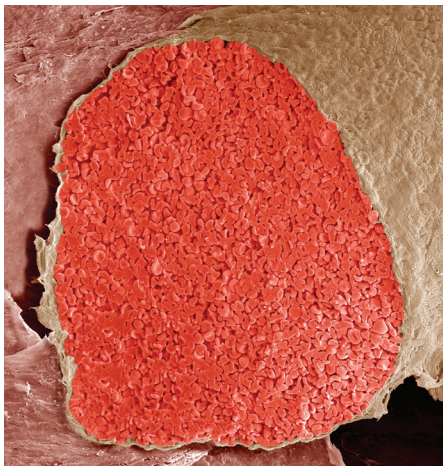
US President Donald Trump's administration is ending fetal-tissue research by government scientists and placing restrictions on academic researchers seeking grants from the National Institutes of Health (NIH) for studies involving fetal tissue.

The administration said on 5 June that it will set up an ethics-review board to evaluate each NIH grant application that would support research with fetal tissue, which is collected from elective abortions. But the government has already decided against renewing its contract with a laboratory at the University of California, San Francisco (UCSF), that uses fetal tissue to study HIV.

"Promoting the dignity of human life from conception to natural death is one of the very top priorities of President Trump's administration," the Department of Health and Human Services (HHS) said in a statement.

The announcement comes after a sustained push by opponents of abortion to limit scientific research with fetal tissue — despite warnings from researchers that using the tissue is the only way to study some health problems. Scientists use fetal tissue to explore topics as diverse as infectious disease, human development and disorders of the eye.

"It's a decision that's going to set back research," says Andrew McMahon, a stem-cell biologist at the University of Southern California in Los Angeles.



STEVE GSCHMEISSNER/SPL

Fetal tissue is at the centre of a US political battle.

McMahon is studying ways to grow kidneys from human stem cells. He says that the only way to determine whether he and his colleagues have successfully mimicked natural development is to compare their proto-organs to kidneys in fetal tissue. Although biomedical research is often done using mice as proxies for people, mouse kidneys are too different from human kidneys to use in McMahon's work.

Since September 2018, the HHS has been reviewing all fetal-tissue research funded by its constituent agencies, including the NIH and the Food and Drug Administration. The HHS contract with the UCSF lab — which tests HIV treatments in mice with immune cells modified with human fetal tissue — expired in March. The department then agreed to extend it until 5 June, but now says it will let the arrangement lapse.

The government's decision is "politically motivated, shortsighted and not based on sound science", said UCSF chancellor Sam Hawgood in a statement. "Today's action ends a 30-year partnership with the NIH to use specially designed models that could be developed only through the use of fetal tissue to find a cure for HIV."

The Trump administration's policy directs scientists at NIH laboratories to stop conducting research with fetal tissue once their current supplies of the material run out. The HHS says that this restriction will affect three government research projects.

The approximately 200 research projects supported by current NIH grants but conducted at other institutions will not be affected by the policy. But the HHS says that any new grants or grant renewals must be submitted to an ethics advisory board "to review the research proposal and recommend whether, in light of the ethical considerations, NIH should fund the research project — pursuant to a law passed by Congress".

The law in question calls for an ethics board with 14–20 members, of whom one-third to one-half are scientists with "substantial accomplishments in biomedical or behavioral research". The board's members, who would be appointed by HHS secretary Alex Azar, must also include a theologian, an ethicist, an attorney and a physician.

Lawrence Goldstein, a neuroscientist at the University of California, San Diego, says that the addition of this extra review could effectively end federal funding for fetal-tissue research. "It's all a matter of who gets appointed and how politically biased it is," he says. "I'm aware of several very important research projects that will be up for renewal in the next few years and I'm afraid that a biased board is going to kill valuable research. If there's a reasonable balance, there's some hope."■

CONSERVATION

Global plant extinctions mapped

Seed-bearing plant species are disappearing 500 times faster than they would naturally.

BY HEIDI LEDFORD

The world's seed-bearing plants have been disappearing at a rate of nearly 3 species a year since 1900, which is up to 500 times higher than would be expected as a result of natural forces alone, according to the largest survey yet of plant extinctions.

The project studied more than 330,000 species and found that plants on islands and in the tropics were the most likely to be declared extinct. Trees, shrubs and other woody perennials had the highest probability of disappearing, regardless of location. The results were published on 10 June in *Nature Ecology & Evolution* (A. M. Humphreys *et al. Nature Ecol. Evol.* http://doi.org/gf3szp; 2019).

The study included more plant species than any other survey by an order of magnitude, and provides hard evidence that will aid conservation, says Stuart Pimm, a conservation scientist at Duke University in Durham, North Carolina. "Its results are enormously significant."

The work stems from a database compiled by

botanist Rafaël Govaerts at the Royal Botanic Gardens, Kew, in London. Govaerts started the database in 1988 to track the status of every known plant species. He mined the scientific literature and created a list of seed-bearing plant species that had been ruled extinct, and noted which species scientists had deemed to be extinct but later rediscovered.

In 2015, Govaerts, plant evolutionary biologist Aelys Humphreys at Stockholm University, and others began analysing the data. They found that 1,234 species had been reported extinct since the publication of Carl Linnaeus's compendium of plant species, *Species Plantarum*, in 1753. But more than half of those had been either rediscovered or reclassified as a living species; 571 are still presumed extinct.

A map of plant extinctions since 1900 produced by the team shows that flora in areas of high biodiversity and burgeoning human populations, such as Madagascar, Brazil, India and South Africa, are most at risk (see 'Extinction pattern'). Islands are particularly sensitive because they are likely to contain species found nowhere else and are especially susceptible to environmental changes, says Humphreys.

Although the team curated the database carefully, the numbers are almost certainly an underestimate, says Jurriaan de Vos, a phylogeneticist at the University of Basel in Switzerland. Some plant species are "functionally extinct", he notes, and live only in botanical gardens or in such small numbers in the wild that researchers don't expect the population to survive.

"You can decimate a population or reduce a population of 1,000 down to one and the thing is still not extinct," says de Vos. "But it doesn't mean that it's all OK."

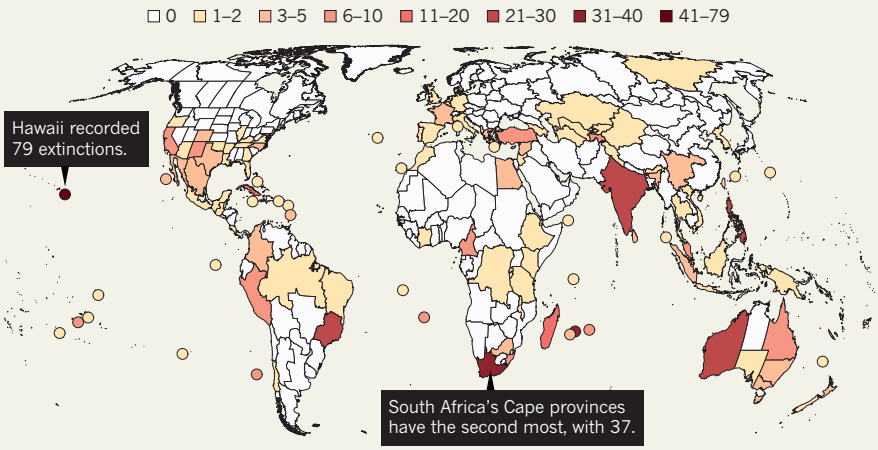
And few researchers have the money or time to launch efforts to find a plant species that they think might have gone extinct. Landscapes can change a lot in a relatively short amount of time, so it's difficult to know whether a species has truly disappeared without an extensive follow-up, de Vos says.

He recalls his own hunt through Cameroon to gather species of yellow-flowering begonias for DNA sequencing. De Vos visited several sites where records indicated that other researchers had collected the plants in decades past. But sometimes he would arrive at a site to find a radically changed landscape.

"You know that it's a rainforest species, but you're standing in a city," de Vos says. "Then you realize just how massive the scale of destruction or land-use change has been over the past 50 or 80 or 100 years." ■

EXTINCTION PATTERN

The number and locations of seed-bearing plant species that have disappeared since 1900.



SOURCE: HUMPHREYS *ET AL.*

ASTROPHYSICS

Mission to map Universe in high-energy X-rays

German–Russian space telescope will detect millions of supermassive black holes.

BY DAVIDE CASTELVECCHI

"Have you seen your body in X-rays? It looks completely different," says Rashid Sunyaev. "We will do the same with the Universe." Sunyaev, a Soviet-born cosmologist at the Max Planck Institute for Astrophysics in Garching, Germany, could be about to get his long-held wish.

On 21 June, a joint German–Russian mission called Spektrum-Roentgen-Gamma (SRG) will launch into space to create an unprecedented map. It won't be the first space telescope sensitive to high-energy 'hard' X-rays. But it will be the first to create a full map of the sky in this part of the spectrum, one that will give astrophysicists a new way to track the Universe's expansion and acceleration over the aeons. "Within a half year, we will cover the whole sky," says Peter Predehl, an X-ray astronomer at the Max Planck Institute for Extraterrestrial Physics, also in Garching, and a principal investigator for the mission.

SRG's main scientific goal is to create a 3D map of the Universe that will reveal how the cosmos accelerates under the mysterious repulsive force known as dark energy. It will do so by probing the distribution of about 100,000 galactic clusters, which can reveal the history and structure of the Universe. SRG will detect the X-ray glow from intergalactic plasma in the clusters, and from the plasma filaments that join them. The mission will also detect up to three million supermassive black holes that spew the radiation — many of which will be new to science — and X-rays from as many as 700,000 stars in the Milky Way.

"It's going to be a great survey," says X-ray astronomer Giuseppina Fabbiano of the Harvard–Smithsonian Center for Astrophysics in Cambridge, Massachusetts. Its data will have a unique role in the field for a long time, she adds.

SRG also represents one of Russia's most significant space-science missions for decades. It carries two independent X-ray telescopes: a German-built one called eROSITA (Extended Roentgen Survey with an Imaging Telescope Array) and a Russian-built one called ART-XC (Astronomical Roentgen Telescope — X-ray Concentrator), which is the first scientific instrument of its kind in the history of Russian and Soviet space research, says Mikhail Pavlinsky, a high-energy astrophysicist at ▶