into the planet's atmosphere within a few months. "Why do they disappear so quickly?" asks John Moores, a planetary scientist at York University in Toronto, Canada. "There's some piece of the puzzle we are missing."

Researchers are looking for answers in the gap between Curiosity, which sniffs for methane 1 metre above Mars's surface, and the TGO, which takes its best measurements at least 5 kilometres above the planet. The scientists are trying to determine how the gas could be destroyed relatively close to Mars's surface.

One possibility is that methane seeping out of the ground is removed by a low-altitude chemical reaction — perhaps involving dust — before it can drift higher into the air, says Michael Mumma, a planetary scientist at NASA's Goddard Space Flight Center in Greenbelt, Maryland. A team based at Aarhus University in Denmark, which has studied how dust particles could deplete Martian methane, will describe its ideas on 11 April at the European Geosciences Union meeting in Vienna.

The work is timely because a giant dust storm spread across Mars in June 2018. It obscured the atmosphere and temporarily forced the TGO to focus its methane search on high elevations and latitudes.

Some scientists are sceptical that the TGO will ultimately find the gas. "I've never seen a convincing detection of indigenous methane on Mars, and I don't believe I ever will," says Kevin Zahnle, a planetary scientist at NASA's Ames Research Center in Moffett Field, California, who has argued that reports of Martian methane are observational errors.

But Oehler says that methane probably wafts out of geologically active regions on Mars, such as those riddled with faults. With the only ground measurements coming from Curiosity, scientists simply haven't had the chance to observe how the gas might be seeping from different parts of the surface, or how methane might be destroyed as it drifts upward.

The TGO will continue to monitor Mars's atmosphere through at least 2022. So far, it has observed only a fraction of a Martian year, which lasts nearly two Earth years. Hints of methane might yet emerge as the seasons pass. "One thing about Mars is it's never boring," says Oehler. ■

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MEDICAL RESEARCH

Cancer geneticists tackle ethnic bias in studies

Efforts are under way to fill long-standing gaps in genomic data from minority groups.

BY HEIDI LEDFORD, ATLANTA, GEORGIA

When Bárbara Segarra-Vázquez's breast cancer came roaring back last summer after a 13-year hiatus, her physicians recommended surgery and a genetic test to determine whether chemotherapy was warranted. The test results suggested that she could forgo the drugs, and she did. But a nagging doubt remains.

"They said, 'You don't need chemo.' But do I, or do I not?" says Segarra-Vázquez, dean of the School of Health Professions at the University of Puerto Rico in San Juan, who is Latina. "I don't know, because they didn't test people like me. The validation of that test was done in white Europeans."

Her story illustrates a long-standing bias in cancer research: most studies and genetic databases are populated mainly by data from people of European descent. This knowledge gap exacerbates disparities in cancer incidence and outcomes around the world. In the United States, for example, African American men are about twice as likely as white men to die of prostate cancer.

But researchers who study these inequities say they are encouraged by renewed interest in closing the data gap from their colleagues and funders, including the US government. The issue was unusually prominent at the annual meeting of the American Association for Cancer Research (AACR) this month in Atlanta, Georgia — one of the world's biggest gatherings of cancer researchers.

"It's a historical year for us working in cancer health disparities," says Laura Fejerman, a geneticist at the University of California, San Francisco, who studies breast cancer in Latina women. "We've been trying to show researchers who don't work on health disparities that this is a really important issue."

Differences in cancer risk and survival are thought to be caused by a complex mix of social, economic and genetic factors. The criteria used to select participants for clinical trials are often unintentionally biased against minority ethnic groups — for example, by excluding people with certain disorders that are more common in such populations. And members of these groups are sometimes distrustful of medical researchers, a legacy of past discrimination and studies conducted without adequate consent.

"We still have a long way to go."

Then there is the simple matter of numbers: the rarer a cancer, the harder it is to enrol enough study participants from a minority population to gather statistically meaningful data. A crop of large studies is attempting to address this problem, Fejerman says. They include an effort that the AACR launched last year to sequence the genomes of tumours from 2,020 African Americans by 2020.

Another project, announced last July and about to start recruiting participants, aims to enrol 10,000 African American men recently diagnosed with prostate cancer. The US$26.5-million effort is funded by the US National Institutes of Health and the Prostate Cancer Foundation, a charity in Santa Monica, California. Led by genetic epidemiologist Christopher Haiman of the University of Southern California in Los Angeles, it will examine not only biological features of participants' cancers, but also characteristics of their neighbourhoods and the social stressors — such as discrimination — they have experienced.

"People tend to think that the molecular features of a tumour are everything," says Jennifer Doherty, a cancer epidemiologist at the Huntsman Cancer Institute at the University of Utah in Salt Lake City. "But then we don't remember that the tumour exists within a human being."

A CLOSER LOOK

How genomic data is collected and labelled is also becoming more nuanced, as researchers re-examine the broad ethnic categories they have long used. The term 'Asian' encompasses dozens of countries with disparate lifestyles and genetic backgrounds. Similarly, 'African American' is used to refer to US citizens of African descent, regardless of which region of

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African Americans, such as this woman with lymphoma (left), are under-represented in genetic studies.

KAREN FOCHT/ ZUMA PRESS

Africa their ancestors called home.

That is a mistake, oncologist Olufunmilayo Olopade of the University of Chicago in Illinois told the AACR meeting. "Africa is a huge continent and you can't just reduce it to one monolithic population," said Olopade, who presented her work on African Americans in Chicago and Africans in Nigeria.

Mindful of such concerns, Fejerman has expanded her genetic studies of breast cancer to include Latinas outside the United States. She is putting together a consortium of researchers to study the disease in California and Latin American countries such as Peru. "It's great for us and for the Latinas in the US because we are learning about a genome that they share," she says. "But we are also giving something to the populations in Latin America that don't have the resources."

Despite such efforts, she worries that the cancer data gap will continue to widen. That would leave under-represented populations at a disadvantage as researchers pursue precision medicine, in which treatments are tailored to a person's genome and physiology. "The problem is that [Latinas] are so behind, so low in terms of numbers compared to women of European ancestry, that it's going to take a long time and a lot of money to make it equal," Fejerman says.

And with a problem as multifaceted as health-care disparities, there are inevitable debates about where funding and efforts should be focused. Candace Henley, a patient advocate in Chicago, finds preliminary genetic studies of minority groups frustrating. Why spend so much time and money digging through genomes when society has yet to address known causes such as discrimination and access to health care, she asks. "If these issues are not addressed, they will continue to cause disparities," says Henley. "We still have a long way to go." ■

FUNDING

Brazil freezes science spending

Move to put nearly half of the science ministry's budget on ice could derail major projects.

BY CLAUDIO ANGELO

Researchers in Brazil are up in arms after President Jair Bolsonaro's government announced late last month that it had frozen 42% of the budget for the country's science and communications ministry (MCTIC).

The decision is especially painful because the science ministry is already struggling with a budget that is one of its lowest in 14 years. Brazil's congress approved 5.1 billion reais (US$1.45 billion) for the MCTIC in 2019; the freeze, announced on 29 March, leaves the ministry with just 2.9 billion reais for the rest of the year.

Unless government officials release some of the funds, agencies within the MCTIC, such as the National Council for Scientific and Technological Development (CNPq) — Brazil's main research-funding agency — could run out of cash as early as July.

The freeze will cripple Brazil's scientific and technological development if the government does not reverse it, said the Brazilian Science Academy and five other scientific societies in a statement on 1 April. "It will take many decades to rebuild the country's science and innovation capacity." The government tried to slash the MCTIC's budget by 44% in 2017, but it restored some of the money later that year.

It is not yet clear how the current freeze will affect the MCTIC's agencies and 16 federal research institutes. But the government did announce a nearly 80% funding freeze on 29 March for the ministry's spending on infrastructure — including its new Sirius synchrotron facility in Campinas, which physicists hope to use to study the structure of matter. Scientists are on edge, fearing delayed projects, wasted research efforts and a brain drain.

Workers managed to complete construction of the Sirius synchrotron's main building and two of its three accelerators last year, and researchers were planning to start experiments later this year, says Antonio Roque da Silva, the project's director. The facility will cost Brazil 1.8 billion reais over 8 years, making it the country's most expensive science project ever.

Officials have scrambled to keep the state-of-the-art facility afloat since Brazil's science-funding slump started in 2014. But they've received only half of the 255 million reais needed to run the facility this year. "Even during serious restriction periods, we managed to keep construction going," Roque says. "But we never had our budget cut by half before."

What worries Roque the most is losing personnel. "I have people constantly being offered positions in labs abroad," he says. "Losing them is the biggest risk to the project."

Ronald Shellard, director of the Brazilian Center for Research in Physics (CBPF) in Rio de Janeiro, fears for Brazil's ability to honour international commitments. The CBPF is part of 20 international science collaborations, including the Large Hadron Collider near Geneva, Switzerland, and the Pierre Auger ▶

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