

23,000 or so human genes present in the blood at any given time.

Chiu's group is analysing these genes — collectively known as the transcriptome — using machine learning. The scientists are searching for similarities between the transcriptomes of people with the illness, and differences between the transcriptomes of those with AFM and people with other, known infections, including those caused by enteroviruses. Once the team knows which genes are relevant to AFM cases, it can test for them directly.

"We're not relying on detecting the virus — we already know we can't detect the virus," says Chiu, who published some of the machine-learning methods in late November<sup>2</sup>. His group hasn't published any results yet because they're still preliminary. But the scientists' data suggest that the expressed genes that are common among people with AFM are those that researchers would expect to see in a person whose immune system is fighting a virus.

"I think it's definitely promising," says Weldon. He says that the CDC has been working with Chiu's group, and is talking with other teams that are pursuing similar experimental tests based on host-immune response.

Khatri stresses that researchers will need to train the machine-learning algorithm with data from diverse populations. Immune responses may vary depending on a person's ethnicity or country of origin, which can determine which pathogens people encounter, he says. Thorough training of the algorithm is especially important if researchers want to use similar host-response diagnostic techniques widely.

One group, led by infectious-disease researcher Christopher Woods at Duke University in Durham, North Carolina, has developed a transcriptomics test that can

determine with 90% accuracy whether a bacterium, a virus or an autoimmune reaction is responsible for a person's symptoms<sup>3</sup>.

The distinction is important for treatment, Woods says, and could prevent physicians from prescribing unnecessary antibiotics for viral or autoimmune diseases.

Khatri's group has developed a test that predicts whether a person will develop active tuberculosis. About 25% of the world's population harbours the bacterium that causes the illness, but only about 5–10% of these people develop symptoms<sup>4</sup>. The test from Khatri's group could allow researchers to categorize and prioritize people for treatment before the disease becomes severe.

Chiu hopes that the host-immune response approach could also help to explain why

only some people infected with EV-D68 develop AFM. His group is also sequencing the genomes of children with the condition. The researchers hope that this information — combined with the transcriptome data — might provide hints about who could be susceptible to the illness before the next outbreak, which many researchers expect to occur in 2020. "These cases this year provide valuable data for us in evaluating how it might progress in the future if we see additional outbreaks," Chiu says. ■

1. Hixon, A. M. *et al. PLoS Pathog.* **13**, e1006199 (2017).

2. Langelier, C. *et al. Proc. Natl Acad. Sci. USA* <https://doi.org/10.1073/pnas.1809700115> (2018).

3. Tsai, E. L. *et al. Sci. Transl. Med.* **8**, 322ra11 (2016).

4. Sweeney, T. E. *et al. Lancet Respir. Med.* **4**, 213–224 (2016).



Most of those affected by the outbreak of acute flaccid myelitis are children.

## PUBLISHING

# China backs open-access plan

Officials pledge support for 'Plan S', which aims to make papers immediately free to read.

BY QUIRIN SCHIERMEIER

**I**n a huge boost to the open-access movement, librarians and funders in China have said that they intend to make the results of publicly funded research free to read immediately on publication.

The move, announced at an open-access meeting last week in Berlin, includes a pledge of support for Plan S, a bold initiative launched in September by a group of European funders to ensure that, by 2020, their scientists make papers immediately open.

It is not yet clear when Chinese organizations

will begin implementing new policies, or whether they will adopt all of Plan S's details, but Robert-Jan Smits, the chief architect of Plan S, says the stance is a ringing endorsement for his initiative. "This is a crucial step forward for the global open-access movement," he says. "We knew China was reflecting to join us — but that it would join us so soon and unambiguously is an enormous surprise."

In three position papers, China's National Science Library (NSL), its National Science and Technology Library (NSTL) and the Natural Science Foundation of China (NSFC), a major research funder, all said that they support

the efforts of Plan S "to transform, as soon as possible, research papers from publicly funded projects into immediate open access after publication, and we support a wide range of flexible and inclusive measures to achieve this goal". They add: "We demand that publishers should not increase their subscription prices on the grounds of the transformation from subscription journals to open access publishing."

The government will now urge Chinese funders, research organizations and academic libraries to make the outcomes of publicly funded research free to read and share as soon as possible, says Xiaolin Zhang, chair of the ▶

► Strategic Planning Committee of the NSTL at the Ministry of Science and Technology in Beijing. He told the meeting that the NSFC, NSTL and NSL will support the government's request to make research papers open immediately after publishing, and that implementation policies should follow soon. He expects funders to push all researchers in China to follow suit.

Zhang told the Open Access 2020 conference, convened by Germany's Max Planck Society, that any idea that open access has little traction in China is misleading. Since 2014, funders and research institutions in China have encouraged — and funded — scientists to publish papers in open-access formats, and to archive manuscripts openly online. But, he added, much of China's scientific output is locked behind paywalls. "NSFC funds about 70% of Chinese research articles published in international journals, but China has to buy these back with full and high prices," he says. "This is simply wrong — economically and politically."

He called on publishers at the meeting to start negotiating transformative deals with Chinese library consortia without delay. Such 'read and publish' agreements, which have been struck by a number of European national library consortia, and which the University of California system is also hoping to negotiate, cover the subscription costs of paywalled journals, but also allow corresponding authors at eligible institutions to publish their work openly in those journals.

#### CLEAR SIGNAL

China's commitment to ending subscription publishing took publishers at the meeting by surprise. "This is the first clear signal I received from China on this matter," said Daniel Ropers, chief executive of Springer Nature. "We were under the impression that open access isn't quite as urgent an issue in China as it is in Europe and the United States. If it is indeed, we are more than happy to engage."

Springer Nature, he says, already offers a broad range of open-access journals and would consider developing the portfolio further in all disciplines of science. But he says a viable solution is still needed for highly selective subscription journals, including *Nature*, to satisfy Plan S. (*Nature*'s news team is editorially independent of its publisher, Springer Nature.)

As it stands, the plan would bar scientists funded by participating agencies from publishing their work behind a paywall after 2020, unless they can also archive the accepted manuscript immediately online with a liberal publishing licence (which few subscription journals permit). Many subscription journals do offer an open-access option, but Plan S will fund publication by that 'hybrid' route in only some cases, and will review this policy in 2023. ■



The European Union's Galileo network (artist's impression) is a global satellite-navigation system.

#### BREXIT

## UK satnav plan faces high hurdles

*Britain says it has abandoned plans to rejoin the Galileo system for defence — but its alternative is problematic.*

BY DECLAN BUTLER

The row over Britain's attempt to stay fully involved in the European Union's global satellite-navigation (satnav) system, Galileo, after it departs the bloc, is back in the headlines after science minister Sam Gyimah cited it in his resignation statement last month. Gyimah's resignation came after the country's Prime Minister Theresa May had said that the UK government would end talks with the EU on Galileo, and would instead consider building its own global satnav system for use after Brexit.

That idea was first floated by the government in May, but many experts have dismissed it as expensive, unnecessary and even unfeasible — the lack of available space on the radio spectrum to run such a system could be a show-stopper.

*Nature* digs into the dispute.

#### What did the science minister say about Galileo?

Gyimah said that the EU's superior hand in negotiations over the programme convinced him that Britain would fare badly in future Brexit negotiations on other issues, including research.

#### What is Galileo, and why is it so important?

Galileo is one of four global satnav systems, which provide myriad civilian, scientific and defence services. The others are the US Global Positioning System (GPS), Russia's Global Navigation Satellite System (GLONASS) and China's BeiDou, which will be fully operational in 2020. The EU started the Galileo programme in 1999 to break its dependence on the GPS and GLONASS.

The Galileo constellation — comprising 26 satellites — was completed this July; a near-complete constellation began beaming down