CECILIA BASTOS/USP

Phosphoethanolamine capsules were manufactured at the University of São Paulo.

have claimed remarkable recoveries, perpetuating the compound's reputation as a miracle cure.

Dismayed by this unofficial distribution of phosphoethanolamine, the university's administration moved in September 2015 to shut it down. Patients took the university to court, and in October 2015, Brazil's Supreme Federal Court ruled in favour of one plaintiff who wanted the right to try the compound. A lower court then began granting orders for the university to provide it to others. University officials say that they were soon overwhelmed by more than 800 requests.

"The decision not only ignored the opinion of medical specialists, but also overlooked the fact that the drug has only been tested on animals," says bioethicist Volnei Garrafa at the University of Brasilia. "Such court decisions bring false expectations for patients and their families, creating turmoil in society and confusion between what is safe and what is not."

The Brazilian constitution guarantees universal access to health care, and it is common in Brazil for patients to turn to the courts to access drugs that the state health-care system does not dispense because of their cost, says Garrafa. But phosphoethanolamine presents a different situation, he adds, because it is not really a 'drug' at all. It is not approved by Brazil's National Health Surveillance Agency.

Those who argue that people who are terminally ill have a right to try experimental medicines saw the decision earlier this year as a significant victory. But to the university administration, drug regulators and cancer researchers, it showed blatant disregard for the basic scientific principle that a drug should be demonstrated to be safe and effective before being given to patients outside of a clinical trial.

"It's a violation of the autonomy of the university," says Marco Antonio Zago, a physician and president of the University of São Paulo. "We are seen as a factory to produce something that we do not believe should be done."

Phosphoethanolamine is an important building block of the lipids that make up cell membranes. The compound can also act as a molecular signal that activates certain cellular processes. Although some studies do suggest that the compound may kill cancer cells in isolated cells and mice, it is not entirely clear how the compound brings about this response. Biochemist Durvanei Augusto Maria at the Butantan Institute in São Paulo believes that the compound may be imported into tumour cells and, once inside, trigger processes that cause the cell to self-destruct. Immunologist James Venturini at São Paulo State University and his colleagues have found that phosphoethanolamine may modulate the immune system's response to cancer or affect cell division (M. S. P. de Arruda *et al. Braz. Arch. Biol. Technol.* **54,** 1203–1210; 2011).

But to justify using phosphoethanolamine in people, Venturini says, one would have to rigorously test it in a series of clinical trials using human volunteers. "I strongly believe that double-blind, randomized clinical studies are necessary," he says.

And even before such trials, further preclinical studies would have to be done, says Jailson Bittencourt de Andrade, secretary for research-and-development policy at Brazil's science and technology ministry. The ministry plans to fund those studies, he says, and has already asked several research laboratories in the country to do the work. If those tests and subsequent clinical trials are successful, he says, the ministry will also fund the research needed to scale up phosphoethanolamine production to the quantities and quality needed for an approved drug.

That process will take years. In the meantime, lawyers representing people with cancer have vowed to appeal against the latest ruling. If those appeals succeed, de Andrade worries that people will not wait until all the tests are completed, and may even abandon conventional treatment in favour of phosphoethanolamine. "Many patients have come forward and said they have tried the drug and it has worked for them," he says. "So the other patients and their families — they want phosphoethanolamine now." ■ SEE EDITORIAL P.410

TIMEKEEPING

Leap-second decision delayed

Nations fail to agree on whether to scrap an adjustment that keeps official time in sync with Earth's rotation.

BY ELIZABETH GIBNEY

A leap second is gone in the blink of an eye. But a decision on whether to ditch these occasional time insertions — which keep official time synced with Earth's rotation — has been delayed for at least eight years.

This month, the International Telecommunication Union (ITU), which bears responsibility for defining official Coordinated Universal Time (UTC), was expected to reach a consensus. But representatives who discussed the issue at the World Radiocommunication Conference in Geneva, Switzerland, failed to agree on whether the leap second's costs outweigh its benefits.

Leap seconds, which occur once every few years, are necessary because Earth's rotation is slowing in an unpredictable way. Without them, the time of day when the Sun is at the highest point in the sky would drift by about one minute over about 100 years. However, these extra seconds have to be programmed into electronic systems manually and can upset systems that ▶

depend on accurate timings.

Most countries, including China, the United States and large parts of Europe, favour scrapping the leap second and basing UTC on the continuous tick of atomic clocks.

Official time would slowly move out of sync with Earth's rotation, but — given that it would take thousands of years to accumulate a difference that is greater than the shifts already caused by daylight savings time — many argue that this would cause few problems. "We are already shifted by one hour in summer compared to winter time," says Elisa Felicitas Arias, director of the Time Department at the International Bureau of Weights and Measures (BIPM) in Sèvres, France, who wants to scrap the leap second. "Are we affected because of that?" A correction — perhaps a leap minute or hour — could be added once the drift is appreciable.

A small number of countries however, including Russia and the United Kingdom, want to keep the leap second. Russia is concerned about how its global navigation system, GLONASS — the only one to incorporate leap seconds — would cope, says Vincent Meens of France's National Centre for Space Studies, and the chair of the ITU subgroup tasked with debating the topic. Britain's argument is based largely on the desire to keep a link between official time and Earth's rotation, says Peter Whibberley, a metrologist at the National Physical Laboratory in Teddington, UK.

Astronomers are among those who would be affected if the leap second were to be scrapped. Their software would need to cope with Earth's rotational time — which defines when stars and galaxies are seen in the sky — being offset by more than a second from universal time, says Meens.

On 18 November, the ITU announced that it would defer a decision until 2023 when it will have more information on the impacts of losing the second.

The union did, however, decide to make changes to the international treaty that currently defines UTC, and in turn the leap second. Rather than having a stand-alone definition of UTC, the treaty will cite an SI definition, and mention of the leap second will move to become part of a 'description' of UTC in a subsidiary section of the treaty that expires in 2023.

Whibberley says that the effect will be to remove responsibility for UTC from the ITU, and that the General Conference on Weights and Measures (CGPM) — which is already responsible for defining SI units, including the second — is most likely to become the authority in the future. But the change is unlikely to speed up the decision on whether to scrap the leap second: the CGPM's next chance to even propose a change is not until 2018. ■

Decades of studies on chimpanzee brains and behaviour will be captured in an online resource.

VINCENT J. MUSI/NATL GEOGRAPHIC CREATIVE

BIOMEDICAL RESEARCH

Chimps retire to a digital world

NIH to fund a cache of brain tissue and online data in place of live-animal experimentation.

BY SARA REARDON

Panzee the chimpanzee was a skilled communicator that could tell untrained humans where to find hidden food by using gestures and vocalizations. Austin the chimp was particularly adept with a computer, and scientists have been scanning its genome for clues to its unusual cognitive abilities.

Both apes lived at a language-research centre at Georgia State University in Atlanta, and both died several years ago — but they will live on in an online database of brain scans and behavioural data from nearly 250 chimpanzees.

Researchers hope to combine this trove, now in development, with a biobank of chimpanzee brains to enable scientists anywhere in the world to study the animals' neurobiology.

This push to repurpose old data is especially timely now that the US National Institutes of Health (NIH) has decided to retire its remaining research chimpanzees. The agency decommissioned more than 300 animals in 2013, but kept 50 available for research in case of a public-health emergency. Following an 18 November decision, this remaining population will also be sent to sanctuaries in the coming years. The NIH also hopes to retire another 82 chimps that it supports but does not own, says director Francis Collins.

"We were on a trajectory toward zero, and today's the day we're at zero," says Jeffrey Kahn, a bioethicist at Johns Hopkins University in Baltimore, Maryland, who led a 2011 study on the NIH chimp colony for the Institute of Medicine.