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Alien life

More doubts cast on potential signs of life in Venus's atmosphere

Abigail Beall

THE recent signal of phosphine gas in Venus's atmosphere, which could potentially be a sign of life, has been called into question again. A new study of the data in the original paper suggests there are no signs of the gas after all.

The original work, led by Jane Greaves at Cardiff University in the UK, examined how light is absorbed as it passes through the Venusian atmosphere, leaving dark absorption lines in the light's spectrum. Greaves's team found an absorption line and identified it as phosphine.

Ignas Snellen at Leiden University in the Netherlands and his colleagues re-examined the data and found no such absorption line. The researchers say their new method of data analysis introduces fewer flaws.

This is common in astronomy, with detections seen in objects that vanish when other people reduce the data, says Christopher Conselice at the University of Manchester in the UK, who wasn't involved in either study.

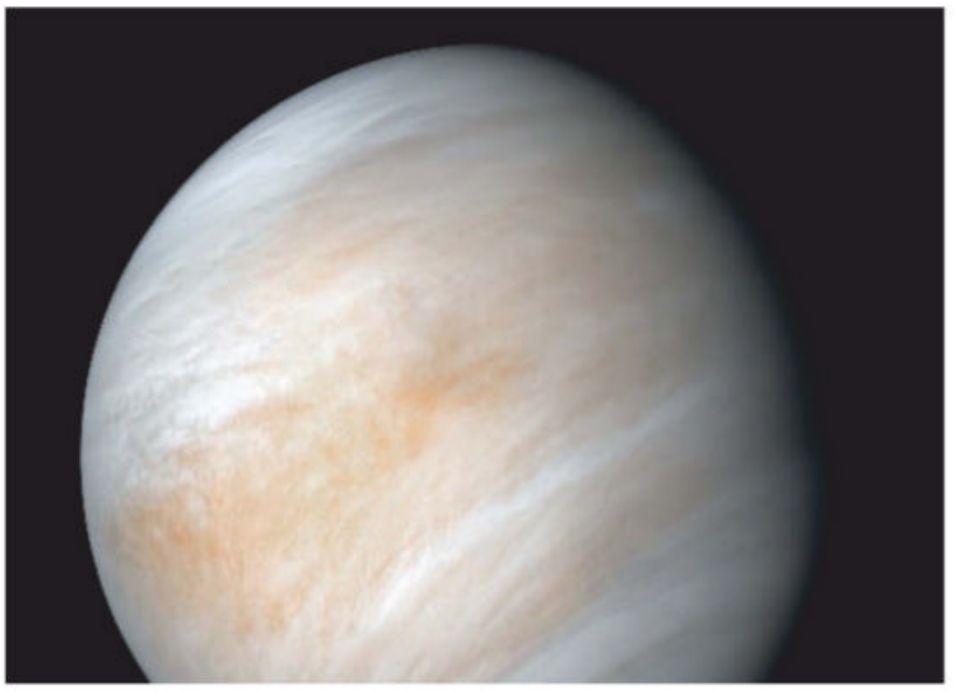
The original research was done using interferometry, in which information is collected by an array of separate telescopes that then has to be pieced together. "[This] is probably one of the most complex types of astronomical data to analyse," says Conselice.

Because of that, there are many ways to process the data. Disturbances or noise must be reduced, and Snellan and his team say the original methods used to do this introduced errors, such as the phosphine signal. When they tried to replicate it, they found that five more absorption or emission signals had been spuriously added (arxiv.org/abs/2010.09761).

"It demonstrates the fundamental challenge of working on important and exciting science when one is simultaneously working very near the limits of the data quality," says Brad Gibson at the University of Hull in the UK.

Snellan and his team's study is yet to be peer reviewed, and some astronomers have said it is too early to speculate about its findings. Some believe another independent analysis is required. Others argue we need more data. "Only new observations will be able to confirm the detection of this potentially biogenic gas," says Abel Méndez at the University of Puerto Rico at Arecibo.

The phosphine seen in Venus's clouds may not be there after all



NASA

The study comes after another analysis led by Clara Sousa-Silva at the Harvard-Smithsonian Center for Astrophysics in Massachusetts, who was involved in the original phosphine observations, found no hint of phosphine on Venus when examining an older set of infrared data (arxiv.org/abs/2010.07817).

The original data set used by both Greaves's and Snellan's teams has been removed from the public archive where all results from the Atacama Large Millimetre/submillimetre Array (ALMA) observatory are published because of a potential problem in the early stages of data processing.

Researchers from Greaves's team declined to comment until the new processing had been applied. "Until this process is completed, we cannot say whether the issue affected the detection of phosphine reported," says an ALMA spokesperson. ▮

Obesity

CRISPR gene editing turns normal fat into energy-burning fat

METABOLIC conditions linked to obesity could be treated by removing fat from a person, turning it into energy-burning "beige fat" using CRISPR gene editing and then implanting the altered fat back into the body, animal studies suggest.

"It would be a personalised therapy for metabolic disease," says Silvia Corvera at the University of Massachusetts Medical School.

While most fat merely stores energy, some types – known as brown and beige fat – burn glucose to produce heat. People have small patches of brown fat but it only becomes active after repeated exposure to the cold.

Corvera's team previously showed that implanting extra beige fat into mice fed a high-fat diet makes them better at regulating blood sugar levels. Another team led by her colleague Michael Czech has shown that normal fat can be turned into what appears to be beige fat by switching off a gene called *NRIP1*.

Now the two teams have joined forces. The researchers used CRISPR genome editing to deactivate the *NRIP1* gene in human fat precursor cells, which then gave rise to beige fat cells. They then implanted these cells into mice. When the animals were put on a high-fat diet, those implanted with the human beige fat put on almost half as much weight as those implanted with unedited human fat. Those given beige fat also continued to regulate blood sugar normally, whereas those with normal fat became glucose intolerant (bioRxiv, doi.org/ffkf).

"This would be a personalised therapy for metabolic conditions, such as those linked to obesity"

Around a gram of fat from a person would provide enough fat precursor cells for the treatment, says Corvera. The method will need to be tested in non-human primates before being tried in humans. ▮

Michael Le Page