New Scientist

WEEKLY 2 November 2024

SPECIAL ISSUE

HOW TO EAT BETTER

The seven chewiest questions about nutrition and your health

Is snacking ever good for you?

Can your diet reduce inflammation?

Does personalised nutrition work?

What is the one thing you should eat more of?

And more...

STRANGE MICROBES REWRITE ORIGIN OF COMPLEX LIFE

HOW ANCIENT PARIS BECAME A STONE AGE TRADING HUB

AI SOLVES IMPOSSIBLE MATHS PROBLEMS

No3515 £6.95 CAN$9.99

Health

Electric skin patch could keep wounds free of infection

Carissa Wong

A PATCH that zaps the skin with electrical pulses could prevent bacteria on the skin from causing blood poisoning, reducing our reliance on antibiotics.

SAEHYUN KIM/UNIVERSITY OF CHICAGO

This bioelectronic patch can reduce the number of bacteria under it by shocking them

Staphylococcus epidermidis **bacteria usually live harmlessly on human skin, but if they enter the body after surgery or via skin cracks due to conditions such as psoriasis, they can cause bloodstream infections, which can lead to dangerously low blood pressure.**

Antibiotics can prevent and treat these infections, but antibiotic-resistant strains of *S. epidermidis* have emerged.

Now, Bozhi Tian at the University of Chicago and his colleagues have turned to electricity. They created a device from square plastic patches 1 millimetre wide, each containing gold electrodes that, when wired up, produce electrical pulses that can't be felt by people. They then spread a strain of *S. epidermidis* onto five samples of disinfected pig skin and put a patch on top of each.

After zapping the skin for 10 seconds every 10 minutes for 18 hours, *S. epidermidis* levels were reduced 10-fold on these samples compared with others that had non-electric patches put on them.

The intervention also disrupted the ability of the bacteria to join up to form a layer called a biofilm, which is linked to more severe infections (*Device*, doi.org/npjc).

The results suggest that the patches could cut the risk of drug-resistant *S. epidermidis* infections, says Tian.

Astrobiology

Molecule needed for life spotted outside solar system for first time

Alex Wilkins

A COMPLEX form of carbon crucial for life on Earth has been detected beyond the solar system for the first time. Its presence helps show how the compounds needed for life could come from space.

The most abundant form of carbon in the universe is that found in carbon monoxide gas, but it is unclear how this turns into the complex compounds found in biological life, which typically contain stronger chemical bonds.

Astronomers have spotted asteroids – such as Ryugu – containing compounds with these stronger carbon bonds. It is thought that such space rocks may have delivered the ingredients for life to Earth, but the original source of the carbon-based compounds in objects like asteroids still isn't well understood.

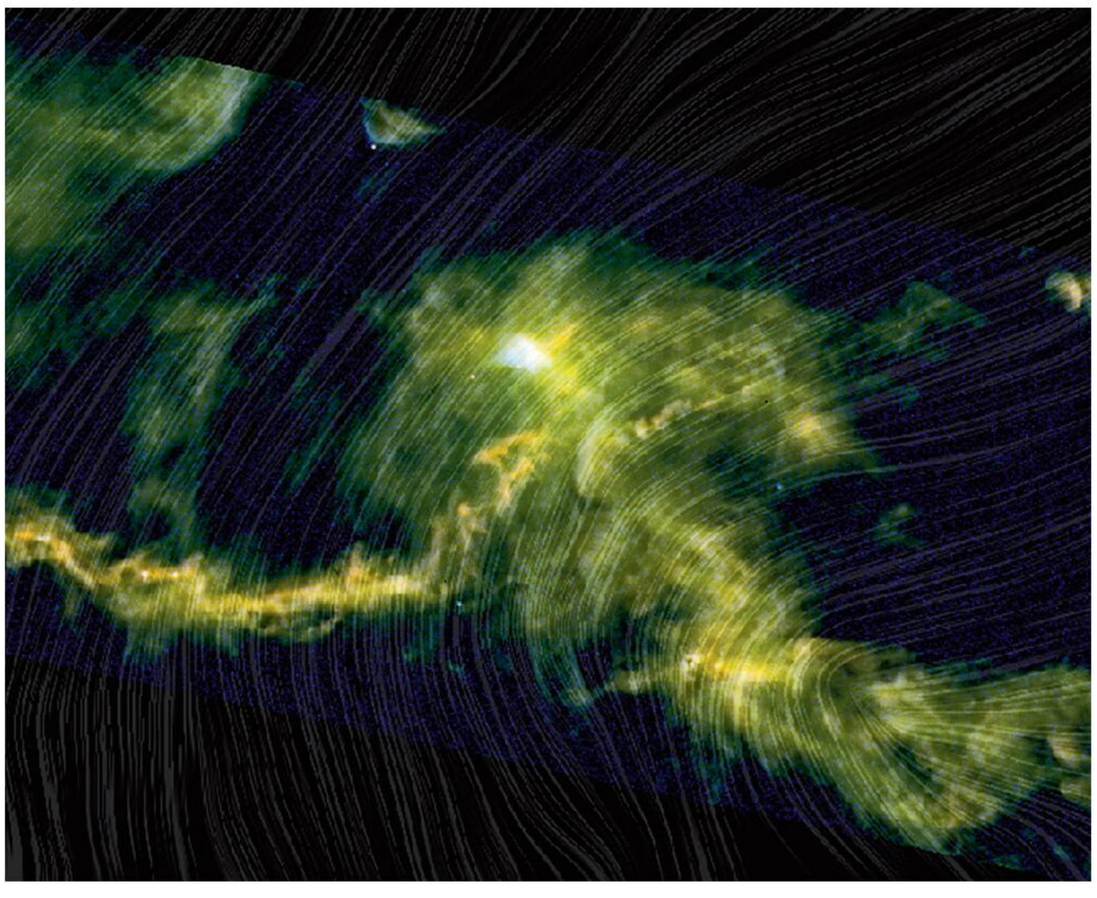
Now, Brett McGuire at the Massachusetts Institute of Technology and his colleagues have looked for and detected a complex, carbon-based molecule called pyrene in a star-forming region called the Taurus molecular cloud. At 430 light years away, this is one of the closest such clouds to Earth.

"Now we're looking back in time and seeing the same molecules forming"

The researchers used the Green Bank Observatory in West Virginia to search for the radio signature of pyrene. Such molecules would be crucial intermediaries between carbon monoxide and complex carbon molecules in living organisms.

Pure pyrene isn't that easy to detect clearly with radio waves, so McGuire and his colleagues instead looked for cyanopyrene, which is pyrene with an attached cyanide molecule, and compared it against the signature of cyanopyrene that they had also carefully produced and measured in the lab on Earth (*Science*, doi.org/npjb).

The Taurus molecular cloud contains compounds known as pyrenes



ESA/HERSCHEL/PLANCK; J. D. SOLER, MPIA

The cloud the researchers saw the cyanopyrene in is extremely cold, at about 10 degrees above absolute zero (-263°C), which means we are seeing these carbon compounds existing at a stage long before a star has formed, says McGuire.

"Now, we're seeing both ends of this life cycle," he says. We are seeing the chemical archaeological record in our solar system in asteroids and on Earth, says McGuire, "and now we're looking back in time at a place where another solar system will form, and seeing these same molecules there forming. We're seeing the start of the archaeological record."

Space reservoir

Assuming that the radio signal McGuire and his team observed from the Taurus molecular cloud is representative of elsewhere in space, it suggests that cyanopyrene is extremely abundant, and possibly one of the largest chemical reservoirs of complex carbon in the universe, he says.

Finding these molecules and the environment that they are in means that chemists can start sketching out the precise chemical reactions and pathways that eventually led to the building blocks of life on Earth, like nucleic acids, says Martin McCoustra at Heriot-Watt University, UK.

It isn't straightforward to explain how the pyrene molecules form in the first place, he says. "What else is in that environment that would lead us to [pyrenes]? We're seeing here a much richer understanding of complex chemistry tied up with these aromatic molecules."