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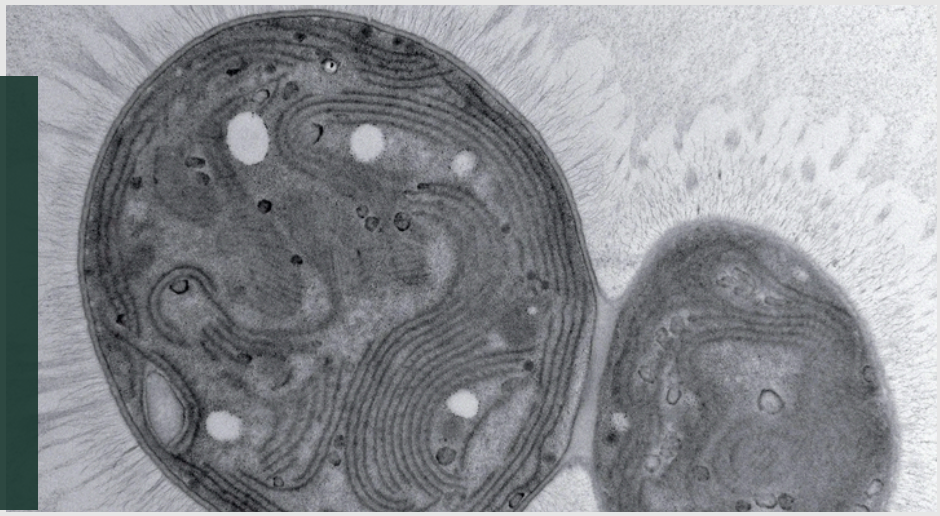
SPARC WEEKLY

CHONKUS

THE MUTANT CYANOBACTERIA THAT COULD HELP SINK CLIMATE CHANGE

This hulking mutant of Synechococcus elongatus stores more carbon and sinks more quickly than other strains



Stand back, ordinary ocean-dwelling, oxygen-spewing organisms: There's a new green, hulkish mutant in town.

And hefty UTEX 3222 — dubbed "Chonkus" by the researchers who found it — may have just the right combination of traits to help with some of humanity's most pressing problems. In particular, Chonkus could help fight climate change, report microbiologist Max Schubert.

Chonkus was discovered in the shallow sunlit waters off the coast of Italy's Vulcano Island, where volcanic gas-rich groundwater seeps into the sea.

S. elongatus is a favorite lab organism, because of how quickly it grows and how resistant it is to environmental stressors. And the new mutant, is like a superpowered version! When they cultured the strain in the laboratory, its individual cells were larger than those of other fast-growing cyanobacteria, and it built larger colonies.

The mutant also contained more carbon than other strains of *S. elongatus*, apparently stored in white granules within its cells. The strain was also heavy: When placed into a test tube, the cyanobacteria rapidly sank to the bottom, forming a dense sludge.

HTTPS://WWW.SCIENCENEWS.ORG/ARTICLE/CHONKUS-CLIMATE-CHANGE-CYANOBACTERIA

THE FAR SIDE OF THE MOON

This image of the far side of the moon is a mosaic of thousands of images captured by the wide-field camera onboard NASA's Lunar Reconnaissance Orbiter

We only ever see half of the moon. Earth's gravity locks our celestial companion in such a way that the same side always faces us. The other half — the so-called far side — looks different. And scientists have only just begun to learn what it's like.

Over the past half century, scientists have studied hundreds of pounds of lunar chunks. Almost all were retrieved from the moon's near side. In June, though, a Chinese spacecraft brought back rocks and soil from the far side.

They represent the first hands-on exploration of our companion's unseen side — and will soon reveal how different the near and far sides are. Those pieces can also help put together a timeline of the moon's evolution. Its stories, in turn, can tell us about the events that shaped our own planet.

How the moon formed

In the beginning, our solar system was just a disk of gas and dust orbiting a baby sun.
By some 4.5 billion years ago, that gas and dust had begun to glom together. This formed larger pieces. For millions of years, the resulting space rocks smashed, merged and grew. The young solar system was like a cosmic game of dodgeball. Then, "over time, the impacts become less and less," says Miki Nakajima.

At some point during these cosmic collisions, a protoplanet likely slammed into the young, developing Earth.

Such a smash would have been powerful enough to break apart the colliding orb. It also may have knocked loose some matter from the young Earth and sent it into space. All that floating debris could have mixed before glomming back together.

Studies show that certain types of chemical elements in moon rocks match those on Earth. To Nakajima and others, this suggests Earth and its moon come from the same source. Whatever formed the moon left its mark on Earth.

Perhaps the impact spewed material from the young Earth into space, where the debris mixed with the colliding object and formed the moon. Or maybe the energy from that smashup vaporized both the impactor and the top layers of Earth into small particles. These might then have mixed in space, some material becoming our moon and the rest falling back to Earth's surface.

HTTPS://WWW.SNEXPLORES.ORG/ARTICLE/MOON-SAMPLES-FAR-SIDE-EARTH

AN ANCIENT LOG SHOWS HOW BURYING WOOD CAN FIGHT CLIMATE CHANGE

In 2013, Ning Zeng came across a very old, very important log.

At the time, he and his colleagues were digging a trench in the Canadian province of Quebec. They planned to fill it with 35 metric tons (39 U.S. tons) of wood. Then, they would cover that wood with clay soil and let it sit for nine years. The goal? To show that the wood wouldn't decompose.

If it worked, this exercise would prove that that burying plant matter could be a cheap way to store carbon. Keeping such carbon from entering the atmosphere could help fight climate change.
But while digging their trench, Zeng's team unearthed a pristine, twisted log. It was very old — older than anything they could have possibly produced in their experiment.

"I remember standing there just staring at it," says Zeng. He's a climate scientist at the University of Maryland in College Park. He recalls thinking, "Wow, do we really need to continue our experiment? The evidence is already here — and better than we could do."

Scientists unearthed this 3,775-year-old piece of wood in Canada. It had held onto at least 95 percent of its carbon, thanks in part to being covered by a layer of clay soil, a new analysis shows.

The uncovered log was once part of an Eastern red cedar. Some 3,775 years ago, this tree had drawn carbon dioxide, or CO2, from the air and then used its carbon molecules for the creation of wood. When it died, the tree got buried beneath as little as two meters (6.5 feet) of clay soil.

That barrier, it now turns out, allowed the log to hold onto at least 95 percent of its carbon. Zeng and his colleagues shared their findings September 24 in *Science*.

"Scientists and entrepreneurs have long contemplated burying wood as a climate solution. This new work shows that it is possible," says Daniel Sanchez. An environmental scientist at the University of California, Berkeley, he did not take part in the study.
"High-durability, low-cost climate solutions like these hold immense promise for fighting climate change," he says.

https://www.snexplores.org/article/burying-wood-carbon-fight-climate-change

WHO ARE WE?

SPARC Robotics Team's mission and vision is to make our environment the best it can be. On a volunteer basis, we look at the problems that are happening around us and make them our problems, both as SPARC and individually, and help as much as we can with appropriate projects.

NASA ACCP (Astro Camp Community Partners) was only in the US until four years ago. This year they came to Turkey with us after four years of traveling to many countries. ACCP educates school-age children from kindergarten to high school on science-related topics of interest with practical knowledge and application, while also supporting children's craft development, general culture and questioning skills.

As SPARC, we have brought this training provided by NASA to our country in the most comprehensive way and our continuous communication with NASA not only enables us to improve our trainings day by day, but also gives us the opportunity to learn about the innovations in the field of STEM instantly, from the most accurate source and to spread the knowledge we have around us.

EDITOR

Hello, I'm Defne Ulu and I am the editor of this edition of our newsletter. With my friend, Defne Yağmur Şehidoğlu, we prepare the SPARC newsletters.

I hope you learned new and interessting facts from these articles and I hope it has helped you to keep your mind out of your problems while reading it.

Have a good day.
See you next week!!