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Health

Common antibiotics seem to regenerate heart cells in animals

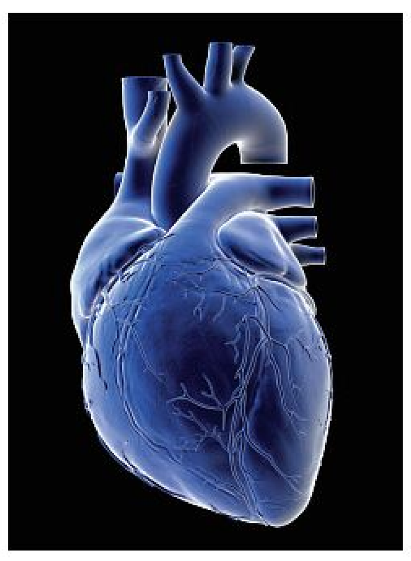
Grace Wade

TWO widely used antibiotics may be able to regenerate heart cells in pigs, suggesting they might one day be used to treat heart failure.

Heart failure occurs when the heart can't pump enough blood to meet the body's needs. It often develops after heart attacks, which damage cardiac muscle. Other than an artificial heart or a heart transplant, treatments can only slow the condition's progression.

Now, Hesham Sadek at the University of Texas Southwestern Medical Center and his colleagues have used drug discovery software to screen already approved medications for the ability to bind to two proteins – Meis1 and Hoxb13 – that prevent heart muscle cells from dividing and regenerating. This helped the researchers identify two antibiotics that spurred rat heart muscle cells to divide in a dish: paromomycin and neomycin.

The researchers administered an intravenous infusion of both drugs to seven pigs with damaged hearts.



SHUTTERSTOCK/SEBASTIAN KAULITZKI

We might be able to use antibiotics to regenerate muscle cells in the heart

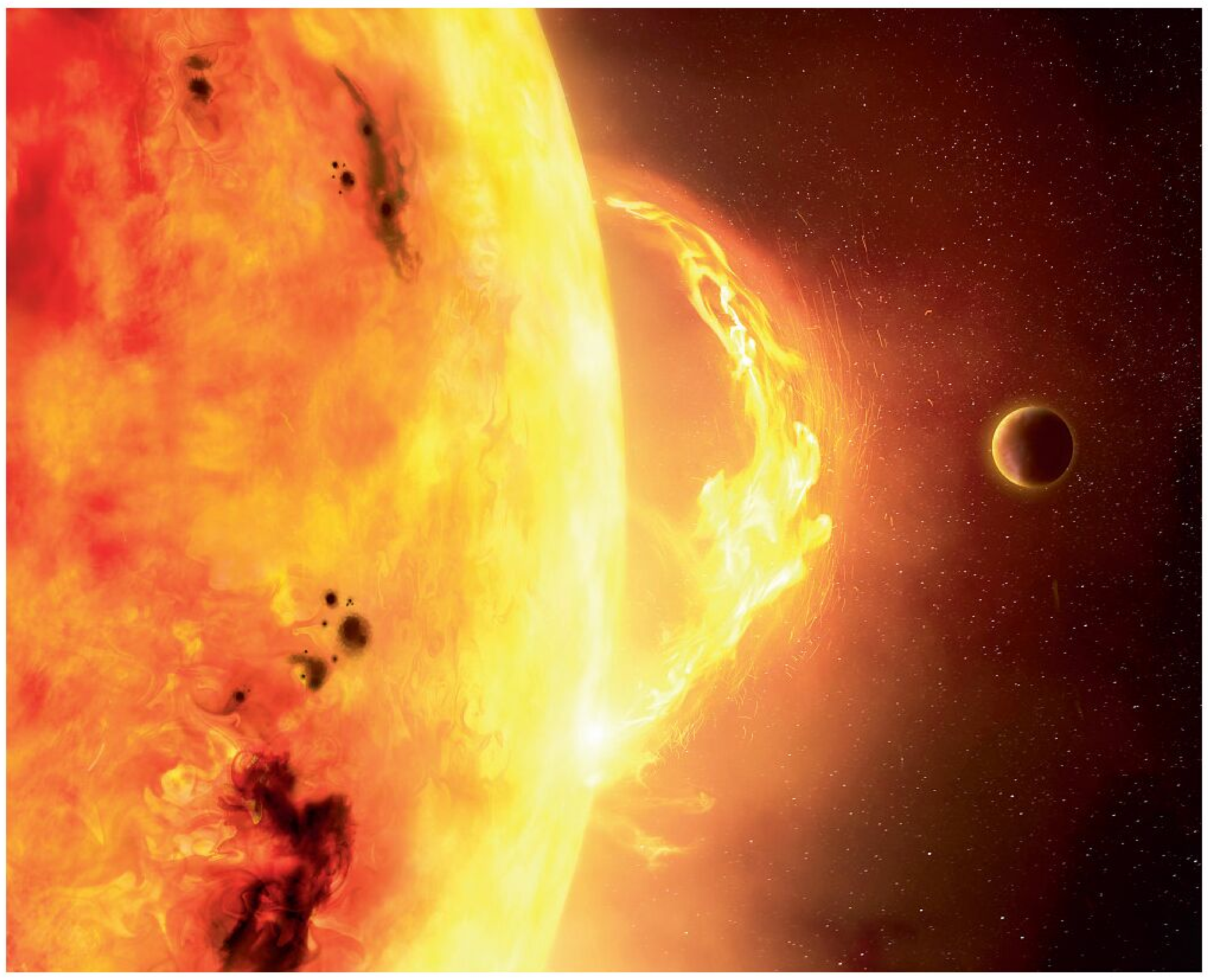
After five weeks, treated pigs' hearts had roughly half the amount of scar tissue as hearts from untreated animals with cardiac damage and were better at pumping blood (*Nature Cardiovascular Research*, doi.org/mm9z).

Hearts of treated pigs also had a roughly 25-fold increase in a biological marker of cell division compared with untreated pigs. The findings suggest that the antibiotic combination regenerates heart cells, says Sadek. ▮

Space

Largest recorded solar storm was even bigger than we thought

Alex Wilkins



JAMES THEW/ALAMY

Plasma from the sun can cause geomagnetic disruption on Earth

THE biggest recorded solar storm in history, the Carrington event of 1859, may have been even rarer and more extreme than we thought, according to rediscovered magnetic data gathered at the time.

In early September 1859, a massive solar flare was seen and a coronal mass ejection – a bubble of plasma and magnetic field expelled from the sun – struck Earth's atmosphere, triggering a geomagnetic storm that produced dazzling auroras and fried telegraph wires for days. If an event of similar magnitude happened today, it could cause havoc, knocking out satellites, communication systems and power grids.

Most of our knowledge of the Carrington event comes from contemporaneous descriptions from astronomers, including Englishman Richard Carrington, or magnetic recordings taken from an observatory in India. However, neither contains detailed numbers describing the storm's magnetic intensity, so it has been hard to know how strong the storm was compared with modern examples.

Now, Ciaran Beggan at the British Geological Survey and his colleagues have digitised paper recordings of Earth's magnetic field made throughout the Carrington event at two observatories in London, at Kew and Greenwich. They found that the intensity and speed of change in the magnetic field during the storm indicate it was at least a 1-in-100-year event, possibly as extreme as a 1-in-1000-year event (*Space Weather*, doi.org/mnfm).

1859

The year a solar ejection caused the huge Carrington event

This brings the storm more in line with some of the original estimates of its strength in an 1861 scientific paper, later revised down by physicists because they thought the original recordings were inaccurate. "Looking at the rate of change [of magnetic field intensity] just computed from the magnetograms, it's at least 500 nanotesla per minute, which kind of supports what the original 1861 papers suggested," says Beggan.

That is almost twice the expected size of a 100-year event, which would be about 350 nanotesla, he says.

To digitise the data, Beggan and his colleagues took images of the London magnetograms, which had been made using a magnetic needle suspended by a thread, the movement of which was recorded on paper to show the strength of the storm. They converted the millimetre deviations into a scale of standardised units. The needle goes off the chart for the peak of the storm, and some of the graphs are hard to read, so there is still some uncertainty over the storm's maximum strength, he says.

The researchers also found readings for an apparent geomagnetic storm several days before the Carrington storm, which may have contributed to the extreme nature of the latter. This is because the previous storm may have swept away some of the solar wind – the plasma of protons and electrons flowing out from the sun – leaving a clearer path for the Carrington storm, says Beggan.

"This is confirmation of how extreme the event was," says Ravindra Desai at the University of Warwick, UK. "People talk about the Carrington event being a 1-in-100 year event, but it's still just a bit wishy-washy. Having a published paper which quantitatively says this, is really, really valuable." ▮