



CLOSING IN ON A CURE FOR MIGRAINES

Science Focus

The secrets of
YOUR SECOND BRAIN

Why we don't need
ROBOTS THAT LOOK LIKE US

**THE NEXT GENERATION OF SPACE TECH
IS HERE AND IT'S GOING TO TAKE US TO
PLACES WE'VE NEVER SEEN BEFORE**

INTO THE UNKNOWN



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The Cartwheel Galaxy, as imaged by NIRCam and MIRI aboard the James Webb Space Telescope

SPACE

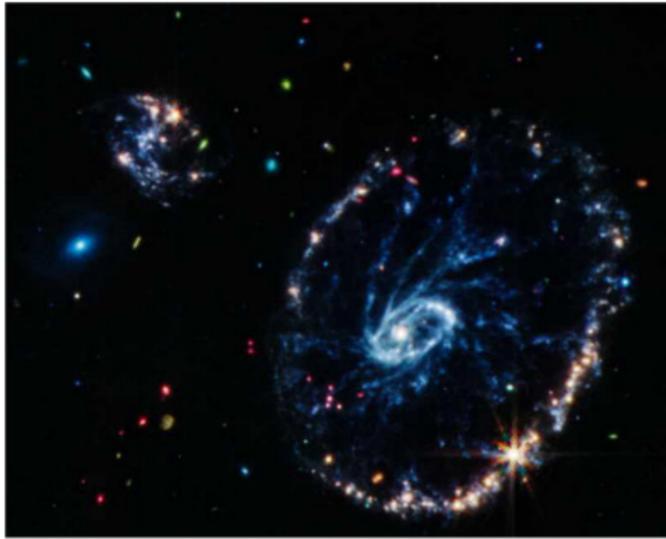
NEW IMAGE OF CARTWHEEL GALAXY SHOWS US HOW STARS ARE BORN

This stunning image released by the James Webb Space Telescope reveals the inner workings of a rare ring galaxy in unprecedented detail

Images captured by the high-precision instruments on the James Webb Space Telescope (JWST) have given astronomers a close-up view of the Cartwheel Galaxy – a bizarre ring galaxy that formed following a collision between a large spiral galaxy and a smaller neighbouring galaxy.

The images were captured by the telescope's Near-Infrared Camera (NIRCam) and Mid-Infrared Instrument (MIRI), and are sharp enough to show the individual stars scattered throughout the galaxy's spectacular form.

The Cartwheel Galaxy was previously captured by the Hubble Space Telescope, but the JWST's capability to detect infrared



This image, taken by MIRI, gives astronomers information about the distances of additional galaxies in the background; the closest are in blue, the furthest are green and red

“The galaxy is located about 500 million light-years from Earth in the Sculptor constellation”

light has now uncovered new insights about the galaxy’s structure and life cycle.

The blue dots seen in the images are individual stars, or areas of star formation, while the red dots show areas rich in hydrocarbons.

The galaxy is located about 500 million light-years from Earth in the Sculptor constellation. Its wheel-like appearance is the result of a highly energetic collision between a large spiral galaxy and a smaller galaxy, which cannot be seen in this image.

It consists of two clearly visible rings – a bright inner ring and a more colourful outer ring. Both rings are expanding outwards from the site of the collision, much like the ripples created by throwing a stone into a pond. And at its centre is a black hole.

The galaxy’s bright core is crammed with raging clouds of hot dust and is littered with young star clusters. The outer ring, which astronomers say has been expanding for about 440 million years, triggers the formation of new stars as it collides with surrounding gas.

The researchers say that the Cartwheel Galaxy is in a state of great change and that further study of this mysterious cosmic object will provide insight into its formation, life cycle and future.

BIOLOGY

OUR GUT MICROBIOMES ARE BEING STARVED OF FIBRE

Modern low-fibre diets could increase the risk of cardiovascular disease, digestive disorders and colon cancer, but supplements could help

Current NHS guidelines state that an average adult should aim to consume around 30g of dietary fibre a day. However, recent figures released by the British Dietetic Association suggest that UK adults are eating just 18g a day.

This is bad news, as insufficient fibre in our diets can have a negative impact on our health and could increase the risk of cardiovascular disease, digestive disorders and colon cancer.

Of course, the most straightforward way to address this would be to simply eat more fibre as a natural part of our diets. But in today’s world of fast food, ready meals and sugary desserts, this can be difficult. Now, a study at Duke University in the US has found that taking dietary fibre supplements may help to make up the shortfall.

When we consume a high-fibre diet, the organisms that make up our gut microbiome produce fatty acids that protect us from digestive diseases, obesity and colorectal cancer. One particular fatty acid, butyrate, has been shown to improve the gut’s resistance to disease, reduce inflammation and improve the health of cells lining the intestine.

“We’ve evolved to depend on nutrients that our microbiomes produce for us,” said study co-author Dr Zack Holmes. “But with recent shifts in diet away from fibre-rich foods, we’ve stopped feeding our microbes what they need.”

The team split 28 participants into groups and gave them one of three types of commonly available fibre supplements – inulin, dextrin and galactooligosaccharides – for one week in different orders.

On the first day of each week the participants were given 4.5g of inulin or dextrin, or 1.8g of galactooligosaccharides, to let their guts get accustomed to the new fibre intake. The dose was then doubled in each case for the rest of the week. After each week-long course, they gave the participants a week off to allow their guts to return to their normal state.

Participants who were already consuming a high-fibre diet saw little change in their gut microbiomes. However, participants who had been consuming the least fibre saw a significant increase in butyrate, regardless of which supplement was being consumed.

“We didn’t see a lot of difference between the fibre supplements we tested. Rather, they looked interchangeable,” said study leader Dr Lawrence David. “Regardless of which of the test supplements you pick, it seems your microbiome will thank you with more butyrate.”