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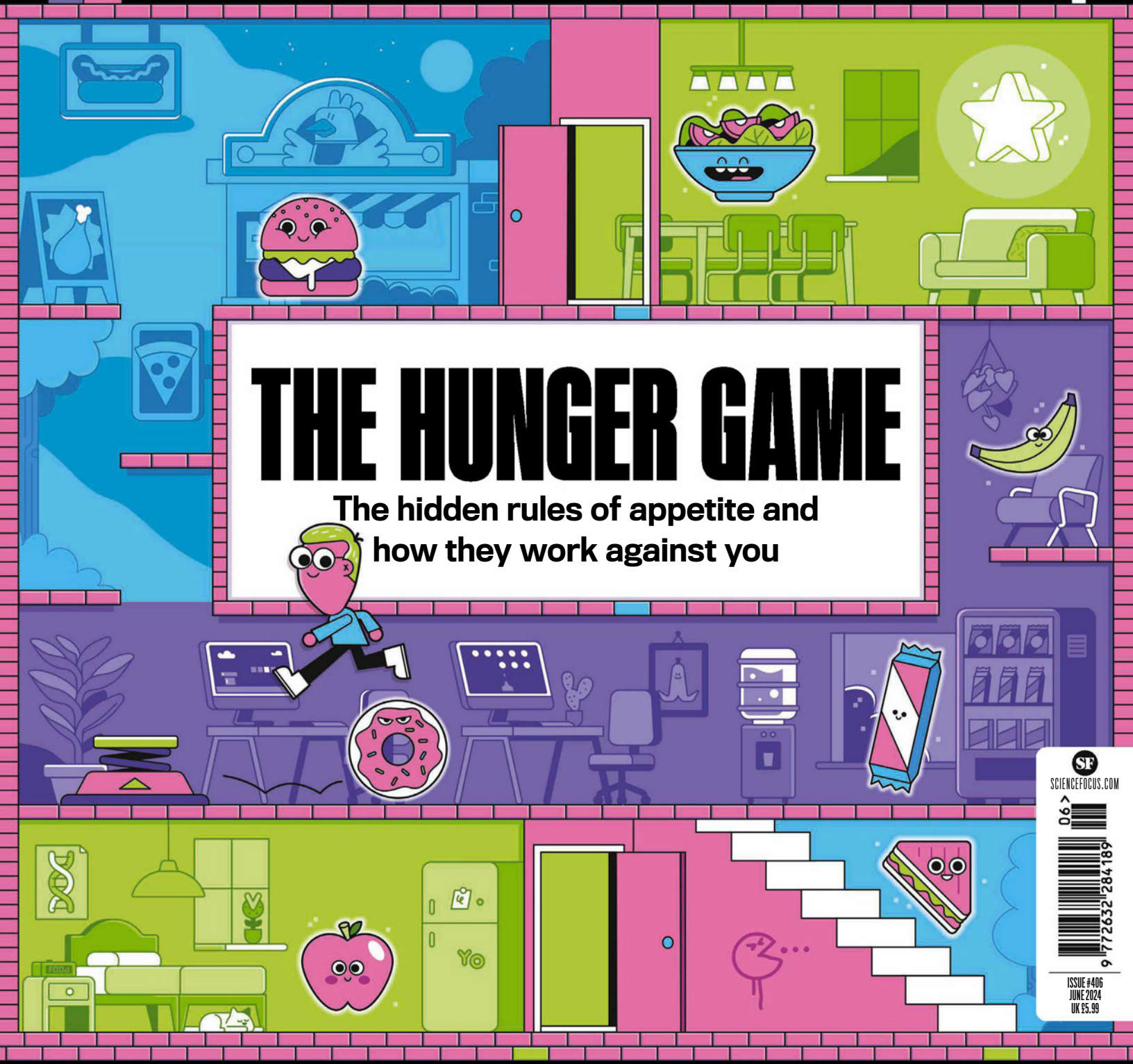

THE HUNGER GAME

The hidden rules of appetite and how they work against you

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HEALTH

INTERMITTENT FASTING AND CORRECTLY TIMED WORKOUTS ARE KEY TO FAT LOSS, SAYS STUDY

A new approach to dieting and exercise could help you lose weight and enhance your health

A new study has not only found that time-restricted eating is most effective when combined with high-intensity exercise, but also that the timing of these two approaches could enhance their benefits.

Time-restricted diets limit when, but not what, you eat. In the study, published in the journal *PLOS ONE*, this counted as eating within an eight-hour window and then fasting for 16 hours. High-intensity functional training (HIFT), meanwhile, combines aerobic and resistance exercise in repeated sets.

The research team from the University of Sfax, Tunisia, found that women with obesity had an improved body composition and cardiometabolic health after completing a 12-week programme where these two methods were combined. Crucially, the exercise took place just after the eating period had ended. "Combining exercise (or simply physical activity) and diet is the best strategy to improve metabolic health, irrespective of weight loss," nutritionist Dr Adam Collins, who was not involved in the study, told *BBC Science Focus*. "I think this could be further enhanced by looking at the timing of eating around exercise, too."

For the study, the scientists assigned 64 obese women aged between 22 and 42 years to one of three programmes. These were: time-restricted eating only, high-intensity exercise only, and a combination of both.

The high-intensity exercise elements took the form of three 45–55 minute workouts per week at 5pm (for those on time-restricted diets, this was the start of their fasting period). After the 12 weeks, the scientists measured the impacts on cholesterol levels, blood glucose and lipid levels, as well as other markers of cardiometabolic health.

The results? All three groups saw significant weight loss and decreases in waist and hip circumferences – as well as healthier lipid and glucose levels. But those in the combined diet and exercise group saw bigger changes – and the researchers think this approach could be easier to commit to in the long term.

SPACE

ORIGIN OF EARTH'S 'SECOND MOON' DISCOVERED

Asteroid sampling mission will confirm whether moon-like Kamoʻoalewa came from our Moon

If you were told that the Moon we see in our night sky isn't Earth's only one, you'd probably be a bit surprised. But some people have started to call the strange object that seems to orbit our planet, Earth's 'second moon' – and now scientists may have discovered where it came from.

In fact, there are many moon-like objects around us in space, but only a handful of the over 200,000 'near-Earth asteroids' (NEAs) have similar orbits to Earth.

One of these, named 469219 Kamoʻoalewa, orbits the Sun, but moves in sync with our orbit so appears to orbit the Earth. This makes it our 'quasi-moon' or, to some, an 'Apollo asteroid.' Potentially as big as the Statue of Liberty, Kamoʻoalewa is between 40 and 100m (131–328 feet) across and rotates quickly: completing one rotation every 28 minutes.

Generally, NEAs are space rocks that scientists think have come from the Main Asteroid Belt between Mars and Jupiter. But new research reveals Kamoʻoalewa may be more moon than asteroid.

Published in the journal *Nature Astronomy*, the new study used existing analysis of Kamoʻoalewa's light spectrum. This analysis revealed that it had silicates (a type of mineral) that are more common in lunar samples. In other words, Earth's 'second moon' probably came from its first.

The research team from Tsinghua University, China, used computer model simulations to test this theory. They found that Kamoʻoalewa's physical shape and orbit fitted with it being a fragment chipped off in a massive impact that

GETTY IMAGES, ADDY GRAHAM/UNIVERSITY OF ARIZONA

"They found that Kamo'oalewa's physical shape and orbit fitted with it being a fragment chipped off in a massive impact that caused a crater on the far side of the Moon"

caused a crater on the far side of the Moon. Specifically, they have matched the timeline of the collision to a 21km-wide (13-mile) crater named Giordano Bruno.

Everything we know about Kamo'oalewa so far has come from ground-based observations. But in 2025, the quasi-moon will be the target of China's asteroid sampling mission Tianwen-2, which might confirm the results. Still, Kamo'oalewa is not technically Earth's second moon. "While the term quasi-moon helps us appreciate the origin of these small fragments, they have no effect on us and are completely different to other moons in our Solar System," astronomer Dr Darren Baskill, who was not involved in the study, told *BBC Science Focus*. "The Earth could have millions of quasi-moons, if we include all the small fragments that have been ejected into space by such collisions."

ABOVE Using existing research combined with computer modelling, astronomers are closer to knowing exactly where the 'quasi-moon' Kamo'oalewa came from