

Science Focus

The tech that lets you
LEARN WHILE YOU DREAM

How to overcome
BODY DYSMORPHIA

A brief history of
GETTING DINOSAURS WRONG

GET MORE TIME

How to actually find more hours in your day and avoid burning out



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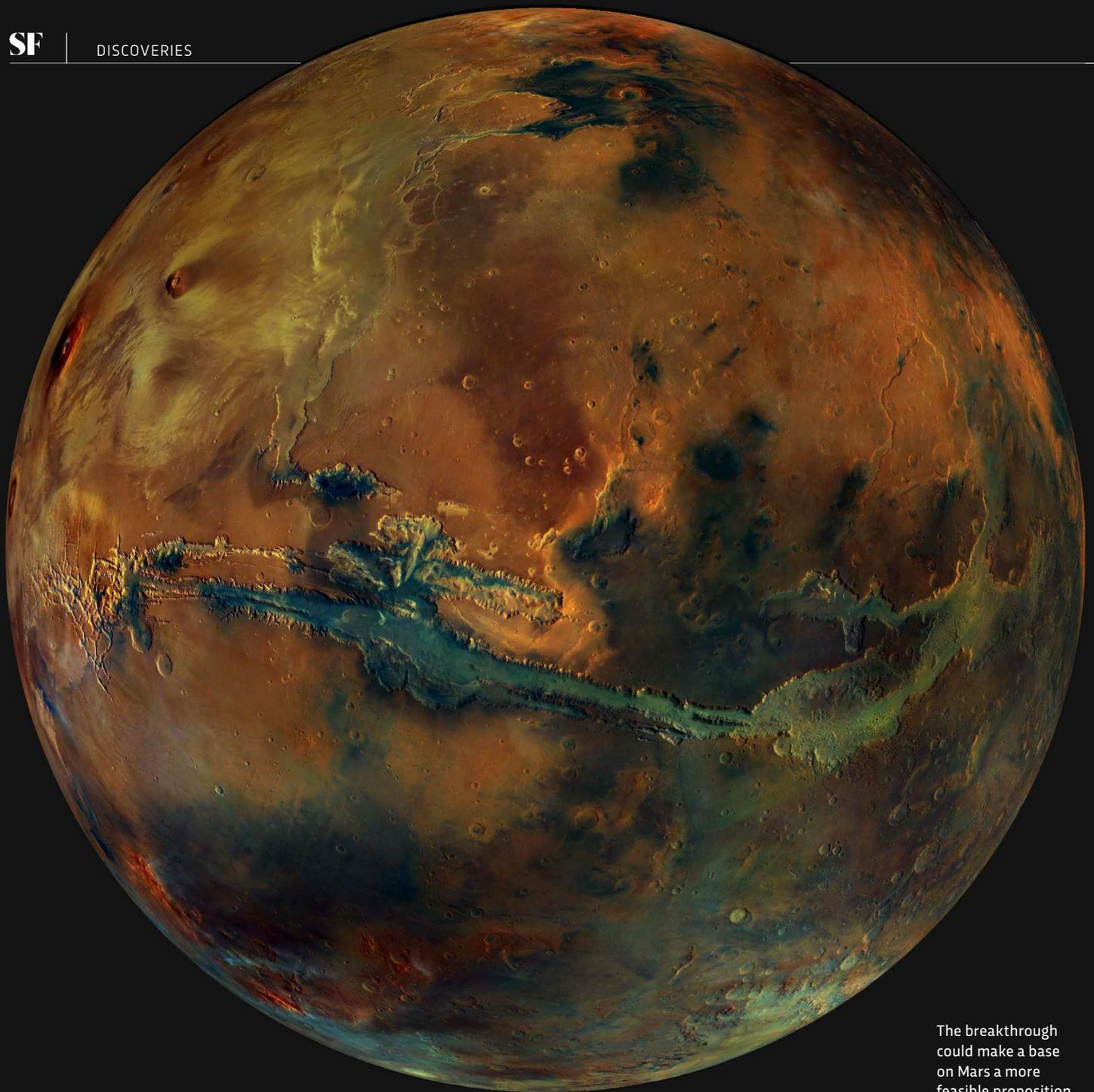
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The breakthrough could make a base on Mars a more feasible proposition

SPACE

PHOTOSYNTHESIS WITHOUT PLANTS COULD MAKE LIFE ON MARS POSSIBLE

Researchers have found a way to harness light to help us explore space and save Earth

Scientists have developed a process that mimics photosynthesis, but without plants – and it could help make it possible for us to live on Mars.

It involves harvesting solar energy and storing it in chemical bonds, which scientists can then convert into products such as fuel, fertilisers and breathable air. Essentially, the process captures light and transforms it into useful chemicals, much like a plant does.

Researchers at the University of Warwick are behind the development,

in partnership with the European Space Agency (ESA), the Georgia Institute of Technology, in the US, and the Centre of Applied Space Technology and Microgravity, in Germany.

Semiconductors, like those in solar cells, are used to absorb light in the same way that chlorophyll (the green pigment in plant leaves) can. Once stored, the solar energy can then be converted, with scientists using it to split compounds such as water into oxygen and hydrogen. In a space setting, the oxygen would be essential for breathing

HEALTH

DAYTIME FATIGUE SLEEP DISORDER COULD BE AFFECTING MILLIONS

If you find yourself feeling sleepy throughout the day, a not-so-rare sleep disorder could be to blame

while the hydrogen could be used to make fuel for spacecraft.

The process, according to the researchers, wouldn't need big industry infrastructure or even electricity to work because it generates electricity itself. What's more, it can produce other molecules depending on which semiconductor is used. For example, the scientists hope to use this method

“Semiconductors are used to absorb light in the same way chlorophyll can”

to convert carbon dioxide (CO₂) in Earth's atmosphere into 'solar fuels'. While there's only a comparatively small concentration of CO₂ in Earth's atmosphere, converting it into fuel could play a part in the fight against climate change. On Mars, however, the CO₂ concentration is incredibly high – around 96 per cent.

The energy conversion process will be tested in a rocket later this year or in 2025. During the mission, a rocket containing an experimental version of the process will fly to the edge of space and then return after spending five to six minutes in microgravity.

The researchers hope that, if it's successful, the process will have applications for life on Earth and Mars. This, according to Dr Katharina Brinkert, associate professor at the University of Warwick, will involve experts from a variety of fields in what she calls a “Manhattan Project for the energy challenge”.

“I think there's a lot to learn from each other because a lot of the problems we have for space [travel] are so pressing that we can't go unless we solve them,” Brinkert told *BBC Science Focus*. “But we're trying to solve the same problem on Earth, because we need more efficient, reliable, sustainable energy sources to tackle climate change.”

Despite a good night's sleep, many people still find themselves feeling drowsy and fatigued throughout the day. According to a study published in December, this could be explained by a sleep disorder that might be more common than previously thought.

Idiopathic hypersomnia is a neurological disorder that can cause people to feel very tired during the day, sleep for excessive periods of time, have difficulty waking up and even wake up disorientated.

While similar in nature, idiopathic hypersomnia is different to the more common narcolepsy. Narcolepsy can also cause people to feel tired throughout the day, but sufferers tend not to sleep excessively and can wake up feeling refreshed from naps.

“It has been difficult to determine the prevalence of idiopathic hypersomnia because expensive and time-consuming sleep testing is required to make a diagnosis,” said the study's author Dr David T Plante, from the University of Wisconsin-Madison in the US.

“We examined data from a large sleep study and found that this condition is much more common than previous estimates, and as prevalent as some other common neurologic and psychiatric conditions such as epilepsy, bipolar disorder and schizophrenia.”

The researchers behind the study analysed sleep data collected from 792 people with an average age of 59.

Every participant had to complete an overnight sleep study, as well as a daytime nap study, measuring how fast they fell asleep.

The participants were surveyed further on daytime sleepiness, fatigue, the amount of time spent napping and how many hours of sleep they get on a worknight and non-worknight.

In the surveys that measured sleepiness, a score range was set up between 0 and 24. Questions included how likely a person is to nod off while sitting, talking and while stopped in a car. On average, people with idiopathic hypersomnia had a score of 14, while those without averaged nine. Anything over 10 was deemed concerning.

With the results of the tests, the researchers were able to determine that 12 people had probable cases of idiopathic hypersomnia. This indicates a prevalence of 1.5 per cent in the wider population.

The study only assessed employed people, however. So the researchers note that the true prevalence of idiopathic hypersomnia could be even higher if the unemployed population were to be included.

