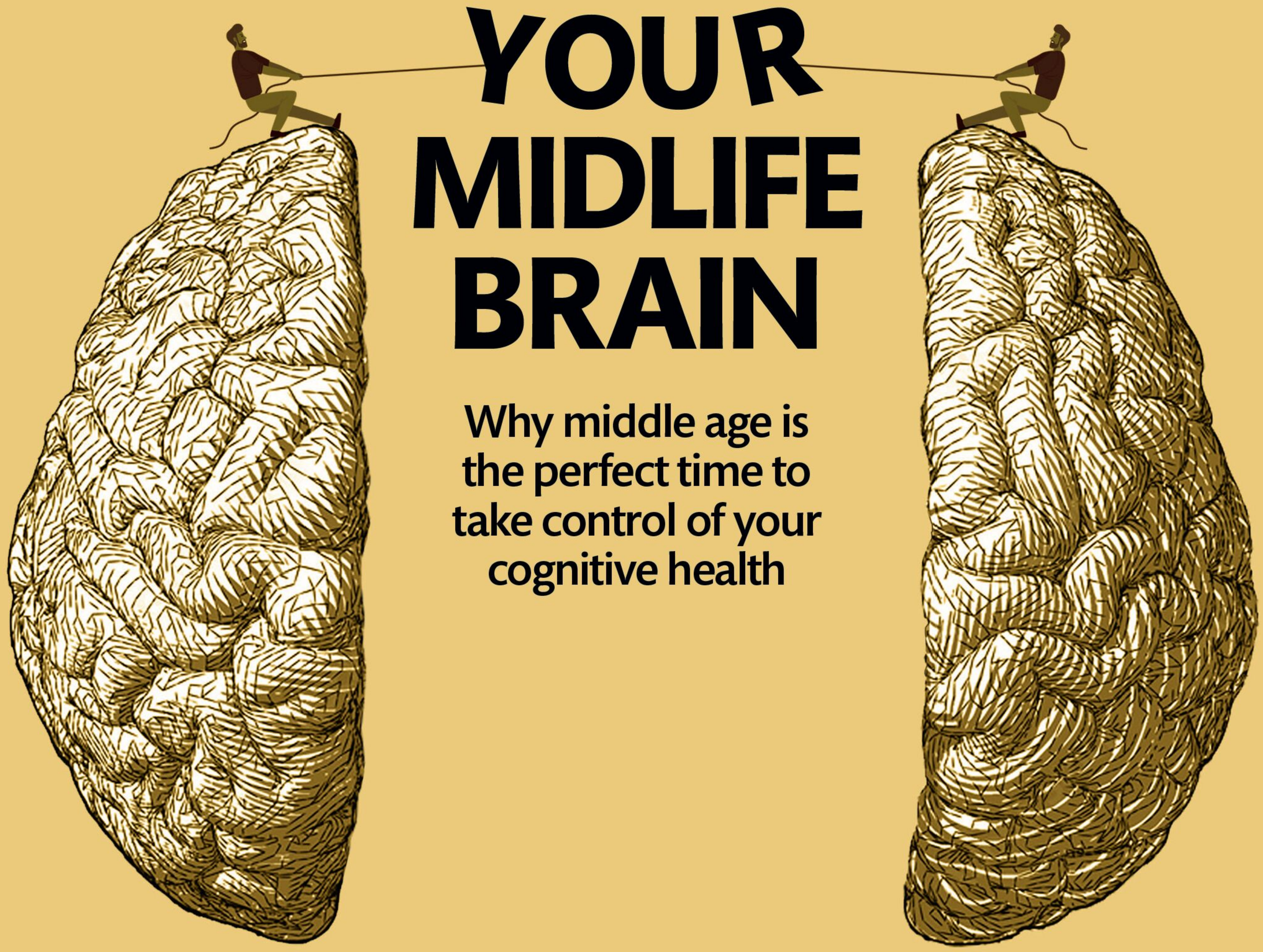
New Scientist

WEEKLY 20 July 2024

THE PLAN TO BUILD A TELESCOPE BIGGER THAN EARTH

LIFE'S OLDEST ANCESTOR JUST GOT OLDER

CAN WE PREVENT GPS ATTACKS ON PLANES?



YOUR MIDLIFE BRAIN

Why middle age is the perfect time to take control of your cognitive health

PLUS URINE-RECYCLING SPACESUIT
NAOMI KLEIN ON CONSPIRACY THEORIES
HOW TO MAKE A CLOCK FROM RANDOMNESS
THE BENEFITS OF DENISOVAN DNA

No3500 £6.95 CAN$9.99

9 770262 407374 29

Space

No waste in space

Urine-recycling spacesuit will keep astronauts supplied with drinking water

Matthew Sparkes

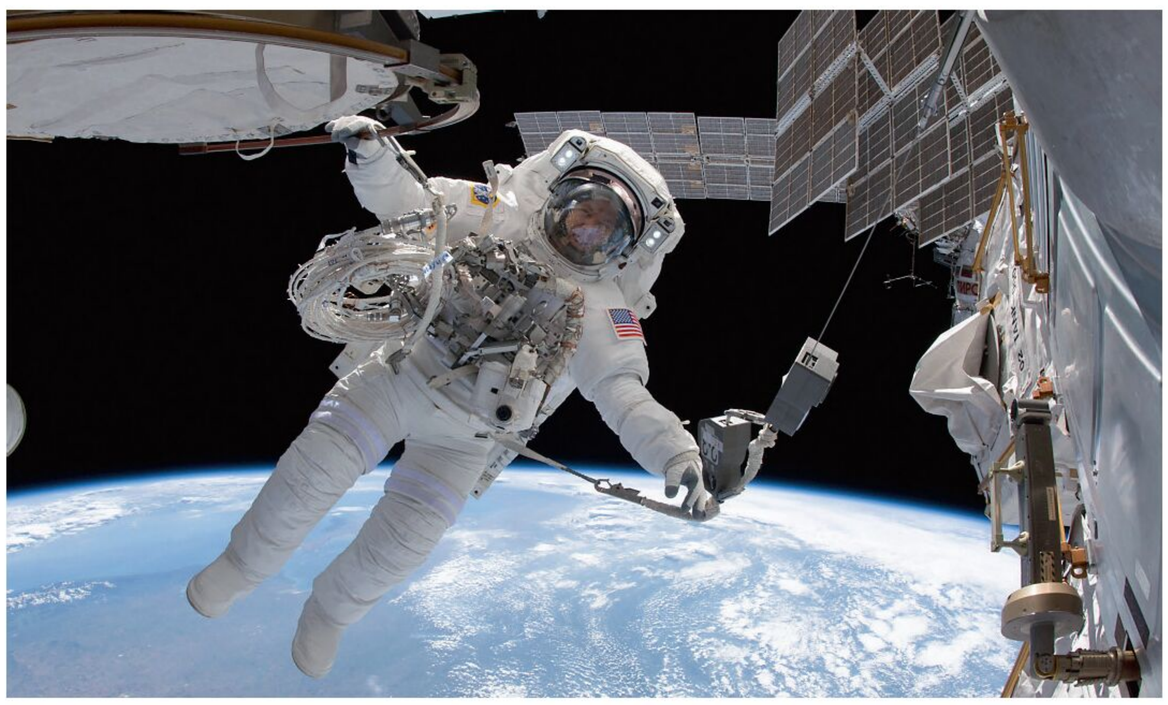
ASTRONAUTS on spacewalks may soon be able to drink their own urine, thanks to a water filtration and recycling system that could be ready in time for NASA's upcoming crewed missions to the moon.

Waste water from urine and sweat is already recycled on the International Space Station, but the bulky equipment required for this doesn't fit in a spacesuit. NASA's current solution is the Maximum Absorbency Garment, which, despite the technical name, is essentially just an adult diaper for collecting urine and faeces. At the end of a spacewalk, these diapers go into the ISS's waste system, eventually being burnt up in Earth's atmosphere – an unsatisfactory waste of resources.

Chris Mason at Cornell University in New York says the current solution is fine for spacewalks that tend to last only a few hours, but increasing activity in space means a better solution will be needed. He and his colleagues have now developed an 8-kilogram device around the size of a shoe box that can recycle urine – collected by unisex external catheters – with 87 per cent efficiency through a two-step osmosis filter.

The purified water is then ready to drink and can be piped into an in-suit bag. This has the additional benefit of ensuring a steady supply of drinking water: the current NASA spacesuits hold just under a single litre, which is often insufficient for a long spacewalk. The remaining 13 per cent of the drinking water content can't be extracted and remains in the filter (*Frontiers in Space Technologies*, doi.org/m7rs).

During spacewalks, astronauts have to wear diapers



NASA/ZUMA WIRE/SHUTTERSTOCK

"I thought this would have been done already, but it's not," says Mason. "People that are pushing the limits of humanity will often trade discomfort for the opportunity to explore an entirely new area of science or medicine."

The filtration technique is the same one that is already used on the ISS. But the team says it is easier to extract water from pure urine as it doesn't include soaps and chemicals, unlike the ISS waste water. Extracting water from stool isn't "totally solved" yet, but this is less of a limitation because astronauts often claim to simply hold bowel movements in during spacewalks, says Mason.

"People that are pushing the limits of humanity will often trade discomfort to explore new science"

Currently, the device is a prototype tested only in the laboratory, but human trials that include collecting urine, recycling it and drinking the resulting water will begin by November.

The researchers say the device could be built into new versions of spacesuits that are planned for NASA's upcoming Artemis missions to the moon.

NASA has contracted a private company, Axiom Space, to build its new suits, but the firm declined to answer *New Scientist*'s questions about how it would be dealing with human waste. NASA didn't respond to a request for comment. ▮

Health

Horse therapy benefits people with Alzheimer's disease

SPENDING time with horses seems to make people with Alzheimer's disease more sociable and improves their mood.

"We're seeing some really promising results with bringing Alzheimer's patients into nature with horses," says Léa Badin at the University of Tours in France.

Badin and her colleagues enrolled 34 people with Alzheimer's – 30 women and four men, aged between 80 and 98, living in four French nursing homes – to participate in either equine-assisted therapy or music therapy, an established way of supporting people with dementia. Both therapies consisted of a weekly 1-hour session over three months.

The 18 participants in the equine-assisted therapy group groomed and walked with horses, watched them and were told about what they eat. The remaining 16 participants were guided through breathing exercises, singing, moving to music and playing percussion.

"The therapy seemed to evoke lots of happy memories from younger days of horses on farms"

Using standardised psychiatric tests, the researchers determined that both therapies improved mood, but this was greater among those in the equine-assisted therapy group.

These individuals also had a greater increase in the number of social interactions they had with fellow participants and their own caregivers, compared with those in the music therapy group.

They also went on to show fewer signs of depression, with related symptoms declining rapidly by the sixth session. Badin presented the work at the Equine Science and Innovation conference in Saumur, France.

The outcomes may have arisen from the participants being comforted by interacting with an animal that is big and strong, but often quiet, says Badin. "The horses also seemed to evoke lots of happy memories from younger days, when these elderly patients used to see more horses on the roads and farms." ▮

Christa Lesté-Lasserre