New Scientist

WEEKLY October 8 - 14, 2022

FAT VS CARBS: A NEW WAY TO HACK YOUR METABOLISM

NUBIA FINALLY EMERGES FROM THE SHADOW OF ANCIENT EGYPT

THE PLANET THAT ESCAPED OUR SOLAR SYSTEM

MAGNETIC UNIVERSE

The forgotten force that sculpts our cosmos

THE NEXT WAVE

Are we heading for a covid-flu twindemic?

PLUS THE FIRST STARS / **OLIVER STONE ON NUCLEAR ENERGY** / **WHO SHOULD OWN AI ARTWORK?** / COCONUT SLOTH

Science and technology news **www.newscientist.com**

No3407 US$6.99 CAN$9.99

Cognition

‘Superagers’ with sharp memories have larger neurons

Carissa Wong

“SUPERAGERS” – people aged 80 or over with exceptionally good memories – may have larger than expected neurons in a region of the brain that is critical for memory.

With age, most people experience a gradual decline in their memory, but some maintain a remarkable ability to recall past events into their 80s or older, on par with people 20 to 30 years younger.

Alongside a decline in memory, our brains naturally shrink with age, with previous studies suggesting this occurs less with superagers. Now, researchers have shown superagers may have larger neurons in their entorhinal cortex.

Tamar Gefen at Northwestern University in Illinois and her colleagues imaged brains donated by six superagers who died at an average age of 91. The six individuals previously took part in ongoing research into superagers.

These images were compared with those from seven people who died at an average age of 89 and a further six who died at an average of 49, all of whom had memories that would be considered normal.

The superagers’ neurons were around 10 per cent larger than those of the people who died at a similar age with standard powers of memory. The superagers’ neurons were even around 5 per cent larger than those of the people who died 40 years younger, suggesting that larger neurons contribute to an exceptional memory (*The Journal of Neuroscience*, doi.org/jfg2).

“[The study] adds to the growing evidence that superagers differ from typical adults on multiple levels of the brain,” says Alexandra Touroutoglou at Harvard Medical School. “The sample size here is relatively small, but that’s understandable. Superagers are a rare group, so finding a good number of them in a postmortem brain study is difficult.” ▮

Astronomy

Long-lost rogue planet could explain distant asteroids

Leah Crane

A ROGUE planet twice the size of Earth may have pushed asteroids into the outer reaches of the early solar system before it was ejected. This could solve the mystery of how some of the most distant objects in the Kuiper belt got there, which can’t be explained by most models of solar system formation.

The Kuiper belt is a huge disc of cold rocks and ice that extends out beyond the orbit of Neptune. It contains three populations of objects: scattering objects, which typically orbit the sun relatively close to Neptune with their paths determined by its gravity; resonant objects, which follow particular orbits that are tied to Neptune’s orbit and are often further from the sun; and detached objects, which follow non-resonant orbits and never come closer to the sun than Neptune.

Astronomers have long thought that the scattering objects and some of the others probably got there when the giant planets migrated to their current positions in the solar system more than 4 billion years ago. But neither resonant objects with high perihelion – meaning they never come close to the sun – nor detached objects fit the same explanation.

“Jupiter and Saturn were very good at basically rapidly chucking everything out into the outer solar system,” says Brett Gladman at the University of British Columbia in Canada. “But the efficiency of that process fails to make enough of these objects with high perihelion.”

“The newly suggested planet could explain some especially large Kuiper belt objects”

Gladman and his colleagues used a set of simulations to study the possibility that another object, a primordial planet with double Earth’s mass, was thrown into the outer solar system early on and pushed those distant objects onto their orbits. Their simulations began with this object already in the Kuiper belt and followed how it would affect the other bodies out there (arXiv, doi.org/jfhn).

AHMAD SAREM/GETTY IMAGES

The Kuiper belt is a ring of icy objects in our solar system

They found that it worked perfectly, but not simply by gravitationally dragging the objects out with it. In the simulations, most of the Kuiper belt objects didn’t interact directly with the planet.

“It’s jiggling the orbits of everything in this area just a little bit and kicking things into and out of the resonances,” says Gladman.

This object would have been unrelated to the giant planet that may reside in the outer reaches of the solar system – dubbed Planet Nine – as, if it exists, its orbit takes it far beyond the Kuiper belt. But the newly suggested planet could explain both how the high-perihelion objects got there and the existence of some especially large Kuiper belt objects on unexpectedly distant orbits.

Eventually, the simulations suggest the planet moved so far from the sun that it was no longer bound by its gravity and floated away into interstellar space, becoming a rogue planet. “When the rogue goes away, those oscillations in the orbits suddenly damp,” says Kat Volk at the University of Arizona. “Anything that happens to be on a really high perihelion will get frozen into the orbit it’s on. They get stranded.”

Those objects stranded in orbits that are particularly distant from the sun then just stayed there, without any other huge objects to perturb them. The next step may be a more detailed model beginning with the formation of the rogue planet, says Volk. ▮