- Plastics / Brain



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Microplastics block brain blood vessels

Researchers have followed the journey of microplastics from ingestion through the blood streams of mice. Their final destination might be a cause for concern in humans.

HEALTH While there is some hope in new ideas to fight microplastics, most science is still delivering bad news about these small plastic particles which exist in the air we breathe, the water we drink, and the food we eat. We still do not know exactly what they do to our health, and researchers from Peking University in Beijing have made an additional worrying discovery: they might be able to block blood flow in the brain.

They do not yet know if this happens in humans, but the researchers have confirmed that it can happen in mice, as described in a study published in *Science Advances*. In one study, researchers used sophisticated imaging technology to track fluorescent microplastic particles travelling through the blood streams of mice. They gave the mice water with the plastic particles and watched as they were gobbled up by the animals' immune cells. But those cells subsequently travelled through the blood vessels to settle in the tiny blood vessels of the brain as small obstructions. This reduced the blood flow in the brains of the mice, impairing their ability to move naturally for a period of up to several days. The obstructions caused by the plastic particles reportedly presented similarly to the effect of blood clots.

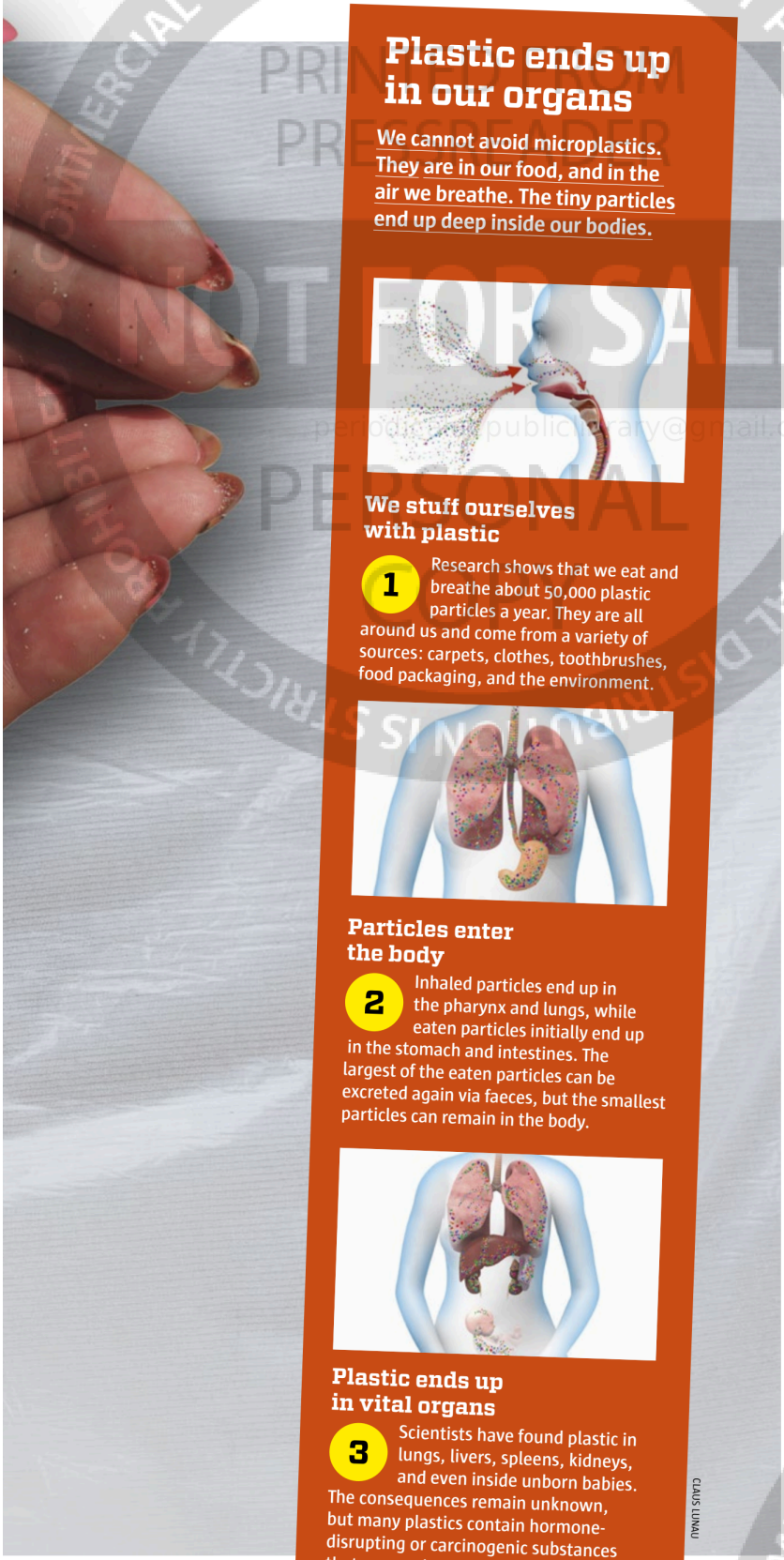
"It was like a car crash in the blood vessels," says Haipeng Huang, biomedical researcher at Peking University.

Previous studies have also found microplastics in the human brain, liver, and kidneys. We still do not fully understand how they affect our health, but a study from 2024 indicated that people with microplastics in their major arteries were more likely to have heart attacks or strokes.

While other researchers seek ways of breaking down these 'forever' plastic pieces, the researchers behind this study hope that their new imaging technology will do more to help determine how microplastics are already affecting our health.

SHUTTERSTOCK

Editors: **Christian Ammitzbøll Juul & Jesper Bindslev**



Plastic ends up in our organs

We cannot avoid microplastics. They are in our food, and in the air we breathe. The tiny particles end up deep inside our bodies.

We stuff ourselves with plastic

1 Research shows that we eat and breathe about 50,000 plastic particles a year. They are all around us and come from a variety of sources: carpets, clothes, toothbrushes, food packaging, and the environment.

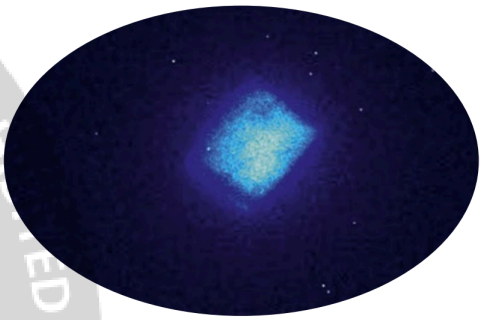
Particles enter the body

2 Inhaled particles end up in the pharynx and lungs, while eaten particles initially end up in the stomach and intestines. The largest of the eaten particles can be excreted again via faeces, but the smallest particles can remain in the body.

Plastic ends up in vital organs

3 Scientists have found plastic in lungs, livers, spleens, kidneys, and even inside unborn babies. The consequences remain unknown, but many plastics contain hormone-disrupting or carcinogenic substances that accumulate in the body.

CLAUS LUNAU



A camera has captured faint light from the artificial diamond with carbon-14 atoms.

UNIVERSITY OF BRISTOL

Diamond battery lasts for thousands of years

A new and highly corrosion-resistant battery could be good news for cardiac patients – and space exploration.

TECHNOLOGY The development of more efficient batteries plays a crucial role in the green transition of the energy sector, especially the batteries which store energy from sunlight and wind, to be used during periods with lower sunlight or wind. The most durable battery to date is an experimental lithium-ion battery that has a lifespan of 20+ years. But now researchers have made a battery that can last thousands of years.

Materials researchers and engineers from the University of Bristol and the UK Atomic Energy Authority have created a stable diamond battery powered by carbon-14.

Carbon-14 is the isotope known from the world of archaeology, where it is used to date organic material such as bones and wooden tools. This is because of its predictable decay time of around 5700 years; over time, carbon-14 decays into nitrogen-14, releasing beta radiation.

This is the decay that the researchers have converted into electricity in a diamond. In the same way that solar panels convert light into electricity, the diamond battery converts the fast-moving electrons from the decay of carbon-14.

Diamond is among the hardest materials known, making diamonds perfect for safely encapsulating carbon-14's short-range radiation. The new prototype measures 10 x 10mm with a thickness of up to 0.5mm. The synthetic diamond can be produced relatively quickly and cheaply, as can carbon-14 when extracted from the graphite blocks which are a waste product of nuclear fission reactors.

"Our micro-power technology can support a wide range of important applications, from space technology and safety devices to implants," says the University of Bristol's Tom Scott.

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