Microplastics can block blood vessels in mice brains, researchers find

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Microplastics can move through mice brains and block blood vessels, essentially mimicking blood clots that could potentially be fatal or otherwise disrupt brain function.

The findings are detailed in a peer reviewed paper for which re- searchers for the first time used real time imaging to track bits of plastic as they moved through and accumulated in brain blood ves- sels. When one piece of plastic got stuck, others accumulated behind it, like a "car crash", the authors re- ported.

The authors then found de- creased motor function in those mice exposed to microplastics, sug- gesting impacts on the brain. While mounting evidence has linked microplastics to neurotoxi- city, the research is the first to sug- gest how it probably reduces blood flow.

"This revelation offers a lens through which to comprehend the toxicological implications of mi- croplastics that invade the blood- stream," the Peking University au- thors wrote.

Microplastics are tiny bits of plastic either intentionally added to consumer goods, or which are products of larger plastics break- ing down. The particles contain any number of 20,000 plastic chemicals, of which thousands, such as BPA, phthalates and Pfas, present serious health risks.

The substance has been found throughout the human body, and can cross the placental and brain barriers. Recent research found microplastics to be accumulating in human brains at much higher levels than eight years ago. The substance is linked to an in- creased risk of heart attack and cancer, and is considered to be a neurotoxicant that can cause mul- tiple forms of brain dys- function, such as Parkinson's disease.

Until now, very little has been understood about how the bits of plastic move through brains, and why they might cause some dis- ease and neurotoxicity.

To track the plastic in the mice brains in real time, researchers gave them water filled with fluo- rescent coated polystyrene, a common material found in house- hold goods and packaging.

Using an imaging technique called two photon microscopy, they were able to watch how, within just a few hours, the fluorescent bits be- gan appearing in the brain.

Researchers suspect that im- mune cells had, in effect, absorbed the bits of plastic, creating irregu- lar shaped cells. As the cells trav- eled the tiny brain cortex vessels where there are gen- erally more and tighter bends, they some- times became lodged. Larger bits of plastic were more prone to get- ting stuck.

When cells did get lodged, more cells would pile on, mimick- ing the effect of cars in a pile up accident. The blockages reduced blood flow and sometimes broke up after a few days or weeks, but some persisted beyond the clo- sure of the study's four week ob- servation period.

In behavioral assessments fol- lowing exposure to microplastic, the exposed mice traveled slower and shorter distances than those who were not exposed, and per- formed poorly on a maze test that gauges memory function.

However, the authors stressed that it was unclear if the same ef- fects would happen in a human brain because the vessels are not quite as small as those in mice, and blood volume and flow rate are greater. Still, it strongly point- ed to serious cardiovascular and brain health risks, and "increased investment in this area of research is urgent and essential to fully comprehend the health risks posed by microplastics in human blood", the authors wrote.