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Should you worry about microplastics?

Little is known about the effects on humans—but limiting exposure to them seems prudent

Ever since Austrian scientists first began looking for them in people in 2018, microplastics have turned up in the blood, lungs, kidneys, liver, heart and even the brain. They have also been detected in the placenta and breast milk.

It is no mystery how these tiny particles, which can range from 5mm across to less than 2 microns (μm), get into human bodies. They are ubiquitous in the air, food and water. They accumulate from degrading plastic waste and the wear and tear of everyday products such as car tyres, paints and synthetic fabrics.

Whether they are harmful is still unclear. These "forever particles" could have a role in various health problems, from infertility to heart attacks and cancer. They may cause physical damage by blocking ducts or scratching tissues. Or they may cause chemical damage to cells. They could also act as microscopic Trojan horses for various heavy metals, allergens and bacteria that cling to them.

In a study published in 2024 in the New England Journal of Medicine scientists examined the plaque scraped from the arteries of 257 patients who had a procedure to remove it (to reduce blockages). Microplastics turned up in more than half of cases. In the next three years, those patients were four times as likely to have a heart attack or stroke, or to die from any cause, than the patients without detectable microplastics in the plaque. It is unclear, however, whether the particles were to blame. Their presence in arteries could have been a byproduct of the biological changes that cause these health problems.

Some studies in the lab have found that microplastics can cause damage to cells, tissues and DNA and promote the growth of cancers. But a problem with lab-based experiments is that the particles used in them do not reflect those that people actually ingest or inhale. More than a dozen types of plastics have been found in human tissues, in all shapes and sizes, from jagged-edged specks to fibre strings. Of most concern are nanoplastics (those smaller than 1μm). These are small enough to pass into the bloodstream through the linings of the gut and the lungs. Particles bigger than 10μm are unlikely to enter human cells. When inhaled, they are typically expelled by the body's "mucous escalator" that brings them up from the lungs to be swallowed and excreted.

By contrast, early laboratory experiments used sterile spherical beads of just one type of plastic, polystyrene, which were bigger than the nano-size range. Shape matters, too. In better studied nanomaterials, the more jagged shapes are the most harmful. Scientists are now developing more relevant microplastics cocktails for experiments by breaking down items like water bottles in ways that simulate natural wear and tear.

Microplastics are impossible to avoid. In 2019 a team from King's College London found that daily deposits from the air in central London reached 1,000 microplastics per square metre. And that was only particles bigger than 20μm.

Reducing exposure to microplastics is feasible, by avoiding food and drinks packaged in plastics, using less synthetic fabric and cleaning up household dust. Heating plastic containers leaches lots of microplastics, so avoiding microwaved ready-meals and plastic kettles should help too. A European research consortium of more than 70 organisations is trying to untangle the specific harms from microplastics to human health and what sort of regulation may be warranted to prevent them. For now, there are more questions than answers.

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