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The air we breathe sucks toxic microplastics into our bodies

Ben Spencer
Science Editor

Microplastics in the air could be delivering toxic chemicals deep into our bodies, a former government adviser has warned.

For decades we have been warned about the growing threat of air pollution, especially the invisible microscopic particulate matter that we inhale with every breath. This PM2.5 pollution, as it is called, has long been blamed for respiratory conditions and heart disease. But increasing evidence has also found links to neurological conditions such as dementia and impacts on pregnancy, with exposure to poor air thought to increase the risk of premature birth and low birth weight.

Professor Frank Kelly, director of the environmental research group at Imperial College London, believes plastic in the air may be part of the problem.

"Plastics are everywhere," said Kelly, who until recently chaired the Department of Health's expert panel on air pollution. "They are in what we eat, what we drink and in the air we breathe."

Samples are taken on Marylebone Road, London

Sir Chris Whitty, the chief medical officer, is due to publish a landmark report on the health impacts of air pollution next month, to which Kelly has contributed a chapter.

Until recently, scientists assumed particulate pollution was predominantly made of carbon – the sooty residue pumped out by cars and factories. Kelly still believes fossil fuels are a major contributor to this pollution, but he is increasingly concerned that plastics are also an issue. Samples taken by his team at Marylebone Road in central London have found airborne particles from a number of different plastic sources, including polyethylene, primarily used in packaging, polyethylene terephthalate, used in clothing, and polypropylene, used in furniture and medical products.

Kelly believes modern tyres – which are predominantly plastic – are a significant source of this pollution. "The modern tyre is not rubber," he said. "It is 55 per cent-plus plastic."

Kelly, who recently moved his entire 68-person research team from King's College London to Imperial's new White City campus, is embarking on a series of studies to ascertain the health impacts of these particles.

"Is it the very presence of air pollution as a foreign body that is causing the problem?" he said. "Or is it the plastic itself? Or is it what the plastic is carrying?"

Kelly believes plastic acts as a transport vessel for chemicals which then spread to the brain or the placenta. "Every bit of plastic is laced with chemicals," he said. "Flame retardants are present in plastic fibres, for example. If that is the real root of the problem, that makes it simple to understand why they can get into the brain. The chemicals get into the body and then they are dispersed."

Studies have found traces of microplastics throughout bodily organs. Kelly, however, issues a word of caution. "Because plastic is on everything already, it's not clear how robust those studies are," he said.

His new lab – packed with high-tech mass spectrometers and monitoring equipment – includes a clean room to ensure any samples are not already contaminated before undergoing testing.

"If every vehicle in London was replaced with electric cars, we would will still have a PM2.5 problem because of the tyres," says Kelly.

"If we had good public transport that was cheap and which everyone could access, it would make a difference."