

Carbon nanotubes found in children's lungs for the first time



Carbon nanotubes have turned up in the lungs of children living in Paris – the first time they have been detected in humans.

Incredibly strong, light and conductive, nanotubes have shown great potential in areas such as computing, clothing and healthcare technology. Nevertheless, there has been some concern over their use after mouse studies showed that injected nanotubes can cause immune reactions similar to those produced by asbestos.

To investigate, Fathi Moussa and colleagues at the University of Paris-Saclay, France, studied fluid from the airways of 64 asthmatic children, and discovered carbon nanotubes in all of the samples. Five other children studied also had them in their macrophages – immune cells that clear unwanted particles – taken from the lungs.

The level at which the nanotubes are present is unclear, as is their source, although the team found similar structures in dust and vehicle exhaust collected in Paris.

The study wasn't set up to look for a link between the presence of nanotubes in the lung and the children's illness, but people with asthma might be particularly vulnerable as the ability of their macrophages to remove debris is impaired, Moussa says. Even if the nanotubes aren't directly toxic, they have large surfaces that other molecules can stick to, potentially helping pollutants to get deep into the lung and cross cell membranes, he adds.

Caution

James Bonner at North Carolina State University in Raleigh says the detection of nanotubes should be treated with caution, as other studies of air pollution over the years

have failed to find them. “In my opinion, there is a great deal of uncertainty as to what these structures really are, especially the material in the lung cells from patients,” he says.

As for the potential health effects, Jonathan Grigg at Queen Mary, University of London, thinks nanotubes are unlikely to have the cancer-causing potential of asbestos fibres, which are much larger and can get trapped in the lining of the lung.

Advertisement

If we are breathing in nanotubes, it’s probably nothing new and fossil fuels are a likely source, he says. “I guess we’ve been breathing them for a very long time. But it needs more work, for sure.”

For more on the potential pollution risk from carbon nanotubes, see this on how their toxic effects may be similar to asbestos.

And for more background on carbon nanotubes see this story on how they were discovered.

Still want more? Computers built from nanotubes could spark a revolution. While nanotube yarn will be woven into smart clothing and nanotube-coated silk could sense your heartbeat.

Journal reference: *EBioMedicine*, DOI: [10.1016/j.ebiom.2015.10.012](https://doi.org/10.1016/j.ebiom.2015.10.012)