

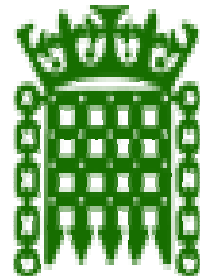


All Party Parliamentary Light Rail Group

House of Commons
London SW1A 0AA

Light Rail & Trams, Affordable & Sustainable Transport

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'Air pollution' particles linked to Alzheimer's found in human brain



Tiny

magnetic particles produced by car engines and brakes can travel into the human brain CREDIT: ANDREW MATTHEWS

5 SEPTEMBER 2016 • 8:00PM

Tiny magnetic particles produced by car engines and brakes can travel into the human brain and may trigger Alzheimer's disease, scientists have warned.

Researchers at Lancaster, [Oxford and Manchester Universities](#) discovered microscopic spheres of the mineral magnetite in the brains of 37 people in Manchester and Mexico who had suffered neurodegenerative disease.

The mineral magnetite is known to be toxic and is linked to the production of free radicals which are associated with Alzheimer's Disease.

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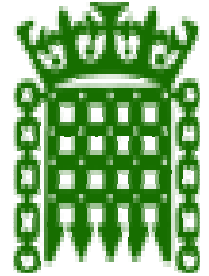


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Researchers said the findings opened up a 'whole new avenue' into the causes of Alzheimer's disease

Although magnetite has [previously been found in the brains of people](#) who had died of Alzheimer's disease, it was thought it occurred naturally. However the tiny balls spotted by the scientists had a fused surface suggesting they had been formed during extreme heat, such as in a car engine.

Magnetite - a form of iron oxide - is known to be produced in car engines - particularly diesel engines which can emit up to 22 times more particulates than petrol engines - as well as when brakes are used, both by cars and trains. It can also be produced by open fires and poorly fitted stoves.

Researchers said the findings opened up a 'whole new avenue' into the causes of Alzheimer's disease, while charities said it offered 'convincing evidence' that the toxic particles could get into the brain.

"Our results indicate that magnetite nanoparticles in the atmosphere can enter the human brain where they might pose a risk to human health, including conditions such as Alzheimer's'" said lead author Professor Barbara Maher, of Lancaster University.

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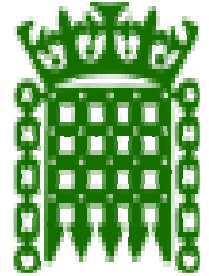


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"The particles we found are strikingly similar to magnetite nanospheres that are abundant in the airborne pollution found in urban settings, especially next to busy roads and which are formed by combustion or frictional heating from vehicle engines or brakes."

We know that air pollution can have a negative impact on certain aspects of human health, but we can't conclude from this study that magnetite carried in the air are harmful to brain health. Dr David Reynolds, Alzheimer's researcher [Prof David Alsoop of Lancaster University](#) added: "This finding opens up a whole new avenue for research into a possible environmental risk factor for a range of brain diseases."

Around 800,000 people in Britain suffer from dementia, mostly Alzheimer's disease, and the figure is expected to increase as the population grows older.

Last week scientists reported that they have found a drug which appears to halt the progress of Alzheimer's by clearing the sticky plaques from the brain which prevent brain cells communicating. But nobody knows what causes the plaques to form in the first place.

Air pollution has already been implicated in lung disease and heart attacks and recent studies have suggested that it could also be a factor in cognitive decline with a US study in 2014 showing that people in highly polluted areas were 50 per cent more likely to suffer mental decline. But until now, nobody thought that the particles could reach the brain. The new research suggests the particles can be inhaled and enter the brain through the olfactory nerve, which takes information about smells to the brain.

Prof Anthony Seaton, Emeritus professor of Environmental and Occupational Medicine at the University of Aberdeen said: "This is an important study and adds to the body of evidence that the combustion of fossil fuels has widespread toxic effects on our health.

"The solution to this is literally in our own hands as we take hold of the steering wheel."

Dementia charities said more research was needed to find out if air pollution could be responsible for conditions like Alzheimer's.

"We know that air pollution can have a negative impact on certain aspects of human health, but we can't conclude from this study that magnetite carried in the air are harmful to brain health," said Dr David Reynolds, Chief Scientific Officer at Alzheimer's Research UK.

Dr Clare Walton, Research Manager at The Alzheimer's Society, added: "Magnetite has previously been seen in the amyloid plaques in the brains of people who have died with Alzheimer's disease.

"This study offers convincing evidence that magnetite from air pollution can get into the brain, but it doesn't tell us what effect this has on brain health or conditions such as Alzheimer's disease."

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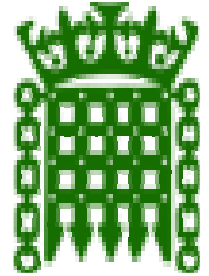


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The research was published in the journal Proceedings of the National Academy of Sciences.

Cities severely affected are (Not a comprehensive list)

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