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Study Discovers Air Pollution Particles in the Human Brain



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By [Julie M. Rodriguez](#) | September 8, 2016
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A new study from Lancaster University has discovered toxic nanoparticles from air iron oxide, was found in massive quantities in the samples – millions of particles per gram of brain tissue.

Finding any particles connected to air pollution in the human brain would be troubling, but magnetite is particularly concerning. Recent research has found that these particles may be linked to Alzheimer's disease, and exposure air pollution has been shown to significantly increase the risk of developing the illness. While there's been no definitive proof yet that these particles cause the disease, the link is enough to make health researchers wary.

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While magnetite is known to form naturally in brain tissue, the biological variety is small and crystal-shaped. The particles associated with air pollution and suspected to be harmful are large and spherical, formed as molten droplets from combustion sources such as industrial processes or car exhaust. The study found about 100 times the pollution-linked particles as it did the naturally-occurring ones. This ratio makes sense when you consider that roadside air analysis in Lancaster, England found as many as 200 million of these particles per cubic meter.

The study also found other metal particles in the brain that are suspected to come from car exhaust, including platinum, cobalt and nickel. It's believed that these particles are able to build up due to the unique way the body processes inhaled substances. When air pollution enters the nose, it's able to completely bypass the blood-brain barrier and directly enter the brain through the nose.

This isn't the first time air pollution has been linked to serious health issues, although in the past the effects have mostly been linked to lung and heart disease. Emerging research has only begun to uncover links to the brain in recent years, which can potentially manifest as reduced intelligence or mental illness. There's even research which shows that prenatal exposure to air pollution raises a child's risk of autism. It's also been linked more generally to dementia and brain damage.

While this new research is troubling, Alzheimer's disease researchers have been quick to stress that there are still many actions you can take to reduce your risk of developing the disease, even if are unable to avoid exposure to traffic exhaust. Speaking to the Guardian, Dr. Clare Walton of the Alzheimer's Society stressed that regular exercise, eating a healthy diet, and avoiding smoking were all proactive steps that can lower the risk of developing dementia later in life.

The new study has been published in the *Proceedings of the National Academy of Sciences*.

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