

Impacts of Air Pollution on Brain Health

Affects children by increasing risk of:

- ADHD
- Slower processing of information
- Autism
- Depressive and anxiety-like symptoms

Affects adults by increasing risk of:

- Alzheimer's disease and related dementias
- Cognitive decline
- Parkinson's disease
- Stroke
- Depression and depressive symptoms



Neuroinflammation

The brain's response to infection, traumatic brain injury or toxics. It can delay brain maturation and lead to problems in:



- Learning
- Movement
- Decision making
- Planning
- Self-control
- Lower test scores
- Behavioral problems



Fine particulate matter (PM2.5) is one air pollutant that can harm the brain. Research has focused on the link between PM2.5 and brain health.



USC Environmental Health Centers



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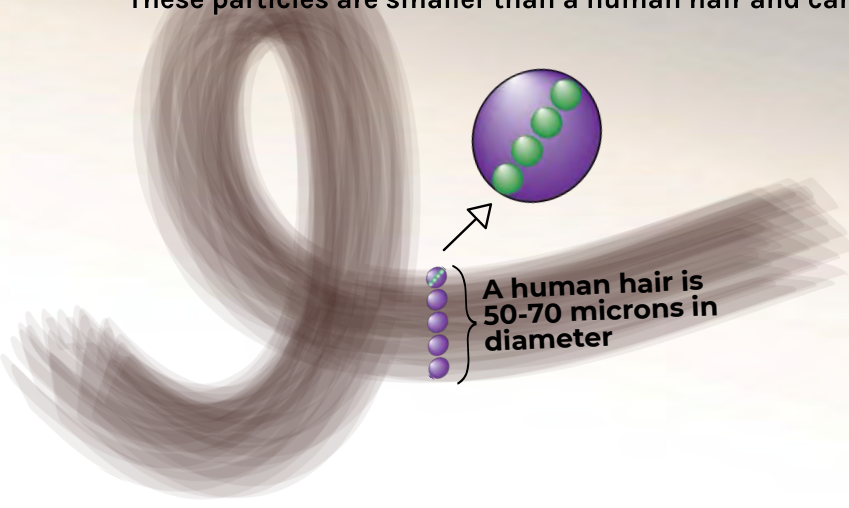
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Infographic: Wendy Gutschow, USC



Fine particulate matter (PM2.5) particle pollution

These particles are smaller than a human hair and can enter the bloodstream and travel to the brain.



A human hair is 50-70 microns in diameter

- Fine Particulate Matter (PM2.5)** are less than 2.5 μ (microns) in diameter. 20-28 particles of PM can fit across the width of a human hair.
- Coarse Particulate Matter (PM10)** particles are less than 10 μ (microns) in diameter. 5-7 particles of PM10 can fit across the width of a human hair.

How air pollution affects brain development

Blood Brain Barrier

Protects the brain from toxins in the blood.

Air pollution may make this barrier 'leaky,' allowing toxins into the brain.



Grey Matter

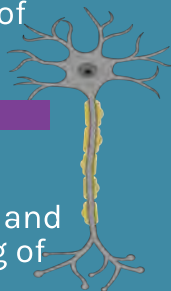
Made up of brain cells that control everything we do: muscle control, language, memory, emotions, and decision-making.

Air Pollution may damage grey matter, resulting in cognitive and behavior problems.

White Matter

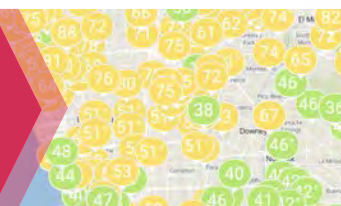
Bundles of fibers called myelin. Myelin allows for faster processing of information.

Air Pollution may damage myelin and slow the processing of information.



Brain icons were created on BioRender.com

Strategies to reduce exposure to pollution levels that can protect brain health



Check the air quality in your neighborhood:

- Download the Air Quality/AirVisual app for hyperlocal air quality information
- Check regional air quality on AirNow.gov

Personal transportation choices

Take public transit and use human powered transportation options when possible



Connect with local organizations that work on these issues:

- Improving air quality
- Reducing pollution at homes & schools
- Electrifying cars, trucks and diesel equipment to achieve zero-emissions