

Health impacts of air pollution exposure in the brain

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Emerging evidence suggests that in addition to targeting the cardiovascular and respiratory systems, air pollution exposure induces adverse health effects in the brain. Epidemiological studies associate air pollution with adverse neurodevelopmental effects and neurodegenerative diseases, and experimental studies corroborate these findings.

This presentation portrays the epidemiological and experimental evidence showing the adverse impacts of air pollution exposure on the brain. It highlights the molecular and cellular events associated with air pollution exposure, and links them to neurodegeneration, with a special focus on Alzheimer's disease (Puris *et al* 2022, Saveleva *et al* 2022 and Chew *et al* 2020a), the most common form of dementia. Discussion is primarily restricted to particulate matter (PM) toxicity.

The presentation also examines the various routes via which air pollutants may gain access to the brain, and concentrates on the role of the nasal-olfactory gateway (Figure 1). Translational human cell models to study the nose-brain connection are summarized (Lampinen *et al* 2022a, Lampinen *et al* 2022b, Kanninen *et al* 2020 and Chew *et al* 2020b), and new omics data are presented on PM effects in the human olfactory mucosa.

Lastly, the presentation considers the future research needs for advancing understanding of air pollutant effects in the brain, and for limiting the adverse health outcomes associated with exposure.

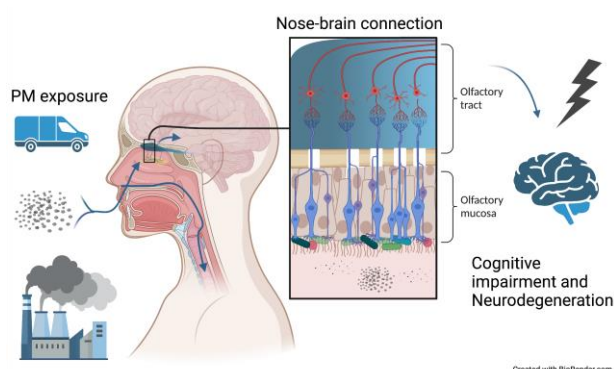


Figure 1: Schematic demonstrating the olfactory route and its relevance for adverse PM exposure effects in the brain.

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