**BREATHE**  
**Project ID:** 268479  
**Funded under:** FP7-IDEAS-ERC

**BRain dEvelopment and Air polluTion ultrafine particles in scHool childrEn**

**From** 2011-08-01 **to** 2016-07-31, closed project

**Project details**

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<th>Total cost:</th>
<th>Topic(s):</th>
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<td>EUR 2 499 230</td>
<td>ERC-AG-LS7 - ERC Advanced Grant - Diagnostic tools, therapies and public health</td>
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<th>EU contribution:</th>
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**Coordinated in:** Spain

**Funding scheme:** ERC-AG - ERC Advanced Grant

**Objective**

Traffic-related air pollution is an important environmental problem that may affect neurodevelopment. Ultrafine particles (UFP) translocate to the brains of experimental animals resulting in local proinflammatory overexpression. As the basic elements for thinking are acquired by developing brains during infancy and childhood, susceptibility may be elevated in early life.

We postulate that traffic-related air pollution (particularly UFPs and metals/hydrocarbons content) impairs neurodevelopment in part via effects on frontal lobe maturation, likely increasing attention-deficit/hyperactivity disorder (ADHD). BREATHE objectives are to develop valid methods to measure children’s personal UFP exposure and to develop valid neuroimaging methods to assess correlations between neurobehavior, neurostructural alterations and particle deposition in order to reveal how traffic pollution affects children’s exposure to key contaminants and brain development, and identify susceptible subgroups.

We have conducted general population birth cohort studies providing preliminary evidence of residential air pollution effects on prenatal growth and mental development.

We aim to demonstrate short and long-term effects on neurodevelopment using innovative epidemiological methods interfaced with environmental chemistry and neuroimaging following 4000 children from 40 schools with contrasting high/low traffic exposure in six linked components involving: repeated psychometric tests, UFP exposure assessment using personal, school and home measurements, gene-environment interactions on inflammation, detoxification pathways and ADHD genome-wide-associated genes, neuroimaging (magnetic resonance imaging/spectroscopy) in ADHD/non-ADHD children, integrative causal modeling using mathematics, and replication in 2900 children with neurodevelopment followed from pregnancy.

We believe the expected results will have worldwide global planning and policy implications.

**Related information**

| Report Summaries | Final Report Summary - BREATHE (BRain dEvelopment and Air polluTion ultrafine particles in scHool childrEn) |
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EU contribution: EUR 240 000

To know more

http://erc.europa.eu/

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