# Air pollution from traffic impairs brain

## Air pollution in cities and beside roads can impair the way the brain functions, two new studies have revealed.

The study examined the average lifetime exposure to traffic-related pollution Photo: REX

By Richard Gray, Science Correspondent

8:00AM BST 09 Oct 2011

Scientists have found living in areas with high levels of traffic pollution can reduce people's performance in cognitive tests.

They found that people older than 51 who had lived in polluted areas had lower cognitive scores than those who had been exposed to lower levels of pollution during their life time even after their results had been adjusted for social and educative status.

A second study in animals has also revealed that fine airborne particulates that are typically emitted by diesel engines can lead to learning and memory problems by reducing the growth of neurons in the brain.

Dr Melinda Power, from the department of epidemiology and environmental health at the Harvard School of Public Health in Boston, Massachusetts, said that long term exposure to air pollution related to traffic seemed to affect the way the brain functions.

She said: "Cognitive decline and impairment in the elderly is a huge public health issue. Our study suggests that traffic-related air pollution, particularly diesel exhaust, may play a role.

"Our results suggest an adverse effect of traffic related air pollution on global cognitive function in older men.

"When we explored the potential for effect modification, our results suggest the effect of traffic-related air pollution on cognition may be greater in smokers or overweight and obese individuals.

"Although we looked at the effect in men, I believe the findings are applicable to women as well."

The study examined the average lifetime exposure to traffic-related pollution and the cognitive test scores of 680 men aged between 51-years-old and 97-years-old.

It found that those living in areas that were exposed to twice as much black carbon as low pollution areas were 1.3 times more likely to have lower cognitive scores.

The researchers also found that if black carbon levels doubled in one area compared to another, the effect on the cognitive functions of people from that area were equivalent to ageing by nearly two years.

Dr Power added: "Traffic-related air pollution is a complex mixture of gases and particles.

"Traffic-related air pollution appears to cause inflammation and oxidative stress in the brain. There is also evidence that ultrafine particulates can get into the brain and cause dysfunction."

In the second, separate study in mice, researchers at Ohio State University in Columbus found that exposure to fine particles of pollution known as PM2.5s caused increases in the levels of inflammatory molecules in the animals' brains.

They found that mice exposed to air polluted with the particles for ten months showed signs of impairment of their learning and memory abilities compared to those that been given filtered air.

The researchers found that a part of the animals' brains known as the hippocampus, which is responsible for memory and learning, had also suffered decreased neuron growth in the mice exposed to the pollution.

Laura Fonken, from the behavioural neuroscience program at the university, said: "These data suggest that long-term exposure to particulate air pollution levels typical of exposure in major cities around the globe an alter the affective responses and impair cognition."

Particulate air pollution has already been linked with increased risk of cardiovascular disease and scientists have found pollution from diesel engines can harden the arteries and increase the risk of heart attacks.

It is estimated that more than 20 towns and cities in Britain are emitting pollution at twice the levels specified by the World Health Organisation.

An official report by the Committee on the Medial Effects of Air Pollutants said that air pollution in the UK takes around two years off the lives of 200,000 people.

The UK has one of the worst rates of air pollution in Europe and last year the Government was warned it may face a £300 million fine for failing to meet European air quality standards.

http://www.telegraph.co.uk/news/science/8815901/Air-pollution-from-traffic-impairs-brain.html