

SCIENCE UPDATE

# Smoking shrinks your brain

A major new US study shows that smoking leaves a permanent impact on your brain. Not even quitting can repair the damage, though it certainly reduces further deterioration.

**HEALTH** The brain changes as a natural part of the ageing process, with areas that control memory and learning, such as the hippocampus, often particularly affected.

There are things that can speed up this natural process, and one of them is smoking, as researchers have now demonstrated in an extensive long-term study involving more than 32,000 people. Researchers from Washington University School of Medicine used MRI brain scans, DNA samples and questionnaires to observe the development of the participants since 2006.

Previous studies have linked smoking with reduced brain volume, including both grey and white matter. But the direct link has been unproven until now.

The new study is firm in its conclusion that smoking makes the brain shrink. Daily smoking reduces both the grey and white matter in the brain, and the more

cigarettes you smoke per day, the more your brain volume decreases.

The study emphasises the importance of quitting to reduce further brain damage and your risk of dementia.

## FACTS

- ▶ **EXTENT:** In 2020, 22.3% of the world's population used tobacco.
- ▶ **DEATHS:** Every year, tobacco kills approximately 8 million people - of which 1.3 million are non-smokers.

“It has now become clear that smoking is also really bad for your brain. It reduces brain volume, and that is important as the population ages,

because ageing and smoking are both risk factors concerning dementia,” says lead author Laura Bierut, a professor of psychiatry at Washington University.

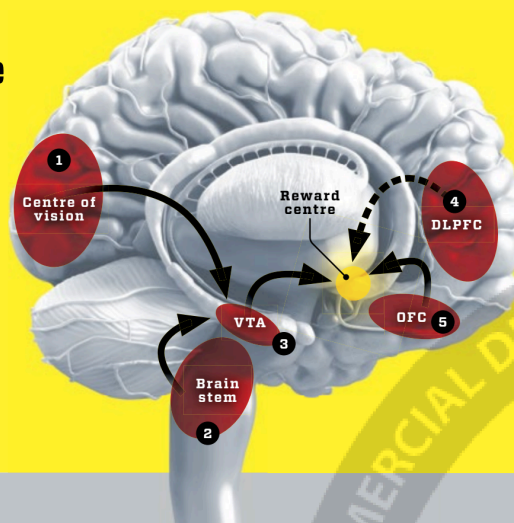
Another important finding is that the brain never returns to its original size. The brains of people who had quit smoking several years before participating in the study remained permanently smaller than in people who had never smoked.

The good news is that quitting smoking does at least prevent further loss of brain tissue. People who quit for a long period of time had lost less grey matter in the brain compared with those who had quit recently, suggesting that quitting smoking can stop the decline in brain volume but not restore the brain.

“You cannot repair the damage that is already there, but you can avoid causing further damage,” says Yoonhoo Chang, co-author of the study and a Washington University graduate student.

## 5 brain centres control the urge

Good memories of cigarettes and withdrawal symptoms combine to cause a strong desire for one more puff. A part of the frontal lobe tries to suppress the urge, but another part supports it. Together, the two parts make a decision that often results in the smoker being unable to resist the temptation.



- 1** Via the hippocampus, the sight of a smoke evokes pleasant memories and feelings.
- 2** Brain stem withdrawal symptoms remind the smoker that smoking will also reduce their anxiety.
- 3** The motivational centre, also known as the Ventral Tegmental Area, VTA, intensifies the signals to the reward centre to expect a cigarette.
- 4** An area in the frontal lobe, the DLPFC, tries to suppress the craving.
- 5** Another part of the frontal lobe, the OFC, supports it.

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