

Smoking and hyperactivity share common genetic risk factor

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A variation of a particular gene may link the behaviours typical of childhood attention hyperactivity disorder, or ADHD for short, and those associated with smoking, suggests research published online in the *Archives of Disease in Childhood*.

Childhood <u>ADHD</u> and subsequent smoking in adulthood frequently go hand in hand, say the authors, with people who have been diagnosed with ADHD more likely to start smoking early and to smoke twice as much as those without the condition.

The researchers focused on five variations in <u>DNA sequences</u> (single <u>nucleotide polymorphisms</u> or SNPs) in different genes that are strongly associated with different aspects of <u>smoking behaviour</u>, such as the number of cigarettes smoked every day, and taking up and quitting smoking.

They wanted to see if these might also be linked to <u>hyperactivity</u> in 454 children aged between 6 and 12 with confirmed ADHD and referred to specialist treatment centres.

They quizzed the children's mothers about their smoking habits during pregnancy. Of those 394 mothers for whom they had information, 171 had smoked during pregnancy and 223 had not.

And they assessed the extent of the children's behavioural and emotional problems at home and at school, as well as their intellectual capacity,



using a battery of validated tests.

They took blood samples from the children, their parents, and siblings to see if any high risk variants (alleles) of the five genetic markers had been passed on, and if these were more strongly associated with the externalising behaviours/disinhibition and impaired cognitive performance characteristic of ADHD.

Only one of the five <u>SNPs</u> (rs 1329650), which was associated with the number of cigarettes smoked, was much more likely to be associated with ADHD.

The high risk C allele of rs 1329650 was significantly more likely to be passed on from the parents and to be associated with the more severe form of ADHD. It was much more common among children who had higher scores on the validated behavioural tests.

And children who performed less well on tasks requiring more brain power and concentration were also more likely to inherit this risk allele.

It was as likely to be found in children whose mothers had smoked during pregnancy as those who hadn't, suggesting that environmental tobacco smoke does not modify the risk allele.

The authors conclude that the C allele of rs1329650 may increase the risk of both ADHD and smoking through prompting behaviours and impaired higher brain functions that are typical of childhood ADHD, and which could act as a gateway to smoking in later life.

In an accompanying editorial, Dr Miriam Cooper and Professor Anita Thapar from the Institute of Psychological Medicine and Clinical Neurosciences and the Medical Research Council Centre for Neuropsychiatric Genetics and Genomics, at Cardiff University School



of Medicine, sound a note of caution.

The study should only be interpreted as preliminary evidence of theoretical plausibility for shared molecular genetic risks for <u>smoking</u> and ADHD, until it has been tested in further larger studies, they say.

But they add: "This is an intriguing starting point from which to conduct further related analyses."

And they add: "Acknowledging that the same genetic risk variants can have different observable effects in people could help inform discovery of risk variants for childhood developmental/psychiatric disorders for which it can be difficult to assemble very large sample sizes.

Such efforts could help uncover novel biological risk pathways and contribute to explaining why different behaviours and disorders commonly co-occur."

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