

What makes a criminal? Gene trawl raises questions

October 28 2014, by Mariette Le Roux



Scientists have identified two genes they believe are linked to "extremely violent behaviour"

Is a violent criminal born that way, or shaped by childhood experiences and circumstances?

Delving into one of oldest questions in psychology, some scientists have



suggested <u>genes</u> may contribute to roughly half of the influence—by affecting complex brain chemistry, for instance.

But, until now, DNA clues to support this have been sketchy.

Scientists in Europe and the United States on Tuesday fingered two genes which in a mutated form are found in a "substantially higher frequency" in violent offenders.

A study of nearly 800 Finns jailed for both violent and non-violent crimes, and compared to the general population, found variants of two genes, called MAOA and CDH13, to be "associated with extremely violent behaviour".

"No substantial signal was observed for either MAOA or CDH13 among non-violent offenders, indicating that findings were specific for violent offending," said the study, published in the journal *Molecular Psychiatry*.

The scientists took into account environmental factors—whether or not people had a history of substance abuse, antisocial personality disorders or childhood maltreatment.

But this did not alter the outcome.

The study was not designed to explain the impact of genetic variants and the authors believe there could be many other genes which play a role, directly or indirectly, in the molecular cascade.

And, they note, the two mutated gene versions or genotypes are "rather common."

As many as one in five people have them, of whom the vast majority never commit rape, assault or murder.



Similarly, people without the variants were found in the ultra-violent trial group.

"Although the high-risk genotype combination of MAOA and CDH13 has a risk of about 13-fold compared with the 'usual' genotype combination, still the vast majority (of) high-risk genotype individuals do not commit severe violent crimes," study co-author Jari Tiihonen of the neuroscience department at Sweden's Karolinska Institutet told AFP.



Scientists will sequence the genetic codes of about 75,000 patients with cancer and rare diseases

The MAOA gene has been linked to the metabolism of dopamine, a neurotransmitter that plays a role in addiction and the ability to experience pleasure.



The CDH13 is believed to be involved in impulse control and has been associated with attention deficit hyperactivity disorder (ADHD).

The probe sheds some light in the nature-vs-nurture debate, but the intellectual jousting is bound to continue.

"I think that we have found two genes which have the largest effect on aggressive behaviour, and that there are probably tens or hundreds other genes having smaller effects," said Tiihonen.

The finding should not make a difference to our notion of criminal responsibility, he added

"According to the basic principles of forensic psychiatry, any risk factors such as <u>genotype</u> or brain injury in car accident, must not have any effect per se on convictions or prison sentences.

"The mental capacity to understand the nature and consequences of one's deeds, and ability to control one's behaviour are the only things that matter."

Tiihonen said the findings were not sensitive or specific enough to allow for the screening of people as a crime-prevention measure.

And he added the results of the Finnish study may be similar in other developed nations, "but not in poor countries, where social issues (such as poverty) may be more important factors" in committing crime.

"Should these preliminary findings hold up, they would have significant implications for identifying potentially <u>violent offenders</u> at an earlier stage," William Davies, a lecturer in behaviour genetics at Cardiff University wrote in a comment describing the work as "interesting and potentially important."



It may also allow yield avenues for treatment.

According to Malcolm von Schantz of the University of Surrey, the findings did not bring us closer to a situation in which violent criminals can claim diminished responsibility because of the genes they were born with.

"It is becoming increasingly clear that there is not one single genetic variant that has a large effect on this, or indeed any complex behaviour," he wrote.

"The pattern that is emerging is one of many genetic factors where each one has a small predisposing effect."

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