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## The Get Out of Jail Free gene

**The sentence of one killer in Italy has been reduced as he possesses a 'violent gene'. Can DNA be used as a defence?**

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When Walter Perez taunted a Muslim man for wearing eye make-up, he could not have known that he would pay for such unkindness with his life. His heavily kohl-ed target, enraged and armed, stabbed him to death. Abdelmalek Bayout, an Algerian who claimed that he darkened his eyes for religious reasons, was initially jailed for just over nine years, after a court heard that he had a history of psychiatric illness.

But, to the horror of Perez's family, mental imbalance was not the only mitigating factor to crop up in the Italian court. An appeal hearing resulted in Bayout's sentence being cut by a further year because, according to scientists, he possessed genes that shortened his fuse. Bayout, his counsel argued, was the victim of genetic misfortune: the owner of five genes known to be associated with violent behaviour.

The evidence on one gene, known as MAO-A (monoamine oxidase A, an enzyme that breaks down chemicals in the brain), proved particularly persuasive for the judge: a growing body of work shows that the variant displayed by Bayout is correlated with violence, aggression and gang membership. Its persistent association with violence has even earned it a nickname among scientists: the warrior gene.

The Bayout trial is thought to be the first time that violent genes have been invoked to amend a sentence. It shows that, rather than being the stuff of some futuristic dystopia, the controversial field of behavioural genetics is having a dramatic effect in courtrooms today. And, further down the line, the complex interplay between genetics, race and crime is also likely to come into controversial focus.

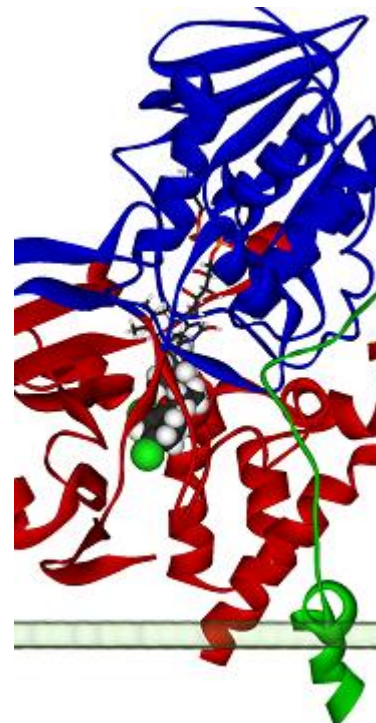
Genetics already plays a role in identifying the race of possible suspects, as in the ongoing British case of the Night Stalker. In that investigation, police have revealed that a genetic analysis of the Night Stalker's DNA showed he was of Caribbean parentage. As the "violent" MAO-A variant is overrepresented in some ethnic groups, it is not far-fetched to think that a judge might take ethnicity into account when sentencing.

Some believe that the link between antisocial behaviour and genes is so strong that genetic information should be accorded the same status as mental illness or an abusive childhood in deciding punishment. In a 2002 report, for example, the influential Nuffield Council on Bioethics concluded that the use of genetic information to help determine custodial sentences (along with other information such as previous convictions) should not be ruled out.

But genes do not automatically turn their owners into killers. There are many people with Bayout's particular genetic baggage who have never transgressed — around 30 per cent of Caucasians carry the same variant of MAO-A, called low activity MAO-A, as Bayout. Suddenly, the idea of a get-out-of-jail gene — or even a don't-be-so-hard-on-me gene — seems misguided and even dangerous, wiping away notions of free will and personal responsibility.

"People in the legal profession should be extremely wary of going down this road," says Troy Duster, a sociologist at New York University and former head of the American Sociological Association who has long advocated caution in the social use of genetic information (one of his books is called, uncompromisingly, *Backdoor to Eugenics*). "This will open the door to lawyers looking for genetic tests that will result in shorter sentences for their clients. That would be OK if the science was properly validated, but by making [Bayout's] sentence more lenient, the judge implied there is more clarity in the science than there really is.

"There may be a correlation between genes and behaviour, but that says nothing about causation. Even scientists who work in the field acknowledge this. I don't think this could have happened in America, where we have the Daubert ruling (which sets out stringent criteria for the admission of scientific evidence)."



The correlation between genes and behaviour might, Professor Duster suggests, be clouding common social factors such as poverty. He points to 60 per cent of murders in America being carried out by African-Americans, though they constitute 12 per cent of the population. But before we label blacks particularly murderous, he says, we should note that murder rates in Caribbean countries or African countries are no higher than in other countries. Therefore we must look to environmental factors, rather than some innate genetic characteristic, to explain the extraordinarily high murder rate.

Professor Duster's sense of dismay is shared by the criminologist Kevin Beaver, whose research at Florida State University has focused on the link between antisocial or violent behaviour and low-activity MAO-A. He has found that men with this variant — which affects their production of neurotransmitters such as serotonin and dopamine — are twice as likely to join gangs and, once in those gangs, four times as likely to use weapons. "Our research is about explanations, not justifications," Dr Beaver says. "Everyone makes their own personal choice about whether to commit a crime. I wouldn't say I support this ruling in any way: if you do the crime you should do the time."

And since, Beaver adds, 30 per cent of Caucasian males have the same MAO-A variant as Bayout, "it is neither a necessary nor a sufficient reason to commit a crime. It might be a contributing factor in why someone becomes violent but it doesn't determine it, and it doesn't mean you should cut them any slack. Other research shows that this MAO-A variant has its most powerful effect when paired with maltreatment in childhood; and the genetic effect disappears with positive parenting." This gives the lie, he says, to those who think that genes determine behaviour, regardless of social context.

The only justifiable courtroom use of such genetic data, Beaver thinks, is as an explanation for a defendant's actions, not an excuse. He could, for example, see it being used on death row to spare an inmate from execution: "Do we really want to sentence someone to death when he's had a terrible abusive childhood, or an awful upbringing? People are more lenient in these situations, as they are with mental illness. I could see it being used in this way. This background information doesn't remove personal responsibility but we can understand to some extent why he did it."

Information about Bayout's childhood has proved elusive; in fact, his appeal happened in September and made no news at the time. It came to light only two weeks ago, when a local Italian newspaper picked up the story. The case was then highlighted in the science journal *Nature*. None of the scientists interviewed by the journal were willing to defend the judge's decision.

Nita Farahany, a law professor at Vanderbilt University who has been cataloguing the march of behavioural genetics into the courtroom, told *Nature* that at least 200 defendants, mostly in the US, had invoked the use of behavioural genetics to explain violent, sometimes murderous, conduct. Only one specifically used evidence on MAO-A activity, but the ploy failed; Stephen Mobley, convicted of murder and armed robbery, was executed in 2005.

Most lawyers regard serotonin as the real legal godsend; low levels of this neurotransmitter are associated with depression, mood disorders and poor impulse control. In a handful of cases, a "serotonin defence" has saved someone from execution (such as Dion Sanders, a rage-prone drug addict who shot his grandparents dead after they threw him out of their house).

Much of the seminal work on the MAO-A gene has been conducted by Terrie Moffitt, Professor of Social Behaviour at the Institute of Psychiatry in London. It was her 2002 paper that really revealed how the low-activity MAO-A gene could be "switched on" in the right environment. Specifically, she showed that boys with the gene variant who had been treated badly in childhood (for example parental rejection, beating, sexual abuse or having a succession of different carers) were nine times more likely to be antisocial or violent than boys who had the same gene variant but who had had happier childhoods. In an e-mail exchange last week, Professor Moffitt said that courts should look at family history, which captures all the social and environmental aspects of a person's behaviour, in addition to anything that might lurk in their genomes.

She explains: "It works in just the same way as taking a family history of heart disease or cancer, but the predictive power is even stronger. Family history of offending in grandparents and parents works so well because it combines information from all genes in the defendant's genome (not just the tiny few currently known to science), and from all socially transmitted causes of crime in the defendant's family as well. Research has shown that crime is heavily concentrated in families, with more than 60 per cent of crimes accounted for by less than 10 per cent of families."

Professor Moffitt will not be drawn on whether genetics should affect sentencing, saying that that is a legal, rather than scientific, matter. She notes, however, that sentencing might go either way: in Bayout's case, where genetic considerations led to leniency. Conversely, people with certain genes might be deemed at high risk of reoffending, resulting in prosecutors pushing for longer periods of incarceration.

She is also adamant that neither genetics nor genealogy should be invoked to exonerate bad or criminal behaviour.

“Imagine you are the identical twin of a convicted murderer. This tells us that you share all of the genes of this murderer, you were reared by the same parents and had the same childhood experiences.

“If you become angry and have the opportunity to attack someone, you are still responsible for that decision. In fact, knowing your background, you are more responsible for your own behaviour.”

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