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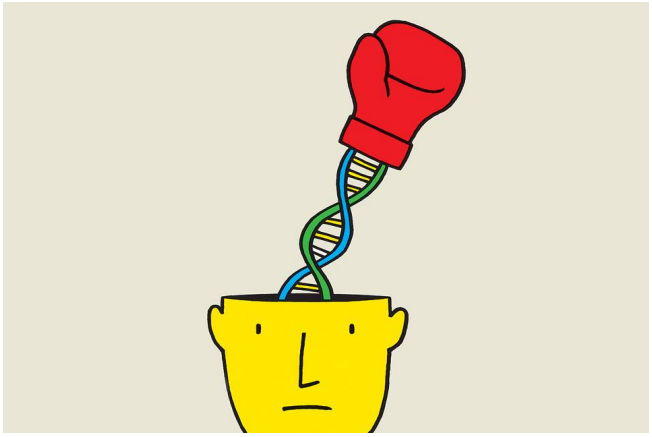
LIFE | IDEAS | MIND AND MATTER: MELVIN KONNER

Lighter Penalties for Those With 'Violent' Genes?

Now we have tools to understand chemical changes that let genes affect levels of violence



Studying violent tendencies *ILLUSTRATION: TOMASZ WALENTA*

By **MELVIN KONNER**
July 22, 2016 10:08 a.m. ET

For many years, studies of traits shared by families have shown that genes can influence an individual's propensity to violence. But those conclusions derive from statistics. Now we have tools to trace how particular genes relate to brain chemistry and, in turn, to behavior.

This chemical evidence provides a smoking gun—pardon the expression—for the genetic component of violence. Which raises an ethical question: Should judges alter punishments based on whether individuals guilty of violent acts were dealt a bad hand of genetic cards?

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The new chemical studies are converging on a molecule called monoamine oxidase (MAO), which helps to process brain chemicals such as dopamine (famously important to pleasure) and serotonin (implicated in depression). Genes don't directly make brain transmitters like dopamine and serotonin. That's where enzymes like MAO—chemical catalysts that accelerate reactions—come in. Genes provide the code for enzymes, and since genes can vary from person to person, so can the enzymes that their coding produces.

Growing evidence about MAO led Jari Tiihonen of the Karolinska Institute in Stockholm and colleagues to study the gene that makes the enzyme in convicts at 19 Finnish prisons. They examined hundreds of violent and nonviolent offenders in their study, published in 2015 in the journal Molecular Psychiatry. The results linked violent

individuals with a form of MAO that is less active than average.

Because most severe violence in Finland occurs under the influence of alcohol or drugs, these factors could not be separated out. But the researchers reasoned that these substances acted with a more devastating effect on offenders with low MAO, prodding them to be more violent.

The scientists emphasized that while they had documented the gene's role in some violent cases, it is too blunt an instrument to identify violence-prone individuals reliably. But the influence is there.

In a 2016 study based at the University of Toronto, Nathan Kolla and colleagues took a related approach. They examined 19 men diagnosed with antisocial personality disorder, each with "a history of impulsive violent offending." None had psychosis, other major mental illness or an addiction.

Researchers focused on a part of the emotional brain called the ventral striatum, known to be involved in aggression, and on the frontal lobe's role in inhibiting those aggressive impulses. Men with a lower density of MAO in the ventral striatum were more impulsive, while their brains were less likely to simultaneously activate their protective frontal lobes.

Many other studies point to MAO in aggression. But what are the real-world implications? In a 2012 study, Lisa Aspinwall of the University of Utah and colleagues explored this with a fictional vignette (based on an actual case) presented to 181 trial judges.

" Jonathan Donahue" robs a restaurant and beats the manager on the head with his gun, causing moderate but permanent brain damage. The jury convicts Donahue of aggravated battery. The judges were asked to sentence him and to explain any mitigating factors.

The judges were told to consider that Donahue had the antisocial disorder psychopathy, either alone or with low MAO and other brain differences. Those who heard about the specific biological factors sentenced Donahue to an average of 13 years instead of 14, and they were more likely (48% versus 30%) to mention mitigating factors in their decisions.

Note that the judges didn't let the testimony about biology sway them greatly—the change in sentencing was small. But we are only starting to learn how genes relate to violence, and we should worry what may happen as experts become more confident. Genetic science can enlighten us about certain sources of behavior, perhaps even lead to treatments, but we should not let it abolish responsibility.

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