

Genes, brain and antisocial behaviour: where do we stand?

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The body of knowledge gained in the field of neuroscience in the last quarter of century have changed the way we conceptualize mind, behavior, and even human nature. Since the 19th century it has been well known that lesions to the cerebral cortex may lead to impairments in specific cognitive functions and in the ability to modulate behavior. In recent years, the development of modern methodologies for investigating brain functions, including positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) has made it possible to investigate the neural circuits implicated not only in cognitive processes such as perception, attention, memory and language, but also in more complex and elusive mental functions such as emotion, impulse control, and moral judgment. In addition, molecular biology and genetics have led to the decoding of the human genome and are now investigating the role that the genetic endowment plays in shaping not only physical, but also personality features, as well as the risk of developing body or brain pathologies. Among research strands followed by modern pioneers of functional exploration of the brain, of special importance for the law is the study of the neural basis of aggression and antisocial behavior. Recent studies indicate that regions and circuits within the frontal lobes are involved in the regulation of aggressive impulses, moral judgment and behavior in general. The hypothesis that those circuits may be dysfunctional in criminal individuals has found support in the empirical observation of significant morphological and/or functional differences between the brains of "normal" individuals and that of criminals. In addition, specific alleles in genes involved in the metabolism of neurotransmitters can be associated with a significantly higher risk of developing antisocial behaviors and of committing criminal acts.

In view of the evidence coming from neuroscience, the question of the extent to which the individual is free and responsible of his or her actions has found renewed vigor. The issue reconnects to the millenary debate in the ethical and philosophical realm on free will versus determinism — a debate whose echo resonates in the courtroom. One foundation of the criminal justice system is that individuals are well equipped with free will that enables them to distinguish good from bad and to decide to act in one way or another. On such a foundation, retributive jurisprudence, typical

of all modern societies, bases culpability and imputability. Insanity is widely recognized as a valid excuse from legal liability. So, if control of aggression is associated with specific neural substrates, isn't it plausible that whatever alterations of such substrates occur—whether congenital or acquired, morphological or functional—these may lead to abnormal behavior that escapes the individual's control, even in the absence of any evident pathology? Also, possessing a given genetic allele that increases the risk of developing impulsive behavior or losing control under stressful situations or in response to provocative stimuli would not in itself represent a limitation to what we call free will? These are only some of the numerous questions that arise at the crossroads between science, philosophy, ethics and the law.

Refereces

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