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GENE-BRAIN -ENVIRONMENT INTERACTIONS IN VIOLENT BEHAVIOR

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Introduction: The prediction, prevention and treatment of violence pose several challenges that are partly due to incompletely described neurobiological underpinnings of human violent behavior.

Objectives: This work's objectives are establishing greater recognition of the neurochemical substrates of violent behavior and importance of the gene-environment interplay in the development of violence, distinguishing the components of the functional neural networks involved in violent behavior and facilitating the interpretation of relations between brain damage and alterations in social behavior from a perspective that takes into account variables such as developmental phase, brain-environment interactions and neuroplasticity.

Aims: We provide an overview of the neurobiological underpinnings of violence and the roles and advantages of using static and functional brain imaging in studying violent behavior.

Methods: A comprehensive review of the scientific literature on the neurobiology of violence was performed. A theoretical framework for the possible role of epigenetic factors in mediating the predisposition for violence is advanced.

Results: Research data from various fields (such as genetics, cognitive and affective neurosciences, static and functional neuroimaging) suggest that the predisposition for violent behavior is influenced by both genetic and environmental factors. Epigenetic mechanisms underlying lasting environmentally-induced modifications in gene expression have recently been implicated in the pathogeny of various psychiatric and non-psychiatric diseases and social behavior disturbances.

Conclusions: The genetic, neurochemical and neuroimaging findings from various studies emphasize the complex role of the gene-environment interplay in the pathogenesis of violence and open a path of hope for the development and optimal timing of violence prevention strategies.