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Neurotrophins and Suicide: A Systematic Review of the Correlation between BDNF, GDNF and Suicidal Behavior

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Description

The complex relationship between neurotrophic factors and suicide has garnered increasing research attention, focusing particularly on Brain-Derived Neurotrophic Factor (BDNF) and Glial Cell Line-Derived Neurotrophic Factor (GDNF). These neurotrophins play crucial roles in neuronal survival, growth, and function, and emerging evidence suggests that they may be implicated in suicidal behavior. This commentary explores the current state of research on BDNF and GDNF in relation to suicide, highlighting key findings, ongoing debates, and future directions for investigation [1].

BDNF is essential for neuroplasticity, synaptic strength, and neuronal survival. It has been extensively studied in the context of depression and mood disorders, with reduced BDNF levels often associated with depressive symptoms and suicidal behavior. GDNF supports the survival of dopaminergic neurons and has been implicated in various neurodegenerative conditions. Its role in psychiatric disorders, including suicide, is less well understood but is emerging as an area of interest [2].

Studies have consistently reported lower levels of BDNF in individuals with depression and those who have died by suicide. This reduction is thought to reflect impaired neuroplasticity and neuronal health, which may contribute to suicidal ideation. Genetic variations in the BDNF gene, such as the Val66Met polymorphism, have been linked to altered BDNF levels and increased susceptibility to depression and suicidal behavior. The Met allele has been associated with reduced BDNF secretion and cognitive impairments [3].

Research on GDNF in the context of suicide is less established compared to BDNF. However, preliminary studies suggest that altered GDNF expression may be related to mood disorders and suicidal behavior. Some studies have found reduced GDNF levels in individuals with major depressive disorder (MDD) and suicide. Given GDNF's role in neuroprotection, its dysregulation could potentially influence neuronal survival and contribute to the neurobiological underpinnings of suicidal behavior. Neurobiological Insights: The association between reduced BDNF and GDNF levels with suicidal behavior provides insights into the neurobiological mechanisms underlying suicide. Impaired neuroplasticity and neuronal survival may contribute to the development of severe mood disorders and suicidal ideation [4].

Both BDNF and GDNF hold promise as potential biomarkers for assessing suicide risk and monitoring treatment responses. Measuring levels of these neurotrophins could improve risk assessment and personalized intervention strategies. The findings suggest that strategies aimed at increasing BDNF and GDNF levels might have therapeutic potential. For example, treatments that enhance neurotrophic factor signaling or counteract neurodegeneration could be explored as interventions for mood disorders and suicide prevention.

The research findings on BDNF and GDNF are varied, with some studies showing strong associations while others find weaker or conflicting results. This heterogeneity may be due to differences in study design, sample characteristics, and measurement techniques. Many studies are cross-sectional, making it difficult to establish causality. Longitudinal studies are needed to determine whether changes in BDNF and GDNF levels precede suicidal behavior and to explore the temporal dynamics of these neurotrophins. Further research is required to elucidate the precise mechanisms through which BDNF and GDNF influence suicidal behavior. Understanding their roles in specific brain regions and neural circuits could provide deeper insights into their involvement in mood disorders.

Combining neurotrophic factor research with other biological markers, such as inflammatory markers or genetic factors, could enhance our understanding of the complex interplay between neurobiology and suicide risk. The relationship between BDNF, GDNF, and suicide underscores the importance of neurotrophic factors in the pathophysiology of mood disorders and suicidal behavior. While the current evidence suggests a significant role for these factors, ongoing research is essential to clarify their exact contributions and potential as therapeutic targets. Advancing our understanding of how BDNF and GDNF influence suicide risk will contribute to more effective prevention strategies and treatment options for individuals at risk [5].

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Conflict of Interest

None.

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