



Neurobiology of Suicide: Do Biomarkers Exist?

A. A. Mamun Hussain¹

Suicide, today is the leading cause of death globally, with nearly 01 million people dying by each year, averaging one suicide every 40 seconds.¹ It is observed that, for every death from suicide, approximately 33 people attempt suicide, and every attempt affects many other people, including family members, friends and co-workers.² But, despite major advances in identifying risk factors, little is known about the neurobiology of suicide, making suicide very difficult to predict at an early stage. Recently, more attention has been given to the biological mechanism of suicide, and multiple studies have evaluated biochemical, genetic, and epigenetic changes in patients who had completed suicide. Low levels of 5-HIAA have been found in the CSF of the patients who have committed violent attempts.³ Genetic studies reported polymorphism on the serotonin transporter and in tryptophan hydroxylase in suicidal behaviour. The role of Ketamine in suicide suggest that it could be involved in a yet unexplored role. Changes in methylation of the glucocorticoid receptor and cortisol suppression has been strongly associated with suicidal behavior.⁴ Multiple neurotrophic factors, especially BDNF (Brain-derived neurotrophic factors), has the most evidence linking it to suicide, to date. Melancholic patients have been consistently reported as having more immunological

abnormalities, like low monocyte counts and cytokines abnormalities. Studies⁵ have reported alterations of IL-1B, IL-6, TNF-alpha, IFN-gamma, VEGF, SIOOB, Orexin, BDNF, and Kynurenin. Several disease, viz., Multiple Sclerosis, Coeliac disease, Diabetes, Epilepsy, to mention a few, by increasing the bodies immune response against several organs have increased risk of suicide. In a Study⁶ of 45,000 Danish mothers, the seropositivity for *Toxoplasma gondii* increased the relative risk of suicide to 2.1 and 1.8 for violent suicide.

So, considering these studies discussed here, there is supporting evidence for a role of several neurobiological system in the pathophysiology of suicide, which further explain a determinist and physicalist model of the mind, challenging prior conceptions about free will and suicide. Finally, as a concluding remark- although there are important advances in the last 50 years of the neurobiology of suicide, yet there are a lot of question still with no answer that perhaps will continue to be explored in the years to come.

References:

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¹ Professor, Department of Psychiatry, Rajshahi Medical College, Rajshahi.

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All Correspondence to
A. A. Mamun Hussain
Professor, Department of Psychiatry
Rajshahi Medical College, Rajshahi.
Email: mamun.hussain.bd@gmail.com