

## Hypothalamus and Hypothalamic Dysfunction in COVID-19

Luis Rafael Moscote-Salazar<sup>1</sup>, Md Moshur Rahman<sup>2\*</sup>, Sabrina Rahman<sup>3</sup>, Ivan David Lozada-Martinez<sup>4</sup> and Mohammed Maan Al-Salihi<sup>5</sup>

<sup>1</sup>Center for Biomedical Research (CIB), Faculty of Medicine, University of Cartagena, Cartagena, Colombia

<sup>2</sup>Assistant Professor, Neurosurgery Department, Holy Family Red Crescent Medical College, Dhaka, Bangladesh

<sup>3</sup>Department of Public Health, Independent University-Bangladesh, Dhaka, Bangladesh

<sup>4</sup>Medical and Surgical Research Center, School of Medicine, University of Cartagena, Cartagena, Colombia

<sup>5</sup>Medical Doctor, College of Medicine, University of Baghdad, Baghdad, Iraq

**\*Corresponding Author:** Md Moshur Rahman, Assistant Professor, Neurosurgery Department, Holy Family Red Crescent Medical College, Dhaka, Bangladesh.

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The recent pandemic associated with the new coronavirus has represented a new paradigm in different aspects of medicine [1]. The neuroinvasive properties verified regarding SARS-Cov2 have allowed us to know how this virus affects multiple organs and systems in the human body [2,3]. One of the affected structures is the hypothalamus, an anatomical region located in the diencephalon with different vital functions for the body's normal functioning [4,8].

SARS-Cov2 might affect the hypothalamic-pituitary-adrenal axis (HPA) through ACE2 receptors. The benefits of glucocorticoids in covid patients have already been established, indicating that steroids can regulate the HPA [8].

Viral entry into the brain through olfactory sensory neuronal fibers from the nose and the post-mortem study report has shown viral invasion and replication in the hypothalamus of covid patients [9].

A proposed mechanism is that sudden death in hypothalamic involvement due to a decrease in noradrenaline and marked rise in adrenaline causes vascular dystonia and cardiac arrhythmia [5,6]. Central hypocortisolism and low dehydroepiandrosterone sulfate levels have been seen in SARS patients, indicating disruption to the hypothalamic-pituitary circuits [11].

The undisclosed matter of sudden death in SARS-Cov2 patients may be linked to the hypothalamic involvement or myocarditis, which is an issue to be revised [6,7]. The worrisome rise in the number of neurological symptoms indicates considerable neurological impairment and a detrimental impact on the central nervous system. We hypothesize that hypothalamic circuits are essential participants in developing symptoms connected to COVID-19's CNS and PNS manifestations, based on the wide range of neurological symptoms. A study found that COVID-19 infection caused acute necrotizing encephalitis, including abnormalities in brain areas linked with consciousness and memory function, such as hypotha-

lamic circuits [10]. The need to develop a targeted research effort to determine the same hypothalamic circuits implicated in the development of neurological damage associated with COVID-19 infection is highlighted by the characteristics of COVID-19's effects on the CNS.

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