

# Cognitive and behavioral manifestations in neurological and psychiatric diseases as models to understand the complexity of human biology

## *Manifestaciones cognitivas y conductuales en enfermedades neurológicas y psiquiátricas como modelos para comprender la complejidad de la biología humana*

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Human cognition and behavior are complex functions of the brain. Our insights for comprehension of its intricate neurobiology came to a large extent from neurological and psychiatric diseases, principally through lesional models and more recently through functional models using technological advances.

The classical vascular models apported strong evidence for our comprehension of human cognition and behavior. These models are still useful today and are essential for comprehension of brain function, such as the Upper Motor Neuron Syndrome, Wernicke's Aphasia, and other syndromes such as the controverted "Vascular Depression," a syndrome that originally was described by Robinson and consists of late-life depression with executive cognitive dysfunction and subcortical hyperintensities in brain imaging, which has apported important knowledge in the comprehension of mood syndromes<sup>1,2</sup>. Furthermore, other kind of lesional models corresponding to focal neurodegeneration have been very helpful to understand the regional anatomy, including circuits and cortical hubs closed to particular cognitive or behavioral functions. That is the case of our comprehension on behavioral social skills, behavioral inhibition and semantic information storage in cases of behavioral variant Frontotemporal Dementia or Semantic Variant

Primary Progressive Aphasia affecting the anterior temporopolar region(s)<sup>3</sup>; or the understanding that we have learned in terms of visual processing through syndromes such as cortical posterior atrophy, commonly secondary to Alzheimer Disease Pathology, and less frequently by Lewy Body Disease or Prion Diseases<sup>4,5</sup>.

On the other hand, the majority of Primary Psychiatric syndromes, with less precision have an affected particular brain region explaining the complete load of the disease. A known research biomarker in people with Primary Depression is the change in function or/and volume of the anterior cingulate gyrus, particularly the subgenual area, a brain structure implicated in the processing of cognitive and affective information<sup>6,7</sup>. Although several trials focusing on the stimulation of the anterior cingulate region for depression have been developed, results are controversial and costs are elevated, leading to deep stimulation as an experimental treatment until now<sup>8</sup>.

Why deep brain stimulation directed to the anterior cingulate, which is a known structural biomarker in depression, does not work in all cases to treat depression? The answer relies on understanding the behavioral and cognitive manifestations of Primary Psychiatric Disorders as "non focal brain diseases" but circuit diseases that may

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be affected in different patterns in different persons, as recent research supports<sup>9</sup>. In addition, Behavioral and Cognitive Manifestations of Psychiatric Disorders also are influenced and modulated by the social-environmental situations and the psychological load of every individual as the biopsychosocial model proposes.

In this issue of Revista Mexicana de Neurociencia interesting research related to behavioral and cognitive manifestations in disease models is exposed, including findings in cognitive function and depression and their correlation to academic performance, as well as an interesting assessment of creative thinking in people affected by frontal meningiomas. Research that contribute evidence to the field of behavioral and cognitive manifestations of neurological and psychiatric diseases.

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