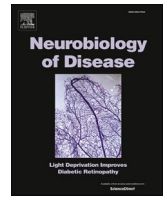




Contents lists available at ScienceDirect

Neurobiology of Disease

journal homepage: www.elsevier.com/locate/ynbdi

Editorial

Special Issue Title: The neuroimmune crosstalk in mood disturbances of neurological and psychiatric diseases



During the last decades, an intricate relationship between the immune and the nervous system has been shown to maintain brain homeostasis and contribute to shaping behavioural responses. It is now acknowledged that neuroimmune cross-talks tightly regulate cognitive, social and affective behaviours, whilst excessive immune responses are considered pathogenic factors for several neurodegenerative disorders, such as multiple sclerosis (MS) or Parkinson's disease (PD). The contribution of inflammatory processes in the pathophysiology of psychiatric diseases seems to derive mainly from associative evidence. A few data highlighting a direct link between immune dysregulation and mood disorders have recently emerged from preclinical studies. Notably, the scientific community is still seeking further evidence to support the idea that inflammation might be a critical disease modifier promoting susceptibility to depression. It is widely recognized that inflammation and depression are bidirectionally connected with important implications for many neuroinflammatory/neurodegenerative diseases.

In particular, the risk of depression is significantly high in patients affected by MS, and early symptoms of mood disturbances in this pathological condition are no longer considered psychological reactions to a potentially disabling disease but are likely linked to organic factors. In this special issue, C. Wang, Y. Zhou and A. Feinstein provided a detailed description of the immune dysregulation taking place in MS patients with depression. In their review, they dissected the common molecular pathways that can contribute to the development of comorbidity between MS and depression, highlighting the relevance of exploring new therapeutic options in the future.

Remaining within the context of MS, the research paper by Gilio and colleagues explored the impact of lifestyle physical activity on clinical symptoms and central inflammation in patients with MS. The authors revealed that depression and anxiety were reduced in exercising MS patients, and such an effect was combined with the reduction of IL-2 expression in the cerebrospinal fluid. Then, the causal link between exercise-mediated immunomodulation on IL-2 and mood symptoms was demonstrated in the animal model of MS.

Mood disorders represent a relevant topic also in the context of PD since, as well as in MS, they affect a large part of PD patients. The review

by S. Hayley and colleagues gives an extensive and complete overview of the relationship between the aetiology of depression and primary motor impairments in Parkinson's disease, examining clinical and preclinical findings.

Finally, Eva M. Medina-Rodriguez and E. Beurel review the relevant link between blood-brain barrier (BBB) dysfunction and major depressive disorder (MDD) pathophysiology. The article overviews BBB biology and its crucial role in maintaining brain homeostasis. It summarises the evidence of BBB dysfunction in humans with MDD and in preclinical models of the disease. Then, the authors reviewed the putative molecular mechanisms that link BBB dysfunction and mood disorders, highlighting the relationship between depression, inflammation and barrier permeability.

The papers in this special issue of Neurobiology of Disease on the neuroimmune crosstalk in mood disturbances of neurological and psychiatric diseases provide advances in this field of research at both pre-clinical and clinical levels. The original research article and the reviews of this special issue dissect the molecular and cellular mechanisms at the basis of the complex neuronal and immune crosstalk. The involvement of the inflammatory component in the interaction between mood disturbances and neurological diseases, such as PD and MS, might have a crucial role in discovering and developing new and more effective pharmacological treatments.

Georgia Mandolesi^{a,b}, Alessandra Musella^{a,b}, Diego Centonze^{c,d,*}

^a Synaptic Immunopathology Lab, IRCCS San Raffaele Roma, Rome, Italy

^b Department of Human Sciences and Quality of Life Promotion University of Rome San Raffaele, Rome, Italy

^c Unit of Neurology, IRCCS Neuromed, Pozzilli, Isernia, Italy

^d Department of Systems Medicine, Tor Vergata University, Rome, Italy

* Corresponding author at: Via Atinense, 18, 86077 Pozzilli (IS), Italy.
E-mail addresses: centonze@uniroma2.it, diego.centonze@neuromed.it (D. Centonze).

<https://doi.org/10.1016/j.nbd.2023.106180>

Available online 1 June 2023

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