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## Nutrition and microbiome as epigenetic regulation of neurocognitive disorders

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Chronic inflammation plays an increasingly appreciated role in the pathogenesis of a number of neurological and behavioral disorders including depression and cognitive impairment. In addition, chronic inflammation contributes to the pathogenesis of a number of related metabolic disorders, and these disorders in turn have been shown to contribute to the elevated inflammatory state, creating a vicious cycle. Chronic inflammation has been shown to contribute to the development of a wide variety of disorders by means of a number of proposed mechanisms. The ability of inflammatory mediators to alter the activity of enzymes, from key metabolic pathways, may explain the connection between these disorders. Proinflammatory mediators possess the ability to directly influence the nervous system by acting on vagal afferents or by crossing the blood brain barrier (BBB) either through leaky sites at the circumventricular organs, or via specialized active transporters. Both depression and cognitive impairment may share a closely linked inflammatory etiology stemming from a cytokine-induced imbalance in the kynurenine pathway. As this pathway provides the primary route for tryptophan (TRP) degradation, it plays a major role not only in the maintenance of serotonin (5-HT) synthesis, but also in the critical balance between neurotoxic and neuroprotective metabolites. Modern nutritional research significantly contributes to improving health of both current and future generations. An important part of nutrition and health is immuno-nutrition, which can be defined as the effect of the provision of specific nutrients on immune function. The effects of diet on the development of some diseases are well documented. A stroke can serve as an example. Scientific literature covers 152 research papers on this subject. A systematic review and meta-analysis of relevant papers suggested that adherence to healthy dietary patterns was associated with reduced risk for stroke incidence and mortality. A number of nutrients have the ability to modulate immune response and counter inflammatory processes. Intestinal tract represents the largest interface between human body and external environment. Its role in nutrient uptake has no substitution. Nutritional components are extremely important for the integrity of the intestinal epithelial barrier. Composition of dietary intake can have significant impact on the microbiota, and consequently on the epithelial barrier. Regulation of intestinal barrier is crucial to control intestinal permeability whose increase is associated with chronic inflammatory conditions. In many diseases, nutrition might be an important key in recovery. But every patient has unique metabolic needs, so some need more of this nutrient, some more of the other one. A greater emphasis on intervention strategies which target inflammation may provide stronger and more sustainable improvements by targeting the inflammatory mediators initially responsible for the alterations in enzyme regulation which ultimately contribute to a number of disorders. Such strategies may help to reduce symptoms of disorders such as depression and cognitive impairment while avoiding many side-effects associated with a heavy reliance on current drug treatments.

### Biography

Agnes Mazic de Sonis has completed her PhD and specialized in Pain Medicine. After specialization in Gynecology and Obstetrics, her interest in the bio-psychosocial management of chronic disease and pain treatment allowed her for multidisciplinary training involving TCM acupuncture pharmaconutritional and pain medicine. She is a Pain Medicine Professor in Brussels and Paris and; In-charge of a special interest group integrative pain medicine supported by Belgian Pain Society.

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