

## From Microbiota-Gut-Brain-Axis to Live Biotherapeutic Products as Treatment for Neurodevelopmental / Neurodegenerative Diseases

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Despite our limited understanding of the complex biology underlying the Microbiota-Gut-Brain axis (MGBA) function and physiology, during the last decade, preclinical and clinical studies have demonstrated that gut microbiota could influence Central Nervous System (CNS) physiology and function. For example, in various psychiatric disorders, studies have shown that gut dysbiosis is observed and that probiotics (psychobiotics) and prebiotics could alleviate symptoms in mood disorders. Recently, gut dysbiosis has been shown in neuro-developmental (Autism,..) and neurodegenerative diseases (Alzheimer's, Parkinson's, Multiple Sclerosis,...). Moreover, very early during the time course of certain neurological diseases (Autism and Parkinson's) gastrointestinal symptoms appear. It should be also pointed out that aggregation of  $\alpha$ -synuclein in Parkinson's disease is firstly observed in gut neurons. Furthermore, Aging, a period of instability for gut microbiota, is the major risk factor of dementias.

Taking into account the mechanistic pathways underlying the communication between the gut and the brain, and the physiopathology of neurodegenerative diseases, we postulate that modulating gut microbiota using Live Biotherapeutic Products (LBPs) could be an innovative, disruptive, safe and pleiotropic way to treat very effectively neurological diseases. In this context, we have built an original collection mainly constituted of strict anaerobic bacterial strains from human faeces. These bacterial strains have been selected regarding their *in vitro* capacities i) To release neurotransmitters/neuromodulators, Short Chain Fatty Acids,..., ii) To have anti-inflammatory and immunologic activities iii) To act on permeability of biological barriers,... Moreover, the selected strains have been tested regarding antibiotics' resistance. Some examples of this strategy will be described.

Results allowed obtaining new innovative LBPs which are into preclinical studies as potential novel treatments against Autism Spectrum disorders and Parkinson's disease.

### Biography:

Pierre Lestage is the CEO and co-founder at NeribiOm, President and CEO at NEUROPHARVAL.