



## Gut - Brain Axis and Treatment for CNS Disorders through Microbiota

**Eswari Beeram\***

School of Liberal Arts and Sciences, Mohan Babu University, Andhra Pradesh, India

**\*Corresponding Author:** Eswari Beeram, School of Liberal Arts and Sciences, Mohan Babu University, Andhra Pradesh, India.

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First evidence of Gut-Brain axis came from the intestinal disorders like Irritable bowel disease and Gut-brain axis mainly connects the central nervous system with the Enteric nervous system connecting the microbiota inhabiting the intestine and majorly responsible for the manifestation of the brain disorders. Microbiota in the intestine can affect the CNS through neural endocrine, immune and humoral links. Administration of antibiotics and probiotics proved to improve the condition Hepatic encephalopathy and chronic treatment with *Lactobacillus rhamnosus* proven to regulate region dependent action on GABA m-RNA.

Treatment for chronic diseases of CNS can be possible by manipulating the gut microbiota through defined nutrition has proven to be effective in patients suffering with Autism, mood disorders and anxiety. Treatment with Cell renewal and regeneration of the cells and tissues is proven to be effective with *Lactobacillus rhamnosus* GG strain and can help in treating brain degenerative disorders. SFB, a class of anaerobic spore forming commensals inhabiting gut has proven for its role in stimulation or boost of immune system through increased IgA production and can help in treatment of immuno suppressive disorders other than HIV.

Microbiota engineering can be possible in Gut by regulating nutritional requirements of microbiota causing diseases with out affecting the useful commensals involved in the metabolism and vitamin production. Dietary fibre deficiency and mucus eroding bacteria like *Citrobacter rodentium* can damage the Gut - Brain axis and may contribute to inflammatory diseases like Erosive gastritis and proven to be improved by the use of antibiotics or probiotics active against *Citrobacter*.

Gut microbiota influence the Gut-Brain axis through the neurotransmitters and neurotransmitter homologs production. Gut microbiota is responsible for most of the gastrointestinal disorders and which can even manifest in to psychiatric diseases. Microbiota is responsible for metabolism of some of the hormones produced by the gut and brain. Colonization of microbiota from schizophrenia rats is proven to induce schizophrenia in healthy individuals.

Neuroactive substances like 5-HT, dopamine and tryptophan can be synthesised by the gut microbiota and for example *Bacillus* can produce Dopamine and *Candida* and *Escherichia* can produce tryptophan and 5-HT from food and can contribute to the mood and anxiety related disorders on inhabitation. *Lactobacillus reuteri*, *Lactobacillus johnsonii*, and *Lactobacillus murinus* can produce indole derivatives from tryptophan and binds to aryl receptor that can induce T-cell differentiation useful in extending the expected life period of HIV patients.

Finally use of antibiotics, probiotics and manipulation of gut microbiota through nutraceuticals or parental nutrition can correct the disorders related to CNS and Gut through Gut-Brain axis.