

Introduction Submission

Living inside the human gut is approximately 100 trillion bacteria, containing nearly 2 million genes. These genes are then paired with other bacteria such as fungi and viruses to make up for what is known as the “microbiota”. Inside each person microbiota there is a distinct composition of gut microbes, partly determined by a mother’s microbiota, the environment exposed at birth and the lifestyle and diet each individual holds. These bacteria living throughout the gut happen to be the most impactful in a human’s life. Without these bacteria, an individual’s metabolism as for the immune system would have major defects that contribute to a disease such as Alzheimer’s. Alzheimer’s disease (AD) is a progressive neurodegenerative disease characterized by memory loss, dramatic changes in character and behavior and an impossibility to carry out normal daily activities in the latter stages of the disease. Specifically, *Lachnospiracea*, is a digestive bacteria, that if unsuccessful interacting with a misfolded amount of protein causes significant imbalance which in turn induces inflammation. With that, toll receptors also become absent, failing the immune system to recognize and respond to diverse microbial pathogens. Particularly, if signaling is not possible the crucial role of initiating host defense responses during microbial infection becomes nonexistent. Immune perturbation in the transgenic brain becomes obvious. TNF- α , is one of the key inflammatory factors involved in the increased numbers of receptors that further dysregulate genetic depletion. In continuous dysregulation of genetic depletion over activation of both TNF and AMPK are performed in the brain affecting neurodegeneration in the brain as a whole. Additionally, two other players in the development and progression of neuroinflammation become apparent, microglia and astrocytes. Microglia happen when chronic neuroinflammation caused by the accumulation of A β and neuronal debris damages the BBB, which then induces a release of proinflammatory cytokines that affects the neuronal integrity and function that contributes to the neurodegeneration. Likewise, astrocytes also induce a pro-inflammatory profile, interacting with A β .49 and contributes to a large scale of neuroinflammation and the loss of neurons. It is these molecules talked above, that alter the gut microbiota composition inducing increased permeability of the gut barrier and immune activation leading to systemic inflammation, which impairs the blood-brain barrier and promotes neuroinflammation, neural injury. Additionally, it is capable of modulating the neurochemical and neuro-metabolic signaling pathways of the brain through the formation of a two-way communication axis involving the endocrine and immune systems, and contribute to the development of neuro-inflammation and ultimately contribute to the pathogenesis of neurodegenerative disorder of Alzheimer’s neurodegeneration.