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Fecal Microbiota Transplantation and the Brain Microbiota in Neurological Diseases

To the Editor:

The review by Choi and Cho, published in the May 2016 issue of *Clinical Endoscopy*, describes the therapeutic role of fecal microbiota transplantation (FMT) in non-gastrointestinal (GI) disorders that include neurological and psychiatric conditions such as autism, chronic fatigue syndrome, mood disorders, multiple sclerosis, and Parkinson's disease.¹ The Authors report clinical evidence that describes how restoration of the gut microbiota, and correction of gut dysbiosis through FMT, is associated with improvement of symptoms in neuropsychiatric disorders. This is achieved through modulation of the gut-brain axis, a concept that has been recently emphasized, for example, in the case of autism.² If the role of the gut microbiota in influencing the development and the function of the brain is well acknowledged,³ little is yet known about the role of the intrinsic brain microbiota and its relationship with the gut microbiota and, hence, with FMT. In 2013, Branton et al.,⁴ demonstrated that, in the brains of human and non-human primates, microbes are present in the absence of any infectious disease or immune deficiency. These microbes are represented, for the most part, by bacteria that are commonly found in soil and water. The authors postulated that these bacteria enter the organism through oral consumption or inhalation, and are transported to the brain by cells of the immune system. Activated lymphocytes and macrophages that constantly surveil the brain would thus act as "trojan horses," carrying the microbes intracellularly.⁴ This latter observation further highlights the role of the immune system in connecting the gut microbiota with the brain microbiota.⁴ We recently demonstrated that alterations of brain lymphatic

drainage may be responsible for the lesions in the brains of autistic children,^{5,6} and it can be hypothesized that such alterations of brain lymphatic circulation affect the composition of the brain microbiota. Therefore, the concept of brain dysbiosis should be evaluated, together with the concept of gut dysbiosis, when FMT is considered for neuropsychiatric disorders. FMT may also thus help correct brain dysbiosis, provided that the functions of the cells of the immune system, and of the lymphatic brain drainage, are not compromised.

Conflicts of Interest

The author has no financial conflicts of interest.

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