Everybody is interested in the gut microbiome. From cardiology to oncology, from psychiatry to endocrinology, health-care professionals of all disciplines are beginning to realize the immense potential of the trillions of bacteria that reside in our gut. Microbiome research has exploded during the past two decades and presents a new paradigm from which to approach many of the common diseases that characterize the modern world. Our gut bacteria have been implicated in virtually all disease states, including obesity, diabetes, cancer, heart disease, asthma, allergies, depression, autism, Alzheimer’s disease, and the list goes on. Many of these noncommunicable diseases share broad pathophysiological associations, such as immune dysregulation, a dysfunctional stress response, and lifestyle factors, including diet, exercise, and alcohol or tobacco use. The influence of the gut microbiome spans all of these domains. Physicists have long been seeking a theory of everything, a single, hypothetical, all-encompassing framework that explains and links together all physical aspects of the universe. Medicine may have found its own ultimate theory in the gut microbiome.

The relationship between psychological functioning and physical symptomatology has long been appreciated, although ideas regarding the nature of this relationship have changed dramatically over time. Freudian theory dominated psychiatric thinking in the early twentieth century and promoted the concept of conversion or hysteria. Freud hypothesized that unresolved emotional conflicts were converted into physical disorders and could account for many physical conditions [Breuer & Freud 2004 (1895)]. While psychiatry has moved beyond the case reports that characterized Freudian psychoanalysis to a more evidence-based medical model of thinking, the concept of the mind–body link in the causation of disease is more relevant than ever. This is particularly true when it comes to the gastrointestinal tract (GIT). Irritable bowel syndrome (IBS) is the archetype of functional gastrointestinal disorders.While the etiology of this condition is unclear, it is well recognized that rates of psychiatric comorbidity, especially depression and anxiety, are extremely high (Whitehead et al. 2002), suggesting a significant etiological role for psychological factors. The same is true for many common, nonfunctional gastrointestinal disorders, including inflammatory bowel disease (IBD) (Graff et al. 2009), celiac disease (Zingone et al. 2015), and peptic ulceration (Lim et al. 2014). Although Freud was adept at dramatic theorizing, he was at least partially correct when suggesting that psychological stress or trauma could produce physical symptoms.

The bidirectional gut–brain axis allows for the top-down influence of our brain and emotional states on gastrointestinal homeostasis and function, as well as a bottom-up modulation of brain function and behavior via neural, endocrine, and immune systems. We have recently come to realize that our gut bacteria are a vital node in this signaling system. Approximately 1 × 1013–14 bacteria reside in the human gut, a staggering number, especially when one considers that our gut bacteria far outnumber our own human cells. The presence of the human gut microbiota has long been known, but it was presumed that these bacteria were commensal organisms, that is, unharmful to but unhelpful for the human host. It is now recognized that this was a gross underappreciation of what is actually a complex symbiotic interaction that influences almost all human physiological, and many psychological, processes.

It is an exciting time in microbiome research. We are in great need of a new paradigm in our approach to mental health and psychological disorders. Depression and anxiety are the tuberculosis and cholera of the twenty-first century. The lifetime prevalence of major depressive disorder (MDD) is more than 10% (Lim et al. 2018), with lifetime anxiety disorders far in excess of this number, at estimated rates as high as 33.7% (Kessler et al. 2012). The World Health Organization predicts that by 2020 depression will rank second in global disease burdens, behind only ischemic heart disease. Could an etiological clue, and possibly a therapeutic answer, to this psychological epidemic reside in our gut? Could probiotics or prebiotics become a new class of antidepressant? Perhaps we are as guilty as Freud of wild hypothesizing, but the rapidly accumulating evidence would suggest that our interest and hope in the gut microbiome are merited.