

Controversy Exam Topic 2020

The gut microbiome is composed of billions of microorganisms (mostly bacteria) that can convey either positive or negative effects on human health. There has recently been tremendous interest in how ingesting commercially available, over-the-counter *probiotics* may optimize our gut microbiome and thus many aspects of our physical health. This has resulted in the manufacturing and sale of orally ingested probiotics being an almost \$40 billion business in the United States each year. While it is well established that a “normal” gut microbiome is vital for human digestion and overall health, the usefulness of orally ingested, over-the-counter probiotics to modify our gut microbiome and improve our overall health is controversial. Moreover, the controversial possibility of taking oral probiotics to improve our brain health and function has been proposed and is of high interest to many neuroscientists.

1) One way that the brain could be affected by the gut microbiome is via the “gut-brain axis”. After very briefly stating the problem to be addressed in your essay, define the gut-brain axis and then give an overview of the literature demonstrating that a gut-brain axis exists in humans and in laboratory rodents. (Approximately two pages)

2) Review the scientific evidence from laboratory rodents and from humans that orally ingested probiotics do or do not affect brain function related to both: A) psychopathology including anxiety and depression and B) Parkinson’s Disease. Please cover the oral probiotic regimens that are or are not effective, what specific behavioral/affective/cognitive outcomes in rodents and humans related to psychopathology and Parkinson’s are altered (or not) by those probiotic treatments, and how and where in brain sites relevant to anxiety and depression or Parkinson’s Disease do the oral probiotics have (or don’t have) effects. (Approximately 6 pages)

3) Given your review of the literature in #2 above, do you believe the existing literature is sufficient to convince you that oral probiotics are effective treatments for anxiety or depression or Parkinson’s Disease (and tell us why you conclude “yes” or “no”)? Even if they are not, is there any potential harm in taking them? As a neuroscientist now familiar with this scientific literature, what would you recommend to patients suffering from psychopathology or Parkinson’s about taking over-the-counter oral probiotic to alleviate or even cure their symptoms (and tell us why you would give that recommendation)? (Approximately 2 pages)