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Poor cognition is associated with increased abundance of Alistipes and decreased abundance of Clostridium genera in the gut

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P4-020 - *Poor cognition is associated with increased abundance of Alistipes and decreased abundance of Clostridium genera in the gut*

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1:45 AM - 9:15 AM

Theme

Basic Science and Pathogenesis

Abstract

Background: Brain and gut health are intricately connected via the gut-microbiota-brain axis. Studies have shown that gut dysbiosis is associated with neurodegenerative diseases, including Alzheimer's disease. However, how cognitive changes affects the gut microbiome structure is currently understudied. We aimed to assess the association between the gut microbiome and global cognitive scores in the Framingham Heart Study (FHS).

Method: Our sample included 1,014 participants (mean age 52, 55% female) of the third generation FHS cohort with available stool samples, cognitive assessments, and no history of dementia or stroke (**Table 1**). We quantified the gut microbiome composition using 16S rRNA sequencing and performed multivariable association and differential abundance analyses, adjusting for age, sex, education, BMI, and other confounders. The global cognitive score (GCS) was built using neuropsychological assessments of four cognitive domains: **Executive function** (trails-making B); **Processing speed** (visual reproduction immediate and delayed); **Language** (similarity test); and **Memory** (logical memory immediate and delayed). Participants were additionally stratified by GCS with lower and higher scores indicating poor and normal cognition, respectively.

Result: Our results **(Figure 1)** showed that individuals with poor cognition have a decreased abundance of genera *Clostridium* (OR = 0.69, 95% CI [0.55, 0.86]) and *Ruminococcus* (0.93, [0.93, 0.94]). Meanwhile, the genus *Alistipes*, previously connected to anxiety, chronic fatigue syndrome, depression, and hypertension, was more abundant (1.06, [1.05, 1.06]) in the poor cognition group. Moreover, the genus *Pseudobutyrivibrio*, a butyrate-producing bacteria from the rumen, was also found to be highly abundant (1.12, [1.11, 1.14]) in the poor cognition compared to normal. Finally, there was no difference in alpha and beta diversity between cognitive groups **(Figure 2).**

Conclusion: Our study suggests that the abundance of several genera, including *Pseudobutyrivibrio*, *Alistipes*, *Ruminococcus*, and *Clostridium* is associated with cognition in middle-age. *Clostridium* was previously proposed as novel probiotics for human health, and increasing its abundance was viewed as an effective strategy to regulate and maintain the homeostasis of the gut microbiota. As all these bacteria have neuroprotective effects, manipulating their abundance through diet and pre/pro-biotics could be a research path for preserving global cognitive function in the future.

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