Some bacteria in the mouth may play a role in memory loss and dementia

Scientists are examining the link between bacteria in the mouth and neurodegenerative diseases such as dementia. Design by MNT; Photography by Henry Horenstein/Getty Images & STEVE GSCHMEISSNER/SCIENCE PHOTO LIBRARY/Getty Images

- New research suggests that the bacteria living in our mouths may influence cognitive function as we age.
- Several bacterial species have been identified as potentially more harmful than others, and some of these microbes may play a role in memory loss and dementia.
- Scientists are now exploring how oral health, along with diet and certain prebiotics, might help slow cognitive decline and protect against conditions like Alzheimer's disease.

As people age, their memory and thinking skills naturally decline. Approximately 15% of older adults experience mild cognitive impairment, a major risk factor for dementia and other forms of dementia such as Alzheimer's disease.

Since cognitive decline and dementia are growing public health concerns, scientists are working to better understand the risk factors and find ways to reduce them. One emerging area of research suggests that oral health may play a role in brain health.

Now, a new study suggests that the bacteria living in the mouth may influence cognitive function as people age, with some harmful bacteria possibly contributing to the development of dementia and Alzheimer's disease.

Diet affects the oral microbiome

In this study, researchers analyzed the oral microbiome of 115 individuals, including 55 with mild cognitive impairment.

Some participants carried the apolipoprotein E4 (APOE4) allele, which is linked to an increased risk of cognitive decline and Alzheimer's disease.

Within the mild cognitive impairment group, a higher abundance of Neisseria bacteria was associated with better executive function and visual attention.

Among healthy individuals, Neisseria was linked to stronger working memory.

The presence of Porphyromonas bacteria was a key predictor of mild cognitive impairment, while Prevotella intermedia was linked to APOE4-carrier status.

The researchers noted that diet influences the oral microbiome, with nitrate-rich diets — such as the Mediterranean diet and the Dietary Approaches to Stop Hypertension (DASH) diet — supporting bacteria that are beneficial for cognitive function.

Diet supports bacteria that are good for cognitive function

James Giordano, Ph.D., Pellegrino Center Professor, Departments of Neurology and Biochemistry at the Georgetown University Medical Center in Washington, DC, not involved in the study, spoke to Medical News Today.

"This study was well-conceived and -conducted, and built upon extant research that has fortified a link both between the gut microbiome and brain function, and the role of the oral microbiome and health," Giordano explained.

"This study importantly demonstrated that maintenance of the oral microbiome can be an important factor to the overall integrity of (oral and GI) microbiome-brain functional reciprocity and health, and that key flora of the oral microbiome are particularly influential in maintaining this functional integrity."

— James Giordano, Ph.D.

"Specifically, the authors demonstrated that the presence of particular species of oral microbiome flora appear to be instrumental to circulatory and cerebral production of the gaseous neuromodulating chemical nitric oxide (NO)," Giordano said.

"NO has been shown to affect cerebrovascular tone and to regulate the intracellular signalling processes crucial for neural functions, inclusive of those operative in cognitive processing. NO has also been shown to exert protective effects against neuroinflammatory processes operative in loss of neural function that is contributory to cognitive impairment," he continued.

ORAL BACTERIA, NITRIC OXIDE, AND NEUROINFLAMMATION

“Thus, the authors provide evidence that specific flora of the oral microbiome are important for the production of NO and the maintenance of NO-dependent neural functioning, which may play a role in sustaining cognitive capabilities. [O]ther oral microbiome species appear to both inhibit normal flourishing of beneficial flora, thereby reducing these beneficial effects, and these pathogenic species may directly impact brain health and function by contributing to chemical processes of neuroinflammation.”

— James Giordano, Ph.D.

Poor oral health, gum disease may be implicated in dementia

Gum disease, or periodontitis, has been linked to poorer cognitive function. Researchers believe this connection may be due to the presence of harmful bacteria in the mouth, such as *Porphyromonas gingivalis*, *Treponema denticola*, and *Prevotella intermedia*.

These bacteria contribute to gum disease by causing inflammation and damage, but they may also affect the brain in ways that increase the risk of cognitive decline.

One way oral bacteria may influence brain health is by entering the bloodstream when there is damage in the mouth, such as bleeding gums.

Once in the blood, these bacteria can travel to the brain, especially in people with Alzheimer’s, as the blood-brain barrier — the protective shield that normally keeps harmful substances out — becomes more porous in the disease.

In fact, bacteria linked to oral infections have been found in the brain fluid of people with brain infections, and *P. gingivalis* has been detected in the brains of Alzheimer’s patients.

Oral bacteria may also influence inflammatory pathways

Another possible way that oral bacteria could contribute to cognitive decline is through their effect on the immune system.

These bacteria in the mouth can damage its protective barrier, making it easier for harmful substances to get into the bloodstream.

This can lead to inflammation that spreads throughout the body.

Long-term inflammation has been connected to brain aging and memory problems, meaning these bacteria might affect more than just oral health.

These findings highlight the importance of maintaining good oral hygiene, not just for healthy teeth and gums but also for long-term brain health.

How to support the oral microbiome

Giordano pointed out that "these findings strengthen evidence that oral health and maintenance of key species of the oral microbiome are instrumental for brain health."

"[T]hese findings suggest that re-establishment or supplementation of a dominant population of particular species of oral microflora may be beneficial to mitigating neuroinflammation and sustaining neuro-cognitive functions," he said.

Jennifer Bramen, PhD, senior research scientist and director of neuroimaging at the Pacific Neuroscience Institute in Santa Monica, CA, who was also not involved in the study, explained that incorporating nitrate-rich foods into your diet can benefit the oral microbiome.

"This study suggests that incorporating nitrate-rich foods like vegetables into one's diet can benefit the oral microbiome by promoting bacteria associated with better oral and cognitive health outcomes while suppressing those associated with disease." — Jennifer Bramen, PhD

In conclusion, Giordano added that "this study offers promise both for sampling the flora of the oral microbiome as putative predictive biomarkers of brain health, and fortifying the beneficial species of oral microbiome flora to maintain brain health and function."

News Source:

https://www.medicalnewstoday.com/articles/can-cannabis-affect-memory-largest-study-yet-investigates