

Tracing the triggers of late-onset Alzheimer's

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In a sprawling review of more than 200 articles examining the suggested link between infections of the mouth and Alzheimer's disease (AD), two researchers—one, an original mapper of the oral microbiome; the other, a scientist who has worked considerably on the connection between oral infection and AD – have surveyed the current body of research, and point to potential oral microbial culprits.

Physicians and researchers the world over are eager to discover a biomarker for Alzheimer's disease, a condition that plagues nearly 44 million people worldwide. Having spent decades studying how oral

microorganisms invade local tissue, wrecking havoc systemically, University of Oslo Professor Ingar Olsen was compelled to draw upon his studies, applying them to AD research. His first step: reaching out to a foremost expert on the topic—Sim K. Singhrao, a senior research fellow at the University of Central Lancashire's Oral & Dental Sciences Research Group, UK.

Their review, titled Can [oral infection](#) be a risk factor for Alzheimer's disease?, was published today in the international peer reviewed Journal of Oral Microbiology. The paper addresses the "plausible aetiology of late-onset AD being an oral infection."

Inflammation of the brain is a characteristic feature of AD; in recent years, scientists have been searching for potential root causes – many zeroing in on "peripheral infections", such as those that originate in the oral cavity.

Researchers have well established that many bacteria in the mouth, particularly in people with gum disease, find their way into the host bloodstream; if they pass the blood brain barrier – any number of them, claims Olsen, could be implicated in the Alzheimer's enigma.

In poring over the research for the review, Olsen – who has spent decades identifying the hundreds of bacteria species that comprise the [oral microbiome](#) – was struck by one particular observation. "I was amazed that so much of the research to date has been focused on a couple of groups of bacteria – namely spirochetes and Porphyromonas gingivalis," said Olsen, "when there are well over 900 different bacteria in the oral cavity.

"I thought—this can't be the entire story!"

"Even oral Candida and herpes virus could possibly cause the

inflammation in the brain that we see in Alzheimer's patients," said Olsen. *Candida*, a typically harmless fungus found in the mouths of half the world's human population, can become treacherous and lead to infection if it enters the bloodstream. And herpes simplex virus is present in more than 70 percent of the population after 50 years of age. It persists latently in the peripheral nervous system and is periodically reactivated in the brain.

Of *Candida*, Olsen and Singhrao wrote in the paper: "With a growing population of elderly, severe systemic fungal infections have increased dramatically in this age group during the last 30 years. Oral yeasts can be found in periodontal pockets, in root canals, on the mucosae and underneath dentures (denture stomatitis) (140-142). ... Fungal molecules including proteins and polysaccharides [(1,3)- β -glucan] were detected in peripheral blood serum, and fungal proteins and DNA were demonstrated by PCR in brain tissue of AD patients."

This extensive review paper launches a collaboration between Singhrao and Olsen, the latter of whom says he is eager to explore these new potential culprits.

More information: "Can oral infection be a risk factor for Alzheimer's disease?" *Journal of Oral Microbiology* 2015 September 17, 2015 doi: [dx.doi.org/10.3402/jom.v7.29143](https://doi.org/10.3402/jom.v7.29143)

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