



PRESS RELEASE (2020/12/24)

Diseased gums shown to produce Alzheimer's-related protein fragments

Study provides clues to the mechanism linking periodontitis and Alzheimer's disease

Collaborative research involving Kyushu University has shown for the first time that inflammatory cells infected with periodontitis-causing bacteria could be a source located outside of the brain of protein fragments associated with Alzheimer's disease.

The study sheds light on a possible mechanism for the link between periodontitis—commonly known as gum disease—and Alzheimer's disease that has been found in multiple clinical studies but for which an explanation has so far remained elusive.

A hallmark of Alzheimer's diseases is the buildup of protein fragments in the brain to form senile plaques, and amyloid β , the main component of the senile plaques, has until now been thought to be specifically produced in the brain, where it then accumulates.

However, the researchers found that amyloid β is produced outside of the brain by inflamed macrophages—the body's major inflammatory cells—in the gums of periodontitis patients and in the liver of middle-aged mice systemically infected with *Porphyromonas (P.) gingivalis*, the bacteria causing periodontitis.

Furthermore, the researchers report that a pre-treatment to inhibit the activity of the protein cathepsin B significantly decreases amyloid β production by the infected macrophages, indicating cathepsin B plays a key role generating the protein fragments.

In addition to helping clarify how periodontitis can play a role in the development of Alzheimer's, the study shows that cathepsin B may be a therapeutic target for delaying the onset and progression of Alzheimer's disease during *P. gingivalis* infection.

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For more information about this research, see "*Porphyromonas gingivalis* infection induces amyloid- β accumulation in monocytes/macrophages", Ran Nie, Zhou Wu, Junjun Ni, Fan Zeng, Weixian Yu, Yufeng Zhang, Tomoko Kadowaki, Haruhiko Kashiwazaki, Jessica L. Teeling, and Yanmin Zhou, *Journal of Alzheimer's Disease* (2019). <https://doi.org/10.3233/JAD-190298>

This was an international project between the research group of the Faculty of Dental Science, Kyushu University, and the research group of the School and Hospital of Stomatology of Jilin University, China, a partner school of Kyushu University.

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