

# Immune-regulating drug improves gum disease in mice

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A drug that has life-extending effects on mice also reverses age-related dental problems in the animals, according to a new study published today in *eLife*.

Periodontal disease, also known as [gum disease](#), is a common problem in older adults that causes painful inflammation, [bone loss](#) and changes in the [good bacteria](#) that live in the mouth. Yet there are no treatments available beyond tooth removal and/or having [good oral hygiene](#). The findings suggest that treatments targeting the aging process in the mouth might help.

Rapamycin is an immune-suppressing drug currently used to prevent organ rejection in transplant recipients. Previous studies in mice have also suggested that it may have life-extending effects, which has led to interest in studying the drug's effects in many age-related diseases.

"We hypothesised that biological aging contributes to periodontal disease, and that interventions that delay aging should also delay the progress of this disease," says lead author Jonathan An, Acting Assistant Professor at the Department of Oral Health Sciences, University of Washington, Seattle, US.

To find out if rapamycin might slow [periodontal disease](#), An and his colleagues added the drug to the food of middle-aged mice for eight weeks and compared their [oral health](#) with untreated mice of the same age. Similar to humans, mice also experience bone loss, inflammation and shifts in oral bacteria as they age.

Using a 3-D-imaging technique called micro-computed tomography, the team measured the periodontal bone, or bone around the tooth, of the rapamycin-treated and untreated mice. They showed that the treated mice had more bone than the untreated mice, and had actually grown new bone during the period they were receiving rapamycin.

The work also showed that rapamycin-treated mice had less gum inflammation. Genetic sequencing of the bacteria in their mouths also revealed that the animals had fewer bacteria associated with gum disease

and a mix of oral bacteria more similar to that found in healthy young mice.

"By targeting this [aging process](#) through rapamycin treatment, our work suggests that we can delay the progress of gum disease and actually reverse its clinical features," explains senior author Matt Kaeberlein, Professor of Pathology and Adjunct Professor of Oral Health Sciences at the University of Washington.

However, Kaeberlein adds that while rapamycin is already used to treat certain conditions, it can make people more susceptible to infections and may increase their risk of developing diabetes, at least at the higher chronic doses typically taken by organ transplant patients. "Clinical trials in humans are needed to test whether rapamycin's potential oral health and other benefits outweigh its risks," he concludes.

**More information:** Jonathan Y An et al, Rapamycin rejuvenates oral health in aging mice, *eLife* (2020). [DOI: 10.7554/eLife.54318](https://doi.org/10.7554/eLife.54318)

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