

**Division of Biochemistry
Department of Oral Biology**

Research Overview

Our research primarily focuses on the following three topics related to aging and oral health:

- 1) Exploration and analysis of anti-aging components derived from natural plants,
- 2) Creation and analysis of genetically modified mice for using the GONAD method,
- 3) Functional analysis of SPP-1 (osteopontin) in the periodontal ligament.

The GONAD method is a new technique for creating genetically modified animals, such as knockouts. Unlike previous methods, it allows for the direct introduction of gene-editing vectors into fertilized eggs within the fallopian tube without extracting the eggs, making it possible to create genetically modified animals. This method has enabled us to easily and quickly create various genetically modified animals. We aim to validate and demonstrate the anti-aging effects of various components extracted from natural plants in vivo using this technology. Additionally, we aim to elucidate the unknown functions of various molecules acting in the periodontal ligament, by applying these techniques.

Research Staff

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The ongoing research topics:

- 1) Exploration of components with anti-aging effects found in the leaves of butterbur.
- 2) Creation and analysis of knockout mice using the GONAD method.
- 3) Production of SPP-1 knockout mice and functional analysis in the periodontal ligament.



Published paper

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- * Takada A, Matsushita K, Horioka S, Furuichi Y, Sumi Y. Bactericidal effects of 310 nm ultraviolet light-emitting diode irradiation on oral bacteria. *BMC Oral Health* 17:96, 2017

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- * Takai R, Uehara O, Harada F, Utsunomiya M, Chujo T, Yoshida K, Sato J, Nishimura M, Chiba I, Abiko Y. DNA hypermethylation of extracellular matrix-related genes in human periodontal fibroblasts induced by stimulation for a prolonged period with lipopolysaccharide derived from *Porphyromonas gingivalis*. *J Periodontal Res* 51(4):508-17. 2016
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