

## Division of Biochemistry Department of Oral Biology

### Outline

We are mainly interested in following 3 topics concerning oral health and aging, namely

- (1) exploring of anti-aging agents in natural plants,
- (2) production of KO mouse and rat by GONAD method,
- (3) a function of osteopontin in periodontal ligament.

GONAD method is a new technique to produce gene deficient and transgenic animals. This method is directly able to edit any gene in fertilized eggs inside of oviduct using both a gene editing technique such as CRISPR/Cas9 and electroporation without isolating eggs. You can utilize the GONAD method and other wide variety of techniques including biochemistry, cell biology, and molecular biology to gain access to the individual goals.

### Faculty members

Professor; Toshiya ARAKAWA, *M.B.A., Ph.D.*

Assistant professor/research associate; Ayuko TAKADA, *D.D.S., Ph.D*

Assistant professor/research associate; Rie TAKAI, *D.D.S., Ph.D.*



Toshiya ARAKAWA



Ayuko TAKADA

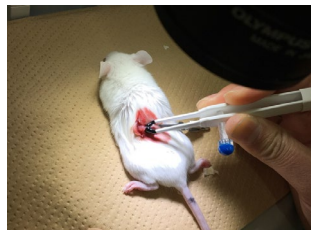
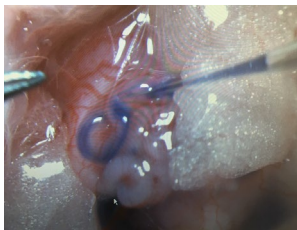


Rie TAKAI

### Main research in progress

- 1) Anti-aging research using natural plants such as a butterbur leaf.
- 2) Production of KO mouse related to aging by GONAD method
- 3) Analysis of osteopontin in periodontal ligament using gene editing and GONAD KO techniques.

GONAD method



Butterbur leaves



## Current publications (Current 5 years)

- \* The profiling and analysis of gene expression in human periodontal ligament tissue and fibroblasts. Hosiriluck N, Kashio H, Takada A, Mizoguchi I, Arakawa T. *Clin Exp Dent Res*. On line, 2022
- \* 5-Aminosalicylic Acid, A Weak Agonist for Aryl Hydrocarbon Receptor That Induces Splenic Regulatory T Cells. Kubota A, Terasaki M, Takai R, Kobayashi M, Muromoto R, Kojima H. *Pharmacology*. 107(1-2):28-34, 2022
- \* An in vitro senescence model of gingival epithelial cell induced by hydrogen peroxide treatment. Giri S, Takada A, Paudel D, Yoshida K, Furukawa M, Kuramitsu Y, Matsushita K, Abiko Y, Furuichi Y. *Odontology*. Jan;110(1):44-53, 2022
- \* Effects of CLIC4 on Fucoxanthinol-Induced Apoptosis in Human Colorectal Cancer Cells. Yokoyama R, Kojima H, Takai R, Ohta T, Maeda H, Miyashita K, Mutoh M, Terasaki M. *Nutr Cancer*.;73(5):889-898, 2021
- \* Alteration of oral flora in betel quid chewers in Sri Lanka. Uehara O, Hiraki D, Kuramitsu Y, Matsuoka H, Takai R, Fujita M, Harada F, Paudel D, Takahashi S, Yoshida K, Muthumala M, Nagayasu H, Chiba I, Abiko Y. *J Microbiol Immunol Infect*. Dec;54(6):1159-1166. Jun 27, 2021
- \* Direct reprogramming of epithelial cell rests of malassez into mesenchymal-like cells by epigenetic agents. Yoshida K, Uehara O, Kurashige Y, Paudel D, Onishi A, Neopane P, Hiraki D, Morikawa T, Harada F, Takai R, Sato J, Saitoh M, Abiko Y. *Sci Rep*. Jan 20;11(1):1852, 2021
- \* Osada K, Ohta T, Takai R, Miyazono S, Kashiwayanagi M, Hidema S, Nishimori K. Oxytocin receptor signaling contributes to olfactory avoidance behavior induced by an unpleasant odorant. *Biol Open* 26;7(9): 2018
- \* 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