

## Division of Biochemistry Department of Oral Biology

### Outline

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

- (1) regeneration of periodontal ligament,
- (2) self-protection mechanism by peroxidases,
- (3) exploring of anti-aging agents in natural plants.

To gain access to the individual goals, you can utilize many appropriate research approaches, including a wide variety of biochemistry, cell biology, and molecular biology techniques. We are also in collaboration with researchers in basic and clinical research divisions.

### Faculty members

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

Assistant professor/research associate; Mihoko ONISHI, Ph.D.

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



Toshiya ARAKAWA



Mihoko ONISHI



Ayuko TAKADA

### SCRP students (5<sup>th</sup> grade students in dental school)



Naomi SAKURAI



Shiori SHIBUYA



Kaisei SAITO

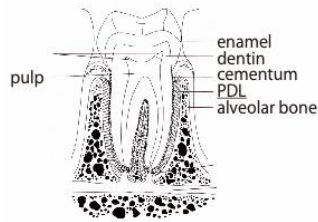


Hiroki KAWASAKI

### Main research in progress

- 1) Regeneration of human periodontal ligament using gene editing techniques with extracellular matrix proteins and mechanical stress signals.
- 2) Study on the living body defense system that peroxidases are concerned.
- 3) Anti-aging research using natural plants such as a butterbur leaf.

## PDL regeneration using ECM



## Butterbur leaves



## Current publications

- \* 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
- \* Arakawa T, Obara N, Okayama M, Hosiriluck N, Irie K, Mizoguchi I, Takuma T. Lysophosphatidic acid is involved in a cellular signaling of periodontal ligament and tooth development. *Dent J Health Sci Univ Hokkaido* 35(2): 23-32, 2016
- \* Nakao Y, Konno-Nagasaka M, Toriya N, Arakawa T, Kashio H, Takuma T, Mizoguchi I. Mechanical load influences proteoglycan expression in rat TMJ disc. *J Dent Res* 94(1): 93-100, 2015
- \* Ito M, Arakawa T, Okayama M, Shitara A, Mizoguchi I, Takuma T. Gravity loading induces adenosine triphosphate release and phosphorylation of extracellular signal-regulated kinases in human periodontal ligament cells. *J Invest Clin Dent* 5, 266–274, 2014
- \* Onishi M, Odajima T. The myeloperoxidase has a tyrosinase-like catalytic activity that forms melanin from L-dopa. *Medicine & Biology* 157: 1246-1250, 2013
- \* Arakawa T, Ohta T, Abiko Y, Okayama M, Mizoguchi I, Takuma T. A polymerase chain reaction-based method for constructing a linear vector with site-specific DNA methylation. *Anal Biochem* 416: 211-217, 2011