

Division of Histology
Department of Oral Growth and Development

Outline

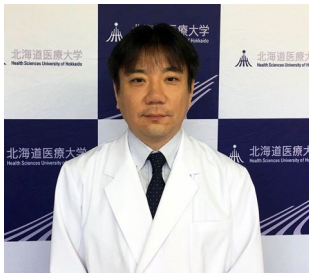
Besides soft tissue such as dental pulp, periodontal ligament, and gingiva, the object of dental treatment includes enamel, dentin, cementum, and alveolar bone. These tissues are mineralized under the cellular control, so that the process is called “biomineralization”. Thus, the understanding of biomineralization would be a key to make progress in dental treatment including tissue engineering. In the Division of Histology, we are concerned to elucidate the process of biomineralization and cellular involvements during development, remodeling, and regeneration of hard tissues (mainly in dentin and alveolar bone) as well as the process of periodontal tissue regeneration, using the morphological approach such as fine structural examination and immunohistochemistry with a light and an electron microscope.

Faculty members

Professor; Akihiro HOSOYA, D.D.S., Ph.D.

Assistant professor/lecturer; Hiroaki TAKEBE, D.D.S., Ph.D.

Assistant professor/research associate; Yuri KISHIMOTO, D.D.S., Ph.D.



Akihiro HOSOYA



Hiroaki TAKEBE



Yuri KISHIMOTO

Postgraduate students

1st-year master's degree; Yukiko NOGUCHI (Division of Orthodontics and Dentofacial Orthopedics)

Main research in progress

Hard tissue biology including

- 1) Molecular mechanisms of tooth development
- 2) Stem cell property of Gli-1, α -smooth muscle actin (α -SMA) expressing cells on dental pulp and periodontal ligament
- 3) Regeneration of periodontal tissue during dental implantation and tooth transplantation
- 4) Roles of hard tissue-forming cells in dentin and bone mineralization

Current publications

* Seki Y, (Takebe H, Hosoya A) et al. Osteoblast differentiation of Gli1+ cells via Wnt and BMP signaling pathways during orthodontic tooth movement. *J. Oral Sci*,66(2):373-380, 2024.

* Fujii S, (Takebe H, Hosoya A) et al. Bone formation ability of Gli1+ cells in the periodontal ligament after tooth extraction. *Bone* 173:116786, 2023.

* Shamsoun K, (Takebe H, Hosoya A) et al. The Role of Hedgehog Signaling in the Melanoma Tumor Bone Microenvironment. *Int J Mol Sci* 24(10):8862, 2023.

* Shibui T, (Hosoya A, Takebe H, Seki Y) et al. Immunohistochemical localization of CD146 and alpha-smooth muscle actin during dentin formation and regeneration. *Anat Rec*, 306(8):2199-2207, 2023.

* Seki Y, (Takebe H, Hosoya A) et al. Differentiation ability of Gli1+ cells during orthodontic tooth movement.

Bone 166:116609, 2023.

* Shimo T, (Takebe H, Hosoya A) et al. Immunohistochemical analysis of CCN2 in experimental fracture healing models. *Methods Mol Biol* 2582:335-342, 2023.

* Shalehin N, (Seki Y, Takebe H, Fujii S, Hosoya A) et al. Gli1⁺-PDL cells contribute to alveolar bone homeostasis and regeneration. *J Dent Res*, 101(12):1537-1543, 2023.

* Takebe H, (Hosoya A) et al. Localization of Bmi1 in osteoblast-lineage cells during endochondral ossification. *Anat Rec* 305(5):1112-1118, 2021

* Sato K, et al. Application of glass ionomer cement containing a newly developed adhesive monomer to indirect pulp capping material. *Adhes Dent* 39(2): 47-58, 2021

* Sato K, et al. Dentin bond strengths and water absorption of “universal” bonding materials. *Adhes Dent* 39(2): 38-46, 2021

* Zhao L, (Hosoya A) et al. Odontoblast death drives cell-rich zone-derived dental tissue regeneration. *Bone* 150:116010, 2021

* Nishida D, (Hosoya A) et al. RANKL/OPG ratio regulates odontoclastogenesis in damaged dental pulp. *Sci Rep* 11(1):4575, 2021

* Hosoya A, (Shalehin N, Takebe H) et al. Stem cell properties of Gli1-positive cells in the periodontal ligament. *J Oral Biosci* 62(4):299-305, 2020

* Shalehin N, Hosoya A, Takebe H, Hasan MR, Irie K. Boric acid inhibits alveolar bone loss in rat experimental periodontitis through diminished bone resorption and enhanced osteoblast formation. *J Dent Sci* 15(4):437-444, 2020

* Takebe H, (Shalehin N, Hosoya A, Irie K) et al. Three-dimensional morphological analysis of dens invaginatus using micro CT. *Dent J Health Sci Univ Hokkaido* 39(1):11-15, 2020

* Odachi T, (Hosoya A) et al. Effects of joint loading on matrix protein expression in mandibular condylar cartilage of growing rat. *Dent J Health Sci Univ Hokkaido* 39(1):1-10, 2020

* Shimo T, (Takebe H, Hosoya A, Irie K) et al. Expression and role of IL-1 β signaling in chondrocytes associated with retinoid signaling during fracture healing. *Int J Mol Sci* 21(7):2365, 2020

* Hosoya A, (Shalehin N, Takebe H, Irie K) et al. Sonic hedgehog signaling and tooth development. *Int J Mol Sci* 21(5):1587, 2020

* Yoshida N, (Hosoya A) et al. M2 phenotype macrophages colocalize with schwann cells in human dental pulp. *J Dent Res* 99(3):329-338, 2020

* Takebe H, (Shalehin N, Hosoya A, Irie K) et al. Sonic hedgehog regulates bone fracture healing. *Int J Mol Sci* 21(2):677, 2020