Division of Histology
Department of Oral Growth and Development

Outline

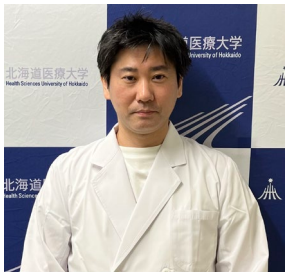
Besides soft tissue such as dental pulp, periodontal ligament, and gingiva, the object of dental treatment includes enamel, dentin, cementum, and alveolar bone. These tissues are mineralized under the cellular control, so that the process is called “biomineralization”. Thus, the understanding of biomineralization 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; Kohei SATO; D.D.S., Ph.D.


Akihiro HOSOYA


Hiroaki TAKEBE


Kohei SATO

Postgraduate students

4th-year master’s degree; Shamsoon KARNOON (Division of Clinical Cariology and Endodontology Department of Oral Rehabilitation)
4th-year master’s degree; Yuri SEKI (Division of Orthodontics and Dentofacial Orthopedics)
4th-year master’s degree; Saki FUJII (Division of Reconstructive Surgery for Oral and Maxillofacial Region)
3rd-year master’s degree; Akira TAKAHAMA (Department of Dentistry for Children and Disabled Persons, Hokkaido University)

Main research in progress

Hard tissue biology including
1) Molecular mechanisms of tooth development
2) Stem cell property of Gli-1 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 in dentin and bone mineralization

Current publications

* Shalehin N, (Takebe H, Hosoya A) et al. Gli1^{+}-PDL cells contribute to alveolar bone homeostasis and regeneration. J Dent Res, in press.
* 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-1β 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
* Yoshiba 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
* Horibe K, (Hosoya A) et al. Expression and localization of CRAMP in rat tooth germ and during reparative dentin formation. Clin Oral Invest 22(7):2559-2566, 2018
* Yoshiba N, (Hosoya A) et al. Detection of bone marrow-derived fibrocytes in human dental pulp repair. Int Endod J 51(11):1187-1195, 2018
* Takebe H, Shalehin N, Hasan MR, Hosoya A, Irie K. The effects of intermittent parathyroid hormone administration and mechanical stress on alveolar bone. Dent J Health Sci Univ Hokkaido 37(1):17-24, 2018
* Tanaka M, (Hosoya A) et al. Minodronic acid induces morphological changes in osteoclasts at bone resorption sites and reaches a level required for antagonism of purinergic P2X2/3 receptors. J Bone Miner Metab 36(1):54-63, 2018
* Obara N, (Irie K) et al. Expression of planar cell polarity genes during mouse tooth development. Arch Oral Biol 83:85-91, 2017
* Hasan MR, (Takebe H, Shalehin N, Irie K) et al. Effects of tooth storage media on periodontal ligament preservation. Dent Traumatol 33(5):383-392, 2017
* Hosoya A et al. Localization of RELM-β/FIZZ2 is associated with cementum formation. Anat Rec 300(10):1865-1874, 2017
* Takebe H, (Irie K) et al. Effects of low-intensity pulsed ultrasound on healing after maxillary sinus Augmentation in Rabbits. J Hard Tissue Biol 25(4):395-402, 2016
* Hasan MR, (Irie K) et al. Evaluation of bio-physiological efficacy of tooth storage media based on normal physiological parameters. Dent J Health Sci Univ Hokkaido 35(1):17-20, 2016