

Division of Histology

Department of Oral Growth and Development

Outline

Besides soft tissue such as dental pulp, periodontal ligament, and gum, the object of dental treatment includes enamel, dentin, cementum, and teeth surrounding 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. Our ongoing research is shown below.

Faculty members

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

Assistant professor/research associate; Hiroaki TAKEBE, D.D.S., Ph.D.

Assistant professor/research associate (International Education and Exchange Center); Md Riasat HASAN; B.D.S., M.P.H., Ph.D.



Akihiro HOSOYA



Hiroaki TAKEBE



Md Riasat HASAN

Postgraduate students

None

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

- * 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, In press
- * 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, In press
- * 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
- * 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
- * Yoshihara 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. *Archives of Oral Biology* 83:85-91, 2017
- * Hasan MR, (Takebe H, Shalehin N, Irie K) et al. Effects of tooth storage media on periodontal ligament preservation. *Dental Traumatology*. 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 Tiss 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