

Biostructural Science

1. Staffs and Students (as of April, 2010)

Professor	Yoshiro TAKANO	
Associate Professor	Makoto J. TABATA	
Assistant Professor	Otto BABA	
Project Assistant Professor (Good Practice Education Program)	Masayuki YOSHIMI	
Technician	Hachiro ISEKI	
Graduate Student	Masud AHMAD,	Devi Sewvandini ATUKORALA,
	Ravindra Kumar RATNAYAKE,	
	Dawud ABDUWELI	

2. Purpose of Education

[Undergraduate Education]

Provide dental students with the essential knowledge and methods of studies necessary to understand fundamentals of structure and function of the human body, based primarily on macroscopic- and microscopic anatomy (Histology), including dissection lab works which lasts nearly 3 months. Emphasis is placed on the structure and function of oral and maxillofacial regions including teeth, periodontal tissues, salivary glands and temporomandibular joints, as well as muscles and nerves related to these structures. These comprise major part of the largest teaching module of the 3rd-year dental education curriculum and are expected to build solid basis for future studies of advanced dental science and clinical medicine.

[Graduate School]

Provide graduate students with updated information of mechanisms of biological mineralization, structural features, as well as ontogenic and evolutionary aspects of the development of biological hard tissues, and give a lab course of essential methods for structural analyses of hard tissues, particularly of teeth and periodontal tissues.

3. Research Subjects

The mechanisms of dental and periodontal tissue formation and their regeneration is the central focus of our research. Followings are rough description of current research subjects in our laboratory.

- 1) Biological mineralization.
- 2) Induction and/or regeneration of dental and periodontal tissues.
- 3) Reaction-diffusion phenomenon in biological systems
- 4) Origin and evolution of tooth
- 5) Molecular mechanisms of tooth development
- 6) Role of dentin matrix proteins in the development of root and periodontal tissues
- 7) Sensory apparatus in masticatory systems.

4. Publications

Original Article

1. Notani T, Tabata MJ, Iseki H, Baba O, Takano Y: Introduction of three-dimensional and layered (TDL) culture, a novel primary co-culture method of ameloblasts and pulp-derived cells. *Arch Histol Cytol* 72: 187-198, 2009.
2. Nakayama H, Takakuda K, Matsumoto HN, Miyata A, Baba O, Tabata MJ, Ushiki T, Oda T, McKee MD, Takano Y: Effects of altered bone remodeling and retention of cement lines on bone quality in osteopetrotic aged c-*Src* deficient mice. *Calcif Tissue Int* 86: 172-183, 2010.
3. Ohisa S, Inohaya K, Takano Y, Kudo A: *sec24d* encoding a component of COPII is essential for vertebra formation, revealed by the analysis of the medaka mutant, *vbi*. *Dev Biol* 342: 85-95, 2010.
4. Inohaya K, Takano Y, Kudo A: Production of *wnt4b* by floor plate cells is essential for the segmental pattern of vertebral column. *Development* 137: 1807-1813, 2010.
5. Tamaki H, Nakayama H, Takano Y: Histological and Histochemical Analyses of Cell-mediated Resorption of Anorganic Bovine Bone Matrix at the Site of Sinus Floor Augmentation in Humans. *J Oral Biosci* 52: 187-200, 2010.
6. Josephsen K, Takano Y, Frische S, Praetorius J, Nielsen S, Aoba T, Fejerskov O: Ion transporters in secretory and cyclically modulating ameloblasts. A new hypothesis for cellular control of preeruptive enamel maturation. *Am J*

Physiol Cell Physiol 299: 1299-1307, 2010.

Book

1. Li W, Yves-Sire J, Takano Y, MacDougall M, Goldberg M, DenBesten P: Amelogenin Exons 8 and 9. In: Amelogenins: Multifaceted Proteins for Dental & Bone Formation & Repair, Edited by Michel Goldberg, eISBN: 978-1-60805-171-7, doi:10.2174/97816080517171100101, Bentham Science Publishers LTD.

Abstracts

1. Atukorala ADS, Baba O, Higuchi K, Tabata MJ, Mitani H, Takano Y: Scales and teeth in Edar mutant medaka. 88th General Session of the IADR, July 14-17, 2010, Barcelona, Spain.
2. Ratnayake RARK, Josephsen K, Fejerskov O, Takano Y: Demonstration of organic anion pathway through secretory stage enamel organ. 88th General Session of the IADR, July 14-17, 2010, Barcelona, Spain.
3. Josephsen K, Takano Y, Frische S, Praetorius J, Nielsen S, Aoba T, Fejerskov O: Ion channels and transporters in secretory and cyclically modulating ameloblasts. 88th General Session of the IADR, July 14-17, 2010, Barcelona, Spain.
4. Miura H, Takano Y, Wada M, Yoshimi M, Fukawa K: NEW COOPERATED EDUCATION PROGRAM WHICH PROMOTES DENTIST WITH SCIENTIFIC ASPECT, ARTISTIC SENSE AND SKILL, ADEE 2010, ACTA, Aug 25-28, 2010, Amsterdam, The Netherlands.
5. Takano Y, Li Y, Iseki H, Uchida T, Kulkarni AB, Gibson CW: Structural and Cytochemical Analyses of Enamel and Enamel Forming Cells in the Teeth of Amelogenin-deficient Mice, 10th TMD, Sept 1-4, 2010, Berlin, Germany.
6. Abduweli D, Takano Y: Cell proliferation and replacement cycles of pharyngeal teeth of medaka: a search for dental stem cells. 115th General Session of Japanese Association of Anatomists, March 29, 2010, Morioka, Japan.
7. Baba O, Terashima T, Ota M, Tabata MJ, Takano Y: The expression of fibroblast growth factor receptors (FGFRs) in odontoblasts. 58th General Session of the JADR, Nov 20-21, 2010, Kitakyushu, Japan.
8. Tabata MJ, Nishii N, Iseki H, Baba O, Takano Y: Development of rat tooth germ without outer enamel epithelium. 58th General Session of the JADR, Nov 20-21, 2010, Kitakyushu, Japan.
9. Abduweli D, Takano Y: Pharyngeal dentition of medaka: Tooth replacement and stem cell niche. 58th General Session of the JADR, Nov 20-21, 2010, Kitakyushu, Japan.

[Invited Lectures]

1. Takano Y: Propagating waves of cyclical morphological changes of ameloblasts engaged in enamel maturation. The 9th Symposium on Tooth Development and Regeneration. Mar 27, 2010, Morioka, Japan.
2. Takano Y: Dental Education and Research at the Tokyo Medical and Dental University. Oct 29, 2010, Deans Conference at Chonnam National University School of Dentistry, Korea.