

## **Division of Biomaterials and Bioengineering Department of Oral Rehabilitation**

### **Outline**

Main research focus in the department is to develop novel biomaterials and biodevices for improving health of patients with oral and craniofacial diseases. Specifically, we are investigating the surface modifications of medical and dental devices to enhance cell and tissue compatibility, and also to provide the surface with an antibacterial property using various chemical, biochemical, and physical methods. The department encourages an open laboratory concept. All facilities and equipments (XPS, micro-XRD, Laser Raman Spectrometer, FT-IR, SEM/EDX, SPM, ICP-AES, EIS, QCM, etc., see next page) are available for use by all researchers and graduate students in Health Sciences University of Hokkaido. Our research interests are shown below.

### **Faculty members**

Professor; Kazuhiko Endo B.E., M.E, Ph.D. in Dentistry & Engineering

Associate professor; Takashi Nezu B.S., M.S., Ph.D. in Science

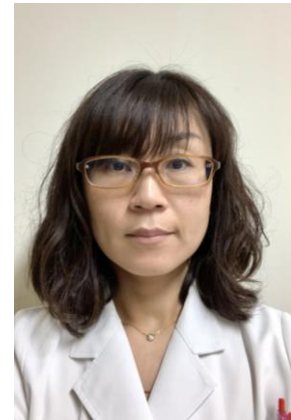
Assistant professor; Futami Nagano-Takebe B.Dent., Ph.D. in Dentistry



**Kazuhiko ENDO**



**Takashi NEZU**



**Futami NAGANO-TAKEBE**

### **Postgraduate students**

Gazi Mehedi Hasan D.D.S.



**Gazi Mehedi HASAN**

## Main research in progress

- 1) Chemical and physical modifications of implant surfaces for promoting desirable cell and tissue responses
- 2) Degradation of metallic surgical implant surface and biological responses
- 3) Application of electrochemical techniques for evaluating the corrosion resistance of metallic biomaterials
- 4) Physico-chemical analyses of functional molecule attachment on the biomaterial surface

## Apparatus for instrumental analyses



EIS

**Electrochemical  
measurements**

**Surface  
analyses**



SEM/EDX



X-ray  
Fluorescence  
Spectrometer



ESCA (XPS)



Laser Raman



AAS

**Inorganic analyses  
(Solutions)**



ICP-AES



SPM



XRD

## Current publications

- \*Ichioka Y, Kado T, Mashima I, Nakazawa F, Endo K, Furuichi Y. Effects of chemical treatment as an adjunctive of air-abrasive debridement on restoring the surface chemical properties and cytocompatibility of experimentally contaminated titanium surfaces. *J Biomed Mater Res B*. 2020 (Jan);180(1):183-191.
- \*Kaga N, Nagano-Takebe F, Nezu T, Matsuura T, Endo K, Kaga M. Protective Effects of GIC and S-PRG Filler Restoratives on Demineralization of Bovine Enamel in Lactic Acid Solution. *Materials (Basel)*. 2020 May;13(9):2140. doi: 10.3390/ma13092140
- \*Kado T, Aita H, Ichioka Y, Endo K, Furuichi Y. Chemical modification of pure titanium surfaces to enhance the cytocompatibility and differentiation of human mesenchymal stem cells. *Dent Mater J*. 2019 Nov;38(6):1026-1035.
- \*Kaga N, Toshima H, Nagano-Takebe F, Hashimoto M, Nezu T, Yokoyama A, Endo K, Kaga M. Inhibition of enamel demineralization by an ion-releasing tooth-coating material. *Am J Dent*. 2019 Feb;32(1):27-32.
- \*Dithi AB, Nezu T, Nagano-Takebe F, Hasan MdR, Saito T, Endo K. Application of solution plasma surface modification technology to the formation of thin hydroxyapatite film on titanium implants. *coatings*. 2019;9(1):3
- \*Kawaguchi K, Iijima M, Endo K, Mizoguchi I. Electrophoretic deposition as a new bioactive glass coating process for orthodontic stainless steel. *Coatings* 7, 199-211, 2017.
- \*Nezu T, Nagano-Takebe F, Endo K. Designing an antibacterial acrylic resin using the cosolvent method — Effect of ethanol on the optical and mechanical properties of a cold-cure acrylic resin, *Dent Mater J* 36, 662-668, 2017.
- \*Muguruma T, Iijima M, Nagano-Takebe F, Endo K, Mizoguchi I. Frictional properties and characterization of a diamond-like carbon coating formed on orthodontic stainless steel. *J Biomater Tissu Eng* 7, 119-126, 2017.
- \*Ito D, Kado T, Ngano-Takebe F, Hidaka T, Endo K, Furuichi Y. Biological activation of zirconia surface by chemical modification method with IGF-1. *J Biomed Mater Res A* 103(11), 3659-3665, 2015.
- \*Kono M, Aita K, Ichioka Y, Kado T, Endo K, Koshino H. NaOCl-mediated bio- functionalization enhances bone-titanium integration. *Dent Mater J* 34, 537-544, 2015.
- \*Kohda N, Iijima M, Kawaguchi K, Toshima H, Muguruma T, Endo K, Mizoguchi I. Inhibition of enamel demineralization and bond-strength properties of bioactive glass containing 4-META/MMA-TBB-based resin adhesive. *Euro J Oral Sci*, 123, 202-207, 2015.