

Division of Clinical Cariology and Endodontology
Department of Oral Rehabilitation

Outline

Our division focuses on the research, education and patient care regarding the diagnosis, treatment, and prevention of diseases or trauma to teeth in Operative Dentistry and Endodontology based on MID. Our main goal is to develop dentin remineralization/regeneration therapy in caries treatment. Our faculty members and ongoing research projects are shown below.

Faculty members

Professor: Takashi SAITO, D.D.S., Ph.D., FICD (t-saito@hoku-iryo-u.ac.jp)

Associate Professor: Yasuhiro MATSUDA, D.D.S., Ph.D. (ymatsuda@hoku-iryo-u.ac.jp)

Senior Assistant Professor: Masanobu IZUMIKAWA, D.D.S., Ph.D.

Assistant Professor: Yasuhiko NAGAI, D.D.S., Ph.D., Tomoo YUI, D.D.S., Ph.D.



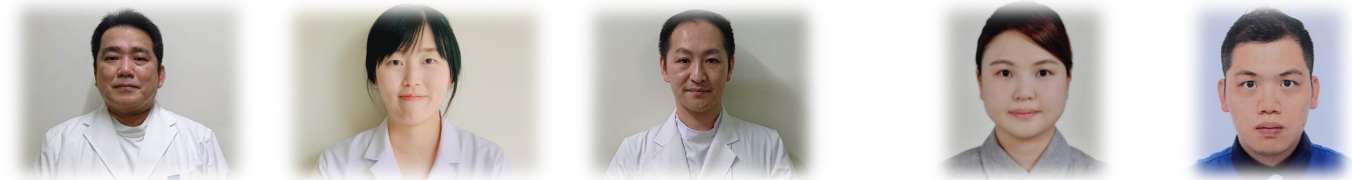
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CH. TSAI

Main research in progress

- 1) Development of multifunctional adhesive materials having remineralization and antibacterial activities
- 2) Development of the materials for dentin regeneration
- 3) Research on the increase of durability of the adhesive interface
- 4) Research on improvement of cavity fit accuracy of CAD/CAM restorations
- 5) Research on improvement of mechanical properties, adhesive performance, and esthetic properties of resin cements
- 6) Research on the transpiration and acid resistance improvement of tooth substrate by LASER

Development of Bio-active Materials

- Remineralization Activity
- Adhesive Performance
- Dentin Regeneration Activity
- Antibacterial Activity

Bio-Coat Ca (2019)

Bulk Base HARD II (2023)

Recent publications

1. Mappa TA, Chu SF, Hung KS, Saito T, Ruslin M, Lan WC, Kuo HH, Cho YC, Hsieh CC, Huang J, Shen YK, Ou KL. An innovative three-dimensional printed titanium implant with a biomimetic structure design for promoting osseointegration potential. *Materials & Design* 238 112692 2024.
2. Thaweboon S, Saito T, Mateekusontan S, Thaweboon B. Antibacterial Effect of dental Adhesive on Cariogenic Multi-Species Biofilm. *Key Engin Meter* 977 129-134 2024.
3. Thaweboon S, Saito T, Thaweboon B. Inhibition of the Biofilm Formation of Anaerobic Bacteria Involved in Secondary Caries by Dental Adhesive. *J Biomimet Biomater Biomed Engin* 62 21-26 2023.
4. Rao Y, Qiu Y, Altankhishig B, Matsuda Y, Hasan MR, Saito T. Novel Universal Bond Containing Bioactive Monomer Promotes Odontoblast Differentiation In Vitro. *J Funct Biomater* 14 506 2023.
5. Shamsoun K, Hiraki D, Yoshida K, Takabatake K, Takebe H, Yokozeki K, Horie N, Fujita N, Nasrun NE, Okui T, Nagatsuka H, Abiko Y, Hosoya A, Saito T, Shimo T. The Role of Hedgehog Signaling in the Melanoma Tumor Bone Microenvironment. *Int J Mol Sci* 2023(24) 8862 2023.
6. Murata M, Nezu T, Takebe H, Hirose Y, Okubo N, Saito T, Akazawa T. Human dentin materials for minimally invasive bone regeneration: Animal studies and clinical cases. *J Oral Biosciences* 65(1) 13-18 2023.
7. Oguma H, Matsuda Y, Yoshihara K, Okuyama K, Sakurai M, Saito T, Inoue S, Yoshida Y. Prevention of Root Caries Using Oxalic Acid. *Materials* 16(4), 1454, 2023.
8. Okuyama K, Matsuda Y, Yamamoto H, Suzuki K, Shintani K, Saito T, Hayashi M, Tamaki Y. Fluoride Retention in Root Dentin following Surface Coating Material Application. *J Funct Biomater* 14(3), 171, 2023.
9. Matsuda Y, Altankhishig B, Okuyama K, Yamamoto H, Naito K, Hayashi M, Sano H, Sidhu SK, Saito T. Inhibition of Demineralization of Dentin by Fluoride-Containing Hydrogel Desensitizers: An In Vitro Study. *J Funct Biomater* 13(4) 246, 2022.
10. Hassan T, Qiu Y, Hasan MR, Saito T. Effects of Dentin Phosphophoryn-Derived RGD Peptides on the Differentiation and Mineralization of Human Dental Pulp Stem Cells In Vitro. *Biomed* 10(11): 2781, 2022.
11. Matsuda Y, Altankhishig B, Okuyama K, Yamamoto H, Naito K, Hayashi M, Sano H, Sidhu S.K, Saito T. Inhibition of Demineralization of Dentin by Fluoride-Containing Hydrogel Desensitizers: An In Vitro Study. *J Funct Biomater* 2022, 13(4), 246.
12. Altankhishig B, Mossamat KM, Sakurai M, Matsuda Y, Saito T. Antibacterial Activity of Zinc Oxide and Copper Oxide Nanocomposite. *IJMSDR* 5(1) 57-62 2022.
13. Altankhishig B, Matsuda Y, Nagano-Takebe F, Okuyama K, Yamamoto H, Sakurai M, Naito K, Hayashi M, Sano H, Sidhu SK, Saito T. Potential of Fluoride-Containing Zinc Oxide and Copper Oxide Nanocomposites on Dentin Bonding Ability. *Nanomaterials* 12(8) 1291 2022.
14. Peng BY, Ou KL, Liu CM, Chu SF, Huang BH, Cho YC, Saito T, Tsai CH, Hung KS, Lan WC. A Three-Dimensional Bioprinted Copolymer Scaffold with Biocompatibility and Structural Integrity for Potential Tissue Regeneration Applications. *Polymers* 14(16) 3415 2022.
15. Rao Y, Qiu Y, Altankhishig B, Cho YC, Huang BH, Tsai HY, Tsai CH, Ou KL, Saito T. Acceleration Effect of Biomimetic Hydrogel System on Odontoblast Differentiation in Vitro. *DPTAJ* 2(1) 11-25 2022.
16. Hamrun N, Talib B, Ruslin M, Pangeran H, Hatta M, Marlina E, Sitti A, Yusuf H, Saito T, Ou KL. Analysis of irreversible hydrocolloid impression material accuracy from the brown algae sargassum polycystum. *Marine Drugs* 20(1) 55 2022.
17. Ou KL, Huang CF, Lan WC, Huang BH, Pan HA, Shen YK, Saito T, Tsai HY, Cho YC, Hung KS, Chou HH. An Innovative Customized Biomimetic Hydrogel for Drug Screening Application Potential: Biocompatibility and Cell Invasion Ability. *Int J Mol Sci* 23(3) 1488 2022.
18. Natsir N, Rahim F, Nugroho JJ, Rovani CA, Syam S, Ruslin M, Saito T, Ou KL. In Vitro Evaluation of the Strength of Dentin Replacement in Complex Posterior Tooth Restoration. *Appl Sci* 12(14) 6877 2022.
19. Chang CW, Tsou CH, Huang BH, Hung KS, Cho YC, Saito T, Tsai CH, Hsieh CC, Liu CM, Lan WC. Fabrication of a Potential Electrodeposited Nanocomposite for Dental Applications. *Inorganics* 10 165 2022.
20. Hung KS, Chen MS, Lan WC, Cho YC, Saito T, Huang BH, Tsai HY, Hsieh CC, Ou KL, Lin HY. Three-Dimensional Printing of a Hybrid Bioceramic and Biopolymer Porous Scaffold for Promoting Bone Regeneration Potential. *Materials* 15(5) 1971 2022.