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*Hiroshima University Graduate School of  
Biomedical and Health Sciences (Dentistry),  
and Hiroshima University Hospital  
(Dental Departments)*

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**Research Achievements 2021**



# Contents

## Hiroshima University School of Dentistry, Hiroshima University Hospital, Graduate School of Biomedical and Health Sciences

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- [Department of Biological Endodontics, and Division of Preventive and Restorative Dentistry \(Department of Endodontics and Operative Dentistry\)](#)
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## Department of Calcified Tissue Biology

### (1) Staff and Students

Professor: Yuji Yoshiko

Assistant Professor: Tomoko Minamizaki, Shohei Kohno, Davood Kharaghani, Tomonori Hoshino

Graduate Student: Tomohiro Ogasawara (Orthodontic Dentistry), Shintaro Ogashira (Orthodontic Dentistry), Risako Oshiro (Orthodontic Dentistry), Parastoo Gitigard (Apr-Nov)

### (2) Main Research Activities

- 1: Mineralization (including ectopic mineralization)
- 2: Osteonetwork
- 3: MicroRNAs
- 4: Bone metastasis

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : Single-Cell RNA-Sequencing Reveals the Breadth of Osteoblast Heterogeneity. Yoshioka H., Okita S., Nakano M., Minamizaki T., Nubukiyo A., Sotomaru Y., Bonnelye E., Kozai K., Tanimoto K., Aubin J.E., Yoshiko Y.: *JBMR Plus*, 5(6), e10496, 2021.
- 2 : Overexpression of miR-125b in Osteoblasts Improves Age-Related Changes in Bone Mass and Quality through Suppression of Osteoclast Formation. Ito S., Minamizaki T., Kohno S., Sotomaru Y., Kitaura Y., Ohba S., Sugiyama T., Aubin J.E., Tanimoto K., Yoshiko Y.: *Int. J. Mol. Sci.*, 22(13), 6745, 2021.
- 3 : Occlusal Trauma and Bisphosphonate-Related Osteonecrosis of the Jaw in Mice. Mine Y., Okuda K., Yoshioka R., Sasaki Y., Peng T.Y., Kaku M., Yoshiko Y., Nikawa H., Murayama T.: *Calcif.: Tissue Int.*, Online ahead of print, 2021.
- 4 : 6-Deoxyjacareubin, a natural compound preventing hypoxia-induced cell death, ameliorates neurodegeneration in a mouse model of familial amyotrophic lateral sclerosis. Hoshino T, Matsuzawa SI, Takahashi R.: *Neurosci Res.* 163, 43-51, 2021.
- 5 : Bioactive Sambong oil-loaded electrospun cellulose acetate nanofibers: Preparation, characterization, and in-vitro biocompatibility. Ullah A., Saito Y., Ullah S., Haider M.K., Nawz H., Duy-Nam P., Kharaghani D., Kim I.S.: *Int J Biol Macromol.* 166, 1009-1021, 2021.
- 6 : Wet-spun bi-component alginate based hydrogel fibers: Development and *in-vitro* evaluation as a potential moist wound care dressing. Umar M., Ullah A, Nawaz H., Areeb T., Hashimi M., Kharaghani D., Kim I.S.: *Int J Biol Macromol.* 168, 601-610, 2021.
- 7 : Fabrication of Poly(Ethylene-glycol 1,4-Cyclohexane Dimethylene-Isosorbide-Terephthalate) Electrospun Nanofiber Mats for Potential Infiltration of Fibroblast Cells. EI-Ghazail S., Khatri M., Mehdi M., Kharaghani D, Tamada Y., Katagiri A., Kobayashi S., Kim I.S.: *Polymers* 13(8), 1245, 2021.

#### B) Review

- 1 : MiRNA-Nanofiber, the Next Generation of Bioactive Scaffolds for Bone Regeneration: A Review. Kharaghani D., Kurniawan E.B., Khan M.Q., Yoshiko Y.: *Micromachines (Basel)*, 12(12), 1472, 2021.

#### C) Publications

- 1 : Nanofiber nonwoven fabric as an artificial corneal material. Kharghani D., Kikuchi Y., Yoshiko Y., Kim I.S.: *The Latest Trends of Nonwoven Fabric: Supervised by Yaida O.: CMC Publishing*, 2021.

#### D) Other Publications

## E) Presentations at Scientific Meetings

- 1 : High-resolution micro-computed tomography analysis of the microarchitecture in Klotho mutant mouse osteocyte lacunae. Minamizaki T., Ahmed F., Kohno S., Kharaghani D., Hoshino T., Yoshiko Y.: The 126th Annual Meeting of The Japanese Association of Anatomists, The 98th Annual Meeting of The Physiological Society of Japan (Web), 2021.
- 2 : Ectopic UCP3 expression regulates muscle mass through the modification of mitochondrial turnover and redox state in skeletal muscle. Kohno S., Riley CL., Mills EM., Yoshiko Y.: The 126th Annual Meeting of The Japanese Association of Anatomists, The 98th Annual Meeting of The Physiological Society of Japan (Web), 2021.
- 3 : The analysis of the function on bone metabolism in Mir125b-2 knockout mice based on bone morphometry. Ogasawara T., Minamizaki T., Kohno S., Kharaghani D., Hoshino T., Sotomaru Y., Tanimoto K., Yoshiko Y.: The 75th Chugoku-Shikoku Sectional Meeting of Japanese Association of Anatomists (Web), 2021.
- 4 : Calciprotein particles play a role in bone formation and vascular calcification: Davood Kharaghani, Eben Bashir Kurmiawan, Shohei Kohno, Tomonori Hoshino, Tomoko Minamizaki, Yuji Yoshiko: 6th Joint Scientific Meeting in Dentistry (Web), 2021.
- 5 : The roles of miR-125b in bone formation: analysis of miR-125b-2 KO mice. Ogasawara T., Minamizaki T., Kohno S., Hoshino T., Yoshiko Y.: The 63th Annual Meeting of Japanese Association for Oral Biology (Web), 2021.
- 6 : MEPE-derived ASARM, an inhibitor of calciparticle protein formation, suppresses vascular calcification but not bone formation. Davood Kharaghani, Tomoko Minamizaki, Shohei Kohno, Tomonori Hoshino, Yuji Yoshiko. ASBMR 2021 Annual Meeting (Web), 2021.

## (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-Aid for Challenging Research (Exploratory) (Continuance): Yoshiko Y., Elucidation of osteoblast fate determination by single cell analysis on mRNA-ncRNA. 18K19647. 1,500,000 yen (until March).
- 2 : Grants-in-Aid for Scientific Research (C) (New): Minamizaki T. (Exploratory), Study of treatment with matrix vesicles transfected with miR-125b for cancer bone metastasis. 20K09879. 1,000,000 yen (until March).
- 3 : Grants-in-Aid for Scientific Research (C) (Continuance): Minamizaki T. (Exploratory), Study of treatment with matrix vesicles transfected with miR-125b for cancer bone metastasis. 20K09879. 900,000 yen (from April).
- 4 : Grants-in-Aid for Scientific Research (C) (New): Yoshiko Y. (Co-investigator), Study of treatment with matrix vesicles transfected with miR-125b for cancer bone metastasis. 20K09879. 200,000 yen (until March).
- 5 : Grants-in-Aid for Scientific Research (C) (Continuance): Yoshiko Y. (Co-investigator), Study of treatment with matrix vesicles transfected with miR-125b for cancer bone metastasis. 20K09879. 200,000 yen (from April).
- 6 : Grants-in-Aid for Scientific Research (C) (New): Kohno S. (Exploratory), Identification of tissue-specific mechanisms of calcification using a combined analysis of transcriptome and chromatin accessibility. 21K09816. 900,000 yen (from April).
- 7 : Grants-in-Aid for Young Scientists (B): Hoshino T. (Exploratory), The effects of vascular calcification on the central nervous system. 21K15628. 2,100,000 yen (from April)
- 8 : Grants-in-Aid for Scientific Research (C) (Continuance): Yoshiko Y. (Co-investigator), Evaluation of the mechanism underlying the diversity of osteoblast lineage cell progression using single cell gene expression analysis. 17K11613. 30,000,000 yen (from April)
- 9 : Grants-in-Aid for Scientific Research (C) (New): Yoshiko Y. (Co-investigator). 21K09331. 300,000 yen (from April)
- 1 0 : Grants-in-Aid for Scientific Research (C) (New): Yoshiko Y. (Co-investigator). 21K10186. 150,000 yen (from April)
- 1 1 : Grants for Cardiovascular Diseases (New) Hoshino T. The Relationship between NETosis of

Neutrophils and Vascular Calcification.. 2,000,000 yen

- 1 2 : Program for Developing and Supporting the Next-Generation of Innovative Researchers at Hiroshima University (New) Ogasawara T., 300,000 yen
- 1 3 : Program for Developing and Supporting the Next-Generation of Innovative Researchers at Hiroshima University (New) Oshiro R., 200,000 yen
- 1 4 : Program for Developing and Supporting the Next-Generation of Innovative Researchers at Hiroshima University (New) Ogashira S., 200,000 yen
- 1 5 : Raffinee International Corporation (New): Yoshiko Y., 2,700,000 yen
- 1 6 : Novelpharma Co., Ltd (New): Yoshiko Y., 1,900,000 yen

(5) Academic Awards, etc.

(6) Patents

- 1 : Yoshiko Y., Minamizaki T., Toshishige M., Kohno S. Peptide, peptide salt, pharmaceutical compositions, and an inhibitor of biological tissue calcification (PCT/JP2021/026751) (Hiroshima University)
- 2 : Yoshiko Y., Minamizaki T., Kohno S., Kharaghani D., Yoshimori A. Cyclic peptide, cyclic peptide salt, pharmaceutical compositions, and an inhibitor of biological tissue calcification (Application #2021-140620) (Hiroshima University)

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## Department of Maxillofacial Anatomy and Neuroscience

### (1) Staff and Students

Professor : Ryuji Terayama

Associate Professor: Kenta Uchibe

### (2) Main Research Activities

- 1 : Studies on nociceptive transmission of orofacial region
- 2 : Roles of glial cells in the development of neuropathic pain
- 3 : Effects of administration of drugs on neuropathic pain
- 4 : Roles of retinoic acid signaling in skeletal development
- 5 : Studies on heterotopic ossification and related diseases

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

#### B) Review

- 1 : Terayama R, Uchibe K, Reorganization of synaptic inputs to spinal dorsal horn neurons in neuropathic pain. *Int J Neurosci*. 2021 in press.

#### C) Publications

#### D) Other Publications

#### E) Presentation at Scientific Meeting

- 1 : Terayama R, Uchibe K, Effects of microglial inhibition on neuropathic pain, The 63rd Annual Meeting of Japanese Association for Oral Biology (Yokosuka), 2021.
- 2 : Terayama R, Uchibe K, Adenosine A<sub>3</sub> receptor activation attenuates abnormal pain sensations after peripheral nerve injury, The 44th Annual Meeting of the Japan Neuroscience Society (Kobe), 2021.
- 3 : Matsuoka M, Uchibe K, Pan H, Tian H, Chorny M, Alferiev I, Mishina Y, Iwamoto M, Local control of heterotopic ossification by synthetic retinoid loaded nanoparticle, ASBMR 2021 Annual Meeting(Toronto), 2021.
- 4 : Iwamoto M, Uchibe K, Tian H, Matsuoka M, Liu T, Kane M, Alferiev I, Chorny M, Pan H, Mishina Y, RAR  $\gamma$  agonist loaded nanoparticle is a novel therapeutic modality to block heterotopic ossification, 5th International Conference on Retinoids (Tucson), 2021.

### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in Aid-for Scientific Research (C): Ryuji Terayama, 19K10042, ¥1,430,000

### (5) Academic Awards, etc.

### (6) Patents

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## Department of Physiology and Oral Physiology

### (1) Staffs and Students

Professor : SUGITA, Makoto

Assistant Professor : SAKAYORI, Nobuyuki

Graduate Students : YAMAMOTO, Kuniyo

### (2) Main Research Activities

- 1 : The molecular and cellular bases of taste perception and coding
- 2 : The neuronal mechanisms underlying the taste-evoked behavioral and emotional responses
- 3 : The roles of essential fatty acids in brain development and feeding behaviors
- 4 : The molecular mechanisms of ion and fluid transport in salivary glands
- 5 : The molecular mechanisms in development, morphogenesis and functional maintenance of salivary glands and oral tissues
- 6 : Studies on the function and dysfunction of ion channels and transporters

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

#### B) Review

#### C) Publications

#### D) Other publication

- 1 : Maternal dietary fatty acids regulate feeding behaviors in the offspring : Sakayori N., Iguchi Y., Fukabori R., Kobayashi K. : Hikarigaoka, 50, p50-51, 2021.

#### E) Presentation at Scientific Meeting

- 1 : The anticancer drug irinotecan-induced changes in attractive salt taste responses : Obayashi N., Sakayori N., Naito M., Kawaguchi H., Sugita M. : 2021 NIPS Research Meeting (online), 2021.
- 2 : Taste alteration and the change of taste tissue caused by anticancer drug “irinotecan” : Obayashi N., Sakayori N., Naito M., Kawaguchi H., Sugita M. : The 105th Meeting of Hiroshima University Dental Society (Hiroshima), 2021.
- 3 : The roles of essential fatty acids in brain development : Sakayori N. : The 30th Annual Meeting of the Japan Society for Lipid Nutrition (online), 2021.
- 4 : The roles of brain polyunsaturated fatty acids in dopamine-dependent ingestive behaviors : Sakayori N., Katakura M., Sugita M., Kobayashi K. : The 44th Annual Meeting of the Japan Neuroscience Society/The 1st CJK International Meeting (online), 2021.
- 5 : Maternal dietary imbalance in polyunsaturated fatty acids induces hedonic feeding in the offspring : Sakayori N., Katakura M., Sugita M., Kobayashi K. : The 75th Annual Meeting of the Japan Society of Nutrition and Food Science (online), 2021.
- 6 : Lipid molecules to produce willpower and its dysregulation by modern diets : Sakayori N. : The 2nd Meeting of the Will Dynamics 2020 (online), 2021.
- 7 : Gramicidin-perforated patch recording reveals the involvement of SGLT1 activities in maintaining Cl<sup>-</sup> secretion from submandibular acinar cells : Sugita M. : The 63th Annual Meeting of Japanese Association for Oral Biology (online), 2021.



- 8 : Genetic tracing of taste representation reveals the plastic changes in activities of amygdalar neurons during conditioned taste aversion learning : Sugita M., Chang C-M. : The 73th Annual Meeting of the PSJ Chugoku-Shikoku Division (online), 2021.

(4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-Aid for Scientific Research (C): Sugita M., Genetic tracing to reveal the whole brain mapping of taste information processing. 21K09828. ¥1,000,000.  
2 : Grant-in-Aid for Scientific Research (B): Sakayori N., The roles of dietary essential fatty acids in feeding behaviors. 21H03357. ¥3,800,000  
3 : Lotte Research Promotion Grant: Sakayori N., The roles of dietary essential fatty acids in the brain reward system. ¥1,000,000

(5) Academic Awards, etc.

- 1 : Sakayori N.: Support for Behavioral Analysis, Support for Physiological Analysis, Platforms for Advanced Technologies and Research Resources, Grant-in-Aid for Scientific Research on Innovative Areas

(6) Patents

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## Department of Molecular Biology and Biochemistry

### (1) Staff and Students

Professor: Chisa Shukunami

Assistant Professor: Katsumi Fujimoto, Shinnosuke Higuchi

Graduate Student: Xinyi Yu

Undergraduate Student: Kenji Nakatsuji, Nanami Miyake, Satoshi Miwa, Chie Kajiwara

Resident: Shinsei Yambe

### (2) Main Research Activities

- 1 : Mechanisms regulating in the establishment of the junction between cartilage and tendon/ligament
- 2 : The role of Pax1 during formation of vertebral column
- 3 : Mechanisms of tendon/ligament formation
- 4 : Mechanisms of periodontal ligaments formation
- 5 : Mechanisms regulating differentiation of dental pulp stem cells
- 6 : Morphogenesis of the head and neck region

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : Loss of tenomodulin expression is a risk factor for age-related intervertebral disc degeneration.: Lin D, Alberton P, Delgado Caceres M, Prein C, Clausen-Schaumann H, Dong J, Aszodi A, Shukunami C, Iatridis JC, Docheva D.: **Aging Cell**, 19(3), e13091, 2020.
- 2 : Deficiency of TMEM53 causes a previously unknown sclerosing bone disorder by dysregulation of BMP-SMAD signaling. : Long Guo, Aritoshi Iida, Gandham SriLakshmi Bhavani, Kalpana Gowrishankar, Zheng Wang, Jing-yi Xue, Juan Wang, Noriko Miyake, Naomichi Matsumoto, Takanori Hasegawa, Yusuke Iizuka, Masashi Matsuda, Tomoki Nakashima, Masaki Takechi, Sachiko Iseki, Shinsei Yambe, Gen Nishimura, Haruhiko Koseki, Chisa Shukunami, Katta M. Girisha & Shiro Ikegawa.: **Nat Commun**, 12: 2046, 2021.
- 3 : Scleraxis upregulated by transforming growth factor- $\beta$ 1 signaling inhibits tension-induced osteoblast differentiation of periodontal ligament cells via ephrin A2.: Masayoshi Kawatsu, Nobuo Takeshita, Aki Takimoto, Yuki Yoshimoto, Masahiro Seiryu, Arata Ito, Seiji Kimura, Tadafumi Kawamoto, Yuji Hiraki, Chisa Shukunami, Teruko Takano-Yamamoto.: **Bone**, 149: 115969, 2021
- 4 : BHLHE41/DEC2 Expression Induces Autophagic Cell Death in Lung Cancer Cells and Is Associated with Favorable Prognosis for Patients with Lung Adenocarcinoma.: Toshiyuki Nagata, Kentaro Minami, Masatatsu Yamamoto, Tsubasa Hiraki, Masashi Idogawa, Katsumi Fujimoto, Shun Kageyama, Kohichi Kawahara, Kazuhiro Ueda, Ryuji Ikeda, Yukio Kato, Masaaki Komatsu, Akihiro Tanimoto, Tatsuhiko Furukawa, Masami Sato.: **Int. J. Mol. Sci.**, 22(21): 11509, 2021.
- 5 : The Identification of Marker Genes for Predicting the Osteogenic Differentiation Potential of Mesenchymal Stromal Cells.: Masami Kanawa, Akira Igarashi, Katsumi Fujimoto, Tania Saskianti, Ayumu Nakashima, Yukihito Higashi, Hidemi Kurihara, Yukio Kato, Takeshi Kawamoto.: **Curr. Issues Mol. Biol.**, 43(3): 2157-2166, 2021.
- 6 : CHRONO and DEC1/DEC2 compensate for lack of CRY1/CRY2 in expression of coherent circadian rhythm but not in generation of circadian oscillation in the neonatal mouse SCN.: Daisuke Ono, Ken-ichi Honma, Christoph Schmal, Toru Takumi, Takeshi Kawamoto, Katsumi Fujimoto, Yukio Kato, Sato Honma.: **Sci. Rep.**, 11: 19240, 2021.
- 7 : Thyroid and endostyle development in cyclostomes provides new insights into the evolutionary history of vertebrates.: Wataru Takagi, Fumiaki Sugahara, Shinnosuke Higuchi, Rie Kusakabe, Juan Pascual-Anaya, Iori Sato, Yasuhiro Oisi, Nobuhiro Ogawa, Hiroshi Miyanishi, Noritaka Adachi, Susumu Hyodo, Shigeru Kuratani.: **BMC Biology**, *in press*.

#### B) Review

### C) Publications

- 1 : Chondrocytes: Methods in extracellular matrix biology From basic research on collagen to application to regenerative medicine. (Katsuhiko Arai and Shunji Hattori): Chisa Shukunami, Yuji Hiraki: Maruzen Publishing Co., Ltd., 364-369, 2021.

### D) Other Publications

### E) Presentation at Scientific Meeting

- 1 : Establishment of *TnmdCre* knock-in mice and lineage tracing of *Tnmd* positive cells : Shinsei Yambe, Yuki Yoshimoto, Shinnosuke Higuchi, Shigeru Miyaki, Chisa Shukunami : The 39th Annual Meeting of the Japanese Society for Bone and Mineral Research, 2021.
- 2 : A mouse model of cleidocranial dysplasia: abnormal tooth root morphogenesis in *Runx2* missense mutant mice : Higuchi Shinnosuke, Yoshimoto Yuki, Yambe Shinsei, Komori Toshihisa, Shukunami Chisa : The 39th Annual Meeting of the Japanese Society for Bone and Mineral Research, 2021.

### F) Special lectures in academic meetings

- 1 : From establishment of chondrogenic differentiation system to tendon/ligament research: Chisa Shukunami: Academic Award Lecture. The 39th Annual Meeting of the Japanese Society for Bone and Mineral Research, 2021.
- 2 : Single cell analysis during in vitro tenogenic induction established by using *ScxGFP* iPSCs: Yuki Yoshimoto, Shinsei Yambe, Chisa Shukunami: Research-Aid Report, The 39th Annual Meeting of the Japanese Society for Bone and Mineral Research, 2021.
- 3 : TMEM53 regulates craniofacial morphogenesis in human and mouse : Long Guo, Tomoki Nakashima, Masaki Takechi, Sachiko Iseki, Chisa Shukunami, Shiro Ikegawa : The 44th Annual Meeting of the Molecular Biology Society of Japan (Yokohama), 2021.
- 4 : Contribution of *Scx<sup>+</sup>/Sox9<sup>+</sup>* cells in the calcified tissue junctions of the craniofacial region : Shinnosuke Higuchi, Ryosuke Kawakami, Shinsei Yambe, Xinyi Yu, Takeshi Imamura, Chisa Shukunami : The 44th Annual Meeting of the Molecular Biology Society of Japan (Yokohama), 2021.

### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-Aid for Scientific Research (B): Chisa Shukunami (Principal Investigator), 21H03107. ¥4,950,000.
- 2 : Fund for the Promotion of Joint International Research (Fostering Joint International Research (B)): Chisa Shukunami (Principal Investigator), 21KK0161. ¥3,100,000.
- 3 : Grant-in-Aid for Scientific Research (B): Chisa Shukunami (Co-Investigator), 20H03805. ¥300,000.
- 4 : Joint Usage/Research Center Program for Transdisciplinary Collaboration on Tissue Engineering and Regenerative Medicine for 2021. Chisa Shukunami (Principal Investigator), ¥500,000.
- 5 : Grant-in-Aid for Scientific Research (C): Katsumi Fujimoto (Principal Investigator), 18K09638. ¥900,000.
- 6 : Grant-in-Aid for Scientific Research (C): Katsumi Fujimoto (Co-Investigator) , 19K08710. ¥100,000.
- 7 : Grant-in-Aid for Scientific Research (C): Katsumi Fujimoto (Co-Investigator) , 21K09792. ¥100,000.
- 8 : Grant-in-Aid for Scientific Research (B): Shinnosuke Higuchi (Co-Investigator), 21H03107. ¥150,000.
- 9 : Fund for the Promotion of Joint International Research (Fostering Joint International Research (B)): Shinnosuke Higuchi (Co-Investigator), 21KK0161. ¥150,000.
- 10 : Grant-in-Aid for Early-Career Scientists: Shinnosuke Higuchi (Principal Investigator), 20K15830, ¥1,690,000.
- 11 : Takeda Science Foundation: Shinnosuke Higuchi (Principal Investigator). ¥2,000,000.

(5) Academic Awards, etc.

From establishment of chondrogenic differentiation system to tendon/ligament research: Chisa Shukunami: Academic Award of The Japanese Society for Bone and Mineral Research. Oct 9, 2021.

(6) Patents

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Maruyama H, Nishi H, Kawaguchi H: Clin Case Rep. 2021 Jul 6;9(7):e04415. doi: 10.1002/ccr3.4415. eCollection 2021 Jul. PMID: 34257981

6. Elimination of *Porphyromonas gingivalis* inhibits liver fibrosis and inflammation in NASH: Nagasaki A, Sakamoto S, Arai T, Kato M, Ishida E, Furusho H, Fujii M, Takata T, Miyauchi M: Journal of Clinical Periodontology. 2021 Oct;48(10):1367-1378. doi: 10.1111/jcpe.13523. Epub 2021 Aug 9. PMID: 34250613
7. Correction to fetal membrane inflammation induces preterm birth via Toll-like receptor 2 in mice with chronic gingivitis: Konishi H, Urabe S, Miyoshi H, Teraoka Y, Maki T, Furusho H, Miyauchi M, Takata T, Kudo Y, Kajioka S: Reprod Sci. 2021 Nov;28(11):3289. doi: 10.1007/s43032-021-00706-z. PMID: 34523071
8. A case of maxillary ameloblastic carcinoma with atypical histology: Hamana T, Hayashido Y, Mishima T, Hirota S, Hamada A, Ando T, Miyauchi M, Toratani T: Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology, 33(5), 536-545, 2021
9. Effects of baicalin on the proliferation and expression of OPG and RANKL in human cementoblast-lineage cells: Kunimatsu R, Kimura A, Sakata S, Tsuka Y, Yoshimi Y, Abe T, Kado I, Yashima Y, Izumino J, Nakatani A, Kitagawa M, Miyauchi M, Takata T, Tanimoto K: J Dent Sci. 2022 Jan;17(1):162-169. doi: 10.1016/j.jds.2021.05.009. Epub 2021 Jun 12.
10. Association between left atrial appendage fibrosis and thrombus formation: A histological approach: Miyauchi S, Tokuyama T, Uotani Y, Miyamoto S, Ikeuchi Y, Okamura S, Okubo Y, Katayama K, Takasaki T, Nakatani N, Matsudaira Y, Furusho H, Miyauchi M, Takahashi S, Nakano Y: the Journal of Cardiovascular Electrophysiology. in press

## B) Reviews

## C) Publications

1. Pathology and Clinical Medicine: Head and neck region: Ogawa I, Ando T, Miyauchi M: Bunkodo, (Tokyo), 39(3), 234-239, 2021.

## E) Presentation at Scientific Meeting

### 1) Special lectures in academic meetings

1. Workshop 9/Salivary gland cytology- Application and explanation of Milan system-WS9-2 Salivary gland tumors in the oral region: Sakamoto S, Ando T, Ogawa I, Miyauchi M: The 62<sup>nd</sup> Annual Spring Meeting of the Japanese Society of Clinical Cytology (Chiba), 2021.

### 2) Presentation at International Scientific Meeting

1. Exploratory study on biomarkers for preterm birth associated with periodontitis: Maegawara S, Hisako F, Shintani T, K Ouhara, Naito M, Miyauchi M: The 99th General Session of the IADR, the 50th Meeting of the AADR, and the 45th Meeting of the CADR (Boston, Hybrid meeting), 2021.
2. Mechanisms of elevated periapical bone loss in diet-induced obesity: Azuma MM, Tazawa K, Furusho H, Sasaki H: The 99th General Session of the IADR, the 50th Meeting of the AADR, and the 45th Meeting of the CADR (Boston, Hybrid meeting), 2021.

### 3) Presentation at Domestic Scientific Meeting

1. *Porphyromonas gingivalis*-odontogenic infection promotes development and progression of NASH-related hepatocellular carcinoma : Sakamoto S, Miyauchi M: The 14th Annual Meeting of the Japanese Society for Evidence and the Dental Professional (Hiroshima, Web meeting), 2021.
  2. A case of Crohn's disease diagnosed by oral mucosal lesions: Fukutani T, Tani R, Mishima T, Furusho H, Toratani S: The 34th Congress of the Japanese Society of Oral Diagnosis / Oral Medicine, The 31th Congress of the Japanese Society Oral Medicine, The 13th Congress of the Japanese Society for Evidence and the Dental Professional, Joint Academic Conference (Tokyo, Web meeting), 2021.
  3. A case of clear cell carcinoma diagnosed by identification of EWSR1-ATF1 fusion gene: Higaki M, Yoshioka Y, Okamoto K, Sakamoto S, Ando T, Okamoto K, Miyauchi M, Toratani S: The 66th Congress of the Japanese Society of Oral and Maxillofacial Surgeons (Makuhari, Hybrid meeting), 2021.
- 4) Case report
1. A case of osteochondroma of the unilateral mandibular condyle with severe occlusal deviation : Nakagawa T, Ono S, Fukui A, Sasaki K, Sakamoto S, Ando T, Miyauchi M, Takechi M: The 75th Annual Meeting of Japanese Stomatological Society (Osaka), 2021.
  2. Maxillary tumor (Clear cell carcinoma): Ando T, Sakamoto S, Higaki M, Okamoto K, Yoshioka Y, Toratani S, Nakamoto T, Okamoto K, Matsuura H, Kaneko M, Ogawa I, Miyauchi M: The 135th Academic Meeting of Chugoku-Shikoku Branch of the Japanese Society of Pathology (Kagawa, Web meeting), 2021.
  3. Palatal tumor (Polymorphous adenocarcinoma): Furusho H, Sakamoto S, Ando T, Ono S, Mizuta K, Ishida Y, Uetsuki R, Nagasaki S, Takechi M, Miyauchi M: The 136th Academic Meeting of Chugoku-Shikoku Branch of the Japanese Society of Pathology (Kagawa, Web meeting), 2021.
  4. Maxillary tumor (Odontogenic fibroma, amyloid variant): Sakamoto S, Ando T, Ito N, Kanda T, Suei Y, Toratani S, Miyauchi M: The 32nd Annual Meeting of the Japanese Society for Oral Pathology (Kanagawa, Web meeting), 2021.
  5. A case of non-sebaceous lymphadenoma-like mucoepidermoid carcinoma: Sakamoto S, Ando T, Miyauchi M, Fujihara M, Nakaguro M, Nagao T, Ogawa I: The 65th Annual Meeting of Japan Salivary Gland Society (Tokyo), 2021.
- (4) Status of Receiving Grants-in Aid for Scientific Research
1. Grants-in-Aid for Scientific Research (Scientific Research(C)): Hisako Furusho (Principal Investigator, Continuance), Role of TLR2 in preterm birth caused by *P.gingivalis* dental infection.
  2. Grants-in-Aid for Scientific Research (Scientific Research(C)): Mutsumi Miyauchi (Co-Investigator, Continuance), Role of TLR2 in preterm birth caused by *P.gingivalis* dental infection.

3. Grants-in-Aid for Scientific Research (Scientific Research(C)): Mutsumi Miyauchi (Co-Investigator, Continuation), Establishment of the preventive methods of non-alcoholic steatohepatitis-hepatic carcinoma focusing on periodontal disease and oral microbiota.
4. Grants-in-Aid for Scientific Research (Scientific Research(C)): Mutsumi Miyauchi, Hisako Furusho (Co-Investigator, Continuation), Study on preterm birth prevention and anti-inflammatory effects of luteal hormones using odontogenic infection induced preterm birth mouse model.
5. Grants-in-Aid for Scientific Research (Scientific Research(C)): Mutsumi Miyauchi (Co-Investigator, Continuation), Establishment of rapid detection system for systemic disease-related oral bacterial genes - applying detection system of cnm-positive *S. mutans* to clinical study-.
6. Grant-in-Aid for Scientific Research (Scientific Research(B)): Mutsumi Miyauchi (Representative, Continuation), Comprehensive study on the effects of periodontal pathogen on the pathophysiology of atrial fibrillation
7. Grant-in-Aid for Scientific Research (Scientific research (B)): Mutsumi Miyauchi (Co-Investigator, Continuation), Research on AI diagnosis and biological basis of multiple diseases by breath components
8. Grant-in-Aid for Scientific Research (C) : Mutsumi Miyauchi (Continuation, New), Evaluation of epigenetic aging changes in hard tissues and its application to age estimation
9. AMED “Program for Strategic Promotion of Translational Research” (seeds A): Mutsumi Miyauchi (Representative, New), Development of biomarker sets for diagnosis of preterm birth reflecting intrauterine inflammation/infection
10. Collaborative research fund from Cortexyme Co. Ltd. (Continuation): Mutsumi Miyauchi (Study on oral systemic disease connection)
11. Donated fund from Earth Co. (Continuation): Mutsumi Miyauchi
12. Collaborative research fund from Earth Co. (Continuation): Mutsumi Miyauchi (Study on oral disease)
13. Donated fund for Hiroshima Prefecture tumor registration business (Continuation): Mutsumi Miyauchi (Study on oral diseases)
14. Donated fund from Mitsubishi-Mihara Hospital (Continuation): Mutsumi Miyauchi (Study on diagnosis for oral disease)

(5) Academic Awards

(6) Patents

1. Shiba F, Miyauchi M, Takata T: Patent application for oral diseases (Japanese Patent Application No. 2022-8881) (Applicants: Hiroshima University, Earth Corporation)

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## Department of Cellular and Molecular Pharmacology

### (1) Staff and Students

Professor: Yukio Ago  
 Assistant Professor: Satoshi Asano  
 Graduate Student: Eiji Imado (D3, Dental Anesthesiology), Kohei Jino (D1)

### (2) Main Research Activities

- 1: Studies on the mechanisms of action of the drugs in depression, schizophrenia, anxiety, and neurodegenerative diseases.
- 2: Studies on the roles of gene-environment interactions in brain development.
- 3: Studies on the roles of cell migration, adhesion, and proliferation in biological and pathological processes.

### (3) Research Achievements

#### A) Original Papers

1. Maetani Y, Asano S, Mizokami A, Yamawaki Y, Sano T, Hirata M, Irifune M, Kanematsu T. Expression of PRIP, a phosphatidylinositol 4,5-bisphosphate binding protein, attenuates PI3K/AKT signaling and suppresses tumor growth in a xenograft mouse model. **Biochem Biophys Res Commun** 552: 106-113, 2021.
2. Sakamoto K, Chen L, Miyaoka T, Yamada M, Masutani T, Ishimoto K, Hino N, Nakagawa S, Asano S, Ago Y. Generation of KS-133 as a novel bicyclic peptide with a potent and selective VIPR2 antagonist activity that counteracts cognitive decline in a mouse model of psychiatric disorders. **Front Pharmacol** 12: 751587, 2021.
3. Kamei N, Suwabe S, Arime K, Bando H, Murata K, Yamaguchi M, Yokoyama N, Tanaka E, Hashimoto A, Kanazawa T, Ago Y, Takeda-Morishita M. Investigation of direct nose-to-brain peptide delivery enhanced by coadministration with penetratin. **Pharmaceutics** 13: 1745, 2021.
4. Yamamoto K, Kuriu T, Matsumura K, Nagayasu K, Tsurusaki Y, Miyake N, Yamamori H, Yasuda Y, Fujimoto M, Fujiwara M, Baba M, Kitagawa K, Takemoto T, Gotoda-Nishimura N, Takada T, Seiriki K, Hayata-Takano A, Kasai A, Ago Y, Kida S, Takuma K, Ono F, Matsumoto N, Hashimoto R, Hashimoto H, Nakazawa T. Multiple alterations in glutamatergic transmission and dopamine D2 receptor splicing in induced pluripotent stem cell-derived neurons from patients with familial schizophrenia. **Transl Psychiatry** 11(1): 548, 2021.
5. Tachibana K, Hashimoto Y, Shirakura K, Okada Y, Hirayama R, Iwashita Y, Nishino I, Ago Y, Takeda H, Kuniyasu H, Kondoh M. Safety and efficacy of an anti-claudin-5 monoclonal antibody to increase blood-brain barrier permeability for drug delivery to the brain in a non-human primate. **J Control Release** 336: 105-111, 2021.
6. Kitagawa K, Matsumura K, Baba M, Kondo M, Takemoto T, Nagayasu K, Ago Y, Seiriki K, Hayata-Takano A, Kasai A, Takuma K, Hashimoto R, Hashimoto H, Nakazawa T. Intranasal oxytocin administration ameliorates social behavioral deficits in POGZWT/Q1038R mouse model of autism spectrum disorder. **Mol Brain** 14(1): 56, 2021.
7. Kambe Y, Yamauchi Y, Nguyen TT, Nguyen TT, Ago Y, Shintani N, Hashimoto H, Yoshitake S, Yoshitake T, Kehr J, Kawamura N, Katsuura G, Kurihara T, Miyata A. The pivotal role of PACAP for lactate production and release in astrocytes for fear memory. **Pharmacol Rep** 73(4): 1109-1121, 2021.

#### B) Review

1. Ago Y, Asano S, Hashimoto H, Waschek JA. Probing the VIPR2 microduplication linkage to schizophrenia in animal and cellular models. **Front Neurosci** 15:717490, 2021.

## C) Publications

1. Atsuko Hayata-Takano, Yukio Ago, Hitoshi Hashimoto. Research aimed at elucidating the molecular mechanism for stress-related psychiatric disorders and the development of therapeutic drug through PACAP signaling. **The CELL** (The New Science Co., Ltd. Tokyo, Japan) 53(1): 60-63, 2021.

## D) Other Publications

None

## E) Presentations at Scientific Meetings

## International conference

1. Satoshi Asano, Misa Yamasaka, Kairi Ozasa, James A. Waschek, Yukio Ago. Regulation of tumor cell migration by vasoactive intestinal peptide (VIP)-VPAC2 receptor signaling. The 6th Joint Scientific Meeting in Dentistry (virtual presentation), July 30 - August 1, 2021.
2. Eiji Imado, Sun Samnang, Abrar Rizal Abawa, Satoshi Asano, Kazuhiro Tsuga, Masahiro Irifune, Yukio Ago. Abnormal pain sensitivity in a prenatal valproic acid-induced mouse model of autism spectrum disorder. The 6th Joint Scientific Meeting in Dentistry (virtual presentation), July 30 - August 1, 2021.
3. Tatsunori Miyaoka, Lu Chen, Mei Yamada, Daichi Koan, Satoshi Asano, Kenji Ishimoto, Shinsaku Nakagawa, Atsuko Hayata, Takanobu Nakazawa, Akihiro Harada, Hitoshi Hashimoto, James A. Waschek, Yukio Ago. Overexpression of VIPR2 in neurons causes defects in dendritic growth and cognitive impairment. The 7th Congress of the Asian College of Neuropsychopharmacology (AsCNP), Kyoto, October 22-23, 2021.
4. Yukio Ago, Lu Chen, Tatsunori Miyaoka, Mei Yamada, Teruaki Masutani, Kenji Ishimoto, Shinsaku Nakagawa, Satoshi Asano, Kotaro Sakamoto. A potent and highly selective VPAC2 receptor antagonist peptide KS-133 counteracts cognitive impairment in a mouse model relevant to schizophrenia. The 60th Annual Meeting of the American College of Neuropsychopharmacology (ACNP) (virtual presentation), December 5-8, 2021.

## Domestic conference

1. Kohei Kitagawa, Kensuke Matsumura, Masayuki Baba, Momoka Kondo, Tomoya Takemoto, Kazuki Nagayasu, Yukio Ago, Atsushi Kasai, Kazuhiro Takuma, Hitoshi Hashimoto, Takanobu Nakazawa. Intranasal oxytocin administration improves impaired social behavior in the POGZ-Q1038R mutant mice. The 94th Annual Meeting of the Japanese Pharmacological Society, Sapporo, 8-10 March, 2021.
2. Daichi Koan, Eiji Imado, Satoshi Asano, Lu Chen, Tatsunori Miyaoka, Mei Yamada, Kenji Ishimoto, Shinsaku Nakagawa, Atsuko Hayata, Takanobu Nakazawa, Akihiro Harada, Hitoshi Hashimoto, James Waschek, Yukio Ago. Neuron-specific VPAC2 receptor overexpression leads to cognitive impairment in mice. The 141st Annual Meeting of the Pharmaceutical Society for Japan (virtual presentation), 26-29 March, 2021.
3. Misa Yamasaka, Satoshi Asano, Atsuko Hayata, Takanobu Nakazawa, Hitoshi Hashimoto, James Waschek, Yukio Ago. Role of the VPAC2 receptor-mediated signals in cell migration. The 141st Annual Meeting of the Pharmaceutical Society for Japan (virtual presentation), 26-29 March, 2021.
4. Yuma Konishi, Kenji Ishimoto, Hayate Oue, Shuichi Otani, Soya Maeda, Yukio Ago, Shinsaku Nakagawa. Basic study on the anti-allergic effect of the tea-derived material epigallocatechin gallate. The 141st Annual Meeting of the Pharmaceutical Society for Japan (virtual presentation), 26-29 March, 2021.
5. Sayaka Tanikawa, Katsuya Okawa, Kaori Kitae, Hiroaki Hase, Kentaro Jingushi, Lu Chen, Takumi Yamaguchi, Yukio Ago, Shinsaku Nakagawa, Kazutake Tsujikawa. Investigation on the mechanism of recognition disorder for mouse lacking Alkbh8. The 141st Annual Meeting of the Pharmaceutical Society for Japan (virtual presentation), 26-29 March, 2021.

6. Kenji Ishimoto, Yuta Nakamura, Shuichi Otani, Shohei Miki, Soya Maeda, Taiki Iwamoto, Yuma Konishi, Yukio Ago, Shinsaku Nakagawa. Basic study on improvement of dissolution ratio in water aiming at practical use of  $\beta$ -carotene amorphous solid dispersion. The 36th Annual Meeting of the Academy of Pharmaceutical Science and Technology Japan (virtual presentation), 13-15 May, 2021.
7. Eiji Imado, Satoshi Asano, Yoki Nakamura, Kazue Nakashima, Norimitsu Morioka, Kazuhiro Tsuga, Masahiro Irifune, Kazuhiro Takuma, Yukio Ago. Prenatal valproic acid-treated mice show an increased pain sensitivity to heat and capsaicin and cause mechanical allodynia. The 139th Kinki Branch Meeting of the Japanese Pharmacological Society (virtual presentation), 26 June, 2021.
8. Kenji Ishimoto, Yukiko Shimada, Akane Ohno, Shuichi Otani, Soya Maeda, Yukio Ago, Shinsaku Nakagawa. Evaluation of intestinal absorption and functionality of amorphous naringenin aiming at the development of functional foods. The 37th Annual Meeting of the Japan Society of Drug Delivery System. Chiba, 29-30 June, 2021.
9. Zhiqi Xie, Yukio Ago, Naoki Okada, Masashi Tachibana. De-targeting by valproic acid of the invasion of myeloid-derived suppressor cells into tumors. The 37th Annual Meeting of the Japan Society of Drug Delivery System. Chiba, 29-30 June, 2021.
10. Tatsunori Miyaoka, Lu Chen, Mei Yamada, Daichi Koan, Satoshi Asano, Kenji Ishimoto, Shinsaku Nakagawa, Atsuko Hayata, Takanobu Nakazawa, Akihiro Harada, Hitoshi Hashimoto, James Waschek, Yukio Ago. Developing a unique transgenic mouse model for cell-type specific and spatiotemporal control of human VPAC2 receptor overexpression. The 2021 Joint Annual Meeting of the 43rd Annual Meeting of Japanese Society of Biological Psychiatry & 51st Annual Meeting of Japanese Society of Neuropsychopharmacology (BPNP2021), Kyoto, 14-16 July, 2021.
11. Natsuki Yoshimoto, Kazuto Ohata, Kazue Nakashima, Yoki Nakamura, Yukio Ago, Dengli Wang, Keyue Liu, Hidenori Wake, Masahiro Nishibori, Norimitsu Morioka. The effect of neutralizing antibody against high-mobility group box 1 on cognitive decline in mice with neuropathic pain. The 35th Forum for Drug Discovery and Pharmacology in Okayama (virtual presentation), 17 July, 2021.
12. Kohei Kitagawa, Masayuki Baba, Tomoya Takemoto, Kazuki Nagayasu, Atsushi Kasai, Ryota Hashimoto, Hitoshi Hashimoto, Yukio Ago, Takanobu Nakazawa. Analysis of molecular pathology of psychiatric disorders by using neural stem cells differentiated from iPS cells generated from a patient with 7q36.3 microduplication. Biofunction and Drug Discovery Symposium 2021, Sapporo, 26-27 August, 2021.
13. Kohei Kitagawa, Masayuki Baba, Tomoya Takemoto, Kazuki Nagayasu, Atsushi Kasai, Ryota Hashimoto, Hitoshi Hashimoto, Yukio Ago, Takanobu Nakazawa. Analysis of molecular pathology of psychiatric disorders by using neural stem cells differentiated from iPS cells generated from a patient with 7q36.3 microduplication. Drug Discovery and Pharmaceutical Science Symposium for the Next Generation of Young Scientists 2021, Sapporo, 28 August, 2021.
14. Satoshi Asano, Yukio Ago. The neuropeptide VIP–VPAC2 signaling is a novel mechanism of regulating tumor cell migration. The 63rd Annual Meeting of Japanese Association for Oral Biology (virtual presentation), 9-11 October, 2021.
15. Natsuki Yoshimoto, Kazue Nakashima, Yoki Nakamura, Yukio Ago, Norimitsu Morioka. Study on the altered neural plasticity in the hippocampus of mice with neuropathic pain. The 60th Chugoku-Shikoku Branch Joint Meeting of the Pharmaceutical Society for Japan, Japan Pharmaceutical Association, and Japanese Society of Hospital Pharmacists, Matsuyama, 23-24 October, 2021.
16. Mei Yamada, Lu Chen, Tatsunori Miyaoka, Teruaki Masutani, Kenji Ishimoto, Nobumasa Hino, Shinsaku Nakagawa, Satoshi Asano, Kotaro Sakamoto, Yukio Ago. Pharmacological characterization and CNS effects of a novel and selective VPAC2 receptor antagonist peptide. The 140th Kinki Branch Meeting of the Japanese Pharmacological Society, Nara, 13 November, 2021.
17. Tomoya Takemoto, Masayuki Baba, Kohei Kitagawa, Kazuki Nagayasu, Kaoru Seiriki, Atsuko Hayata, Atsushi Kasai, Yukio Ago, Kazuhiro Takuma, Hitoshi Hashimoto, Takanobu Nakazawa. Oxytocin treatment improves abnormal social behavior in a mouse model carrying a deletion of the chromosomal region corresponding to the human 3q29 region. The 140th Kinki Branch Meeting of the Japanese Pharmacological Society, Nara, 13 November, 2021.
18. Kotaro Sakamoto, Yukio Ago. Generation of a VIPR2-selective antagonist peptide with pharmacological effects in vivo. The 16th GPCR Conference (virtual presentation), 19-20 November, 2021.

#### F) Symposium, Special lectures in academic meetings, etc.

1. Yukio Ago. Special lecture; Mental illness and drug discovery: How to evaluate brain function and mental processing in animals. Open Lecture at School of Medicine, Hiroshima University. Hiroshima, Japan, 7 August, 2021.
2. Yukio Ago. Special lecture; Brain research aimed at drug discovery for psychiatric disorder: what we have seen in mice. The 40th Round Table Conference on Pharmacological and Biochemical Researches in Bipolar Disorder (virtual presentation), 23 October, 2021.
3. Yukio Ago. Special lecture; Elucidation of pathology and drug development for psychiatric disorders by focusing on rare variants. The 36th Forum for Drug Discovery and Pharmacology in Okayama (virtual presentation), 25 December, 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

1. Grant-in-Aid for Challenging Research (Exploratory) from Japan Society for the Promotion of Science (JSPS): Yukio Ago (Principal Investigator, New), Grant Number: 21K19714
2. Grant-in-Aid for Scientific Research (B) from Japan Society for the Promotion of Science (JSPS): Yukio Ago (Principal Investigator, Continuance), Grant Number: 20H03392
3. Grant-in-Aid for Scientific Research (B) from Japan Society for the Promotion of Science (JSPS): Yukio Ago (Co-Investigator, Continuance), Grant Number: 20H03404
4. Grant-in-Aid for Scientific Research (B) from Japan Society for the Promotion of Science (JSPS): Yukio Ago (Co-Investigator, Continuance), Grant Number: 20H03429
5. Grant-in-Aid for Scientific Research (C) from Japan Society for the Promotion of Science (JSPS): Yukio Ago (Co-Investigator, New), Grant Number: 21K10139
6. Grant-in-Aid for Scientific Research (C) from Japan Society for the Promotion of Science (JSPS): Satoshi Asano (Principal Investigator, Continuance), Grant Number: 20K09905
7. Collaborative Research Grant from ICHIMARU PHARCOS Co., Ltd. (Japan): Yukio Ago (Principal Investigator, New)
8. Collaborative Research Grant from Tokuyama Corporation (Japan): Yukio Ago (Principal Investigator, New)
9. Research Grant from Nakatomi Foundation (Japan): Yukio Ago (Principal Investigator, New)
10. Research Grant from Mochida Memorial Foundation for Medical and Pharmaceutical Research (Japan): Yukio Ago (Principal Investigator, New)
11. Research Grant from Astellas Foundation for Research on Metabolic Disorders (Japan): Yukio Ago (Principal Investigator, New)

#### (5) Academic Awards, etc.

None

#### (6) Patents

1. Kotaro Sakamoto, Yukio Ago: VIPR2 ANTAGONIST PEPTIDE. PCT/JP2021/11316, 19 March, 2021.

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## Department of Biomaterials

### (1) Staff and Students

Professor: Koichi Kato  
Assistant Professor: Isao Hirata, Rei Kuwabara, Archana Mootha  
Research Collaborator: Ayana Nakano  
Graduate Student: Tomoko Ogasawara, Fumika Abe, Karina Erda, Yenny Yustisia  
Hengky Ardhiyanto  
Undergraduate student: Mizuki Watanabe, Mao Shimoi, Ayumi Takeuchi, Yohei Tsutsumi  
Akiko Narukami, Kana Takeda, Yuta Kobayashi, Naoto Hisabayashi

### (2) Main Research Activities

- 1: Biomaterials and biodevices for regenerative medicine
- 2: Study on the interactions between biological systems and biomaterial surfaces
- 3: Developing novel approaches for disease treatment with biomaterials

### (3) Research Achievements

#### A) Original Papers

- 1: Mucoadhesion of polyamphoteric hydrogels synthesized from acrylic acid and *N,N*-dimethylaminopropyl acrylamide: Fumiko Nishio, Isao Hirata, Katsuhiko Nakamae, Kazuhiro Tsuga, Koichi Kato: *International Journal of Adhesion and Adhesives* (2021) 104:102746.
- 2: Evaluation of a peptide motif designed for protein tethering to polymer surfaces: Ayana Nakano, Isao Hirata, Binh Vinh Pham, Ajay Shakya, Kotaro Tanimoto, Koichi Kato: *Journal Biomaterials Science, Polymer Edition* (2021) 32:76–92.
- 3: Quantitative cell subset analysis using antibody microarrays: Tomoko Ogasawara, Rei Kuwabara, Katsuyuki Kozai, Koichi Kato: *ACS Applied Bio Materials* (2021) 4:7673–7681.
- 4: Comparison of interleukin-21 levels and its correlation with clinical parameters among healthy individuals, chronic periodontitis and aggressive periodontitis patients: Archana Mootha, Sankari Malaiappan, Dan M. J. Milstein, Gurumoorthy Karthikeyan, Sheeja S. Varghese, N. Doraisamy Jayakumar: *Journal of Clinical and Translational Research* (2021) 7:84–92.
- 5: Enhancement of intercellular interaction between iPSC-derived neural progenitor cells and activated endothelial cells using cell surface modification with functional oligopeptides: Isha Goel, Makoto Noiri,

- Yuka Yamauchi, Koichi Kato, Ung-il Chung, Yuji Teramura: Biomaterials Science, Epub ahead of print.
- 6: Nd:YVO<sub>4</sub> laser groove treatment can improve the shear bond strength between dental PEEK and adhesive resin cement with an adhesive system: Hitomi Kimura, Hiroki Tsuka, Koji Morita, Isao Hirata, Fumiko Nishio, Hitoshi Abekura, Kazuya Doi, Kazuhiro Tsuga: Dental Materials Journal, Epub ahead of print.

## B) Reviews

- 1: Recombinant protein synthesis for nanomaterial assembly: Technical overview: Ayana Nakano, Koichi Kato. The Bulletin of the Society of Nano Science and Technology, in press.
- 2: T. Ogasawara, K. Kato: Solid-phase cytometry using antibody microarrays. Journal of Hiroshima University Dental Society, in press.

## C) Other Publications and Deliverables

- 1: Linking bridge: Japan–China interactions on nanomedicine: Koichi Kato: The Bulletin of the Japan-China Medical Association, in press.
- 2: Laboratory: Department of Biomaterials, Hiroshima University: Koichi Kato: The Journal of the Japanese Society for Dental Materials and Devices, (2021) 40(3):216.
- 3: Webpage: Hiroshima University e-START Program, "Dentistry in a Global Perspective": Koichi Kato, Isao Hitrata, Rei Kuwabara, Mootha Archana, Andra Rizqiawan, Tania Saskianti, Maretaningtias Dwi Ariani, Mega Moeharyono Puteri: <https://biomaterials-hu.wixsite.com/global-dent>

## D) Invited Lectures

- 1: Manufacturing by genetic engineering: Koichi Kato, 78th Autumn Meeting of Japanese Society for Dental Materials and Devices (Kobe, Online) 2021
- 2: Quantitative subset analysis by solid-phase cytometry using antibody microarrays: Koichi Kato: 14th International Symposium on Nanomedicine and 11th Taiwan-Japan-Korea Nanomedicine Meeting, Japan Nanomedicine Society and The Society of Nano Science and Technology (Matsue, Online) 2021
- 3: Biofunctional nanomaterials design using substrate-binding adaptor polypeptides: Koichi Kato, Ajay Shakya, Yuka Yamauchi, Ayana Nakano: 8th Japan-China Symposium on Nanomedicine (Tsu, Online) 2021
- 4: Possible utilization of photonic nanocrystals for application in bio-sensing: Archana Mootha, Masakazu Iwasaki, Kentaro Suzuki, Hironori Asada: 8th Japan-China Symposium on Nanomedicine (Tsu, Online) 2021
- 5: Effect of extracellular matrix inclusion in alginate-based immunoprotective membrane to prolong

- allogeneic islet graft survival: Rei Kuwabara, Paul de Vos: 8th Japan-China Symposium on Nanomedicine (Tsu, Online) 2021
- 6: Bioengineering challenges toward regenerative dentistry: Koichi Kato: 6th Indonesia Society of Dental Materials and Devices (Jakarta, Online) 2021
- 7: Application of biochemical nano-particles for cell imaging and periodontal tissue regeneration: Archana Mootha: Saveetha University (Saveetha dental college and hospitals), (India, Online) 2021.

#### E) Presentations at Scientific Meetings

- 1: The concept of algebra of sets enables quantitative cell subset analysis using antibody microarrays: Tomoko Ogasawara, Rei Kuwabara, Katsuyuki Kozai, Koichi Kato: 8th Asian Biomaterials Congress (Nagoya, Online) 2021
- 2: Tandem repeats of lysine and leucine as a peptide tag for protein immobilization: Ayana Nakano, Isao Hirata, Binh Vinh Pham, Ajay Shakya, Kotaro Tanimoto, Koichi Kato: 6th Joint Scientific Meeting in Dentistry (Surabaya, Online) 2021
- 3: Development of micropore-forming polylactide filaments for use in 3D printing: Isao Hirata and Koichi Kato: 6th Joint Scientific Meeting in Dentistry (Surabaya, Online) 2021
- 4: Cell-surface modification of neural progenitor cells for stroke treatment: Isha Goel, Yuka Yamauchi, Koichi Kato, Yuji Teramura. 70th Symposium on Macromolecules, The Society of Polymer Science, Japan (Tokyo, Online) 2021
- 5: Cell surface modification of neural stem cells for ischemic stroke treatment: Isha Goel, Yuka Yamauchi, Koichi Kato, Yuji Teramura: 70th SPSJ Annual Meeting, The Society of Polymer Science, Japan (Nagoya, Online) 2021
- 6: Cell-surface modification of neural progenitor cells for stroke treatment: Isha Goel, Yuka Yamauchi, Koichi Kato, Yuji Teramura: 8th Japan-China Symposium on Nanomedicine (Tsu, Online) 2021

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1: Fund for the Promotion of Joint International Research, Fostering Joint International Research (B), Grants-in-Aid for Scientific Research, JSPS (PI: Koichi Kato): Koichi Kato, Strategy for spatially-controlled tissue regeneration. 19KK0278. 1,800,000 JPY
- 2: Grant-in-Aid for Scientific Research (C), Ministry of Education, Culture, Sports, Science and Technology, JSPS (PI: Isao Hirata): Isao Hirata, Development of Metabolic System Controlled Culture Substrates to Maintain Stemness of Mesenchymal Stem Cells. 20K09994. 850,000 JPY
- 3: Fund for the Promotion of Joint International Research, Fostering Joint International Research (B), Grants-in-Aid for Scientific Research, JSPS (PI: Koichi Kato): Isao Hirata, Strategy for spatially-controlled tissue regeneration. 19KK0278. 200,000 JPY
- 4: Grant-in-Aid for Scientific Research (C), Ministry of Education, Culture, Sports, Science and



- Technology, JSPS (PI: Isao Hirata): Koichi Kato, Development of Metabolic System Controlled Culture Substrates to Maintain Stemness of Mesenchymal Stem Cells. 20K09994. 50,000 JPY
- 5: Grant-in-Aid for Scientific Research (C), Ministry of Education, Culture, Sports, Science and Technology, JSPS (PI: Koji Morita): Isao Hirata, Elucidation of the effects of masticatory ability on intestinal microflora and short-chain fatty acid production in persons requiring nursing care. 20K10034. 50,000 JPY
- 6: Grant-in-Aid for Scientific Research (C), Ministry of Education, Culture, Sports, Science and Technology, JSPS (PI: Kotaro Tanimoto): Koichi Kato, Functional analysis of deciduous dental pulp stem cell-derived exosomes and application to induction of cleft palate bone regeneration. 21K10186. 150,000 JPY
- 7: Grant-in-Aid for Scientific Research (C), Ministry of Education, Culture, Sports, Science and Technology, JSPS (PI: Masami Kanawa): Isao Hirata, Development of a Marker System to Predict the Differentiation Potential of Adipose-derived Mesenchymal Stem Cells. 21K09792. 50,000 JPY
- 8: Grant-in-Aid for Scientific Research (C), Ministry of Education, Culture, Sports, Science and Technology, JSPS (PI: Saiji Shimoe): Isao Hirata, Development of bio-friendly polyetheretherketone (PEEK) composite restorations. 21K10002. 100,000JPY
- 9: Grant-in-Aid for Research Activity Start-up (PI: Ayana Nakano) Ayana Nakano, Controlled release of protein factors for tissue engineering of cleft palate, 21K21014. 1,200,000 JPY

#### (5) Academic Awards, etc.

- 1: Ayana Nakano: Evaluation of a peptide motif designed for protein tethering to polymer surfaces: 24th Incentive Award–Basic Research, Alumni association of Hiroshima University Dental School, 2021
- 2: Ardhiyanto Hengky : Immobilization of VEGF and BMP-2 on hydroxyapatite scaffold to enhance angiogenesis and osteogenesis in ridge augmentation: Program for Developing and Supporting the Next-Generation of Innovative Researchers at Hiroshima University, JST, 2021

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**Department of Orthodontics and Craniofacial Development  
Biology  
Division of Oral Health and Development  
Department of Orthodontics**

(1) Staff and Students

Professor: Kotaro Tanimoto

Associate Professor: Ryo Kunimatsu

Lecturer: Naoto Hirose

Assistant Professor: Yuki Asakawa, Yuki Yoshimi, Tetsuya Awada (~2021.6), Yuji Tsuka, Takaharu Abe, Makoto Yanoshita, Isamu Kado (2021.10~)

Intern: Koji Iwai, Azusa Onishi, Sakura Yamada, Yuka Yashima, Hiroki So, Yuka Yamauchi, Tomoka Hiraki, Jin Izumino, Shota Ito, Kazuyo Ando, Haruka Kagawa, Ayaka Nakatani, Ayana Nakano, Sayumi Miura, Shuzo Sakata, Sayuri Nishiyama

Education and Research Support Staff: Cynthia Concepción Medina

Graduate Student: Yuma Koizumi, Kazutaka Ikeda, Eri Ishida, Tomohiro Ogasawara, Eri Tsuboi, Kodai Rikitake, Naoki Kubo, Kanae Oda, Nurul Aisyah Rizky Putranti, Fumika Abe, Shintaro Ogashira, Sho Oshima, Ayaka Odo, Risako Oshiro, Saki Ogawa, Daiki Kita, Katsuhito Sugai, Moe Matsunaga, Izumi Tanabe

Reserch Student: Etsuna Tsuchiyama (~2021.6)

Visiting Professor: Kazuo Tanne, Eiji Tanaka, Ichiro Takahashi, Shoichi Miyawaki

Registered Intern: Kuniaki Tanaka, Kazunori Itatani, Yu Matsumura, Shoutoku Kojima, Yuko Nakao, Aya Kimura, Taeko Yamamoto, Mami Takano

Dental Hygienist: Miho Okada, Mariko Nakamura

(2) Main Research Activities

- 1 : Elucidation of pathogenic mechanism in malocclusion and management of oral maxillofacial skeletal growth
- 2 : Optimization of tooth movement by orthodontic force
- 3 : Establishment of a new orthodontic treatment based on the image and biochemical diagnosis of temporomandibular disorders (TMD)
- 4 : Application of regeneration medicine to orthodontic treatment
- 5 : Suppression of caries risk in orthodontic treatment
- 6 : Evaluation of the contribution of various oral functions to general fitness
- 7 : Development of new instruments and materials for orthodontic treatment

(3) Research Achievements

A) Original Papers (2021.1-2021.12 including Case Reports)

- 1 : Single-cell RNA-sequencing reveals the breadth of osteoblast heterogeneity : Yoshioka H., Okita S., Nakano M., Minamizaki T., Nobukiyo A., Sotomoru Y., Bonnelye E., Kozai K., Tanimoto K., Aubin JE., Yoshiko Y.: JBMR Plus (WOA), 5(6): e10496. 2021. doi: 10.1002/jbm4.10496.
- 2 : Surveillance of salivary properties of pre-orthodontic patients in relation to age and sex : Kado I., Kunimatsu R., Yoshimi Y., Medina CC., Yamada S., Tanimoto K.: Sci Rep., 11(1):6555, 2021. doi: 10.1038/s41598-021-85861-8
- 3 : Multislice Computed Tomography Assessment of Airway Patency Changes in the Supine Position Following Mandibular Setback Surgery for Mandibular Prognathism: A Prospective 1-year Follow-Up Study : Iwai K., Ueda H., Nagasaki T., Cynthia CM., Matsumura Y., Tanimoto K.: APOS Trends Orthod, 11(2):106-115, 2021. doi:10.25259/apos\_169\_2020.
- 4 : EGFR Regulates the Hippo Pathway By Promoting The Tyrosine Phosphorylation Of MOB1 : Ando

- T., Arang N., Wang Z., Costea DE., Feng X., Goto Y., Izumi H., Gilardi M., Ando K., Gutkind JS.: *Commun Biol.*, 2021 Nov 1;4(1):1237. doi: 10.1038/s42003-021-02744-4.
- 5 : Overexpression of miR-125b in Osteoblasts Improves Age-Related Changes in Bone Mass and Quality through Suppression of Osteoclast Formation : Ito S., Minamizaki T., Kohno S., Sotomaru Y., Kitaura Y., Ohba S., Sugiyama T., Aubin JE., Tanimoto K., Yoshiko Y.: *Int J Mol Sci.*, 22(13), 6745, 2021. doi: 10.3390/ijms22136745.
  - 6 : Evaluation of a peptide motif designed for protein tethering to polymer surfaces : Nakano A, Hirata I, Pham BV, Shakya A, Tanimoto K, Kato K.: *J Biomater Sci Polym Ed.*, 32(1): 76-92, 2021. doi: 10.1080/09205063.2020.1816870.
  - 7 : Changes in tongue-palatal contact during swallowing in patients with skeletal mandibular prognathism after orthognathic surgery : Kagawa H., Kaku M., Yamamoto T., Yashima Y., Sumi H., Kamiya T., Yamamoto I., Tanimoto K.: *PLoS One*, 16(5): e0251759, 2021. doi: 10.1371/journal.pone.0251759.
  - 8 : ANGPL2 induces synovial inflammation via LILRB2 : Nishiyama S., Hirose N., Yanoshita M., Takano M., Kubo N., Yamauchi Y., Onishi A., Ito S., Sakata S., Kita D., Asakawa-Tanne Y., Tanimoto K.: *Inflamm.*, 44(3):1108-1118, 2021. doi: 10.1007/s10753-020-01406-7
  - 9 : High-frequency Near-infrared Diode Laser Irradiation Suppresses IL-1 $\beta$ -induced Inflammatory Cytokine Expression and NF- $\kappa$ B Signaling Pathways in Human Primary Chondrocytes : Sakata S., Kunimastu R., Tsuka Y., Nakatani S., Gunji H., Yanoshita M., Kado I., Ito S., Putranti NAR., RC Prasetya., Hirose N., Tanimoto K.: *Lasers Med Sci.*, Online ahead of print, 2021. doi: 10.1007/s10103-021-03371-5. Epub.
  - 10 : Effect of CD146<sup>+</sup> SHED on bone regeneration in a mouse calvaria defect model : Rikitake K., Kunimatsu R., Yoshimi Y., Nakajima K., Hiraki T., Putranti NA., Tsuka Y., Abe T., Ando K., Hayashi Y., Nikawa H., Tanimoto K.: *Oral Dis.*, Online ahead of print, 2021. doi: 10.1111/odi.14020.
  - 11 : Changes in airway patency and sleep-breathing in healthy skeletal Class II children undergoing functional Activator therapy : Cynthia CM., Ueda H., Iwai K., Kunimatsu R., Tanimoto K.: *Eur Oral Res.*, 56(1). 2021. doi: 10.26650/eor.2022807392
  - 12 : Effects of baicalin on the proliferation and expression of OPG and RANKL in human cementoblast-lineage cells : Kunimatsu R., Kimura A., Sakata S., Tsuka Y., Yoshimi Y., Abe T., Kado I., Yashima Y., Izumino J., Nakatani N., Kitagawa M., Miyauchi M., Takata T., Tanimoto K.: *J Dent Sci.*, 17(1): 162-169, 2022. doi: 10.1016/j.jds.2021.05.009.
  - 13 : An investigation of tongue-palatal contact changes in patients with skeletal mandibular lateral deviation after sagittal split ramus osteotomy : Kaku M., Kojima S., Yamamoto I., Yamamoto T., Kagawa H., Shimoe S., Tanimoto K.: *J. Craniofac. Surg.*, 32: e94-e98. 2021. doi: 10.1097/SCS.00000000000006796
  - 14 : Generalized periodontitis treated with periodontal, orthodontic, and prosthodontic therapy: A case report : Kaku M., Matsuda S., Kubo T., Shimoe S., Tsuga K., Kurihara H., Tanimoto K.: *World J Clin Cases.*, 9(21):6110-6124, 2021. doi: 10.12998/wjccv9.i21.6110.
  - 15 : Landmark annotation and mandibular lateral deviation analysis of posteroanterior cephalograms using a convolutional neural network : Takeda S., Mine Y., Yoshimi Y., Ito S., Tanimoto K., Murayama T.: *J Dent Sci.*, 16(3):957-963. 2021. doi: 10.1016/j.jds.2020.10.012.
  - 16 : A survey of idiopathic mandibular condylar resorption in the Department of Orthodontics Hiroshima University Hospital : Tanimoto K., Awada T., Onishi A., Hirose N.: *J. Chu-shi. Orthod. Soc.*, 33(1): 5-9. 2021.
  - 17 : Orthodontic treatment and temporomandibular disorders – A systematic approach correspond to the pathological condition- : Tanimoto K.: *J. Jpn Soc T.M.J.*, 33(3): 3-7, 2021.
  - 18 : Maxillofacial morphology and oral features in osteogenesis imperfecta : Yashima Y., Yoshimi Y., Awada T., Abe T., Kado I., Ito S., Izumino J., So H., Tanimoto K.: *Chu-shi. Orthod. Soc.*, 33 (1), 69-78, 2021.

## B) Review (2021.1-2021.12)

- 1 : Treatment of malocclusion in the community– Timing to start orthodontic treatment of open bite and determination of the difficulty – : Tanimoto K.: J. Hiroshima Dent. Asso. 47, 1-6, 2021.

#### C) Publications (2021.1-2021.12)

#### D) Other Publications (2021.1-2021.12)

- 1 : Kado I., Tanimoto K. : STUDY FINDS BRACES DISRUPT ORAL MICROBIOME TO PRE-GUM DISEASE STATE: HIROSHIMA UNIVERSITY UPDATE, 2, 15, 2021.
- 2 : Foreword : Tanimoto K.: J. Jpn Soc T.M.J., 33(1): 1, 2021.
- 3 : Importance of anatomy : Tanimoto K.: Hiroshima University Shiragiku, 49, 29-30, 2021.
- 4 : Forefront of the clinic “Department of Orthodontics” : Tanimoto K.: Hiroshima University Hospital News, 60, 6, 2021.
- 5 : Information from the committee of certified orthodontists : Tanimoto K.: Japanese Orthodontic Society information letter, No.2, 7, 2021.

#### E) Presentations at Scientific Meetings (2021.1-2021.12)

- 1 : An investigation of maxillofacial morphology and oral characteristics in craniosynostosis patients in Department of Orthodontics, Hiroshima University Hospital : Izumino J., Abe T., Awada T., Yoshimi Y., Kado I., Ito S., So H., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 2 : Automated detection of temporomandibular joint disc in MRI images using semantic segmentation : Ito S., Yoshimi Y., Mine Y., Takeda S., Onishi A., Kakimoto N., Murayama T., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 3 : Clinical and statistical study on non-syndromic oligodontia patients with six congenitally missing teeth in at Department of Orthodontics Hiroshima University Hospital : So H., Kunimatsu R., Yoshimi Y., Abe T., Awada T., Ando K., Kado I., Yashima Y., Ito S., Izumino J., Nakano A., Ogawa S., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 4 : Maxillofacial morphology and dental features in osteogenesis imperfecta : Yashima Y., Awada T., Yoshimi Y., Abe T., Kado I., Ito S., Izumino J., So H., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 5 : Landmark annotation and mandibular lateral deviation analysis of posteroanterior cephalograms using a convolutional neural network : Takeda S, Mine Y, Yoshimi Y, Ito S, Tanimoto K, Murayama T.: The 12nd Scientific Meeting of the Japan Academy of Digital Dentistry (Tokyo), 2021.
- 6 : Effects of estrogen addition on mandibular growth and changes in cartilage : Kubo N., Awada T., Hirose N., Yanoshita M., Takano M., Nishiyama S., Tsuboi E., Kita D., Onishi A., Yamauchi Y., Matsunaga M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.
- 7 : Changes in tongue-palatal contact during swallowing in patients with skeletal mandibular prognathism after sagittal split ramus osteotomy : Kagawa H., Kaku M., Yamamoto T., Sumi H., Kamiya T., Kojima S., Yamamoto I., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa) , 2021.
- 8 : Effects of high-frequency near-infrared diode laser irradiation on pain induced by experimental tooth movement model : Nakatani A., Kunimatsu R., Tsuka Y., Sakata S., Ito S., Kado I., Putranti NAR., Terayama R., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.
- 9 : Application to bone regeneration therapy using CD146-positive deciduous pulp-derived mesenchymal stem cells : Rikitake K., Kunimatsu R., Yoshimi Y., Nakajima K., Hiraki T., Putranti NAR., Tsuka Y., Abe T., Ando K., Hayashi Y., Nikawa H., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.

- 10 : An orthodontic treatment for a patient with maxillary protrusion and fibrous dysplasia : Hirose N., Yanoshita M., Onishi A., Nishiyama S., Kagawa H., Kubo N., Kita D., Matsunaga M., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.
- 11 : A case of orthodontic treatment for a maxillary protrusion with patient with systemic lupus erythematosus : Nishiyama S., Hirose N., Yanoshita M., Onishi A., Yamauchi Y., Kagawa H., Kubo N., Kita D., Matsunaga M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 12 : Orthodontic treatment with temporary anchorage devices for the patient with crowding occurred after serial extraction in childhood : Yanoshita M., Hirose N., Onishi A., Yamauchi Y., Nishiyama S., Kagawa H., Kubo N., Kita D., Matsunaga M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021
- 13 : A case report of maxillary protrusion with Moebius syndrome : Onishi A., Hirose N., Yanoshita M., Yamauchi Y., Kubo N., Nishiyama S., Kagawa H., Kita D., Matsunaga M., Miura S., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021
- 14 : Assessment of masticatory function in adult cleft lip and palate patients after orthodontic treatment : Miura S., Hirose N., Iwai K., Cynthia CM., Ishida E., Onishi A., Yanoshita M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 15 : Automated segmentation of temporomandibular joint disc in MRI images using deep learning. : Ito S., Yoshimi Y., Mine Y., Takeda S., Onishi A., Kakimoto N., Murayama T., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 16 : Effects of high frequency near infrared diode laser irradiation on expression of inflammatory cytokines in human chondrocytes. : Sakata S., Kunimatsu R., Tsuka Y., Nakatani A., Putranti NAR., Yanoshita M., Hirose N., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 17 : Preliminary results of oropharyngeal crowding and daytime sleepiness evaluation of Japanese orthodontic patients : Cynthia CM., Hirose N., Iwai K., Miura S., Ishida E., Kunimatsu R., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefectural Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 18 : An investigation of maxillofacial morphology and oral characteristics in craniosynostosis patients in Department of Orthodontics, Hiroshima University Hospital : Izumino J., Abe T., Awada T., Yoshimi Y., Kado I., Ito S., So H., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefectural Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 19 : Clinical and statistical study on non-syndromic oligodontia patients with six congenitally missing teeth in at Department of Orthodontics Hiroshima University Hospital : So H., Kunimatsu R., Yoshimi Y., Abe T., Kado I., Yashima Y., Ito S., Izumino J., Nakano A., Ogawa S., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefectural Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 20 : 2 cases of MFT treatment evaluated based on oral function, skeletal analysis and dental model : Ando K., Asakawa Y., Tsuka Y., Okada M., Yamada S., Naitou T., Yamamoto S., Komatsu M., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefectural Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 21 : Changes in hyoid bone position in skeletal Class II children post-functional appliance therapy : Iwai K., Cynthia CM., Kunimatsu R., Miura S., Ishida E., Tanimoto K. : The 20th Annual Meeting of the Japanese Academy of Dental Sleep Medicine (Fukuoka), 2021.
- 22 : The roles of miR-125b in bone formation: analysis of miR-125b-2 KO mice : Ogasawara T., Minamizaki T., Kohno S., Hoshino T., Yoshiko Y. : The 63rd Annual Meeting of Japanese Association for Oral Biology (Kanagawa) , 2021.
- 23 : 骨形態計測による Mir125b-2 ノックアウトマウスの骨代謝機能の解析 : Ogasawara T.,

- Minamizaki T., Kohno S., Davood K., Hoshino T., Sotomaru Y., Tanimoto K., Yoshiko Y. : The 75th Chugoku-Shikoku Sectional Meeting of Japanese Association of Anatomists (Okayama), 2021
- 24 : Resolvin D1 reduces inflammation in Human Fibroblast-Like Synoviocytes via p-38, NF- $\kappa$ B and AKT signaling pathway. : Yanoshita M., Hirose N., Nishiyama S., Onishi A., Yamauchi Y., Tsuboi E., Kubo N., Kita D., Asakawa Y., Tanimoto K. : 34th Annual Meeting of The Japanese Society for the Temporomandibular Joint (Tokyo), 2021.
- 25 : Effects of high-frequency near-infrared diode laser irradiation on IL-1 $\beta$ -induced expression of inflammatory cytokines and matrix metalloproteinases in human primary chondrocytes. : Sakata S., Kunimatsu R., Tsuka Y., nakatani A., Putranti NAR., Yanoshita M., Hirose N., Tanimoto K.: The 34th Annual Meeting of the Japanese Society for the Temporomandibular Joint (Tokyo), 2021.
- 26 : Role of Semaphorin 3A in endochondral ossification of mandibular condyle : Tsuboi E., Hirose N., Asakawa Y., Yanoshita M., Onishi A., Takano M., Nishiyama S., Kubo N., Kita D., Tanimoto K.: The 34th Annual Meeting of the Japanese Society for the Temporomandibular Joint (Tokyo), 2021.

#### F) Special lectures in academic meetings (2021.1-2021.12)

- 1 : Introduction of Hiroshima University School of Dentistry : Tanimoto K.: 2021 explanatory meeting for parents of new students, April 17, 2021.
- 2 : COVID-19 crisis and future dental education : Tanimoto K.: 2021 The supporter's association of Hiroshima University School of Dentistry, May 19, 2021.
- 3 : Checking for malocclusion in school dental examinations - Endeavors for malocclusion treatment in the community- : Tanimoto K.: The 29th annual meeting of school dental health , August 5, 2021.
- 4 : To those who aim to apply or renew a certified orthodontist, and instructor - To understand the new / renewal application for the certified orthodontist and the instructor, : Tanimoto K.: The instructor's meeting of the Japanese Orthodontic Society, November 3, 2021.
- 5 : Orthodontic treatment and digital transformation : Tanimoto K.: The 2nd annual meeting of Hiroshima prefectural dental association, November 14, 2021.
- 6 : The trial of Hiroshima University - treatment for malocclusion in the community- : Tanimoto K.: Tohoku Orthodontic Society, November 23, 2021.
- 7 : 廣瀬尚人：地域拠点病院としての大学病院での口唇裂・口蓋裂治療：第9回口唇裂・口蓋裂治療勉強会（若夏矯），2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-aid for Scientific Research (C) : Tanimoto K., Functional analysis of exosome in human exfoliated deciduous teeth (SHED) and application to bone regeneration for cleft palate. 21K10186. 1,560,000 yen
- 2 : Grant-in-aid for Scientific Research (C) : Kunimatsu R., Application of cold laser to regeneration of periodontal tissue and pain relief during tooth movement. 19K10385. 910,000 yen
- 3 : Grant-in-aid for Scientific Research(C) : Hirose N., Elucidation of mechanics of temporomandibular joint osteoarthritis and establishment of new therapeutic method with NFATc inhibitor. 19K10383. 780,000 yen
- 4 : Grant-in-aid for Scientific Research(C) : Yoshimi Y., Application of functional amelogenin peptides to bone organoid preparation and bone regeneration. 19K10384A. 1,300,000 yen
- 5 : Grant-in-aid for Scientific Research(C) : Tsuka Y., Optimal transplantation condition of stem cells from human exfoliated deciduous teeth and establishment of cleft palate regeneration therapy by cold laser. 20K10226. 1,430,000 yen
- 6 : Grant-in-Aid for Early-Career Scientists : Abe T., Establishment of minimally invasive cleft palate closure treatment using mesenchymal stem cell-derived exosome from human exfoliated deciduous teeth. 21K17186. 1,820,000 yen
- 7 : Grant-in-Aid for Early-Career Scientists : Yanoshita M., Elucidation of interaction between FAK and autophagy and its application to therapies for temporomandibular joint osteoarthritis. 20K18781. 2,080,000 yen

- 8 : Grant-in-Aid for Early-Career Scientists : Yamada S., Development of anti-bone destructive peptides based on lactoferrin research. 20K187580. 1,950,000 yen
- 9 : Grant-in-Aid for Early-Career Scientists : Gunji H., Elucidation of mechanism and treatment for osteoarthritis of temporomandibular joint applied photoactivation. 20K18759. 2,080,000 yen
- 10 : Grant-in-Aid for Early-Career Scientists : Onishi A., Elucidation of the suppression mechanism of odontoclast activity by ameloblastin and therapeutic application for root resorption. 20K18782. 1,300,000 yen
- 11 : Grant-in-Aid for Early-Career Scientists : Takano M., Elucidation of cartilage destruction mechanisms of ANGPTL2 enhancing the expression of MMPs and application to PCR treatment. 20K18783. 1,950,000 yen
- 12 : Grant-in-Aid for Early-Career Scientists : Yashima Y., Elucidation of osteocytes dynamics mediated by Semaphorin 3A under mechanical stress. 20K18780. 1,300,000 yen
- 13 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Hiraki T., Analysis of bone regeneration mechanism in stem cells from human exfoliated deciduous teeth (SHED) conditioned media and it's clinical application to jaw cleft bone regeneration treatment. 20K2305. 1,430,000yen
- 14 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Yamauchi Y., Elucidation of cartilage destruction mechanism by low molecular weight hyaluronic acid via CD44 cross-linking inhibition and TLR4. 20K23056. 1,430,000 yen
- 15 : Grant-in-Aid for Early-Career Scientists : Kado I., Development of comprehensive oral microbiome analysis and construction of risk management method for orthodontic patients using a next generation sequencing. 21K17161. 1,690,000 yen
- 16 : Grant-in-Aid for Early-Career Scientists : Yamamoto T., Comparison of the root resorption restraint effect and elucidation of the mechanism of NSAIDs and acetaminophen. 21K17184. 2,210,000 yen
- 17 : Grant-in-Aid for Early-Career Scientists : Kimura A., Explore the treatment option of TMJ-OA and mechanism of condylar resorption with flavonoid herbal medicine. 21K17160. 1,800,000 yen
- 18 : Grant-in-Aid for Early-Career Scientists : Izumino J., Searching for periodontal metabolic activity by natural product chemical biology and application to root resorption prevention treatment. 21K17185. 2,340,000 yen
- 19 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Sakata S., Establishment of cartilage regeneration therapy for temporomandibular joint using cold laser technology to control matrix metabolic activity. 21K21041. 1,560,000 yen
- 20 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Nakano A., Controlled release of protein factors for the treatment of cleft palate by tissue engineering. 21K21014. 1,560,000 yen
- 21 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Ando K., Susceptibility genes assessment and elucidation of bone differentiation mechanism using crisper technology in fibrous dysplasia. 21K21015. 1,560,000 yen
- 22 : Satake Fund Research Grant 2021 : Rikitake K., Elucidation of bone regeneration mechanism and optimal cell transplantation conditions in human deciduous pulp-derived mesenchymal stem cells. 170,000 yen
- 23 : Hiroshima University research grant for female researchers 2021 : Nakatani A., Elucidation of the mechanism of pain relief in tooth movement by applying photochemical action. 400,000 yen

#### (5) Academic Awards, etc.

- 1 : Kado I. : Hiroshima University school of dentistry alumni association research encouragement prize 2021.
- 2 : Nakano A. : Hiroshima University school of dentistry alumni association research encouragement prize 2021.
- 3 : Nakatani A. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International



- Congress best presentation award.
- 4 : Kubo N. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
  - 5 : Rikitake K. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
  - 6 : Nakatani A. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
  - 7 : Ito S. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress
  - 8 : Rikitake K. : Hiroshima University, Excellent Student Scholarship 2021.
  - 9 : Hiraki T. : The 24th Japanese Orthodontic Society Academic Encouragement Award

(6) Patents

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## Department of Molecular Oral Medicine & Maxillofacial Surgery

### Division of Oral & Maxillofacial Surgery and Oral Medicine (Department of Oral & Maxillofacial Surgery)

#### (1) Staff and Students

Associate Professor: Shigeaki Toratani Chief: Shigeaki Toratani (by-work)

Clinical Associate Professor: Yasutaka Hayashido

Assistant Professor: Ryouji Tani, Yukio Yoshioka, Kouichi Koizumi, Taku Kanda(~Mar), Kensaku Sumi, Tomoaki Hamana, Naohiro Kimura(~Mar), Sachiko Yamasaki, Atuko Hmada, Mirai Higaki(Oct~)

Clinical fellow: Naohiro Kimura(Apr~), Nanako Itoh, Yuki Taguchi, Eri Akagi(~Mar), Fuyuyoshi Takatsu(~Mar), Fumitaka Obayashi, Taeko Fukutani, Kouji Tsushima(~Mar), Mirai Higaki(~Sep), Kensaku Matsui(~Mar), Takefumi Mishima(Jul~), Seiya Hayashi(~Jun), Tadayoshi Nobumoto(~Mar), Shigeki Satoh(~Mar)

Registered part-time doctor: Koh Nabeshima(~Mar), Yasutaka Ishida, Yoshinari Myoken, Yoshinori Fujita, Kohsei Okamoto(~Mar), Yoku Ito, Akihiko Sakamoto(~Mar)

Graduate Student: Hideaki Takahasji, Kento Okamoto, Misato Tatsuki(~Mar), Natsuki Eboshida(Apr~), Tamamo Matsuyama(Apr~)

Researcher: Taku Kanda(Apr~), Suguru Hirota, Shigeru Sakurai, Youji Nakase, Tadayoshi Nobumoto(Apr~)

#### (2) Main Research Activities

1. Gene/molecular diagnosis and therapy for oral cancer and salivary gland tumors. (Cancer stem cells, growth factors, growth factor receptors, invasion and metastasis, tumor angiogenesis, and molecular/gene target therapy).
2. The molecular/genetic diagnosis and therapy for oral and cranio-maxillofacial deformities.
3. Establishment and characterization of human induced pluripotent stem (iPS) cells derived from human pulp cells in serum- and feeder-free cell culture.
4. Generation of human induced pluripotent stem (iPS) cells derived from patients with genetic disorders in the oral and cranio-maxillofacial region in serum- and feeder-free culture to elucidate the molecular mechanism involved in the disease.
5. Purification of biologically active factors from marine organism.
6. Photodynamic therapy for oral cancer.
7. Immune cell therapy for oral cancer by using NK/lymphokine-activated killer (LAK) cells.
8. Jaw and tooth regeneration in vitro.
9. Molecular-epidemiological study of oral and maxillofacial disease among residents of Semipalatinsk Nuclear Test Site (SNTS) area in Kazakhstan.
10. Measuring brain hemodynamic changes on mounting dental appliance using Near-Infrared Spectroscopy
11. The intestinal and oral microbiota of patients with oral cancer
12. Establishment study of liquid biopsy by isolation of circulating oral cancer cells in blood and analysis of their cell characteristics

#### (3) Research Achievements

Original Papers (including Case Reports)

1. A case of high perimandibular approach for open reduction and internal fixation of mandibular condyle fracture.: Kanda T., Obayashi F., Sato S., Ito N., Hamana T., Tortoni S. J. Hiroshima Univ. Dent. Soc., 53(1), 23-29, 2021.
2. A case of lichenoid oral mucositis associated with nivolumab therapy.: Ito N., Tani R., Obayashi F., Okamoto K., Toratani S., Okamoto T.: Oral Science International. 2021 May. doi: 10.1002/osi.2.1113.



3. A case of maxillary ameloblastic carcinoma with atypical histology.: Hamana T., Hayashido Y., Mishima T., Hirota S., Hamada A., Ando T., Miyauchi M., Toratani S.: *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*. 33(2), 536–545, 2021 Sep.
4. A Clinical Study of Salivary Gland Tumors in the Department of Oral and Maxillofacial Surgery at Hiroshima University Hospital. : Nobumoto T., Yoshioka Y., Hamada A., Yamasaki S., Hamana T., Kanda T., Koizumi K., Tani R., Hayashidou Y., Toratani S., Okamoto T.: *J. Hiroshima Univ. Dent. Soc.*, 53(1), 16-22, 2021.
5. Age-related changes in oral tactile and thermal sensation throughout adulthood.: Nishimura R, Yoshida M, Shigeishi H, Fukada-Sambuichi E, Yamashita-Urabe K, Takechi M, Toratani S, Tsuga K, Sugiyama M.: *Odontology*. 109(3), 710-718, 2021. doi: 10.1007/s10266-021-00594-4.
6. Bosutinib-induced osteonecrosis of the jaw in a patient with chronic myeloid leukemia: a case report.: Myoken Y, Fujita Y, Imanaka R, Toratani S. : *Oral Maxillofac Surg.*, 25(3), 421-425, 2021 Sep.
7. Development of radiomics and machine learning model for predicting occult cervical lymph node metastasis in patients with tongue cancer.: Kubo K, Kawahara D, Murakami Y, Takeuchi Y, Katsuta T, Imano N, Nishibuchi I, Saito A, Konishi M, Kakimoto N, Yoshioka Y, Toratani S, Ono S, Ueda T, Takeno S, Nagata Y.: *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*. 2021. doi: 10.1016/j.oooo.2021.12.122
8. Effects of perioperative oral care on postoperative inflammation following heart valve surgery.: Nishi H., Takahashi S., Ohta K., Takamoto M., Shigeishi H., Go S., Obayashi T., Yoshioka Y., Konishi M., Shimizu Y., Yano K., Miyagawa T., Kakimoto N., Ohge H., Kawaguchi H., Kurihara H.: *Oral Dis.*, 27(6), 1542-1550, 2021.
9. Enhanced KRT13 gene expression bestows radiation resistance in squamous cell carcinoma cells. : Nguyen TQ., Hamada A., Yamada K., Higaki M., Shintani T., Yoshioka Y., Toratani S., Okamoto T. : *In Vitro Cell Dev Biol Anim.*, 57(3), 300-314, 2021, doi:10.1007/s11626-020-00542-6.
10. 4 cases of salivary gland MALT lymphoma that occurred in the oral cavity.: Sakaue E., Koizumi K., Yoshioka Y., Hamana T., Ito N., Ando T., Tortoni S. : *J. Hiroshima Univ. Dent. Soc.*, 53 (1) , 30-37, 2021.
11. Heparin-Binding Protein 17/Fibroblast Growth Factor-Binding Protein-1 Knockout Inhibits Proliferation and Induces Differentiation of Squamous Cell Carcinoma Cells.: Shintani T., Higaki M., Okamoto T.: *Cancers (Basel)*, 29;13(11), 2684, 2021, doi: 10.3390/cancers13112684.
12. Identification of a familial cleidocranial dysplasia with a novel RUNX2 mutation and establishment of patient-derived induced pluripotent stem cells. : Hamada A., Mukasa H., Taguchi Y., Akagi E., Obayashi F., Yamasaki S., Kanda T., Koizumi K., Toratani S., Okamoto T. : *Odontology.*, 2021, doi:10.1007/s10266-021-00674-5.
13. MICA A5.1 homozygous genotype is associated with a risk for early-onset oral cancer. : Tani R, Ito N, Matsui K, Yamasaki S, Hamada A, Tokumaru K, Toratani S, Okamoto T. : *Oral Oncology*, 2021 May;116:105256. doi:10.1016/j.oraloncology.2021.105256.
14. Relationships between intraoral ultrasonographic and histopathological findings in patients with tongue cancer. : Konishi M., Sakamoto S., Ogawa I., Yoshioka Y., Ono S., Kakimoto N.: *Head Neck*, 43(9): 2778-2785, 2021.
15. Teriparatide treatment for medication-related osteonecrosis of the jaw: Is this an effective option?: Myoken Y, Fujita Y, Toratani S. *J Clin Oncol.*, 39(2), 172-173, 2021 Jan 10.
16. Use of the superiorly-based facial artery musculomucosal flap for defect reconstruction in stage 3 medication-related osteonecrosis of the maxilla: Technical note. Myoken Y, Kawamoto T, Fujita Y, Toratani S. *J Dent Sci.*, 16(4), 1305-1307. 2021 Oct.
17. Using smartphone technology to impart basic pediatric dentistry knowledge to early childhood educators: A preliminary study Myoken Y, Kawamoto T, Nakata M, Toratani S, Fujita Y, Myoken Y.: *Int J Oral-Med Sci.*, 20(2), 152–156, 2021.

## B) Review article

not applicable

## C) Publications

not applicable

## D) Other Publications

not applicable

## E) Presentation at Scientific Meeting

1. A case of cleidocranial dysplasia treated with orthognathic surgery: 12-year course of treatment: Hamada A., Kanda T., Iwai H., Mishima T., Koizumi K., Tanimoto K., Toratani M.: The 49th Annual Meeting of the Japanese Society of Oral Surgeons, Chugoku-Shikoku Branch (Kochi Web meeting), Feb 6, 2021.
2. Two cases of cystadenoma of the palate : Ito N., Koizumi K., Sakamoto S., Sato S., Yamasaki S., Toratani S. : The 49<sup>th</sup> Academic Meeting of the Japanese Society of Oral Surgery, Chugoku-Shikoku Branch (Kochi Web meeting), Feb 6, 2021.
3. Clinical study of the Outpatient in Hiroshima University Dental clinic.:Kimura N., Hino T., Ohara M., Yoshino H., Okamoto T., Kurihara H., Tsuga K., Shiba H. :The 75<sup>th</sup> Annual Meeting of Japanese Stomatological Society (Osaka Web meeting) May 12-14, 2021.
4. A clinical study on oral cancer patients treated with immune checkpoint inhibitors in department of oral and maxillofacial surgery, Hiroshima University Hospital.: Yoshioka Y., Ono S., Tani R., Mizuta K., Nakagawa T., Ando T., Sakamoto S., Takechi M., Toratani S., Okammoto T.: The 75th Annual Meeting of the Japanese Stomatological Society. (Web meeting, Osaka) May 12-14, 2021.
5. Functional analysis of Heparin-binding protein 17/FGF-Binding Protein-1 (HBp17/FGFBP-1) in squamous cell carcinoma (SCC) cells using the CRISPR/Cas9 system: Higaki M., Shintani T., Okamoto T. : The 75th Annual Meeting of Japanese Stomatological Society (Osaka Hybrid meeting), May 12-14, 2021.
6. Participation of plasminogen/plasmin system in the proliferation of oral squamous cell carcinoma cells: Takahashi H., Hamana T., Hayashido Y.: The 75th Annual Meeting of Japanese Stomatological Society (Osaka Hybrid meeting), May 12-14, 2021.
7. Maxillary tumor (Clear cell carcinoma): Ando T, Sakamoto S, Higaki M, Okamoto K, Yoshioka Y, Toratani S, Nakamoto T, Okamoto K, Matsuura H, Ogawa I, Miyauchi M.: The 135th Academic Meeting of Chugoku-Shikoku Branch of the Japanese Society of Pathology (Kagawa, Web meeting), Jun 19, 2021.
8. A clinical study on oral cancer patients treated with immune checkpoint inhibitors in department of oral and maxillofacial surgery, Hiroshima University Hospital.: Yoshioka Y., Ono S., Tani R., Mizuta K., Nakagawa T., Ando T., Sakamoto S., Takechi M., Toratani S., Okammoto T.: The 115th Annual meeting of Society of Clinical Oncology Hiroshima (Hiroshima), July 3, 2021.
9. Maxillary tumor (Odontogenic fibroma, Amyloid Variant) : Sakamoto S., Ando T., Ito N., Kanda T., Tortoni S., Suei Y., Miyauchi M. : The 32nd Annual Meeting of the Japanese Society of Oral Pathology (Kanagawa Web meeting), Aug 12, 2021.
10. Weight Loss in Head and Neck Cancer Patients Treated with Postoperative Chemoradiation Therapy: Kadota A., Kambara C., Nagao A., Mashida E., Hirayama J., Hamana T., Taruya T., Amano K., Sugiyama S., Tanabe K.: The 13th Japanese Society for Clinical Nutrition and Metabolism (Kurashiki Web meeting), Aug 28, 2021
11. A case of Crohn's disease diagnosed by oral mucosal lesions: Fukutani T., Tani R., Mishima T., Furusho H., Toratani S: The 34th Congress of the Japanese Society of Oral Diagnosis / Oral Medicine, The 31th Congress of the Japanese Society Oral Medicine, The 13th Congress of the Japanese Society for Evidence and the Dental Professional, Joint Academic Conference (Tokyo Web meeting), Sep 9-10, 2021.
12. A case of clear cell carcinoma diagnosed by identification of EWSR1-ATF1 fusion gene: Higaki M., Yoshioka Y., Okamoto K., Sakamoto S., Ando T., Okamoto K., Miyauchi M., Toratani S.: The 66th Congress of the Japanese Society of Oral and Maxillofacial Surgeons (Makuhari Hybrid meeting), Nov 12-14, 2021

13. A case of giant cell tumor in the mandibular condyle : Ito N., Koizumi K., Obayashi F., Sakamoto S., Ando T., Toratani S.: The 66th Congress of the Japanese Society of Oral and Maxillofacial Surgeons (Makuhari Hybrid meeting) , Nov 12-14, 2021.
14. A case of superficial mucous cyst on the lower lip : Obayashi F., Kanda T., Ito N., Takahashi H., Sakamoto S., Koizumi K., Tortoni S. : The 66th Congress of the Japanese Oral and Maxillofacial Surgeons (akuhari Hybrid meeting), Nov 12-14, 2021.
15. A clinico-statistical study of midfacial fractures treated in the Department of Oral and maxillofacial Surgery, Hiroshima Prefectural Hospital : Ueda Y., Matsui K., Kanda T., Kiriyaama T. : The 66th Congress of the Japanese Oral and Maxillofacial Surgeons (akuhari Hybrid meeting), Nov 12-14, 2021.
16. Comparative study before and after the use of Epicil oral liquid in patient s with hematological malignancies: Fukutani T., Yoshioka Y., Sakurai S., Fujita Y., Myoken Y., Toratani S.: The 66th Congress of the Japanese Oral and Maxillofacial Surgeons (akuhari Hybrid meeting), Nov 12-14, 2021.
17. A case of odontogenic infection with suspected Lemierre's syndrome: Matsuyama T., Hamana T., Hamada A., Higaki M., Toratani S.: The 68th Annual Meeting of the Chugoku Shikoku Local Section Japanese Stomatological Society (Tokushima Web meeting), Nov 20, 2021.
18. A case of oral cancer patient with severe dementia coexisting with alcoholism treated in collaboration with other departments: Eboshida N., Koizumi K., Ito N., Yamada S., Masuda N., Sakamoto T., Toratani S. : The 68th Meeting of Japanese Stomatology Society Chugoku-Shikoku Branch. (Tokushima Web meeting), Nov 20, 2021.
19. A clinico-statistical study of midface fractures over the past 12 years in our department: Ueda Y., Matsui K., Kanda T., Kiriyaama T. : The 68th Meeting of Japanese Stomatology Society Chugoku-Shikoku Branch. (Tokushima Web meeting), Nov 11, 2021.

#### F) Special lectures at academic meetings

1. Ready to use! Dental Safety Guide: Kanda T. Hiroshima Dental Hygienists' Association 2040 Medical Technician Workshop (Hiroshima web), Feb 7, 2021.
2. Mazda hospital postgraduate training lecture for nurse; Oral care for preventing aspiration pneumonia : Akihiko Sakamoto (Hiroshima), June 7, 2021.
3. A clinical study on oral cancer patients treated with immune checkpoint inhibitors in department of oral and maxillofacial surgery, Hiroshima University Hospital.: Yukio Yoshioka, Oncology meeting in Hiroshima University Hospital, 2021.9.15
4. Lifestyle-related diseases, Periodontitis : Ueda Y., Kanda T., Matsui K., Kiriyaama T. : Health Seminar at midori-machi Civic Hall (Hiroshima), Nov 8, 2021.
5. About Anti-resorptive agent-related Osteonecrosis of the Jaw.: Sado T.: Study meeting for nurses of Miyoshi Municipal Central Hospital (Miyoshi), Dec 15, 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

1. Grants-in aid for scientific research (C): Sachiko Yamasaki: #18K09723. 1,344,000yen.
2. Grants-in aid for scientific research (C): Yasutaka Hayashido: #19K10310. 1,200,000yen.
3. Grants-in aid for scientific research (C): Tomoaki Shintani: #19K10332. 1,500,000yen.
4. Grants-in aid for scientific research (C): Ryouji Tani: #19K10359. 800,000yen.
5. Grants-in aid for scientific research (C): Taku Kanda: #20K10117. 1,000,000 yen
6. Grants-in aid for scientific research (C): Tomoaki Hamana: #21K10114. 900,000yen.
7. Grant-in-Aid for Young Scientists: Suguru Hirota: #19K19197. 800,000yen.
8. Grant-in-Aid for Young Scientists: Atsuko Hamada: #19K19198. 1,100,000 yen.
9. Grant-in-Aid for Young Scientists: Yuki Taguchi: #19K19233. 800,000yen.
10. Grant-in-Aid for Young Scientists: Fumitaka Obayashi: #20K18670. 1,200,000yen.
11. Grant-in-Aid for Young Scientists: Yoji Nakase: #20K18725. 1,400,000 yen.
12. Grant-in-Aid for Young Scientists: Shigeru Sakurai: #20K18726. 1,000,000 yen.
13. Grant-in-Aid for Young Scientists.: Tadayoshi Nobumoto: # 21K17139 1,200,000yen.
14. Grant-in-Aid for Young Scientists: Mirai Higaki: # 21K17141. 1,100,000 yen.
15. Collaborative Research Grant: Ryouji Tani. 2,175,000yen.

(5) Academic Awards, etc.

1. Matsuyama T.: JSS Young Investigator Award 2021, The 68th Annual Meeting of the Chugoku Shikoku Local Section Japanese Stomatological Society, Nov 20, 2021.

(6) Patents  
not applicable

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## Department of Oral and Maxillofacial Surgery

### Division of Oral and Maxillofacial Surgery and Oral Medicine (Department of Oral and Maxillofacial Reconstructive)

#### (1) Staff and Students

Associate Professor: Masaaki Takechi (~Dec)

Research Associate: Yoshiaki Ninomiya (Diagnosis and treatment lecturer), Shigehiro Ono (Diagnosis and treatment lecturer), Kuniko Mizuta, Takayuki Nakagawa, Misato Tada, Akiko Fukui, Takako Naruse  
Resident: Yasuki Ishioka, Fumi Ishida (~Jul), Yoko Ishida, Kazuki Sasaki, Ryo Uetsuki, Hiroki Kato (~Dec), Hiroshi Murodumi (~Mar), Miyuki Sakuma(Apl~), Sho Yokoyama(Apl~)

Graduate Student: Miyuki Sakuma(~Mar), Sho Yokoyama(~Mar), Nao Yamakado, Misaki Akagi, Erina Hashimoto, Toshiki Anyouji (Apr~Jul), Chieko Niwata(Apr~), Ayumi Fujii (Apr~), Daitoku Murakami (Apr~)

Registered Intern: Masaki Kiyomihara, Yoshihisa Inoue, Taro Kashihara, Yasuhiro Tanaka (~Mar)

#### (2) Main Research Activities

- 1 : Functional evaluation and development of oral and maxillofacial reconstructive surgeries
- 2 : Genomic analysis of stomatognathic diseases
- 3 : Biochemical characterization and development of therapeutics of oral tumors
- 4 : Molecular-biological studies on control of invasion and migration of oral cancers
- 5 : Studies on responsible gene of osseous dysplasia of jaws
- 6 : Molecular-biological studies on dental and periodontal tissue regeneration
- 7 : Development of biomaterials of oral and maxillofacial reconstruction
- 8 : Development of biomaterial for dental implant treatment

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

1. High cervical transmasseteric anteroparotid approach for mandibular condylectomy.: Okuda S, Ono S, Tada M, Ishida F, Uetsuki R, Takechi M. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology.* 33: 276-280, 2020.
2. The squamous cell carcinoma cell line OM-1 retains both p75-dependent stratified epithelial progenitor potential and cancer stem cell properties.: Uetsuki R, Higashikawa K, Okuda S, Yamakado N, Ishida F, Rizqiawan A, Ono S, Takechi M, Mizuta K, Shigeishi H, Kamata N. *Biochem Biophys Rep.* 26: 2021.
3. In vitro investigation of the cell compatibility and antibacterial properties of titanium treated with calcium and ozone.: Takechi M, Takamoto M, Ninomiya Y, Ono S, Mizuta K, Nakagawa T, Shigeishi H, Ohta K, Ishikawa K, Tsuru K. *Dent Mater J.* 40: 712-718, 2021.
4. Effects of miR-224-5p-enhanced downregulation of PANX1 on docetaxel-induced apoptosis in amoeboid-like CD44<sup>high</sup> oral cancer cells.: Yokoyama S, Shigeishi H, Murodumi H, Sakuma M, Ono S, Tobiume K, Sugiyama M, Ohta K, Takechi M. *European Journal of Oral Sciences,* 2021.
5. Melatonin enhances cisplatin-induced cell death through inhibition of DERL1 in mesenchymal-like CD44<sup>high</sup> OSCC cells.: Shigeishi H, Yokoyama S, Murodumi H, Sakuma M, Fukada S, Okuda S, Yamakado N, Ono S, Takechi M, Ohta K. *Journal of Oral Pathology & Medicine,* 2021.
6. Usefulness of Tranexamic Acid Administration During Sagittal Split Ramus Osteotomy.: Yoshida M, Ono S, Shimizu Y, Oue K, Mukai A, Doi M, Irifune M. *J Craniofac Surg* 32:273-276, 2021.
7. Postoperative Complications of Impacted Mandibular Third Molar Extraction Related to Patient's Age and Surgical Difficulty Level: A Cross-Sectional Retrospective Study.: Rizqiawan A, Lesmaya YD, Rasyida AZ, Amir MS, Ono S, Kamadjaja DB. *Int J Dent (in press)* .
8. Development of radiomics and machine learning model for predicting occult cervical lymph node

metastasis in patients with tongue cancer.: Kubo K, Murakami Y, Kawahara D, Takeuchi Y, Katsuta T, Imano N, Nishibuchi I, Saito A, Konishi M, Kakimoto N, Yoshioka Y, DDS, Toratani S, Ono S, Ueda T, Takeno S, Nagata Y. *Oral Surg Oral Med Oral Pathol Oral Radiol* (in press) .

9. Expression of anti-fungal peptide,  $\beta$ -defensin 118 in oral fibroblasts induced by *C. albicans*  $\beta$ -glucan-containing particles.: Sakuma M, Ohta K, Shohei F, Kato H, Naruse T, Nakagawa T, Shigeishi H, Nishi H, Takechi M. *J Appl Oral Sci* (in press).
10. Two cases of maxillary sinusitis after maxillary sinus floor elevation.: Ninomiya Y, Ohta K, Ono S, Tada M, Nakagawa T, Ishida F, Okuda S, Takechi M. *Japanese Journal of Maxillo Facial Implants* 20(1): 37-43, 2021.
11. A case of mediastinal swelling after dental carbon dioxide laser irradiation.: Ishida Y, Ono S, Sakuma M, Ohta K, Takechi M. *The Journal of Hiroshima University Dental Society* 53(1): 38-44, 2021.

## B) Review

## C) Publications

## D) Other Publications

## E) Presentations at Scientific Meetings

1. A case of Trousseau's syndrome caused by tongue cancer with lung metastases in young adults during chemotherapy.: Kato H, Mizuta K, Sasaki K, Uetsuki R, Ono S, Ohta K. Takechi M: The 39th Annual Meeting of Japanese Society of Oral Oncology General Information (2021.1.28~2.21 Nagano Web)
2. An example of bilateral muscular hyperplasia with significant trismus, which was simulated by surgery using a three-dimensional model.: Tada M, Ono S, Okuda S, Takechi M.: The 48th Congress of the Japanese Society of Oral and Maxillofacial Surgeons Chugoku Shikoku Branch (2021.2.6 Kochi Web)
3. Examination of immune checkpoint inhibitor-administered cases in oral surgery at Hiroshima University Hospital: Yoshioka Y, Ono S, Tani R, Mizuta K, Nakagawa T, Ando T, Sakamoto S, Takechi M, Toratani S, Okamoto T.: The 75th Annual Meeting of Japanese Stomatological Society (2021.5.12 Ohsaka Web)
4. A case of osteochondroma of the unilateral mandibular condyle with severe occlusal deviation: Nakagawa T, Ono S, Fukui A, Sasaki K, Sakamoto S, Ando T, Miyauchi M, Takechi M.: The 75th Annual Meeting of Japanese Stomatological Society (2021.5.12~14 Osaka Web)
5. Apoptotic effects of sunitinib, a tyrosine kinase activity inhibitor, on oral mucosal epithelial cells.: Fukada S, Ohta K, Kato H, Sakuma M, Murodumi H, Naruse T, Nakagawa T, Shigeishi H, Takechi M.: The 75th Annual Meeting of Japanese Stomatological Society (2021.5.12~14 Osaka Web)
6. Examination of immune checkpoint inhibitor-administered cases in oral surgery at Hiroshima University Hospital.: Yoshioka Y, Ono S, Tani R, Mizuta K, Nakagawa T, Ando T, Sakamoto S, Takechi M, Toratani S, Okamoto T.: The 75th Annual Meeting of Japanese Stomatological Society (2021.5.12~14 Ohsaka Web)
7. Examination of the effect of surgical orthodontic treatment on the anthropometric index.: Uetsuki R, Ono S, Mizuta K, Nakagawa T, Tada M, Sasaki T, Takechi M.: The 31st Annual Meeting of the Japanese Society for Jaw Deformities (2021.6.11 Sendai)
8. An example of bilateral myoplastic hyperplasia in which myoblast was resected by a surgical guide.: Tada M, Ono S, Mizuta K, Nakaga T, Uetsuki R, Takechi M.: The 31st Annual Meeting of the Japanese Society for Jaw Deformities (2021.6.11 Sendai)
9. A case of multidisciplinary intervention in a mandibular fracture patient due to DV.: Naruse T, Mizuta K, Ishida Y, Ono S, Takechi M: The 22th Annual Meeting of Japanese Society of Oral and Maxillofacial Trauma (2021.8.2~8.15 Web)
10. Clinical study of various factors affecting the implant stability quotient value: Ishioka Y, Ninomiya Y, Takechi M, Kitagawa M.: The 14th Annual Meeting of Japanese Society for Evidence and the dental professional (2021.8.21~8.22 Hiroshima Web)
11. Analysis of apoptosis-inducing effect of sunitinib, a tyrosine kinase activity inhibitor on oral mucosal epithelial cells.: Fukada S, Ohta K, Kato H, Sakuma M, Murodumi H, Naruse T, Nakagawa T, Shigeishi H, Takechi M.: The 34th Annual Meeting of the Japanese Society of Oral Diagnosis/Oral



- Medicine and the 31st Annual Meeting of the Japanese Society of Oral Medicine (2021.9.9~9.10 Tokyo Web)
12. Evaluation of Anti-tumor effect of MK-0429, an integrin  $\alpha v\beta 3$  inhibitor, by inhibiting angiogenesis.: Nakagawa T, Ohta K, Naruse T, Narisawa S, Sakuma M, Yamakado N, Okuda S, Mizuta K, Ninomiya Y, Takechi M.: The 80th Annual Meeting of the Japanese Cancer Association (2021.9.30~10.3 Yokohama)
  13. Palatal tumor (Polymorphous adenocarcinoma).: Furusho T, Sakamoto M, Ando T, Ono S, Mizuta K, Ishida Y, Uetsuki R, Nagasaki S, Takechi M, Miyauchi M.: The Annual Meeting of the Japanese Society of Pathology (The 136th Slide conference) (2021.10.23 Kagawa Web)
  14. A case of Trousseau syndrome during Paclitaxel + Cetuximab combination therapy for lung metastasis of tongue cancer.: Kato H, Mizuta K, Sasaki K, Uetsuki R, Ono S, Ohta K, Takechi M.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~11.14 Chiba Web)
  15. A case of congenital hemophilia A discovered due to poor hemostasis of a tongue bite.: Niwata C, Hasegawa D, Hosoi K, Tabayashi M, Otsuru H, Takechi M, Besho O.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~11.14 Chiba Web)
  16. Establishment of immortalized minor salivary gland-derived epithelial cells and expression of leukocyte migration factor.: Naruse T, Ohta K, Sakuma M, Fukada S, Kato H, Ishiada Y, Fukui A, Shigeishi H, Takechi M.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~12.14 Chiba Web)
  17. Analysis of apoptosis-inducing effect of sunitinib on oral mucosal epithelial cells.: Fukada S, Ohta K, Kato H, Sakuma M, Murodumi H, Naruse T, Nakagawa T, Shigeishi H, Takechi M.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~11.14 Tokyo Web)
  18. A Case of Mandibular Reconstruction using Implant Supported Maxillofacial Prostheses for Wide Edentulous Area after Resection of Odontogenic myxoma.: Fukui A, Tada M, Ninomiya Y, Ono S, Nakagawa T, Okuda S, Fukada S, Ishida F, Takechi M.: The 25th Annual Meeting of the Japanese Academy of Maxillofacial Implants (2021.11.12~12.14 Nagoya Web)
  19. Examination of risk factors for removal after diagnosis of peri-implantitis.: Ninomiya Y, Ishioka Y, Tada M, Takechi M.: The 66th Congress of the Japanese Society of Oral and maxillofacial Surgeons (2021.11.12~11.14 Chiba Web)
  20. A case of squamous cell carcinoma of the tongue with skin metastasis.: Tada M, Ono S, Okuda S, Naruse T, Akagi M, Kakimoto N, Konishi M, Ohta K, Takechi M.: The 66th Congress of the Japanese Society of Oral and maxillofacial Surgeons (2021.11.12~11.14 Chiba Web)
  21. A case of reactive AA amyloidosis discovered with mandibular osteomyelitis.: Sasaki K, Nakagawa T, Fukui A, Murakami D, Ono S, Takechi M.: The 68th Annual Meeting of the Japanese Stomatological Society Chugoku Shikoku Branch (2021.11.20 Web)
  22. Clinical study of factors affecting implant survival.: Ishioka Y, Ninomiya Y, Yokoyama S, Sasaki K, Tada M, Mizuta K, Ono S, Takechi M.: The 51th Anniversary Annual Meeting of the Japanese Society of Oral Implantology, The 41th Annual Meeting of the Japanese Society of Oral Implantology Chugoku Shikoku Branch Co-sponsored (2021.12.17~12.26 Hiroshima Web)

#### F) Special lectures in academic meetings

1. Special lecture at the University of the Ryukyus Faculty of Medicine “Maxillofacial implant” Takechi M. (2021.7.13 Web)
2. Special lecture at Hokkaido University Faculty of Dentistry “Bone formation related to oral implants” Takechi M. (2021.7.30 Web)
3. Special lecture at Okayama University Faculty of Dentistry “Bone formation related to oral implants” Takechi M. (2021.11.8 Web)
4. The 51th Anniversary Annual Meeting of the Japanese Society of Oral Implantology, The 41th Annual Meeting of the Japanese Society of Oral Implantology Chugoku Shikoku Branch Co-sponsored : Specialist education course, Takechi M. (2021.12.17~26 Web)

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

1. Grant-in-Aid for Scientific Research (Basic research (C)) continuation : Tada M, Takechi M, Ninomiya Y, Basic research for clinical application of mandible reconstruction using highly functional cultured bone using porous ceramics. Issue number 19K10267

2. Grant-in-Aid for Scientific Research (Basic research (C)) continuation : Mizuta K, Tobiume K, TMEM16EElucidation of the onset mechanism of hard tissue-forming fibrotic lesions in the jawbone due to mutation.19K10309
3. Grant-in-Aid for Scientific Research (Basic Research (C)) continuation: Ishioka Y, Ono S: Study on the mechanism of nuclear receptor-mediated acquisition of antineoplastic resistance in human salivary gland tumors: Issue number 20K10161
4. Grant-in-Aid for Scientific Research (Basic Research (C)) new: Takechi M, Ohta K, Nakagawa T: Basic research for developing dental implant treatment guidelines for patients receiving bisphosphonates: Issue number 21K09952
5. Grants-in-Aid for Scientific Research (Scientific Research (C)) new: Nakagawa T, Takechi M, Ohta K. “Development of transplantation material for treatment of jaw bone necrosis with angiogenic effect” Issue Number 21K10094
6. Grants-in-Aid for Scientific Research (Scientific Research (C)) new: Naruse T. “Elucidation of the immune response mechanism of SARS-Cov-2 binding receptors in the oral mucosa” Issue Number 21K17116
7. Grant-in-Aid for Scientific Research (Basic Research (C)) continuation “Elucidation of the involvement of EMT and cancer stem cells in the mechanism of inducible oral cancer metastasis” Ono S, Takechi M, Tobiume K. Subject number: 20K10139
8. Grant-in-Aid for Scientific Research (Basic Research (C)) continuation “Elucidation of mechanotransduction mechanism in CD44 highly expressed oral squamous cell carcinoma”Shigeishi H., Ono S. Subject number: 20K10138
9. Grant-in-Aid for Scientific Research (Basic Research (C)) continuation “Functional analysis of novel candida cell wall component recognition receptors in the oral mucosa and their significance in oral candidiasis” Ohta K, Takechi M, Nishi H, Shigeishi H. Subject number: 20K10179

#### (5) Academic Awards, etc.

1. The 31st Annual Meeting of the Japanese Society of Oral Medicine, The 34th Annual Meeting of the Japanese Society of Oral Diagnosis / Oral Medicine Grand President's Award (2021.9.9~9.10 Tokyo Web) Fukada S

#### (6) Patents

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## Department of Advanced Prosthodontics

### Division of Preventive and Restorative Dentistry

### (Department of Oral Implant)

#### (1) Staff and Students

Professor	: Kazuhiro Tsuga
Associate Professor	: Yasuhiko Abe, Mineka Yoshikawa, Takayasu Kubo
Assistant Professor	: Hiroshi Oue, Yohei Okazaki, Shinsuke Okada, Takahiro Mori, Yoshifumi Oki, Maho Takeuchi
Research Associate	: Mariko Maruyama, Aya Hiraoka
Graduate Student	: Erika Asahara, Eri Ishida, Kiichi Nakamori, Kanako Yamawaki, Azusa Haruta, Anna Takehara, Yutaro Takahashi, Rie Hatakeyama, Yoko Hama, Hengky Bowo Ardhiyanto
Clinical Trainee	: Ryo Takeshita, Michihiko Kawamura
Administrative staff	: Rinko Kurumi

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

- 1 : Elimination of Porphyromonas gingivalis inhibits liver fibrosis and inflammation in NASH: Nagasaki A, Sakamoto S, Arai T, Kato M, Ishida E, Furusho H, Fujii M, Takata T, Miyauchi M.: J Clin Periodontol, 48(10): 1367-1378, 2021.
- 2 : Association between buccal mucosa ridging and oral feature/symptom and its effects on occlusal function among dentate young adults in a cross-sectional study of Japan: Morita K, Tsuka H, Kuremoto KI, Kimura H, Kawano H, Yokoi M, Yasuda K, Yoshida M, Tsuga K: Cranio, 39, 24-28, 2021.
- 3 : Association between Weight Loss and Food Form in Older Individuals Residing in Long-Term Care Facilities: 1-Year Multicenter Longitudinal Study: Endo A, Watanabe Y, Matsushita T, Okada K, Ohara Y, Iwasaki M, Ito K, Nakajima J, Iwasa Y, Itoda M, Sasaki R, Nishi Y, Furuya J, Watanabe Y, Umemoto G, Kishima M, Hirano H, Sato Y, Yoshida M, Yamazaki Y: Int J Environ Res Public Health, 18, 10776, 2021.
- 4 : Adherence to the food-based Japanese dietary guidelines and prevalence of poor oral health-related quality of life among older Japanese adults in the Kyoto-Kameoka study: Watanabe D, Kurotani K, Yoshida T, Nanri H, Watanabe Y, Date H, Itoi A, Goto C, Ishikawa-Takata K, Kikutani T, Yoshida M, Fujita H, Yamada Y, Kimura M; Kyoto-Kameoka Study Group: Br J Nutr, doi:10. 1017/S0007114521003329, 2021.
- 5 : Age-related changes in oral tactile and thermal sensation throughout adulthood: Nishimura R, Yoshida M, Shigeishi H, Fukada-Sambuichi E, Yamashita-Urabe K, Takechi M, Toratani S, Tsuga K, Sugiyama M: Odontology, 109, 710-718, 2021.
- 6 : Improper sitting posture while eating adversely affects maximum tongue pressure: Yoshikawa M, Nagakawa K, Tanaka R, Yamawaki K, Mori T, Hiraoka A, Higa C, Nishikawa Y, Yoshida M, Tsuga K: J Dent Sci, 16, 467-473, 2021.
- 7 : Association between stroke lesions and videofluoroscopic findings in acute stroke patients: Nakamori M, Hosomi N, Imamura E, Matsushima H, Maetani Y, Yoshida M, Yoshikawa M, Takeda C, Nagasaki T, Masuda S, Kayashita J, Tsuga K, Tanimoto K, Wakabayashi S, Maruyama H: J Neurol, 268, 1025-1035, 2021.
- 8 : A case of a patient with vascular dementia using a palatal augmentation prosthesis and dysphagia training which improved oral function: Itaki S, Tomiki H, Yamane T, Kanehisa Y, Taji T, Yoshikawa M: JJSDH, 15(2), 2021.

- 9 : Comparison of the Iowa Oral performance instrument and JMS tongue pressure measurement device: Yoshikawa M, Fukuoka T, Mori T, Hiraoka A, Higa C, Kuroki A, Takeda C, Maruyama M, Yoshida M, Tsuga K: *J Dent Sci*, 16(1):214-219, 2021.
- 10 : Controlled release, antimicrobial activity, and oral mucosa irritation of cetylpyridinium chloride-montmorillonite incorporated in a tissue conditioner: Asahara E, Abe Y, Nakamori K, Okazaki Y, Makita Y, Hasebe A, Tsuga K, Yokoyama A: *Dent Mater J*, 41(1), 142-149, 2021.
- 11 : Optimizing glass-ceramic bonding incorporating new silane technology in an experimental universal adhesive formulation: Yao C, Ahmed M H, De Grave Lauren, Yoshihara K, Mercelis B, Okazaki Y, Van Landuyt K, Huang C, Van Meerbeek B: *Dental Materials*, 37(5), 894-904, 2021.
- 12 : Initial Curing Characteristics of Composite Cements under Ceramic Restorations: Inokoshi M, Nozaki K, Takagaki T, Okazaki Y, Yoshihara K, Minakuchi S, Bart Van Meerbeek: *Journal of Prosthodontic Research*, 65(1), 39-45, 2021.
- 13 : Multiparameter evaluation of acrylamide HEMA alternative monomers in 2-step adhesives: Ahmed M H, Yoshihara K, Yao C, Okazaki Y, Van Landuyt K, M Peumans, Van Meerbeek B: *Dental Materials*, 37(1), 30-47, 2021.
- 14 : Acid bone lysates reduce bone regeneration in rat calvaria defects: Strauss FJ, Kuchler U, Kobatake R, Heimel P, Tangl S, Gruber R: *J Biomed Mater Res A*, 109: 659-665, 2021.
- 15 : New application of plant cultivation scaffold by the porous titanium: Kobatake R, Doi K, Tsuga K: *Titanium Japan*, vol. 69 No.1, 18-22, 2021.
- 16 : Osseointegration aspects of implants at the bone reconstruction site by a novel porous titanium scaffold: Doi K, Kobatake R, Makihara Y, Oki Y, Umehara H, Kubo T, Tsuga K: *J Oral Maxillofac Res*, 30; 12: e4, 2021.
- 17 : Use of an intraoral scanner to evaluate oral health: Doi K, Yoshiga C, Kobatake R, Kawagoe M, Wakamatsu K, Tsuga K: *J Oral Sci*, 29; 63: 292-294, 2021.
- 18 : Treatment of dental caries in a patient with Joubert syndrome without the use of sedatives: A case study: Oda Y, Yoshida K, Furutani C, Wakita A, Hama Y, Miyauchi M, Okada Y: *Spec Care Dentist*, 41(3), 411-416, 2021.

## B) Review

## C) Publications

## D) Other Publications

## E) Presentations at Scientific Meetings

- 1 : The effect of tooth loss on cerebrovasculature in mouse model : Oue H, Yokoi M, Ishida E, Tsuga K : The 130th Commemorative Scientific Meeting of the Japan Prosthodontic Society, WEB, 2021.
- 2 : Basic experiments on the radiopaque properties of PEEK crowns: Nishio F, Morita K, Doi K, Hirata I, Kimura H, Abekura H, Tsuga K, Kakimoto N: The 77th General Session of the Japanese Society for Dental Materials and Devices, Tokyo(Web), 2021.
- 3 : A comparative study of radiopaque property of Polyetheretherketone crown: Nishio F, Morita K, Abekura H, Yamaoka H, Kakimoto N, Tsuga K: 6th Joint Scientific Meeting in Dentistry, Airlangga (Web), 2021.
- 4 : Isolation/characterization of oral antibiotic-resistant Gram-negative bacteria in nursing homes : Haruta A, Matsuo M, Yoshikawa M, Takeuchi M, Mi Nguyen Tra Le, Yahara K, Ohge H, Tsuga K, Sugai M, Komatsuzawa H, The 94<sup>th</sup> Annual Meeting of Japanese Society for Bacteriology, Web, 2021.
- 5 : Isolation and characterization of oral antibiotic-resistant Gram-negative bacteria in the long-term care facility : Haruta A, Matsuo M, Yoshikawa M, Takeuchi M, Le Nguyen Tra Mi, Yahara K, Kajihara T, Kutsuno S, Ohge H, Tsuga K, Sugai M, Komatsuzawa H, MIRAI 2.0 Digital Research and Innovation Week (R&I Week) , Web, 2021.
- 6 : New oral care method solved the problem of drug-resistance bacteria : Haruta A, HIRAKU 3MT Competition, 2021.
- 7 : A case that tried to improve dysphagia due to stimulant psychosis: Yoshikawa M, Yamada S, Yoshida M, Nagasaki T, Tsuga K: *World Dysphagia Summit 2021*, Nagoya, 2021.

- 8 : Trial of quantify for swallowing strength using an electronic stethoscope(An interim report): Mukai A, Simizu Y, Takahashi T, Yoshikawa M, Oshimo S, Saeki N, Sadamori T, Shime N, Tsuga K: 66<sup>th</sup> Scientific meeting of the Japanese society of stomatognathic function, Hiroshima, 2021.
- 9 : A case of Sharcomary Chuth's disease with dietary intervention through multidisciplinary collaboration: Takaki S, Yoshida M, Yoshikawa M, Tsuga K: The 16th/17th JSDNNM, Osaka, 2021.
- 10 : Application of intra-oral scanner in the evaluation of oral health condition: Yoshiga C, Doi K, Kobatake R, Maruyama M, Oki Y, Tsuga K : The 130th Commemorative Scientific Meeting of the Japan Prosthodontic Society, Web, 2021.
- 11 : Use of intra oral scanner in the evaluation of oral health: Yoshiga C, Doi K, Makihara Y, Maruyama M, Kobatake R, Morimoto S, Tsuga K: Annual Scientific Meeting of Japan Prosthodontic Society Chugoku & Shikoku Branch, Web, 2021.
- 12 : Newly development of porous titanium bone reconstruction material which enables implant treatment: Wakamatsu K, Doi K, Kobatake R, Makihara Y, Oki Y, Umehara H, Kubo T, Tsuga K, 6th Joint Scientific Meeting in Dentistry, Airlangga (Web), 2021.
- 13 : Investigation of implant stability at the bone reconstruction site with novel porous titanium: Wakamatsu K, Doi K, Kubo T, Makihara Y, Oki Y, Umehara H, Kobatake R, Tsuga K : The 51th Annual Scientific Meeting of Japanese Society of Oral Implantology and the 41st Annual Conference of Chugoku & Shikoku Branch, Web, 2021.
- 14 : Osseointegration aspects of placed implant in bone reconstruction with newly developed porous titanium: Kobatake R, Doi K, Makihara Y, Oki Y, Umehara H, Kubo T, Gruber R, Tsuga K: 7th Biennial joint congress of JPS-CPS-KAP, Web, 2021.
- 15 : Quantitative videofluorographic evaluation of swallowing class 0j and 0t foods of Japanese Dysphagia Diet 2013: Takeda C, Yoshida M, Nakamori M, Yoshikawa M, Kayashita J, Tsuga K: The 2nd World Dysphagia Summit, Web, 2021.
- 16 : Isolation and characterization of oral antibiotic-resistant Gram-negative bacteria in the long-term care facility : Azusa Haruta, Miki Matsuo, Mineka Yoshikawa, Maho Takeuchi, Le Nguyen Tra Mi, Koji Yahara, Toshiki Kajihara, Syoko Kutsuno, Hiroki Ohge, Kazuhiro Tsuga, Motoyuki Sugai, Hitoshi Komatsuzawa, 6th Joint Scientific Meeting in Dentistry, Airlangga (Web), 2021.

#### F) Special lectures in academic meetings

- 1 : Dysphagia severity and distribution of antimicrobial-resistant bacteria in the oral cavity among long-term care facilities residents: Yoshikawa M: The 16th/17th JSDNNM, Osaka, 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : MEXT Grant-in-aid (C): PI: Oue H, Co-I: Yokoi M: Elucidation of the mechanism tooth loss induce cognitive decline (Grant No. 20K10035). ¥ 520,000.
- 2 : MEXT Grant-in-Aid for Scientific Research (C) : Yoshikawa M: Distribution of antimicrobial-resistant bacteria in the oral cavity among long-term care facilities residents and the effect of oral hygiene management on nursing and healthcare associated Ppneumonia (Grant No. 20K10248). ¥1200,000.
- 3 : MEXT Grant-in-Aid for Scientific Research (C): Abe Y: Development of antibacterial denture base material that does not fix Candida in the deep layer of the denture base. (Grant No. 20K10052). ¥1,300,000.
- 4 : MEXT Grant-in-Aid for Scientific Research (C): Takeuchi M: Development of antibacterial urethane gel adhesive sheet for breast prostheses. (Grant No. 21K09978). ¥1,300,000.
- 5 : MEXT Grant-in-Aid for Scientific Research (C): Kubo T: Exploring the effects of osteoporosis therapy on masticatory and cognitive functions. (Grant No. 20K10072). ¥1,040,000.
- 6 : MEXT Grant-in- Aid for Young Scientists: Oki Y: Development of the cell introduction type bio-membrane. (Grant No. 20K18561). ¥1,300,000.

#### (5) Academic Awards, etc.

#### (6) Patents

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## Department of Advanced Prosthodontics Division of Preventive and Restorative Dentistry (Department of Prosthetic Dentistry)

### (1) Staff and Students

Professor	: Kazuhiro Tsuga
Associate Professor	: Hitoshi Abekura, Mitsuyoshi Yoshida
Assistant Professor	: Kazuya Doi, Kouji Morita, Yusuke Makihara, Keisuke Yasuda,
Resident	: Kazuko Kagawa, Chiaki Higa, Miyuki Yokoi, Fumiko Nishio, Hanako Umehara
Graduate Student	: Hitomi Kimura, Chiho Takeda, Yuhei Hashimoto, Kaien Wakamatu, Chihiro Yoshiga
Reserch Fellow	: Reiko Kobatake
Clinical Trainee	: Sachiko Takagi, Wataru Teshima
Research student	: Masayasu Kato
Administrative staff	: Rinko Kurumi

### (2) Main Research Activities

- 1 : Elucidation of the effect of prosthodontic treatments on the quality of life of elderly people.
- 2 : Removal prosthodontics and swallowing function of elderly people.
- 3 : Development and clinical application of functional oral rehabilitation utilizing tongue pressure measurement.
- 4 : Development and clinical application of new materials for oral implants.
- 5 : Development of novel biomaterial with “bio-metal”.
- 6 : Elucidation of the effect of FGF on bone formation surrounding oral implants.
- 7 : Biomechanics analysis of prostheses and their surrounding bone supported by implants.
- 8 : Dental clinical application of super engineering plastics

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : Elimination of Porphyromonas gingivalis inhibits liver fibrosis and inflammation in NASH: Nagasaki A, Sakamoto S, Arai T, Kato M, Ishida E, Furusho H, Fujii M, Takata T, Miyauchi M.: J Clin Periodontol, 48(10): 1367-1378, 2021.
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- M, Shigeishi H, Fukada-Sambuichi E, Yamashita-Urabe K, Takechi M, Toratani S, Tsuga K, Sugiyama M: *Odontology*, 109, 710-718, 2021.
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- Abekura H, Yamaoka H, Kakimoto N, Tsuga K: 6th Joint Scientific Meeting in Dentistry, Airlangga (Web), 2021.
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  - 7 : A case that tried to improve dysphagia due to stimulant psychosis: Yoshikawa M, Yamada S, Yoshida M, Nagasaki T, Tsuga K: World Dysphagia Summit 2021, Nagoya, 2021.
  - 8 : Trial of quantify for swallowing strength using an electronic stethoscope(An interim report): Mukai A, Simizu Y, Takahashi T, Yoshikawa M, Oshimo S, Saeki N, Sadamori T, Shime N, Tsuga K: 66<sup>th</sup> Scientific meeting of the Japanese society of stomatognathic function, Hiroshima, 2021.
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  - 14 : Osseointegration aspects of placed implant in bone reconstruction with newly developed porous titanium: Kobatake R, Doi K, Makihara Y, Oki Y, Umehara H, Kubo T, Gruber R, Tsuga K: 7th Biennial joint congress of JPS-CPS-KAP, Web, 2021.
  - 15 : Quantitative videofluorographic evaluation of swallowing class 0j and 0t foods of Japanese Dysphagia Diet 2013: Takeda C, Yoshida M, Nakamori M, Yoshikawa M, Kayashita J, Tsuga K: The 2nd World Dysphagia Summit, Web, 2021.

## F) Special lectures in academic meetings

### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : MEXT Grant-in-Aid for Scientific Research (C): Abekura H: Research on clinical application of last molar crowns and molar bridges made of PEEK (Grant No. 21K10021). ¥2,600,000.
- 2 : MEXT Grant-in-Aid for Scientific Research (C): Morita K: A study of chewing ability on intestinal microbiota and short-chain fatty acid production in persons requiring nursing care (Grant No. 20K10034). ¥700,000.
- 3 : MEXT Grant-in-Aid for Research Activity Start-up: Nishio F: Development of new antibacterial silver nanoparticles-containing PEEK crown with preventive effect on periodontitis and secondary caries (Grant No. 20K23028). ¥1100,000.
- 4 : Grant-in-Aid for Young Scientists : Yokoi M: Establishment of bone regeneration therapy for peri-implantitis bone defects using FGF receptor signal inhibition (Grant No.19K190690A) . ¥1,100,000.
- 5 : Grant-in-Aid for Research Activity Start-up: Umehara H: Development of novel bio titanium mesh



- membrane. (Grant No. 21K21088). ¥1,430,000.
- 6 : MEXT Grant-in-Aid for Scientific Research (C): Doi K: Establish of bone regeneration therapy using bio metal. (Grant No. 21K09934). ¥780,000.
- 7 : MEXT Grant-in- Aid for Young Scientists: Kobatake R: Novel development of bone reconstruction material / dental implant complex. (Grant No. 21K17043). ¥1,820,000.
- 8 : JST Grant-in- Aid for A-step: Doi K. ¥3,000,000.
- 9 : Collaborative Research Grant from NSK Nakanishi Corporation: Doi K. ¥2,040,000.
- 10 : 28th Hiroshima Young Venture Award (Commercial and life culture field Gold award): Yoshiga C: New interior planter with porous titanium. ¥100,000.
- 11 : 28th Hiroshima Young Venture Award (Science and technology field Silver award): Wakamatsu K: Development of the highly functional sanitary mask with repeatable porous titanium membrane. ¥50,000.
- 12 : The Hiroshima University Award for Encouraging Female Researchers. (incentive research expense): Kagawa K: The development of novel mouthguards for intraoperative transcranial electric motor evoked potential (Tc -MEP) monitoring applying CAD / CAM technology. ¥400,000.

#### (5) Academic Awards, etc.

- 1 : Yoshiga C: Digital oral hygiene evaluation method that can safely evaluate oral hygiene for the With / Post Corona society -Development of a new black plaque disclosing solution for the intra oral scanner-: 15th Dream Challenge Award, 2021.
- 2 : Yoshiga C: New interior planter with porous titanium: 28th Hiroshima Young Venture Award (Commercial and life culture field Gold award) , 2021.
- 3 : Wakamatsu K: Toward the earth and people friendly masks for SDGs -Development of a new structural mask cover supporting titanium mesh membranes with photocatalytic function-: 15th Dream Challenge Award, 2021.
- 4 : Wakamatsu K: Development of the highly functional sanitary mask with repeatable porous titanium membrane: 28th Hiroshima Young Venture Award (Science and technology field Silver award) , 2021.
- 5 : Kagawa K: The development of novel mouthguards for intraoperative transcranial electric motor evoked potential (Tc-MEP) monitoring applying CAD / CAM technology: The Hiroshima University Award for Encouraging Female Researchers, 2020.

#### (6) Patents

- 1 : Doi K, Kobatake R, Fujita T, Kubo T, Umehara H, Inoue T, Chiba S: Patent publication. 2021-013495(Applicants: Hiroshima University, Nagamine seisakusho)
- 2 : Doi K, Kobatake R, Yoshiga C, Wakamatsu K, Taguchi Y, Fujita T, Morikawa H: Patent application. 2021-006113 (Applicants: Doi K)

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**Department of Orthodontics and Craniofacial Development  
Biology  
Division of Oral Health and Development  
Department of Orthodontics**

(1) Staff and Students

Professor: Kotaro Tanimoto

Associate Professor: Ryo Kunimatsu

Lecturer: Naoto Hirose

Assistant Professor: Yuki Asakawa, Yuki Yoshimi, Tetsuya Awada (~2021.6), Yuji Tsuka, Takaharu Abe, Makoto Yanoshita, Isamu Kado (2021.10~)

Intern: Koji Iwai, Azusa Onishi, Sakura Yamada, Yuka Yashima, Hiroki So, Yuka Yamauchi, Tomoka Hiraki, Jin Izumino, Shota Ito, Kazuyo Ando, Haruka Kagawa, Ayaka Nakatani, Ayana Nakano, Sayumi Miura, Shuzo Sakata, Sayuri Nishiyama

Education and Research Support Staff: Cynthia Concepción Medina

Graduate Student: Yuma Koizumi, Kazutaka Ikeda, Eri Ishida, Tomohiro Ogasawara, Eri Tsuboi, Kodai Rikitake, Naoki Kubo, Kanae Oda, Nurul Aisyah Rizky Putranti, Fumika Abe, Shintaro Ogashira, Sho Oshima, Ayaka Odo, Risako Oshiro, Saki Ogawa, Daiki Kita, Katsuhito Sugai, Moe Matsunaga, Izumi Tanabe

Research Student: Etsuna Tsuchiyama (~2021.6)

Visiting Professor: Kazuo Tanne, Eiji Tanaka, Ichiro Takahashi, Shoichi Miyawaki

Registered Intern: Kuniaki Tanaka, Kazunori Itatani, Yu Matsumura, Shoutoku Kojima, Yuko Nakao, Aya Kimura, Taeko Yamamoto, Mami Takano

Dental Hygienist: Miho Okada, Mariko Nakamura

(2) Main Research Activities

- 1 : Elucidation of pathogenic mechanism in malocclusion and management of oral maxillofacial skeletal growth
- 2 : Optimization of tooth movement by orthodontic force
- 3 : Establishment of a new orthodontic treatment based on the image and biochemical diagnosis of temporomandibular disorders (TMD)
- 4 : Application of regeneration medicine to orthodontic treatment
- 5 : Suppression of caries risk in orthodontic treatment
- 6 : Evaluation of the contribution of various oral functions to general fitness
- 7 : Development of new instruments and materials for orthodontic treatment

(3) Research Achievements

A) Original Papers (2021.1-2021.12 including Case Reports)

- 1 : Single-cell RNA-sequencing reveals the breadth of osteoblast heterogeneity : Yoshioka H., Okita S., Nakano M., Minamizaki T., Nobukiyo A., Sotomoru Y., Bonnelye E., Kozai K., Tanimoto K., Aubin JE., Yoshiko Y.: JBMR Plus (WOA), 5(6): e10496. 2021. doi: 10.1002/jbm4.10496.
- 2 : Surveillance of salivary properties of pre-orthodontic patients in relation to age and sex : Kado I., Kunimatsu R., Yoshimi Y., Medina CC., Yamada S., Tanimoto K.: Sci Rep., 11(1):6555, 2021. doi: 10.1038/s41598-021-85861-8
- 3 : Multislice Computed Tomography Assessment of Airway Patency Changes in the Supine Position Following Mandibular Setback Surgery for Mandibular Prognathism: A Prospective 1-year Follow-Up Study : Iwai K., Ueda H., Nagasaki T., Cynthia CM., Matsumura Y., Tanimoto K.: APOS Trends Orthod, 11(2):106-115, 2021. doi:10.25259/apos\_169\_2020.
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- 5 : Overexpression of miR-125b in Osteoblasts Improves Age-Related Changes in Bone Mass and Quality through Suppression of Osteoclast Formation : Ito S., Minamizaki T., Kohno S., Sotomaru Y., Kitaura Y., Ohba S., Sugiyama T., Aubin JE., Tanimoto K., Yoshiko Y.: *Int J Mol Sci.*, 22(13), 6745, 2021. doi: 10.3390/ijms22136745.
  - 6 : Evaluation of a peptide motif designed for protein tethering to polymer surfaces : Nakano A, Hirata I, Pham BV, Shakya A, Tanimoto K, Kato K.: *J Biomater Sci Polym Ed.*, 32(1): 76-92, 2021. doi: 10.1080/09205063.2020.1816870.
  - 7 : Changes in tongue-palatal contact during swallowing in patients with skeletal mandibular prognathism after orthognathic surgery : Kagawa H., Kaku M., Yamamoto T., Yashima Y., Sumi H., Kamiya T., Yamamoto I., Tanimoto K.: *PLoS One*, 16(5): e0251759, 2021. doi: 10.1371/journal.pone.0251759.
  - 8 : ANGPL2 induces synovial inflammation via LILRB2 : Nishiyama S., Hirose N., Yanoshita M., Takano M., Kubo N., Yamauchi Y., Onishi A., Ito S., Sakata S., Kita D., Asakawa-Tanne Y., Tanimoto K.: *Inflamm.*, 44(3):1108-1118, 2021. doi: 10.1007/s10753-020-01406-7
  - 9 : High-frequency Near-infrared Diode Laser Irradiation Suppresses IL-1 $\beta$ -induced Inflammatory Cytokine Expression and NF- $\kappa$ B Signaling Pathways in Human Primary Chondrocytes : Sakata S., Kunimastu R., Tsuka Y., Nakatani S., Gunji H., Yanoshita M., Kado I., Ito S., Putranti NAR., RC Prasetya., Hirose N., Tanimoto K.: *Lasers Med Sci.*, Online ahead of print, 2021. doi: 10.1007/s10103-021-03371-5. Epub.
  - 10 : Effect of CD146<sup>+</sup> SHED on bone regeneration in a mouse calvaria defect model : Rikitake K., Kunimatsu R., Yoshimi Y., Nakajima K., Hiraki T., Putranti NA., Tsuka Y., Abe T., Ando K., Hayashi Y., Nikawa H., Tanimoto K.: *Oral Dis.*, Online ahead of print, 2021. doi: 10.1111/odi.14020.
  - 11 : Changes in airway patency and sleep-breathing in healthy skeletal Class II children undergoing functional Activator therapy : Cynthia CM., Ueda H., Iwai K., Kunimatsu R., Tanimoto K.: *Eur Oral Res.*, 56(1). 2021. doi: 10.26650/eor.2022807392
  - 12 : Effects of baicalin on the proliferation and expression of OPG and RANKL in human cementoblast-lineage cells : Kunimatsu R., Kimura A., Sakata S., Tsuka Y., Yoshimi Y., Abe T., Kado I., Yashima Y., Izumino J., Nakatani N., Kitagawa M., Miyauchi M., Takata T., Tanimoto K.: *J Dent Sci.*, 17(1): 162-169, 2022. doi: 10.1016/j.jds.2021.05.009.
  - 13 : An investigation of tongue-palatal contact changes in patients with skeletal mandibular lateral deviation after sagittal split ramus osteotomy : Kaku M., Kojima S., Yamamoto I., Yamamoto T., Kagawa H., Shimoe S., Tanimoto K.: *J. Craniofac. Surg.*, 32: e94-e98. 2021. doi: 10.1097/SCS.00000000000006796
  - 14 : Generalized periodontitis treated with periodontal, orthodontic, and prosthodontic therapy: A case report : Kaku M., Matsuda S., Kubo T., Shimoe S., Tsuga K., Kurihara H., Tanimoto K.: *World J Clin Cases.*, 9(21):6110-6124, 2021. doi: 10.12998/wjccv9.i21.6110.
  - 15 : Landmark annotation and mandibular lateral deviation analysis of posteroanterior cephalograms using a convolutional neural network : Takeda S., Mine Y., Yoshimi Y., Ito S., Tanimoto K., Murayama T.: *J Dent Sci.*, 16(3):957-963. 2021. doi: 10.1016/j.jds.2020.10.012.
  - 16 : A survey of idiopathic mandibular condylar resorption in the Department of Orthodontics Hiroshima University Hospital : Tanimoto K., Awada T., Onishi A., Hirose N.: *J. Chu-shi. Orthod. Soc.*, 33(1): 5-9. 2021.
  - 17 : Orthodontic treatment and temporomandibular disorders – A systematic approach correspond to the pathological condition- : Tanimoto K.: *J. Jpn Soc T.M.J.*, 33(3): 3-7, 2021.
  - 18 : Maxillofacial morphology and oral features in osteogenesis imperfecta : Yashima Y., Yoshimi Y., Awada T., Abe T., Kado I., Ito S., Izumino J., So H., Tanimoto K.: *Chu-shi. Orthod. Soc.*, 33 (1), 69-78, 2021.

## B) Review (2021.1-2021.12)

- 1 : Treatment of malocclusion in the community– Timing to start orthodontic treatment of open bite and determination of the difficulty – : Tanimoto K.: J. Hiroshima Dent. Asso. 47, 1-6, 2021.

#### C) Publications (2021.1-2021.12)

#### D) Other Publications (2021.1-2021.12)

- 1 : Kado I., Tanimoto K. : STUDY FINDS BRACES DISRUPT ORAL MICROBIOME TO PRE-GUM DISEASE STATE: HIROSHIMA UNIVERSITY UPDATE, 2, 15, 2021.
- 2 : Foreword : Tanimoto K.: J. Jpn Soc T.M.J., 33(1): 1, 2021.
- 3 : Importance of anatomy : Tanimoto K.: Hiroshima University Shiragiku, 49, 29-30, 2021.
- 4 : Forefront of the clinic “Department of Orthodontics” : Tanimoto K.: Hiroshima University Hospital News, 60, 6, 2021.
- 5 : Information from the committee of certified orthodontists : Tanimoto K.: Japanese Orthodontic Society information letter, No.2, 7, 2021.

#### E) Presentations at Scientific Meetings (2021.1-2021.12)

- 1 : An investigation of maxillofacial morphology and oral characteristics in craniosynostosis patients in Department of Orthodontics, Hiroshima University Hospital : Izumino J., Abe T., Awada T., Yoshimi Y., Kado I., Ito S., So H., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 2 : Automated detection of temporomandibular joint disc in MRI images using semantic segmentation : Ito S., Yoshimi Y., Mine Y., Takeda S., Onishi A., Kakimoto N., Murayama T., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 3 : Clinical and statistical study on non-syndromic oligodontia patients with six congenitally missing teeth in at Department of Orthodontics Hiroshima University Hospital : So H., Kunimatsu R., Yoshimi Y., Abe T., Awada T., Ando K., Kado I., Yashima Y., Ito S., Izumino J., Nakano A., Ogawa S., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 4 : Maxillofacial morphology and dental features in osteogenesis imperfecta : Yashima Y., Awada T., Yoshimi Y., Abe T., Kado I., Ito S., Izumino J., So H., Tanimoto K.: The 64th Annual Meeting of the Chu-Shikoku Orthodontic Society (Matsuyama), 2021.
- 5 : Landmark annotation and mandibular lateral deviation analysis of posteroanterior cephalograms using a convolutional neural network : Takeda S, Mine Y, Yoshimi Y, Ito S, Tanimoto K, Murayama T.: The 12nd Scientific Meeting of the Japan Academy of Digital Dentistry (Tokyo), 2021.
- 6 : Effects of estrogen addition on mandibular growth and changes in cartilage : Kubo N., Awada T., Hirose N., Yanoshita M., Takano M., Nishiyama S., Tsuboi E., Kita D., Onishi A., Yamauchi Y., Matsunaga M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.
- 7 : Changes in tongue-palatal contact during swallowing in patients with skeletal mandibular prognathism after sagittal split ramus osteotomy : Kagawa H., Kaku M., Yamamoto T., Sumi H., Kamiya T., Kojima S., Yamamoto I., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa) , 2021.
- 8 : Effects of high-frequency near-infrared diode laser irradiation on pain induced by experimental tooth movement model : Nakatani A., Kunimatsu R., Tsuka Y., Sakata S., Ito S., Kado I., Putranti NAR., Terayama R., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.
- 9 : Application to bone regeneration therapy using CD146-positive deciduous pulp-derived mesenchymal stem cells : Rikitake K., Kunimatsu R., Yoshimi Y., Nakajima K., Hiraki T., Putranti NAR., Tsuka Y., Abe T., Ando K., Hayashi Y., Nikawa H., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.

- 10 : An orthodontic treatment for a patient with maxillary protrusion and fibrous dysplasia : Hirose N., Yanoshita M., Onishi A., Nishiyama S., Kagawa H., Kubo N., Kita D., Matsunaga M., Tanimoto K.: The 80st Annual Meeting of the Japanese Orthodontic Society and The 5th International Congress (Kanagawa), 2021.
- 11 : A case of orthodontic treatment for a maxillary protrusion with patient with systemic lupus erythematosus : Nishiyama S., Hirose N., Yanoshita M., Onishi A., Yamauchi Y., Kagawa H., Kubo N., Kita D., Matsunaga M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 12 : Orthodontic treatment with temporary anchorage devices for the patient with crowding occurred after serial extraction in childhood : Yanoshita M., Hirose N., Onishi A., Yamauchi Y., Nishiyama S., Kagawa H., Kubo N., Kita D., Matsunaga M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021
- 13 : A case report of maxillary protrusion with Moebius syndrome : Onishi A., Hirose N., Yanoshita M., Yamauchi Y., Kubo N., Nishiyama S., Kagawa H., Kita D., Matsunaga M., Miura S., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021
- 14 : Assessment of masticatory function in adult cleft lip and palate patients after orthodontic treatment : Miura S., Hirose N., Iwai K., Cynthia CM., Ishida E., Onishi A., Yanoshita M., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 15 : Automated segmentation of temporomandibular joint disc in MRI images using deep learning. : Ito S., Yoshimi Y., Mine Y., Takeda S., Onishi A., Kakimoto N., Murayama T., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 16 : Effects of high frequency near infrared diode laser irradiation on expression of inflammatory cytokines in human chondrocytes. : Sakata S., Kunimatsu R., Tsuka Y., Nakatani A., Putranti NAR., Yanoshita M., Hirose N., Tanimoto K.: The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress (Kanagawa), 2021.
- 17 : Preliminary results of oropharyngeal crowding and daytime sleepiness evaluation of Japanese orthodontic patients : Cynthia CM., Hirose N., Iwai K., Miura S., Ishida E., Kunimatsu R., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefectural Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 18 : 2 cases of MFT treatment evaluated based on oral function, skeletal analysis and dental model : Ando K., Asakawa Y., Tsuka Y., Okada M., Yamada S., Naitou T., Yamamoto S., Komatsu M., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefectural Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 19 : Changes in hyoid bone position in skeletal Class II children post-functional appliance therapy : Iwai K., Cynthia CM., Kunimatsu R., Miura S., Ishida E., Tanimoto K. : The 20th Annual Meeting of the Japanese Academy of Dental Sleep Medicine (Fukuoka), 2021.
- 20 : The roles of miR-125b in bone formation: analysis of miR-125b-2 KO mice : Ogasawara T., Minamizaki T., Kohno S., Hoshino T., Yoshiko Y. : The 63rd Annual Meeting of Japanese Association for Oral Biology (Kanagawa) , 2021.
- 21 : 骨形態計測による Mir125b-2 ノックアウトマウスの骨代謝機能の解析 : Ogasawara T., Minamizaki T., Kohno S., Davood K., Hoshino T., Sotomaru Y., Tanimoto K., Yoshiko Y. : The 75th Chugoku-Shikoku Sectional Meeting of Japanese Association of Anatomists (Okayama), 2021
- 22 : Resolvin D1 reduces inflammation in Human Fibroblast-Like Synoviocytes via p-38, NF- $\kappa$ B and AKT signaling pathway. : Yanoshita M., Hirose N., Nishiyama S., Onishi A., Yamauchi Y., Tsuboi E., Kubo N., Kita D., Asakawa Y., Tanimoto K. : 34th Annual Meeting of The Japanese Society for the Temporomandibular Joint (Tokyo), 2021.
- 23 : Effects of high-frequency near-infrared diode laser irradiation on IL-1 $\beta$ -induced expression of inflammatory cytokines and matrix metalloproteinases in human primary chondrocytes. : Sakata S., Kunimatsu R., Tsuka Y., nakatani A., Putranti NAR., Yanoshita M., Hirose N., Tanimoto K.: The 34th Annual Meeting of the Japanese Society for the Temporomandibular Joint (Tokyo), 2021.
- 24 : Role of Semaphorin 3A in endochondral ossification of mandibular condyle : Tsuboi E., Hirose N., Asakawa Y., Yanoshita M., Onishi A., Takano M., Nishiyama S., Kubo N., Kita D., Tanimoto K.:

The 34th Annual Meeting of the Japanese Society for the Temporomandibular Joint (Tokyo), 2021.

#### F) Special lectures in academic meetings (2021.1-2021.12)

- 1 : Introduction of Hiroshima University School of Dentistry : Tanimoto K.: 2021 explanatory meeting for parents of new students, April 17, 2021.
- 2 : COVID-19 crisis and future dental education : Tanimoto K.: 2021 The supporter's association of Hiroshima University School of Dentistry, May 19, 2021.
- 3 : Checking for malocclusion in school dental examinations - Endeavors for malocclusion treatment in the community- : Tanimoto K.: The 29th annual meeting of school dental health , August 5, 2021.
- 4 : To those who aim to apply or renew a certified orthodontist, and instructor - To understand the new / renewal application for the certified orthodontist and the instructor, : Tanimoto K.: The instructor's meeting of the Japanese Orthodontic Society, November 3, 2021.
- 5 : Orthodontic treatment and digital transformation : Tanimoto K.: The 2nd annual meeting of Hiroshima prefectural dental association, November 14, 2021.
- 6 : The trial of Hiroshima University - treatment for malocclusion in the community- : Tanimoto K.: Tohoku Orthodontic Society, November 23, 2021.
- 7 : 廣瀬尚人：地域拠点病院としての大学病院での口唇裂・口蓋裂治療：第9回口唇裂・口蓋裂治療勉強会（若夏矯），2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-aid for Scientific Research (C) : Tanimoto K., Functional analysis of exosome in human exfoliated deciduous teeth (SHED) and application to bone regeneration for cleft palate. 21K10186. 1,560,000 yen
- 2 : Grant-in-aid for Scientific Research (C) : Kunimatsu R., Application of cold laser to regeneration of periodontal tissue and pain relief during tooth movement. 19K10385. 910,000 yen
- 3 : Grant-in-aid for Scientific Research(C) : Hirose N., Elucidation of mechanics of temporomandibular joint osteoarthritis and establishment of new therapeutic method with NFATc inhibitor. 19K10383. 780,000 yen
- 4 : Grant-in-aid for Scientific Research(C) : Yoshimi Y., Application of functional amelogenin peptides to bone organoid preparation and bone regeneration. 19K10384A. 1,300,000 yen
- 5 : Grant-in-aid for Scientific Research(C) : Tsuka Y., Optimal transplantation condition of stem cells from human exfoliated deciduous teeth and establishment of cleft palate regeneration therapy by cold laser. 20K10226. 1,430,000 yen
- 6 : Grant-in-Aid for Early-Career Scientists : Abe T., Establishment of minimally invasive cleft palate closure treatment using mesenchymal stem cell-derived exosome from human exfoliated deciduous teeth. 21K17186. 1,820,000 yen
- 7 : Grant-in-Aid for Early-Career Scientists : Yanoshita M., Elucidation of interaction between FAK and autophagy and its application to therapies for temporomandibular joint osteoarthritis. 20K18781. 2,080,000 yen
- 8 : Grant-in-Aid for Early-Career Scientists : Yamada S., Development of anti-bone destructive peptides based on lactoferrin research. 20K187580. 1,950,000 yen
- 9 : Grant-in-Aid for Early-Career Scientists : Gunji H., Elucidation of mechanism and treatment for osteoarthritis of temporomandibular joint applied photoactivation. 20K18759. 2,080,000 yen
- 10 : Grant-in-Aid for Early-Career Scientists : Onishi A., Elucidation of the suppression mechanism of odontoclast activity by ameloblastin and therapeutic application for root resorption. 20K18782. 1,300,000 yen
- 11 : Grant-in-Aid for Early-Career Scientists : Takano M., Elucidation of cartilage destruction mechanisms of ANGPTL2 enhancing the expression of MMPs and application to PCR treatment. 20K18783. 1,950,000 yen

- 12 : Grant-in-Aid for Early-Career Scientists : Yashima Y., Elucidation of osteocytes dynamics mediated by Semaphorin 3A under mechanical stress. 20K18780. 1,300,000 yen
- 13 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Hiraki T., Analysis of bone regeneration mechanism in stem cells from human exfoliated deciduous teeth (SHED) conditioned media and it's clinical application to jaw cleft bone regeneration treatment. 20K2305. 1,430,000yen
- 14 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Yamauchi Y., Elucidation of cartilage destruction mechanism by low molecular weight hyaluronic acid via CD44 cross-linking inhibition and TLR4. 20K23056. 1,430,000 yen
- 15 : Grant-in-Aid for Early-Career Scientists : Kado I., Development of comprehensive oral microbiome analysis and construction of risk management method for orthodontic patients using a next generation sequencing. 21K17161. 1,690,000 yen
- 16 : Grant-in-Aid for Early-Career Scientists : Yamamoto T., Comparison of the root resorption restraint effect and elucidation of the mechanism of NSAIDs and acetaminophen. 21K17184. 2,210,000 yen
- 17 : Grant-in-Aid for Early-Career Scientists : Kimura A., Explore the treatment option of TMJ-OA and mechanism of condylar resorption with flavonoid herbal medicine. 21K17160. 1,800,000 yen
- 18 : Grant-in-Aid for Early-Career Scientists : Izumino J., Searching for periodontal metabolic activity by natural product chemical biology and application to root resorption prevention treatment. 21K17185. 2,340,000 yen
- 19 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Sakata S., Establishment of cartilage regeneration therapy for temporomandibular joint using cold laser technology to control matrix metabolic activity. 21K21041. 1,560,000 yen
- 20 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Nakano A., Controlled release of protein factors for the treatment of cleft palate by tissue engineering. 21K21014. 1,560,000 yen
- 21 : Grant-in-aid for Scientific Research(Research Activity Start-up) : Ando K., Susceptibility genes assessment and elucidation of bone differentiation mechanism using crisper technology in fibrous dysplasia. 21K21015. 1,560,000 yen
- 22 : Satake Fund Research Grant 2021 : Rikitake K., Elucidation of bone regeneration mechanism and optimal cell transplantation conditions in human deciduous pulp-derived mesenchymal stem cells. 170,000 yen
- 23 : Hiroshima University research grant for female researchers 2021 : Nakatani A., Elucidation of the mechanism of pain relief in tooth movement by applying photochemical action. 400,000 yen

#### (5) Academic Awards, etc.

- 1 : Kado I. : Hiroshima University school of dentistry alumni association research encouragement prize 2021.
- 2 : Nakano A. : Hiroshima University school of dentistry alumni association research encouragement prize 2021.
- 3 : Nakatani A. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
- 4 : Kubo N. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
- 5 : Rikitake K. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
- 6 : Nakatani A. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress best presentation award.
- 7 : Ito S. : The 80th Annual Meeting of the Japanese Orthodontic Society & The 5th International Congress
- 8 : Rikitake K. : Hiroshima University, Excellent Student Scholarship 2021.

#### (6) Patents

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• **Department of Oral & Maxillofacial Radiology**  
 • **Division of Oral and Maxillofacial Surgery and Oral  
 Medicine (Department of Oral and Maxillofacial Radiology)**

(1) Staff and Students

Professor	: Naoya Kakimoto
Associate Professor	: Takashi Nakamoto
Associate Professor/Lecturer	: Yoshikazu Suei, Masaru Konishi(February~ )
Assistant Professor	: Toshikazu Nagasaki, Masahiko Ohtsuka, Masaru Konishi (~January), Verdonschot R.G.(~March)
Graduate Student	: Kiichi Shimabukuro, Pongsapak Wongratwanich

(2) Main Research Activities

- 1: Radiographic diagnosis of oral diseases
- 2: Radiographic study on mandibular osteomyelitis
- 3: Study of radiation dosimetry in X-ray region for diagnosis
- 4: Study on the videofluoroscopic examination of swallowing
- 5: Improvement of treatment results in the radiotherapy for oral cancers
- 6: Radiographic study to screen osteoporosis using panoramic radiographs of the jaw
- 7: Study on taste disorder with oral cancer patients after radiotherapy
- 8: Speech production in the human brain
- 9: Quantitative analysis of temporomandibular joint on MRI

(3) Research Achievements

A) Original Papers (including Case Reports)

- 1: An investigation of tooth loss factors in elderly patients using panoramic radiographs: Konishi M, Verdonschot RG, Kakimoto N: *Oral Radiology*, 37(3), 436-442, 2021.
- 2: Intraoral ultrasonographic features of tongue cancer and the incidence of cervical lymph node metastasis: Konishi M, Fujita M, Shimabukuro K, Wongratwanich P, Verdonschot RG, Kakimoto N: *Journal of Oral and Maxillofacial Surgery*, 79 (4), 932-939, 2021.
- 3: Diffusion-weighted magnetic resonance imaging of the oral and maxillofacial region: optimal fat suppression method: Shimamoto H, Majima M, Kitamori H, Tsujimoto T, Kakimoto N, Iwamoto Y, Senda Y, Kreiborg S, Mallya SM, Murakami S: *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, 131 (6), 738-745 2021.
- 4: Effects of perioperative oral care on postoperative inflammation following heart valve surgery: Nishi H, Takahashi S, Ohta K, Takamoto M, Shigeishi H, Go S, Obayashi T, Yoshioka Y, Konishi M, Shimizu Y, Yano K, Miyagawa T, Kakimoto N, Ohge H, Kawaguchi H, Kurihara H: *Oral Diseases*, 27 (6), 1542-1550, 2021.
- 5: Relationship between oral and nutritional status of older residents with severe dementia in an aged care nursing home: Konishi M, Kakimoto N: *Gerodontology*, 38 (2), 179-184, 2021.
- 6: Relationships between intraoral ultrasonographic and histopathological findings in patients with tongue cancer: *Head Neck*, Konishi M, Sakamoto S, Ogawa I, Yoshioka Y, Ono S, Kakimoto N, 43 (9), 2778-2785, 2021.
- 7: Treatment outcomes of real-time intraoral sonography-guided implantation technique of <sup>198</sup>Au grain brachytherapy for T1 and T2 tongue cancer: Konishi M, Fujita M, Takeuchi Y, Kubo K, Imano N, Nishibuchi I, Murakami Y, Shimabukuro K, Wongratwanich P, Verdonschot RG, Kakimoto N, Nagata Y: *J Radiat Res*, 62 (5), 871-876, 2021.

B) Review



- 1: Do various imaging modalities provide potential early detection and diagnosis of medication-related osteonecrosis of the jaw? A review: Wongratwanich P, Shimabukuro K, Konishi M, Nagasaki T, Ohtsuka M, Suei Y, Nakamoto T, Verdonschot RG, Kanesaki T, Sutthiprapaporn P, Kakimoto N: *Dentomaxillofac Radiol*, Jan 15:20200417, 2021.
- 2: Clinical guidelines for the application of panoramic radiographs in screening for osteoporosis: Taguchi A, Tanaka R, Kakimoto N, Morhimoto Y, Arai Y, Hayashi T, Kurabayashi T, Katsumata A, Asaumi J: *Oral Radiology*, 37 (2), 189-208, 2021.

#### E) Presentation at Scientific Meeting

- 1: The reproducibility of T2 relaxation time for TMJ assessment with a 3.0 T MRI: Wongratwanich, P., Kakimoto, N.: The 108th Scientific Assembly and Annual Meeting of Radiological Society of North America (RSNA) (Chicago, IL, USA), 2021
- 2: Do various imaging modalities provide potential early detection and diagnosis of medication-related osteonecrosis of the jaw? A review: Wongratwanich, P., Shimabukuro, K., Konishi, M., Nagasaki T., Ohtsuka, M., Suei, Y., Nakamoto, T., Verdonschot, R.G., Kanesaki, T., Sutthiprapaporn, P., Kakimoto, N.: The first European Academy of Dentomaxillofacial Radiology (EADMFR) Journal Club and Discussion (online), 2021
- 3: Tastes change after administering brachytherapy to treat tongue cancer: Konishi M., Sawajiri M., Verdonschot RG., Shimabukuro K., Wongratwanich P., Kakimoto N.: The 61th annual meeting of Japanese Society of Oral and Maxillofacial Radiology (Virtual and on-demand meeting), 2021.
- 4: Investigation of changes in oral conditions and body weight of older residents in an aged care nursing home: Konishi M.: 36th Annual Meeting of Japanese Society for Clinical Nutrition and Metabolism (JSPEN) (Kobe), 2021.
- 5: Investigation of assessment methods of oral status for older residents in an aged care nursing home: Konishi M., Kakimoto N.: 2nd World Dysphagia Summit (Virtual and on-demand meeting), 2021.
- 6: Basic experiments on X-ray opacity of PEEK crown: Nishio F, Morita K, Doi K, Hirata I, Kimura H, Abekura H, Tsuga K, Kakimoto N: The Japanese Society for Dental Materials and Devices, 2021 Spring Meeting (Web), 2021.
- 7: A comparative study of radiopaque property of Polyetheretherketone crown: Nishio F, Morita K, Abekura H, Yamaoka H, Kakimoto N, Tsuga K: 6th Joint Scientific Meeting in Dentistry (Web), 2021.
- 8: Automatic segmentation of temporomandibular joint disks in MRI images by deep learning: Ito S, Yoshimi Y, Mine Y, Takeda S, Onishi A, Kakimoto N, Murayama T, Tanimoto K: The 80th Annual Meeting of the Japanese Society of Orthodontics & The 5th International Conference (Yokohama + Web), 2021.
- 9: Significance of low-dose-rate irradiation in anti-cancer therapy: Shimabukuro K, Tanimoto K, Hirohashi N, Kakimoto N: The 61th general assembly and annual scientific congress of Japanese Society for Oral and Maxillo-Facial Radiology, (Virtual and on-demand meeting), 2021.

#### F) Special lectures in academic meetings

- 1: The Effects of Low Dose-Rate Irradiation on Gene Expression in Cells under Hypoxic Conditions: Shimabukuro K, Tanimoto K, Kakimoto N, Hirohashi N: The 5th International Symposium of the Network-type Joint Usage/Research Center for Radiation Disaster Medical Science (Web), 2021.
- 2: Cancer of the mouth (with a focus on tongue cancer): Kakimoto, N.: The 21st Public Lecture of the Japan Society of Clinical Oncology (Web), 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1: Grant-in-aid for Early-Career Scientists: Konishi M., Mechanism of taste dysfunction and recovery after radiotherapy. 20K18807, 600,000 JPY.
- 2: Joint research from Research Center for Radiation Disaster Medical Science: Konishi M. Study on the mechanism of taste disorder from radiation. 200,000 JPY.
- 3: Research Grant (Nakanishi Co., Ltd): Doi K., (Representative), Konishi M: Fundamental study for establishment of bone quality diagnosis system by bone cutting resistance value. 200,000 JPY.
- 4: Grant-in-aid for Scientific Research (C): Kakimoto N., Nakamoto T., Konishi M., Normalization of high

dose rate interstitial brachytherapy for oral cancer patients. 19K10289, 910,000 JPY

- 5: Grant-in-aid for Scientific Research (C): Okawa R., Ogaya Y., Kakimoto N., Nakamoto T., Nakano M.,  
A Comprehensive Review of Dental Conditions in Patients with Bone System Diseases and Evaluation  
of New Therapeutic Agents in Dentistry, 21K10183, 208,000 JPY

#### (5) Academic Awards

- 1: Ito S, Yoshimi Y, Mine Y, Takeda S, Onishi A, Kakimoto N, Murayama T, Tanimoto K: The 80th Annual  
Meeting of the Japanese Society of Orthodontics & The 5th International Conference, Best Presentation  
Award

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**Department of Biological Endodontics**  
**Division of Preventive and Restorative Dentistry (Department of**  
**Endodontics and Operative Dentistry)**

(1) Staff and Students

Professor: Hideki Shiba

Lecturer: Katsuhiko Takeda

Assistant Professor: Shizu Hirata-Tsuchiya, Noriko Saito, Keiichi Akutagawa (-August), Kazuma Yoshida, Jun Nakanishi, Daisuke Furutama

Graduate Student: Satomi Shirawachi, Tomoki Kumagai, Naoki Sadaoka, Tomoya Naruse, Tomoki Kawayanagi, Wang Chutian

(2) Main Research Activities

- 1: Studies on biological regeneration of dentin/pulp complex and periapical tissues
- 2: Studies on pulp regeneration by regulation of inflammation
- 3: Studies on biological obturation of root canals at apical areas

(3) Research Achievements

A) Original Papers (including Case Reports)

1. Endodontic approach and periodontal regenerative therapy for a mandibular right central Incisor affected by a perforation and cemental tear: Nagahara T., Takeda K., Inoue S., Wada K., Shirawachi S., Iwata T., Shiba H.: *Int J Periodontics Restorative Dent.*, 41: e205-e212, 2021.
2. PPAR $\gamma$ -induced global H3K27 acetylation maintains osteo/cementogenic abilities of periodontal ligament fibroblasts: Yuan H., Suzuki S., Hirata-Tsuchiya S., Sato A., Nemoto E., Saito M., Shiba H., Yamada S.: *Int J Mol Sci.*, 2021 22: 8646., 2021.
3. Involvement of Rac1 in macrophage activation by brain-derived neurotrophic factor: Sasaki S, Takeda K., Ouhara K., Shirawachi S., Kajiya M., Matsuda S., Kono S., Shiba H., Kurihara H., Mizuno N.: *Mol Biol Rep.*, 48:5249-5257, 2021.
4. DMP-1 promoter-associated antisense strand non-coding RNA, panRNA-DMP-1, physically associates with EGFR to repress EGF-induced squamous cell carcinoma migration: Suzuki S., Yuan H., Hirata-Tsuchiya S., Yoshida K., Sato A., Nemoto E., Shiba H., Yamada S.: *Mol Cell Biochem.*, 476: 1673-1690, 2021.
5. Semaphorin3A released from human dental pulp cells inhibits the increase in interleukin-6 and CXCL10 chemokine ligand 10 production induced by tumor necrosis factor- $\alpha$  through suppression of nuclear factor- $\kappa$ B activation: Shindo S., Kumagai T., Shirawachi S., Takeda K., Shiba H.: *Cell Biol Int.*, 45: 238-244, 2021.
6. Identification of a safe and highly specific titanium reagent for patch tests: results from a preliminary clinical trial: Kitagawa M., Iwamoto K., Oka H., Tanaka M., Takechi M., Kurihara H., Hide M.; Shiba H., *JJSEDP*, 13, 39-44, 2021.

7. Successful outcome of generalized chronic periodontitis (stage III grade A) treated with delayed autotransplantation and multiple periodontal surgeries: A Case Report: Nagahara T., Takada K., Iwata T., Shiba H., Mizuno N.: *Jpn J Conserv Dent*, 64: 285-295, 2021.
8. Identification of regulatory mRNA and microRNA for differentiation into cementoblasts and periodontal ligament cells: Iwata T., Mizuno N., Nagahara T., Kaneda-Ikeda E., Kajiya M., Kitagawa M., Takeda K., Yoshioka M., Yagi R., Takata T., Kurihara H.: *J Periodontal Res*. 56:69-82, 2021.

## B) Review

## C) Publications

## D) Other Publications

1. Periodontal tissue destruction exacerbated by traumatic injury at an upper left central incisor with cemental tear. A case report: Nagahara T., Takeda K., Wada K., Shiba H.: 126-127, Japan Endodontic association presents the latest trends to all dentists, a separate volume, the Quintessence, 2021.

## E) Presentations at Scientific Meetings

- 1: Identification of a novel resistant factor against bacteriocin in *Streptococcus mutans*: Sadaoka N, Takeda K, Shiba H: The 154th Meeting of the Japanese Society of Conservative Dentistry, Kagoshima, held online, 2021.
- 2: Regulation of Inflammatory Responses in Dental Pulp via Functional Regulation of Macrophages.: Shirawachi S, Nakanishi J, Takeda K, Shiba H: The 24th Scientific Meeting of the Japanese Association for Dental Science (The 42nd Annual Scientific Meeting of Japan Endodontic Association), Yokohama, held online, 2021.
- 3: Effect of bone formation by drug repositioning of aspirin: Hirata-Tsuchiya S., Suzuki S., Nakanishi J., Takeda K., Shiba H: The 24th Scientific Meeting of the Japanese Association for Dental Science (The 42nd Annual Scientific Meeting of Japan Endodontic Association), Yokohama, held online, 2021.
- 4: Two case reports of non-surgical and surgical endodontic treatments for chronic apical periodontitis with periapical osteoperiostitis: Nagahara T., Takeda K., Wada K., Yamada Y., Shiba H.: The 24th scientific meeting of the Japanese Association for Dental Sciences (The 42th Annual scientific meeting of Japan Endodontic Association), Yokohama, held online, 2021.
- 5: Development of regenerative medical therapy for hard tissues applying of hybrid recombinant Phosphoryn: Nakanishi J., Suzuki S., Yoshida K., Hirata-Tsuchiya S., Yamada S., Shiba H: The 155th meeting of the Japanese Society of Conservative Dentistry, Niigata, held online, 2021.
- 6: The engagement of  $\gamma\delta$ T cells in dental pulp mineralization via IL-17A.: Kumagai T, Shindo S, Takeda K, Shiba H: The 155th meeting of the Japanese Society of Conservative Dentistry, Niigata, held online, 2021.
- 7: A case report of the periodontal regenerative and endodontic therapies at mandibular right first premolar with the circumferential bone defect and the C-shape root/root canals : Nagahara T., Takeda K., Shiba H.: The 155th meeting of the Japanese Society of Conservative Dentistry, Niigata, held online, 2021.
- 8: Loss of I $\kappa$ B $\zeta$  drives tertiary dentin formation via altering H3K4me3 status: Suzuki S., Yuan H., Hirata-Tsuchiya S., Nemoto E., Saito M., Shiba H., Yamada S: The 155th meeting of the Japanese Society of Conservative Dentistry, Niigata, held online, 2021.
- 9: Questionnaire survey on periodontology lectures and practice study under COVID-19 infection control:

Taguchi Y., Umeda M., Arita H., Otogoto J., Shiba H., Nakamura T., Nishida T., Yoshida N., Ogata Y.: The 64th autumn meeting of the Japanese Society of Periodontology, On-site (Nagoya) and held online, 2021.

- 10: PPAR $\gamma$ -induced global H3K27 acetylation is required to maintain osteo/cementogenic abilities of periodontal ligament fibroblasts: Yuan H., Suzuki S., Sato A., Nemoto E., Saito M., Shiba H., Yamada S.: The 64th autumn meeting of the Japanese Society of Periodontology, On-site (Nagoya) and held online, 2021.
- 11: Elucidation mechanisms of multiple root resorption in systemic sclerosis patients: Memida T., Matsuda S., Suzuki S., Kajiya M., Ouhara K., Okanobu A., Hatano S., Furutama D., Shiba H., Yamada S., Mizuno N.: The 64th autumn meeting of the Japanese Society of Periodontology, On-site (Nagoya) and held online, 2021.
12. Bacteriocin and Cnm carriage in clinical isolates of the cariogenic bacterium Streptococcus: Sadaoka N, Matsuo M, LE NGUYEN TRAMI, Takeda K, Komatsuzawa H, Shiba H: The 60th annual Meeting of the Hiroshima Prefectural Dental Association (The 105th Annual Meeting of the Hiroshima University Dental Society), Hiroshima, 2021
13. The engagement of gd T cells in dental pulp mineralization via IL-17A: Kumagai T, Shindo S, Takeda K, Shiba H: The 8th Hiroshima Conference and 6th Airlangga Joint Scientific Meeting in Dentistry (JSMiD), Hiroshima, held online, 2021.
14. Identification of a novel resistant factor against bacteriocin in Streptococcus mutans: Sadaoka N, Matsuo M, Takeda K, Komatsuzawa H, Shiba H: The 8th Hiroshima Conference and 6th Airlangga Joint Scientific Meeting in Dentistry (JSMiD), Hiroshima, held online, 2021.

#### F) Special lectures in academic meeting

1. Aiming for the realization of Biological Endodontics: Shiba H.: the International Federation of Endodontic Associations 12th World Endodontic Congress (Held online), August, 2021.
2. The role of dental professionals in extending the healthy life expectancy of hemophiliacs: Shiba H.: Hemophilia Seminar in Hachioji (Held online), September, 2021.
3. Supportive activities of dental department of Hiroshima University Hospital to HIV-positive people: Shiba H.: Dental Information Exchange Meeting for HIV-Infected People in Kita-Kanto Koshinetsu Block (Held online), October, 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1: Research grants: Grants for research received from Hiroshima Prefecture: Study on network construction of dental practice for HIV infection: ¥3,000,000.
- 2: Grants-in aid for scientific research: Hideki Shiba: Extension of healthy life expectancy through elucidating the mechanism of exacerbation of cerebral hemorrhage through PRIP by Cnm-positive cariogenic bacteria: #21H03120, ¥5,400,000.
- 3: Grants-in aid for scientific research: Katsuhiro Takeda: Development of a new conservative treatment of dental pulp using BDNF based on the regulation of pulp cell-macrophage cooperation: #20K09976, ¥1,300,000.
4. Grants-in aid for scientific research (C): Tsuchiya S. Development of hard tissue regeneration treatment through the regulation of estrogen signaling by the MTI-II. #20K09956, ¥1,430,000.
5. Grant-in-Aid for Early-Career Scientists: Yoshida K. The research and applying regenerative therapy to

pulp tissue of MXRA5 highly expressed in MSCs. #20K185110, ¥1,600,000.

6. Grant-in-Aid for Early-Career Scientists: Nakanishi J. Development of conservative treatment of dental pulp applying hybrid recombinant Phosphoryn. #20K18510, ¥1,700,000.
7. Grant-in-Aid for Early-Career Scientists: Daisuke Furutama. Elucidation of the Effect of Chronic Inflammation induced by Periodontitis on Sarcopenia. No. 21K16969, ¥1,800,000.
8. Grant-in-Aid for Scientific Research (Start-up) Yoshida K. Establishment of novel endodontic therapy 2020 using low cytotoxic agent, heparin-LL37 complex. #19K240960, ¥1,100,000.

(5) Academic Awards, etc.

(6) Patents

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## Department of Pediatric Dentistry

### Division of Oral Health and Development

## Department of Pediatric Dentistry

#### (1) Staff and Students

Professor: Katsuyuki Kozai (~Mar.) (\* Chief: Katsuyuki Kozai (by-work) (~Mar.)  
 Associate Professor: Chieko Mitsuhashi Chief: Chieko Mitsuhashi (by-work) (Apr.~)  
 Assistant Professor: Noriko Niizato, Meiko Tachikake  
 Yuko Iwamoto, Yasumasa Irie (~Mar.)  
 Masashi Nakano, Tatsuya Akitomo (Apr.~)  
 Resident: Nao Kado (~Mar.), Misa Takeyasu (~Aug.), Tomoko Ogasawara (Sep.~)  
 Graduate Student: Yuria Asao, Satoru Kusaka, Momoko Usuda (Apr.~), Mariko Kametani (Apr.~)  
 Clinical Trainee: Fumiko Hayashi, Akira Yamane, Seiko Watanabe, Shoji Takahashi (~Mar.)  
 Ami Okamine, Shuhei Kaneko

#### (2) Main Research Activities

- 1 : Bacteriological research of onset mechanism and prevention of dental caries in children
- 2 : Bacteriological research in periodontal diseases in children
- 3 : Clinical research in oral care in children suffered from systematic diseases
- 4 : Evaluation of psychological stress in dental treatment in children
- 5 : Clinical research of dental trauma in children
- 6 : Dental approach to pediatric dysphagia
- 7 : Investigation of oral status of Cambodian children
- 8 : Research in oral environment and dental diseases in abused children

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

- 1 : Current Status of Oral Function Management for Perioperative Children in Pediatric Dentistry: Iwamoto Y., Mitsuhashi C., Hamamoto Y., Ogasawara T., Okamine A., Asao Y., Akitomo T., Nakaoka M., Kozai K.: *The Japanese journal of pediatric Dentistry*, 59 (1), 14-19, 2021.
- 2 : A new supernumerary tooth occurring in the same region during follow-up after supernumerary tooth extraction: A case report: Akitomo T., Asao Y., Mitsuhashi C., Kozai K.: *Pediatric Dental Journal*, 31 (1), 100-107, 2021.
- 3 : Quantitative Cell Subset Analysis Using Antibody Microarrays: Ogasawara T., Kuwabara R., Kozai K., and Kato K.: *ACS Applied Bio Materials*, 4 (10), 7673-7681, 2021.
- 4 : A questionnaire survey on the guideline for pediatric dentistry in the national dentistry examination: Funayama H., Saitou K., Morikawa K., Nakano K., Iinuma M., Shimizu T., Shimomura-Kuroki J., Baba A., Uchikawa Y., Shimada Y., Saitoh M., Kurashige Y., Fukuda A., Yawaka Y., Shimamura K., Hayasaki H., Ohshima K., Sekimoto T., Ohsuga N., Hoshino T., Shintani S., Tsujino K., Karibe H., Shirakawa T., Iwamoto T., Miyashin M., Funatsu T., Kimoto S., Asari J., Moriyasu K., Hasegawa S., Okawa R., Arita K., Harada K., Kozai K., Iwamoto Y., Nakano M., Hirano K., Kitamura T., Maki K., Yamaza H., Ozaki M., Fujiwara T., Yamasaki Y., Murakami D., Asada Y.: *The Japanese journal of pediatric Dentistry*, 59 (2), 80-94, 2021.
- 5 : Detecting the presence of supernumerary teeth during the early mixed dentition stage using deep learning algorithms: A pilot study: Mine Y., Iwamoto Y., Okazaki S., Nakamura K., Takeda S., Tzu-Yu Peng, Mitsuhashi C., Kakimoto N., Kozai K., Murayama T.: *International Journal of Paediatric Dentistry* (in press) <https://doi.org/10.1111/ipd.12946>
- 6 : Single-cell RNA-sequencing reveals the breadth of osteoblast heterogeneity: Yoshioka H., Okita S., Nakano M., Minamizaki T., Nubukiyo A., Sotomaru Y., Bonnylye E., Kozai K., Tanimoto K.,

Aubin JE., Yoshiko Y.: JBMR Plus, 5 (6): e10496, 2021.

## B) Review

## C) Publications

## D) Other Publications

## E) Presentations at Scientific Meetings

- 1 : Role of amygdalar mGluR7 in conditioned taste aversion: Akitomo T., Kozai K.: The 59th Congress of Japanese Society of Pediatric Dentistry (online), 2021.
- 2 : A case of ectopic eruption of the left mandibular second molar in a child with Williams Syndrome improved by occlusal guidance: Tachikake M., Akitomo T., Nakano M., Iwamoto Y., Mitsuhata C., Kozai K.: The 59th Congress of Japanese Society of Pediatric Dentistry (online), 2021.
- 3 : Third supernumerary tooth occurring in the same region during follow-up after the second supernumerary tooth extraction: Akitomo T., Asao Y., Iwamoto Y., Mitsuhata C., Ando T., Sakamoto S., Kozai K.: The 28th Congress of the IAPD (online), 2021.
- 4 : The continuous survey of oral hygiene condition of Cambodian primary school children: Asao Y., Iwamoto Y., Akitomo T., Mitsuhata C., Naito M., Kozai K.: The 28th Congress of the IAPD (online), 2021.
- 5 : Five-year oral management of osteogenesis imperfecta patient: Mitsuhata C., Nakano M., Iwamoto Y., Kozai K.: The 28th Congress of the IAPD (online), 2021.
- 6 : Detection of supernumerary teeth during early mixed dentition stage with deep learning-based convolutional neural network algorithms: Mine Y., Iwamoto Y., Takeda S., Nakamura K., Mitsuhata C., Kozai K., Murayama T.: The 28th Congress of the IAPD (online), 2021.
- 7 : A case of long-term follow-up for eruption disorder of deciduous maxillary left central incisor caused by odontoma: Nakano M., Usuda M., Mitsuhata C.: The 40th Congress of Japanese Society of Pediatric Dentistry Chushikoku Branch (online), 2021.
- 8 : A case of non-syndromic oligodontia with long-term oral management from beginning of the eruption of primary teeth: Akitomo T., Iwamoto Y., Kusaka S., Kametani M., Mitsuhata C.: The 40th Congress of Japanese Society of Pediatric Dentistry Chushikoku Branch (online), 2021.
- 9 : Caries severity of children in temporary shelters is associated with daily dental health behavior and physical care environment: Niizato N., Nakano M., Kaihara Y., Nii N., Mitsuhata C., Ueda Y., Kamikawa K., Maeshima M., Yamasaki K., Kozai K.: The 27th Congress of the JaSPCAN (Yokohama, online), 2021.
- 10 : The concept of algebra of sets enables quantitative cell subset analysis using antibody microarrays: Ogasawara T., Kuwabara R., Kozai K., and Kato K.: The 43rd Annual Meeting of the Japanese Society for Biomaterials (43JSB) and the 8th Asian Biomaterials Congress (8ABMC) (Nagoya, online), 2021.
- 11 : Detection of supernumerary teeth using deep learning approach: Takeda S., Mine Y., Iwamoto Y., Nakamura K., Mitsuhata C., Kozai K., Murayama T., the 2021 IADR/AADR/CADR General Session (online), 2021.
- 12 : Oral health condition survey of Cambodian public primary school children: Iwamoto Y., Asao Y., Kimheang N., Samnang S., Ueda K., Yakushiji S., Shimizu S., Mitsuhata C., Kozai K.: The 6th Joint Scientific Meeting in Dentistry (JSMiD) (online), 2021.
- 13 : Oral health education for primary school children in Cambodia-approach by dental hygienist: Kozono C., Iwamoto Y., Nakaoka M., Kajiya M., Kozai K.: The 16th Annual Meeting of the Japan Society for Dental Hygiene (online), 2021.
- 14 : Needs for school health of Cambodian nursing teacher: Shimizu H., Miyake M., Miyazaki R., Touge T., Uehara H., Iwamoto Y., Miyazaki A.: The 67th Annual Meeting of the Japanese Association of School Health (Nisshin, online), 2021.
- 15 : Grad-CAM helps explainability of supernumerary teeth detection by deep learning: Okazaki S., Mine Y., Iwamoto Y., Takeda S., Mitsuhata C., Murayama T.: 35th Annual Scientific Meeting of the International Association of Dental Research Southeast Asian (Hong Kong, online), 2021.

- 16 : Association between maternal caries experience and early childhood caries in their children: A systematic review: Sumitani E., Kondo M., Nishimura R., Ishizu H., Asao Y., Iwamoto Y., Naito M.: The 80th Annual Meeting of Japanese Society of Public Health (Tokyo, online), 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-Aid for Scientific Research (C): Kozai K., Elucidation of the prevention mechanism of dental caries in children by the TAS2R family of bitter taste receptors. No.20K10203. 2021 direct expenses: ¥900,000, indirect expenses: ¥220,000.
- 2 : Grant-in-Aid for Scientific Research (C): Mitsuata C., Effect of childhood stress on developmental brain formation. No.21K10161. 2021 direct expenses: ¥1,200,000, indirect expenses: ¥360,000.
- 3 : Grant-in-Aid for Scientific Research (C): Niizato N., Survey on oral health condition and dental health behavior of abused children in shelter. No.17K11962. Carried over.
- 4 : Grant-in-Aid for Early-Career Scientists: Iwamoto Y., Development of oral health education model for children in Cambodia and Southeast Asia. No.19K19330. 2021 direct expenses: ¥600,000, indirect expenses: ¥180,000.

#### (5) Academic Awards, etc.

- 1 : Kozai K., Iwamoto Y.: The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, Awards for Science and Technology, Public Understanding Promotion Category, 2021
- 2 : Asao Y.: Winner/Japanese Division and *Nature Digest* Award, HIRAKU 3MT Competition 2021

#### (6) Patents

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**Department of Dental Anesthesiology,  
Graduate School of Biomedical and Health Sciences and  
Department of Dental Anesthesiology,  
Division of Oral & Maxillofacial Surgery and Oral Medicine**

(1) Staff and Students

Professor	: Masahiro Irifune, D.D.S., Ph.D.
Lecturer	: Mitsuhiro Yoshida, D.D.S., Ph.D.
Research Associate	: Yoshitaka Shimizu, D.D.S., Ph.D., Mitsuru Doi, D.D.S., Akari Mukai, D.D.S., Ph.D., Kana Oue, D.D.S., Ph.D.
Resident	: Tamayo Takahashi-Uno, D.D.S., Ph.D., Taiga Yoshinaka, D.D.S., Ph.D., Maetani Yuka, D.D.S., Ph.D., Aya Oda, D.D.S., Ph.D., Hisanobu Kamio, D.D.S., Ph.D., Takahiro Kochi, D.D.S., Ph.D.
Graduate Student	: Utaka Sasaki, D.D.S., Eiji Imado, D.D.S.
Clinical Trainee	: Michio Kawahara, M.D., Ph.D., Masaki Yasusaka, D.D.S., Yuuki Kojima, D.D.S., Ph.D.

(2) Main Research Activities

- 1: Study on mechanisms of general anesthetic action
- 2: Development of a novel general anesthetic method applying enhancement of descending pain suppression system
- 3: Study on role of each neuron in an intravenous anesthetic agent-induced anesthetic factor
- 4: Study on a stage of delirium in general anesthesia
- 5: Study on involvement of dopamine neurons in awakening from general anesthesia
- 6: Study on antianxiety effects of sedative drugs
- 7: Study on respiratory sound monitor during dental treatment under sedation
- 8: Study on effects of nitrous oxide on cardiovascular system
- 9: Study on chronic pain
- 10: Study on medical emergency during dental treatments

(3) Research Achievements

A) Original Papers (including Case Reports)

- 1: Usefulness of tranexamic acid administration during sagittal split ramus osteotomy: Yoshida M, Ono S, Shimizu Y, Oue K, Mukai A, Doi M, Irifune M: *J Craniofac Surg.* 32(1): 273-276, 2021.
- 2: Pretreatment with high mobility group box-1 monoclonal antibody prevents the onset of trigeminal neuropathy in mice with a distal infraorbital nerve chronic constriction injury: Kochi T, Nakamura Y, Ma S, Hisaoka-Nakashima K, Wang D, Liu K, Wake H, Nishibori M, Irifune M, Morioka N: *Molecules.* 26(7): 2035, 2021.
- 3: Syntaxin 3 interacts with serotonin transporter and regulates its function: Motoike S, Taguchi K, Harada K, Asano M, Hide I, Tanaka S, Irifune M, Sakai N: *J Pharmacol Sci.* 145(4): 297-307, 2021.
- 4: Expression of PRIP, a phosphatidylinositol 4,5-bisphosphate binding protein, attenuates PI3K/AKT signaling and suppresses tumor growth in a xenograft mouse model: Maetani Y, Asano S, Mizokami A, Yamawaki Y, Sano T, Hirata M, Irifune M, Kanematsu T: *Biochem Biophys Res Commun.* 552: 106-113, 2021.
- 5: Efficacy of chest compressions performed on patients in dental chairs versus on the floor: Shimizu Y, Sadamori T, Saeki N, Mukai A, Doi M, Oue K, Yoshida M, Irifune M: *Anesth Prog.* 68(2): 85-89, 2021.

B) Review



## C) Publications

## D) Other Publications

## E) Presentation at Scientific Meeting

- 1: Abnormal pain sensitivity in a prenatal valproic acid-induced mouse model of autism spectrum disorder: Imado E, Asano S, Nakamura Y, Nakashima K, Morioka N, Tsuga K, Irifune M, Taguma K, Ago Y: The 120th Kinki Branch Meeting of Japanese Pharmacological Society (Nagoya), 2021.
- 2: A case of idiopathic tooth pain whom sodium valproate was effective: Kamio H, Doi M, Imado E, Sasaki U, Motoike S, Yoshida M, Irifune M: The 35th Scientific Meeting of Dental Anesthesiology in Chugoku and Shikoku Branch (Okayama), 2021.
- 3: A case of cerebral palsy patient with type II respiratory failure after dental treatment under general anesthesia whom nasal high flow oxygen therapy was effective: Oda A, Oue K, Oda Y, Mukai A, Doi M, Shimizu Y, Yoshida M, Irifune M: The 35th Scientific Meeting of Dental Anesthesiology in Chugoku and Shikoku Branch (Okayama), 2021.
- 4: A case of Crouzon syndrome child patient scheduled for dental treatment under intravenous sedation who was expected air-way obstruction: Yoshinaka T, Mukai A, Takahashi T, Oda A, Maetani Y, Oue K, Doi M, Shimizu Y, Yoshida M, Irifune M: The 35th Scientific Meeting of Dental Anesthesiology in Chugoku and Shikoku Branch (Okayama), 2021.
- 5: A case of autism spectrum disorder in which visual support enabled premedication and dental treatment under general anesthesia: Oda A, Oda Y, Oue K, Takahashi T, Yoshinaka T, Mukai A, Shimizu Y, Yoshida M, Okada Y, Irifune M: The 38th Annual Meeting of the Japanese Society for Disability and Oral Health (Yokohama), 2021.
- 6: A case of anticipated difficult nasotracheal intubation for a pediatric patient with Hallermann-Streiff syndrome underwent dental treatment under general anesthesia: Mukai A, Imado E, Takahashi T, Yoshinaka T, Oda A, Oue K, Shimizu Y, Yoshida M, Irifune M: The 38th Annual Meeting of the Japanese Society for Disability and Oral Health (Yokohama), 2021.
- 7: The effect of intranasal premedication of midazolam for an autism spectrum disorder child with a giant venous valve and mild aortic valve regurgitation: Oue K, Oda Y, Oda A, Yoshinaka T, Takahashi T, Mukai A, Shimizu Y, Yoshida M, Okada Y, Irifune M: The 38th Annual Meeting of the Japanese Society for Disability and Oral Health (Yokohama), 2021.
- 8: Difficult intubation and postoperative aspiration pneumonia associated with Moebius syndrome: case report: The Anesthesiology annual meeting, San Diego, U.S.A., 2021.
- 9: Interaction of obesity and periodontal disease on cognitive impairment: Oue K, Yamawaki, Y, Kanematsu T: The 63rd Annual Meeting of Japanese Association for Oral Biology (Yokohama), 2021.
- 10: A case of spinal muscular atrophy diagnosed by delayed muscle relaxants recovery: Oda A, Oue K, Takahashi T, Yoshinaka T, Mukai A, Shimizu Y, Yoshida M, Irifune M: The 49th Annual Meeting of Japanese Dental Society of Anesthesiology (Sapporo), 2021.
- 11: Two cases of analog-sedation for patients with chronic respiratory disease in oral surgeries: Takahashi T, Yoshida M, Kamio H, Oda A, Yoshinaka T, Oue K, Mukai A, Doi M, Shimizu Y, Irifune M: The 49th Annual Meeting of Japanese Dental Society of Anesthesiology (Sapporo), 2021.
- 12: Perioperative management of a case of difficult intubation and postoperative aspiration pneumonia associated with Moebius syndrome: Oda A, Oda Y, Taguchi S, Oue K: The 41st Annual Meeting of the Japan Society for Clinical Anesthesia (Sapporo), 2021.

## F) Special lectures in academic meetings

- 1: Pathological model of Burning mouth syndrome and Psychological intervention for patients: Doi M: The 34th Annual Meeting of the Japanese Society of Oral Diagnosis / The 31st Annual Meeting of the Japanese Society of Oral Medicine, Symposium 3 Forefront of Treatment for Burning mouth syndrome (Tokyo), 2021.
- 2: Cognitive characteristics of the Patients with Orofacial pain “Patients who respond to medication and those who do not”: Doi M: The 26th Annual Meeting of Japanese Society of Orofacial Pain, Educational seminar 2 “Approach to the heart of pain” (Shizuoka city), 2021.

## (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1: Grant-in-Aid No. 21K10139 for Scientific Research (C) from the Ministry of Education, Culture, Sports, Science, and Technology of Japan (New): Irifune M, Mukai A, Ago Y: Development of a control method for depth of anesthesia and/or sedation applied to a selective dopamine receptor subtype ligand. ¥1,300,000.
- 2: Grant-in-Aid No. 21K10072 for Young Scientists (B) from the Ministry of Education, Culture, Sports, Science, and Technology of Japan (New): Shimizu (Ogawa) Y: Analysis of noise characteristics from dental apparatus during auscultation of breath sounds to prevent from air-way obstruction under sedation. ¥1,700,000.
- 3: Grant-in-Aid No. 17K11908 for Scientific Research (C) from the Ministry of Education, Culture, Sports, Science, and Technology of Japan (Continued): Yoshida M: Clarification of the mechanism of functional alteration of the central nervous system in development of chronic pain of masticatory muscle. ¥800.
- 4: Grant-in-Aid No. 20K18669 for Young Scientists (B) from the Ministry of Education, Culture, Sports, Science, and Technology of Japan (Continued): Oue K: Study on interaction of obesity and periodontal disease on cognitive impairment. ¥1,000,000.

(5) Academic Awards, etc.

(6) Patents

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## Department of Public Oral Health

### (1) Staff and Students

Professor : Kouji Ohta  
 Associate Professor : Hideo Shigeishi  
 Assistant Professor : Tomoko Maehara, Yoshino Kaneyasu  
 Graduate Student : Yoshimi Kawamura, Momoko Ishikawa, Mariko Nakamura (D2), Kanako Yano (M2), Iori Oka (M1)

### (2) Main Research Activities

- 1 : Study on Prevention for oral infection and oral complication of systemic diseases
- 2 : Study on efficacy of perioperative oral care on systemic diseases
- 3 : Study on human papillomavirus in oral squamous cell carcinoma
- 4 : Study on mechanism of oral mucosa against micro organism
- 5 : Study on efficacy of care program for elderly
- 6 : Study on development of new device and examination for oral hygiene management
- 7 : Study on associations between dysphagia and lifestyle for Japanese adults

### (3) Research Achievements

#### Original Papers (including Case Reports)

- 1: Detection of HPV16 E6 DNA in periodontal pockets of middle-aged and older people: Shigeishi H, Murodumi H, Ohta K, Sugiyama M. *Oral Science International*. 18(1), 50-55, 2021.
- 2: Association of oral Epstein-Barr virus with periodontal health in Japanese adults: Su CY, Shigeishi H, Murodumi H, Sugiyama M, Ohta K, Takemoto T. *Experimental and Therapeutic Medicine*. 22(1):767, 2021
- 3: The association of oral HPV16 infection with periodontal inflammation and the oral microbiome in older Japanese women: Shigeishi H, Su CY, Kaneyasu Y, Matsumura M, Nakamura M, Ishikawa M, Saito A, Ohta K, Sugiyama M. *Experimental and Therapeutic Medicine*. 21(2): 167, 2021.
- 4: Effects of perioperative oral care on postoperative inflammation following heart valve surgery: Nishi H, Takahashi S, Ohta K, Takamoto M, Shigeishi H, Go S, Obayashi T, Yoshioka Y, Konishi M, Shimizu Y, Yano K, Kakimoto N, Ohge H, Kawaguchi H, Kurihara H. *Oral Diseases*. 27(6), 1542-1550, 2021
- 5: The Associations of Periodontopathic Bacteria and Oral Candida with Periodontal Inflamed Surface Area in Older Adults Receiving Supportive Periodontal Therapy: Shigeishi H, Nakamura M, Oka I, Su CY, Yano K, Ishikawa M, Kaneyasu Y, Sugiyama M, Ohta K. *Diagnostics*. 11, 1397, 2021.
- 6: TGF- $\beta$ 1 induces amoeboid-to-mesenchymal transition of CD44<sup>high</sup> oral squamous cell carcinoma cells via miR-422a downregulation through ERK activation and Cofilin-1 phosphorylation: Yokoyama S, Shigeishi H, Murodumi H, Sakuma M, Kato H, Higashikawa K, Ohta K, Sugiyama M, Takechi M. *Journal of Oral Pathology & Medicine*. 50(2):155-164, 2021.
- 7: Relationship between oral and physical function and length of participation in long-term care prevention programs in community-dwelling older Japanese women: Miyoshi S, Saito A, Shigeishi H, Ohta K, Sugiyama M. *European Geriatric Medicine*. 12(2):387-395, 2021.
- 8: In vitro investigation of the cell compatibility and antibacterial properties of titanium treated with calcium and ozone: Takechi M, Takamoto M, Ninomiya Y, Ono S, Mizuta K, Nakagawa T, Shigeishi H, Ohta K, Ishikawa K, Tsuru K. *Dental Materials Journal*. 40(3):712-718, 2021.
- 9: Age-related changes in oral tactile and thermal sensation throughout adulthood: Nishimura R, Yoshida M, Shigeishi H, Fukada-Sambuichi E, Yamashita-Urabe K, Takechi M, Toratani S, Tsuga K, Sugiyama M. *Odontology*. 109(3):710-718, 2021.
- 10: The squamous cell carcinoma cell line OM-1 retains both p75-dependent stratified epithelial progenitor potential and cancer stem cell properties: Uetsuki R, Higashikawa K, Okuda S, Yamakado N, Ishida F, Rizqiawan A, Ono S, Takechi M, Mizuta K, Shigeishi H, Kamata N, Tobiume K. *Biochemistry and Biophysics Reports*. 26:101003, 2021.

- 11: Changes in Physical and Oral Function after a Long-Term Care Prevention Program in Community-Dwelling Japanese Older Adults: A 12-Month Follow-Up Study: Iwao-Kawamura Y, Shigeishi H, Uchida S, Kawano S, Maehara T, Sugiyama M, Ohta K. *Healthcare*. 9(6), 719, 2021.
- 12: Effects of miR-224-5p-enhanced downregulation of PANX1 on docetaxel-induced apoptosis in amoeboid-like CD44<sup>high</sup> oral cancer cells: Yokoyama S, Shigeishi H, Murodumi H, Sakuma M, Ono S, Tobiume K, Sugiyama M, Ohta K, Takechi M. *European Journal of Oral Sciences*. 129(5), e12812, 2021.
- 13: Anti-inflammatory effect of glycyrrhizin with Equisetum arvense extract : Shiba F, Miyauchi M, Chea C, Furusho H, Iwasaki S, Shimizu R, Ohta K, Nishihara T, Takata T. *Odontology*. 109(2), 464-473, 2021.
- 14: Relationship between dietary diversity and oral function among older women aged 75 years and over participating in community-based health exercise programs. Miyoshi S, Saito A, Shigeishi H, Ohta K, Sugiyama M. *The Journal of Japan Society for Dental Hygiene* 15(2): 62-69, 2021.
- 15: Two cases of maxillary sinusitis after maxillary sinus floor elevation.: Ninomiya Y, Ohta K, Ono S, Tada M, Nakagawa T, Ishida F, Okuda S, Takechi M. *Japanese Journal of Maxillo Facial Implants* 20(1): 37-43, 2021.
- 16: A case of mediastinal swelling after dental carbon dioxide laser irradiation.: Ishida Y, Ono S, Sakuma M, Ohta K, Takechi M. *The Journal of Hiroshima University Dental Society* 53(1): 38-44, 2021.

## B) Review

## C) Publications

- 1: [Learn on the bulletin board] Let's treat a wound bind !: Kaneyasu Yoshino: Higashiyamashobo(Kyoto), 83-89, 2021.

## D) Other Publications

## E) Presentations at Scientific Meetings

- 1 : Investigation of association between oral cytomegalovirus infection and periodontitis : Mariko Nakamura, Hideo Shigeishi, Masaru Sugiyama, Kouji Ohta : The 70th General meeting of Japanese Society for Oral Health (web), 2021
- 2 : Association between HPV16 DNA and periodontopathic bacteria. Hideo Shigeishi, Mariko Nakamura, Yoshino Kaneyasu, Masaru Sugiyama, Kouji Ohta : The 70th General meeting of Japanese Society for Oral Health (web), 2021.
- 3 : Association between oral Epstein-Barr virus infection and periodontitis. Hideo Shigeishi, Yoshino Kaneyasu, Masaru Sugiyama, Kouji Ohta : The 32nd annual local meeting of Kinki-Chugoku-Shikoku Branch, Japanese Society for Oral Health (paper), 2021.
- 4 : Association of oral human cytomegalovirus prevalence with Periodontopathic bacteria : Mariko Nakamura, Hideo Shigeishi, Masaru Sugiyama, Kouji Ohta : The 64th Autumn Meeting of the Japanese Society of Periodontology (Nagoya), 2021
- 5: Association of Human Papillomavirus (HPV) with oral cancers: Hideo Shigeishi: The 34th Congress of the Japanese Society for Sexually Transmitted Infections Symposium, (web), 2021.
- 6: A case of Trousseau's syndrome caused by tongue cancer with lung metastases in young adults during chemotherapy.: Kato H, Mizuta K, Sasaki K, Uetsuki R, Ono S, Ohta K, Takechi M: The 39th Annual Meeting of Japanese Society of Oral Oncology General Information (2021.1.28~2.21 Nagano Web)
- 7: Apoptotic effects of sunitinib, a tyrosine kinase activity inhibitor, on oral mucosal epithelial cells.: Fukada S, Ohta K, Kato H, Sakuma M, Murodumi H, Naruse T, Nakagawa T, Shigeishi H, Takechi M.: The 75th Annual Meeting of Japanese Stomatological Society (2021.5.12~14 Osaka Web)
- 8: Analysis of apoptosis-inducing effect of sunitinib, a tyrosine kinase activity inhibitor on oral mucosal epithelial cells.: Fukada S, Ohta K, Kato H, Sakuma M, Murodumi H, Naruse T, Nakagawa T,

- Shigeishi H, Takechi M.: The 34th Annual Meeting of the Japanese Society of Oral Diagnosis/Oral Medicine and the 31st Annual Meeting of the Japanese Society of Oral Medicine (2021.9.9~9.10 Tokyo Web)
- 9: Evaluation of Anti-tumor effect of MK-0429, an integrin avb3 inhibitor, by inhibiting angiogenesis.: Nakagawa T, Ohta K, Naruse T, Narisawa S, Sakuma M, Yamakado N, Okuda S, Mizuta K, Ninomiya Y, Takechi M.: The 80th Annual Meeting of the Japanese Cancer Association (2021.9.30~10.3 Yokohama)
  - 10: A case of Trousseau syndrome during Paclitaxel + Cetuximab combination therapy for lung metastasis of tongue cancer.: Kato H, Mizuta K, Sasaki K, Uetsuki R, Ono S, Ohta K, Takechi M.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~11.14 Chiba Web)
  - 11: Establishment of immortalized minor salivary gland-derived epithelial cells and expression of leukocyte migration factor.: Naruse T, Ohta K, Sakuma M, Fukada S, Kato H, Ishiada Y, Fukui A, Shigeishi H, Takechi M.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~12.14 Chiba Web)
  - 12: Analysis of apoptosis-inducing effect of sunitinib on oral mucosal epithelial cells.: Fukada S, Ohta K, Kato H, Sakuma M, Murodumi H, Naruse T, Nakagawa T, Shigeishi H, Takechi M.: The 66th Congress of the Japanese Society of Orla and Maxillofacial Surgeons (2021.11.12~11.14 Tokyo Web)
  - 13: A case of squamous cell carcinoma of the tongue with skin metastasis.: Tada M, Ono S, Okuda S, Naruse T, Akagi M, Kakimoto N, Konishi M, Ohta K, Takechi M.: The 66th Congress of the Japanese Society of Oral and maxillofacial Surgeons (2021.11.12~11.14 Chiba Web)
  - 14: Relationships between leisure-time exercise and dysphagia risk in the Japanese population : Maehara T, Nishimura R, Tsukamoto M, Kadomatsu Y, Kubo Y, Okada R, Nagayoshi M, Tamura T, Hishida A, Takeuchi K, Wakai K, Yoshitake A, Naito M.: 2nd World Dysphagia summit (Web), 2021.

#### F) Special lectures in academic meetings

#### G) Contribution to Community

- 1: Ohta K: Hiroshima dental hygienist education meeting, lecture, “Basic and clinical practice of oral candidiasis” (2021.7.3 web)
- 2: Ohta K: Japan dental hygienist seminar, dental health safety management course, e-learning lecture, “Environmental improvement as infection prevention measures” “Standard preventive measures in dental office” “Risk management of dental hygienist” “medical safety measures related to oral surgery”(2021. web)
- 3: Ohta K: Japan dental hygienist seminar, dental health safety management course. on line exercise “Learn risk management process as risk manager”(2021. web)
- 4: Ohta K, Maehara T : Japan Dental Hygienist Society Certified Dental Hygienist Seminar Staff of Dental Care Safety Management Course, 2021.
- 5: Maehara T : Dental hygienist collaboration committee member of the Japanese Society for Disability and Oral Health, 2021.
- 6: Maehara T : Assessment of oral function at special nursing home “Kosei-En”

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1: Grants-in-Aid for Scientific Research (Scientific Research (C) : Shigeishi H (Main researcher) : Study on mechanotransduction mechanism of CD44high oral squamous cell carcinoma cells. (No. 20K10138).
- 2: Grants-in-Aid for Scientific Research (Scientific Research (C) : Shigeishi H (Co- researcher): Study on the mechanisms of malignant transformation via gene methylation in HPV16-positive oral squamous cell carcinomas. (No. 18K097910A).
- 3: Grants-in-Aid for Scientific Research (Scientific Research (C) : Ohta K (Main researcher), Shigeishi H (Co- researcher) : Functional analysis of novel candida cell wall component recognition receptor in oral mucosa and their significance in oral candidiasis. (No.20K10179)
- 4: Grants-in-Aid for Scientific Research (Scientific Research (C) : Ohta K (Co- researcher): Basic

research for developing dental implant treatment guidelines for patients receiving bisphosphonates. (No.21K09952)

- 5: Grants-in-Aid for Scientific Research (Scientific Research (C) : Ohta K (Co- researcher): Development of transplantation material for treatment of jaw bone necrosis with angiogenic effect. (21K10094)
- 6: Grants-in-Aid for Scientific Research (Scientific Research (C) : Ohta K (Co- researcher): Constitution of systemic complication prevention system for cancer chemotherapy targeting oral bacteria. (No.20K10162)
- 7: Grants-in-Aid for Scientific Research (Scientific Research (C) : Ohta K (Co- researcher): Effect of distribution of resistant bacteria in the oral cavity and managing oral hygiene on medical / long term care related pneumonia (No.20K10248)

“Functional analysis of novel candida cell wall component recognition receptors in the oral mucosa and their significance in oral candidiasis” Ohta K, Takechi M, Nishi H, Shigeishi H. Subject number: 20K10179

#### (5) Academic Awards, etc.

- 1: Mariko Nakamura : Association of oral cytomegalovirus prevalence with periodontitis, The 70th General meeting of Japanese Society for Oral Health, Best Presentation Award

#### (6) Patents

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## Department of Oral Epidemiology

### (1) Staff and Students

Professor : NAITO Mariko  
 Research Associate : NISHIMURA Rumi  
 Graduate Student : MAEHARA Tomoko  
                           ASAEDA Mayuka  
                           ARIMOTO Nishiki  
                           YAMADA Sachiko  
                           HAMA Yohko (Advanced Prosthodontics)  
                           ISHIZU Hanako  
 Research Student : SUZUKI Yoshitaka

### (2) Main Research Activities

- 1 : Study on the methods for Oral health care
- 2 : Study on the education program for Oral health
- 3 : Study on the development of oral function
- 4 : Epidemiological studies regarding associations between oral health and general health
- 5 : Molecular epidemiology and gene-environmental interaction
- 6 : Associations between health screening behavior, health status and lifestyle
- 7 : Research for dysphagia patients and their caregivers
- 8 : QOL/PRO research

### (3) Achievements

#### A) Original Papers (including Case Reports)

- 1 : Changes in Physical and Oral Function after a Long-Term Care Prevention Program in Community-Dwelling Japanese Older Adults: A 12-Month Follow-Up : Iwao-Kawamura Y, Shigeishi H, Uchida S, Kawano S, Maehara T, Sugiyama M, Ohta K. : Health care (Basel). Jun 11;9(6):719, 2021.
- 2 : Treatment of dental caries in a patient with Joubert syndrome without the use of sedatives: A case study : Oda Y, Yoshida K, Furutani C, Wakita A, Hama Y, Miyauchi M, Okada Y. : Spec Care Dentist., 41(3), 411-416, 2021.
- 3 : Age-related changes in oral tactile and thermal sensation throughout adulthood: Nishimura R, Yoshida M, Shigeishi H, Fukada-Sambuichi E, Yamashita-Urabe K, Takechi M, Toratani S, Tsuga K, Sugiyama M.: Odontology, 109(3), 710-718, 2021.
- 4 : The Past and Current Status of Dentists in Japan: Sugiyama M, Nishimura R, Myung-Jin Lee, Sang-Hwan Oh.: Journal of Dental Hygiene Science, 21, 8-18, 2021.
- 5 : Diagnostic accuracy of dental health checkups for university freshmen by trainee dentists at the beginning of postgraduate clinical training.: Sasahara H, Sugiyama M, Nishimura R, Maehara T, Nikawa H.: The Journal of Hiroshima University Dental Society, 53(2), 75-81, 2021.
- 6 : Reproducibility and validity of food group intake in a short food frequency questionnaire for the middle-aged Japanese population. Imaeda N, Goto C, Sasakabe T, Mikami H, Oze I, Hosono A, Naito M, Miyagawa N, Ozaki E, Ikezaki H, Nanri H, Nakahata N T, Kamano S K, Kuriki K, Yaguchi Y T, Kayama T, Kurihara A, Harada S, Wakai K. Environ Health Prev Med 2021; 26: 28.
- 7 : Tooth brushing, tooth loss, and risk of upper aerodigestive tract cancer: a cohort study of Japanese dentists. Tsukamoto M, Naito M, Wakai K, Naito T, Kojima M, Umemura O, Yokota M, Hanada N, Kawamura T. Nagoya J Med Sci 2021; 83: 331-341.
- 8 : Smoking and colorectal cancer: A pooled analysis of 10 population-based cohort studies in Japan. Akter S, Islam Z, Mizoue T, Sawada N, Ihira H, Tsugane S, Koyanagi YN, Ito H, Wang C, Tamakoshi A, Wada K, Nagata C, Tanaka K, Kitamura Y, Utada M, Ozasa K, Sugawara Y, Tsuji I, Shimazu T, Matsuo K, Naito M, Tanaka K, Inoue M. Int J Cancer. 2021 Feb 1;148(3):654-664.
- 9 : Alcohol consumption and breast cancer risk in Japan: A pooled analysis of eight population-based cohort



- studies. Iwase M, Matsuo K, Koyanagi YNY, Ito H, Tamakoshi A, Wang C, Utada M, Ozasa K, Sugawara Y, Tsuji I, Sawada N, Tanaka S, Nagata C, Kitamura Y, Shimazu T, Mizoue T, Naito M, Tanaka K, Inoue M. *Int J Cancer*. 2021 Jun 1;148(11):2736-2747.
- 10 : Impact of reproductive factors on breast cancer incidence: Pooled analysis of nine cohort studies in Japan. Takeuchi T, Kitamura Y, Sobue T, Utada M, Ozasa K, Sugawara Y, Tsuji I, Hori M, Sawada N, Tsugane S, Koyanagi YN, Ito H, Wang C, Tamakoshi A, Wada K, Nagata C, Shimazu T, Mizoue T, Matsuo K, Naito M, Tanaka K, Inoue M; Research Group for the Development, Evaluation of Cancer Prevention Strategies in Japan. *Cancer Med*. 2021 Mar;10(6):2153-2163.
- 11 : Increase of serum uric acid levels associated with APOE  $\epsilon$ 2 haplotype: a clinico-genetic investigation and in vivo approach. Ogura M, Toyoda Y, Sakiyama M, Kawamura Y, Nakayama A, Yamanashi Y, Takada T, Shimizu S, Higashino T, Nakajima M, Naito M, Hishida A, Kawai S, Okada R, Sasaki M, Ayaori M, Suzuki H, Takata K, Ikewaki K, Harada-Shiba M, Shinomiya N, Matsuo H. *Hum Cell*. 2021 Nov;34(6):1727-1733.
- 12 : Ethical, legal and social implications of human genome studies in radiation research: a workshop report for studies on atomic bomb survivors at the Radiation Effects Research Foundation. Noda A, Kato K, Tamura C, Biesecker LG, Imaizumi M, Inoue Y, Henderson GE, Wilfond B, Muto K, Naito M, Kayukawa J. *J Radiat Res*. 2021 Jul 10;62(4):656-661.
- 13 : Oral care and oral assessment guide in breast cancer patients receiving everolimus and exemestane: subanalysis of a randomized controlled trial (Oral Care-BC). Umeda M, Ota Y, Kashiwabara K, Hayashi N, Naito M, Yamashita T, Mukai H, Nakatsukasa K, Amemiya T, Watanabe KI, Hata H, Kikawa Y, Taniike N, Yamanaka T, Mitsunaga S, Nakagami K, Adachi M, Kondo N, Shibuya Y, Niikura N. *Ann Transl Med*. 2021 Apr;9(7):535.
- 14 : Secondary endpoints analysis in patients with estrogen receptor-positive metastatic breast cancer treated with everolimus and exemestane enrolled in Oral Care-BC. Nakatsukasa K, Niikura N, Kashiwabara K, Amemiya T, Watanabe KI, Hata H, Kikawa Y, Taniike N, Yamanaka T, Mitsunaga S, Nakagami K, Adachi M, Kondo N, Shibuya Y, Hayashi N, Naito M, Yamashita T, Umeda M, Mukai H, Ota Y. *BMC Cancer*. 2021 Jan 7;21(1):34.
- 15 : Diagnostic system during dental health examination for university freshmen by resident dentists in the early stage of training: Kisako Sasahara, Masaru Sugiyama, Rumi Nishimura, Asako Maehara, Hiroki Nikawa. *Hiroshima University Dental Journal* 53(2), 75-81, 2021.

## B) Review

- 1 : The Japanese Society for Oral Health Sciences Conference Statement "Lifetime 28": A Consideration of the Scientific Basis: Tatsuo Yamamoto, Yoshihisa Yamashita, Mariko Naito, Rumi Nishimura, Masanori Iwasaki, Kentoki Takeuchi: *Dentistry Perspectives* 137(4), 2021.

## C) Publications

None

## C) Other Publications

- 1 : Chapter 8 Caries activity tests : Prophylactic Treatment of Dental Caries for Dental Hygienists 2nd : Niitani Y, Nishimura R(ed. By Nakagaki H, Katou K, Ishitobi K and Kousaka T) : Ishiyaku Publishers,Inc (Tokyo): 126-130,2021.
- 2 : Implant treatment: The newest series of textbook for dental hygienist education -Basic theory and practical process for prosthodontic dentistry: Nishimura R(ed. By Akagawa Y, Suese K, Masui I, Aiba C and Yamada S): Ishiyaku Publishers,Inc (Tokyo): 200-209, 2021.
- 3 : Dysphagia Rehabilitation for Dental Hygienists 2nd : Nishimura R (ed. By Inoue M, Kikutani T, Sato Yshimoyama K, Fujitani J, Huruya J, Mizugami M and Mukai Y) : Ishiyaku Publishers,Inc (Tokyo):135-144, 2021.



## D) Presentations at Scientific Meetings

- 1 : A case who complained tongue swelling and bulbar palsy dysphagia but did not reach a definitive diagnosis: Yamada S, Yoshida M, Yoshikawa M, Nagasaki T, Tsuga K: The 32nd Society of Japanese Clinical dysphasia Research (Hiroshima),2021.
- 2 : Oral function, maxillofacial skeleton, and dentition in two patients treated with MFT. Ando K., Asakawa Y, Tsuka Y, Okada M, Yamada S, Naito T, Yamamoto S, Komatsu M, Tanimoto K: The 60th Scientific Meeting of Hiroshima Prefecture Dental Association and 105th Scientific Meeting of Hiroshima University Dental Society (Hiroshima),2021.
- 3 : Efforts of the Center for Dental Hygienists' Education and Training, Hiroshima University in the Project to Support the Return to Work of Dental Hygienists. : Daijo A, Kurawaki Y, Aimi R, Misumi K, Nishimura R, Matsumoto A, Takemoto T, Naito M : The 60th Scientific Meeting of Hiroshima Prefecture Dental Association and 105th Scientific Meeting of Hiroshima University Dental Society (Hiroshima),2021.
- 4 : Relationship between history of diabetes mellitus and oral health status, oral health behavior and awareness. Ishizu H., Nishimura R., Yamada S., Segawa N., Uchibori N., Usami T., Wakai T., Naito M. : The 60th Scientific Meeting of Hiroshima Prefecture Dental Association and 105th Scientific Meeting of Hiroshima University Dental Society (Hiroshima),2021.
- 5 : Programs of the Center for Dental Hygienists' Education and Training, Hiroshima University in the Project to Support the Return to Work of Dental Hygienists. : Kurawaki Y, Aimi R, Misumi K, Daijo A, Nishimura R, Matsumoto A, Takemoto T, Naito M : The 24th Scientific Meeting of the Japanese Association for Dental Science (Web),2021.
- 6 : Studies on the occupational stress of Dental Hygienists. : Kurawaki Y, Aimi R, Misumi K, Daijo A, Nishimura R, Matsumoto A, Takemoto T, Naito M : The general meeting of Chugoku Society for Dental Practice Administration(Hiroshima),2021.
- 7 : Relationships between leisure-time exercise and dysphagia risk in the Japanese population : Maehara T, Nishimura R, Tsukamoto M, Kadomatsu Y, Kubo Y, Okada R, Nagayoshi M, Tamura T, Hishida A, Takeuchi K, Wakai K, Yoshitake A, Naito M. : 2nd World Dysphagia summit (Web), 2021.
- 8 : Association of number of teeth present with nutrient intake: Asaeda M., Nishimura R., Suma S., Tsukamoto M., Kadomatsu Y., Kubo Y, Okada R., Nagayoshi M., Tamura T, Hishida A., Takeuchi K., Wakai K., Ishizu H., Naito M.: The 2nd World Dysphagia Summit (Web), 2021.
- 9 : Association of the timing of dental examination with oral conditions and oral hygiene awareness: Asaeda M., Yoshida Y., Kawano A., Fukuda M., Miyode M., Takahashi Y., Hama Y., Nakamura M., Ujihashi T., Yagi T.: The 16th Annual Meeting of the Japan Society for Dental Hygiene (Web), 2021.
- 10 : Awareness survey and effectiveness of oral health education in dental examination for university freshmen: Kawano A., Yoshida Y., Asaeda M., Fukuda M., Miyode M., Takahashi Y., Hama Y., Nakamura M., Ujihashi T., Yagi T.: The 16th Annual Meeting of the Japan Society for Dental Hygiene (Web), 2021.
- 11 : Association of dental hygienists and other parents' knowledge about oral hygiene with children's oral health behavior: Shimizu H., Ikeda A., Uehara H., Asaeda M., Aiba C.: The 16th Annual Meeting of the Japan Society for Dental Hygiene (Web), 2021.
- 12 : Effect of chocolate containing *Lacticasebacillus rhamnosus* L8020 on the oral environment: Fujishima N, Fujishige K, Nishimura R, Matsumoto A, Nikawa H, Naito M: The 16th Annual Meeting of the Japan Society for Dental Hygiene (Web), 2021.
- 13 : Perception of class evaluation on "Dental Preventive Care I": Arimoto N, Amasaki J, Sakamoto Y, Yamamoto K, Kawano A, Nakamura T:12th Japan Society of Dental Hygiene Education (web), 2021.
- 14 : Impact of removable dentures on oral health-related QOL: Arimoto N, Nishimura R, Wakai K, Naito T, Umemura O, Hanada N, Kawamura T, Kobayashi T, Naito M: The 99th General Session of the IADR(web), 2021.
- 15 : The analysis of newspaper articles' reporting of aspiration pneumonia.: Fukuda M, Hirabara S, Fukutani H, Ishizu H, Nishimura R, Naito M: The 13<sup>th</sup> Annual Meeting of the Japanese Association of Health Communication(web), 2021.
- 16 : Association between maternal caries experience and early childhood caries in their children: A systematic review.: Sumitani E, Kondo M, Nishimura R, Ishizu H, Asao Y, Iwamoto Y, Naito M. The

- 80th Annual Meeting of Japanese Society of Public Health (Tokyo),2021.
- 17 : Association between dysphagia and oral sensation throughout perception in the general adult.: Nishimura R, Naito M: The 32<sup>nd</sup> Annual Meeting of Japanese Society for Mastication Science and Health Promotion(web),2021.
- 18 : Association between regular dental examination and willingness to pay for health: Kobayashi T, Naito M, Segawa N, Ogawa N, Utibori N, Watanabe M, Kuroyanagi Y, Usami T, Kondo Y, Wakai K.: The 91st Annual Meeting of the Japanese Society for Hygiene(Toyama),2021.
- 19 : Dai Towa, Mariko Naito, Mineko Tsukamoto, Yuka Kadomatsu, Yoko Kubo, Rieko Okada, Mako Nagayoshi, Tae Shinokabe, Sayo Kawai, Takashi Tamura, Asayo Hishida, Kentoki Takeuchi, Takeshi Wakai, Nobuyuki Hamashima. Association between PAPSS1 gene polymorphism and fasting blood glucose level. The 31st Annual Meeting of the Japan Epidemiological Association, (Web), 2021.

#### E) Lectures

- 1 : Asaeda M.: Open lecture” Let's enjoy oral health training!”: Kobe Tokiwa regional exchange center (Web), 2021.
- 2 : Asaeda M.: Open lecture” General health starts with oral health!”: Kobe Tokiwa girls' high school (Kobe), 2021.
- 3 : Nishimura R: Hiroshima Dental Hygienists' Association Workshop (Hiroshima),2021.
- 4 : Mariko Naito: Oral frailty: International conference of oral care of the elderly: Focus on prevention of oral frail AR/VR workshop, Taipei Medical University, 2021.

#### F) Social Contributions

- 1 : Asaeda M.: Dental counseling for infants: Child-care Support Center "Toki-wan Moto-roku" (Kobe), 2021.
- 2 : Asaeda M.: Dental counseling for infants: Child-care Comprehensive Support Facility "KIT" (Kobe), 2021.
- 3 : Asaeda M.: Assessment of oral function at Tokiwa Kindergarten attached to Kobe Tokiwa University (Kobe), 2021.
- 4 : Maehara T : Dental hygienist collaboration committee member of the Japanese Society for Disability and Oral Health, 2021.
- 5 : Nishimura R, Maehara T : Assessment of oral function at special nursing home “Kosei-En”(Hiroshima), 2021.
- 6 : Nishimura R, Maehara T : Japan Dental Hygienist Society Certified Dental Hygienist Seminar Staff of Dental Care Safety Management Course, 2021.

#### (5) Status of Receiving Grants-in Aid for Scientific Research, etc

- 1 : Grants-in-Aid for Scientific Research (Scientific Research (C): Asaeda M (Co-researcher): Effect of lip closing force on young children (aged 3-5years) growth and development. No. 21K10845. ¥200,000.
- 2 : Research grant(FUTOKU foundation): Nishimura R (Principal Investigator): Effect of the joint training for dental health guidance: ¥200,000
- 3 : Health Labour Sciences Research Grant : Nishimura R (Co-researcher): A study to review the work of dental hygienists.
- 4 : Grant-in-Aid for Scientific Research (C): Mariko Naito (Principal Investigator): Research on the impact of tooth loss on QOL, Project No. 21K10211, ¥800,000
- 5 : MEXT Grant-in-Aid for Scientific Research (B): Mariko Naito (Research Co-PI): Establishment of Scientific Evaluation Methods for Patient-Reported Outcomes and Quality of Life - Development of Guidelines for Research and Interpretation, Issue No. 20H03905, ¥1,750,000
- 6 : MEXT Grant-in-Aid for Scientific Research (C): Mariko Naito (Principal Investigator): Study on gene-

environment interaction in tooth loss: investigation using genome-wide association analysis, Proposal No. 18K09908, ¥800,000

7 : Grant-in-Aid for Scientific Research (C) from the Ministry of Education, Culture, Sports, Science and Technology (MEXT): Mariko Naito (co-investigator): Development of an oral care program for patients undergoing cancer immunotherapy, Project number 19K10952, ¥50,000

8: Health and Labor Sciences Research Grant, Comprehensive Research Project for Science and Policy: Mariko Naito (co-investigator): Research on the development of PRO guidelines in collaboration with the efforts of related academic societies, ¥600,000

(5) Academic Awards, etc.

None

(6) Patents

None

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## Department of Anatomy and Functional Restorations

### (1) Staff and Students

Professor	: Masato Kaku
Associate Professor	: Saiji Shimoe
Graduate Students	: Chao Fan Yi (Taiwan), Ayaka Koizumi, Momoyo Higo
Undergraduate Student	: Haruya Kawabata, Nozomi Kimura, Akie Nishimura, Miu Hirakawa, Kosuke Yamada, Kohei Yamamoto, Rei Ueda, Shiori Takeda, Risa Yamamoto
Research Student	: Shogo Iwaguro
Clinical Resident	: Kazunori Itatani

### (2) Main Research Activities

- 1 : Effects of mechanical stress on bone metabolism and angiogenesis
- 2 : Tongue-palatal contact during articulation and swallow
- 3 : Study on dental materials for esthetic
- 4 : Study on new clinical application using novel dental ceramic
- 5 : Study on objective evaluation using the three-dimensional image

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : Kaku M, Kojima S, Yamamoto I, Yamamoto T, Kagawa H, Shimoe S, Tanimoto K. 2021, An investigation of tongue-palatal contact changes in patients with skeletal mandibular lateral deviation after sagittal split ramus osteotomy. *J Craniofac Surg*, 32:e94-e98.
- 2 : Mine Y, Okuda K, Yoshioka R, Sasaki Y, Peng TY, Kaku M, Yoshiko Y, Nikawa H, Murayama T. 2021, Occlusal trauma and Bisphosphonate-Related osteonecrosis of the jaw in mice. *Calsif Tissue Int*, Sep 27. doi: 10.1007/s00223-021-00916-2. Online ahead of print. PMID: 34580750.
- 3 : Iwaguro S, Shimoe S, Takenaka H, Wakabayashi Y, Peng TY, Kaku M. 2021, Effects of dimensions of laser-milled grid-like microslits on shear bond strength between porcelain or indirect composite resin and zirconia. *J Prosthodont Res*, July 29. Doi: 10.2186/jpr.JPR\_D\_20\_00197.
- 4 : Kagawa H, Kaku M, Yamamoto T, Yashima Y, Sumi H, Kamiya T, Yamamoto I, Tanimoto K. 2021, Changes in tongue-palatal contact during swallowing in patients with skeletal mandibular prognathism after orthognathic surgery. *PLoS ONE*, May 19;16:e0251759. Doi: 10.1371/journal.pone.0251759.
- 5 : Peng TY, Shimoe S, Fuh LJ, Lin CK, Lin DJ, Kaku M. 2021, Bonding and thermal cycling performances of two (poly) Aryl-Ether-Ketone (PAEKs) materials to an acrylic denture base resin. *Polymers*, 13: 543; doi:10.3390/polym13040543.
- 6 : Kaku M, Matsuda S, Kubo T, Shimoe S, Tsuga K, Kurihara H, Tanimoto K. 2021, Generalized periodontitis treated with periodontal, orthodontic, and prosthodontic therapy: A case report. *World J Clin Cases*, 9 (21);6110-6124. doi: 10.12998/wjcc.v9.i21.6110.
- 7 : From design, manufacture to delivery of titanium prosthesis with few failures: Shimoe S, Imai H. *Journal of Nippon Academy of Dental Technology*, Vol.42, (1), pp.11–14, 2021.
- 8 : Stress analysis of zirconia clasp for finite element analysis: Koizumi A, Shimoe S, Peng TY, Iwaguro S, Kaku M. *Journal of Nippon Academy of Dental Technology*, Vol.42, (1), pp.78–84, 2021.

#### B) Review

#### C) Publications

- 1 : Kaku M, Tanne K, Tanimoto K. 2020, Treatment of open bite with TAD: The nature of molar intrusion

- and relapse. In Temporary anchorage devices in clinical orthodontics (Editor: Park JH.). Wiley-Blackwell, Hoboken, New Jersey, 309-318.
- 2 : Tanne K., Ohtani J., Sunagawa H., Kaku M., Fujita T. : Treatment of Class II open bite malocclusion supported by skeletal anchorage. In: Skeletal Anchorage in Orthodontic Treatment of Class II Malocclusion – Contemporary application of orthodontic implants, miniscrew implants and miniplates (Editor: Moschos M. Papadopoulos). Mosby Elsevier, London, New York, Toronto etc, 235-238, 2014~
  - 3 : Tanne K., Tanaka E., Kaku M., et al. : Comprehensive dental care for orthodontics -basic technology and development-. Tokyo RinshoShuppan, (Tokyo), 2005~
  - 4 : Kawata T., Kaku M., Owada T.: Safety and high quality of IPS cells manufacture. –Cryopreservation and transportation of IPS cells.: Technical Information Institute Co. LTD, 2016~
  - 5 : The newest series of textbooks for dental technologist-Dental Materials Science: Takayuki Yoneyama, Nikawa Hiroki, Saiji Shimoe, Hideo Matsumura, Hideyuki Imai et al, Ishiyaku Publishers, Inc (Tokyo), 201, 2016~.
  - 6 : The newest series of textbooks for dental technologist-Dental Technology for Fixed Dental Protheses and Restoration: Hideo Matsumura, Yasushi Kumono, Saiji Shimoe, Kazuhiko Suese et al, Ishiyaku Publishers, Inc (Tokyo), 181, 2017~.
  - 7 : The newest series of textbooks for dental technologist-Practice of Dental Technology: Tateo Ozaki, Masahiro Kuwata, Saiji Shimoe, Hiroyuki Miura, Takeshi Murayama et al, Ishiyaku Publishers, Inc (Tokyo), 215, 2017~.
  - 8 : The Newest Series of Textbooks for Dental Technologist - Dental Technology for Fixed Dental Protheses and Restorations (Book language: Traditional Chinese): Hideo Matsumura, Kazuhiko Suese, Akio Shintani, Saiji Shimoe, Hideyuki Imai, et al, Ho-Chi Book Publishing (Taiwan), Total of 182 pages, 2018~
  - 9 : The Newest Series of Textbooks for Dental Technologist - Oral and Maxillofacial Anatomy (Book language: Traditional Chinese): Tzu-Yu Peng (Sole Translator), Ho-Chi Book Publishing (Taiwan), Total of 208 pages, 2019. (ISBN: 9789863682592)
  - 10: The Newest Series of Textbooks for Dental Technologist-Dental Technology for Removable Dentures (Book language: Traditional Chinese): Tzu-Yu Peng (Sole Translator), Ho-Chi Book Publishing (Taiwan), Total of 308 pages, 2019. (ISBN:9789863683094)

#### D) Other Publications

#### E) Presentation at Scientific Meeting

- 1 : Kaku M. An investigation of tongue-palatal contact changes in patients with mandibular protrusion after sagittal split ramus osteotomy by an electropalatography: The 7<sup>th</sup> EPG Symposium (Online), 2021.
- 2 : Chao FY, Ikeda K, Higuchi S, Tanimoto K, Shukunami C, Shimoe S, Kaku M. Remodeling of the sagittal suture development in *Sost* knockout (*Sost*<sup>-/-</sup>) mice associated with cranial flat bone growth: The 6<sup>th</sup> Joint Scientific Meeting in Dentistry (Online meeting), 2021.
- 3 : Yoshioka R., Mine Y., Kaku M., Nikawa H., Murayama T. Lansoprazole and Zoledronate Delayed Hard Tissue Healing of Tooth Extraction Sockets in Mice: The 60<sup>th</sup> Scientific Meeting of Hiroshima Prefecture Dental Association, The 105<sup>nd</sup> Hiroshima University Dental Society (Hiroshima), 2021.
- 4 : Kagawa H., Kaku M., Yamamoto T., Sumi H., Kamiya T., Kojima S., Yamamoto I., Tanimoto K. Changes in tongue-palatal contact during swallowing in patients with skeletal mandibular prognathism after orthognathic surgery. The 80<sup>th</sup> Annual Meeting of The Japanese Orthodontic Society (Yokohama), 2021.
- 5 : Yamamoto I., Kimura T., Kaku M., Kojima S., Kozato S., Fujiwara Y. remote speech therapy under COVID-19 pandemic: The 45<sup>th</sup> Annual Meeting of Japanese Cleft Palate Association (Takarazuka), 2021.
- 6 : Nakamoto H., Kajikawa N., Shimoe S., Kaku M. Changes in the tongue-palatal contact in patients with maxillary protrusion after sagittal split ramus osteotomy by an electropalatography: The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
- 7 : Kajikawa N., Shimoe S., Kaku M. Changes in the tongue-palatal contact in patients with mandibular

- protrusion after sagittal split ramus osteotomy by an electropalatography: The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
- 8 : Tendo Shiho, Shimoe Saiji, Ohtaku Mai, Kaku Masato. Chemical interaction between polyetheretherketone (PEEK) and a functional monomer-containing primer : The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 9 : Higo M, Shimoe S, Iwaguro S, Kaku M. Effect of laser groove processing on resin composite bonding to PEEK : The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 10 : Yumi Nakamura, Saiji Shimoe, Masato Kaku. Effect of injection of alumina blast treatment on adhesion of zirconia and resin for denture base : The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 11 : Mona Shintani, Saiji Shimoe, Masato Kaku. Literature survey on optical impression using intraoral scanner : The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 12 : Yui Tamura, Saiji Shimoe, Masato Kaku. Fatigue resistance of light-cured glazing agents applied to the denture base acrylic resin : The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 13 : Kato M, Shimoe S, Kaku M. Effect of Pretreatment on the Adhesion of PEEK and Denture Base Resins : The 42<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 14 : Takayama Y, Shimoe S, Taji T, Nikawa H. The effect of scan methods by intraoral scanner on trueness and precision of scanning data : The 43<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 15 : Yamamoto K, Shimoe S, Mine Y, Takayama Y, Kaku M. Changes in the surface of titanium due to different abrasives : The 43<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 16 : Kawabata H, Shimoe S, Iwaguro S, Kaku M : Effect of alumina blasting pressure on the adhesion of PEEK to dental composite resin : The 43<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.
  - 17 : Hirakawa M, Shimoe S, Ohtaku M, Kaku M. Effect of alumina blast processing on resin for denture base bonding to PEEK : The 43<sup>th</sup> the meeting of the Nippon Academy of Dental Technology (Online), 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

Grant-in-Aid for Scientific Research(C): (representative) Saiji Shimoe, (member) Masato Kaku, Isao Hirata: Development of bio-friendly polyetheretherketone (PEEK) complex type restoration. (No. 21K10002), ¥1,500,000

#### (5) Academic Awards, etc.

- 1 : Momoyo Higo : The 24<sup>nd</sup> Student's Carving Contest, Silver Award, 2021.3.23
- 2 : Yui Tamura : The 42<sup>nd</sup> Japanese Academy of Dental Technology, Poster Award, 2021.6.26

#### (6) Patents

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## Program of Oral Health Sciences

### Department of Medical System Engineering

#### (1) Staff and Students

Professor	: Takeshi Murayama
Lecturer	: Yuichi Mine
Graduate Students	: Memori Minoda, Shota Okazaki, Saori Takeda, Reina Yoshioka, Shiho Urabe, Yuuki Sasaki,
Graduation Research Students	: Mai Utsunomiya, Satori Undo, Mami Kato, Nana Kurogi, Keiki Tanioka, Saki Tokuhara, Saki Fujimoto, Hiroki Hase, Sumire Oba, Mizuho Sano, Miyui Shimanouchi, Eri Nagasawa, Moeka Kasagawa, Hitone Hirose

#### (2) Main Research Activities

- 1: Application of manufacturing system technologies (e. g., CAD/CAM, 3-d printing) to dentistry
- 2: Application of artificial intelligence to dentistry
- 3: 3-d modeling and computer simulation in dentistry
- 4: Study on mechanisms of medication-related osteonecrosis of the jaw (MRONJ)
- 5: Anti-resorptive agents for postmenopausal breast cancer
- 6: Translational research

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

- 1: Mesoporous Properties of Bioactive Glass Synthesized by Spray Pyrolysis with Various Polyethylene Glycol and Acid Additions: Peng TY, Tsai PY, Chen MS, Mine Y, Wu SH, Chen CY, Lin DJ, Lin CK: *Polymers*, 13(4), 618, 2021.
- 2: Biofilm Formation on the Surface of (Poly) Ether-Ether-Ketone (PEEK) and In Vitro Antimicrobial Efficacy of Photodynamic Therapy on Peri-implant Mucositis: Peng, TY, Lin DJ, Mine Y, Tasi CY, Li PJ, Shih YH, Chiu KC, Wang TH, Hsia SM, Shieh TM: *Polymers*, 13(6), 640, 2021.
- 3: In vivo Efficacy of Lacticaseibacillus rhamnosus L8020 in a Mouse Model of Oral Candidiasis: Ito R, Mine Y, Yumisashi Y, Yoshioka R, Hamaoka M, Taji T, Murayama T, Nikawa H: *Journal of Fungi*, 7(5), 322, 2021.
- 4: Landmark annotation and mandibular lateral deviation analysis of posteroanterior cephalograms using convolutional neural network: Takeda S, Mine Y, Yoshimi Y, Ito S, Tanimoto K, Murayama T: *Journal of Dental Sciences*, 16(3), 957-963, 2021.
- 5: Learning Priority Rule using Neural Network for Job Shop Scheduling with regard to Weighted Tardiness: Eguchi T, Hayashi E, Murayama T: *Proceedings of the 10th International Conference on Leading Edge Manufacturing in 21st Century (LEM21)*, 566-568, 2021.
- 6: Occlusal Trauma and Bisphosphonate-related Osteonecrosis of the Jaw in Mice: Mine Y, Okuda K, Yoshioka R, Sasaki Y, Peng TY, Kaku M, Yoshiko Y, Nikawa H, Murayama T: *Calcified Tissue International* in press
- 7: Detecting the presence of supernumerary teeth during the early mixed dentition stage using deep learning algorithms: A pilot study: Mine Y, Iwamoto Y, Okazaki S, Nakamura K, Takeda S, Peng TY, Mitsuhashi C, Kakimoto N, Kozai K, Murayama T: *International Journal of Paediatric Dentistry* in press
- 8: Alterations to titanium surface depending on the fluorides and abrasives in toothpaste: Shuto T, Mine Y, Makihira S, Nikawa H, Wachi T, Kakimoto K: *Materials* in press
- 9: Automated segmentation of articular disc of the temporomandibular joint on magnetic resonance images using deep learning: Ito S, Mine Y, Yoshimi Y, Takeda S, Tanaka A, Onishi A, Peng TY, Nagasaki T, Nakamoto T, Kakimoto N, Murayama T, Tanimoto K: *Scientific Reports* in press



## B) Review

- 1: Current Status of Deep Learning Studies on Dentistry: Okazaki S, Mine Y, Takeda S, Murayama T: The Journal of Hiroshima University Dental Society, 53(1), 1-10, 2021.

## C) Publications

## D) Other Publications

## E) Presentation at Scientific Meeting

- 1: Support system for maxillofacial prosthesis fabrication with frugal technologies Mine Y, Taji T, Murayama T: The 42th Meeting of the Nippon Academy of Dental Technology(online), 2021.
- 2: Current Status of Deep Learning Studies on Dentistry: Okazaki S, Mine Y, Takeda S, Eguchi T, Murayama T: The 12th Annual Conference of Japan Academy of Digital Dentistry(Tokyo), 2021.
- 3: Landmark annotation and mandibular lateral deviation analysis of posteroanterior cephalograms using a convolutional neural network: Takeda S, Mine Y, Yoshimi Y, Ito S, Tanimoto K, Murayama T: The 12th Annual Conference of Japan Academy of Digital Dentistry(Tokyo), 2021.
- 4: Construction of maxillofacial model by photogrammetry and reproducibility evaluation of 3D printed model: Mine Y, Taji T, Yoshioka R, Wachi T, Murayama T: The 32th Annual Conference of the Japanese Society of Gerodontology(Nagoya), 2021.
- 5: Evaluation of tooth extraction sockets in mice treated with lansoprazole and zoledronic acid: Yoshioka R, Mine Y, Wachi T, Nikawa H, Murayama T: The 32th Annual Conference of the Japanese Society of Gerodontology(Nagoya), 2021.
- 6: Study on in vivo efficacy of Lacticaseibacillus rhamnosus L8020 in a murine oral candidiasis model: Hamaoka M, Mine Y, Yumisashi Y, Taji T, Nikawa H: The 130th Annual Meeting of the Japan Prosthodontic Society(Tokyo), 2021.
- 7: Detection of Supernumerary Teeth during Early Mixed Dentition Stage with Deep Learning-based Convolutional Neural Network Algorithms: Mine Y, Iwamoto Y, Takeda S, Nakamura K, Mitsuhata C, Kozai K, Murayama T: 28th Congress of the IAPD (International Association of Paediatric Dentistry), 2021.
- 8: Automated detection of temporomandibular joint disc in MRI images using semantic segmentation: Ito S, Yoshimi Y, Mine Y, Takeda S, Onishi A, Kakimoto N, Murayama T, Tanimoto K: The 64th Annual Meeting of Chu-shikoku Orthodontic Society(Matsuyama), 2021.
- 9: Evaluation of Extraction Socket Healing in Zoledronate-medicated Mice Combining Lansoprazole: Yoshioka R, Mine Y, Nikawa H, Murayama T: 2021 IADR/AADR/CADR General Session & Exhibition(Boston), 2021.
- 10: Detection of Supernumerary Teeth Using Deep Learning Approach: Takeda S, Mine Y, Iwamoto Y, Nakamura K, Mitsuhata C, Kozai K, Murayama T: 2021 IADR/AADR/CADR General Session & Exhibition(Boston), 2021.
- 11: Lacticaseibacillus rhamnosus L8020 and Murine Oral Candidiasis Model: Hamaoka M, Mine Y, Ito R, Yumisashi Y, Yoshioka R, Taji T, Murayama T, Nikawa H: 2021 IADR/AADR/CADR General Session & Exhibition(Boston), 2021.
- 12: Mandibular lateral deviation detection of posteroanterior cephalograms using a deep learning approach: Okazaki S, Mine Y, Yoshimi Y, Ito S, Takeda S, Tanimoto K, Murayama T: The 6th Joint Scientific Meeting in Dentistry (JSMiD) 2021 (Indonesia), 2021.
- 13: Enhancement of tight junction function by spray-dried powder of Lacticaseibacillus rhamnosus L8020: Kamiura I, Hamaoka M, Mine Y, Kumagai H, Sasaki H, Taji T, Nikawa H: 2021 Annual Meeting of Japan Prosthodontic Society Chugoku & Shikoku Branch(Matsuyama), 2021.
- 14: PDGFR and regurgate cell proliferation in malignant mesothelioma: Suehiro T, Nguyen HTD, Mine Y, Nikawa H, Fujii M: The 93nd Annual Meeting of the Japanese Tissue Culture Association(Hiroshima), 2021.
- 15: BAMBI expression is regulated by CTGF and controls the proliferation of mesothelioma cells: Nguyen HTD, Suehiro T, Mine Y, Fujii M: The 93nd Annual Meeting of the Japanese Tissue Culture Association(Hiroshima), 2021.
- 16: Changes in gene expression in the treatment of malignant mesothelioma using a gravity control

- device: Suehiro T, Nguyen Hoang T. D., Mine Y, Yuge R, Fujii M: The 93rd Annual Meeting of the Japanese Tissue Culture Association(Hiroshima), 2021.
- 17: Job shop scheduling with operators having different skills using genetic algorithm: Eguchi T, Shibushita H, Takemura T, Murayama T: 2021Annual Congress of The Japan Society of Mechanical Engineers(online), 2021.
  - 18: Scheduling for Minimizing Weighted Tardiness Using Neural Network: Eguchi T, Hayashi H, Murayama T: 2021Annual Congress of The Japan Society of Mechanical Engineers(online), 2021.
  - 19: Examination of the effects of PDGFR $\alpha$  and PDGFR $\beta$  for the treatment of malignant mesothelioma: Suehiro T, Nguyen Hoang T. D., Mine Y, Fujii M: The 80th Annual Meeting of the Japanese Cancer Association(Yokohama), 2021.
  - 20: CTGF regulates the expression of BAMBI and controls the proliferation of mesothelioma cells: Nguyen HTD, Suehiro T, Mine Y, Fujii M: The 80th Annual Meeting of the Japanese Cancer Association(Yokohama), 2021.
  - 21: Detection of supernumerary teeth during early mixed dentition stage with deep learning algorithms: Mine Y, Okazaki S, Murayama T: The 78th General Session of the Japanese Society for Dental Materials and Devices(Okayama), 2021.
  - 22: Automated segmentation of temporomandibular joint disc in MRI images using deep learning: Ito S, Yoshimi Y, Mine Y, Takeda S, Onishi A, Kakimoto N, Murayama T, Tanimoto K: The 80th Annual Meeting of the Japanese Orthodontic Society &The 5th International Conference(Yokohama), 2021.
  - 23: Reproducibility evaluation of digital impressions and 3D printed models for maxillofacial region with photogrammetry: Mine Y, Tajii T, Iwaguro S, Murayama T: The 43th Meeting of the Nippon Academy of Dental Technology, 2021.
  - 24: Changes in the surface of pure titanium due to differences in abrasive materials: Yamamoto K, Shimoe S, Mine Y, Takayama Y, Kaku M: The 43th Meeting of the Nippon Academy of Dental Technology, 2021.
  - 25: Lansoprazole and Zoledronate Delayed Hard Tissue Healing of Tooth Extraction Sockets in Mice: Yoshioka R, Mine Y, Kaku M, Nikawa H, Murayama T: 105th Regular Meeting of Hiroshima University Dental Society(Hiroshima), 2021.
  - 26: Study on the enhancement of tight junctions by spray-dried powder of L8020 lactic acid bacteria: Kamiura I, Hamaoka M, Mine Y, Kumagaya H, Sasahara K, Kawahara K, Tajii T, Nikawa H: 105th Regular Meeting of Hiroshima University Dental Society(Hiroshima), 2021.
  - 27: Comprehensive analysis of gingival epithelial-like cell gene expression by spray-dried powder of oral-derived lactic acid bacteria: Fujishiro R, Hamaoka M, Mine Y, Kumagaya H, Sasahara K, Kawahara K, Tajii T, Nikawa H: 105th Regular Meeting of Hiroshima University Dental Society(Hiroshima), 2021.
  - 28: Grad-CAM Helps Explainability of Supernumerary Teeth Detection by Deep Learning: Okazaki S, Mine Y, Iwamoto Y, Takeda S, Mitsuhata C, Murayama T: The 35th Annual Scientific Meeting of International Association of Dental Research - South East Asia Division (IADR-SEA) (Hong Kong), 2021.

#### F) Special Lectures in Academic Meetings

- 1: Artificial Intelligence in Medicine and Dentistry: Yuichi Mine: The 6th Joint Scientific Meeting in Dentistry (JSMiD) 2021 (Indonesia), 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1: KAKENHI Grant-in-Aid for Young Scientists: (Principal Investigator) Mine Y, Hyperocclusive state and MRONJ, Grant Number 20K18604.
- 2: KAKENHI Grant-in-Aid for Scientific Research (B): (Co-Investigator) Mine Y, Development of Multidisciplinary Therapy for Oral Mucosa Malignant Melanoma, Grant Number 19H03826.
- 3: KAKENHI Grant-in-Aid for Scientific Research (C): (Co-Investigator) Mine Y, HiPIMS-DLC for Peri-implantitis Control, Grant Number 20K10053.
- 4: KAKENHI Grant-in-Aid for Scientific Research (C): (Co-Investigator) Mine Y, Development of a Novel Root Surface Caries Preventive Agent to Reduce Tooth Loss in the Elderly, Grant Number 20K10260.

- 5: KAKENHI Grant-in-Aid for Scientific Research (C): (Co-Investigator) Murayama T, Mine Y, A Pioneering Support System for Maxillofacial Prosthesis Realized by Digital Transformation, Grant Number 21K10020.
- 6: KOSE COSMETOLOGY RESEARCH FOUNDATION: (Principal Investigator) Mine Y, Development of innovative maxillofacial prosthesis fabricating system applying deep learning
- 7: National Research and Development Agency, Japan Science and Technology Agency (JST) START Social Return Acceleration Program(SCORE) Team Promotion Type: (Co-Investigator) Mine Y Verification of commercialization of jawbone reconstruction therapy using bone-like tissue from cell culture technology without artificial materials

(5) Academic Awards, etc.

- 1: Mine Y, Taji T, Murayama T: Excellent Poster presentation award of the 42th Meeting of the Nippon Academy of Dental Technology, 2021.
- 2: Yoshioka R: 2021 Hiroshima University Excellent Student Scholarship, 2021.
- 3: Suehiro T, Nguyen Hoang T. D., Mine Y, Nikawa H, Fugii M: English Presentation Award of the 93rd Annual Meeting of the Japanese Tissue Culture Association, 2021.
- 4: Ito S, Yoshimi Y, Mine Y, Takeda S, Onishi A, Kakimoto N, Murayama T, Tanimoto K: Excellent presentation award of the 80th Annual Meeting of the Japanese Orthodontic Society &The 5th International Conference, 2021.

(6) Patents

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## Department of Oral Biology & Engineering

### (1) Staff and Students

Professor : Hiroki Nikawa  
 Associate Professor : Tsuyoshi Taji  
 Lecturer : Hisako Sasahara  
 Education and Research Support Staff : Kaori Taguchi  
 Research Student : Kazuko Kawahara  
 Graduate Student : Tomoya Suehiro, Misa Hamaoka,  
 Undergraduate Student : Taiga Bunai, Nana Hiramoto, Ibuki Kamiura, Ryo Fujishiro, Haruka Tateishi, Rumi Yamaguchi, Hikaru Yamashita, Nagomi Ohgami, Nanao Kinoshita

### (2) Main Research Activities

- 1 : Study on candidal biofilms and denture plaque
- 2 : Study on dental caries and probiotics
- 3 : Design for cationic antimicrobial peptides
- 4 : Study on mechanisms of the alveolar bone resorption
- 5 : Development of bone-resorption inhibitors
- 6 : Study on dental implant materials
- 7 : Collaborative research about allergy
- 8 : Study on digital dentistry
- 9 : Collaborative research about aortic aneurysm
- 10 : Development of oral function devices
- 11 : Analysis of food texture

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : In vivo Efficacy of Lacticaseibacillus rhamnosus L8020 in a Mouse Model of Oral Candidiasis : Ito R, Mine Y, Yumisashi Y, Yoshioka R, Hamaoka M, Taji T, Murayama T, Nikawa H: *Journal of Fungi*, 7(5), 322. 2021.
- 2 : Occlusal Trauma and Bisphosphonate-Related Osteonecrosis of the Jaw in Mice : Mine Y, Okuda K, Yoshioka R, Sasaki Y, Peng TY, Kaku M, Yoshiko Y, Nikawa H, Murayama T: *Calcif Tissue Int*, Sep 27, Online ahead of print. 2021.
- 3 : Effect of CD146+ SHED on bone regeneration in a mouse calvaria defect model: Rikitake K, Kunimatsu R, Yoshimi Y, Nakajima K, Hiraki T, Aisyah Rizky Putranti N, Tsuka Y, Abe T, Ando K, Hayashi Y, Nikawa H, Tanimoto K: *Oral Dis*, Sep 12, Online ahead of print. 2021.
- 4 : Alterations to Titanium Surface Depending on the Fluorides and Abrasives in Toothpaste. Shuto T, Mine Y, Makihira S, Nikawa H, Wachi T, Kakimoto K. *Materials*. 22;15(1):51, Online ahead of print. 2021.
- 5 : Clinical investigation of oral cancer in adolescent and young adult generation: Yoshioka Y, Sakaue T, Matsui K, Tsushima K, Obayashi F, Hamada A, Yamasaki S, Hamana T, Sumi K, Kanda T, Koizumi K, Tani R, Hayashido Y, Sasahara H, Ito Y, Sado T, Ishida Y, Okamoto K, Kobayashi M, Sakamoto A, Myoken Y, Toratani S, Okamoto T: *Oral Sic Int*, 18(2): 126-134, 2021.

#### B) Review

#### C) Publications

#### D) Other Publications

## E) Presentation at Scientific Meeting

- 1: Lactaseibacillus rhamnosus L8020 and Murine Oral Candidiasis Model : Hamaoka M, Mine Y, Ito R, Yumisashi Y, Yoshioka R, Taji T, Murayama T, Nikawa H: 99th IADR (2021 IADR/AADR/CADR General Session & Exhibition) (Virtual Meeting) ,2021.

## F) Symposium and special lecture

### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grants-in-Aid for Scientific Research (Scientific Research (C)) : Hiroki Nikawa (Head), Tsuyoshi Taji (Co-investigators), Research Project Number: 20K10053. ¥1,300,000
- 2 : Grants-in-Aid for Scientific Research (Scientific Research (C)) : Tsuyoshi Taji (Head), Hiroki Nikawa (Co-investigators), Research Project Number: 21K10020. ¥1,950,000
- 3 : Collaborative Research budget from *Eisai* Co., Ltd. to Hiroki Nikawa. ¥500,000
- 4 : Donation from ROHTO Pharmaceutical Co., Ltd. to Hiroki Nikawa. ¥300,000
- 5 : Donation from Shikoku nyugyou corporation to Hiroki Nikawa. ¥300,000
- 6 : Donation from Ishida dental & orthodontic clinic to Hiroki Nikawa. ¥50,000
- 7 : Donation from CampusMedico Co., Ltd. to Hiroki Nikawa. ¥3,000,000

### (5) Academic Awards, etc.

### (6) Patents

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## Central Research Laboratory

### (1) Staff and Students

Director : Chisa Syukunami (by-work)  
Assistant Professor :Ikue Hayashi

### (2) Main Research Activities

- 1 : Proteome analysis and metabolome analysis using mass spectrometry
- 2 : Structural analysis of biologically active substances

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : Lactobacillus reuteri BM53-1 Produces a Compound That Inhibits Sticky Glucan Synthesis by Streptococcus mutans: Noda M., Sugihara N., Sugimoto Y., Hayashi I., Sugimoto S., Danshiitsoodol N., Sugiyama M.: Microorganisms, 9(7): 1390, 2021.
- 2 : Intracellular reactive oxygen species level in blood cells of atomic bomb survivors is increased due to aging and radiation exposure: Hayashi T., Furukawa K., Morishita Y., Hayashi I., Kato N., Yoshida K., Kusunoki Y., Kyoizumi S., Ohishi W: Free Radic Biol Med., 171: 126-134, 2021.

#### B) Review

#### C) Publications

#### D) Other Publications

- 1 : Molecular epidemiological study on the effect of smoking on metabolome and inflammation-related biomarkers : Hayashi I., Sugimura H. : Smoking Research Foundation Annual Research Report, 872-877, 2021

#### E) Presentations at Scientific Meetings

#### F) Special lectures in academic meetings

- 1 : Effect of smoking on metabolome and inflammation-related biomarkers : Hayashi I., Sugimura H.: Grant Research Presentations on Smoking Research Foundation: (Online)Tokyo, September 2, 2021

### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Research project, Grant-in-Aid for Scientific Research (C): Hayashi I: Functional analysis of novel acetyltransferase derived from oral streptococcus and its relation to the regulation of virulence: (No. 20 K10268) 1,100,000JPY

### (5) Academic Awards, etc.

### (6) Patents

## Graduate School of Biomedical and Health Sciences

### (1) Staff and Students

Assistant Professor: KATO Fuminori

### (2) Main Research Activities

- 1 : Toxin-antitoxin systems in *Staphylococcus aureus*
- 2 : Transcriptional regulators for pathogenic genes in *Staphylococcus aureus*
- 3 : Molecular genetic tools in *Staphylococcus aureus*

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

#### B) Review

#### C) Publications

#### D) Other Publications

#### E) Presentations at Scientific Meetings

- 1 : Characterization of chromosomally encoded TA systems in *Staphylococcus aureus*: Fuminori Kato, Masayori Inouye: The 16<sup>th</sup> Annual Meeting of Society of Genome Microbiology, Japan (Hakata, online), 2021
- 2 : Characterization of TsaA/TsaT TA system in *Staphylococcus aureus*: Fuminori Kato, Masayori Inouye: The 94th Annual Meeting of Japanese Society for Bacteriology (Okayama, online), 2021
- 3 : Identification of toxin-antitoxin systems in *Staphylococcus aureus*: Fuminori Kato, Masayori Inouye: The 6th Joint Scientific Meeting in Dentistry (Surabaya, Indonesia, online), 2021.
- 4 : Characterization of *Staphylococcus aureus* toxin-antitoxin system inhibiting DNA: Fuminori Kato, Masayori Inouye: The 44th Annual Meeting of the Molecular Biology Society of Japan (Yokohama, online), 2021

### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : JSPS Grant-in-Aid For Scientific Research(C) : *Staphylococcus aureus* toxin-antitoxin system regulating bacterial cell death and persister formation: Fuminori Kato, Grant Number JP20K07480, 4,290,000 yen
- 2 : JSPS Grant-in-Aid For the Promotion of Joint International Research (Fostering Joint International Research (A)): Development of novel antibiotics targeting toxin-antitoxin system in *Staphylococcus aureus* : Fuminori Kato, JP19KK0409, 15,210,000 yen

### (5) Academic Awards, etc.

### (7) Patents

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## Center for Cause of Death Investigation Research & Education

### (1) Staff and Students

Associate Professor/Lecturer: Hiroko Oka (Specially appointed)

### (2) Main Research Activities

- 1 : Cuses of death and oral findings
- 2 : Age prediction using oral specimen and findings
- 3 : Personal identification system
- 4 : Education method and assessment on forensic odontology

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : H Oka, T Taji: How school life with international students develops the intercultural competence of domestic dental students. *European Journal of Dental Education*. 2021 Dec 24. doi: 10.1111/eje.12753. Online ahead of print.
- 2 : M Kitagawa, K Ouhara, H Oka, S Sakamoto, Y Yamane, A Kashiwagi, R Kanamoto, M Miyauchi, K Nagamine: Selective and easy detection of the *Porphyromonas gingivalis* fimA type II and IV genes by loop-mediated isothermal amplification. *Journal of Microbiological Methods*, 185: 106228, 2021.
- 3 : K Yamashiro, H Miki, M Kitagawa, H Oka, A Zulema, S Takashiba: Allergic Reaction to Zirconia Ceramic Bridge Cementation Using a Dental Adhesive Resin Cement: a Case Report, *SN Comprehensive Clinical Medicine*, 3:327–330, 2021.
- 4 : A Kumagai, S Katsumura, H Oka, Y Ohbayashi, E Kosuge, H Saitoh: The experience of participation in practical training for mass disaster by the International Congress of Mass Disaster (CIDEM) project. *Forensic Dental Science*, 14(1):16-19, 2021.
- 5 : A Sakuma, H Saitoh, S Katsumura, A Kumagai, H Oka, A Motomura, H Iwase: Study on the factors hindering improvement in the success rate of dental identification in disasters in Japan. *Japanese Journal of Disaster Medicine* 26 (1) 1-10, 2021.

#### B) Review

#### C) Publications

#### D) Other Publications

- 1: An Activity Report of JUMP (October 2015-March 2021)- To develop through interprofessional collaboration-. Japanese Unidentified and Missing Persons response team

## E) Presentations at Scientific Meetings

- 1 : Current status of the forensic dentistry section at the cause of death investigation research and education hub centers. -A report of FY2019-: Hiroko Oka, Akiko Takeuchi, Katsuhiko Suzuki, Rieka Katsuragi, Hisako Saitoh, Koichi Sakurada, Hiromi Yamashita: The 18<sup>th</sup> Annual Meeting of 警察歯科医会 (Web), 2021.
- 2 : Learning from DVI international standards and discussion about what Japan can apply: Akiko Kumagai, Seiko Katsumura, Hiroko Oka, Yumiko Ohbayashi, Eiko Kosuge, Hisako Saitoh: The 18<sup>th</sup> Annual Meeting of 警察歯科医会 (Web), 2021.
- 3 : Study on dental materials in the oral cavity of Asians-Results of trial oral clinical examination of students in medical and dental fields, 1st report- : Hiroko Oka. The 15<sup>th</sup> Annual Meeting of Japanese Society of Forensic Dental Science (Web, Kyoto), 2021.
- 4 : A Preliminary Survey for the IPW under the Disasters-the Knowledge of Medical Students about Roles of Health Professions : Hiroko Oka. The 40<sup>th</sup> Annual Academic Meeting of Japanese Dental Education Association (Web), 2021.

## F) Special lectures in academic meetings

- 1 : What can I can we do as dentists in disasters  
Hiroko Oka: A Seminar for Dental Trainees at Hiroshima University Hospital (April 2021, Hiroshima)
- 2 : Current status of dental materials in the oral cavity of Asians -Some cases from Vietnam, Indonesia, China-  
Hiroko Oka: A Web seminar of Hiroshima University Center for Cause of Death Investigation Research & Education (November 2021, Web)

## (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grants-in-Aid for Scientific Research (Scientific Research(C)) : Hiroko Oka, No. 21K10253
- 2 : Pfizer Health Research Foundation 2020 : Hiroko Oka, A study for personal identification based on the dental metal composition in oral cavity of Asians

## (5) Academic Awards, etc.

## (8) Patents

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## Division of General Dentistry

### Department of General Dentistry

#### (1) Staff and Students

Professor: Hiroyuki Kawaguchi

Assistant Professor: Hiromi Nishi, Taiji Obayashi, Syuichi Munenaga

Resident: Nami Obayashi

Graduate Student: Noriaki Ide

#### (2) Main Research Activities

- 1 : Research in patient-centered dentistry based on narrative approach
- 2 : Research in general dentistry
- 3 : Examination of postgraduate dental training program
- 4 : Research in health communication strategy
- 5 : Research in clinical education
- 6 : Research in assessment of clinical skills
- 7 : Research in development and standardization of simulated patients
- 8 : Research in taste disorder of patients receiving chemotherapy

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

1. Nishi H, Takahashi S, Ohta K, Takamoto M, Shigeishi H, Go S, Obayashi T, Yoshioka Y, Konishi M, Shimizu Y, Yano K, Miyagawa T, Kakimoto N, Ohge H, Kawaguchi H, Kurihara H. Effects of perioperative oral care on postoperative inflammation following heart valve surgery. *Oral Dis.* 2021 Sep;27(6):1542-1550.
2. Munenaga S, Usuda M, Ouhara K, Maetani Y, Kajiya M, Matsuda S, Furusho H, Miyauchi M, Nakamori M, Maruyama H, Nishi H, Kawaguchi H. External cervical resorption detected via cone-beam computed tomography in a patient with myelin oligodendrocyte glycoprotein antibody-associated disease: A case report. *Clin Case Rep.* 2021 Jul 6;9(7)
3. Miyauchi S, Tokuyama T, Shintani T, Nishi H, Hamamoto Y, Ouhara K, Furusho H, Miyauchi M, Komatsuzawa H, Nakano Y. Periodontitis and the outcome of atrial fibrillation ablation: *Porphyromonas gingivalis* is related to atrial fibrillation recurrence. *J Cardiovasc Electrophysiol.* 2021 Feb 15. Epub ahead of print.
4. Katsura K, Soga Y, Zenda S, Nishi H, Soga M, Usubuchi M, Mitsunaga S, Tomizuka K, Konishi T, Yatsuoka W, Ueno T, Aragaki T, Hayashi T. A cost-minimization analysis of measures against metallic dental restorations for head and neck radiotherapy. *J Radiat Res.* 2021 Mar 10;62(2):374-378..
5. Iwata T, Mizuno N, Ishida S, Kajiya M, Nagahara T, Kaneda-Ikeda E, Yoshioka M, Munenaga S, Ouhara K, Fujita T, Kawaguchi H, Kurihara H. Functional Regulatory Mechanisms Underlying Bone Marrow Mesenchymal Stem Cell Senescence During Cell Passages. *Cell Biochem Biophys.* 2021 Jun;79(2):321-336.
6. Oka H, Nishi H, Obayashi T, Kawaguchi H. Attitudes of trainee dentists toward disaster dental medicine: A questionnaire survey of trainee dentists at Hiroshima University Hospital in 2019, 2020, and 2021 - *The Journal of Japanese Dental Education Association* Vol. 37, No. 3, 2021

##### B) Review

##### C) Publications

## D) Other Publications

## E) Presentations at Scientific Meetings

1. Effect of nisin A produced by *Lactococcus lactis* to *Clostridioides difficile* strain : Noriaki Ide, Miki Kawada-Matsuo, Mi Nguyen Tra Le ,Hiromi Nishi ,Hiroyuki Kawaguchi , Hitoshi Komatsuzawa : 6th Joint Scientific Meeting in Dentistry : 6th Joint Scientific Meeting in Dentistry: WEB held: Poster presentation. 21/07/30-08/01
2. Effect of nisin A produced by *Lactococcus lactis* to *Clostridioides difficile* strains : Noriaki Ide, Miki Kawada-Matsuo, Mi Nguyen Tra Le ,Hiromi Nishi ,Hiroyuki Kawaguchi , Hitoshi Komatsuzawa : The 63rd Annual Meeting of Japanese Association for Oral Biology : WEB held : Poster presentation. 21/10/09~11
3. The Anticancer Drug Irinotecan-induced Changes in Attractive Salt Taste Responses:Nami Obayashi, Nobuyuki Sakayori, Mariko Naito, Hiroyuki Kawaguchi, Makoto Sugita. NIPS Research Meeting (WEB held), 2021.
4. Taste Alteration and the Change of Taste Tissue Caused by Anticancer Drug “Irinotecan” : Nami Obayashi, Nobuyuki Sakayori, Mariko Naito, Hiroyuki Kawaguchi, Makoto Sugita, The 105th Meeting of Hiroshima University Dental Society (Hiroshima), Poster presentation, 2021.
5. The poor oral environment may be a risk factor for the development of head and neck cancer. : Obayashi Taiji, Toigawa Yuya, Taga Ryotaro, Nishi Hiromi, Munenaga Shuichi, Kawaguchi Hiroyuki. The 14<sup>th</sup> Japanese Society of the General Dentistry Meeting (WEB held), 21/10/29-11/06
6. Oral environment and febrile neutropenia during peri-operative chemotherapy in breast cancer. Matukoto Kanako, Sadasa Shinsuke, Nishi Hiromi, Ikejiri Haruka, Kaneko Yuki, Kai Azusa, Kawamata Ayumi, Hiraoka Emiko, Emi Jyunko, Masumoto Norio, Kadoya Manabu, Okada Morito. The 29<sup>th</sup> Annual Meeting of the Japanese Breast Cancer Society(Yokohama). 21/07/01
7. Microbial analysis of thoracic esophageal cancer. Yoshikawa Toru, Nishi Hiromi, Emi Manabu, Hirohata Ryosuke, Hamai Youichi, Okada Morihito. The 76<sup>th</sup> General Meeting of the Japanese Society of Gastroenterological Surgery (WEB held). 21/07/07
8. **Cost estimation study of measures against metallic dental restorations for head and neck radiotherapy in Japan. : Kouji Katsura, Yoshihiko Soga, Sadatomo Zenda, Hiromi Nishi, Marie Soga, Masatoshi Usubuchi, Sachiyo Mitsunaga, Ken Tomizuka, Tetsuhito Konishi, Wakako Yatsuoka, Takao Ueno, Tadanobu Aragaki, Takafumi Hayashi.** MASCC/ISOO Annual Meeting, (Seville), 21/06/24-26
9. Identification of New Predictive Factors for Diagnosis and Treatment by Analysis of Oral Microbiota in Esophageal Cancer Patients. Nishi Hiromi, Yoshikawa Toru, Emi Manabu, Ohta Kouji, Ide Noriaki, Kawaguchi Hiroyuki. The 66th Congress of the Japanese Society of Oral and Maxillofacial Surgeons (WEB held), 21/11/12

## F) Implementation of Seminars / Workshops

- 1 : Kawaguchi H (Director), Nishi H, Munenaga S, Obayashi T (Facillitator): The 24<sup>th</sup> Seminar of Instructor of Dentist Clinical Training at Chugoku-Sikoku regions, 2021/3/27, 28
- 2 : Kawaguchi H (Chief Facillitator), Obayashi (Facillitator) T: Reiwa 3rd year Japan Dental Hygienist Association Certified Dental Hygienist Seminar (WEB held), September 4-5, 2021.
- 3 : Kawaguchi H (President), Obayashi T (Executive Committee) : Health Communication Week 2021 ~ Hiroshima ~, September 29th-October 5th, 2021.

## B) Lecturer • Symposium

1. Lecturer Nishi H : "Medical Cooperation with Local Communities: Points to Note," Hiroshima Prefecture Training Seminar for Consultants for Persons with Difficulties in Providing Dental Health Care Services, Hiroshima, 2021/02/07

2. Lecturer Nishi H : "Oral complications in patients undergoing treatment for diseases," Otsuka Pharmaceutical in-house workshop, Hiroshima, 2021/02/06
3. Symposium Nishi H : "The Role of Dentistry in Evidence-Based Management," The 5th Hiroshima Radiotherapy Team Medical Study Group, Hiroshima, 2021/03/06
4. Lecturer Nishi H : "Medical Safety Measures in Perioperative Oral Care and Home Care" Certified Dental Hygienist Seminar "Dental Safety Management" Course (WEB held), 2021/8/21~2021/09/03.
5. Lecturer Kawaguchi H : "Management of Medical Safety" Certified Dental Hygienist Seminar "Dental Safety Management" Course (WEB held), 2021/8/21~2021/09/03.
6. Lecturer Kawaguchi H : "Resilience Engineering and Medical Safety" Certified Dental Hygienist Seminar "Dental Safety Management" Course (WEB held), 2021/8/21~2021/09/03.
7. Symposium Nishi H : "What we learned from the experience of COVID-19: From the standpoint of dental care" The 23rd National Conference on Infection Control in Public University Hospitals Symposium (WEB held), 2021/11/11
8. Lecturer Nishi H : "Oral Management for Prevention of Complications in Cancer Patients at Hiroshima University Hospital," organized by Chugoku-Shikoku Regional Cancer Professional Development Consortium (WEB held), 2021/12/05

### C) Attending of Lectures, Seminars, and Workshops

1. Obayashi T: Workshop for Development of New Evaluation Method for Clinical Training for Dentists, 2021, organized by Taguchi Group of Health, Labor and Welfare Science Research Group (Web held), 21/08/07
2. Nishi H: 2021 1st Workshop for External Evaluator Training of OSCE for Common Use Examination, organized by Organization for Implementation and Evaluation of Common Use Examination among Universities for Medical Sciences (Nagoya), 21/11/20-21

### I) Implementation of OSCE, CSA

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

1. Grant-in-Aid Scientific Research : Munenaga S, Elucidation of the multiple sclerosis mechanism via periodontal tissue-induced HuR and RANKL-expressing Th17 cells. Project No.21K16970. 4,680,000 yen
2. Grant-in-Aid for Scientific Research (C): Principal Investigator: Nishi H, Development of a system to prevent systemic complications in cancer chemotherapy targeting oral bacteria. Project No. 20K10162. 4,420,000 yen
3. Grant-in-Aid for Scientific Research (C): Principal Investigator: Kawaguchi H, Utility of the perioperative oral management by the probiotics. Project No. 18K09880. 4,030,000 yen
4. AMED 2021: Project sharing Leader: Nishi H, "Research and Development of Innovative Drugs for Emerging and Re-emerging Infectious Diseases", Research and Development on Inhibition of the Establishment of Drug-Resistant Bacteria in the Oral and Respiratory Tracts.

#### (5) Academic Awards, etc.

#### (6) Patents

## Division of Oral Health and Development Department of Oral Health

### (1) Staff and Students

Professor: Kouji Oota, Toshinobu Takemoto, Mariko Naito, Hiroki Nikawa, Masato Kaku

(\* ) Chief: Kouji Oota (by-work)

Associate Professor: Tsuyoshi Taji

Associate Professor/Lecturer: Hisako Sasahara, Hideo Shigeishi, Atsue Matsumoto

Assistant Professor: Yoshie Niitani, Rumi Nishimura, Tomoko Maehara, Yoshino Kaneyasu

Education and Research Support Staff: Naomi Nakashima, Sanae Miyoshi, Yuko Kurawaki, Kotomi Tetsumori, Ayumi Daijo, Keiko Misumi, Hitomi Ito

Please refer to the research achievements of the following each department.

- Department of Public Oral Health: Kouji Oota, Hideo Shigeishi, Tomoko Maehara, Yoshino Kaneyasu
- Department of Oral Epidemiology: Mariko Naito, Rumi Nishimura
- Department of Oral Health Management: Toshinobu Takemoto, Atsue Matsumoto, Yoshie Niitani
- Department of Anatomy and Functional Restorations: Masato Kaku
- Department of Oral Biology & Engineering: Hiroki Nikawa, Tsuyoshi Taji, Hisako Sasahara

### (2) Main Research Activities

- 1 : Study on oral function in the elderly
- 2 : Study on Job Return Support Program

### (3) Achievements

#### A) Original Papers (including Case Reports)

- 1 : Relationship between dietary diversity and oral function among older women aged 75 years and over participating in community-based health exercise programs.: Miyoshi S, Saito A, Shigeishi H, Ohta K, Sugiyama M : The Journal of Japan Society for Dental Hygiene, 15(2), 62-69, 2021.
- 2 : Relationship between oral and physical function and length of participation in long-term care prevention programs in community-dwelling older Japanese women. : Miyoshi S, Saito A, Shigeishi H, Ohta K, Sugiyama M : Eur Geriatr Med. 12(2):387-395, 2021.

#### B) Review

#### C) Publications

#### D) Other Publications

#### E) Presentations at Scientific Meetings

- 1 : Programs of the Center for Dental Hygienists' Education and Training, Hiroshima University in the Project to Support the Return to Work of Dental Hygienists. : Kurawaki Y, Aimi R, Misumi K, Daijo A , Nishimura R, Matsumoto A, Takemoto T, Naito M : The 24th Scientific Meeting of the Japanese Association for Dental Science(web),2021.
- 2 : Studies on the occupational stress of Dental Hygienists. : Kurawaki Y, Aimi R, Misumi K, Daijo A , Nishimura R, Matsumoto A, Takemoto T, Naito M : The general meeting of Chugoku Society for Dental Practice Administration(Hiroshima),2021.
- 3 : Efforts of the Center for Dental Hygienists' Education and Training, Hiroshima University in the Project to Support the Return to Work of Dental Hygienists. : Daijo A, Kurawaki Y, Aimi R, Misumi K,

Nishimura R, Matsumoto A, Takemoto T, Naito M : The 60th Scientific Meeting of Hiroshima Prefecture Dental Association and 105th Scientific Meeting of Hiroshima University Dental Society (Hiroshima),2021.

F) Lectures

(4) Status of Receiving Grants-in Aid for Scientific Research, etc.

(5) Academic Awards, etc.

1 : Sanae Miyoshi : Japan Dental Hygienists' Association Academic Paper Award (Sunstar Foundation Award) , Encouragement Award, 2021

(6) Patents

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## Division of Oral Health and Development Department of Special Care Dentistry

### (1) Staff and Students

Professor	: Yoshiyuki Okada (*) Chief: Yoshiyuki Okada
Lecturer	: Yuki Oda (lecturer in Hospital)
Assistant professor	: Yuriko Yoshida
Medical Doctor	: Chiaki Furutani, Hisaho Yamaguchi, Masako Morimoto Yoshifumi Nishio
Clinical Staff	: Kota Miyahara, Hironori Miyazaki
Research Student	: Kota Miyahara, Hironori Miyazaki, Hisaho Yamaguchi, Masako Morimoto Yoshifumi Nishio, Momo Adachi
Clinical Trainee	: Fumiko Hayashi, Masaki Hayashiuchi, Nobuyuki Ando

### (2) Main Research Activities

- 1: Evaluation of the circulatory systems in patients with cardiovascular and congenital heart diseases.
- 2: Effects of vasoconstrictor in local anesthesia on baroreflex sensitivity.
- 3: Relationship between central artery stiffness and periodontal diseases, and the influence on baroreflex sensitivity.
- 4: Influences of sleep bruxism in hypoxia on the central cardiovascular control system.
- 5: Underlying mechanisms of suppressed pressor responses to pain stimulation by N2O.
- 6: Alterations of pulse wave reflection by sedative agents.
- 7: Influence of mechan- and chemo-receptors in periodontal ligament on baroreflex sensitivity.
- 8: A study about the influence of *L. Rhamnosus* on caries and periodontal risk with disabled patients
- 9: A study on the frequency of bruxism and clenching during sleep in patients with cerebral palsy
- 10: A study on relationship between autism spectrum disorder and oral-intestinal flora
- 11: Effect of different administration route of midazolam on sedation in patients with intellectual disabilities
- 12: Evaluation of anxiety and stress caused by the spread of Covid-19 infection in people involved in Special Care Dentistry
- 13: A study on the mechanism of the nerve tracts of the spinal cord using the soleus H-reflex
- 14: Effect of licking training for the deterioration of oral function in people with Down syndrome

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

- 1 : Antibacterial effect of a disinfectant spray for sports mouthguards on *Streptococcus sobrinus*. Gen Tanabe, Hiroshi Churei, Yasuo Takeuchi, Aki Kanasaki, Yuriko Yoshida, Jun Touma, Yoshiaki Araie, Toshiaki Ueno: *Dent Res J*, 18(1): pp. 59-63, 2021
- 2 : Useful design of custom-made mouthguard for athletes undergoing orthodontic treatment with brackets and wires. Ruman Uddin Chowdhury, Hiroshi Churei, Gen Tanabe, Yuriko Yoshida, Kairi Hayashi, Hidekazu Takahashi, Takahiro Wada, Motohiro Uo, Takahiro Mizobuchi, Nafees Uddin Chowdhury, Toshiaki Ueno: *Journal of Dental Sciences*, 17(1): pp. 308-315, 2021
- 3 : Use of the fiberglass reinforcement method in thermoplastic mouthguard materials to improve flexural properties for enhancement of functionality. Hiroshi Churei, Ruman Uddin Chowdhury, Yuriko Yoshida, Gen Tanabe, Shintaro Fukasawa, Takahiro Shirako, Takahiro Wada, Motohiro Uo, Hidekazu Takahashi, Toshiaki Ueno: *Dent Mater J*, 40(6): pp. 1338-1344, 2021
- 4 : Thickness change and deformation of custom-made mouthguards after two years of use by Bangladeshi field hockey players, Dental Traumatology. Kairi Hayashi, Ruman Uddin Chowdhury, Nafees Uddin Chowdhury, Abhishekhi Shrestha, Ishan Pradhan, Sharika Shahrin, Yukako Toyoshima, Gen Tanabe, Yuriko Yoshida, Kaito Togawa, Hiroshi Churei, Toshiaki Ueno: *Dental Traumatology*. 37(4): pp. 617-622, 2021
- 5 : Treatment of dental caries in a patient with Joubert syndrome without the use of sedatives: A case

- study. Yuki Oda, Keita Yoshida, Chiaki Furutani, Atsuko Wakita, Yoko Hama, Miwa Miyauchi, Yoshiyuki Okada: *Spec Care Dentist*, 41: pp. 411-416, 2021
- 6 : Pharyngeal Deposits Comprising Salivary Mucin in Tube-fed Elderly Patients: MUC2 and MUC7 Immunoreactivity : Kohta Miyahara, Tadashi Ogasawara, Hiromasa Hasegawa, Kohichi Shinotsuka, Katsumitsu Shimada, Takanaga Ochiai, Fa-Chih Shen, Yasuaki Kakinoki : *Dysphagia*, 36: pp. 875–881, 2021
- 7 : Cardiorespiratory synchronisation and systolic blood pressure correlation of peripheral arterial stiffness during endoscopic thoracic sympathectomy: Toshifumi Muneyasu, Harutoyo Hirano, Akira Furui, Zu Soh, Ryuji Nakamura, Noboru Saeki, Yoshiyuki Okada, Masashi Kawamoto, Masao Yoshizumi, Atsuo Yoshino, Takafumi Sasaoka, Shigeto Yamawaki, Toshio Tsuji: *Sci Rep*. 11(1): 5966, 2021
- 8 : Relationship between baroreflex sensitivity and blood pressure reduction during dental treatments under intravenous sedation with propofol: Hironori Miyazaki, Sachi Sumida, Kazushige Isono, Chiaki Furutani, Hironao Asahina, Yudai Higuchi, Kota Miyahara, Tadashi Ogasawara, Yoshiyuki Okada: *JJMCP* 30(2): pp. 88-96, 2021
- 9 : Incisive canal cyst in an intellectually disabled patient with first and second branchial arch syndrome; a case report: Chiaki Furutani, Hironori Miyazaki, Masaki Hayashiuchi, Kota Miyahara, Yuriko Yoshida, Fumiko Hayashi, Yuki Oda, Yoshiyuki Okada: *JJSDH* 42 (3): pp. 258-63, 2021
- 10: A Survey of Parents' Attitude toward Behavior Management for Non-cooperative Patients with Disabilities Comparison between Dental Clinic (Hospital) without Using Drug and with Using Drug: Tadashi Ogasawara, Yasuharu Tachinami, Ayako Okamune, Hiromune Iwatsubo, Yukio Ishikura, Masami Yao, Hideaki Watanabe, Tomoko Suzuki, Chifuyu Ichinose, Yoshihisa Katoh, Tomohiro Ueji, Mutsuko Makiya, Noriaki Asahina, Yukihisa Otsuki, Yoshiyuki Okada, Katsuya Ogata: *JJSDH* 42 (2): pp. 189-195, 2021
- 11: Idiopathic Horizontal Gingival Hyperplasia in Severely Disabled Persons: Nina Wakimoto, Tadashi Ogasawara, Satoshi Komoda, Mizuho Kawase, Souichiro Kawase, Emi Oki, Toshiyuki Inoue, Eiji Kondo, Yoshiyuki Okada, Nobuo Yoshinari: *JJSDH* 42 (1): pp. 84-90, 2021
- 12: A case report of cerebral palsy patient whose over-denture with magnet attachment succeeded to stabilize the denture and reduce the burden on the remaining teeth : Yuki Oda, Chiaki Furutani, Kota Miyahara, Hironori Miyazaki, Masako Morimoto, Hisaho Yamaguchi, Yoshifumi Nishio, Atsuko Wakita, Fumiko Hayashi, Yuriko Yoshida, Yoshiyuki Okada : *J Hiroshima Univ Den Soc*, 53(2): pp.96-101, 2021

## B) Review

- 1 : Role of *Lactobacillus rhamnosus* in Oral Health of Disabled Individuals. Yuki Oda, Chiaki Furutani, Yuika Mizota, Hiroki Nikawa: *Current Oral Health Reports*, Online ahead of print, 2021.

## C) Publications

- 1 : Dentistry for Medically Compromised Patients 2<sup>nd</sup> Edition: Yoshiyuki Okada (coauthored): Nagasue-syoten (Kyoto), p75-79, 2021.

## D) Other Publications

Dental Outlook, Vol.137, No.3 News and Report/ The 31th annual meeting of Japanese Academy of Sports Dentistry: Yuriko Yoshida, Gen Tanabe (coauthored): Ishiyaku Publishers (Tokyo), p702, 2021

## E) Presentations at Scientific Meetings

- 1 : Antibacterial performance and shock absorbance of mouthguard material incorporated with silver-nanoparticles-embedded EVA masterbatch: Yuriko Yoshida, Hiroshi Churei, Takahiro Wada, Yasuo Takeuchi, Motohiro Uo, Yoshiyuki Okada, Toshiaki Ueno: The 6th Joint Scientific Meeting in Dentistry, (Indonesia (Online)), 2021
- 2 : The effect of *Lactobacillus rhamnosus* L8020 on periodontal pathogens in intellectually disabled

- individuals: Yuki Oda, Chiaki Furutani, Tsuyoshi Yaji, Yuika Mizota, Yuriko Yoshida, Kota Miyahara, Hironori Miyazaki, Masako Morimoto, Hisaho Yamaguchi, Yoshifumi Nishio, Yoshiyuki Okada, Hiroki Nikawa: The 6th Joint Scientific Meeting in Dentistry, (Indonesia (Online)), 2021
- 3 : Effects of Central Command Induced by Repetitive Pain Experiences on Hemodynamic Responses during the Cold Pressor Test: Hironori Miyazaki, Kota Miyahara, Tomoko Tokikazu, Haruka Yasuda, Chiaki Furutani, Yuriko Yoshida, Yuki Oda, Yoshiyuki Okada: Experimental Biology 2021 (Indianapolis (Online)), 2021
- 4 : Propofol Decreases the Augmentation Index of Central Arteries via a Delay in the Pulse Wave Reflection: Yoshiyuki Okada, Kazushige Isono, Yudai Higuchi, Tatsuhisa Mitsui, Kota Miyahara, Chiaki Furutani, Hironao Asahina, Tadashi Ogasawara: Experimental Biology 2021 (Indianapolis (Online)), 2021
- 5 : Difficult intubation and postoperative aspiration pneumonia associated with Moebius syndrome; a case report: Aya Oda, Kana Oue, Yuki Oda, Mitsuru Doi, Yoshitaka Shimizu, Mitsuhiro Yoshida, Masahiro Irifune: American society of Anesthesiologists Annual Meeting (San Diego), 2021
- 6 : A survey on changes in self-evaluation of knowledge, skills, and attitudes related to special care dentistry over time among residents trained in special care dentistry in Hiroshima University Hospital: Yuriko Yoshida, Yuki Oda, Chiaki Furutani, Kota Miyahara, Tomoko Tokikazu, Mayuko Watari, Yuika Mizota, Hiromi Nishi, Hiroyuki Kawaguchi, Yoshiyuki Okada: The 38th Japanese Society for Disability and Oral Health (Yokohama (Online)), 2021.
- 7 : A research about the extent of useful bacteria colonization in oral cavity caused by continuous probiotics intake in individuals with intellectual disabilities: Yuki Oda, Chiaki Furutani, Yuika Mizota, Kota Miyahara, Hironori Miyazaki, Shinsuke Takashima, Atsuko Wakita, Tsuyoshi Taji, Yoshiyuki Okada, Hiroki Nikawa: The 38th Japanese Society for Disability and Oral Health (Yokohama (Online)), 2021.
- 8 : A research about the factors for judgement on continuous consultation of Special Care Dentistry during the term of emergency state for covid-19: Chiaki Furutani, Yuki Oda, Yuka Wakabayashi, Haruka Yasuda, Kota Miyahara, Hironori Miyazaki, Shinsuke Takashima, Yuriko Yoshida, Mariko Naito, Yoshiyuki Okada: The 38th Japanese Society for Disability and Oral Health (Yokohama (Online)), 2021.
- 9 : Effects of nitrous oxide on vascular resistance and pulse waves : Kota Miyahara, Hironori Miyazaki, Masako Morimoto, Yoshifumi Nishio, Hisaho Yamaguchi, Chiaki Furutani, Yuki Oda, Yoshiyuki Okada: The 38th Japanese Society for Disability and Oral Health (Yokohama (Online)), 2021.
- 1 0 : A case of autism spectrum disorder in which visual support enabled premedication and dental treatment under general anesthesia: Aya Oda, Yuki Oda, Kana Oue, Tamayo Takahashi, Taiga Yoshinaka, Akari Mukai, Yoshitaka Shimizu, Mitsuhiro Yoshida, Yoshiyuki Okada, Masahiro Irifune: The 38th Japanese Society for Disability and Oral Health (Yokohama (Online)), 2021.
- 1 1 : The effect of intranasal premedication of midazolam for an autism spectrum disorder child with a giant venous valve and mild aortic valve regurgitation. : Kana Oue, Yuki Oda, Aya Oda, Taiga Yoshinaka, Tamayo Takahashi, Akari Mukai, Yoshitaka Shimizu, Mitsuhiro Yoshida, Yoshiyuki Okada, Masahiro Ifirifune: The 38th Japanese Society for Disability and Oral Health (Yokohama (Online)), 2021.
- 1 2 : An effective case of nasal high-flow oxygen therapy for type 2 respiratory failure after dental treatment under general anesthesia in a patient with cerebral palsy: Aya Oda, Kana Oue, Yuki Oda, Akari Mukai, Mitsuru Doi, Yoshitaka Shimizu, Mitsuhiro Yoshida, Masahiro Irifune: The 31st Meeting of Chugoku-Shikoku Dental Anesthesia Study Group (Okayama), 2021.
- 1 3 : Difficult intubation and postoperative aspiration pneumonia associated with Moebius syndrome; a case report: Aya Oda, Kana Oue, Yuki Oda, Mitsuru Doi, Yoshitaka Shimizu, Mitsuhiro Yoshida, Masahiro Irifune: American society of Anesthesiologists Annual Meeting (San Diego), 2021
- 1 4 : Disaster Preparedness Initiatives in the Outpatient Dentistry of Hiroshima University Hospital: Maiko Kawagoe, Hiroyuki Kawaguchi, Miyuki Nakaoka, Taiji Ohbayashi, Hiroko Oka, Yasuhiko Abe, Kohji Ohta, Yoshiyuki Okada, Hideki Shiba: The104th Meeting of Hiroshima University Dental Society (Hiroshima), 2021.
- 1 5 : A case of a mouthguard provided to a boccia enthusiast: Yuriko Yoshida. Yoshiyuki Okada: The 32nd Annual Meeting of Japanese Academy of Sports Dentistry (Yokohama (Online)), 2021 .
- 1 6 : Exfoliated epithelial membrane and oral bacterial flora on the Palates with Tube feeding patients Analysis by Next-generation Sequencer (second report): Hironao Asahina, Toshie Akieda, Kota

Miyahara, Kohei Mtsamura, Yoshiyuki Okada, Tadashi Ogasawara: The 32nd Annual Meeting of Japanese Society of Gerodontology (Yokohama (Online)), 2021.

- 1 7 : The relationship between membranous substances of the palate and oral mucosa moistur: Naohiro Asahina, Noriaki Asahina, Kota Miyahara, Kohei Matsumura, Yoshiyuki Okada, Tadasi Ogasawara: The 27th Annual Meeting of Japanese Society of Dysphagia rehabilitation (Nagoya), 2021.

#### F) Special lectures in academic meetings

- 1 : Pharmacologic Behavior Management in Special Needs Patients: Yoshiyuki Okada (Invited Speaker), The 14th National Scientific Meeting in Pediatric Dentistry, Indonesian Pediatric Dentist Association, Surabaya – Indonesia, 2021
- 2 : Yoshiyuki Okada : Basic knowledge and dental treatment of children with disabilities: What to do in various situations: Hiroshima Prefecture Comprehensive Project for Securing Community Medical Care, Consultation Doctor Training Workshop, Hiroshima Prefecture Oral Health Liaison Council, Hiroshima, 2021
- 3 : Research design and how to fill out a research ethics application form. Yoshiyuki Okada (Lecturer): Basic Training Course for Specialists in Special Care dentistry [Medical Ethics Seminar] The Society of Dentistry for Persons with Disabilities 2021

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

1. Grants-in-Aid for young scientists : Yuki Oda (PI, New), Effects of probiotics on the oral, intestinal, and brain phases -Examination in autistic spectrum disorder. 21K17199. 4,550,000 yen.
2. Grants-in-Aid for scientific research (C): Yuki Oda (CI, New), Construction of dental capability strategy for persons with disabilities and their families: Oral and well-being surveys at other facilities. 21K10206. 3,900,000yen.
3. Grants-in-Aid for scientific research (C) : Yoshiyuki Okada (CI, New), Establishment of a method for evaluating nociceptive stimuli during surgery by measuring electrical activity of peripheral blood vessels. 21K08923. 4,030,000yen
4. Grants-in-Aid for scientific research (C) : Yoshiyuki Okada (CI, New), Association of sympathetic baroreflex with the occurrence of atrial fibrillation after transcatheter aortic valve replacement. 21K08053. 4,160,000yen
5. Grants-in-Aid for scientific research (B): Yoshiyuki Okada (CI, Continuance), Proposal of a non-invasive estimation method for human peripheral sympathetic nerve activity and challenge to establish a measurement method of pain sensation. 19H04442. 17,420,000yen.
6. General foundation Ryokufukai. The year of 2020 Grant for young researcher: Hironori Miyazaki (PI, New). Effect of central command induced by stress experience on hemodynamics and its modification by nitrous oxide sedation. 200.000yen.

#### (5) Academic Awards, etc.

- 1 : Excellent Student Scholarship 2021. Hironori Miyazaki (D3)
- 2 : Excellent Student Scholarship 2021. Kota Miyahara (D3)

#### (6) Patents

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## Central Clinical Facilities Division of Special Dental Treatment

### (1) Staff and Students

Chief Professor : Kotaro Tanimoto  
 Research Associate : Sachiko Yamada  
 Research Associate : Yukimi Yasuhara

### (2) Main Research Activities

- 1 : Research for improvement in articulation problem
- 2 : Research for relation between lingual pressure and the function of speech/swallowing
- 3 : Research for speech and swallowing rehabilitation of oral cancer

### (3) Research Achievements

#### A) Original Papers (including Case Reports)

#### B) Review

#### C) Publications

#### D) Other Publications

#### E) Presentation at Scientific Meeting

- 1 : A case who complained tongue swelling and bulbar palsy dysphagia but did not reach a definitive diagnosis : Yamada S., Yoshida M., Yoshikawa M., Nagasaki T., Tsuga K.: The 32nd Society of Japanese Clinical dysphasia Research (Hiroshima), 2021.
- 2 : Relationship between history of diabetes mellitus and oral health status, oral health behavior and awareness : Ishizu H., Nishimura R., Yamada S., Segawa N., Uchibori N., Usami T., Kuroyanagi Y., Wakai T., Naito M.: The 60th Scientific Meeting of Hiroshima Prefecture Dental Association and 105th Scientific Meeting of Hiroshima University Dental Society (Hiroshima), 2021.
- 3 : 2 cases of MFT treatment evaluated based on oral function, skeletal analysis and dental model : Ando K., Asakawa Y., Tsuka Y., Okada M., Yamada S., Naitou T., Yamamoto S., Komatsu M., Tanimoto K.: The 60th Scientific Meeting of Hiroshima Prefecture Dental Association and 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.

#### F) Special lectures in academic meetings

- 1 : Do you know what the Speech therapists exactly do at work? : Yasuhara Y.: Gokou-highschool (Kure), 2021.
- 2 : Do you know what the Speech therapists exactly do at work? : Yasuhara Y.: Yasugi-highschool (Yasugi), 2021.

- 3 : Do you know what the Speech therapists exactly do at work? : Yasuhara Y.: Nisshokan-highschool (Miyoshi), 2021.
- 4 : The relationship between oral disease and articulation: Yasuhara Y.: Hiroshima University Higashi-Hiroshima campus lecture for graduate students in Linguistics department. (Higashi Hiroshima), 2021.
- 5 : Assessment and actuality of Dysphagia Rehabilitation: Yasuhara Y.: Hiroshima pref. community-based health care and nursing mutual security project: Workshop of the swallowing functional training (Hiroshima), 2021.
- 6 : Assessment and actuality of Dysphagia Rehabilitation: Yasuhara Y.: Hiroshima pref. community-based health care and nursing mutual security project: Workshop of the swallowing functional training (Kure), 2021.
- 7 : Assessment and actuality of Dysphagia Rehabilitation: Yasuhara Y.: Hiroshima pref. community-based health care and nursing mutual security project: Workshop of the swallowing functional training (Fukuyama), 2021.

(4) Status of Receiving Grants-in Aid for Scientific Research, etc.

(5) Academic Awards, etc.

(6) Patents

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## Central Clinical Facilities

### Center of Oral Clinical Examination

#### (1) Staff and Students

Director:	Hideki Shiba
Lecturer:	Masae Kitagawa (Clinic, Until September) , Tomoaki Shintani
Part-time Dentist:	Masae Kitagawa (Clinic, From October)
Research Associate:	Toshinori Ando
Dentist:	Shinnichi Sakamoto
Technician:	Rie Miyata

#### (2) Main Research Activities

- 1 . Diagnostic pathological study on head and neck lesions.
- 2 . Study on test and treatment of metal allergy and dry mouth.
- 3 . Molecular pathological study on development and progression of oral squamous cell carcinoma.
- 4 . Study on molecular target therapy to oral cancer targeted with HBp17/FGFBP.
- 5 . Analysis of actual condition of oral bacterial infection.
- 6 . Molecular pathological research on oral/head and neck cancer focusing on genomic alterations and the Hippo pathway.

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

- 1 : Relationships between intraoral ultrasonographic and histopathological findings in patients with tongue cancer : Konishi M., Sakamoto S., Ogawa I, Yoshioka Y., Ono S., Kakimoto N.: *Head Neck*, 43(9), 2778-2785, 2021.
- 2 : Elimination of *Porphyromonas gingivalis* inhibits liver fibrosis and inflammation in NASH : Nagasaki A., Sakamoto S., Arai T., Kato M., Ishida E., Furusho H., Fujii M., Takata T., Miyauchi M.: *J Clin Periodontol*, 48(10), 1367-1378, 2021.
- 3 : Development of Kikuchi-Fujimoto disease after a cervical lymph node metastasis of mucoepidermoid carcinoma: a case report: Higaki M., Kanda T., Ando T., Tani R., Toratani S.: *Oral and Maxillofacial Surgery*, 25(1), 133-137, 2021.
- 4 : A case of maxillary ameloblastic carcinoma with atypical histology : Hamana T., Hayashido Y., Mishima T., Hirota S., Hamada A., Ando T., Miyauchi M., Toratani S.: *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*, 33(5), 536-545, 2021.
- 5 : EGFR Regulates the Hippo Pathway by promoting the tyrosine phosphorylation of MOB1 : Ando T., Arang N., Wang Z., Costea DE., Feng X., Goto Y., Izumi H., Gilardi M., Ando K., Gutkind JS.: *Communications Biol.*, 4(1), 1237, 2021.
- 6 : Oral administration of bovine lactoferrin suppresses the progression of rheumatoid arthritis in an SKG mouse model: Yanagisawa S., Nagasaki K., Chea C., Ando T., Ayuningtyas NF., Inubushi T., Ishikado A., Imanaka H., Sugiyama E., Takahashi I., Miyauchi M., Takata T.: *Plos One*, in press, 2021.
- 7 : Heparin-Binding Protein 17/Fibroblast Growth Factor-Binding Protein-1 Knockout Inhibits Proliferation and Induces Differentiation of Squamous Cell Carcinoma Cells: Shintani T., Higaki M., Okamoto T.: *Cancers (Basel)*, 13(11), 2684, 2021.
- 8 : *Porphyromonas gingivalis* and left atrial appendage spontaneous echo contrast in atrial fibrillation ablation candidates: Miyauchi S., Tokuyama T., Shintani T., Uotani Y., Miyamoto S., Ikeuchi Y., Okamura S., Okubo Y., Miyauchi M., Nakano Y.: *Heart Vessels*, 36 (11), 1721-1729, 2021.
- 9 : Periodontitis and the outcome of atrial fibrillation ablation: *Porphyromonas gingivalis* is related to atrial fibrillation recurrence: Miyauchi S., Tokuyama T., Shintani T., Nishi H., Hamamoto Y., Ouhara K., Furusho H., Miyauchi M., Komatsuzawa H., Nakano Y.: *J Cardiovasc Electrophysiol*, 32 (5), 1240-1250, 2021.



- 10 : Enhanced KRT13 gene expression bestows radiation resistance in squamous cell carcinoma cells: Nguyen TQ., Hamada A., Yamada K., Higaki M., Shintani T., Yoshioka Y., Toratani S., Okamoto T.: *In Vitro Cell Dev Biol Anim*, 57 (3), 300-314, 2021
- 11 : Selective and easy detection of the *Porphyromonas gingivalis* fimA type II and IV genes by loop-mediated isothermal amplification.: Kitagawa M., Ouhara K., Oka H., Sakamoto S., Yamane Y., Kashiwagi A., Kanamoto R., Miyauchi M., Nagamine K.: *J Microbiol Methods.*, 185:106228, 2021.
- 12 : Identification of a safe and highly specific titanium reagent for patch tests : results from a preliminary clinical trial.: Kitagawa M., Iwamoto K., Oka H., Tanaka M., Takechi M., Kurihara H., Hide M., Shiba H., *JSEDP*, 13(1),39-44, 2021.
- 13 : The effect of transforming growth factor beta 1 on the mineralization of human cementoblasts.: Koba T., Watanabe K., Goda S., Kitagawa M., Mutoh N., Hamada N., Tani-Ishii N.: *J Endod.*,47(4),606-611, 2021.
- 14 : Identification of regulatory mRNA and microRNA for differentiation into cementoblasts and periodontal ligament cells.: Iwata T., Mizuno N., Nagahara T., Kaneda-Ikeda E., Kajiyama M., Kitagawa M., Takeda K., Yoshioka M., Yagi R., Takata T., Kurihara H.: *J Periodontal Res.*, 56(1),69-82, 2021.
- 15 : Allergic Reaction to Zirconia Ceramic Bridge Cementation Using a Dental Adhesive Resin Cement: a Case Report: Yamashiro K., Miki H., Kitagawa M., Oka H., Arias Z., Takashiba S.: *SN Comprehensive Clinical Medicine*, 3, 327-330,2021.
- 16 : Effects of baicalin on the proliferation and expression of OPG and RANKL in human cementoblast-lineage cells.: Kunimatsu R., Kimura A., Sakata S., Tsuka Y., Yoshimi Y., Abe T., Kado I., Yashima Y., Izumino J., Nakatani A., Kitagawa M., Miyauchi M., Takata T., Tanimoto K.: *J Dent Sci*, Epub 2021.
- 17 : A Case of Multiple Oral Squamous Cell Carcinomas Including Soft Palate Basaloid Squamous Cell Carcinoma and Mouth Floor Lymphoepithelial Carcinoma : Fukui A., Ohta K., Nakagawa T., Tada M., Naruse T., Sasaki K., Sakamoto S., Takechi M.: *Hiroshima Univ Dent Soc.*, 53(2), 109-116, 2021.
- 18 : Four Cases of Extranodal Zone Lymphoma of the Mucosa-Associated Lymphoid Tissue (MALT lymphoma) of Salivary Gland in the Oral Cavity: Sakaue E., Koizumi K., Yoshioka Y., Hamana T., Ito N., Ando T., Toratani S.: *J. Hiroshima Univ. Dent. Soc.*, 53(1), 30-37, 2021.

## B) Review

## C) Publications

- 1 : Pathology and Clinical Medicine, head and neck region: Ogawa I, Ando T, Miyauchi M.: *Bunkodo*, 39(3), 234-239, 2021.

## D) Other Publications

- 1 : Dementia, Alzheimer's disease, Internal medicine for dentist: Shintani T., Okamoto T.: *ISHIYAKU PUBLISHERS, INC. (Tokyo)*, 249-251, 2021.
- 2 : Genetic testing of oral bacteria involved in systemic diseases.: Kitagawa M., Nagamine K.: *Precision Medicine*:4(8) , 90-94, 2021.
- 3 : Answer clinical questions. What if a patient suspects of metal allergy comes? : Kitagawa M., Ogawa I., Akashi Y., Matsuzaka K., *The Nippon Dental Review*: 81(5), 72-80, 2021.

## E) Presentations at Scientific Meetings

- 1 : *Porphyromonas gingivalis*-Odontogenic Infection Promotes Development and Progression of NASH-Related Hepatocellular Carcinoma : Sakamoto S., Miyauchi M.: *The 14<sup>th</sup> Annual Meeting of the Japanese Society for Evidence and the Dental Professional (Hiroshima)*, 2021.
- 2 : A clinical study on oral cancer patients treated with immune checkpoint inhibitors in department of oral and maxillofacial surgery, Hiroshima University Hospital.: Yoshioka Y., Ono S., Tani R., Mizuta K., Nakagawa T., Ando T., Sakamoto S., Takechi M., Toratani S., Okamoto T.: *The 75<sup>th</sup> Annual Meeting of Japanese Stomatological Society (Osaka)*, 2021.
- 3 : The mechanism of YAP/TAZ activation through MOB1 phosphorylation by EGFR in oral squamous cell carcinoma: Ando T.: *The 39<sup>th</sup> Annual Meeting of Japanese Society of Oral Oncology (Web)*, 2021.

- 4 : Importance of anti-centromere antibodies in Sjogren's syndrome diagnosis: Focusing on oral findings Kitagawa M., Sugimoto T., Ando T., Kajiya M., Ogawa I., Shima H.: The 14th Annual Meeting of Japanese Society for Evidence and the Dental Professional (Hiroshima), 2021.
- 5 : Two cases of cystadenoma of the palate: Ito N., Koizumi K., Sakamoto S., Sato S., Yamasaki S., Toratani S.: The 49<sup>th</sup> Academic Meeting of the Japanese Society of Oral Surgery, Chugoku-Shikoku Branch (Kochi Web meeting), 2021.
- 6 : A clinical study on oral cancer patients treated with immune checkpoint inhibitors in department of oral and maxillofacial surgery, Hiroshima University Hospital.: Yoshioka Y., Ono S., Tani R., Mizuta K., Nakagawa T., Ando T., Sakamoto S., Takechi M., Toratani S., Okamoto T.: The 115th Annual meeting of Society of Clinical Oncology Hiroshima (Hiroshima), 2021.
- 7 : A case of Crohn's disease diagnosed by oral mucosal lesions: Fukutani T., Tani R., Mishima T., Furusho H., Toratani S.: The 34th Congress of the Japanese Society of Oral Diagnosis / Oral Medicine, The 31th Congress of the Japanese Society Oral Medicine, The 13th Congress of the Japanese Society for Evidence and the Dental Professional, Joint Academic Conference (Tokyo Web meeting), 2021.
- 8 : A case of clear cell carcinoma diagnosed by identification of EWSR1-ATF1 fusion gene: Higaki M., Yoshioka Y., Okamoto K., Sakamoto S., Ando T., Okamoto K., Miyauchi M., Toratani S.: The 66th Congress of the Japanese Society of Oral and Maxillofacial Surgeons (Makuhari Hybrid meeting), 2021.
- 9 : A case of giant cell tumor in the mandibular condyle: Ito N., Koizumi K., Obayashi F., Sakamoto S., Ando T., Toratani S.: The 66th Congress of the Japanese Society of Oral and Maxillofacial Surgeons (Makuhari Hybrid meeting), 2021.
- 10 : Effect of tablets containing Lactobacillus rhamnosus L8020 on the number of Streptococcus mutans bacteria: Kitagawa M., Taji T., Miyata R., Nagamine K., Shiba H., Nikawa H.: The 14th Annual Meeting of Japanese Society for Evidence and the Dental Professional (Hiroshima), 2021.
- 11 : Dental study of anti-centromere antibody-positive Sjogren's syndrome (ACA-SS): Kitagawa M., Sugimoto T., Yoshida Y., Hirata S., Sugiyama E.: The 32nd Meeting of Chugoku-Shikoku Branch of Japan college of Rheumatology (Matsuyama), 2021.
- 12 : Gene amplification of oral anaerobic bacteria.: Nagamine K., Kitagawa M.: The 141st Annual Meeting of the Pharmaceutical Society of Japan (Nagoya), 2021.
- 13 : Effect of childhood eating environment on the bacteria of dental caries.: Kimura R., Kitagawa M., Nagamine K.: The 68th Meeting of the Japanese Society of Nutrition and Dietetics (Niigata), 2021.
- 14 : Genetic testing of Streptococcus mutans and Porphyromonas gingivalis involved in systemic diseases.: Nagamine K., Kitagawa M.: The 44th Annual Meeting of the Molecular Biology Society of Japan (Yokohama), 2021.

## F) Case presentations

- 1 : A case of osteochondroma of the unilateral mandibular condyle with severe occlusal deviation : Nakagawa T., Ono S., Fukui A., Sasaki K., Sakamoto S., Ando T., Miyauchi M., Takechi M.:The 75<sup>th</sup> Annual Meeting of Japanese Stomatological Society (Osaka), 2021.
- 2 : Third supernumerary tooth occurring in the same region during follow-up after the second supernumerary tooth extraction : Akimoto T., Asao Y., Iwamoto Y., Mitsuhashi C., Ando T., Sakamoto S., Kozai K.:The 28<sup>th</sup> Congress of the International Association of Paediatric Dentistry (IAPD) (Virtual Congress), 2021.
- 3 : Maxillary tumor (Clear cell carcinoma) : Ando T., Sakamoto S., Higaki M., Okamoto K., Yoshioka Y., Toratani S., Nakamoto T., Okamoto K., Matsuura H., Kaneko M., Ogawa I., Miyauchi M.:The 135th Academic Meeting of Chugoku-Shikoku Branch of the Japanese Society of Pathology (Kagawa, Web), 2021.
- 4 : Palatal tumor (Polymorphous adenocarcinoma): Furusho H., Sakamoto S., Ando T., Ono S., Mizuta K., Ishida Y., Uetsuki R., Nagasaki S., Takechi M., Miyauchi M.: The 136th Academic Meeting of Chugoku-Shikoku Branch of the Japanese Society of Pathology (Kagawa, Web), 2021.
- 5 : Maxillary tumor (Odontogenic fibroma, amyloid variant): Sakamoto S., Ando T., Ito N., Kanda T., Suei Y., Toratani S., Miyauchi M.: The 32<sup>nd</sup> Annual Meeting of the Japanese Society for Oral Pathology (Kanagawa, Web), 2021.
- 6 : A case of non-sebaceous lymphadenoma-like mucoepidermoid carcinoma: Sakamoto S., Ando T.,

Miyauchi M., Fujihara M., Nakaguro M., Nagao T., Ogawa I.: The 65<sup>th</sup> Annual Meeting of Japan Salivary Gland Society (Tokyo), 2021.

#### G) Special lectures in academic meetings

- 1 : Workshop 9/Salivary gland cytology- Application and explanation of Milan system-WS9-2 Salivary gland tumors in the oral region : Sakamoto S., Ando T., Ogawa I., Miyauchi M.:The 62<sup>nd</sup>Annual Spring Meeting of the Japanese Society of Clinical Cytology (Chiba), 2021.
- 2 : Analysis of genetic alterations and aberrant Hippo signaling pathway regulation in oral cancer : Ando T.:The 14<sup>th</sup> Annual Meeting of the Japanese Society for Evidence and the Dental Professional (Hiroshima), 2021.

#### (4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : Grant-in-Aid for Early-Career Scientists: Sakamoto S.: Comprehensive analysis of NASH-related hepatocarcinoma promotion mechanism by *P. gingivalis* infection. 20K18478, 900,000 yen
- 2 : Grants-in-Aid for Early-Career Scientists: Ando T.: Exploring receptor type tyrosine kinases regulating Hippo pathway for the treatment of patients with head and neck cancer. 20K18477, 900,000 yen
- 3 : Grants-in-Aid for Early-Career Scientists in cancer field by the Yasuda Medical Foundation: Analysis of HRAS mutation and YAP/TAZ activation in epithelial-myoepithelial carcinoma in salivary gland. 1,000,000 yen
- 4 : Grants-in-Aid for Scientific Research (C): Shintani T.: Development of oral cancer treatment with exosome-derived miRNA that regulates HBp17 / FGFBP1. 19K10332, 1,500,000 yen
- 5 : Grants-in-Aid for Scientific Research (C): Kitagawa M.: Establishment of rapid detection method for systemic disease-related oral bacterial genes. 20K09940, 1,560,000 yen

#### (5) Academic Awards, etc.

- 1 : Ando T.: Presentation award, The 135<sup>th</sup> Academic Meeting of Chugoku-Shikoku Branch of the Japanese Society of Pathology

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## Central Clinical Facilities

### Dental Laboratory

#### (2) Staff and Students

Director of Dental Technicians Section : Hiroki Nikawa (Prof.)  
 Assistant Chief Dental Technician : Ryoji Kato  
 Dental Technician : Eisaku Habu, Yoshihiro Otani, Shogo Iwaguro,  
 Yukihiro Takayama, Mai Ohtaku

#### (2) Main Research Activities

- 10 : Management of the patient's information by the use of implanted devices in the denture.
- 11 : Radioprotective prostheses for irradiation therapies
- 12 : Clinical analysis of superstructure of implant.
- 13 : Esthetic dentistry
- 14 : Accuracy of castings
- 15 : Information processing in the dental laboratory
- 16 : Study on dental composite materials for esthetic

#### (3) Research Achievements

##### C) Original Papers (including Case Reports)

- 6: Effects of dimensions of laser-milled grid-like microslits on shear bond strength between porcelain or indirect composite resin and zirconia.: Iwaguro S, Shimoe S, Takenaka H, Wakabayashi Y, Peng TY, Kaku M: J Prosthodont Res, 66(1),151-160,2021.
- 7: In vivo Efficacy of Lacticaseibacillus rhamnosus L8020 in a Mouse Model of Oral Candidiasis : Ito R, Mine Y, Yumisashi Y, Yoshioka R, Hamaoka M, Taji T, Murayama T, Nikawa H: Journal of Fungi, 7(5), 322, 2021.
- 8: Alterations to Titanium Surface Depending on the Fluorides and Abrasives in Toothpaste.: Shuto T, Mine Y, Makihira S, Nikawa H, Wachi T, Kakimoto K: Materials, 22;15(1), 51, Online ahead of print, 2021.

##### D) Review

##### C) Publications

##### D) Other Publications

##### E) Presentation at Scientific Meeting

- 1: Lacticaseibacillus rhamnosus L8020 and Murine Oral Candidiasis Model : Hamaoka M, Mine Y, Ito R, Yumisashi Y, Yoshioka R, Taji T, Murayama T, Nikawa H: 99th IADR (2021 IADR/AADR/CADR General Session & Exhibition) (Virtual Meeting) ,2021.

##### F) Symposium and special lecture

(4) Status of Receiving Grants-in Aid for Scientific Research, etc.

(5) Academic Awards, etc.

(6) Patents

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## Central Clinical Facilities

### Dental Hygiene Section

#### (1) Staff and Students

Director of Dental Hygiene Section: Koji Ohta

Section leader of Dental Hygiene Section: Miyuki Nakaoka

Chief Dental Hygienist: Miho Okada(by-work, From April), Kanako Yano(by-work, From April), Maiko Kawagoe(by-work, From April), Natsumi Ino(by-work, From April)

Dental Hygienists: Atsuko Wakita, Tomoko Tokikazu, Chika Kozono, Yuki Hamamoto(Till November), Yuika Mizota, Kana Dainobu, Yurie Nakano(From May), Yuka Wakabayashi(Till March), Fumi Tokui, Ayaka Yoshimoto(Till March), Saori Ikeda(Till March), Mariko Nakamura, Haruka Yasuda, Shoko Kimura, Sayaka Iwata(Till March), Hina Nitanda, Yasuko Yokoyama, Yuka Tsuzuki(From February), Yuka Kurozumi(From April), Kotone Tanabe(From April), Kiho Naganuma(From April), Fuki Matsuda(From April), Ruri Miyano(From April)

Dental Assistants : Yuka Tamamoto(Till March), Keiko Kodani, Saori Nagamine, Ayako Masuda

#### (2) Main Research Activities

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

- 1 : Current Status of Oral Function Management for Perioperative Children in Pediatric Dentistry : Iwamoto Y., Mitsuhata C., Hamamoto Y., Ogasawara T., Okamine A., Asao Y., Akitomo T., Nakaoka M., Kozai K.: The Japanese journal of pediatric Dentistry, 59(1), 14-19, 2021.
- 2 : What Dental Hygienists Learned through Training with Simulated Patient and How They Applied it in Practice? : Nagatani Y., Nakaoka M., Imafuku R., Yoshida T., Konoo T.: Medical Education, 52(4), 319-324, 2021.

##### B) Review

##### C) Publications

- 1 : Special feature: New normal of preventive measures by infection route of corona vortex  
 ■ Scene New normal of preventive measures by infection route by site-Infection risk and actual infection control : Iwata T., Okada M., Mizuno N. : Van Medical co., Ltd. (Tokyo), 247-253, 2021.

##### D) Other Publications

##### E) Presentation at Scientific Meeting

- 1 : Cases of MFT treatment evaluated based on oral function, skeletal analysis and dental model. : Ando K., Asakawa Y., Tsuka Y., Okada M., Yamada S., Naitou T., Yamamoto S., Komatsu M., Tanimoto K. : The 60th Scientific Meeting of Hiroshima Prefectural Dental Association 105th Hiroshima University Dental Society Regular Meeting (Hiroshima), 2021.
- 2 : Oral health education for primary school children in Cambodia-Approach by dental hygienist- : Kozono C, Iwamoto Y, Nakaoka M, Mikihito K, Kozai K : The 16th Annual Meeting of the Japanese Society of Dental Hygiene (WEB), 2021.
- 3 : Utilization of intraoral scanner to an oral hygiene state evaluation in the implant maintenance : Kawagoe M., Doi K., Kubo T., Takechi M. : The 51st Annual Meeting of the Japanese Society of Oral Implantology (Hiroshima), 2021.

## F) Lecture

- 1 : Oral care in Special care dentistry : Yano K. : Hiroshima prefecture regional medical care nursing comprehensive securing business Education at Hiroshima Oral Health Center· Research function development project Hiroshima prefecture dental health care service provision difficult person consultation physician training workshop (Hiroshima), 2021.
- 2 : Oral care in Special care dentistry : Tokikazu T. : Hiroshima prefecture regional medical care nursing comprehensive securing business Education at Hiroshima Oral Health Center· Research function development project Hiroshima prefecture dental health care service provision difficult person consultation physician training workshop (Hiroshima), 2021.
- 3 : Oral hygiene management of cancer patients : Tokikazu T. : Hiroshima University School of Dentistry Dental Hygienist Education and Training Center Reiwa 3rd Year Public symposium (WEB), 2021.
- 4 : Efforts of dental hygienists in the comprehensive outpatient department for hemophilia at Hiroshima University Hospital : Okada.M : Tottori University Hemophilia Comprehensive Medical Lecture (WEB Hiroshima), 2021.
- 5 : HIV disease and dentistry : Okada.M : AIDS Medical Worker Training for Nurses First-time Examiner Course Workshop (WEB Hiroshima), 2021.
- 6 : Efforts of dental hygienists in the comprehensive outpatient department for hemophilia at Hiroshima University Hospital : Okada.M : Takeda Pharmaceutical Company Limited Takeda kansai Hematology Forum online (WEB Hiroshima), 2021.

(4) Status of Receiving Grants-in Aid for Scientific Research, etc.

(5) Academic Awards, etc.

(6) Patents

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## Central Clinical Divisions

### Division of Medical Informatics and Systems

#### (1) Staff and Students

Director : Yoshiyuki Okada(Co.)  
 Assistant Professor : Masahiko Ohtsuka (Co.), Takeshi Tanaka(Co.)  
 Technician : Tokue Yanagida (Co.)

#### (2) Main Research Activities

- 1 : Research on development and management of healthcare and welfare information system.
- 2 : Research on Medical Informatics.

#### (3) Research Achievements

##### A) Original Papers (including Case Reports)

- 1 : Tanaka T: An Estimation of Impact of Copy-and-Paste Operation by Undergraduate Students in Answering a Web Examination on Their Grades by Text Mining: Japan Journal of Medical Informatics, 41 (Suppl.): 738-741, 2021.
- 2 : Miyaji K, Mihara N, Tanaka T: Evaluation of Possibility of Originally Developed Personal Virtual Medical Training Simulator (PVMTS) for Medical Education: Japan Journal of Medical Informatics, 41 (Suppl.): 864-867, 2021.
- 3 : Imazu M, Ujima K, Tanaka T: Letter Recognition Thresholds for Central Vision and Peripheral Vision: Journal of Japan Society for Low-vision Research and Rehabilitation 21: 98-103, 2021.

##### B) Review

None.

##### C) Publications

None.

##### D) Other Publications

None.

##### E) Presentation at Scientific Meeting

- 1 : Narai A et al: Interviews with the leaders of major visually disabled support groups to arrange the social collaboration of new patients in Japan: the 14th Joint Meeting of Japan-China-Korea Ophthalmologists (Web), 2021.
- 2 : Imazu M, Ujima K, Tanaka T: Letter Recognition Thresholds for Central Vision and Peripheral Vision: The 22<sup>nd</sup> Meeting of Japan Society for Low-vision Research and Rehabilitation (Web), 2021.
- 3 : Narai A et al: Interviews with the leaders of major visually disabled support groups to arrange the social collaboration of new patients: The 22<sup>nd</sup> Meeting of Japan Society for Low-vision Research and Rehabilitation (Web), 2021.
- 4 : Tanaka T: Text-content requirements for a medical institution Web page that is easy to be understood by people with disabilities: The 40th Joint Conference on Medical Informatics (Yonago, Japan & Web), 2021.
- 5 : Tanaka T: An Estimation of Impact of Copy-and-Paste Operation by Undergraduate Students in



Answering a Web Examination on Their Grades by Text Mining: The 41<sup>st</sup> Joint Meeting for Medical Informatics (Naogoya, Japan & Web), 2021.

- 6 : Miyaji K, Mihara N, Tanaka T: Evaluation of Possibility of Originally Developed Personal Virtual Medical Training Simulator (PVMTS) for Medical Education: J The 41<sup>st</sup> Joint Meeting for Medical Informatics (Naogoya, Japan & Web), 2021.

F) Special lectures in academic meetings

None.

(4) Status of Receiving Grants-in Aid for Scientific Research, etc.

- 1 : MEXT KAKENHI Grant-in-aid for Scientific Research(C), No. 21K12594. 400 thousand JPY.  
2 : MEXT KAKENHI Grant-in-aid for Scientific Research(C), No. 19K12699. 100 thousand JPY.  
3 : MEXT KAKENHI Grant-in-aid for Scientific Research(B), No. 20H01595. 1700 thousand JPY.

(5) Academic Awards, etc.

None.

(6) Patents

None.

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