

Research Subjects Available

Research Area	
Molecular Cell Biology and Oral Anatomy	<ul style="list-style-type: none"> • Orofacial stem cell-based medicine for tissue/organ regeneration • Molecular regulation of proliferation, differentiation, and senescence in orofacial stem cells • Orofacial stem cell-based pathology for human diseases • Functions of neural crest-derived stem cells in organ development • Molecular mechanism of bone metabolism
Molecular and Cellular Biochemistry	<ul style="list-style-type: none"> • The common molecular mechanisms that control postmenopausal osteoporosis and weight gain and development of therapeutic strategies • The regulatory mechanism of bone metabolism • The molecular mechanism of bone invasion by oral cancer
Aging Science and Pharmacology	<ul style="list-style-type: none"> • Studies on type 3 Diabetes and Alzheimer's Disease • Impacts of chronic systemic inflammation on the brain functions (especially focus on microglia) • Pathophysiological roles of cathepsins in inflammation
Oral Neuroscience	<ul style="list-style-type: none"> • Understanding of molecular mechanisms of taste signaling associated with various diseases (e.g. taste disorders, metabolic syndromes) and development of therapeutic methods for the diseases • Taste organ regeneration and functional analysis of taste related molecules by using new 3 dimensional organ culture system (organoid) • Analysis of taste signaling serving for different functions in multiple organs • Analysis of regulation of food intake and energy homeostasis via taste signaling in oral-brain-gut axis
Oral, Brain and Total Health Science	<ul style="list-style-type: none"> • Studies on predisposition to non-communicable diseases regulated by environmental factors and epigenomic memory • Studies on molecular basis of biological defense system regulation mediated by protease reaction • Studies on the sex differences in energy metabolism and cognitive function
Preventive and Public Health Dentistry	<ul style="list-style-type: none"> • Molecular epidemiology on relationship between oral microbiome and oral and systemic health • Epidemiology on relationship between oral and systemic health • Clinical study of relationship between oral function and systemic health • Development of preventive measures of oral diseases utilizing molecular biology

<p>Pediatric Dentistry and Special Need Dentistry</p>	<ul style="list-style-type: none"> • Translational research of applying primary tooth to regenerative medicine • Study of the energy metabolism on craniofacial growth and development • Molecular analysis of mitochondrial function during dento-craniofacial morphogenesis and development • Genetic analysis of congenital anomaly of craniofacial complex in children and special need children
<p>Orthodontics and Dentofacial Orthopedics</p>	<ul style="list-style-type: none"> • Analysis for the molecular mechanisms through epithelial-mesenchymal interaction • Molecular mechanism of the mechanical stress response during chondrogenesis and osteogenesis • Molecular and developmental biological analysis of the craniofacial region • Finite element analysis and biomechanics relating to clinical orthodontics • An approach to evaluate the physiological and biochemical properties of stomatognathic function • Improvement of Quality of Life through orthodontic treatment for patient with malocclusion
<p>Biomaterials</p>	<ul style="list-style-type: none"> • Fabrication of carbonate apatite bone replacement • Development of three-dimensional interconnected bone replacement • Development of osteoconductive polymer • Development of high performance apatite cement • Analysis of the mechanism of osteoconductivity
<p>Endodontology and Operative Dentistry</p>	<ul style="list-style-type: none"> • Studies on identification of factors and scaffolds indispensable for periodontal ligament tissue regeneration • Studies on the induction of periodontal ligament stem cells derived from iPS cells • Developmental research on 'Bio-Implant' which includes the engineered periodontal ligament tissue • Development of novel pulp capping materials • Studies on the aging of dental pulp cells • Development of bactericidal treatment for caries microorganisms using bacteriophage
<p>Periodontology</p>	<ul style="list-style-type: none"> • Studies on the development of new assessment and diagnostic tool for periodontal diseases • Studies on etiology and bio-regulatory mechanisms of periodontal disease • Studies on biological periodontal tissue regeneration • Basic and clinical studies on the interaction between periodontal disease and systemic disease • Studies on the mechanism of development of low-grade inflammation caused by periodontal disease, and its influence on other tissues

	<ul style="list-style-type: none"> • Studies on the pathogenesis of unique periodontal disease such as drug-induced gingival overgrowth • Studies on the elucidation of patho-physiology of pulpitis and establishment of novel molecular targeted therapy
Fixed Prosthodontics	<ul style="list-style-type: none"> • Studies on esthetic prosthesis • Clinical and physiological study on maxillofacial rehabilitation • Longitudinal study of oral functions and prosthetic interventions • Evaluation and management of oral dryness and oral hygiene • Analytical study on treatment planning for prosthetic interventions • Clinical research for bone regeneration • Mechanobiology of dental implant and prosthodontics • Basic study on cellular responses to surface modification of dental implants
Implant and Rehabilitative Dentistry	<ul style="list-style-type: none"> • Development of biomaterials for prosthodontic treatment • Mechanobiology of dental implant and prosthodontics • Studies on bone regeneration therapy • Development of evaluation system for stomatognathic function • Epidemiological and physiological study on oral rehabilitation using removable dentures • Epidemiological and biomechanical study on oral rehabilitation using implants • Application of digital dentistry and workflow across prosthodontic treatment • Studies on physical effect of mouthguard for exercise • Development and evaluation of treatments in Medication-Related OsteoNecrosis of the Jaw • Studies for optimisation of the surgical and prosthodontic skills affecting short / long term success for implant treatment
Oral Pathology	<ul style="list-style-type: none"> • Molecular and genetic investigation on the development and regeneration of the tooth and periodontal tissues for regenerative therapy • Cellular and molecular biology of oral cancer • Investigation of a common mechanism of developmental formation and tumor formation
Oral and Maxillofacial Radiology	<ul style="list-style-type: none"> • Study on quantitative diagnosis • Computer-assisted diagnosis using dental images • Studies on direct digital introral imaging system • Analysis on patient radiation dose in dental radiography • Diagnostic image analysis for oral cancer • Image analysis on oral cancers • Studies on radiotherapy for oral cancers • Radiological analysis of cervical lymph node metastasis of malignant tumors • Image analysis on the structure and pathology of salivary glands • Application of ultrasonography to dentistry

	<ul style="list-style-type: none"> • Image analysis on the structure and pathology of the masticatory muscles and related structures • Application of “interventional radiology” to dentistry • Development of the training system for dental radiography using virtual reality technique
<p>Oral and Maxillofacial Surgery</p>	<ul style="list-style-type: none"> • Accurate 3 dimensional measurement on cleft lip and palate / jaw deformity • Development of surgical simulation / navigation system • A study on bone regeneration and compatible biomaterials • Development of artificial temporo-mandibular joint • Development of new treatment method in cleft lip and palate • Development and evaluation of treatments in jaw deformity • Molecularly targeted therapy for oral cancer • A study on the mechanism of invasion and metastasis of oral cancer • Molecular mechanisms of salivary gland development and regeneration • Immunological studies on the pathogenesis of oral mucosal diseases • Immunological studies on the pathogenesis of Sjögren's syndrome • Experimental study on bone regeneration in jaw • A study on regulatory mechanisms of bone immunology
<p>Oral and Maxillofacial Oncology</p>	<ul style="list-style-type: none"> • Development of the novel treatment for oral cancer • Studies on morphological and functional reconstruction after the surgery of oral cancer • Studies on host defense mechanism against oral cancer • Studies on the oncogenes of oral cancer • Studies on the mechanism of invasion and metastasis of oral cancer • Studies on the mechanism of the escape from immune surveillance by tumor-associated macrophages of oral cancer • Studies on relationship between oral bacterial flora and treatment of oral cancer • Studies on dysphagia after treatment of oral cancer (evaluation and rehabilitation) • An immunological study on the pathogenesis of oral mucosal diseases • Analysis of the cell differentiation and intracellular transduction of oral epithelial cells • Immunological studies on the pathogenesis of Sjögren's syndrome • Immunological studies on the pathogenesis of IgG4-related disease • Studies on expanded T and B cells for IgG4-RD and other human autoimmune disease -Joint International Research- • Studies on the treatment of odontogenic tumors • Biological and cytological studies of odontogenic tumors • Studies on the orthognathic surgery for jaw deformities

	<ul style="list-style-type: none"> • Clinical studies on the preventive treatment of anti-resorptive agents related osteonecrosis of the jaw • Studies on the pathogenesis and treatment of cleft lip and or palate • Clinical studies on the relationship between chronic orofacial pain and psychosocial factors
Dental Anesthesiology	<ul style="list-style-type: none"> • Studies on nutrition and metabolism during perioperative period • Studies on life support for dental emergency • Studies on clinical pharmacokinetics of aspirin • Studies on electroencephalogram during general anesthesia • Studies on electrocardiogram during perioperative period • Studies on the management of tracheal tube during general anesthesia • Studies on microcirculation during general anesthesia • Study of the effect of inspiratory oxygen concentration during general anesthesia after emergency • Study on hemolysis by extracorporeal circulation • Study on the standard values of preoperative screening tests in children • Study of AR-based materials on the educational effects
Geriatric Dentistry and Perioperative Medicine in Dentistry	<ul style="list-style-type: none"> • Studies on the relationship among oral function, systemic disease, and nutrition • Studies on oral management of patients with systemic disease • Studies on oral function management for long healthy lives • Studies on the development of regenerative dental medicine for super-aged society • Studies on oral health care for multidisciplinary collaboration in disasters
Dental Education	<ul style="list-style-type: none"> • Development of instructional strategies to encourage students to transform themselves into lifelong active learners • Development of systematic outcome-based educational programs • Development of ICT-based learning support systems and effective learning materials • Development of reliable tools to assess students' learning outcomes
General Dentistry	<ul style="list-style-type: none"> • Studies on oral tissue regeneration using stem cell populations and/or stem cell-inducing factors • Studies on oral care for the perioperative patients • Studies on the improvement of oral function for ADL elevation of the aged. • Studies on etiology and bacteria of periodontal disease • Development of novel training programs and evaluation systems for dental trainees • Research on mental health status of dental trainees