Biomaterials Research

Please find below a listing of the types of research that we are currently involved in. For further information regarding biomaterials research opportunities, please email godoy@uthsc.edu or lwedel1@uthsc.edu.

Biomaterials Development

- Microtensile fracture strength testing
- Profilometer fracture mode testing
- Fatigue, thermocycling and load testing
- Scanning electron microscope evaluation
- Confocal electron microscope evaluation
- Leakage testing
- Hybrid layer evaluation
- Remineralization and demineralization studies
- Color and gloss analysis
- Implant coatings

Clinical Testing

- Whitening kits
- Restorative materials
- Endodontic materials
- Periodontal therapies
- Prosthodontic devices
- Toothpaste
- Mouthwash
- Adhesives
- Disinfectants
- Analgesics
- Drugs
- Lasers
- Dental instruments and devices
- Toothbrushes (manual or power)
- Ortho appliances/devices
- Dental floss
- Implants
- Plaque and gingivitis

Toothbrushing

- Dentifrice testing
- Abrasion testing
- Wear testing
- Clinical testing
Biocompatibility Testing

- Drugs and biomaterials
- In vitro cytotoxicity
- In vivo biocompatibility
- Histological assessment

Molecular Assays

- Protein/Gene activation
- PCR
- Gene silencing
- Gene isolation
- Molecular pathway elucidation
- Stem cells
Craniofacial Research

Please find below a listing of the types of research that we are currently involved in. For further information regarding craniofacial research opportunities, please email godoy@uthsc.edu, mdabbous@uthsc.edu, or ipendleton@uthsc.edu.

Inflammation Research

- Tissue alterations in periodontal diseases
- Cellular response to anti-inflammatory drugs (i.e. COX inhibitors, transcription factor inhibitors), natural products (i.e. myrrh oil, tea tree oil, cranberry components), and oral rinses
- Levels of arachidonic acid metabolites in gingival crevicular fluid in gingivitis/periodontitis
- Role of fibroblast production of matrix metalloproteinases and inflammatory mediators in periodontal diseases and inflammatory TMJ destruction
- Effects of methamphetamine on gingival fibroblasts and neutrophils in periodontitis

Innate Immunity

- Role of peroxidase enzymes of leukocytes and saliva in producing antimicrobial oxidizing agents that protect tissues against microbial infection and inflammation
- Antibiotic peptides produced by human leukocytes, oral epithelial cells, and the salivary glands. Mechanisms of antimicrobial activity and the molecular basis for microbial resistance

Oral Cancer

- Analysis of tumor cell invasion and metastatic potential
- Testing therapeutic potential of anti-tumor agents
- Immunolocalization of specific tumor antigens in cells and tissue

Proteomic Analysis and Protein Expression Patterns

- Proteomic analysis of cells and tissues
- Molecular marker identification, characterization, and prognostic value

Bone Metabolism

- Effects of drugs (i.e. bisphosphonates and statins) and natural products (i.e. cranberry components) on soft tissue cell (gingival fibroblast and epithelial cell) production of mediators of bone metabolism (i.e. IL-6, RANKL, OPG)

Gingival Fibroses

- Gingival fibroblast production/regulation of extracellular matrix molecules and matrix metalloproteinases in gingival fibroses (hereditary/idiopathic, drug-induced)
Molecular Assays

- PCR
- Bacterial gene isolation and gene product identification
- Protein expression from isolated gene
- DNA analysis

Clinical Testing

- Assay for efficacy of mouthwash and toothpaste, using in-vitro analysis
- Evaluation of periodontal therapy products
- Effects of natural products such as cannabidiol
- Testing for biofilm in dental waterlines (screening and enumeration of microbial populations in dental waterlines; culturing anaerobic bacteria)

Dental Materials Testing

- Cellular and tissue response to implant materials and other biomaterials
- Cytotoxicity of implant and other dental materials