Advanced Graduate Education (AGE)

Oral Biology Core Courses

OB 601 Oral Microbiology
B. Paster, F. Dewhirst and Associates
Fall Term /3 credits

The objective of this course is to present fundamental information and concepts regarding the relationship between microbiology (bacteriology) and dental diseases. The relationship between basic and clinical research is explored to include significance in clinical dental practice - as it is and how it might develop. The first part of the course covers traditional and newly developed molecular microbiological methods. The taxonomy of oral species is presented including methods used to derive stable species classifications. Acquisition of the oral microbiota and inter-bacterial relationships as they relate to plaque biofilm ecology are described. The second part of the course covers microbiology of dental caries and periodontal infections including other oral infections of dental origin including peri-implant and endodontic microbiology. Therapy, virulence and anti-microbial strategies for therapy and prevention are presented, and an introduction to species virulence and pathogenicity.

OB 602 Oral Immunology
M. Taubman and Associates
Fall Term /3 credits

This course provides an introduction to basic immunology with emphasis on aspects of immunology relevant to the oral environment followed by an in depth survey of immunological phenomena operative in the oral cavity. The nature of innate and adaptive immunities is considered with emphasis on immune selective mechanisms, recognition, cellular interaction, development of immunity, and generation of diversity to meet the challenges of the host. Also considered are the genetics of the adaptive immune system, tolerance, control mechanisms and the nature of chemokines, cytokines and the association with immune cell subdivisions and specialization. A major emphasis is placed on the immune system of mucosal surfaces. The cellular dynamics and interactions in induction of mucosal immunity including unique molecules, synthesis and structures are highlighted. The impact of mucosal immunity on the oral cavity and the potential for basic immune mechanisms and the uniqueness of these oral environments are considered in depth. The molecular pathogeneses of major oral infectious diseases including dental caries, periodontal diseases, and pulpal infection are considered extensively in relation to host immunity to these infections and the philosophy of vaccine formulation. In addition, the etiology and oral manifestations of autoimmune diseases such as Sjogrens Syndrome and bullous diseases are considered in depth. There is also discussion of human immunodeficiency virus infection with emphasis on the oral cavity and effects on oral and other immune mechanisms. Outside readings of 4 hours per week are part of this course.

OB 603 Oral Pathology
S. Woo and Associates
Fall Term /3 credits

The aim of the course is to review diseases of the mouth, jaws, and salivary glands. Particular emphasis is placed upon more recent concepts in the areas of oral mucous membrane diseases and metabolic diseases of the bone affecting the jaws. Oral manifestations of systemic disease are also discussed. Pertinent findings in experimental pathology are discussed where they apply to clinical topics. Material is

offered in the form of lectures with extensive presentation of illustrative material in Kodachrome transparencies and microprojection of histological slides. Many handouts are given to the students outlining the basic subject matter; additional readings are assigned from the current literature dealing with topics in oral disease. Additional reading is required equivalent to 4 hours per week.

OB 604 Connective and Mineralized Tissues
E. Salih and Associates
Spring Term /3 credits

This course will explore molecular organization, regulation and mechanism of connective and mineralized tissue formation, with specific reference to the fundamental processes involving cellular and biochemical pathways. It will provide a detailed understanding of the constituent protein-structure in defining the final fate of the connective and mineralized tissue architecture and stability, and the mechanism/regulation of biomaterialization. Interaction between specialized connective tissue cells and their extracellular matrix and its components involving cell receptors, hormones, growth factors and protein based ligands with biological consequence of regulation of cellular behavior and function will be discussed. The process of connective tissue turnover as a prerequisite for normal development, wound healing and inflammation, and potential pathological consequences of tissue turnover will be examined. Introduction to molecular basis and genetics of connective tissue disorders, including new trends in mineralized tissue regeneration by implants will also be explored.

OB 606 Fundamentals of Implant Dentistry
H.P. Weber and Associates
Spring Term /3 credits

This course will discuss the basic principles of implant dentistry, biomaterials, tissue reactions, and the development of different implant concepts. Topics will include diagnosis and treatment planning, surgical insertion, restoration, follow-up maintenance, and treatment of failing implants.

OB 607 Clinical Pharmacology
J. Shaefer and Associates
Spring Term /3 credits

Topics for discussion in this course include drug mechanisms of action, drug interaction, clinical usage and impact on dental treatment. The following areas of interest will also be discussed: antibacterial, antifungal and antiviral agents, anti-inflammatories, pain control (including local anesthetics, premedication sedation and IV sedation, and N2O), antihypertensives and diuretics, commonly employed drugs in cardiac care, and antimetabolites in chemotherapy.

OHPE 741 Clinical Research Design in Oral Health Research
R. Kent and Associates
Fall Term /3 Credits

This course is directed to individuals interested in clinical trials research in oral health disciplines. Considerations in the design, conduct and evaluation of clinical trials will be addressed. Basic guiding principles of safety, validity and efficiency will be introduced and illustrated. The course will cover issues related to Planning and Design, Conduct and Monitoring, and Analysis and Reporting of clinical trials research. Specific topics will include: a brief history and overview of clinical trials research in dentistry, planning and protocol development, alternative research designs, considerations in defining a study population and formulation of inclusion/exclusion criteria, sample size determination, subject acquisition, randomization methods, legal, ethical and regulatory concerns, blinding, concerns in defining

control groups, pretrial activities such as examiner training and calibration, study conduct and monitoring issues such as compliance, missing data, random and non-random loss-to follow-up, practical aspects of data acquisition, data quality assurance and data management, statistical analysis and report preparation. The importance of statistical analyses appropriate to a given study design will be emphasized. Clinical measures frequently used in dental research will be reviewed and issues of design and analysis related to the multiplicity of teeth and sites in the mouth will be discussed. Additional topics may include issues specific to multicenter studies, uses of metanalysis in dental research, and discussion of current guidelines for clinical trials of dental therapeutics. Lectures, materials and assignments will emphasize examples and case studies from different areas of oral health research. Each student will be expected to submit several written critiques of published studies which will be discussed in class and to submit a written protocol for a clinical trial in his/her area of interest.

Prerequisite: An understanding of statistics equivalent to an introductory biostatistics course.
Note: This course can be used to fulfill Oral Biology credit requirements in the MMSc and DMSc degree programs.

OHPE 751 Biostatistics
R. Badovinac and Associates
Spring Term /3 credits

This course will provide an introduction to the principles of biostatistics. This course is designed primarily for clinical researchers or clinicians with an interest in research. Topics to be covered include: summarizing and displaying data, normal distribution, Central Limit Theorem, probability, estimation and hypothesis testing. Students will also develop skills in data entry and the analysis and interpretation of data.

GD 600 Growth and Development
L. Will, J. Li and Associates.
Spring Term /1.5 credits

This course takes students through the molecular aspects of development (neural crest contributions, epithelial-mesenchymal interactions), postnatal craniofacial development, somatic growth of the child, and psychosocial and cognitive development. The course is especially relevant for anyone who will be dealing with children clinically.

IDP 600,700, 800, 900 Advanced Graduate Research Seminar Series

E. Boye and Associates
Spring Term /N/A credits

The goal of the Research Seminars is for both DMSc and MMSc candidates to share their current research work with faculty, students and staff from all departments of HSDM. The seminars provide fellows with the chance for academic and research exchange among the different departments