

APPENDIX 2. IMPACT OF THE MERGER ON THE EDUCATIONAL MISSION OF MOLECULAR PATHOBIOLOGY

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INTRODUCTION. The educational mission of MPB at NYU College of Dentistry is multifold. MPB is responsible for teaching foundational biomedical sciences for:

1. Predoctoral DDS program
2. Dental Hygiene program
3. Postgraduate specialty programs
4. Postgraduate MS program, Oral Biology Track.

The educational contributions of MPB to the college curriculum are both in courses run by the department and in multiple courses offered by other departments. Currently, MPB is responsible for 11 predoctoral courses, 1 dental hygiene course, and 3 Masters courses. Additionally, MPB has shared responsibility, with the Department of Oral and Maxillofacial Pathology, Radiology and Medicine (OMPRM), for 2 integrated predoctoral courses. Biomedical subjects covered by MPB faculty within in the college's curriculum include anatomy, biochemistry, bone biology, cell organelles, embryology, genetics, histology, immunology, microbiology, molecular biology, neuroscience, pharmacology, physiology, and virology.

EXPERTISE OF MOLECULAR PATHOBIOLOGY FACULTY. MPB faculty are educational content experts in the biomedical sciences, and their teaching is related to their areas of expertise. MPB faculty and their primary areas of expertise are (in alphabetical order):

- Baker, Eric. M.Phil. Clinical Associate Professor (anatomy)
- Bromage, Timothy. PhD. Professor (biological anthropology, histology, and microscopy)
- Bunnett, Nigel. PhD. Professor (physiology, mechanisms and treatment of pain)
- Cunningham, Elena. PhD. Clinical Associate Professor (anatomy)
- Di Gregorio, Anna. PhD. Associate Professor (developmental biology)
- Jeong, Juhee. PhD. Associate Professor (craniofacial development)
- Guttenplan, Joseph. PhD. Professor (chemical carcinogenesis)
- Jensen, Dane. PhD. Assistant Professor (neuroscience, cell signaling)
- Lacruz, Rodrigo. PhD. Associate Professor (enamel mineralization, facial growth)
- Levy, David. PhD. Associate Professor (HIV, molecular biology, immunology)
- Li, Xin. PhD. Associate Professor (bone biology, diabetes, cancer)
- Liang, Shuang. PhD. Clinical Assistant Professor (microbiology, immunology)
- Lopez, Elisabeth. PhD. Clinical Assistant Professor (anatomy)
- Partridge, Nicola. PhD. Professor (parathyroid hormone, bone biology, physiology)
- Pavlov, Evgeny. PhD. Associate Professor (mitochondrial physiology, bioenergetics)
- Saint-Jeannet, Jean-Pierre. PhD. Professor (craniofacial development, neuroanatomy)
- Saxena, Deepak. PhD. Professor (molecular biology, microbiology)
- Schiff, Joel. PhD. Associate Professor (physiology)
- Sitara, Despina. PhD. Assistant Professor (bone biology, hematopoiesis)
- Spielman, Andrew. PhD., D.M.D. Professor (biochemistry, mechanisms of taste)
- Stefan, Cristian. M.D. Clinical Professor (biomedical sciences)
- Thomsen, Alex. PhD. Assistant Professor (cell signaling)
- Warsaw, Johanna. PhD. Clinical Associate Professor (anatomy)
- Yakar, Shoshana. PhD. Professor (biochemistry, bone metabolism)
- Yan, Wenbo. PhD. Clinical Assistant Professor (pharmacology, cell biology)

GENERAL TEACHING CONTRIBUTION OF FACULTY. There are 7 teaching-track faculty and 18 tenured/tenure-track research faculty in MPB. All faculty members contribute to the fulfillment of the educational mission of the department. MPB faculty contribute to predoctoral, postgraduate, dental hygiene, and Master of Science courses as needed and based on their area of expertise. Currently, there is only 1 MPB faculty member who is qualified as a dentist; Andrew Spielman is dual degreed (PhD and D.M.D). Over the past 2 years, 3 MPB faculty who were dual degreed have retired.

EDUCATIONAL PROGRAMS AND MERGER IMPACT

Predoctoral College of Dentistry (D1-D4)

Anticipated impact of merger — beneficial. Currently, there are 3 faculty in Biomaterials with dental qualifications. MPB would benefit from the addition of dual degreed faculty. Additional MPB faculty with dental qualifications can assist in the integration of foundational biomedical science content with clinical applications for dental practice. In addition, Jack Ricci is trained as an anatomist; and he would be able to fully participate in the head and neck anatomy course, reducing MPB's dependency on adjuncts in teaching anatomy. Furthermore, John McDevitt is an expert in immunology and as such he would be able to assist in MPB's teaching mission. Also, Biomaterials faculty are experts in bone histology; and as such, they can contribute to the teaching mission of the department.

Postgraduate Programs

Anticipated impact of merger — beneficial. Having 3 additional dentists as members of the faculty of MPB would enable MPB to increase its participation in postgraduate education.

Postgraduate MS, Oral Biology Track

Anticipated impact of merger — beneficial. Currently, the MS in Oral Biology curriculum recommends that students take 4 courses that are offered by the Department of Biomaterials (see Appendix 2). Having these 4 courses as offerings through MPB would improve the integration of the curriculum's content, as well as the administration of the MS program.

Summary of Merger Impact on Molecular Pathobiology Educational Programs. The impact of this merger is only positive. The educational mission of MPB will benefit if the merger goes forward. The advantages to MPB of this merger include: the addition of the clinical expertise of those faculty with dental qualifications, the ability of Jack Ricci to teach anatomy, the immunological expertise of John McDevitt, and the histological (bone biology) knowledge of the biomaterials faculty. All of these will enhance the ability of MPB to meet and excel at its educational mission.

MOLECULAR PATHOBIOLOGY COURSES

Predoctoral Courses

BAS01-DN.1508: Building Blocks of Life (3.0 credits). Building Blocks of Life provides foundational knowledge of the biochemical structures, properties, and function. In addition to providing a foundation for subsequent courses in the dental education curriculum, students learn the relevance and application of biochemistry in developing a differential diagnosis, treatment, and follow up using clinical case studies.

BAS01-DN.1509: Cellular Organelles and Functions (2.6 credits). This course provides a basic understanding of cell structure and function, with an emphasis on the functions of basic organelles. This course provides information on cellular processes such as gene regulation, cell motility, apoptosis, cell adhesion, and signal transduction. In addition, the course provides an understanding of the patterns and processes of Mendelian and molecular genetics and the control of cell cycling, especially as it pertains to tumor biology. This course forms the underlying basis for the Basic Tissues and Body and Disease courses, among others.

BAS01-DN.1511: Embryology and Craniofacial Development (1.4 credits). The Embryology and Craniofacial Development course covers general concepts in human embryology and culminates with in-depth discussions of both prenatal and postnatal craniofacial development. Emphasis is placed upon the oral health implications of concepts in human developmental biology. The course is organized into three units focusing on General Embryology, Prenatal Craniofacial Development, and Postnatal Craniofacial Growth and Development. This course provides a basic understanding of embryology to serve as an introduction to craniofacial development and serves to prepare students to understand aberrations of development that may occur in humans.

BAS01-DN.1608: Head and Neck Anatomy (5.5 credits). Head and Neck Anatomy provides a critical experience in the study of human structure, which is fundamental to the practice of dentistry. Much of the rationale for the understanding of function and disease, diagnostic skills and clinical practice is based on the language and knowledge of anatomy. This course presents the detailed structures of the head and neck in their structural and functional relationships, enabling students to recognize the application of anatomical information in dental practice. In addition, it provides students with a basis for understanding other basic clinical sciences and prepares students for future postgraduate courses

BAS01-DN.1510: Basic Tissues (2.0 credits). Basic Tissues presents the traditional microscopic anatomy, as well as biochemical, molecular, physiological, and pathological aspects of tissues by focusing on epithelium, soft connective tissue, cartilage, bone, muscle, blood and bone marrow, and aspects of clotting. Correlations with clinical dentistry are stressed in the areas of tissue structure and function.

BAS01-DN.1612: Introduction to Neuroscience (1.0 credits). The Neuroscience course provides students with the fundamentals of how the nervous system is organized and works in health and disease. The course brings together neuroanatomy, neurohistology, neurophysiology, and an introduction to the neurological examination and neurological disorders. Discussions and applications place the emphasis on analytical skills, integration, critical thinking and problem solving with clinical relevance. This course is foundational to advanced courses in the curriculum where neuroscience is taught.

BAS01-DN.1613: Craniofacial Biology (2.1 credits). Craniofacial Biology presents the cell and molecular biology, histology and physiology of oral tissues that have direct relevance to the understanding and practice of dentistry. The course builds upon the concepts presented earlier in the first-year basic science curriculum and serves as a bridge to courses in pathology and clinical sciences that follow in the DDS curriculum. Topics include oral cavity, saliva and salivary glands; tooth formation, enamel and dentin; root formation, periodontal and ulpal tissues; muscles of mastication, swallowing and temporomandibular joint (TMJ).

BAS01-DN.1610: Principles of Pharmacology (1.0 credits). The Principles of Pharmacology course provides a basic understanding of drug administration, pharmacokinetics, pharmacodynamics, drug interactions

and adverse drug reactions. Pharmacology is a subject that is highly integrated with material from other basic sciences. Consequently, the course relies on a working knowledge of physiology, pathology, biochemistry, histology, and anatomy. And the course is foundation for future courses that focus on pharmacological applications to the clinical practice of dentistry.

BAS01-DN.1614: Microbiology (3.0 credits). The Microbiology course serves as an introduction to the microbial organisms that cause most of the infections in humans, by focusing on bacteria, viruses, fungi, and the methods used for their identification in the clinical lab. The course presents the general properties, genetics and metabolism of these organisms, and the antimicrobial agents utilized for treating infections. In addition, this course addresses virulence factors of microbial agents that enable them to cause disease in humans. Modes of transmission are described, as well as treatment and prevention.

BAS06-DN.2510: Body and Disease 1*. The Body and Disease (B&D) course emphasizes basic mechanisms in systemic physiology, systemic pathology and therapeutics and its integration and implications for dental practice. This course is divided into vertical integrated units (VIUS) by organ system. There are physiological and pharmacological/therapeutics components for each organ system. The course thus covers common diseases within the range of the major organ systems: cardiovascular, hematology, pulmonary, endocrine, gastrointestinal, immunology, reproductive, renal, skeletal, nervous, and skin. The knowledge taught in this course applies to all the clinical disciplines.

***Note:** this course is administered jointly with the Department of Oral and Maxillofacial Pathology, Radiology and Medicine.

BASCI-DN. 2610: Body and Disease 2* . The Body and Disease course 2 is the continuation of B&D 1. It emphasizes basic mechanisms in systemic physiology, systemic pathology and therapeutics and its integration and implications for dental practice. This course is divided into vertical integrated units (VIUS) by organ system. There are physiological and pharmacological/therapeutics components for each organ system. The course thus covers common diseases within the range of the major organ systems: cardiovascular, hematology, pulmonary, endocrine, gastrointestinal, immunology, reproductive, renal, skeletal, nervous, and skin. The knowledge taught in this course applies to all the clinical disciplines.

***Note:** this course is administered jointly with the Department of Oral and Maxillofacial Pathology, Radiology and Medicine.

BAS01-DN.1617: Comprehensive Exam Preparation 1 (0.75 credits). The goal of the course is to help first year predoctoral students retain foundational knowledge from completed courses and learn to critically access clinical scenarios and appropriately apply foundational knowledge to these cases.

BAS01-DN.2517: Comprehensive Exam Preparation 2 (0.5 credits). The goal of the course is to help second year predoctoral students retain foundational knowledge from completed courses and learn to critically access clinical scenarios and appropriately apply foundational knowledge to these cases.

Dental Hygiene Courses

DHYG1-UD.124: Oral Embryology and Histology (2.0 credits). The Oral Embryology and Histology course provides an understanding of embryology and orofacial development, histology, and the cellular and molecular mechanisms underlying tooth formation. Topics include the oral cavity, general principles of human embryogenesis, orofacial and tooth development, the developmental properties of enamel, dentin, periodontal tissues and alveolar bone. In addition, the eruption and exfoliation of teeth, and the biology of dental pulp, salivary glands and TMJ are discussed. At the conclusion of the course, the student

should understand the rationale that constitutes current therapies in dental hygiene. The student should also have knowledge in oral biology to be successful in those areas of the National Board Examinations.

Master of Science, Oral Biology Track Courses

BASCI-DN.8048: Integrative Seminars in Oral Biology I: Oral Systemic Connections (3.0 credits). This course provides an introduction to current topics in oral biology primarily focusing on the connection between oral disease and other systemic diseases and medical conditions. Topics include various aspects relating to etiology of dental caries, periodontal diseases, oral facial pain, oral infections (oral biofilm, oral microbiome, HIV), metabolism of tobacco carcinogens by human oral tissue, squamous cell carcinomas, mechanisms of host-pathogen interactions, and correlations between oral pathogens and chronic systemic inflammatory diseases.

BASCI-DN.8049: Integrative Seminars in Oral Biology II: Bone Biology and Craniofacial Development (3 credits). This course provides an introduction to up-to-date knowledge of skeletal and bone biology, molecular, cellular, and oral biology. Topics cover both basic and clinical aspects of bone metabolism, skeletal biology, craniofacial development, bone and soft tissue remodeling, bisphosphonate-related osteonecrosis of the jaw, and chronic systemic inflammatory disease and osteoporosis.

BASCI-DN.8050: Directed Individual Research in Oral Biology (1-4 credits). This course provides the opportunity for students to work with a faculty member at NYU College of Dentistry on his/her current research project, including laboratory research or library research (readings, literature reviews).

Biomaterials courses recommended for students in Master of Science, Oral Biology Track

BIOM-GA.1003: Bioceramics (3.0 credits)

BIOM-GA.1005: Biomaterials Tissue Interface I (3.0 credits).

BIOM-GA.1008: Introduction to Electron Microscopy (3.0 credits).

BIOM-GA.1016: Imaging Science (4.0 credits)