Immunology and Microbial Pathogenesis

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Degrees Offered

• Doctor of Philosophy
• Joint Doctor of Medicine and Doctor of Philosophy

Faculty members and students explore diverse areas of inquiry related to the medical implications of microbes and the human body’s response to them.

Current Research Areas

• Immunology
• Effects of man-made pesticides and herbicides on the immune system
• Effects of heavy metals on the immune system
• Biochemistry of inflammatory cytokines
• Immune response in bacterial and viral diseases
• Regulation of signal transduction in immune responses
• Molecular aspects of cell signaling as it relates to cancer chemotherapy and cell growth
• Peptide and DNA vaccines for contraception
• Microbiology
• Physiology of pathogenic microbes
• Microbial genetics
• Mechanisms of bacterial pathogenesis
• Chemotaxis and motility
• Interactions between microbes and their hosts
• Molecular mimicry and structure-function relationship of bacterial virulence factors
• Microbial biofilms

The major purpose of graduate education in the program is research training. The basic philosophy of the program is that students acquire a strong foundation in the basic concepts of immunology and microbial pathogenesis and have flexibility in choosing advanced coursework in their specific areas of interest. A major emphasis of the graduate program is extensive laboratory research in microbiology, immunology, microbial pathogenesis, and cell biology. Each student will complete an original, in-depth research investigation. The overall aim of the program is to produce students capable of designing and doing independent research and teaching.

Program Requirements

Every student must take the required courses in the first year common core curriculum. Once students acquire a strong foundation in the core biomedical concepts, we offer flexibility in choosing advanced coursework in specific areas of interest. The remainder of the coursework is selected by the student and the Advisory Committee. Enrollment in MICB 796 Graduate Seminar and MICB 785 Immunol Micro Journal Club is required each semester that the student is in residence. All full-time students in this graduate program are required to participate in teaching at least one semester a year for two years (MICB 790 Teaching Practicum).

Faculty

Graduate Program Director

• Dr. John Barnett

Doctor of Philosophy

After completion of the first-year, integrated core curriculum, the doctoral student takes additional coursework as determined by the student’s Graduate Research Advisory Committee. Students will be expected to complete at least two additional graduate-level courses (numbered 700 or above) beyond the basic required courses taken as part of the common core curriculum in the first year of graduate school and those listed above. Where appropriate, coursework in related subjects such as computer science, cell biology, biochemistry, physical chemistry, and statistics is required. MICB 796 Graduate Seminar is a required course each semester that the student is in residence. The doctor of philosophy program requires a dissertation representing the results of an original research investigation and the passing of a written qualifying and final oral examination. The qualifying examination is given at the
end of the first year of study. The final oral examination is given after completion of research and an acceptable dissertation. All full-time students are required to participate in teaching at least one semester a year for two years.

For a description of faculty research interests, guidelines for graduate study in the graduate program of immunology and microbial pathogenesis, or additional information, write to the Departmental Chairperson at Admissions and Scholarship Committee, Department of Microbiology and Immunology, P.O. Box 9177, West Virginia University, Morgantown, WV 26506-9177 or visit our website at http://www.hsc.wvu.edu/ResOff/PhDPrograms/Biomedical-Sciences/pages/Graduate-Programs/Immunology-Microbial-Pathogenesis.