MICROBIOLOGY & IMMUNOLOGY, PH.D.

About the Program

The major emphases in the Department are microbial pathogenesis and immunology. Our students are trained by mentors at OUHSC, Oklahoma Medical Research Foundation, and Dean McGee Eye Institute. The Department of Microbiology and Immunology averages a total of approximately 30 students and the number of students that enter the Department each year ranges from 4 to 8. Most of our students enter the Department from the Graduate Program in Biomedical Sciences after they have completed one year of courses and laboratory rotations.

Areas of Specialization

Microbial Pathogenesis and Immunology: Special emphasis on molecular and immunological mechanisms of diseases caused by human pathogens as well as emphasis on immune response to infections, autoimmunity, T and B cell development and MHC function.

Career Opportunities

Students who complete a PhD program in Microbiology and Immunology find future employment in many areas of science such as research and/or teaching positions at public or private institutions, scientific writing, research administration, clinical laboratories, science policy, research administration, sales and marketing, among many others.

Cost

It is the student's responsibility to ensure they are enrolled in the prescribed courses and to pay tuition and fees at the time designated by the Bursar's Office. Details regarding tuition/fee charges and collection are available from the Bursar's Office.

Prerequisites

- Bachelor's or entry level first professional degree from accredited institution.
- Grade point average of 3.0 in the last 60 hours of coursework applied to degree.
- GRE general exam is required.
- Proof of language proficiency for international applicants.
- Three letters of recommendation.
- RECOMMENDED COURSEWORK
  - Biochemistry
  - Organic Chemistry
  - Upper Division Biology (one or more of the following):
    - Cell Biology
    - Molecular Biology
    - Microbiology
    - Physiology
    - Calculus
    - Physics

Doctor of Philosophy Degree Requirements

Students interested in the PhD degree in Microbiology and Immunology are required to take a minimum of 90 hours of graduate work of which at least 45 hours are Research for Doctor's Dissertation (MI 6980 Research for Doctor's Dissertation) and complete a dissertation based on original research. All PhD students must complete the core courses offered in the first semester through the GPiBS program. Subsequent courses are offered by the Department. In addition, all PhD candidates take Research for the Doctoral Dissertation (MI 6980 Research for Doctor's Dissertation). PhD students are required to present seminars (variable number of hours) in Seminar (MI 5971 Seminar) and attend Journal Club. The remainder of the PhD degree program is completed with graduate level courses in this or in other departments of the University. Requirements for any of the individual core courses may be waived by the departmental orientation committee with sufficient evidence of equivalent prior course completion. A student may transfer up to 44 hours of graduate course work taken elsewhere depending upon the decision of the student's advisory committee and the Graduate College (described elsewhere in Bulletin).

For admission to candidacy for the PhD degree, the student must pass a written and oral qualifying examination. The examination is offered once a year and should be completed by the end of the second year.

Code	Title	Hours
Fall - Year 1		
BMSC 6012	Molecular Systems I	2
BMSC 6112	Molecular Systems II	2
BMSC 6152	Cellular Systems I	2
BMSC 6052	Cellular Systems II	2
BMSC 5001	Integrity in Scientific Research	1
BMSC 5221	Interdisciplinary First Year Journal Club	1
BMSC 6100	Bioscience Interdisciplinary Laboratory Rotation	1-4
BMSC 5031	Laboratory Animal Use and Concepts	1
Spring - Year 1		
MI 6031	Immunology I	1
MI 6041	Immunology II	1
MI 5321	Microbiology I	1
MI 6301	Microbiology II	1
MI 6501	Microbiology III	1
BMSC 6100	Bioscience Interdisciplinary Laboratory Rotation	1-4
Summer - Year 1		
BMSC 5011	Experimental Design and Applied Statistics	1
MI 6401	Bioinformatics Introduction	1
MI 5990	Special Studies	1-6
Fall - Year 2		
MI 6822	Infection and Immunity	2
MI 6604	Scientific Grant Writing	4
MI 5990	Special Studies	1-6
Journal Club		
Department Seminars		
Spring - Year 2		
MI 5990	Special Studies	1-6
Qualifying Exam		

Journal Club		
Department Seminars		
Summer - Year 2		
MI 6980	Research for Doctor's Dissertation	1-16
Fall - Year 3		
MI 6980	Research for Doctor's Dissertation	1-16
MI 5971	Seminar	1
MI 6101	Immunology Journal Club	1
Journal Club		
Spring - Year 3		
MI 6980	Research for Doctor's Dissertation	1-16
Journal Club		
Departmental Seminars		
Summer - Year 3		
MI 6980	Research for Doctor's Dissertation	1-16
Fall - Year 4		
MI 6980	Research for Doctor's Dissertation	1-16
MI 5971	Seminar	1
MI 6101	Immunology Journal Club	1
Spring - Year 4		
MI 6980	Research for Doctor's Dissertation	1-16
Journal Club		
Departmental Seminars		
Summer - Year 4		
MI 6980	Research for Doctor's Dissertation	1-16
Fall - Year 5		
MI 6980	Research for Doctor's Dissertation	1-16
MI 5971	Seminar	1
MI 6101	Immunology Journal Club	1
Journal Club		
Spring - Year 5		
MI 6980	Research for Doctor's Dissertation	1-16
Journal Club		
Departmental Seminars		
Summer - Year 5		
MI 6980	Research for Doctor's Dissertation	1-16

Note: Student's advisory committee sets the remainder of any needed requirements to meet the 90 hours required for the degree.

Admission Requirements

The department of Microbiology and Immunology is a participant in the interdisciplinary Graduate Program in Biomedical Sciences (GPiBS) (http://graduate.ouhsc.edu/Graduate-Programs/PhD-Programs/Graduate-Program-in-Biomedical-Sciences/), which combines the expertise of the six programs at the University of Oklahoma Health Sciences Center: Biochemistry & Molecular Biology, Cell Biology, Microbiology & Immunology, Neuroscience, Pathology and Physiology. Students wishing to enter the Microbiology and Immunology graduate program to obtain a PhD degree should apply to GPiBS (http://graduate.ouhsc.edu/Graduate-Programs/PhD-Programs/Graduate-Program-in-Biomedical-Sciences/) as described in the GPiBS section of the Bulletin. An application is filed with the Office of Admissions and is accompanied by official transcripts and results of the Graduate Record Examination (GRE), and TOEFL for foreign applicants. Three letters of recommendation from individuals who can address the candidate's research potential and suitability for graduate school are also required.

For students choosing to concentrate in Microbiology and Immunology, first year progress in the GPiBS program is assessed by the Microbiology Admission's Committee. Applicants must have satisfactorily completed the first-year curriculum including four Microbiology electives and be able to verify undergraduate credit in about 20 hours of biology, including 4 hours of bacteriology or microbiology or immunology; 12 hours of chemistry, which includes 4 hours of organic chemistry and 8 hours of additional course work selected from biochemistry, physics, chemistry, calculus, genetics, physiology, histology or anatomy.

Students who do not meet all the necessary requirements and prerequisites may under special circumstances be admitted conditionally. Depending upon the deficiency and individual circumstances, conditions are stipulated at the time of admission to the Department.

Computer skills and research experience is an additional asset.

Program Objectives

The doctoral program prepares students for careers in academia and industry in the research areas of microbiology and immunology. The curriculum is designed to provide a solid scientific background and includes advanced courses utilizing the expertise of our faculty members. Research areas in microbiology include bacterial toxins, Lyme disease, bacterial genetics, role of outer membrane lipid remodeling in Gram-negative pathogenesis, bacterial and fungal eye infections, and Toxoplasmosis. Research areas in immunology include B and T lymphocyte biology, NKT cells and humoral immunity, anti-viral immunity, autoimmunity, role of major histocompatibility complex molecules in cancer and infection, and the role of IL-22 in inflamed tissues.