Twin Cities Campus

Microbiology, Immunology, and Cancer Biology Ph.D.

Medical School - Adm

Medical School

Link to a list of faculty for this program.

Contact Information:
Microbiology, Immunology and Cancer Biology PhD Program
689 23rd Avenue SE, Room 1-109 MRF
Minneapolis, MN 55455
612-624-5947
Email: micab@umn.edu
Website: http://micab.umn.edu

- Program Type: Doctorate
- Requirements for this program are current for Fall 2018
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

Students prepare for careers in biomedical research and teaching by completing broad training in molecular biology or biological sciences, and focused specialization in one of three concentrations (microbiology, immunology, or cancer biology). The program offers exceptional research opportunities for graduate training in autoimmunity, biotechnology, cancer biology and therapy, environmental microbiology, genetic engineering of microorganisms, lymphocyte activation and development, microbial pathogenesis, molecular genetics of disease, tumor immunology, vaccine development, and vascular biology and inflammation.

Accreditation

This program is accredited by NA

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

Applicants must have a bachelor's degree (BS preferred).

Other requirements to be completed before admission:
Required courses include calculus, general chemistry, organic chemistry, and physics. A minimum of two upper-level biology courses, which may include biochemistry, genetics, cell biology, molecular biology, microbiology, or immunology, etc., are also required.

Research experience is required. Relevant undergraduate experience includes honors thesis work, paid or volunteer work in a research laboratory and summer internships. It does not include laboratory courses that accompany science courses such as biology. Postbaccalaureate research experience is preferred but not required.

Special Application Requirements:
The program evaluates applications based on four equally weighted criteria: academics, letters (3) of recommendation, a personal statement, and research experience. The average GPA and GRE scores of accepted applicants are typically 3.50 and 80th percentile, respectively (no GRE Subject Test is required). Letters of recommendation from research advisers or mentors are preferred as these individuals can comment knowledgeably on the student's potential in biomedical research. Applicants' personal statements should describe their research in general and their specific contribution to it, their rationale for seeking a doctoral degree, and any information they wish to share regarding their backgrounds and interest in the MICaB Program. Finally, applicants should provide specific details of their research experiences (project titles, mentors, dates, locations, etc.), along with a list of relevant abstracts, publications, etc.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 96
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

11 to 12 credits are required in the major.
12 to 13 credits are required outside the major.
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Beginning study in the fall, students spend their first year on major coursework, identifying an advisor by doing laboratory rotations, selecting a focus area, and initiating their thesis research project. In the fall semester of their second year, all students take MICA 8012, which highlights the integrated nature of the three foci and helps prepare the students for their written and oral qualifying examinations (taken in the spring semester of the second year). Students also take courses that support studies in their focus area during their first two years.

In addition to coursework and research, students have opportunities to participate in laboratory meetings, journal clubs, and student research seminars, and to assist in laboratory courses. Most students complete the PhD in five years.

Required Coursework

Take 8 credits from the following list. Take MICA 8094 during the fall and spring semesters of the first year for a total of 2 credits. While students are required to take only one of the three core courses (MICA 8002, 8003, and 8004), they are encouraged to take all three.

MICA 5000 - Practicum: Teaching (0.0 cr)
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
MICA 8003 - Immunity and Immunopathology (4.0 cr)
MICA 8004 - Cellular and Cancer Biology (4.0 cr)
MICA 8012 - Writing and Reviewing a Research Proposal (2.0 cr)
MICA 8094 - Research in Microbiology, Immunology, and Cancer Biology (1.0 cr)
MICA 8910 - Seminar: Faculty Research Topics (0.0 cr)
MICA 8920 - Seminar: Student Research Topics (0.0 cr)

Focus Area and Elective Coursework

Take one 3-credit, 5xxx-level or higher focus area science course in the first and second years. Select a focus area course from the following list, or another course related to the area of interest. MICA 8002, 8003 or 8004 can be used as a focus area course, if not taken as a required course. Elective courses also can be chosen from this list or selected in consultation with the advisor. No more than one 4xxx-level course can be applied towards credit requirements.

Take 16 or more credit(s) from the following:

- BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
- BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)
- BIOC 5960 - Biophysical Spectroscopy (2.0 cr)
- BIOC 8001 - Biochemistry: Structure, Catalysis, and Metabolism (3.0 cr)
- BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- BIOC 8216 - Signal Transduction and Gene Expression (3.0 cr)
- BTHX 5610 - Research & Publication Seminar (1.0 cr)

- CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)
- CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)
- CHEN 8995 - Special Topics (1.0 - 4.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)
- ESCI 4801 - Geomicrobiology (3.0 cr)
- GCD 5005 - Computer Programming for Biology (3.0 cr)
- GCD 6103 - Human Histology (3.0 - 8.0 cr)
- GCD 8008 - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- GCD 8073 - Genetics & Genomics in Human Health (2.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- GCD 8161 - Advanced Cell Biology and Development (2.0 cr)
- GCD 8920 - Special Topics (1.0 - 4.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- MICA 8009 - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)
- MICA 8010 - Microbial Pathogenesis (3.0 cr)
- MICA 8011 - Current Topics in Immunology (3.0 cr)
- MICA 8013 - Translational Cancer Research (2.0 cr)
- MICA 8014 - Small RNA Biology (2.0 cr)
- MICA 8371 - Mucosal Immunobiology (3.0 cr)
- PHCL 5111 - Pharmacogenomics (3.0 cr)
- PHSL 8242 - Professional Skills Development for Biomedical Scientists (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- SCB 8181 - Stem Cell Biology (3.0 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)

Thesis Credits

Take at least 24 doctoral thesis credits.

MICA 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)