Introduction

The University of Miami is one of four institutions in the United States that offers an undergraduate program in Microbiology and Immunology. What does this mean? It means that you are being trained in an undergraduate major that focuses on two aspects of healthcare, various diseases and our bodies’ defenses against them. Throughout your four years with us, you will learn about bacteria that cause the plague or that naturally inhabit our bodies, viruses such as Influenza, HIV, Zika or even Ebola and parasites such as Malaria. You will also learn how each of these can be controlled by our immune systems and how vaccinations can prevent some of these infections. Finally, you will understand how sometimes the immune system itself can inflict undesired damage and how it can be exploited to achieve cancer remissions. Students that have finished our program have gone on to careers in research, medicine, dentistry, pharmacy, optometry, physician assistant, law and many more.

Educational Objectives

1. To expose students to the various disciplines within the field of Microbiology and Immunology, including virology, parasitology, microbial genetics, immunology and medical bacteriology.
2. To introduce students to special projects and/or research opportunities in laboratories at the School of Medicine.
3. To provide laboratory experience for the development of skills required for the conduct of research.
4. To make students aware of current cutting edge research in the field of Microbiology and Immunology by attending seminars of speakers from within and outside the University.

Degree Programs

• A Bachelor's of Science degree is awarded to all microbiology and immunology majors upon completion of the requirements. A chemistry minor is automatically received however, a student’s choice of minor may be science or non-science.

Advanced Writing and Communication

To satisfy the College of Arts and Sciences writing requirement in the discipline, students majoring in Microbiology and Immunology should take at least one course from the following: MIC 280, MIC 304, MIC 441.

Departmental Honors

Students that wish to gain a deeper understanding of Microbiology and Immunology can choose to write a thesis. The following program constitutes receiving Departmental Honors in Microbiology and Immunology.

1. Overall GPA 3.0 or higher
2. Six credit hours of Special Projects (MIC 451, MIC 452, MIC 453, MIC 454, MIC 455 or MIC 456) carried out under supervision of a member of the Microbiology and Immunology faculty, culminating in a senior thesis that includes 15 references. Once the mentor and student have revised and finalized the document a hard copy must be turned in to the Program Director.

MIC 100. Microbiology as it Relates to Humans (EXP). 3 Credit Hours.

An introductory microbiology course for the summer scholars program. Microorganisms are in every facet of our lives and make up a microscopic world. Right now, your body is inhabited by over 40 trillion bacteria. Due to the evolution of our immune systems, we have been able to coexist with this world. It is when our immune systems weaken or when our otherwise healthy immune system encounters a particularly nasty pathogen that we become vulnerable. This course will cover the topics of how our immune system works, how microbial pathogens cause disease, how beneficial microbes protect us from disease, and some of the other activities perform that impact our world. The laboratory will provide you with invaluable experience in growing, staining, viewing and identifying microorganisms through the use of practical techniques and procedures. An in lab presentation of your "unknown organism" will culminate what you have learned.

Components: LAB.
Grading: GRD.
Typically Offered: Summer.

MIC 201. Modern Plagues and Society. 3 Credit Hours.

An examination of three infectious diseases (AIDS, tuberculosis, and malaria) that currently impact a significant fraction of the human population, describing the infectious microbes themselves, efforts of researchers to contain these diseases, and how politics, infrastructure, and geographical factors determine public health outcomes.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.
MIC 280. UMiami Scientifica Magazine - Writer. 0 Credit Hours.
UMiami Scientifica is a premier scientific publication at the University of Miami. The magazine, focuses on the STEM fields and publishes quarterly. Students who write for the magazine will learn to write clearly, concisely and in a manner that can be understood by the layperson. Successfully completing an article does not mean that an article will be published.

Components: THI.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MIC 301. Introduction to Microbes and the Immune System. 3 Credit Hours.
Basic principles of microbiology and immunology; the microbiology component will include basic properties of bacteria, viruses, and parasites and how microbes interact with multicellular organisms in both disease and non-disease settings. The Immunology component presents the players and basic concepts of immune responses as they apply to combat infectious pathogens, autoimmunity, allergy and transplantation. Course is required for microbiology and immunology majors; recommended for biology, chemistry and biochemistry majors and those considering the health sciences

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MIC 304. Introduction to Microbes and the Immune System (Lab). 2 Credit Hours.
Basic laboratory principles of microbiology and immunology. Students are instructed on how to handle, culture, and identify microorganisms. Microscope care/use, various staining techniques, ELISA, blood typing, bacterial transformation, and more. This laboratory is required of all microbiology and immunology majors.

Components: LAB.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 319. Innate Immunity. 3 Credit Hours.
The innate immune system provides the first line of defense against infectious microorganisms and is a very important disease-preventing mechanism. In this course the students will learn the molecular and cellular processes mediating innate immune responses to microbial pathogens, including intra- and extra- cellular bacteria and viruses.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MIC 320. Introduction to Microbes and the Immune System for Nurses. 3 Credit Hours.
Course covers the basic principles of microbiology and immunology. Course cannot be used for MIC major or minor credit.
Requisite: School of Nursing Health Studies.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MIC 321. Immunobiology. 3 Credit Hours.
Mechanisms underlying the cooperation between T-cells, B-cells, and antigens leading to humoral and cell mediated responses. The significance of immune cells and their products pertaining to autoimmunity, transplantation, and the surveillance of neoplastic cells is covered.
Prerequisite: MIC 301 or MIC 303.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MIC 322. Medical Parasitology. 3 Credit Hours.
Course discusses the biochemistry, physiology, pathogenicity, immunology, and mechanism of drug action and resistance of medically important parasitic protozoa, trematodes, nematodes, and cestodes.
Prerequisite: MIC 301 or MIC 303.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MIC 323. Microbial Pathogenesis and Physiology. 3 Credit Hours.
Fundamental properties of microbes as well as host-microbe relationships at the molecular and cellular levels.
Prerequisite: MIC 301. Or MIC 303.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.
MIC 436. Fundamental and Medical Virology. 3 Credit Hours.
The study of viruses as biological entities and etiological agents of disease. Virus-cell and virus-host interactions are also discussed.
Prerequisite: MIC 301 or MIC 303.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MIC 441. Microbiology and Immunology Colloquium. 1 Credit Hour.
External and internal faculty presentations as well as graduate presentations of recent advances in research. Course meets one hour per week.
Prerequisite: MIC 301. Or MIC 303.
Components: SEM.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 451. Special Projects in Immunobiology. 2-6 Credit Hours.
Wet bench laboratory research with faculty in the Microbiology and Immunology (M&I) Department at the Miller School of Medicine. Students will be actively participating in all aspects of hypothesis-driven scientific research ranging from familiarity with the literature to conducting and analyzing experiments.
Requisite: at least 17 credits in MIC and MIN GPA 3.0.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 452. Special Projects in Parasitology. 2-6 Credit Hours.
Wet bench laboratory research with faculty in the Microbiology and Immunology (M&I) Department at the Miller School of Medicine. Students will be actively participating in all aspects of hypothesis-driven scientific research ranging from familiarity with the literature to conducting and analyzing experiments.
Requisite: at least 17 credits in MIC and MIN GPA 3.0.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 453. Special Projects in Pathogenic Bacteriology. 2-6 Credit Hours.
Wet bench laboratory research with faculty in the Microbiology and Immunology (M&I) Department at the Miller School of Medicine. Students will be actively participating in all aspects of hypothesis-driven scientific research ranging from familiarity with the literature to conducting and analyzing experiments.
Requisite: at least 17 credits in MIC and MIN GPA 3.0.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 454. Special Projects in Microbial Genetics. 2-6 Credit Hours.
Wet bench laboratory research with faculty in the Microbiology and Immunology (M&I) Department at the Miller School of Medicine. Students will be actively participating in all aspects of hypothesis-driven scientific research ranging from familiarity with the literature to conducting and analyzing experiments.
Requisite: at least 17 credits in MIC and MIN GPA 3.0.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 455. Special Projects in Immunogenetics. 2-6 Credit Hours.
Wet bench laboratory research with faculty in the Microbiology and Immunology (M&I) Department at the Miller School of Medicine. Students will be actively participating in all aspects of hypothesis-driven scientific research ranging from familiarity with the literature to conducting and analyzing experiments.
Requisite: at least 17 credits in MIC and MIN GPA 3.0.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.
MIC 456. Special Projects in Virology. 2-6 Credit Hours.
Wet bench laboratory research with faculty in the Microbiology and Immunology (M&I) Department at the Miller School of Medicine. Students will be actively participating in all aspects of hypothesis-driven scientific research ranging from familiarity with the literature to conducting and analyzing experiments.
Requisite: at least 17 credits in MIC and MIN GPA 3.0.
Components: THI.
Grading: GRD.
Typically Offered: Fall & Spring.

MIC 460. Advanced Topics in Microbiology and Immunology. 3 Credit Hours.
An extensive and detailed examination of a number of topics covered in the core courses of the major. The goal is for upper-division undergraduate students to take the knowledge base they acquired in their major core courses into 'cutting edge' research areas. Each topic (of a total of 4 to 8) will be presented by a Faculty member with expertise in the area. Topics may include HIV Infection and the Immune System, immunology of Pregnancy, and Mitochondrial-based diseases. Emphasis will be placed on gaining a familiarity with the primary scientific: literature.
Requisite: MIC 301 OR MIC 303 OR MIC 304 AND MIC 319 AND MIC 321.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.