

# MICROBIOLOGY AND MOLECULAR GENETICS

## Microbiology/Cell and Molecular Biology

Microbiology is the hands-on study of bacteria, viruses, fungi and algae and their many relationships to humans, animals, plants and the environment. Cell and molecular biology bridges the fields of chemistry, biochemistry and biology as it seeks to understand life and cellular processes at the molecular level. Microbiologists apply their knowledge to infectious diseases and pathogenic mechanisms; food production and preservation, industrial fermentations which produce chemicals, drugs, antibiotics, alcoholic beverages and various food products; biodegradation of toxic chemicals and other materials present in the environment; insect pathology; the exciting and expanding field of biotechnology which endeavors to utilize living organisms to solve important problems in medicine, agriculture, and environmental science; infectious diseases; and public health and sanitation.

Microbes live in every imaginable habitat. They generate two-thirds of the oxygen in our atmosphere, drive the geochemical cycles that make life on Earth sustainable and are the basis of every food web. As model organisms used for basic research, microbes have contributed more than any other organisms to the current knowledge of genetics at the molecular level and genomics.

In contrast to the enormous benefits derived from some microbes, other microorganisms and viruses are the causative agents of infectious disease and hence have a devastating impact on humanity. These pathogens are the subjects of research into the mechanisms of infections, with the ultimate goal of combating or preventing diseases.

Departmental courses are designed to provide comprehensive training and the skills required for working with microorganisms in a professional setting, as well as a broad understanding of all aspects of microbial life. The lecture courses are taught by tenured faculty members and the laboratory courses are designed to integrate classroom learning with hands-on research experience.

Opportunities for employment exist at all scholarly levels, in many local, state and national agencies and industry. The record for employment of microbiologists has been excellent for many years and with the increased interest in biotechnology, medicine and the human microbiome, employment opportunities look even brighter for the future.

Microbiology is the strongest possible foundation for students who wish to go to medical, dental, veterinary or graduate schools. We take pride in offering research and internship opportunities that prepare students for careers in the biomedical sciences. Our graduates find jobs in medicine, health care, medical laboratories, teaching, research, industry and government.

## Medical Laboratory Science Option

This option is designed to give students the broad general education and the technical skills that are required for a successful career in medical laboratory science (MLS). The minimum requirement for the BS degree in Microbiology/Cell and Molecular Biology with the (MLS) option is three years of university work that includes general chemistry, organic chemistry, biochemistry, immunology, genetics, anatomy & physiology, physics, upper-division courses in microbiology, and one year of clinical laboratory education (internship).

For certification and completion of the BS degree, students will take one year of clinical internship in program accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS) and affiliated with Oklahoma State University. Students have the options of the following hospitals/programs: Comanche County Memorial Hospital, Lawton, OK; St. Francis Hospital, Tulsa, OK; Mercy Hospital, Ada, OK; Mercy Hospital, Ardmore, OK.

Medical Laboratory Science is unique in allowing students to enter the health profession directly after obtaining a BS degree. Clinical laboratory scientists comprise the third-largest segment of the healthcare professions and are an important member of the healthcare team, working alongside doctors and nurses. Students who complete Microbiology/Cell and Molecular Biology with the MLS option enjoy a 100% employment rate upon graduation.