Undergraduate, Graduate and Postdoctoral Research Opportunities

Veterinary Molecular Biology faculty are highly competitive researchers with funding from many grant sources including the National Institutes of Health, United States Department of Agriculture, American Lung Association, as well as private industry. Research is conducted in the following major areas:

- Infectious diseases of man, livestock, and wildlife
  Brucellosis, scrapie, chronic wasting disease (CWD), mastitis, pneumocystis, pneumonia, rotavirus, toxoplasmosis, influenza, strep, coccidioidomycosis, and herpes
- Mechanisms of disease resistance and prevention
  Vaccine development, mucosal immunity, leukocyte function and regulation
- Cellular, molecular, and developmental biology
  Transgenics, genetics, embryo development and fertility in animals, genomics

For more information:
Department of Veterinary Molecular Biology
P.O. Box 173610
Montana State University
Bozeman, Montana 59717-3610
(406)994-4705
Email: vmb@montana.edu
http://vmb.montana.edu

Financial Assistance
Graduate research assistantships are available from several sources including state, regional and federal grants. For more information, contact the department.

Cover photo: Photomicrograph of lung tissue. An airway is pictured (green color) with a lymph duct in yellow. The lymph duct is important in immunizing the lungs to infectious diseases.
Veterinary Molecular Biology (VMB) is a unique research/academic unit within the Montana University System. The highly productive faculty utilize exciting and powerful cutting-edge techniques of molecular biology to address important infectious disease issues relevant to man, livestock, and wildlife. VMB faculty are pursuing a better understanding of immunity, vaccine design, adjuvant development, and diagnostic assays for animal diseases.

Our undergraduate instructional efforts in VMB will lead you to a B.S. in Biotechnology in the College of Agriculture, while our graduate education leads to M.S. and Ph.D. degrees in Veterinary Molecular Biology.

Undergraduate Programs

B.S. in Biotechnology – Animal Systems Option

The Bachelor of Science in Biotechnology – Animal Systems Option is an interdisciplinary degree offered by the College of Agriculture and the Veterinary Molecular Biology Department. This program provides a challenging basic science curriculum with an emphasis on providing students hands-on learning in methods courses and an internship program. Students gain both theoretical and working knowledge of the most important molecular and biochemical techniques used in biotechnology, and those completing the Animal Systems Option curriculum will be strongly prepared for careers in both academic and industry settings. These students will also be prepared to enter graduate or medical (human or veterinary) professional schools for further study.

Animal Systems students will be advised by faculty in Veterinary Molecular Biology who use the tools of modern biotechnology in their research programs. Beyond the standard biological, microbiological, and chemistry laboratories, Animal Systems students also complete a rigorous two-course laboratory sequence in their junior and senior years where they gain hands-on experience with tissue culture, immunocytochemistry, microscopy, flow cytometry, basic molecular biology and protein biochemistry techniques. Students then participate in an internship program, which provides additional hands-on experience with biotechnology techniques used by research laboratories in industry, government, or academic settings.

Preventive Medicine Program

Our preventive medicine program prepares students for professional veterinary medical school through didactic coursework and internships. Although Montana does not have a college of veterinary medicine, a student desiring to become a veterinarian can complete the requirements for application to a veterinary college by enrolling in our preventive medicine program. Montana residents may obtain supplemental funding for their professional program through the Western Interstate Commission for Higher Education (WICHE) Program. This program enables students to attend veterinary schools out-of-state, yet pay in-state rates for tuition.

Preventative care work can be applied toward a bachelor of science in any major including animal science, biotechnology, biology, and microbiology.

Biotechnology—Animal Systems Option

Coursework

- Infectious Diseases of Domestic Animals
- Functional Anatomy of Domestic Animals
- Animal Cell Methods—Immunology
  - Hybridomas
  - Advanced Immunology
  - Flow Cytometry
  - Advanced Microscopy
- Animal Cell Methods—Molecular Biology
  - Genome Science
  - Functional Gene Expression
  - Ethical Practice of Science
  - Biotechnology Capstone Seminar
  - Biotechnology Internship

Prerequisite coursework in Biology, Chemistry, Biochemistry, Physics, Microbiology, Genetics, and Biotechnology will be used by research laboratories in industry, and those completing the Animal Systems Option curriculum will be strongly prepared for careers in both academic and industry settings.

MSU’s College of Agriculture in Bozeman, Montana is the ideal setting for students interested in the natural environment, ecology, biotechnology and the relationship between humans and the natural environment, ecology, biotechnology and the relationship between humans and the natural environment.

All programs of study are based in science and research. You will learn skills and study critical issues that prepare you to step into the challenges and opportunities of the working world. And, just as you are drawn to Montana for its unique balance of learning and lifestyle, our professors have also chosen MSU for its supportive, ambitious and down-to-earth atmosphere.

As leaders in their fields, MSU faculty have chosen Bozeman for its dynamic, collaborative and inspiring setting.

The MSU College of Agriculture is supported by the Montana Agricultural Experiment Station (MAES), which conducts relevant research for the people of Montana and the nation, and MSU Extension, which disseminates the research findings through a network of county and reservation offices and other venues. Many College of Agriculture faculty and staff are fully or partially funded by MAES or MSU Extension.

If you want to be challenged, meet inspiring people, and prepare for a professional career in one of the most beautiful places on earth, the MSU College of Agriculture is for you.

Graduate Programs

Our graduate program offers both Master of Science and Doctor of Philosophy degrees in Veterinary Molecular Biology and is accepted as a unique program within the Western Regional Graduate Program of Western Interstate Commission for Higher Education (WICHE WRGP). One special feature of the program is the high level of student-faculty interaction where students learn from and work directly with VMB faculty members who have 80-100 percent research appointments. Interdisciplinary studies are strongly encouraged, and the association of VMB with other MSU graduate programs and departments provides students with a diverse range of research experiences. Students from participating WICHE WRGP states accepted into the VMB graduate program qualify for in-state tuition and fees. During their first year of study, students must complete three to 32 week research rotations in different laboratories. Students then choose a VMB lab and advance their thesis research. Rotations provide a broad range of research approaches, familiarize students with departmental resources and expertise, and result in technical skills and knowledge that benefit the thesis project. VMB students are highly competitive for a variety of employment opportunities such as postdoctoral fellowships, academic teaching and research, industry research and management positions, and research technicians.