

# What Can I Do With a Major In...

## Biotechnology, Animal Systems Option?

**Biotechnology-Animal Systems programs**<sup>2</sup> will teach the student how to use scientific principles and technical skills in support of biologists and biotechnologists in research, industrial, and government settings. The program includes instruction in immunology, flow cytometry, histology and microscopy, cell culture, protein purification, biologic synthesis, biochemical assays, molecular biology, chromatography and bio separation, genetic technology, laboratory and hazardous materials safety, and computer applications. The goal for this program is to promote research, education and technology transfer for applications in biotechnology and for the benefit of the environment, agriculture, engineering and veterinary medicine. This program will provide academic programs leading to an undergraduate Bachelor of Science degree. The professors and staff in the program will engage in instruction and research in areas such as immunology, biochemistry, genetics, and cell, molecular, and developmental biology. Majors have the opportunity through coursework, laboratories and research experience to develop the knowledge and skills necessary to enter into a career in biotechnology or to continue to graduate education.

**Programs at Montana State University**<sup>2</sup>—Modern research in cellular and molecular biology and its resultant technology offers unparalleled opportunities to provide solutions to our society's most urgent problems in human and animal health, plant agriculture, and environmental quality. The Bachelor of Science in Biotechnology is an interdisciplinary degree offered by the College of Agriculture with three options: Plant Systems, Animal Systems, and Microbial Systems. The Animal Systems option administered by the Immunology & Infectious Diseases Department in the College of Agriculture provides a challenging science curriculum with an emphasis on providing students unique "hands on" learning experiences in methods courses and through an internship program. Students will gain both theoretical and working knowledge of the most important molecular and biochemical techniques used in biotechnology. Students successfully completing the Animal Systems Option curriculum will be 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.

All biotechnology students follow the same basic science curriculum in their first two years and then choose an area of emphasis (option). Students selecting the Animal Systems Option will be advised by faculty from Immunology & Infectious Diseases. Once students at the Junior and Senior level have completed their methods courses they will then participate in a research internship, which provides them with hands-on experience with biotechnology techniques used by industry laboratories, university laboratories, or other laboratories, such as those in federal or state facilities.

**Characteristics associated with success**<sup>1</sup> strong interest in understanding why things work as they do, curiosity about the logic and laws of nature, and a need to ask questions and find answers.

### You should<sup>1</sup>:

- Be creative
- Be logical
- Be skilled in mathematics and in science
- Be logical and organized
- Be able to express yourself, both orally and in writing
- Be able to use computers
- Be creative in problem solving
- Have good observational skills

**Occupations in this field require ability to**<sup>1</sup>: have laboratory skills, problem solving skills, professional ethics, communication skills, writing skills, and the knowledge of scientific literacy.

### Related occupations include<sup>1</sup>:

- Bioinformatics Specialist
- Biotechnical Scientist
- Consultant
- Biochemist
- Fisheries/Marine Biologist
- Pharmacologist (Human and Vet)
- Research Associate
- Clinical Research Associate
- Industry Researcher
- Ecologist
- Professor/Teacher
- Microbiologist
- Veterinarian
- Biophysicist
- Laboratory Technician
- Health Policy Consultant
- Pharmacist
- Medical Professional

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*MSU graduates (Bachelor's degree) were hired in the following selected fields<sup>3</sup>:*

Research Assistant-MSU  
Bay Area Field Sales Account Manager-Sepax Technologies  
Research Associate-MSU  
Laboratory Technician-Origen, Inc  
Embryologist-Rocky Mountain Reproductive Services  
Research Associate-Ligocyte Pharmaceutical  
Research Associate-MSU

**Salary averages of survey respondents: (# of respondents in parentheses)<sup>3</sup>**

2010: MT: Insufficient Data	Out of State: Insufficient Data
2009: MT: Insufficient Data	Out of State: Insufficient Data
2008: MT: \$28,960 (3)	Out of State: Insufficient Data
2007: MT: Insufficient Data	Out of State: Insufficient Data

The Biotechnology-Animal Systems Option program has graduated 17 students from 2007-2010, therefore because of this limited data set, please review the following information for additional context for educational outcomes. Please remember when reviewing the salary information that it is the “median”, meaning 50% of reported wages fell below and 50% above the reported wage.

In the field of “Biological Scientist”<sup>5</sup> the median<sup>4</sup> wages in 2010 for the State of Montana are estimated at \$61,700. In 2008 there were 430 positions in Montana and growth is forecasted through 2018 at 4%. Nationally, the median<sup>4</sup> wages in 2010 are estimated at \$68,200. In 2008 there were 31,700 positions nationally with an expected growth forecast of 19% through 2018. Job openings nationally, due to both growth and net replacement is estimated at 1,610 annually nationally and 10 in the State of Montana.

**Graduates from this program entered programs of further education at these institutions:**

No graduates are known to have entered programs of further education at this time.

**Other Sources of Information:**

Montana State University-Bozeman: College of Agriculture <http://www.montana.edu/wwwcat/programs/biot.html>  
ACT, Inc. Discover <http://actapps.act.org/eDISCOVER/>  
Cornell University-Biotechnology Department <http://www.biotech.cornell.edu/>  
University of Missouri– Biotechnology Department <http://www.umsl.edu/bulletin/as/biotechnology.html>

**\*Insufficient Data:** Each year the Career, Internship & Student Employment Services Office at Montana State University conducts a survey to determine placement rates and salary survey information from recent MSU graduates. Graduates were requested to participate in the survey to provide relevant information regarding the transition from college to career/graduate school. At times, there are limited or no respondents. Statistics, therefore, are not always based upon the response of the total sample group and are sometimes listed as “Insufficient Data”.

For more information contact:



Montana State University  
177 Strand Union Building  
Bozeman, MT 59717  
(406) 994-4353  
[www.montana.edu/careers](http://www.montana.edu/careers)

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<sup>2</sup> Montana State University College of Agriculture

<sup>3</sup> Montana State University Career & Internship Services

<sup>4</sup>50% of reported wages fall below the Median wage and 50% above and include entry to senior level positions. This is not an average.

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