

# Molecular Biology and Biotechnology

Manipulate cells and molecules to make life-saving innovations.

## THIS MAJOR IS A GOOD FIT IF YOU CAN SEE YOURSELF:

EXPLORING how life works at the most basic levels

STUDYING MATH and SCIENCE

EXPERIMENTING WITH CELLS and molecules in state-of-the-art laboratories

This major teaches you about cell structure and molecular function and how they can be modified to solve some of society's most pressing problems. Study proteins, carbohydrates, lipids, nucleic acids, and other biomolecules and learn about cellular functions such as DNA regulation and protein secretion. Learn about diseases and immune responses at the cellular level. Learn how to put your knowledge to work to design drugs and genetically engineer hardier and more useful plants. Since 2000, our department has received \$60 million in grants from the National Institutes of Health and the National Science Foundation to study infectious diseases.

## INSIDE THE CLASSROOM

Learn fundamental laboratory skills like isolating and cloning a gene, separating strands of DNA, and fabricating a biological chemical such as insulin. Study how to develop and test a vaccine. Senior year, you will draw on everything you've learned when you design and carry out your own research project. For example, you could experiment with designing plants that have a higher concentration of useful oils or higher resistance to drought. Receive guidance from a professor and present your findings at a poster competition.

## OUTSIDE THE CLASSROOM

**INTERN.** Get practical experiences like these: NATIONAL INSTITUTES OF HEALTH Produce proteins that can be used to treat disease . . . PHARMACEUTICAL DEVELOPER Help design a drug that targets a specific enzyme to reduce cholesterol . . . BIOTECHNOLOGY COMPANY Produce skin and bone tissue through tissue engineering.

**STUDY ABROAD.** Deepen your understanding of your major—and the world—in countries like these: SPAIN Take science classes in Spanish . . . SWITZERLAND Observe a different health care system . . . MEXICO Study how disease is managed in rural villages.

**DO RESEARCH.** Work for pay or credit in an on-campus laboratory. Study immune responses in virus-infected cells, manipulate bacteria to produce large quantities of a medicine, or alter the genetic makeup of rice to increase its nutritional value.

**VOLUNTEER.** Give back. Assist hospital medical staff as they care for patients. Treat sick pets at a veterinary clinic. Work at a clinic in a developing country.

**GET INVOLVED.** Network and have fun. MMBB CLUB Teach lab techniques to school children, learn about internships, and meet experts in the field. Take trips to biotech companies, laboratories, breweries, wineries, research centers, and hot springs . . . PRE-VET CLUB Meet other students planning for vet school and volunteer at a horse sanctuary . . . UI ENVIRONMENTAL CLUB See what you and others can do to live more sustainably.

## FASTFACT

You could help understand how the human cytomegalovirus damages a developing fetus.

## CAREER OPPORTUNITIES

Demand for our graduates is high. Work for biotechnology or pharmaceutical companies or the agricultural industry. Conduct research in university or government laboratories. Salaries start as high as \$50,000.

Here are a few possibilities:

**PHARMACEUTICAL SCIENTIST.** Develop, test, and produce new antibiotics and vaccines. Collect data on patients in clinical trials, monitor their reactions, and analyze the results.

**MEDICAL RESEARCHER.** Collect and analyze data about the mutations in cells that cause disease. Help understand disease and design treatments.

**AGRICULTURAL BIOTECHNOLOGIST.** Modify and improve crops such as rice, soybeans, and wheat or develop biopesticides and other agricultural products that will reduce our dependence on conventional pesticides.

**FORENSIC SCIENTIST.** Use DNA fingerprinting and other laboratory skills to inform criminal investigations.

**COMBINE YOUR EDUCATION.** Take courses in a foreign language, plant or animal science, law, engineering, soils, agribusiness, economics, or journalism.

**CONTINUE YOUR EDUCATION.** Many of our graduates go on to medical, nursing, dental, pharmacy, or veterinary schools or earn advanced degrees in medical technology, biotechnology, or molecular biology.

FIND OUT MORE ABOUT THE UNIVERSITY OF IDAHO MOLECULAR BIOLOGY AND BIOTECHNOLOGY MAJOR

[WWW.CALS.IDAHO.EDU/MMBB](http://WWW.CALS.IDAHO.EDU/MMBB)

	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR
FALL	<b>Chem 111</b> Principles of Chemistry I	<b>Chem 277/278</b> Organic Chemistry I/Lab	<b>Chem 253</b> Quantitative Analysis	<b>MMBB 400</b> Seminar
	<b>CORE 103-149</b> Core Discovery Course	<b>MMBB 250/255</b> General Microbiology/Lab	<b>MMBB 380/382</b> Introductory Biochemistry/Lab	<b>MMBB 488</b> Genetic Engineering
	<b>Engl 102</b> College Writing & Rhetoric	<b>Phys 111</b> General Physics I (with lab) or <b>Phys 211</b> Engineering Physics I (with lab)	<b>Elective</b> Elective—Core	<b>Elective</b> Elective—Molecular Biology & Biotechnology
	<b>Math 160</b> Survey of Calculus or <b>Math 170</b> Analytic Geometry & Calculus	<b>Stat 251</b> Statistical Methods	<b>Elective</b> Elective	<b>Electives</b> Electives
	<b>TOTAL</b>	<b>TOTAL</b>	<b>TOTAL</b>	<b>TOTAL</b>
	4	4	5	1
	4	5	6	3
	3	4	3	3
	4	4	3	9
	15	16	17	16
SPRING	<b>Biol 115</b> Cells & the Evolution of Life	<b>Chem 372</b> Organic Chemistry II	<b>Biol 210</b> Genetics or <b>Gene 314</b> General Genetics	<b>MMBB 440</b> Advanced Lab Techniques
	<b>Chem 112</b> Principles of Chemistry II	<b>Engl 207</b> Persuasive Writing or <b>Engl 208</b> Personal & Exploratory Writing or <b>Engl 209</b> Inquiry-Based Writing or <b>Engl 317</b> Technical Writing	<b>MMBB 442</b> Biochemistry II	<b>Elective</b> Elective—Molecular Biology & Biotechnology
	<b>CORE 153-199</b> Core Discovery Course	<b>Phys 112</b> General Physics II (with lab) or <b>Phys 212</b> Engineering Physics II (with lab)	<b>Elective</b> Elective—Molecular Biology & Biotechnology	<b>Elective</b> Elective—International
	<b>Electives</b> Electives	<b>Elective</b> Elective—Core	<b>Elective</b> Elective—Core	<b>Electives</b> Electives
		<b>Elective</b> Elective	<b>Elective</b> Elective	
	4	3	4	4
	5	3	3	3
	3	3	3	3
	6	3	3	6
	18	16	15-16	16

Total for degree = 128 credits. Course offerings may change from year to year. Always check the current course catalog.

TO LEARN MORE  
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*“A highlight of this major is that you gain an understanding of how the smallest, most basic components of life have big implications. By understanding how things function at a molecular level, I have a better understanding of how infectious disease affects a person and how treatment works.”*

NICHOLAS HOMER, *molecular biology and biotechnology major*