

Molecular and Cellular Biology

Specializing your Biology degree at Iowa State University

Have Questions About the Biology Major?

Visit Student Services in 103 Bessey Hall
or call 515-294-1064

Molecular and cellular biologists specialize in the structure, function, and interactions of the molecules within living cells. Encompassing fields such as biochemistry, genetics, developmental biology, histology, microbiology, pathology, and physiology, this specialization underpins all biological sciences. Molecular/cell biology addresses questions such as: how do cells replicate themselves and grow? How do cells acquire their specialized function? When these processes go awry, what abnormalities or diseases result? Focusing on molecular and cellular biology prepares students for careers in biotechnology, human medicine, regulation (food, drug, environmental), veterinary medicine, and more.

Students interested in this specialization should prioritize completing BIOL 313, BIOL 313L, and BIOL 314 within the biology core curriculum. For advanced biology coursework, we recommend taking at least 9 credits from the list below. Participating in experiential learning, such as an independent study course (BIOL 490), related internship experience (BIOL 494), and especially lab/field research (BIOL 499) is also advised. Many students specializing in this area pursue further education with a Masters or Ph.D.

Suggested Advanced Biology Courses for Molecular/Cellular Students

Course #	Course Name	Credits	Course #	Course Name	Credits
AN S 345	Growth/Dev't Domestic Anim.	3	GDCB 510	Transmission Genetics	3
AN S 352	Genetic Improv't Domest. Anim.	3	GDCB 511	Molecular Genetics	3
BBMB 405	Biochemistry II	3	GDCB 528	Advances in Molec/Cell Bio	3
BBMB 411	Techniques in Biochem Rsch.	4	GDCB 533	Advances in Developmental Bio	3
BBMB 420	Mammalian Biochemistry	3	GDCB 542	Intro to Molec. Bio Techniques	1
B M S 335	Molec/Cell Basis of Disease	1	GDCB 545	Plant Molec/Cell/Dev't Biology	3
BIOL 322	Intro Bioinformatics	3	GDCB 556	Cell/Molec/Dev't Neuroscience	3
BIOL 328	Molec/Cell of Human Disease	3	GDCB 557	Advanced Neuroscience Tech.	3
BIOL 349	Genome Perspective in Biology	2	GEN 340	Human Genetics	3
BIOL 352	Vertebrate Histology	4	GEN 409	Molecular Genetics	3
BIOL 402	Introduction to Pathology	3	GEN 410	Analytical Genetics	3
BIOL 423	Developmental Biology	3	MICRO 302	Biology of Microorganisms	3
BIOL 423L	Developmental Biology Lab	1	MICRO 302L	Microbiology Lab	1
BIOL 428	Topics in Cell Biology	3	MICRO 310	Medical Microbiology	3
BIOL 434	Endocrinology	3	MICRO 310L	Medical Microbiology Lab	1
BIOL 436	Neurobiology	3	MICRO 320	Molec. and Cellular Bacteriology	4
BIOL 444	Bioinformatic Analysis	3	MICRO 402	Microbial Genetics	3
ENT 410	Insect-Virus Interactions	3	MICRO 408	Virology	3
			MICRO 475	Immunology	3

Suggested Supporting Science Courses

Having a more comprehensive understanding of chemistry is important for specializing in cellular and molecular biology, so students should plan to take a full year of general chemistry (CHEM 177 + CHEM 177L, and CHEM 178 + CHEM 178L), a full year of organic chemistry (CHEM 331 + CHEM 331L, and CHEM 332 + CHEM 332L), and strongly consider taking more advanced biochemistry courses (i.e., BBMB 420, or BBMB 404 and BBMB 405). Calculus is also used more frequently in this specialization, so students are encouraged to take at least one semester of calculus, if not a full-year of the discipline. Similarly, a full-year of physics (PHYS 111 and PHYS 112 or PHYS 221 and PHYS 222) is suggested. Bioinformatics (<https://bcbio.las.iastate.edu>) complements this specialization, and students may want to consider a minor in this area.

Resources for Molecular/Cellular Students

American Society for Biochemistry and Molecular Biology: <http://www.asbmb.org>

American Society for Cell Biology: <http://www.ascb.org>

American Society for Microbiology: <http://www.asmta.org>

Biotechnology Careers: <http://www.bio-link.org/home/resources>

Genetics Society of America: <http://genetics-gsa.org>

Society for Neuroscience: <http://www.sfn.org>

GRE Information: <http://www.ets.org/gre/>

Be sure to check for student organizations too at: <https://www.stuorg.iastate.edu>