

PH.D. IN CELL AND MOLECULAR BIOLOGY

The graduate program in Cell and Molecular Biology is an interdisciplinary degree-granting program that involves over 100 faculty members from 17 departments and 6 colleges who share common interests in cell and molecular biology. The PhD program includes core coursework in molecular genetics and cell biology and rigorous and reproducible research. Elective courses cover specialized areas, including grant writing, ethical conduct of research and statistics. Two alternating graduate seminar series allow students to present their research and to attend presentations by CSU faculty and nationally prominent scientists. Core courses typically are completed during the first year and most students advance to candidacy by the end of their 5th semester. The PhD degree can generally be completed within five years. There is an option to include a Cancer Biology Specialization (<https://catalog.colostate.edu/general-catalog/university-wide-programs/interdisciplinary-studies/cell-molecular-biology/phd-cell-molecular-cancer-biology-specialization/>).

Most students admitted to the PhD program rotate through three laboratories in their first year to identify a PhD advisor. Current focus areas of research include, but are not limited to, Cancer Biology; Gene Expression; Genome Structure, Evolution & Repair; Infectious Disease; Metabolism & Physiology; Microbiomes; Plant Molecular Biology; Prions & Neurobiology; Stem Cells & Development; Synthetic Biology and STEM Communication. Students are encouraged to complete coursework in computational/quantitative approaches, and an emphasis is placed on effective communication with various audiences. The CMB program supports a student association and aims to create a welcoming culture for all.

Students interested in this program should refer to the Graduate and Professional Bulletin (<https://catalog.colostate.edu/general-catalog/graduate-bulletin/>) or visit the Cell and Molecular Biology website (<http://www.cmb.colostate.edu/>) for further details.

Learning Objectives

Graduates from our program will have strong foundations in core cell and molecular biology principles, state-of-the-art training in technical laboratory and computational skills, and leadership and communication skills necessary for professional achievement.

Upon successful completion of the Ph.D. program, students will be able to:

1. Demonstrate and apply detailed knowledge of the molecular processes by which genetic material is replicated, expressed, and regulated and/or the cellular processes involved in membrane formation, organelle biogenesis, cell communication/shape/motility and how these are linked with growth, aging, and death.
2. Evaluate primary research papers in the field of cell and molecular biology, including discerning the major questions/hypotheses being addressed, critically interpreting the data presented, assessing whether the conclusions are adequately supported by evidence, and relating the findings to the broader context and significance in the field.
3. Apply appropriate, ethical, and technically competent research practices to generate and analyze data and determine statistical and biological relevance.
4. Write publication-quality scientific manuscripts in the field of cell and molecular biology based on research findings.
5. Formulate new hypotheses based on the literature in the field of cell and molecular biology and design appropriate experimental and analytical approaches to test them and refine those approaches/hypotheses based on initial findings.