

PH.D. IN CELL AND MOLECULAR BIOLOGY, CANCER BIOLOGY SPECIALIZATION

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. The Cancer Biology Specialization is a focus area within the Cell and Molecular Biology graduate program that includes over two dozen faculty members from six departments in three colleges who share a strong interest and a broad expertise in molecular and clinical aspects of the development and treatment of cancer. The basic science and translational research activities of the focus area are closely linked with the clinical research and clinical trials programs of the Robert H. and Mary G. Flint Animal Cancer Center (<https://www.csuanimalcancercenter.org/>). (<https://www.csuanimalcancercenter.org/>)

Clinical cancer treatment of pet animals is a major strength of the cancer biology curriculum. The Cancer Biology Specialization combines nationally recognized research training, focused on cutting edge approaches to cancer diagnosis and treatment, with innovative clinical trials. Students who choose the Cancer Biology Specialization complete all of the requirements of the Cell and Molecular Biology graduate program, including the three laboratory rotations during their first year, plus an additional 5 credits of coursework.

Students interested in graduate work should refer to the Graduate and Professional Bulletin (<https://catalog.colostate.edu/general-catalog/graduate-bulletin/>) or visit the Cell and Molecular Biology website (<https://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. with a Cancer Biology Specialization, students will be able to:

1. Demonstrate and apply detailed state-of-the-art knowledge of the molecular processes by which genetic material is replicated, expressed, and regulated (molecular biology) 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. Demonstrate advanced knowledge of the molecular and cellular biology of cancer and carcinogenesis (cancer biology).
3. 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.
4. Derive and synthesize knowledge from peer-reviewed publications.
5. Collaborate effectively with others in the design and execution of research and other projects.
6. Independently design, execute, analyze, and document rigorous and reproducible cell and molecular biology experiments.
7. Maintain high standards for conduct of rigorous, reproducible, and ethically sound research.
8. Demonstrate technical mastery of laboratory/computational approaches.
9. Communicate research orally to specialist and general audiences.
10. Compose publication-quality scientific manuscripts in the field of cell and molecular biology, based on research findings or literature review.
11. Formulate novel hypotheses based on prior published research and/or their own discoveries and design rigorous and ethically sound experiments to test them.
12. Apply appropriate statistical tests to generate and analyze data and determine statistical and biological relevance.
13. Demonstrate skills such as leadership, management, teaching and mentoring to support future careers beyond academia.