Biochemistry and Molecular Biology

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Degrees Offered

• Doctor of Philosophy
• Joint Doctor of Medicine and Doctor of Philosophy

The disciplines of biochemistry and molecular biology seek to understand biology by exploring the functions of the molecular components of cells. A major goal of this program is to foster ability for independent thought. To this end, our faculty cultivates an open, collegial relationship with one another and with our students. Close collaboration between scientists, the sharing of ideas, and open inquiry are critical components of our training plan. Our goal is to develop independence as a scientist.

The hallmarks of graduate training in biochemistry and molecular biology are the emphasis placed on the use of the scientific literature in advanced coursework and on protecting time for laboratory research. In addition, students will have time for professional development through seminar presentation, attendance at national meetings, teaching opportunities, and seminar programs both within the department and throughout the Health Sciences Center.

Faculty research in the program can provide the student with training in multiple basic sciences areas:

• Regulation of gene expression
• Chromatin silencing
• RNA processing
• Cell survival mechanisms
• Intermediary metabolism
• Regulation of signal transduction by nutrients and metabolites
• Nutritional biochemistry
• Cell proliferation and cell cycle regulation
• Cell adhesion
• Ion channel biochemistry
• Kinases and phosphatases in signal transduction mechanisms involved in cancer cell metabolism
• Spirochete biology
• Oxidant-induced cellular stress
• Structure/function relationships of proteins
• Molecular genetics of visual and auditory development
• G protein-mediated signaling in retina photoreceptors
• Molecular basis of age-related blindness

These research areas provide fundamental knowledge toward both the normal health-state and the amelioration of multiple diseases: atherosclerosis, blindness, cancer, deafness, diabetes, and metabolic disorders.

Faculty

Graduate Program Director

• Lisa Salati - Ph.D. (University of Minnesota)

Doctor of Philosophy

Upon successful completion of the undifferentiated first year, as outlined earlier, students choose a dissertation research advisor, at which time emphasis is placed on research. During the second year, specialized courses in biochemistry are offered as students continue their research projects. During subsequent years, students emphasize independent dissertation research, and a few formal courses may be taken.

Completion of the Ph.D. program is realized when the student successfully presents the research results to both the department and their graduate advisory committee. Typically, four to five years are required to realize this goal.