



Molecular Medicine Program

Join the Post Genomic Biology Revolution

Quick Facts about the Program

Located in Baltimore, MD near the Inner Harbor

3 tracks of interrelated and complementary study :

- Cancer Biology
- Molecular Physiology & Pharmacology
- Genome Biology

150+ faculty researcher mentors

Average duration of study: 5.4 years

Student retention rate: 85% (2009-2015)

Graduations : 5-10/year

95 PhD graduates from the Program since 2007

Tuition, health insurance and nationally competitive stipends provided throughout the duration of study

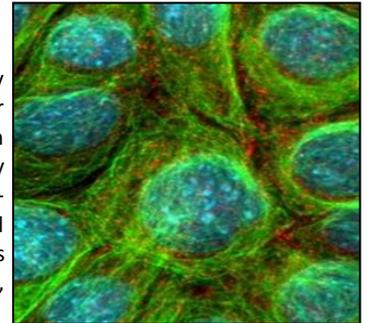
Opportunities to apply to NIH supported training grants and other funding sources.

As we move into the new millennium, it is becoming increasingly clear that the biomedical sciences are entering the most exciting phase of their development. Rapid advances in biology have not only revolutionized the detection, management and treatment of a wide range of diseases— but also provided a greater understanding of the deranged physiology underlying disease processes.

The **Graduate Program in Molecular Medicine at the University of Maryland** offers an multi-disciplinary program of study and research that provides students with knowledge, research skills, and state-of-the art methodologies to equip them for a successful research career in the Biomedical Sciences in the post-genomic era. The Program combines research tracks in Cancer Biology, Genome Biology and Molecular Physiology and Pharmacology into a unique interdisciplinary graduate training program that is ideally suited for training scientists for future biomedical research. Students seamlessly cross between track specialties to tailor their course of study to their research interests and career goals.

Cancer Research

Students in the **Cancer Biology Track** undertake problems in the etiology of cancer including the investigation of oncogenes, tumor suppressor genes, pathways of DNA damage and repair, cell cycle regulation, growth factors, angiogenesis and tumor metastasis, with emphasis on many different aspects of basic, translational and clinical cancer. Through interactions with the basic research and clinical faculty in the Marlene and Stewart Greenebaum Comprehensive Cancer Center, a unique focus is the integration of education and training with fundamental research, population science and clinical cancer research activities.



Cancer cells



Network servers

Genomics, Genetics and Bioinformatics

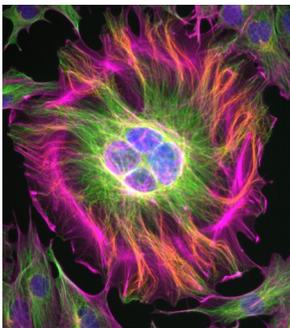
Students in the **Genome Biology Track** focus on recent advances in next-generation DNA sequencing and bioinformatics to better understand molecular genetic mechanisms, genetic development of organisms, and the genetic basis of a variety of diseases. Through interactions with the faculty in the Institute for Genome Sciences (<http://www.igs.umaryland.edu/>), students gain hands-on experience with cutting-edge bioinformatics and genomics tools while applying these platforms to a wide range of diverse biomedical questions in areas of cancer, human genomics, microbial genomics, transcriptomics, and evolutionary biology.

Molecular Basis of Physiology and Disease

Students in the **Molecular Physiology and Pharmacology Track** are combining modern tools of molecular and cellular biology with post-genomic strategies and state-of-the-art physiological techniques to illuminate key physiological and pathophysiological mechanisms to solve problems underlying molecular basis of human disease. Students are uncovering the causes and mechanisms of a wide range of diseases, including Alzheimer's disease, cardiac arrhythmias, atherosclerosis, cystic fibrosis, diabetes, heart failure, hypertension, kidney disease, infertility, osteoporosis, muscular dystrophy, and stroke.

Molecular Therapeutics

Among all the tracks, students also focus on molecular therapeutics using model systems that include breast, prostate and skin cancers, as well as chronic and acute cardiovascular and neurodegenerative diseases.



Cytoskeletal staining of osteocytes

Training Progression

The core curriculum includes an introduction in molecular and cell biology, and biochemistry, and specialty advanced courses in the student's particular areas of interest. Students complete laboratory rotations, attend Professors' Rounds and student seminars to learn about the multiple diverse research opportunities available. In the third semester of study, students prepare for the qualifying exam by writing a proposal addressing a problem related to their research interests, and defend the proposal in an oral qualifying exam. Following admission to candidacy, students pursue their thesis research under the direction of their mentor and a thesis advisory committee, and by the end of the third year in the program, present their research proposal to their thesis advisory committee and their peers. Completion of the Ph.D. program, including the final thesis defense, usually requires 5 years. During their training students are encouraged to present their research results at national and international meetings and to publish in top tier research journals.



Internships and Career Development

The Office of Predoctoral and Postdoctoral Scholars housed within the GPILS offers a variety of venues to enhance the training experience and expand the skill sets of predoctoral students for both academic and non-academic careers. These opportunities include Careers in Science presentations, grant writing workshops, a Teaching Pedagogy Seminar Series, a course in Entrepreneurship in Life Sciences, internship opportunities in the areas of Science Communications, Undergraduate Teaching at local universities, and Biotech Company Research Internships.



Location and Facilities

The University of Maryland School of Medicine was established in 1807 as the first public medical school in the United States. It is currently the fulcrum of a large academic health center that combines medical education, biomedical research, biotechnological innovation, patient care and community service. Located in the heart of metropolitan Baltimore, near the famous Inner Harbor area, the campus occupies modern building facilities and has state-of-the-art technology, offering unique training opportunities for graduate students.



The Molecular Medicine Graduate Program is in the Graduate Program in Life Sciences (GPILS), an umbrella graduate program consisting of 8 PhD and MD/PhD granting programs and a current enrollment of over 350 students. The GPILS programs span a wide spectrum of biomedical disciplines, each placing a special emphasis on both fundamental discovery and translational research. Students in the Molecular Medicine Program are trained and mentored from faculty throughout the campus, including the School of Medicine, the Dental School, the School of Nursing, the Institute for Genome Sciences, the Center for Vascular & Inflammatory Diseases, the Center for Vaccine Development, the Center for Translational Medicine, the Marlene and Stuart Greenebaum Comprehensive Cancer Center, and the Institute for Human Virology. Specialized expertise, cutting-edge technologies and sophisticated scientific resources and equipment all support a robust basic, clinical and translational biomedical research environment through the Center for Innovative Biomedical Resources (CIBR; <http://medschool.umaryland.edu/CIBR/>).

Visit our website:

<http://lifesciences.umaryland.edu/molecularmedicine/>

Program Manager

Marcina Garner
University of Maryland School of Medicine
800 W. Baltimore Street Rm 216
Baltimore, MD 21201
Phone: 410 706 8114
mgarner@som.umaryland.edu

Program Director

Toni Antalis, Ph.D.
University of Maryland School of Medicine
800 W. Baltimore Street Rm 220
Baltimore, MD 21201
Phone: 410 706 8222
tantal@som.umaryland.edu