Biomedical Sciences Graduate Programs

Overview

The WVU Health Sciences Center offers biomedical research training leading to the Ph.D. and M.S. degrees and the joint M.D./Ph.D. degree. Our Ph.D. and M.S. students matriculate into a common, integrated core curriculum including research laboratory rotations. This integrated first year allows students to build competence in key areas of contemporary science, gain exposure to our seven training programs, and network scientifically and socially. In the second semester, students customize their coursework by selecting from an array of program-specific electives. By April of year one, students have acquired the necessary didactic and research knowledge to make an informed selection of a research advisor and one of our seven graduate training programs. M.D./Ph.D. scholars take the first two years of medical school, do research for three to four years in one of our seven training programs under the guidance of a graduate faculty advisor, and then complete the last two years of medical school.

Our seven graduate training programs are as follows: biochemistry and molecular biology; cancer cell biology; cellular and integrative physiology; exercise physiology; immunology and microbial pathogenesis; neuroscience; and pharmaceutical and pharmacological sciences.

Successful completion of the Ph.D. degree requires a 3.0 GPA, A’s, B’s, or S in research, passages of the qualifying examination, which usually includes a defense of the research proposal and dissertation defense, and at least one first-author manuscript, based on the Ph.D. dissertation research, published or in press in a peer-reviewed journal before the formal defense of the dissertation.

The goal of all seven biomedical sciences graduate Ph.D. programs is to train highly qualified students for academic and scientific careers as research investigators. The program provides the instructional and research background needed to enable doctoral candidates to complete an original Ph.D. project that advances the field and is acceptable for publication in peer-reviewed journals. This doctoral training serves as a foundation for further career development, which usually includes three to five years of postdoctoral research training.

Admissions

Ph.D. Students

Applicants to the Ph.D. graduate programs in the biomedical sciences and the Schools of Medicine and Pharmacy must submit an official application for admission to the WVU Office of Admissions, P.O. Box 6009, Morgantown, WV 26506-6009. Applicants should request to have their GRE and TOEFL/IELTS scores sent to WVU. Additionally, applicants are also required to furnish official copies of transcripts or marks sheets directly to the Office of Admissions. The online application and instructions can be found online at [http://grad.wvu.edu](http://grad.wvu.edu).

Applicants must have a bachelor’s degree and excellent GRE scores. Three letters of recommendation and a personal statement are required. Students are invited in groups of ten to fifteen for paid, two-day visit/interviews from January through March. Students are admitted as a class by a common graduate admissions committee comprised of the graduate directors of each of our seven Ph.D.-degree granting programs, a senior Ph.D. student from the Graduate Student Organization (GSO), and the Assistant Dean of Graduate Studies.

Applicants must have a bachelor’s or equivalent academic degree and should demonstrate a strong background in the biological sciences, inorganic and organic chemistry, physics, and mathematics through calculus. Courses in biochemistry, cell biology, molecular genetics, and physical chemistry, and experience in research are recommended. Students with demonstrated abilities but lacking some recommended courses should correct these deficiencies in the summer preceding or after enrollment. Recommended are a minimum GPA of 3.0 and a GRE total of 1,000 for verbal and quantitative with a 4.0 in the analytical essay.

M.D./Ph.D. Students

Formal application requires successful application to the School of Medicine through the American Medical College Application Service (AMCAS) followed by a separate application to the Director of the M.D./Ph.D. Scholars Program. M.D./Ph.D. candidates interview with two current M.D./Ph.D. scholars, the director of the scholars program, and selected graduate faculty.

Financial Aid

All Ph.D. and M.D./Ph.D. students matriculated in the biomedical sciences graduate programs in the WVU Health Sciences Center receive full financial support during their training, provided that they remain in good academic standing, keep a 3.0 GPA, and exhibit excellent performance in research. Stipend levels are considered for adjustment approximately every two years. Such support currently includes a $20,000 annual stipend, full tuition coverage, and student health insurance (hospitalization and disability).
Faculty
Assistant Dean for Graduate Studies
• Fred L. Minnear - Ph.D.
  M.D./Ph.D. Scholars Program

Chair
• Jason Huber

ASSISTANT DIRECTOR FOR GRADUATE STUDIES
• Renee Seitz

Staff Assistant
• Penny Phillips
  M.D./Ph.D. Scholars Program

Ph.D. Undifferentiated First Year
Advantages of an undifferentiated first year:
• Students acquire a fundamental yet in-depth exposure to relevant contemporary science.
• Students have one year to select a specific training program and research advisor.
• There are larger numbers of available graduate faculty to select from for a research advisor.
• Students develop important intellectual and social connections.
• It enhances future collaborations among research laboratories.

In year one, students:
• Take an integrated core curriculum that focuses on contemporary science and scientific integrity
• Take specialized areas of science that align with the research strengths of the graduate faculty
• Rotate through three active research laboratories supported by federal grant

First semester:
Cellular Structure and Function, Cellular Methods, and Fundamentals of Integrated Systems are the three major courses. Journal clubs are incorporated and complement the didactic information, emphasizing discussions of literature articles led by students and facilitated by the faculty. Biostatistics for the Basic Sciences provides an introductory background to statistics. Students take Discussions on Scientific Integrity that meets weekly, is led by individual faculty, and incorporates small and large group discussions of ethical and moral issues presented as scientific case studies.

Second semester:
Molecular Biology, which also incorporates a journal club, is required of all students. In addition, students help design their own curriculum. Each of the seven graduate programs offers a module taught primarily from the current literature with an emphasis on discussions among students and faculty. Each student, with assistance from the graduate directors, selects two or three of these modules.

By April of year one, students are provided the necessary didactic and research experiences to make an informed selection of a research advisor and one of the seven graduate training programs.

In the first summer, students take Scientific Writing. Students attend weekly lectures and complete assignments in two separate writing skills, a scientific journal article and an NIH pre-doctoral fellowship grant.

M.D./Ph.D. Scholars Program
The WVU School of Medicine’s M.D./Ph.D. Scholars Program prepares students for academic careers that combine the practice and teaching of clinical medicine with laboratory investigation of disease mechanisms. The goal is to train independent investigators who can function in the future as physician-scientists. This joint training program requires at least seven years to complete.

Medical School, Years One and Two
Students enter the program in July before beginning medical school with an orientation to the various areas of research. Students choose one six-week research rotation before medical school starts in August. In years one and two, trainees take the integrated medical school basic science curriculum. All M.D./Ph.D. trainees participate in monthly research forums. At these forums, students present their research, learn from physician-scientist role
models, and discuss academic career opportunities. During the summer of year one, trainees complete a rotation in one additional research laboratory to facilitate their final selection of a specific graduate program and research advisor by April of year two.

**Ph.D. Training**

After successful completion of years one and two of the medical curriculum and step one of the United States Medical Licensing Examination (USMLE), students enter the research portion of their Ph.D. training. There are two M.D./Ph.D. training programs: biomedical sciences and public health sciences. The research opportunities in these two training programs are numerous and include cell and molecular biology, integrative physiology, immunology, exercise physiology, cardiovascular sciences, receptor biochemistry, bacterial pathogenesis, lung cell biology and environmental exposures, inflammation, molecular genetics, pharmacological sciences, neuroendocrine and reproductive biology, developmental biology, tumor invasion and angiogenesis, cancer cell biology, neurodegenerative disorders and stroke, functional brain imaging and cognitive behavior, learning and memory, as well as population-based outcomes and epidemiology studies relevant to public health. Before transitioning back to the clinical clerkships, students brush-up on their clinical skills by shadowing physicians, conducting physicals, and presenting case studies at the monthly M.D./Ph.D. forums.

**Medical School, Years Three and Four**

After the writing and successful defense of the doctoral dissertation, students complete years three and four of medical school at the Morgantown campus.