DOCTOR OF PHILOSOPHY IN THE FIELD OF PHARMACOLOGY AND PHYSIOLOGY

The doctor of philosophy (PhD) in pharmacology and physiology program centers on biological systems, including the interaction of molecules (drugs), function integration of organ systems and how cells regulate ionic metabolic fluxes under normal and pathophysiological states.

The program begins with interdisciplinary coursework in genes, cells, and systems in biomedical sciences, professional development in scientific communication and science careers, and laboratory rotations offered through GW’s Institute for Biomedical Sciences. After the first year of study, students work with their research advisor to complete remaining degree requirements, including the dissertation.

Program faculty are drawn largely from the GW School of Medicine and Health Sciences, including scientists from Children’s Research Institute of Children’s National Health System.

Students have access to extensive research facilities and libraries on campus and in the greater Washington, DC area. This includes the School of Medical and Health Sciences, GW’s Gelman Library and Himmelfarb Health Sciences Library, Children’s Research Institute, the National Institutes of Health, and numerous other research institutions.

This is a STEM-designated program.

Visit the program website (https://smhs.gwu.edu/ibs/program/molecular-medicine/pharma-physio/) for additional information.

ADMISSIONS

Admission deadlines:

Fall – December 1

Standardized test scores:
The GRE general exam is not required.

Test scores:
The Test of English as a Foreign Language (TOEFL), the academic International English Language Testing System (IELTS), or the PTE Academic is required of all applicants except those who hold a bachelor’s, master’s, or doctoral degree from a college or university in the United States or from an institution located in a country in which English is the official language, provided English was the language of instruction.

Minimum scores for the program are:

- Academic IELTS: an overall band score of 7.0 with no individual score below 6.0; or
- TOEFL: 600 on paper-based or 100 on Internet-based; or
- PTE Academic: 68;

Recommendations required:

Three (3) recommendations

Prior academic records:

Transcripts are required from all colleges and universities attended, whether or not credit was earned, the program was completed, or the credit appears as transfer credit on another transcript. Unofficial transcripts from all colleges and universities attended must be uploaded to your online application. Official transcripts are required only of applicants who are offered admission. If transcripts are in a language other than English, English language translations must be provided. The English translation alone should be uploaded into your application.

Prerequisite:

A bachelor’s degree in biological sciences, requirement chemistry, or a related field.

Statement of purpose:

In an essay of 250 – 500 words, state your purpose in undertaking graduate study in your chosen field. Include your academic objectives, research interests, and career plans. Also discuss your related qualifications, including collegiate, professional, and community activities, and any other substantial accomplishments not already mentioned on the application.

Interview:

An interview is required.

Additional requirements:

A Curriculum Vitae is required.

International applicants only:

Please follow this link - https://columbian.gwu.edu/international-graduate-applicants - to review the International Applicant Information carefully for details on required documents and English language requirements.

For more information on the admission process, please visit the Columbian College of Arts and Sciences Frequently Asked Questions (http://columbian.gwu.edu/graduate/admissions/faqs/) page.

Supporting documents not submitted online should be mailed to:

Columbian College of Arts and Sciences - Graduate Admissions Office
The George Washington University
801 22nd Street NW, Phillips Hall 215
Washington DC 20052

Contact for questions:
askccas@gwu.edu – 202-994-6210 (phone) – 202-994-6213 (fax)
8:30 am – 5:30 pm, Monday through Friday
REQUIREMENTS

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Graduate Programs (http://bulletin.gwu.edu/arts-sciences/#degreeregulationstext).

The requirements for the Doctor of Philosophy program (http://bulletin.gwu.edu/arts-sciences/#doctoraltext).

72 credits, including required core and elective courses. Successful completion of a grant-style qualifier examination is required for advancement to candidacy. In addition, students perform full-time research in faculty laboratories for the duration of their program. In GW laboratories, they are hired as paid research assistants/associates in the third year and beyond of the program.

Students are advised to complete up to 45 credits comprising required interdisciplinary core courses, required pharmacology and physiology core courses, electives, and advanced readings and research in the first two years of PhD study. Upon successful completion of a grant-style qualifier, students register for up to 24 credits in dissertation research through completion and successful oral defense of a written dissertation.

The following requirements must be fulfilled: 72 credits, including required core and elective courses. Successful completion of a grant-style qualifier examination is required for advancement to candidacy. In addition, students perform full-time research in faculty laboratories for the duration of their program.

Students are advised to complete 45 credits in the first two years of PhD study comprising required interdisciplinary core courses, required genomics core courses, electives, and advanced readings and research. Upon successful completion of a grant-style qualifier, students register for up to 27 credits of dissertation research through completion and successful oral defense of a written dissertation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMSC 8218</td>
<td>Career Options in the Biomedical Sciences</td>
<td></td>
</tr>
<tr>
<td>BMSC 8230</td>
<td>Molecular Basis of Human Disease</td>
<td></td>
</tr>
<tr>
<td>BMSC 8235</td>
<td>Applied Biostatistics for Basic Research</td>
<td></td>
</tr>
</tbody>
</table>

**Required pharmacology and physiology core**

- PHAR 6205  Pharmacology
- PHAR 6116  Pharmacogenomics and Personalized Medicine
- PHAR 8211  Physiology
- PHAR 8214  Physiology and Pharmacology Seminar (Taken two times for a total of two credits)
- PHAR 8281  Molecular Pharmacology and Neurobiology of Excitable Tissues

**Electives**

9 credits in elective courses selected from the following in consultation with graduate program advisor:

- ANAT 6130  Clinically Oriented Human Embryology
- ANAT 6150  Clinically Oriented Human Microscopic Anatomy
- ANAT 6160  Human Clinical Neuroanatomy
- ANAT 6182  Fundamentals of Translational Science
- ANAT 6275  Advanced Studies in Translational Sciences
- ANAT 6292  Projects in Anatomical Sciences: Introduction to Neuroradiology
- BIOC 6240  Next Generation Sequencing
- BIOC 6242  Bioscience Big Data Statistics
- BIOC 8225  Metabolism
- BIOC 8232  Molecular and Cellular Signaling
- BMSC 8219  Writing the Grant-Style Qualifier
- BMSC 8220  IBS Research Practicum
- CANC 8221  The Basic Science of Oncology
- CANC 8222  Molecular Oncology and Cancer Epigenetics
- CANC 8223  Immunology and Immunotherapy of Cancer
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENO 6223</td>
<td>Bioinformatics</td>
</tr>
<tr>
<td>GENO 6236</td>
<td>Medical Genomics</td>
</tr>
<tr>
<td>GENO 6237</td>
<td>Proteomics and Biomarkers</td>
</tr>
<tr>
<td>GENO 8231</td>
<td>Introduction to Genomics, Proteomics, and Bioinformatics</td>
</tr>
<tr>
<td>GENO 8232</td>
<td>Computational Biology and Bioinformatics: Principles and Practices</td>
</tr>
<tr>
<td>MICR 8210</td>
<td>Infection and Immunity</td>
</tr>
<tr>
<td>MICR 8230</td>
<td>Molecular and Cellular Immunology</td>
</tr>
<tr>
<td>MICR 8270</td>
<td>Advanced Topics in Immunology</td>
</tr>
<tr>
<td>NRSC 8284</td>
<td>Foundations of Experimental Neuroscience I</td>
</tr>
<tr>
<td>NRSC 8285</td>
<td>Foundations of Experimental Neuroscience II</td>
</tr>
<tr>
<td>PHAR 6206</td>
<td>Advanced Pharmacology</td>
</tr>
<tr>
<td>PHAR 6208</td>
<td>Pharmacology in Disease Pathophysiology For Health Sciences Students</td>
</tr>
<tr>
<td>PHAR 6322</td>
<td>Advanced Professional and Communication Skills</td>
</tr>
<tr>
<td>PHAR 8998</td>
<td>Advanced Reading and Research</td>
</tr>
<tr>
<td>PUBH 6276</td>
<td>Public Health Microbiology</td>
</tr>
<tr>
<td>PUBH 6278</td>
<td>Public Health Virology</td>
</tr>
<tr>
<td>PUBH 6861</td>
<td>Public Health Genomics</td>
</tr>
</tbody>
</table>

**Dissertation research (6-27 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAR 8999</td>
<td>Dissertation research</td>
</tr>
</tbody>
</table>

*Required courses may be waived at the discretion of the graduate program director based on written documentation of prior equivalent coursework. Any waiver increases the number of electives required, by the number of credits waived.*