Overview
Programs in Biomedical Sciences (PIBS) at the University of Miami Miller’s School of Medicine (UMMSM) provides students a wide variety of research opportunities in the biological sciences across many disciplines and departments.

First–year students take a core curriculum that builds a solid foundation in the biomedical sciences. The common coursework in the first semester ranges from molecules to cells to systems of human physiology. Lectures are balanced by breakout sessions, in which faculty members discuss the primary literature with students in small groups. Students have the flexibility to select breakout sessions that match their interests. The core curriculum also offers critical learning opportunities in biostatistics, genomic and analytical tools. In the second semester, students select individual modular courses offered in our eight disciplines. These courses cover topics of specific relevance to graduate programs or research topics. Students also complete a course in Biostatistics and a workshop in BioInformatics.

PhD Program Selection
During their first year in the umbrella program, students complete three to four laboratory rotations in various disciplines. This opportunity allows students to explore their interests before selecting a program and dissertation mentor. Students match with mentors in specific programs and achieve program affiliation at the end of their first year in one of the following programs (for years two through five):

- Biochemistry & Molecular Biology (http://biomed.med.miami.edu/graduate-programs/biochemistry-and-molecular-biology)
- Cancer Biology (http://biomed.med.miami.edu/graduate-programs/cancer-biology)
- Human Genetics & Genomics (http://biomed.med.miami.edu/graduate-programs/human-genetics-and-genomics)
- Microbiology & Immunology (http://biomed.med.miami.edu/graduate-programs/microbiology-and-immunology)
- Molecular & Cellular Pharmacology (http://biomed.med.miami.edu/graduate-programs/molecular-and-cellular-pharmacology)
- Neuroscience (http://biomed.med.miami.edu/graduate-programs/neuroscience)
- Physiology & Biophysics (http://biomed.med.miami.edu/graduate-programs/physiology-and-biophysics)

Contact Information
Office of Graduate and Postdoctoral Studies
Rosenstiel Medical Sciences Building, Suite 1128
1600 NW 10th Avenue, M857
Miami, FL 33136
305 243 1049
ogps@med.miami.edu

Admission Requirements
Applicants to biomedical programs should have a bachelor degree in a biological or related discipline (e.g., psychology, chemistry, engineering, physics). Although there are no prerequisite requirements, courses in general biology, cell/molecular biology, calculus, general physics, organic chemistry, physical chemistry, and biochemistry are encouraged. Applications are generally accepted from September to December for fall entry only. Select applicants will be offered an interview.

Competitive Candidates Will Have the Following:

- Excellent academic record
- Competitive GRE exam scores
- Research experience in a laboratory setting
- Publications of abstract and / or papers
- Co-authorship in a peer-reviewed journal is recommended
- Strong letters of recommendation from research scientists who know the candidate well
- Motivation to pursue state-of-the-art biomedical research

Applicants Must Submit the Following:

- Online Application
- Application Fee
- Official Academic Transcripts
- GRE General Test
- English Proficiency Exam (non-native speakers)
- Statement of Purpose
- Resume / CV

Full application instructions can be found here. (http://biomed.med.miami.edu/apply)

Curriculum Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>PIB 700</td>
<td>Journal Club</td>
<td>2</td>
</tr>
<tr>
<td>PIB 701</td>
<td>Introduction to Biomedical Sciences</td>
<td>5</td>
</tr>
<tr>
<td>PIB 702</td>
<td>Scientific Reasoning</td>
<td>3</td>
</tr>
<tr>
<td>PIB 705</td>
<td>Biostatistics for the Biosciences</td>
<td>3</td>
</tr>
<tr>
<td>PIB 731</td>
<td>Laboratory Research</td>
<td>3-5</td>
</tr>
<tr>
<td>PIB 780</td>
<td>Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>PIB 782</td>
<td>Professional Development: Skills for Success I</td>
<td>1</td>
</tr>
<tr>
<td>PIB 783</td>
<td>Professional Development: Skills for Success II</td>
<td>1</td>
</tr>
<tr>
<td>PIB 830</td>
<td>Doctoral Dissertation</td>
<td>1</td>
</tr>
</tbody>
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Total Credit Hours: 20-22

Plan of Study
Students enrolled in the first year program for the PhD in Biomedical Sciences complete the following core requirements. The curricula for years two through five can be found in the program links above.
Program Elective Courses

The following program courses are available to first year students in their spring semester. It is generally recommended that students only take courses in the program they wish to enter. This will put students on a timely path to graduation. Your options will be discussed in your spring course advising appointment.

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BMB 714</td>
<td>Molecular Genetics</td>
<td>4</td>
</tr>
<tr>
<td>BMB 715</td>
<td>Structural Biology and Applications to Drug Discovery</td>
<td>2</td>
</tr>
<tr>
<td>CAB 710</td>
<td>Cancer Biochemistry &amp; Molecular Biology</td>
<td>3</td>
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<tr>
<td>CAB 720</td>
<td>Dialogues with Cancer Clinitians (PIBS Module)</td>
<td>1</td>
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<tr>
<td>HGG 630</td>
<td>Variation and Disease</td>
<td>2</td>
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<tr>
<td>HGG 640</td>
<td>Family Studies and Genetic Analysis</td>
<td>2</td>
</tr>
<tr>
<td>MCP 704</td>
<td>Mechanisms of Drug Action</td>
<td>3</td>
</tr>
<tr>
<td>MCP 752</td>
<td>Systems Biology &amp; Approaches in Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>MCP 753</td>
<td>Computational Pharmacology and Fundamentals of Drug Design</td>
<td>3</td>
</tr>
<tr>
<td>MDB 751</td>
<td>Advanced Cell Biology Approaches to Molecular Medicine</td>
<td>2-3</td>
</tr>
<tr>
<td>MDB 752</td>
<td>Current Topics in Mammalian Development</td>
<td>2-3</td>
</tr>
</tbody>
</table>
PIB 731. Laboratory Research. 1-6 Credit Hours.
Laboratory rotations familiarize students with a variety of modern techniques in biomedicine and potential mentors for their dissertation projects. One credit is awarded per rotation.

Components: LAB.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

PIB 780. Research Ethics. 1 Credit Hour.
The NIH Guide for Grants and Contracts stipulates that Institutions receiving support for National Research Service Award Training Grants are required to develop a program in the principles of scientific integrity. This program should be an integral part of the proposed training effort.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

PIB 782. Professional Development: Skills for Success I. 1 Credit Hour.
This workshop will teach students the basics on how to: manage your career, choose a rotation lab / mentor, read a scientific paper, write a lab report and present in the journal club and lab meetings.

Components: LEC.
Grading: SUS.
Typically Offered: Fall.

PIB 783. Professional Development: Skills for Success II. 1 Credit Hour.
This workshop will teach students the basics on how to: write a fellowship and scientific paper as well as the proper and ethical handling of research data.

Components: LEC.
Grading: SUS.
Typically Offered: Spring.

PIB 785. PIBS Bioinformatics Workshop. 1 Credit Hour.
The aim of this workshop is to introduce graduate students to basic bioinformatics data retrieval and analysis as relevant to bio-medical research. The sessions will include discussion on focused topics and hands-on, project-based exercises. Only publicly available databases and web-tools will be used, no programming will be taught.

Components: WKS.
Grading: SUS.
Typically Offered: Summer.

PIB 830. Doctoral Dissertation. 1-12 Credit Hours.
Required for all PhD candidates. First-year students generally take one credit of doctoral dissertation in their first summer semester then continue in program specific dissertation credit through graduation.

Components: THI.
Grading: SUS.
Typically Offered: Summer.