Pathobiology and Molecular Medicine Theme

Degree Offered: Ph.D.
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Prospective students should use this checklist (http://www.uab.edu/graduate/images/acrobat/checklist/PBMWchecklist.pdf) to obtain specific admissions requirements on how to apply to Graduate School.

Theme Information and Course Requirements

The Pathobiology & Molecular Medicine (PBMM) Graduate Program at UAB is the successor of the popular and highly successful Integrative Biomedical Sciences Graduate Program established in 1999. PBMM represents an expansion of the Integrative Biomedical Sciences Program and is designed to give students the very best multidisciplinary training within the emerging and directing field of molecular medicine. The main objective of the program is to expose students to a diverse faculty with research interests that range from molecules - to whole organisms - to disease processes - to new therapies. Our premise is that students, when trained in basic principles of molecular and cellular biology, in addition to organ-based physiology, pharmacology and pathology, will be prepared to study biological processes at any level of organization. The important biomedical issues of today are sufficiently complex that the successful investigator must be able to tackle these issues using integrated, multifaceted approaches.

The advantage of joining PBMM is that students have full access to all 350 faculty within the GBS, including those not within PBMM. This gives students the broadest opportunity possible to move their studies in the direction that they find most interesting. In addition, PBMM faculty utilize state-of-the-art resources and ideas to drive the field of molecular medicine forward. Within PBMM, you will have the opportunity to immerse yourself at the leading edge of biomedicine and share in the excitement first-hand by working alongside research pioneers.

During your first year, you will complete a series of rigorous courses that includes training in biochemistry, molecular biology, genetics, cellular physiology and pathobiology. Due to the interdisciplinary nature of Graduate Biomedical Sciences, students have the option to select their advanced, elective courses from courses numbered at the 700-level and above in participating departments. Those include courses within the School of Medicine, School of Public Health, and other Joint Health Sciences. Courses should be chosen in consultation with the student’s mentor and committee to ensure coursework supports his/her research. You will also have the opportunity to take courses within designated “Focus Areas.” These Focus Areas are organized around specific research strengths represented by faculty within the PBMM and address important issues in diseases such as diabetes, heart disease and cancer among others. In addition, you will have full access to courses offered by other programs within the GBS where strengths exist in multiple fields including immunology, neuroscience, structural biology and others. There will also be ample time allotted for you to attend research seminars, learn to make scientific presentations and to perform 3 laboratory rotations. These rotations are designed to give the student a practical introduction to bench research and to help the student choose a faculty mentor.

After the first year there will be additional coursework directed in your area of interest, but the main focus will be on intensive research training within the laboratory. Here, guided by your mentor and graduate advisory committee, you will develop critical technical and analytical skills that will form the basis of your dissertation research.

Graduates of the PBMM training program are fully prepared to address the most complex and challenging issues in disease biology and therapy and are positioned to pursue work in academic, industrial or government research or related positions. Training for the PhD degree is generally completed within four to six years, depending on the student’s background and training goals.

Admission Requirements

Undergraduate Education

A baccalaureate degree in the natural or physical sciences is required. Undergraduate level courses in organic and analytical chemistry, cell biology, biochemistry and genetics are strongly encouraged. Undergraduate mathematics through calculus and physics are also recommended.

Grades & Scores

The Graduate School recommends that entering students have a minimum grade point average (GPA) of 3.0 on a 4.0 scale and a minimum combined verbal/quantitative score on the Graduate Record Exam (GRE) of 300 (new test) or 1100 (old test). International students must submit scores from the Test of English as a Foreign Language (TOEFL) earned within the last two years. Applicants with scores of 600 (paper-based) or 80 (internet-based) or higher will be considered.

Research

Most students admitted to the program have undergraduate or postgraduate research experience.

Application Review

Applications are reviewed by the GBS Admissions Committee, representing all GBS thematic programs.

Acceptance will be based on a combination of factors including:

- Undergraduate performance (both the curriculum and grade point average)
- Letters of recommendation
- GRE scores
- A personal statement of research and career interests
- Previous research experience
- Personal interview, at program expense (international applicants may be interviewed by phone or video conference) Admission to our Programs is very competitive and the number of positions is limited; thus not every qualified applicant can be offered a position.
**Academic Program**

**Year 1**

**Courses**

Integrated, science-based teaching is the foundation of every PBMM course. You will learn from a team of faculty that will contribute their expertise in the basic biology and physiology of each topic coupled with an emphasis on understanding relevant diseases, clinical correlates, and therapeutic approaches. The lectures also emphasize the scientific techniques and experimental approaches that are essential to the concepts being discussed. In addition, many instructors assign journal readings and independent projects, which may include Web-based searches or literature reviews, to actively engage you in the learning process.

- First year students in all Graduate Biomedical Sciences Themes take a common 12-week core curriculum emphasizing the fundamentals of biochemistry, genetics, and cell biology. This coursework will include an overview of the principles of biochemistry, metabolism, molecular biology, genetics and biological organization. This will be followed by an integrated course in experimental medicine that focuses on mechanisms that drive specific diseases and exposes students to approaches being taken by UAB scientists who are addressing disease-based problems. Additional coursework in the first year will include integrative physiology, pathophysiology, endocrinology, immunology, pharmacology and molecular medicine.

- **Journal Club**

You will present relevant published research papers to help hone your presentation skills and to teach you to learn to think like a scientist.

- **Seminar Series**

Faculty from participating departments, other UAB faculty, and faculty from other institutions discuss their latest research.

- **Lab Rotations (3 rotations of 10 weeks each)**

Based on your specific interests, you will choose from a wide range of research laboratories available to you. This "hands on" research experience will provide you with the background to decide on a laboratory and mentor to guide you through your dissertation research.

**Second year and beyond - Qualifying examination, courses, journal clubs, research, completion of degree.**

**Qualifying examination.** Students must pass a Qualifying Examination that assesses their general knowledge, ability to read the literature, and ability to formulate and defend testable hypotheses. The examination involves a written proposal and oral defense of the proposal.

**Journal Clubs.** From the second year until completion of the program, students participate in a Journal Club related to their specific area of interest. The purpose of the journal club is to enhance the ability to critically read the literature and to stay abreast of current findings in the field.

**Pathobiology and Molecular Medicine courses.** Advanced courses in areas relevant to the student's area of interest are required and may be completed anytime from the second year on. Students are encouraged to take these courses as early as possible in order to achieve the most benefit in their training.

**Dissertation research.** After completion of the Qualifying Examination, and no later than the third year, the student forms a dissertation committee comprised of five faculty members (including the mentor) whose expertise will be beneficial in helping direct the research and course of study.

**Awarding of the PhD degree.** The PhD is awarded upon completion of the academic requirements and defense of the dissertation. The dissertation consists of a written document that is expected to include published papers or manuscripts in preparation, along with a scholarly introduction and discussion of the work that has been completed. A successful private defense of the dissertation in front of the dissertation committee is then followed by a seminar presentation and public defense of the dissertation as the final step in completion of the PhD degree.

**Student Support**

All students accepted into PBMM receive a competitive annual stipend and fully paid tuition and fees. Single coverage health insurance is also provided at no cost to the student through VIVA Health UAB. The annual stipend for the 2013-2014 academic year is $26,000. The total annual award value, including stipend, tuition, fees and health insurance is over $37,000. Stipends are reviewed and updated regularly.

First-year students are funded through the PBMM Graduate Program by Graduate School Fellowships and occasionally by other national and University fellowships. In subsequent years, students are supported through their advisor's research grants, institutional funds or training grants. In addition, highly qualified students are encouraged to apply for individual fellowship awards, with the guidance of their advisors. See Fellowships and Awards (http://www.uab.edu/graduate/area-3/current-students/90-funding-information-for-graduate-students) for additional fellowship information and resources.

**Pathobiology and Molecular Medicine Theme Faculty**

The faculty listing for the Pathobiology and Molecular Medicine theme is located at http://services.medicine.uab.edu/facultydirectory/FacultyListingType.asp?FacultyTypeID=PBMM

**Additional Information**

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<td>Please refer to Theme Website: <a href="http://www.uab.edu/pbmm">http://www.uab.edu/pbmm</a></td>
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<td>Letters of Recommendation Required:</td>
<td>Three</td>
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<td>Entrance Tests (University Code: 1856)</td>
<td>GRE (TOEFL and TWE also required for international applicants whose native language is not English.)</td>
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