

BIOMEDICAL SCIENCES, M.S.

The Biomedical Science Graduate Program at the University of South Carolina School of Medicine offers a two year course of graduate study and significant research opportunities leading to the Master of Science (MS) degree with a major in biomedical science. Students have the option in this degree program of electing to complete a research-based thesis project or a non-thesis, coursework based program of study. Biomedical science is a multidisciplinary field of study aimed at advancing our knowledge of human disease. Scientists working in the USC SOM Biomedical Science program have diverse interests ranging from the study of molecular and cellular processes to the study of organ systems and whole organism functions. This interdisciplinary program prepares students for careers in biomedical fields including research positions in academia and industry. The MS degree is also ideal for students seeking advanced preparation for entry into professional (medical, dental, veterinary) schools. The program provides a broad foundation of knowledge in the basic medical sciences with an opportunity to focus further on a specific discipline(s) including immunology, neuroscience, cardiovascular biology, complimentary medicine and others.

The program is administered by the Biomedical Sciences Graduate Director in consultation with the Graduate Education Committee and the Biomedical Sciences Graduate Committee. These committees include faculty representatives from all of the School of Medicine Basic Science departments.

Learning Outcomes

- Students will demonstrate an understanding of the scientific principles underlying biomedicine.
- Students will demonstrate an understanding of responsible conduct of research and ethical issues related to biomedical research including animal use human subjects in research data management collaborative science authorship (including plagiarism) conflicts of interest and peer review.
- Students will obtain entry into desired professional schools (medical dental graduate etc) or obtain desired employment in the biomedical field following graduation from the School of Medicine Biomedical Sciences MS program. While this outcome does not directly assess student knowledge or appropriateness of the curriculum it is an important measure of program success.

Curriculum

The two year curriculum presents multiple training components designed to prepare students for a career in biomedical fields. In the first year of the two year program, there is a core of basic medical science courses together with multidisciplinary laboratory courses on research methods, facilities, and major equipment. These must be passed with a B average. The student will also participate in the Biomedical Sciences seminar programs that are designed to expose the student to modern, cutting-edge research in diverse biomedical areas.

In the second year, the MS student finishes required courses and performs research with a selected mentor. This can either be laboratory research or library research. The former leads to a thesis based upon a research hypothesis and data generated by the student. It is hoped that data generated by the student will also lead to the publication of research paper(s). The library-based research program requires the student to conduct an extensive literature review focused on a

specific topic of interest. This leads to a thesis reviewing published literature and addressing current deficiencies in the area. It is hoped that this will culminate in the publication of a review paper by the student-mentor team. Opportunities for laboratory or library research are in such current areas of interest as cancer, reproductive biology, biodefense, complementary medicine, immunology, cell and molecular biology, neuroscience, microbiology, vision science, developmental biology, cardiovascular biology, AIDS and many more specialties. A detailed description of research activities within the biomedical science program may be found at the School of Medicine web site: <http://www.med.sc.edu>.

Admission Standards

An applicant must have a baccalaureate degree or its equivalent from an accredited college or university. Undergraduate courses should include two semesters each of biology, physics, inorganic chemistry, and organic chemistry as well as some math (preferably through calculus).

Admission is determined by the Dean of The Graduate School after recommendation by the Director of the Biomedical Science Graduate Program and the Biomedical Science Graduate Advisory Committee. Criteria examined include an appraisal of courses taken, grades achieved, letters of recommendation, research experience, scores on the GRE, and the student's statement of purpose for graduate study. Applicants may designate a preferred academic specialization, but, because of the interdisciplinary nature of biomedical research, applications are reviewed by all departmental directors; when possible, highly ranked applicants are invited to interview and visit the program.

An GPA average of 3.00 or better is required in both the major and overall. GRE scores on the general section above the 50th percentile are preferred.

Application Information

Inquiries concerning admission and requests for printed program information should be directed to:

School of Medicine Office of Graduate Studies
University of South Carolina
Columbia, SC 29208
telephone: 803-216-3321 or 803-216-3896
e-mail: biomedicalsciences@uscmed.sc.edu

Degree Requirements (32 Hours)

Thesis Based MS Option

The MS degree in Biomedical Sciences requires the completion of a series of core courses in basicbiomedical topics as well as elective courses in focused areas. The MS degree in Biomedical Science requires at least 32 graduate credit hours, not more than 6 of which may be taken in thesis or dissertation research. Of the 32 credit hours, at least 50 percent must be in courses numbered 700 or above, exclusive of dissertation credit. Not more than 6 hours of independent study, special topics, or directed research other than dissertation research are permitted, unless justified by the program of study and approved by the Dean of Graduate Studies. The remainder of the requirements may include courses numbered from 500 to 699 taken for graduate credit. As many as 12 hours of study may be taken in USC schools and colleges other than the School of Medicine; this option provides great flexibility to individually tailor programs and draw on the wider resources of a

comprehensive university. At least 10 credit hours of graduate study must be taken from basic medical science graduate courses.

The curriculum consists of required core courses in the basic medical sciences and additional elective courses that depend upon the interest and career goals of the student.

Core Courses

Include the following:

Course	Title	Credits
Select one of the following:		3-4
BMSC 707	Biochemistry for the Biomedical Sciences	
BMSC 754	Biomedical Biochemistry I	
BIOL 717	Biological Chemistry	
BMSC 700	Biomedical Science Interdisciplinary Laboratory I	1
BMSC 706	Ethics in Biomedical Research	2
BMSC 801	Seminar in Biomedical Science	2
Select one of the following:		3-4
BMSC 702	Medical Cell Biology I	
BMSC 708	Human Cell and Molecular Biology for Biomedical Sciences	
BIOL 714	Advanced Cell Biology	
Total Credit Hours		11-13

Comprehensive Assessment # Students will demonstrate their ability to synthesize and integrate knowledge across the biomedical discipline via writing and oral defense of the thesis. While focused on a specific biomedical research topic, the thesis will incorporate ideas that span the biomedical field. Likewise, the thesis defense will address topics and issues that span the biomedical sciences including ethical issues in biomedical research. The thesis and defense thereof will be evaluated by the student's MS Advisory Committee.

Non-Thesis Option

Students who elect to pursue the Biomedical Sciences MS degree, non-thesis option, are required to complete the core course work outlined for the thesis option but in lieu of 6 hours of research credit can take an additional 6 hours of course work to better prepare them for their ultimate career goals. This track requires at least 32 graduate credit hours. Of the 32 credit hours, at least 50 percent must be in courses numbered 700 or above, exclusive of dissertation credit. Not more than 6 hours of independent study or special topics are permitted, unless justified by the program of study and approved by the Dean of Graduate Studies. The remainder of the requirements may include courses numbered from 500 to 699 taken for graduate credit. As many as 12 hours of study may be taken in USC schools and colleges other than the School of Medicine; this option provides great flexibility to individually tailor programs and draw on the wider resources of a comprehensive university. At least 10 credit hours of graduate study must be taken from basic medical science graduate courses.

Comprehensive Assessment # Students will demonstrate their mastery of basic science concepts through the completion of a comprehensive exam given at the end of their course work. This exam will be assembled and evaluated by the student's MS Advisory Committee and should reflect the course work completed during the student's program of study.