

Request to Plan a Doctoral Program in Medicinal Biochemistry at the University of North Carolina at Greensboro

Introduction

The University of North Carolina at Greensboro requests approval to plan a doctoral program in Medicinal Biochemistry (CIP: 26.0299).

Program Description

The proposed PhD program in Medicinal Biochemistry at UNCG will prepare scientists with the knowledge and the theoretical and experimental expertise necessary for conducting basic and applied research in the area of medicinal biochemistry. The curriculum will provide students with a foundation in the biochemical basis of drug design and drug action. Through their dissertation research and additional courses, students will specialize in applications of medicinal biochemistry, such as bioanalytical chemistry, computational drug design, organic synthesis, bio-organic chemistry, biophysical chemistry, and xenobiotic metabolism. The goal of the program is to educate students in the fundamentals of medicinal biochemistry and to provide them with excellent experimental skills and knowledge of the literature in their areas of specialization. The program will be designed for students who are preparing for careers in pharmaceutical research and development, as well as in academics and in government laboratory supervision in the chemical life sciences. The PhD degree program will be built on a foundation of strong existing degree programs in chemistry and biochemistry for undergraduates and for graduate students at the Master of Science level. The new PhD program and the existing MS programs will complement and support each other in both coursework and research. The proposed new PhD program will be supported by 15 faculty members in the Department of Chemistry and Biochemistry, of whom 11 have research interests in biochemistry and 8 have experience in either medicinal chemistry or the biochemistry of drug action. The newly established UNCG Center for Drug Design, which will be associated with the PhD program, evinces the Department's emphasis on the medicinal aspects of biochemistry and demonstrates the University's support for our efforts. The continued interest of students in our undergraduate and graduate programs in biochemistry and the Department's reputation for superior teaching at all levels indicate that the Department will be in a strong position to attract graduate students to the proposed PhD program.

The PhD program in Medicinal Biochemistry will be innovative in offering an approach to understanding pharmaceutical effects and drug design that is based on biochemical interactions and mechanisms. The program will have biochemistry as the foundation, with further knowledge in drug design and medicinal chemistry taught from the perspective of biochemical function. Several features of the proposed PhD program in Medicinal Biochemistry distinguish it from programs in medicinal chemistry, which is probably the most closely related field. First, the curriculum is based on a strong coursework foundation in biochemistry, which defines it as a degree in biochemistry rather than chemistry. Second, while nearly all medicinal chemistry programs are housed in pharmacy schools or jointly shared by chemistry and pharmacy departments, the PhD

in Medicinal Biochemistry will be housed in a department of chemistry and biochemistry. This fundamental knowledge foundation will have a distinguishing influence on the character of the degree. Pharmacy-based medicinal chemistry programs typically focus on the small drug molecule, whereas the proposed Medicinal Biochemistry program will emphasize the interaction between the drug molecule and the macromolecular target site. Third, the program will offer areas of coursework specialization that are not typically associated with medicinal chemistry programs, such as bioanalytical chemistry, physical chemistry, and biomolecular spectroscopy. Finally, the faculty will offer areas of research specialization that are not typically associated with medicinal chemistry programs, including bioanalytical chemistry, biophysical chemistry, and xenobiotic metabolism.

Program Review

The review process for requests to plan is designed to determine if the proposal is developed to the stage appropriate for taking to the Graduate Council and if so what are the issues that may need further attention. Proposals to plan doctoral programs are reviewed internally. The concerns from the reviewers were summarized in a letter to the Chancellor prior to the presentation to the Graduate Council. That summary follows:

As one reviewer points out, strong doctoral programs are built on strong master's programs. While the MS in Chemistry is a thriving program, the MS in Biochemistry has just started up. The directions and development of that program are important for the proposed new program, so it will be important to show where that program will be when this proposed doctoral program would likely start up. That is, will the MS in Biochemistry have grown to the requisite strength when this new program is slated to begin?

One reviewer is concerned that there is very little detail in the description of the biochemical aspects of the program. There appears to be little attention to the disease process and how students will learn about these processes in relation to drug design.

Questions were also raised about how similar or different this program is to the UNCCH program.

It was also pointed out that this is likely to be an expensive program and there will need to be explicit commitment of resources to make the program successful.

Graduate Council

The Graduate Council had, as a basis for its consideration, the proposal to plan the program, the summary letter to the Chancellor, and a presentation to the Council by representatives of the program. In addition to the issues raised previously, the following concerns were expressed by Council members: There was discussion of the interdisciplinary nature of research in this field.

Response

The representatives of the program indicated that the program would be very much focused on biochemistry and understanding the interaction of diseases and medicinal impact. The representatives indicated that typically medicinal chemistry focuses on the drug molecule, while medicinal biochemistry focuses on drug targets such as receptors, ion channels, enzymes, and transporters. Faculty research is directed to getting medicinal agents more precisely to a target which may have the result both of therapy being more effective and side effects being reduced.

While recognizing this is an expensive program, the representatives emphasized how much was already in place. UNCG has a new 170,000 foot research facility that opened in 2003, 29 laboratories, a \$2.5 million equipment budget, 15 faculty with interest in the areas of the doctoral program, and support from NIH and NSF among other funding agencies. Currently UNCG is recruiting for a new faculty position and will add a total of three new faculty positions for this doctoral program.

The program differs from the program at UNCCH since there the focus is on medicinal chemistry and natural products.

This proposed program is slated to be initiated in 2009, so there will be time for one or two classes to have completed the master's program in biochemistry.

Need for the Program

Clearly North Carolina has staked its future economy in part on the growth of the biotechnology, biomanufacturing, and pharmaceutical industries. Graduates of this program would be well suited to those industries. In addition to the extensive list of companies in the Research Triangle and around the State, the Piedmont Triad has a large number of such industries. Aqeel Fatmi, global vice president for research and development for Banner Pharmacaps, a triad company, said "...I am well aware of this area's need for scientists trained in pharmaceutical and medicinal chemistry/biochemistry. Having a local resource for recruitment would be of great benefit to our company."

Recommendation by the Graduate Council

After consideration of the issues raised by previous reviewers and Council members, the Graduate Council voted, without dissent, to recommend approval for the University of North Carolina at Greensboro to plan a doctoral program in Medicinal Biochemistry.

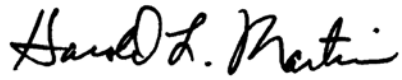
Issues to Address in Planning

None beyond those required as part of the process.

Recommendation

The staff of the General Administration recommends that the Board of Governors approve the request from the University of North Carolina at Greensboro to plan a doctoral program in Medicinal Biochemistry.

**Approved to be Recommended for Planning to the Committee on Educational
Planning, Policies, and Programs**

A handwritten signature in black ink, reading "Harold L. Martin". The signature is written in a cursive style with a large initial "H" and "M".

Senior Vice President for Academic Affairs Harold Martin January 3, 2007