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

Introduction

Following a recommendation from the Graduate Council and from the Senior Vice President for Academic Affairs, the Committee on Educational Planning, Policies, and Programs approved on January 11, 2007 the request from the University of North Carolina at Greensboro to plan a doctoral program in Medicinal Biochemistry. The University of North Carolina at Greensboro now seeks approval to establish a doctoral program in Medicinal Biochemistry (CIP: 26.0299) effective May 2007.

Program Description

The pharmaceutical industry relies heavily on the ability to identify and characterize biological targets, which offers a rational approach to drug design and synthesis. The type of fundamental biochemical information required to effectively utilize this strategy for drug development is a primary focus of the proposed PhD program in Medicinal Biochemistry. 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:

(1) the degree is offered through the Chemistry and Biochemistry Department as opposed to the more traditional School of Pharmacy setting, where the focus is often on the small drug molecule, rather than the physical and chemical properties of the target.

(2) The curriculum is strongly oriented toward fundamental biochemical studies, distinguishing it further from the more synthetic chemistry oriented pharmacy programs.

(3) The program is designed to produce students trained in areas not typically associated with medicinal chemistry programs, such as bioanalytical chemistry, biophysical chemistry and biomolecular spectroscopy. Students will emerge from this program equipped to meet the broad needs of the rapidly growing biotechnology industry in the triad area. This view is underscored by the letters of support received from many local industry representatives, who indicate the proposed degree will be complementary to the development of the Piedmont Triad as a biotechnology center.

The Department of Chemistry and Biochemistry at UNCG is uniquely positioned to successfully initiate and maintain the proposed Medicinal Biochemistry Program in terms of the available expertise in the department and the available resources that will be devoted to the program. The department has experienced tremendous growth in the past decade in its Biochemistry component with the addition of 10 new faculty members all with research or teaching interests in a biological aspect of chemistry. A focused interest in the fundamental aspects of drug discovery has created a rich environment for a program in Medicinal Biochemistry to thrive. In 2003, a brand new 170,000 square feet

research and teaching facility was opened with $2.5 million worth of new research instrumentation. The department is also home of the newly established UNCG Center for Drug Design, which is a research center headed by Professor J. Phillip Bowen. A new Molecular Graphics and Bioinformatics Laboratory was established in Spring 2006 as a resource for the center in its research and teaching missions. The facilities available for the proposed program are extensive and include cell culturing facilities, access to confocal microscopy, animal facilities and a Center for Biotechnology and Health Research, to name a few.

The PhD in Medicinal Biochemistry will serve the needs of students, the University of North Carolina at Greensboro, the State of North Carolina and the scientific community as a whole.

- Students will be prepared for a career in biochemical research with outstanding fundamentals in biochemical knowledge, and the ability to be independent scientists who can be leaders on professional projects during their career. As such, the program will produce graduates who will be employable in the pharmaceutical, biotechnology, and chemical industries.
- It will help to improve the national and regional standing of the graduate programs at UNCG by building research programs with national recognition and by producing a pool of PhD graduates who will develop successful careers in industry and academia at both the national and regional levels.
- The program will be designed to involve local industry representatives as consultants, as adjunct faculty, and as mentors in the student internship program, and will thereby help to establish and maintain an alliance with industry and provide a means to address specific needs of local companies. This close communication will ensure that this program will provide a steady supply of researchers to drive the biotechnology or pharmaceutical industries both locally and nationally.

Student demand for programs in the biochemical and biomedical sciences is increasing at UNCG, across the state, and nationally, and this program will provide educational opportunities for students with specific interests in fundamental aspects of drug discovery. Societal demand for highly trained researchers in medically related biochemistry is also increasing. The state of North Carolina is a leader in the biotechnology industry, and the North Carolina Biotechnology Center (NCBC), as the first government sponsored organization dedicated to developing the biotechnology industry, has played a major role in moving North Carolina to the forefront in this industry. According to NCBC, "North Carolina's colleges and universities are the bedrock of the state's growing biotechnology community and are vital to the state's competitive advantage." The continued growth of biotechnology in North Carolina will be critically dependent on the state's ability to meet the growing demand for highly trained individuals in the biomedical sciences.

The PhD degree program will be built on a foundation of strong existing degree programs in chemistry and biochemistry for undergraduates and for Master's students. The new PhD program and the existing MS programs will complement and support each other in

both coursework and research. 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 Department has a research active faculty who have well-developed or growing research programs, producing refereed publications at a growing rate. The faculty has been successful in winning major research and instrumentation grants from the National Institutes of Health and the National Science Foundation, as well as from many other foundations such as the Petroleum Research Fund, the Dreyfus Foundation, and the Research Corporation.

Program Review

The review process is designed to surface strengths and weaknesses in proposed new degree programs. Proposals to establish new doctoral programs are reviewed internally and externally. The concerns from the two review processes were summarized in a letter to the Chancellor prior to the presentation to the Graduate Council. That summary follows:

The reviewer believes the program is likely to be successful, but has a number of concerns that need to be addressed. The reviewer also believe that there will be an adequate supply of students for the program and that the graduates will be employable, but not likely in academic position until the program gets itself establish.

The reviewer thinks the size of the faculty is adequate to launch the program but would need to be expanded by three or four new faculty members in the mid-range and most of the faculty would have to move their research up a few notches. The magnitude of this should be fully appreciated since the reviewer indicates a recent assistant professor was hired with a $750,000 start up package.

The reviewer would have liked to have had more detail about the courses that will constitute the program.

The review would also like to see this proposal set in the context of what the record has been with other recent doctoral programs that have been launched at UNCG.

The second reviewer expresses a number of concerns about the proposed program and provides a challenging set of concerns for the program to address. Since the reviewer summarized those concerns on pages 4 and 5, I will simply direct your attention to the reviewer's statement of them. Some concerns, I think, misunderstand our process, for example, the concerns about the Graduate Dean's endorsement, but others will need careful review and consideration.

Graduate Council
The Graduate Council had, as a basis for its consideration, the proposal to establish the program, copies of the outside reviews of 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: that they would need to plan for an increase level of research in the program.

Response
The Representative of the program described the recent hire and the additional hires that will be made to the faculty and the state-of-the art research facilities available to the program. The program has recruited Dr. Lakshmi Kotra a national recognized researcher with a start-up package totaling $650,000. Dr. Kotra was formerly at the Toronto General Research Institute and the University of Toronto. He was the lead author on a study that created a chemical compound in their laboratory that can bind itself to the malaria enzyme and prevent it from replicating. The administration has committed to three new faculty positions for the program. The representative also made the point that the program is collaborating with local and regional industry and with the Wake Forest Medical School. Several biotechnology firms in the region have expressed strong support for the program and for the kind of training that will be available locally for students. The Administration has also committed to sizable packages for graduate students that would be in the $20,000 to $24,000 range plus tuition remission. Faculty are stepping up grant writing to move the level of grant support to a higher level. A presentation was made about the curriculum and the courses that constitute it.

Need for the Program
Given North Carolina's commitment to biotechnology and biopharmaceutical companies, this proposed degree appears to be poised to prepare doctoral level graduates for that industry. North Carolina ranks 3rd among the states in employment in this industry and we have taken major steps to prepare a workforce for this industry through the Golden Leaf grant, the facilities on NCSU's and NCCU's campuses, and the role the community colleges are playing in training the entry-level workforce for this industry. This program will be directed to preparing more high-level researchers for this industry, both for the companies in the Triad and across the state.

Resources
The University of North Carolina at Greensboro has committed to additional faculty, to graduate student stipends, and to first class research facilities in the new science facility that has opened on campus. While this is projected to be a small doctoral program it will also gain resources through the enrollment expansion process. There is ongoing dialogue with business and industry about internships and other forms of support for the program. The program will also be better placed to carry out major funded research projects with a cadre of well-trained doctoral students and will have to focus its efforts on expanding its sponsored research base.

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

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 establish a doctoral program in Medicinal Biochemistry.

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

Senior Vice President for Academic Affairs **January 3, 2008**