

MEMORANDUM

To: Board of Regents
From: Board Office
Subject: Proposed for an M.S. and Ph.D. Program in Biomedical Sciences, ISU
Date: September 8, 2003

Recommended Action:

Approve Iowa State University's proposal for an M.S. and Ph.D. program in Biomedical Sciences.

Executive Summary:

New Graduate Major to Replace Existing Graduate Program Iowa State University is requesting approval to offer a single, new graduate major: Biomedical Sciences to be administered by the Department of Biomedical Sciences, College of Veterinary Medicine. The proposed program will replace the existing graduate programs in the Department of Biomedical Sciences, which has a major in Veterinary Anatomy and a major in Physiology, therefore a concurrent request to discontinue the existing graduate programs has been submitted.

ICEC and Board Office Recommendation The Interinstitutional Committee on Educational Coordination (ICEC) and the Board Office have reviewed the proposed program and are recommending approval.

Need for Graduates in Biomedical Sciences The University indicates that there is an increased need for a sound, research-based, education of graduates in different areas of specialization of Biomedical Sciences. The graduates are required for employers of individuals trained in life sciences, in human and veterinary health care, industry, federal and state institutions, and academia. Biomedical Science is emerging as an attractive field in many academic institutions nationwide. The National Research Council has recently described the 41% increase in the number of graduate students in medical sciences since 1993.

Focus on Animal Health In preparing this request, faculty at ISU looked for similarities with other Regents' offerings. The University of Iowa has a graduate training program in Biosciences, but the University of Northern Iowa does not. The program at Iowa State University serves primarily the animal health agenda, whereas the Bioscience program at the University of Iowa serves the human health agenda. In fact, the proposed biomedical science graduate program will complement the research programs at the University of Iowa in terms of understanding human disease processes using animal models.


Regents New
Program Review
Questions

The University's response to the Board of Regents New Program Review
Questions is attached.



Robert J. Barak

Approved:



Gregory S. Nichols

Program Proposal

Basic Information

1. ***Name of the proposed curriculum, major:*** Biomedical Sciences
2. ***Name of the degree:*** M.S. and Ph.D. in Biomedical Sciences
3. ***Name of the departments involved:*** Biomedical Sciences

Regents Program Review Questions

1. Need

- a. **How will this proposed program further the education and curriculum needs of the students in this discipline?**

The need for a sound, research based, training of graduate students in different areas of specialization of Biomedical Sciences has increased. The graduates are required by employers of individuals trained in life sciences, in human and veterinary health care, industry, federal and state institutions and academia. Our program offers the opportunity to train in focused areas of specialization of Biomedical Science, with an emphasis on animal models of disease. The M.S. will allow students to progress to a level where they have sufficient knowledge of their disciplines and some exposure to research, and be able to serve an advanced supportive role in industry. The Ph.D. will give them additional knowledge through research, which will allow them to have a leading role in their employment.

According to a study performed by the National Resources Council entitled "Research-Doctorate Programs in the United States: Continuity and Change" (NRC, 1995), the Physiology program at ISU ranked 92.5 among 140 programs (66.1%) and the Pharmacology program at ISU ranked 84 among 127 programs (66.1%). This report did not have national rankings of the Veterinary Anatomy programs. With general improvement in education by the proposed BMS graduate program, it is expected that the rankings of these programs in the next NRC report will be improved.

- b. **How does it further the educational and curriculum needs of other units in the college or university?**

There are several reasons for pursuing this proposal. In addition to wanting to increase the efficiency of programs offered by the Department of Biomedical Sciences, we have sought to include graduate faculty members from additional departments in this program. Currently, the departments of Veterinary Clinical Sciences (VCS) and Veterinary Diagnostic and Production Animal Medicine (VDPAM) do not offer a Ph.D. degree. A number of the faculty members from these departments are included in this proposal and will have co-appointments in Biomedical Sciences. Thus, faculty in both VCS and VDPAM will be involved in education of graduate students in the proposed program. With this proposal, then, we are increasing and extending the academic range of activities in the College of Veterinary Medicine.

2. Duplication and Collaboration

a. What programs in this field of study are available in other colleges and universities of Iowa?

At the University of Northern Iowa, the Department of Biology, in the College of Natural Science, offers a M.A. and a M.S. in Biology. The program is described as flexible with focus areas of cellular and molecular biology; advanced physiology and development; advanced ecology; advanced systematic and evolutionary biology.

At the University of Iowa, the Bioscience Program, which involves collaboration with 11 departments, allows the study of 11 Ph.D. majors: anatomy and cell biology; biochemistry; biological sciences; microbiology; pharmacology; physiology and biophysics; free radical and radiation biology; genetics; immunology; molecular biology; and neuroscience.

b. With what representatives of these programs have you consulted in developing this proposal? Provide a summary of the reactions of each institution consulted as well as a complete text of the responses.

This proposal was submitted to:

Dr. Barbara Hetrick, Head of the Department of Biology, University of Northern Iowa.

Dr. Marc Wold, Assistant Dean of Research and Graduate Programs, College of Medicine, University of Iowa.

Dr. Duane Enger, Chair of the Department of Zoology and Genetics, College of Liberal Arts and Sciences, Iowa State University.

Dr. Susan Lamont, Chair of the Department of Animal Science, College of Agriculture, Iowa State University.

Dr. Janice Buss, Director of the Molecular, Cellular and Developmental Biology Program, Iowa State University.

c. In what ways is the proposed program similar to those mentioned in 2a? In what ways is it different or does it have different emphasis?

The proposed M.S. and Ph.D. major program of Biomedical Sciences is unique in the State of Iowa. It proposes to combine two existing but presently separate programs in Biomedical Sciences, left over from the two former Departments of Veterinary Anatomy and Veterinary Physiology and Pharmacology when they merged to become Biomedical Sciences.

The program proposed in Biomedical Sciences has an animal health agenda, focusing on animals as model for physiological, cellular, pharmacological and disease investigation. The University of Northern Iowa and the University of Iowa do not have an animal health agenda like the College of Veterinary Medicine. We have looked at their programs to look for duplication and conflicts with the Program Proposal for Biomedical Sciences at Iowa State University. None of these majors have an agenda of animal health. The principles of the techniques of cell culture, molecular biology, histochemistry, and electrophysiology will be the same at the three Regent's Universities, but they will be applied in the instruction and the research conducted to examine problems focused on more veterinary interests.

d. How does the proposed program supplement the current programs available?

The proposed program is intended to replace two separate graduate programs currently conducted in the Department of Biomedical Sciences. These two programs, Veterinary Anatomy and Physiology were operative when the Department of Veterinary

Anatomy and the Department of Veterinary Physiology and Pharmacology were separate. However, the two Departments have now joined to become the Department of Biomedical Sciences. We wish to remove these programs and replace them with a single combined program that has common rules.

e. Has the possibility of some kind of inter-institutional program or other cooperative effort been explored? What are the results of this study?

There has been discussion among faculty in Biomedical Sciences of an inter-institutional program in comparative medicine. A strong graduate program in Biomedical Sciences will provide a strong foundation for Iowa State University to contribute to such an effort.

f. Please list the Iowa Institutions in which articulation agreements are being developed for the proposed program.

Not applicable.

g. Please provide the Classification of the Instructional Program (CIP) code for the proposed program

26.0102

3. Please estimate the enrollment in this program (for the next five years) as follows:

a. Undergraduate: Not applicable.

b. Graduate:

	Year 1*	Year 2	Year 3	Year 4	Year 5
M.S. Major	2	2	2	2	2
M.S. Non-Major					
Ph.D. Major	5	10	15	20	20
Ph.D. Non-Major					

*We expect another 11-13 students to be transferred from the Veterinary Anatomy program and Physiology program during Year 1.

c. On what basis were these estimates made?

Current graduate students in the Department of Biomedical Sciences number twenty-three, with eight of them being in interdepartmental graduate programs. With increased funding for research projected in the next three to five years and following the appointment of two new faculty members as replacements for retiring faculty, additional students are expected. Non-majors are expected to come from related departments of the University. Thus it is predicted that the number of major Biomedical Science graduate students will increase progressively over 3-4 years to a maximum of around 20. Some, but not all, of the students may co-major in an Interdepartmental Graduate Program.

d. What are the anticipated sources of these students?

Several major sources of students constitute the current graduate student pool interested in Veterinary Anatomy and Physiology and Pharmacology. These students are expected to continue, and in addition we are seeking to make the new program more attractive to domestic students.

- Previous ISU D.V.M. graduates returning from practice seeking a M.S. or Ph.D. training in Biomedical Sciences.
- Out-of-state D.V.M. graduates seeking a M.S. or Ph.D. training in Biomedical Sciences.
- Students at the National Animal Disease Center, Ames, who are conducting research on domestic animals, and who require University instruction.
- International D.V.M. students (previously, China, Taiwan, Korea, Thailand, Jordan, Turkey, Saudi Arabia, Yugoslavia, India, Brazil), domestic, and life science graduates of ISU or other universities.
- International life science graduates.

4. Please provide any available data or information on employment opportunities available to graduates of this program in Iowa and Nationally.

Recent M.S. graduates have proceeded to take a Ph.D. and Ph.D. graduates have taken Post-Doctoral positions with a view to obtaining, subsequently, positions in academia, the pharmaceutical industry or federal authorities. Regrettably, there is a shortage of D.V.M./Ph.D. graduates for the universities. Our graduates find, after a post-doctoral position, a job in universities or pharmaceutical industry.

5. Are there accreditations standards for this program? If so, please provide a copy of the Accreditation Standards.

There are no required certification or accreditation standards for this program, which is an academic degree.

6. Does the proposed program meet minimal national standards for the program, e.g., Council of Graduate Schools or other such bodies?

The proposed program meets the standards established by the Council of Graduate Schools.

7. Please report any reactions of the Iowa Coordinating Council for Post-High School Education.

The request was sent to the ICCPHSE on May 13; no objections were received.

8. How does this program relate to the college's/university's strategic plan?

The strategic plan of the Department of Biomedical Sciences and the strategic plan of the College of Veterinary Medicine include specific plans for the development of a graduate program in Biomedical Sciences. The university strategic plan includes: Goal 1: Enhance learning through exceptional learner-centered teaching, services, and enrichment opportunities. Demonstrated strength in all graduate programs, with distinctive targeted professional masters programs, and selected doctoral programs of national and international reputation (mostly in or related to science and technology). The new graduate program is a

direct outcome of these strategic plans and will strengthen graduate education in the College of Veterinary Medicine. The strategic plan of the College of Veterinary Medicine is at: <http://www.vetmed.iastate.edu/about/FinalPlan.pdf>.

Additional Resource Needs

1. Will the program require new resources?

No.

2. Will the program require reallocated resources?

Yes. The existing Veterinary Anatomy and Veterinary Physiology Graduate Programs will cease and TA funds, and office support for the two previous programs will be used for the new Biomedical Science Graduate Program.

3. At what level of enrollment will additional resources be required for the program?

Additional resources for the program will be required when the enrollment reaches 30.

4. Estimate the total costs (or *incremental increases in expenditures*) that may be necessary as a result of the new program for the next three years.

	First Year	Second Year	Third Year
a. Faculty	None	None	None
b. Graduate Assistants	None	None	None
c. General Expense	None	None	None
d. Equipment	None	None	None
e. Library Resources	None	None	None
f. New Space Needs	None	None	None
g. Computer use	None	None	None
h. Other resources	None	None	None
TOTAL(S)	None	None	None

*This program will replace two graduate program offerings, so no new or increased costs will result. In fact, cost savings will be realized.

5. For programs planning to use external grants, what would be the effect of the grant termination?

Costs for the (current to) proposed program will continue to be met from contributions from federal grants supporting the graduates. The effect of grant termination would lead to loss of support for the graduate student.