Department of Microbiology Ph.D. Program

Strategic Assessment for the Graduate College

MISSION

Graduate studies in the Microbiology Ph.D. Program (hereafter referred to as the Program) is designed so that after receiving their Ph.D., students will have expertise in research in a specific area of microbiology. The Department of Microbiology consists of 33 faculty members with strengths in bacterial genetics and physiology, animal virology, pathogenic bacteriology and virology, and immunology. Areas of research include Bioinformatics, Cellular Microbiology, Molecular Virology and Bacteriology, Immunology, Bacterial Biochemistry and Physiology, Bioremediation, Bacterial and Viral Pathogenesis, and Molecular Parasitology. Therefore, graduate students in the Program are provided with an extensive choice of research endeavors for completion of their graduate work. Many of these areas are overlapping and provide a broad-based conceptual understanding of basic research in addition to allowing the student to focus on specific topics. By working in the laboratory of their Ph.D. adviser, students learn to define and experimentally investigate scientific questions by the formulation of hypotheses, testing of these hypotheses, interpretation of experimental results, and subsequent formulation of conclusions and answers to microbiologically related questions. The mission of the program is to train Ph.D. level graduates who possess the expertise and credentials to become future productive scientists. The Program facilitates the performance of original research by the graduate student in preparation for positions in academia, government and industry. In addition, a goal of the Program is to provide the student with a quality of training and mentorship that will enable graduates to become competitive in their appropriate job market and subsequently establish career goals that will enable them to become leading microbiologists with national and international reputations for their studies.

ADMISSION PROCESS AND CRITERIA

Student demand and recruitment: For the last five years (Fall 2001-Fall 2005) the number of students applying to the Program has remained relatively constant. Approximately 50 domestic applications per year were received annually in this time period (range 49-51 with the exception of 61 applications for admission in the Fall of 2005). This indicates a level of sustainability and vitality of the Program. Applicants represent a geographically broad range demonstrating that the Program is considered to be attractive by students nationally. In addition the Program receives applications from students graduating from large public and private research institutions as well as from smaller liberal arts colleges in equal proportions. There is no reason to project that the number of applications will decrease in the foreseeable future and, considering the state of the economy, it may be anticipated that the number of applications will increase.

Each spring (Feb/Mar) approximately 15-20 of the applicants (for selection process see below) are invited to visit the Program for 3 days. During this visit each applicant is interviewed by Program faculty based upon the students stated putative research interests and also by one member of the admissions committee. In addition, the applicants interact with our current graduate student population and are provided with information about the Program, its expectations, requirements, and structure.
During this period the Program is focused upon recruitment of the top applicants to our Program, and we take this opportunity to demonstrate the high quality of faculty, research, and infrastructure found at the University of Iowa. Over 99\% of applicants invited to visit the Program accept this invitation.

**Criteria for selection:** Prior to visiting the Program all applications are evaluated by the Program admissions committee chaired by a senior faculty person and comprising 5-7 faculty members representing the various subdisciplines of microbiology. Evaluation of students is based upon a composite of undergraduate GPA (and quality of institution), GRE scores, letters of reference (3), personal essay, and prior research experience. After extensive committee discussion and evaluation, the top 15-20 students are invited to visit the Program and, after this second level of evaluation, letters of formal acceptance into the program are sent to 80-90\% of these students. Therefore, each year the Program will offer positions to 10-15 students. The precise numbers will vary from year to year based upon the availability of funds, numbers of students graduating from the Program and any loss due to attrition. However, the range in numbers has remained constant over the last five years.

**Success in enrolling the highest quality of students:** The Program has generally achieved a 50\% success rate in attracting students from the pool of applicants that have received formal acceptance letters resulting in an incoming class size of approximately 4-7 students per year. Bearing in mind that ALL of our applicants will be accepted into the programs of multiple peer institutions, the number of students actually coming to the Program at Iowa is high and these students represent the highest caliber of graduate applicants. This is borne out by the facts that the Department of Microbiology’s incoming classes have almost identical GPAs, GRE scores, etc as the other Biology/Biomedical Science PhD programs at the University of Iowa and considerably higher scores than the national averages entering other institutions.

**Success in enrolling a diverse student population:** The Program receives relatively few applications from under represented minorities in the sciences. The Program has endeavored to attract this group of students with limited success. Currently, there are three students (one of which is Deans Award recipient) in the Program from this group. Because of the very high competitive index for minority students wishing to attend graduate schools in microbiology, most of those students who attain the minimal admissions criteria are attracted to Programs with the highest perceived academic reputations.

**Financial commitments:** The Program is committed to financially supporting the students up to a period of six years from admission by providing the student stipend and paying tuition. The source of these funds is primarily externally funded grants to individual faculty members but may also include training grants (usually external funds) and departmental support. After the six year period the financial support of the student is based upon discussions between the student’s mentor and DEO of Microbiology.

**PROGRAM OUTCOMES**

The median time to degree (TTD) for students in the Program is 5.7 years with a completion rate of close to 80\%. This is very similar to the other Biomedical Programs at the U of I and compares favorably to the national average TTD of 6.2 years for other Microbiology Programs. An attrition rate of 20\% is also within the range observed by
other institutions. Although there is no formal requirement for Microbiology students to have authored a minimum number of publications before graduating from the Program, more than 90% of our students will have at least one publication and the majority will have multiple publications. As indicated above, graduates from the program enter a variety of career paths most of which require the completion of 1-5 years postdoctoral fellowship research. One of the aims of the Program is to prepare graduates to compete effectively in this market place.

PROGRAM CHARACTERISTICS

The size of the Program is determined to large extent by the number of faculty possessing extramural support providing stipend and tuition payments for graduate students. With a size of approximately 30 faculty (primary and secondary appointments) Microbiology has sustained a graduate student population of approximately 40-50 students over the last five years. This is most likely to continue for the next several years. The diversity of research interests among the faculty has facilitated a rich research experience for graduate students and the Department of Microbiology has maintained this research diversity with new faculty hires in recent years. There is no formal national ranking of Microbiology Graduate Programs but our recruitment of students from diverse geographic regions, along with applications from many different states, indicates that the Program at the U of I is well respected throughout the country.

The strengths of the Program are numerous, some of which have been mentioned above. The Program is very successful at placing its graduates in postdoctoral research positions at highly prestigious research universities and institutions. Subsequently, most of these graduates have been able to successfully follow their chosen career paths. There are few perceived weaknesses of the Program although the problem of recruiting high caliber students from under represented minorities in the sciences remains.

CONCLUSIONS

Overall the Program exhibits a sustainable healthy growth in providing graduate education in microbiology to its students. The challenges going forward will be to maintain our numbers of students in times of diminishing NIH and NSF budgetary restraints since these agencies provide the bulk of our student financial support via research grants. Since the Program provides a unique opportunity for graduate research in procaryotic organisms (bacteria and viruses), and because of the importance of these microbes in human health and disease, biotechnology, etc., the necessity of maintaining this healthy Program will be important.