

Molecular and Cellular Biology

An interdisciplinary graduate program housed in the College of Natural Sciences and Mathematics offering the M.S. and Ph.D. in Molecular and Cellular Biology.

■ The Review Process

This was a standard AQAD review. Reviewers were:

Hong Ma, chair (Pennsylvania State University)
Enrique De La Cruz (Yale University)
David Gard (University of Utah)
Carol Otey (University of North Carolina, Chapel Hill)

■ Main Issues

Overall, the team found MCB to be “an excellent vehicle for training the next generation of graduate students. The program provides outstanding opportunities for interactions between faculty, graduate students and post-doctoral fellows, and facilitates fruitful collaborations among its members.” The faculty associated with MCB possess “a wide range of life science expertise, and thus form an exceptionally strong foundation for future advances in life sciences at UMass.” And while the faculty are a “key asset to the success of the program, ... the converse is also true: the MCB program is a vital element in the recruitment of research-active faculty to UMass.” Noting that MCB also serves as the major source for graduate students for the departments of Biology and Biochemistry, the team characterized the program as “the core of basic life sciences graduate training at UMass.” The team found the graduate curriculum and training experiences to be “of the highest caliber,” and could “offer little to improve the overall quality of the excellent and thoughtful training plan.”

Since the last AQAD review, in 2000, associated faculty have grown from 78 to 101, and graduate students have increased from 57 to 85. Extramural research support has tripled. The team warned, however, that “despite, or perhaps as a result of, this period of exceptional growth, the MCB program now finds itself in a precarious position.” The team identified three significant challenges threatening the continued success of the program:

- **“Unreasonable ‘curriculum fees’ imposed upon graduate students.”** Rapid growth in these charges has “restricted increases in the stipends paid to MCB graduate students to the point where these stipends are no longer competitive in today’s marketplace,” and have increased student costs charged to research grants “to the point where it is economically impractical to accept students. Individually, these effects threaten the continued success of the MCB graduate training program. When combined, they threaten its very survival.”
- **“Leadership crisis.”** The team observed that the “recent search for a permanent director was unsuccessful,” the result of “frustrations” stemming from the curriculum fee situation and also from “the unusual ‘Lead Dean’ model of administration” which is seen as “pitting the MCB program’s interests against those of its individual departments within the lead dean’s college.” The team recommended “re-structuring the administration of the MCB (and other) graduate

programs, so that the program directors report directly to ... either the Vice Provost for Research, or the Dean of Graduate Studies.”

- **Funding of students in their first year.** Currently, first-year graduate students are supported through TA appointments, and therefore carry teaching responsibilities in addition to pursuing their own coursework, organizing their research programs and selecting a faculty member with whom to work. The team found (as did the AQAD team in 2000) that “the timing of the teaching experience in the MCB program does not appear to be driven by the needs of student training, but rather by the practical necessity of using TA-ships to support students during their first year,” a practice that “detracts from students’ professional development.” The team therefore recommended that the student teaching experience be moved from the first year, recognizing that “such a drastic change will require substantial restructuring of the financial support of MCB students.” Such a change would also enable another recommendation of the team, expanding the lab rotations through which students are placed with faculty from the current two to three.

In addition, related to the organizational issues cited above, the team suggested that the University “reconsider the degree-granting status of the program.” The team observed that at many institutions interdepartmental graduate programs serve as “entry portals and provide a unified curriculum and other professional training activities in the first year, and then they transfer responsibility for the students to the departments in the second year, so that the departments grant the students’ degrees. It appears that the current mechanism at UMass has set up a potential conflict between the program and some of the participating departments, which may view the MCB program as being in competition with them for limited resources.”

The team made several other recommendations to improve the effectiveness of the program:

- Provide support to faculty to encourage development of training grant proposals as a means of expanding program resources.
- Involve MCB in faculty hiring and other decisions affecting the life sciences.
- Establish a central office to provide administrative support for the four interdisciplinary life sciences graduate programs.
- Consider dropping the written comprehensive exam at the end of the first year, which appears “superfluous.”

■ Student Outcomes Assessment

The MCB program offers graduate degrees only, and therefore does not employ the kinds of student outcomes assessment tools appropriate to undergraduate education. MCB is a laboratory science discipline, in which learning outcomes are established in the framework of comprehensive exams, dissertation development, and identification of a research program with the faculty sponsor. Achievement of these outcomes is evaluated through the oral and written exams, individual faculty evaluation of laboratory work on an ongoing basis, participation in work leading to peer-reviewed publications, the comprehensive exam, and the major culminating experience of the dissertation and its oral defense.

In addition, the program has surveyed its entire population of graduate students in terms of the Molecular and Cellular Biology curriculum. The program evaluated this evidence, along with feedback from MCB faculty, and has instituted changes to enhance graduate students’ success in

the program. Other areas for improvement identified in the survey data continue to be discussed and possible solutions considered.

■ Response to the Review

The program expressed appreciation for the team's "highly favorable" review. The program expressed general agreement with the team's recommendations to change the reporting structure, revise the comprehensive exam, and consolidate the support for the four life sciences programs. The program acknowledged the leadership challenge, and recommended that funding be provided for restoration of a professional staff position and for a full-time office assistant. This, combined with a "standardized" compensation package for the director, would aid in attracting a new director.

The program recognized the difficulties associated with the funding of first-year students through TA appointments, but noted that changing this practice would require a significant infusion of resources. The program did not concur with the recommendation to remove degree-granting status, citing negative impacts on Five College faculty and faculty in cooperating departments such as Chemistry which might find it difficult to attract students because suitable degree programs would not be available.

The Dean reported ongoing conversations to modify the reporting structure for the life sciences programs by moving to a non-rotating coordinating dean for each. The Dean also expressed support for plans to establish a more stable funding basis for the programs.