

Fall 2017

**Memorandum of Understanding Among
The Interdisciplinary Program in Molecular and Cellular Biology Program The
Department of Biological Sciences,
The Department of Biomedical Sciences,
The Department of Chemistry and Biochemistry,
The Department of Environmental and Plant Biology
And
The Heritage College of Osteopathic Medicine
at Ohio University**

The Interdisciplinary Doctoral Program in Molecular and Cellular Biology (MCB) is an academic program providing a broad graduate training of students by faculty from the participating departments. Because MCB students are departmental graduate students, they must be simultaneously admitted into both the MCB Program and their department of emphasis (home department). **Each department participating in the MCB program (Department of Biological Sciences, Biomedical Sciences, Chemistry and Biochemistry, and Environmental and Plant Biology) may serve as a home department. MCB also offers a Ph.D. program in conjunction with the DO program in Heritage College of Osteopathic Medicine.** DO/Ph.D. students may be enrolled in any department within the program but usually choose the Department of Biological Sciences or Biomedical Sciences and should follow the Ph.D. requirements of that home department with the exceptions as noted. Each of the home departments participates in programs of study leading to the Ph.D. degree, with its own requirements for admission and graduation. MCB admission and graduation requirements reflect both the requirements of the home department and the requirements of the MCB Program. This document delineates the role of both the home departments and the MCB Program in admitting Ph.D. students, offering stipends and other support, setting requirements for graduation and monitoring progress. All general requirements and specific MCB and home department requirements must be followed. The intent of this document is to provide clarity and simplicity in these aspects of MCB student affairs. The home departments and MCB reserve the right to make changes in their policies, procedures, and requirements from time to time; therefore, this document will be revised as required by such changes. The policies and requirements in force at the time that the student is admitted into the program will govern the student's program of study.

I. GENERAL PROCEDURES

A. Admission: The MCB Graduate Committee is composed of one MCB faculty member from the four participating departments (Biological Sciences, Biomedical Sciences, Chemistry and Biochemistry, and Environmental and Plant Biology) and an MCB student. The MCB Graduate Committee, in considering applications, will use the specific admission requirements for the home department and the MCB Program (see Section II A) as well as the objective and subjective evaluation of the quality of such information as letters of reference and student interviews. The specified requirements are to be considered minimal. Applicants accepted to the MCB graduate program must also

be accepted by their respective home department graduate committee. The home department has veto authority regarding admission.

B. Student Progress and Graduation: Each student is personally responsible for satisfying all requirements, meeting all deadlines, and for ensuring that all documentation of completion of said requirements is provided to the MCB program administrative assistant within one week after completion. Yearly, during the spring semester, the MCB administrative assistant will send the **MCB Student Progress Form** to all students. Each student should return the completed form to the administrative assistant within two weeks after receipt. The documents will be provided to the MCB Curriculum Committee chairperson who will maintain records and annual progress reports for each student. In addition, copies of all documents regarding a student will be provided to the home department graduate chairperson by the MCB administrative assistant within one week of receipt of the document. The specific requirements for progress and graduation are defined below under MCB and departmental requirements, and the chairperson of the MCB Graduate Committee will serve as the authority for determination that the requirements have been met. To ensure that students will not be confused over which unit governs their progress and graduation, once a student has been admitted she/he will deal with the MCB Graduate Committee chairperson. The MCB Graduate Committee chairperson, in consultation with the home department graduate chairperson, the student, and the student's advisor, will determine any action to be taken concerning problems or answers to any questions that might arise. Thus, the student need only notify the MCB chairperson of a concern or questions and will not be expected to mediate between MCB and the home department. However, departments may terminate students from their program if departmental requirements, as stated in this document, are not met.

If a home department determines that this arrangement is not serving well, this Memorandum of Understanding can be altered in the spring or summer semester of each year. However, a student already enrolled will be affected only by the agreement in force when she/he was admitted.

C. Stipends and Other Financial Support: At the time of admission and yearly thereafter, the MCB graduate chairperson and the home department graduate chairperson will consult together and with the student's advisor to determine the appropriate source (home department, MCB, or grant) of support, if any. Factors such as teaching or research needs, availability of grant-funded stipends and student aptitude and progress will be considered. The MCB graduate chairperson in conjunction with the departmental graduate chairperson will provide each student a description of any service required for support. For more detail see Section II I.

II. SPECIFIC REQUIREMENTS

A. Admission: Applicants must have a B.A., B.S. or M.S. degree in biological or physical science. Criteria considered are course work completed, grades, letters of recommendation, and scores on the Graduate Record Examination (GRE). Unconditional admission requires an overall grade-point average of 3.0 on a 4.0 point scale. International students, for whom English is not their primary language, should have earned a minimum grade of 620 written or 260 computer on the Test of English as a Foreign Language (TOEFL).

For admission to the **Departments of Biological Sciences or Biomedical Sciences**, a score in the 50th percentile or above on the General Test of the Graduate Record

Examinations (verbal, quantitative, and analytical) and an overall grade-point average of 3.2 on a 4.0 scale is required.

For admission to the **Department of Chemistry and Biochemistry**, students must have completed one full year of undergraduate classes in one of the following areas: analytical, inorganic, organic, physical or biological chemistry.

For admission to the **DO/PhD** program, students must be accepted into the College of Osteopathic Medicine and the PhD graduate program in the department of their choice and meet all admission requirements of both.

Exceptions to these requirements will be made only where background or special talents dictate.

B. Research Advisor: The student will select her/his research advisor from among the MCB program faculty before the end of the **second semester** in the program. The selected faculty advisor must have graduate faculty status in the home department of the student advisee. If the faculty member does not have graduate status in the student's home department, the student must apply to and be admitted to the home department in which the faculty has such an affiliation. Prior to selection of an advisor, the home department representative to the MCB Graduate Committee will serve in that capacity.

Students in the **Departments of Biological Sciences/ Biomedical Sciences** may, without penalty, perform lab rotations in qualified laboratories prior to the selection of the dissertation advisor. Once an advisor has been selected, all students in **Biological Sciences/ Biomedical Sciences**, in conjunction with the advisor, must submit **Dissertation Advisor Form** to the MCB program administrative assistant.

C. Doctoral Advisory Committee: The student and her/his research advisor will choose a Doctoral Advisory Committee (DAC) composed of no fewer than four faculty members, at least three of whom are MCB faculty. All members of the DAC must hold graduate faculty status in their home departments to be eligible to serve. Two members of the committee, including the chairperson (the student's research advisor), must be from the student's home department or have graduate faculty status in that department. At least one committee member must NOT be associated with the graduate program of the student's home department and will serve, with approval from the Dean of the College of Arts and Science, as the Graduate Faculty Representative of the College. **The DAC must be formed and should meet by the end of the second semester** to discuss coursework for the student's program of study (see C. Coursework). A great deal of the responsibility for determination of the program of study of the student is left to the DAC. General and specific requirements are included in this document, and the DAC has the initial responsibility to ensure that these requirements are met

D. Coursework: A student is required to complete a minimum of **30 graded credit hours** of graduate coursework unless he/she has previously earned a MS degree in a related field. A student entering the program with an earned MS degree is required to complete a minimum of **24 graded credit hours** of graduate coursework. Courses taken in foreign languages and undergraduate courses will not count toward the graded credit hours. The student's DAC has the responsibility of determining appropriate course work. Within one week after the first meeting of the DAC (no later than the second semester of study), the student should submit form **CAS#5 Dissertation Committee Information** and the **signed MCB Course Approval Form** to the MCB Program administrative

assistant. Students in the **Environmental and Plant Biology** must also submit a **Course Approval Form** to their graduate chair.

The coursework chosen by the DAC has as one of its objectives the adequate preparation of the student for the comprehensive examinations. However, a required core curriculum for MCB students consists of

Biochemistry - CHEM 5901 (4 credits) and CHEM 5902 (4 credits),

Biological Research and Science Ethics – PBIO 5170 (1 credit)

Molecular Biology - MCB 7200 (3 credits),

Bioinformatics - Genomics Laboratory – MCB 5280 (3 credits) or Problem Solving with
Bioinformatics Tools – MCB 5160 (3 credits)

*Advanced Cell Biology - MCB 7600 (3 credits),

Writing in the Life Sciences - PBIO 5180 (3 credits), and

Seminar in Molecular and Cellular Biology - MCB 7410 (1 credit).

****Students who do not have a background in cell biology should take PBIO 5310, Cell Biology, before enrolling in MCB 7600.***

A student who can demonstrate competency in any required course may be exempt from the requirement but only with the approval of his/her DAC and the MCB curriculum chair. Depending on the requirements of the home department, competency may be demonstrated by having previously taken a similar course and earning a grade of B or better or by successfully completing a competency exam. This exemption does not give a student graded course credit for the course, but simply exempts him/her from taking the course, thus giving him/her flexibility in selecting courses that better meet his/her programmatic needs.

All students are also required to register for Seminar in Molecular and Cellular Biology (MCB 7410) when offered and must present at least one seminar each year. First year students may be exempt from the presentation requirement depending upon seminar enrollment. However, students whose home department is the Department of **Biological Sciences** or **Biomedical Sciences** must present a seminar in their first year, either in the MCB seminar series or an appropriate class or journal club. Also note that students in all home departments may use a dissertation research seminar to fulfill the yearly MCB seminar presentation requirement in their final year. Attendance is required for all seminars in the semesters registered. All students are also required to attend all seminars presented by MCB invited speakers. The MCB Graduate Committee chairperson or her/his representative will record student attendance at all MCB seminars. Absences must be approved in advance by the MCB Graduate Committee chairperson.

Typically, during the first year of enrollment, a student is expected to take core courses in the following sequence: fall semester - CHEM 5901, MCB 7200, PBIO 5170, MCB 7410; spring semester – CHEM 5902, MCB 5280 or MCB 5160 and MCB 7410. In the second year, the student is expected to take: fall semester – MCB 7600 ***or possibly PBIO 5310***; and MCB 7410; spring semester – MCB 7410. In the third year, the student is expected to take: fall semester – PBIO 5180, MCB 7600 if not taken previously and MCB 7410; spring semester – MCB7410.

Additional Courses Required by Home Departments:

Biological Sciences/Biomedical Sciences: In addition to the above requirements, students are required to take one of the following: BIOS 6700 Biostatistics I, PBIO 5150 Quantitative Methods or an equivalent course.

Chemistry and Biochemistry: A minimum of three (3) CHEM courses at the 7000 level are required in addition to the above MCB requirements. A student may substitute 3 credits of a graded seminar series (Student must present) (ie. MCB 7410 Seminar or Chemistry Seminar) or journal club for ONE of the CHEM courses.

In addition, all graduate students in Chemistry and Biochemistry must **Demonstrate Competency** in the field of chemistry during the first year of the PhD program. Students failing to meet the competency requirement during their first year of graduate study may lose their financial support until competency is demonstrated or may be removed from the program at the discretion of the Chemistry and Biochemistry Graduate Committee.

Demonstration of Competency

- All graduate students new to the Department of Chemistry and Biochemistry (MCB Option) will be required to take entrance examinations in Analytical, Biochemistry, Inorganic, Organic, and Physical Chemistry. The exams will be taken from the current American Chemical Society exam sequence, unless a division decides to generate and grade its own exam. The exams are offered twice during the academic year in September and January.
- Each student must pass a total of three (3) out of five (5) entrance exams taken with scores at the 50th percentile or greater to demonstrate competence in that area. A student may take an exam a maximum of two times.
- Alternately, competency can be demonstrated by making a grade of B or better in a 5000 level course in three of the five areas (Analytical, Biochemistry, Inorganic, Organic, and Physical). General/review courses (5000 level) in each research area are offered each fall.

Environmental and Plant Biology: In addition to the above requirements, students must take one course in experimental design/data analysis (PBIO 5150 Quantitative Methods in Plant Biology - 4 cr.) and a minimum of two additional courses in PBIO.

DO/PhD program in MCB: Because of coursework taken in the Medical School, students in the DO/PhD program are asked to complete only 15 additional hours of graded coursework for the PhD. DO/PhD students are required to take MCB 7200 Molecular Biology, MCB 5280 Genomics Laboratory or MCB 5160 Problem Solving using Bioinformatics Tools (as appropriate to their needs), MCB 7600 Advanced Cell Biology and additional coursework for a total of 15 hours of graded coursework. Coursework must satisfy the additional requirements of their home department and be approved by the DAC. Although not included in the graded coursework, students are also required to participate in the MCB seminar, MCB 7410, during the 3 years of coursework, to satisfy the requirement to attend and present in an established seminar series.

E. Grades: Students must maintain a 3.0 grade-point average to remain in the MCB Program and to graduate (see section L). In addition, if a student receives a grade of C+ or less in more than two courses, she/he will be terminated from the MCB Program.

F. Research Proposal: With the approval of her/his advisor and committee members*, the student will prepare and submit a specific research proposal to her/his DAC by the end of the third semester (excluding summers) in the program. The proposal should follow the format dictated by the National Science Foundation or the National Institute of Health as indicated by the advisor and shall include a half-page Abstract, a Project Description (comprised of Specific Aims, Background and Significance, Preliminary Data, Experimental Plan, Expected Outcomes and Pitfalls and a Time Table for Completion) and References. The Project Description should be no more than 15 single spaced pages, 11-12 pt font with 2.5 cm margins on all sides. The abstract and list of references shall not be counted in the 15 page limit.

The DAC will meet and advise the student on the merits and weaknesses of the proposal. If deficiencies are discovered, the DAC will ask the student to prepare again for another meeting (including revision of the proposal if required). A second unsatisfactory presentation will lead to termination from the MCB Program. Some home departments have unique requirements for documentation of the proposal defense. Please see the **Table of Required Forms** to determine the specific requirement for each home department.

*This requirements can be met either formally by a meeting of the committee or informally by individual meetings between the student and each committee member.

G. Comprehensive Examinations

1. Written Examination: After the research proposal requirement, the student must pass a written comprehensive examination prepared by their DAC. The DAC will decide which member (other than the student's advisor) will administer the examination. The student should speak with each member of the DAC to determine how she/he should prepare for the examination. It is the student's responsibility to contact the DAC members for this information. After notifying the student of the general content of the examination, each member of the DAC will prepare written examinations. These examinations will then be submitted to the DAC member administering the examination. The DAC member will administer the written examinations to the student, who will take the examinations one or two per day over a ten-day period. The DAC members will evaluate their respective exams and compile a final grade within two weeks after completion of the last examination. The student is to be notified by the DAC (in writing) of the results of the written examination within one week thereafter (original and repeats). If more than one examination(s) are failed, the DAC will determine which examination(s) are to be repeated, whether additional course work is required, and when the examination(s) are to be repeated. An examination may be repeated no more than one time.

2. Oral Examination: Within one month after completion of the written examinations, and after being notified by the DAC chairperson of the general content of the examination, the student will be evaluated in an oral examination administered by the DAC. Within one week after completion of the examination, the student must submit form **CAS#4 - Report of the Comprehensive Exam** to the MCB Program administrative assistant. If the student fails the oral examination, she/he will be given one opportunity to be reexamined. The comprehensive examinations are to be completed no later than the end of the sixth semester (excluding summers) of enrollment in the MCB

Program. In the event an examination must be repeated, it must be completed by the end of the seventh semester of enrollment. Failure to pass all examinations after any second attempts will result in termination in the MCB Program.

After completion of the comprehensive exams and the 30 credit hours of graded coursework, the student will advance to candidacy for the Ph.D. He/she should submit form **CAS#6 - Recommendation to Advance to Candidacy** to the MCB Program administrative assistant at that time.

Failure to complete the research proposal and/or the comprehensive examinations on time may result in the loss of financial support and fee waiver or dismissal from the MCB Program.

H. Teaching Requirement: Teaching experience is an important aspect of graduate education. **For the Departments of Biological Sciences, Biomedical Sciences and Environmental and Plant Biology**, regardless of his/her funding source, each student is required to teach a full assigned course load for a minimum of two semesters prior to completion of his/her degree. Teaching in an MCB course(s) and/or a home department course(s) as needed by the department and MCB may fulfill the teaching requirement. The department of **Chemistry and Biochemistry** has no teaching requirement for the Ph.D.

The MCB Program reserves the right to select specific students enrolled in the MCB Program to serve as teaching assistants for MCB courses, as long as the selected student is being fully supported (stipend and fee waiver) by the MCB Program.

I. Financial Support: Students must have unconditional admission status in the MCB Program and maintain a 3.0 or better grade point average in overall course work to receive financial support from the MCB Program. A student entering with a B.A. or B.S. degree may be supported for four years and a fifth year is possible on a semester by semester basis. The MCB graduate chairperson and the home department graduate chairperson will consult together and with the student's advisor to determine the appropriate source (department, MCB, or grant) of support, if any. Appointments at all stipend levels require 15-graduate credit hours registration each semester in the first year* and 12-graduate credit hours registration in subsequent years unless otherwise approved by the home department and, if necessary, by the Dean of Arts and Sciences. *Students who enter with a Masters degree should register for 12 credit hours per semester in the first and all subsequent years.

Teaching Associates in all departments generally teach three semesters per year (which may include summer semester).

Research stipends are available dependent upon funding. A student may receive a departmental research assistantship or a grant-funded stipend. Departmental awards are usually granted competitively at the discretion of the MCB or home department graduate committee and may be awarded for any duration from a single semester to a full academic year. Grant-funded research stipends are awarded solely at the discretion of the advisor and graduate chair.

J. Scholarly Disciplines: Scholarly disciplines are proficiency in statistics, computer languages and/or usage, foreign languages, or advanced mathematics. The DAC will determine whether any scholarly discipline requirement is to be satisfied. Within two academic semesters after its formation, the DAC will submit to the MCB Graduate

Committee chairperson the plan for completion of the student's scholarly discipline requirement (if any). This will consist of a statement signed by all DAC members indicating specifically what the scholarly disciplines are to be and reasons why they are deemed appropriate for the student. The MCB Graduate Committee will approve or disapprove the DAC recommendation and notify the student and DAC members in writing within one month. Typically, the scholarly disciplines requirement is satisfied by PBIO 5180 Writing in the Life Sciences and a course in statistics or data analysis (i.e. BIOS 6700, PBIO 5150 or PBIO/CS 5160). The Graduate Committee chairperson will submit **CAS#3 Scholarly Discipline for PhD** to the college on the student's behalf.

K. Dissertation Defense: Each student must defend her/his dissertation before the DAC at a public forum. Three weeks prior to the defense the student should submit for **CAS#7 – Arrangements for Oral Examination on the Dissertation** to the MCB Program administrative assistant. Within one week after completion of the dissertation defense, the student must submit **CAS#8: Report of Final Oral Dissertation Defense**, signed by all members of the DAC and the graduate chair of the home department, to the MCB administrative assistant.

L. Probation and Remediation: A student failing to achieve a 3.0 or higher GPA at the end of any semester will be placed on probation for the next semester. If the GPA is still below a 3.0 at the end of the probationary period, the student will be terminated from the MCB Program. No variance from the requirements stated in this document is allowed except in extraordinary cases, such as prolonged hospitalization. If a deadline cannot be met due to an unforeseen and unavoidable, extraordinary circumstance, the student and her/his advisor may petition the MCB Graduate Committee in writing for an opportunity to correct the deficiency. The graduate committee will determine whether the request can be allowed and notify the student and advisor in writing of its decision.

M. Academic Misconduct: Academic misconduct in any form by an MCB graduate student will not be tolerated. It is the student's responsibility for knowing what constitutes academic misconduct. However, incoming students will be provided with material from the Office of Judicial Affairs, which defines many forms of misconduct. If the student did not receive this material, she/he should obtain it from the MCB administrative assistant. Students can also consult the Ohio University student handbook for information regarding academic misconduct. A guilty charge of academic misconduct may result in the loss of financial support (i.e. stipend), fee waiver or dismissal from the MCB Program. The MCB Graduate Committee will be responsible for the review of each case of academic misconduct and will determine the penalties.