

EDUCATIONAL PROGRAM OBJECTIVES (EPOs)

MOLECULAR MEDICINE (MOME) TRACK

BIOMEDICAL SCIENCES Ph.D. PROGRAM

COLLEGE OF MEDICINE

UNIVERSITY OF TOLEDO

First-Year Core Curriculum EPOs

Graduate educational programs shall articulate their objectives in order to permit the alignment of course instruction, research training and evaluation of students with the Educational Program Objectives (EPOs). To meet this requirement, the Biomedical Sciences faculty of the University of Toledo, College of Medicine has adopted the following objectives for the Core Curriculum component of the program leading to the Ph.D. or M.S. degree in Biomedical Sciences.

The EPO competencies reflect scientific knowledge, skills, and professional attitudes. The student's progress will be evaluated and documented with respect to competence in each of these areas and over the duration of years needed to complete the degree requirements.

Upon completion of the first-year Core Curriculum, a BMS Ph.D. or M.S. student will be able to:

1. Identify and summarize the structure and function of cells, tissues, and organs
2. Describe the molecular, biochemical, and cellular mechanisms that maintain the normal function, development, and plasticity of cells, tissues, and organs
3. Summarize basic disease causes and processes that affect the structure and function of cells, tissues, and organs
4. Assess and critically analyze relevant basic science and clinical literature.
5. Design and conduct applicable biomedical sciences experiments.
6. Organize, interpret and summarize results of applicable biomedical sciences experiments.
7. Demonstrate ethical and responsible conduct in research and all other scholarly activities consistent with the University of Toledo, Health Science Campus, *Standards of Conduct* (Policy 01-027).

MOME TRACK SPECIFIC EPOs

Introduction

Graduate educational programs must articulate their objectives, in order to permit the alignment of course instruction, research training, and evaluation of students with such explicit program objectives. To this end, the faculty of MOME track, upon the recommendation of its Curriculum Committee, has established the following objectives for the program leading to the Ph.D. and MS degrees in Biomedical Sciences, the MOME track.

The competencies described in the Educational Program Objectives reflect three domains: knowledge, skills, and professionalism. Student progress is measured and documented with respect to competence in each domain over the course of the program.

Part I: A MOME graduate will be knowledgeable

In the course of the curriculum, students have the opportunity to gain knowledge through instruction by content experts, and by active, mentored participation in on-going research projects in laboratories of the faculty. Before graduation, a student will have demonstrated, to the satisfaction of the teaching faculty and graduate advisory committee, knowledge in the categories listed below. Knowledge will be assessed by the student's ability to define, describe, and explain facts and concepts, as well as to apply, analyze, integrate and synthesize information.

- K1 Knowledge of normal structure and function of the body and its major organ systems, with emphasis on the systems studied in MOME laboratories (e.g., cardiovascular, renal, digestive, endocrine and neuroendocrine systems)
- K2 Knowledge of biochemical, molecular and cellular mechanisms that are important in maintaining cardiac and vascular function as well as metabolism and energy balance.
- K3 Knowledge of the pathophysiology of prevalent cardiovascular and metabolic diseases, such as diabetes, obesity, fatty liver disease, hypertension, heart failure, and ischemic heart disease.
- K4 Knowledge of the genetic and environmental basis of prevalent cardiovascular and metabolic diseases, such as hypertension, diabetes and obesity
- K5 Knowledge of the epidemiology of prevalent cardiovascular and metabolic diseases, such as hypertension, diabetes and obesity
- K6 Knowledge of basic principles of pharmacology (drug action) and pharmacology of specific drugs used in the treatment of prevalent cardiovascular and metabolic diseases
- K7 Knowledge of statistical methods used in the appropriate design and interpretation of research projects

- K8 Knowledge of the principles that govern ethical decision making in the design and conduct of research projects, including the publication and reporting of results.
- K9 Knowledge of the various approaches used to develop research proposals and to raise funds to finance biomedical research projects.

Part II: A MOME graduate will be skilled

The MOME faculty has designed a curriculum in which research and teaching skills are learned in concert with the knowledge acquired in the classroom and through independent reading. Students have the opportunity to gain these skills under the mentorship of their major advisor, through direct participation in research projects (laboratory-based and otherwise), through direct contact with the laboratory research team, and through collaborations and interactions with expert scientists from within and outside the institution

Before graduation, a student will have demonstrated, to the satisfaction of the teaching faculty and their graduate advisory committee, skills in the following categories:

- S1 The ability to perform most basic laboratory procedures that are commonly used in the track laboratories.
- S2 The ability to perform advanced/specialized procedures that are necessary for the completion of the student's thesis research project(s)
- S3 The ability to design and complete independent research projects, including the introduction and optimization of unfamiliar techniques and the development of new research techniques
- S4 The ability to perform productively as a member of a research team and train junior students in routine and basic laboratory techniques
- S5 The ability to recognize hazardous procedures in the laboratory and follow appropriate precautions to protect the laboratory and institutional personnel
- S6 The ability to communicate effectively, both verbally and in writing, with other students, post-doctoral fellows and faculty members, as well as with national and international collaborators
- S7 The ability to present their results at local, national and international meetings as well as to be able to organize and chair local meetings
- S8 The ability to retrieve biomedical information from electronic databases and other sources; to manage, and utilize the information, including by use of bioinformatics, in order to develop hypotheses to address scientific issues and the

means to test them and to discuss the results in the context of reports in the literature.

- S9 The ability to write and submit manuscripts and to communicate effectively with scientific journal editors and reviewers
- S10 The ability to write a comprehensible research proposal and raise funds to support it from federal, state and other funding agencies

Part III. A MOME graduate will be professional

UT/COM believes in the importance of molding the character of students, and dedicating curricular and extracurricular time to the development of student's ethical standards, humanistic beliefs, and behaviors. Before graduation, students will have developed:

- P1 Ethical, responsible, reliable, and dependable behavior in all aspects of their professional lives, and a commitment to the profession and society.
- P2 Honesty and integrity in all interactions with faculty advisors, colleagues, faculty members, laboratory and institutional staff, research subjects, and others with whom students may interact in their professional lives.
- P3 Honesty and integrity in research conduct and reporting of results.
- P4 Responsible behavior while using shared equipment and facilities.
- P5 Responsible behavior and willingness to train and teach junior students to the best of their knowledge.
- P6 Professionalism in dress and grooming in compliance with health and safety rules applicable to the research laboratories and other research sites.
- P7 Compassionate treatment of patients as subjects of research, and respect for their privacy and dignity.
- P8 Compassionate treatment of experimental animals, and respect for all laws and regulations applicable to the use of animals in medical research.
- P9 Professionalism in following rules and regulations set by different committees of the institution, e.g. IACUC, IRB, Biohazard committee, Radiation Safety etc.