

# MD/PHD

Program Director Christopher Whitlow

## Overview

An MD/PhD dual degree offers graduates outstanding opportunities in the new era of biomedical research of the 21st century. The invaluable perspective of an MD/PhD graduate positions the physician scientist as a crucial link in translating scientific research into improving human health and reducing disease.

With the increasing sophistication of research tools, MD's without extensive formal research training rarely have the depth of knowledge needed to progress rapidly as a research scientist. The increasing pace of research, the need for knowledge in specific techniques, and the competition in funding have made it more difficult for MD clinicians to succeed in a research-intensive career. Optimal training is provided by combining an MD with a PhD academic program.

The MD/PhD program, a combined effort between the School of Medicine and the Graduate School of Arts and Sciences, is an integrated program where neither the MD nor the PhD degree is compromised. The student gains the full perspective for identification and analysis of problems related to human health while receiving rigorous training in a basic or translational research discipline—training which provides the depth of knowledge of scientific logic and techniques for an effective, exciting, and successful career in medical research.

The program seeks outstanding students who have already shown aptitude and enthusiasm for research.

## Structure of the Program

The duration of the program typically is seven years. During the summer before entry into medical school, beginning in early June, students attend an orientation program to introduce faculty and available research opportunities. An eight-week research rotation is conducted with a selected member of the participating graduate faculty. This research rotation (and subsequent ones, if needed) familiarize students with faculty and their fields of expertise; usually one of these faculty are chosen as the student's graduate (PhD) advisor.

**Years One and Two.** The first two academic years are spent as a medical student. Phase I (seven months) introduces core biochemical knowledge, including development and structure of the human body (gross, microscopic, embryological, and radiological anatomy) and basic cellular functions (biochemistry, molecular biology and genetics, immunology, introduction to pathology).

Phase II (months 8-20) includes courses in systems pathophysiology (physiology, pharmacology, microbiology and pathology), and a two-month period for a second rotation in a lab of the selected graduate program in the summer after the first year.

Medicine as a profession, clinical decision making, and epidemiology studies are included in both Phases I and II.

During these years, the student usually attends a graduate seminar course. The seminar meets once a week and provides a continuing in-depth introduction to the chosen graduate discipline in addition to social and intellectual contact with other graduate students and faculty.

If possible, the student chooses a graduate adviser by the end of Phase II of the medical curriculum. Otherwise, the summer after Phase II may be used for another laboratory rotation, prior to choosing an adviser.

At the beginning of year three, students will remain with their medical school class for a three month clinical experience. These three months are spent learning basic clinical skills on internal medicine rotations and introduce the students to the practice of medicine providing basic skills in completing the history and physical exam experience during the graduate school years in an out-patient clinic. These three months of training will also increase the flexibility for returning to medical school upon completion of the graduate degree. After completion of the three clinical months the students will then join the graduate school with the new cohort of graduate students.

**Years Three through Five:** During the graduate school years, the student participates in a monthly outpatient clinical experience. Students rotate at a clinic for the underserved, working with faculty and private practice physicians. Participation in this clinic not only helps to maintain clinical skills but gives the student experience with balancing research and clinical responsibilities.

The third year is spent taking advanced basic science courses and conducting research. Didactic coursework is intended to supplement the biomedical knowledge base built in the medical school curriculum. Program or departmental courses also provide a more discipline-specific focus and, therefore, depend on the chosen graduate program.

The duration of the dissertation research may vary but typically is completed in years three-to-five and, if needed, a portion of year six. The PhD dissertation is completed and defended prior to returning to clinical studies.

**Years Six and Seven.** The student completes eighteen months of required clinical rotations (Phase III of the clinical curriculum) which include internal medicine, surgery, pediatrics, obstetrics, women's health, neurology, psychiatry, radiology, anesthesiology, family and community medicine, and emergency medicine. Four months of elective time are spent in other clinical experiences or may be used for completion of graduate studies prior to returning to the medical curriculum. This part of the schedule is tailored to the individual student with the approval of the graduate advisor, MD/PhD program director, and the Associate Deans for medical education and student services.

**Conferring of Degrees.** The PhD degree is conferred in the semester in which all requirements for that degree are met. The MD degree shall be awarded upon completion of the program.

## Participating Graduate Programs

- Track 3 - Biology
- Track 4 - Molecular and Cellular Biosciences:
  - Biochemistry and Molecular Biology
  - Cancer Biology
  - Microbiology and Immunology
  - Molecular Medicine and Translational Science
  - Molecular Genetics and Genomics
- Track 5 - Integrated Physiology and Pharmacology
- Track 6 - Neuroscience
- Track 7 - Biomedical Engineering

## Mechanism of Application

Both the School of Medicine and the Graduate School evaluate the applicant's credentials. The MCAT is the required standardized test for all applicants.

Initial application is through the American Medical College Application Service (AMCAS). When the School of Medicine receives AMCAS applications, students are sent supplemental forms for application to the School of Medicine. The applicant should indicate interest in the combined MD/PhD program on the supplemental application. The School of Medicine supplemental packet requests an evaluation by the applicant's premedical advisory committee. For the MD/PhD program, the applicant should also include letters of evaluation specifically addressing his or her research experience and abilities.

This is a highly competitive, limited program. Students who matriculate receive tuition scholarships throughout the program. In addition to outstanding grades and MCAT scores, the applicant should provide evidence of enthusiasm and aptitude for research, with prior research experience beyond that of college courses. This is an important factor in evaluation of the application.

After the supplemental application packet, MCAT scores, and letter(s) of evaluation are received, the completed application is reviewed by the committees on admissions of the MD/PhD program. A small percentage of applicants are then asked to visit the University for interviews from October through March.