



DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY  
UNIVERSITY OF TORONTO

# Graduate Pharmacology

*This pamphlet has been prepared for prospective graduate students in Pharmacology at the University of Toronto.*

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## What is Pharmacology?

Pharmacology is a broadly based and integrative discipline of biology dealing with the properties of chemical compounds and their interactions with living systems. The discipline provides the scientific basis and principles for a variety of special applications, such as the study of drug actions in the health sciences, the use of drugs as therapeutic agents in medicine or as tools in scientific research, the development and control of pharmaceuticals, the investigation and control of poisons and pollutants in natural and social environments, and as yet unforeseen applications in the future.

Pharmacology differs from Pharmacy, which is the profession engaged in the preparation and dispensing of drugs and the operation of drug stores.

The goal of Pharmacology, as presently defined, is the design or identification of chemical agents to cure, ameliorate, or prevent disease; to understand and explain the mechanisms of their actions; and to contribute to the maintenance of health, well-being and productiveness of society.

Pharmacologists require a solid knowledge of the biological sciences, and also of mathematics, chemistry, and many aspects of medicine. The techniques and methods of investigation employed by pharmacologists are those used in biological and physical sciences.

## About the Department

The Department of Pharmacology and Toxicology at the University of Toronto is among the oldest and largest in North America. We presently have over 70 graduate faculty members and 160 graduate students. Most laboratories are located in the Medical Sciences Building on the main campus of the University as well as in nearby institutes and hospitals.

## Degree Programs

Our graduate study program for the M.Sc. and Ph.D. degrees involves course study and supervised research in one of the following areas of Pharmacology:

- Biochemical and Molecular Pharmacology
- Cardiovascular Pharmacology
- Clinical Pharmacology
- Drug Addiction
- Drug Metabolism, Distribution, and Pharmacokinetics
- Endocrine Pharmacology
- Immunopharmacology
- Neuropharmacology
- Pharmacogenetics
- Psychopharmacology
- Receptor Pharmacology
- Second Messengers and Signal Transduction
- Toxicology

### M.Sc. Training in Pharmacology

The objective of the M.Sc. program is to train students in the principles and practices of Pharmacology research. M.Sc. Students obtain a core knowledge of pharmacology but also work towards expanding that knowledge base through research and scientific discovery. Graduates must be able to formulate hypotheses in a specific area of pharmacology and test them through active research. Graduates will acquire expertise in selected experimental techniques commonly used in pharmacology through project courses, laboratory courses and/or thesis-based research.

Presently the Department offers two formats of study leading to the M.Sc. degree. Students in the **thesis-based M.Sc.** will participate in a research program with a Graduate Faculty member and present the results of the investigation as a written thesis. The thesis will be evaluated and defended to the satisfaction of a thesis examination committee. Students in the **M.Sc. Applied Clinical Pharmacology** field of study will acquire research training in diverse areas within clinical pharmacology through independent research projects, practicums and placements in a course-based format.

### Ph.D. Training in Pharmacology

The objective of the Ph.D. degree is to provide advanced and comprehensive scientific training in Pharmacology research. Students will develop not only a comprehensive understanding of pharmacological principles, but also an in-depth expertise in their particular area of interest. Students will strive to be proficient in the design and conduct of research within their field of expertise, with the overall goal of developing research independence and contributing to the knowledge base of their chosen research topic.

Successful Ph.D. students

1. Enjoy learning and are flexible in learning new areas
2. Are self-motivated and self-teaching
3. Are capable, creative, problem-solvers with interpretational ability
4. Desire independent scientific thought and action
5. Have a sense of moral responsibility towards science and society

**Ph.D. Direct Entry:** Well-qualified students with excellent research potential holding an appropriate bachelor's degree from a recognized university may be considered for direct admission to the Ph.D. program.

### Collaborative Specializations

Students wanting to explore a complementary interdisciplinary area may participate in any of the following collaborative specializations:

- Biomedical Toxicology
- Addiction Studies
- Cardiovascular Sciences
- Human Development
- Musculoskeletal Sciences
- Neuroscience
- Resuscitation Sciences
- Women's Health

### Career Opportunities

Pharmacologists are employed in universities, hospitals, the pharmaceutical industry, government agencies and consulting firms, both within Canada and abroad. Depending on the strengths and inclinations of the individual, after further professional training, pharmacologists may practice their profession as physicians, researchers, teachers, administrators, or combinations of these.

Another route into a career as a pharmacologist is from one of the health professions. Earning a degree in medicine, dentistry, veterinary medicine or pharmacy, or completing a combined MD-PhD program will often be the path into a clinically oriented branch of Pharmacology.

### Applying to Pharmacology

Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants should keep in mind that background courses in physiology, biochemistry, or allied sciences are a critical foundation for further study in pharmacology. Detailed information may be found at <http://pharmtox.utoronto.ca/graduate-admissions>.