

Faculty Research Interests-A Strength

Atchison, William D., Ph.D., *University of Wisconsin, Professor. Neurotoxicology; effect of drugs and chemicals on neurotransmitter release.*

Barman, Susan M., Ph.D., *Loyola University, Professor. Neural control of the cardiovascular function, sympathetic rhythms, cardiorespiratory synchronization.*

Chen, Alex F., Ph.D., *Southern Illinois University, Assistant Professor. Cerebral and cardiovascular biology and experimental gene therapy in hypertension, diabetes, and stroke.*

Cobbett, Peter J.R., Ph.D., *St. Andrews University, Scotland, Associate Professor. Neuromuscular control in parasitic and nonparasitic helminths; physiology of calcium channels.*

Fink, Gregory D., Ph.D., *Tulane University, Professor. Integrative cardiovascular physiology and pharmacology, hypertension, renal-cardiovascular integration, renin-angiotensin system, endothelin, venous function, biostatistics.*

Galligan, James J., Ph.D., *University of Arizona, Professor. Autonomic nervous system physiology and pharmacology with a special emphasis on the nervous regulation of gastrointestinal and cardiovascular function.*

Ganey, Patricia E., Ph.D., *Michigan State University, Associate Professor. Mechanisms of chemical-induced alteration in function of inflammatory cells; mechanisms of inflammation-mediated modulation of toxic responses in liver.*

Gebber, Gerard L., Ph.D., *University of Michigan, Professor. Baroreceptor reflexes; central neural control of circulation and respiration; rhythm generators.*

Goodman, Jay I., Ph.D., *University of Michigan, Professor. Mechanisms of carcinogenesis with emphasis upon DNA methylation and epigenetic regulation of gene expression; science-based safety assessment; toxicology.*

Goudreau, John, Ph. D., D. O., *Michigan State University, Assistant Professor. Basic and clinical research of the interaction between exogenous neurotoxins and disease predisposing genes in Parkinson's disease.*

Haywood, J.R. (Chair), Ph.D., *University of Florida, Professor. Neural control of the circulation in hypertension, genetics of sodium-dependent hypertension, regulation of central and peripheral neurotransmitter release.*

Kaminski, Norbert E., Ph.D., *North Carolina State University, Professor. Molecular mechanisms responsible for altered immune function by drugs and chemicals; Immunotoxicology of dioxins; immunopharmacology of cannabinoids; allergic airway disease.*

Lookingland, Keith J., Ph.D., *University of Maryland, Associate Professor. Effects of drugs and environment on aminergic and peptidergic neurons in the hypothalamic regulation of the autonomic nervous system and pituitary hormone secretion.*

Roth, Robert A., Jr., Ph.D., *Johns Hopkins University, Professor and Associate Director, National Food & Safety Toxicology Center. Mechanisms of liver injury from drugs and food-borne chemicals, including the role of inflammation as a susceptibility factor for intoxication.*

Watts, Stephanie W., Ph.D., *University of Indiana, Associate Professor. Signal Transduction and receptor regulation of vascular smooth muscle contractility; focus on hypertension.*

ADMINISTRATIVE AND TEACHING FACULTY

Fischer, Lawrence J., Ph. D., *University of California, San Francisco. Professor and Director of the Institute for Environmental Toxicology. Studies on the toxic effects of chemicals in hormone-secreting-cells of the endocrine pancreas.*

Moore, Kenneth E., Ph.D., *University of Michigan, Professor and Past Chair. Biochemical and toxicological aspects of drugs which act in the peripheral or central nervous systems; catecholamines; neuroendocrine systems.*

Sato, Paul H., Ph.D., *New York University, Associate Professor. Therapeutic applications of enzymes; metabolism of ascorbic acid; pharmacogenetics; drug metabolism.*

Thornburg, John E., Ph.D., *Purdue University; D.O., Michigan State University, Professor. Clinical pharmacology; medical education and licensure examinations, human subjects protections*

FIXED-TERM FACULTY

Maddox, Jane F., D.V.M., *Michigan State University; Ph.D., The Pennsylvania State University. Assistant Professor. Inflammation and eicosanoids in arthritis and liver toxicity; effect of antioxidants.*

Yuan, Yukun, Ph.D., *Assistant Professor, Michigan State University. Effects of environmental neurotoxicants on central synaptic function in the central nervous systems, particularly visual synaptic pathway.*

Pharmacology and Toxicology

Carcinogenesis
Cardiovascular
Drug Idiosyncrasy
Environmental
Toxicology
Gastrointestinal
Immunotoxicology
Neuroscience



*Become a part
of it...*

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Fall 2003

Pharmacology & Toxicology

Discovery through Integrative Research

MICHIGAN STATE
UNIVERSITY

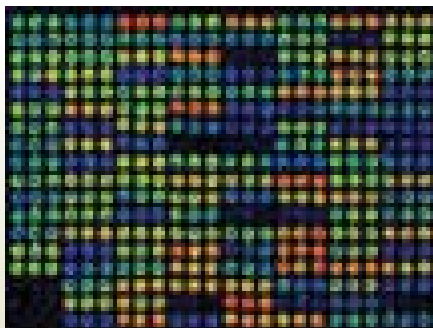
From Our Chair

We in the Department of Pharmacology and Toxicology at Michigan State University invite you into the exciting world of Pharmacology and Toxicology. Our graduate program has a long track record of training scientific leaders in academia, government and industry. The department has achieved national recognition in graduate education and research in toxicology and pharmacology. We use methods ranging from the cellular and molecular level to the whole animal to understand drug action.

The graduate program gains its strength through the quality and enthusiasm of our faculty and the success of our students. Our goal as educators is to prepare students with the knowledge and critical thinking skills necessary to be creative, independent scientists in the fast changing world of biomedical research. To this end, we are dedicated to ensuring our graduate training program is challenging, intellectually stimulating and personally rewarding.

At Michigan State University, we want to provide you every opportunity to achieve your career goals. High quality facilities and a collegial atmosphere among faculty, staff and students offer an environment conducive for learning and collaboration. Come share our excitement for Pharmacology and Toxicology!

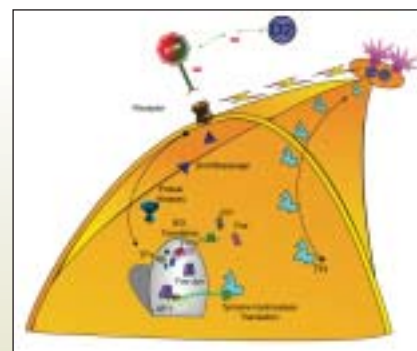
Genetic



Gene Chip Microarray.

Courtesy of Annette Thelen, MSU Genomics Structure Facility.

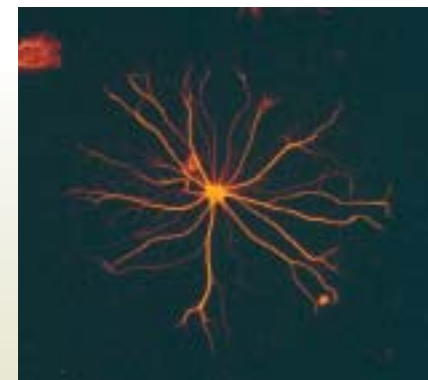
Molecular



Interaction of the dopamine (D2) and dynorphin system in regulation of tuberoinfundibular neuronal function.

Courtesy of Y. Will-Murphy and K. Lookingland

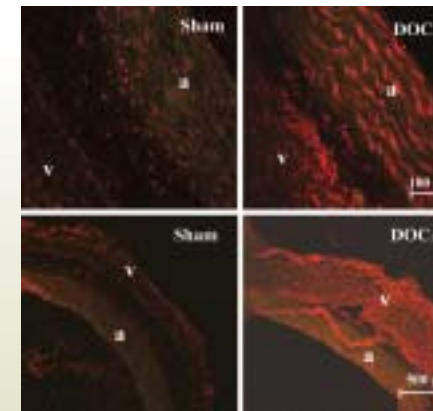
Cellular



Astrocyte, labelled with Glial Fibrillary Acidic Protein

Courtesy of J. Edwards and B. Atchison.

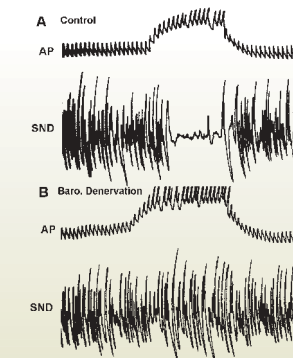
Tissue



Superoxide measurement through dihydroethidium in artery (a) and vein (v) of normotensive (sham) and hypertensive (DOCA) rats.

Courtesy of H. Xu and J. Galligan

Whole Animal



Effect of sectioning baroreceptor nerves (denervation) on the inhibition of sympathetic nerve discharge during a rise in arterial pressure in an anesthetized cat.

AP = arterial pressure, SND = sympathetic nerve discharge.

Courtesy of S. Barman and G. Gebber.

Human



MRI of Human Head

Courtesy of Kevin Henley and James Potchen of the Radiology Department, MSU

Program Objectives and Overview of Study

Pharmacology and Toxicology are unique disciplines with their own vocabulary, theoretical concepts and practical applications. They are broad areas of study that require a knowledge base that ranges from drug and toxicant interaction with molecules to the interactions of these substances with integrated physiological systems in animal and human subjects. Therefore, students seeking a career in pharmacological and toxicological research require broad-based training in molecular biology, biochemistry, cellular and integrative physiology and biostatistics. Such comprehensive training requires a well-developed program specific for the needs of students in the pharmacological and toxicological sciences. The goal of our program is to provide a broad experience in order to prepare our graduates for productive research careers in academics, industry and government.

The predoctoral training program culminates in the awarding of the Doctor of Philosophy degree (Ph.D.). The objective of our graduate program is primarily to prepare students for careers in research and teaching. However, with the breadth of training in the program, many career options are available. Since the inception of our program in 1966, over 130 alumni have taken positions in universities and medical colleges, major pharmaceutical firms and federal research units.

The predoctoral training program leading to the awarding of the Ph.D. requires at least four years of study. Initially, the program consists of course work which provides a foundation of basic biomedical science with an emphasis in pharmacology and/or toxicology and a strong laboratory emphasis. Students

meet with the Chairperson of the Graduate Committee to determine a program of course work for the first year. The selection of courses depends on the student's background and research goals.

During the first semester, all students meet with faculty to become familiar with all research activities in the department. Individually, students will work in two different research laboratories during this first year, actively participating in laboratory work, obtaining a working knowledge of particular fields of research, and demonstrating a potential for a research career in pharmacology/toxicology.

At the end of the second semester of graduate study, the student will select one faculty member to serve as the major advisor for the thesis research and convene a Guidance Committee. At all times during a student's course of study and research, members of the Guidance Committee are available for consultation.



Our Facilities

Students have access to the well-equipped laboratories of individual faculty members and to a wide range of departmental and university facilities. Departmental facilities include a real time PCR instrument, an imaging system, a western gel analysis system, a confocal microscope, spectrophotometers, ultracentrifuges and a remote telemetry physiological monitoring core laboratory. The University has confocal, scanning, and transmission electron microscopes, genomics and bioinformatics facilities, clinical and research magnetic resonance imaging instruments, mass spectrometry, DNA sequencing and macromolecular structure facilities, a mainframe computer with consultant services, science library, and university laboratory animal resources.

Financial Support

Students are supported by the program in their first year of study. In subsequent years, support is obtained from research grants, departmental or college assistantships, or fellowships and grants from industry or other private sources. Stipends are competitively nationally. Financial support also includes a full tuition credit waiver and student health care benefits. Graduate students will have the opportunity to apply individually for competitive fellowships funded by national organizations (The National Institutes of Health, The American Heart Association, The Pharmaceutical Research and Manufacturers of America Foundation).

Admission Information

Students with an undergraduate background in biological sciences (biochemistry, chemistry, microbiology, physiology) and related disciplines are invited to apply.

Application for admission is made directly to the department. Application materials and instructions can be obtained upon request from the program office or from our web site at <http://www.phmtox.msu.edu>. Applicants should submit:

1. the MSU application for graduate study
<http://grad.msu.edu/apply.htm>
2. a personal statement outlining the applicant's research interests and career goals
3. transcripts
4. GRE scores for the verbal, quantitative, and analytical writing exams
5. three letters of recommendation from people who can evaluate the applicant's potential for graduate study.

These materials should be sent directly to the Graduate Secretary, B440 Life Sciences Building, Department of Pharmacology and Toxicology. Admission is made only for fall semester. The department has a rolling admissions process beginning in late Fall. The deadline for receipt of applications is April 1 each year for U.S. applicants and the previous December for international applicants.

Interdisciplinary Training

Departmental faculty contribute to interdisciplinary training programs in Cell and Molecular Biology, Environmental Toxicology and Neuroscience.

Students in the Ph.D. program in Pharmacology and Toxicology will interact with students in these training programs and will have the opportunity to participate in interdisciplinary activities including seminars, journal clubs and workshops. Moreover, our department interacts with the Colleges of Osteopathic, Human and Veterinary Medicine, enabling development of translational research efforts.

Location & Cost of Living

Michigan State University is located in East Lansing, adjacent to the state capital in Lansing. The metropolitan area has a population of approximately 250,000. In addition to the many cultural and recreational activities provided by the University for its 45,000 students, the immediate surrounding area provides opportunities for camping, boating, fishing, and swimming as well as for concerts, theater, and other cultural events. Detroit is 85 miles to the east, and Chicago is 240 miles to the west. The proximity of the Great Lakes makes Michigan a favorite vacation spot for much of the Midwest. The cost of living is relatively inexpensive. On-campus housing options include single rooms in Owen Hall, which is a graduate residence, and furnished one- and two-bedroom apartments for married students. Off-campus housing is available at a wide range of prices.

Our Goals for You

Biomedical research today provides exciting career possibilities for those trained in integrative pharmacology and toxicology. Our program is unique in providing integrative training that encourages students to become broad-thinking problem solvers. As research technologies and concepts evolve rapidly, employers in the pharmaceutical and biotechnology industries and in academe place great value on scientists with these abilities. Our graduates are well-positioned to contribute in a productive and meaningful way to the development of new knowledge that will lead to improved human and animal health and quality of life.