CURRICULUM IN TOXICOLOGY AND ENVIRONMENTAL MEDICINE (GRAD)

The Curriculum in Toxicology and Environmental Medicine administers a degree program leading to the award of the Ph.D. in toxicology. The curriculum is an interdisciplinary program, and its faculty is drawn from various administrative units of the schools of medicine, pharmacy, and public health. The training faculty also includes scientists at government laboratories on campus or in the Research Triangle Park (e.g., EPA, NIEHS). The research interests of the faculty include most areas of toxicology, with particular emphasis on understanding the links between the environment and health risks, the mode of action of toxicants and disease pathogenesis, and how emerging knowledge could be translated into prevention strategies, new therapeutic interventions, and an improved scientific basis for risk assessment.

The main areas of research concentration are molecular carcinogenesis, mechanistic toxicology, neurotoxicology, cardiopulmonary toxicology, hepatic toxicology, computational toxicology, developmental toxicology, immunotoxicology, drug and xenobiotic metabolism, and ethanol toxicology. Multidisciplinary efforts are directed at environmental toxicology, systems biology, animal models of human diseases, translational research, and biomarkers. The faculty generally does not conduct research in the areas of aquatic toxicology, forensic toxicology, the ecological aspects of toxicology, or studies in invertebrate systems. The research activities of the Curriculum in Toxicology are conducted in the laboratory facilities assigned to each faculty member by a participating administrative unit.

Applications

Students with interest in the Ph.D. degree in toxicology must apply for Graduate School admission through the Biological and Biomedical Sciences Program. Applications are considered from students who have received or expect to receive a B.S./B.A. or an M.S. degree in a scientific discipline. A desirable background for predoctoral studies in toxicology includes courses in biological sciences (including histology and animal physiology), in chemistry (including analytical and organic), and in mathematics through calculus, although all of these are not absolutely essential. A strong course in general biochemistry accelerates the student's progress. Applicants are evaluated on the basis of undergraduate (and graduate) academic performance, Graduate Record Examination (GRE) scores, and letters of recommendation. Students are accepted on the basis of their achievement and potential. Prior research experience is strongly considered in the assessment of qualifications for admission.

Financial Aid

The curriculum seeks to fund predoctoral students each year. All applicants are considered for financial aid awards.

Doctor of Philosophy

The selection of graduate courses for the Ph.D. degree is influenced by the student's prior academic background. The academic courses that are considered appropriate for graduate training in toxicology include biochemistry, biostatistics, pathology, pharmacology, toxicology, and two elective courses in the specific areas of the doctoral research. In addition, each predoctoral student is expected to participate in other training activities (i.e., student-centered seminars and scientific meetings) while developing the doctoral dissertation project. Attendance and participation in the Curriculum in Toxicology seminar series is required during the entire training period.

A major requirement for the Ph.D. degree is a doctoral dissertation based on the development of the student's research project. Written and oral examinations are required in the fields of general toxicology and the student's research concentration.

Professors

Neil Alexis
Kim R. Brouwer
Rebecca Fry
Avram Gold
Ilona Jaspers
Beverly Koller
Leena A. Nylander-French
David Peden
Dale A. Ramsden
Scott H. Randell
Shehzad Z. Sheikh
Miroslav Styblo
Alexander Tropsha
Cyrus Vaziri
Paul B. Watkins
Bernard E. Weissman
Mark Zylka

Associate Professors

Erin Baker
Folami Ideraabdullah
Samir Kelada
Jeffrey M. Macdonald
Timothy P. Moran
Celia Shiau

Assistant Professors

Edward Bahnson
Leon Coleman Jr.
Elizabeth Corteselli
Klarissa Dawniette Jackson
Julia Rager
Meghan Rebuli
Imran Rizvi
Johanna Smeekens
Gregory Smith

Faculty Affiliates from Other Research Institutions

National Institute of Environmental Health Sciences

Kelly Ferguson
Stephen Ferguson
Michael B. Fessler
G. Jean Harry
Gregory S. Travlos
Carmen J. Williams

North Carolina Central University

Antonio Baines

U.S. Environmental Protection Agency

Brian Chorley
Hisham El-Masri
Aimen K. Farraj
M. Ian Gilmour
Mehdi A. Hazari
David Herr
Erin Hines
Urmila P. Kodavanti
John M. Rogers
James M. Samet
Haiyan Tong
Cavin Ward-Caviness

TOXC

Advanced Undergraduate and Graduate-level Courses

TOXC 423. Developmental Toxicology and Teratology. 3 Credits.
Emphasizes topics of current research interest relative to the genesis of environmentally caused and genetically based birth defects. One two-hour session per week (evening).

Rules & Requirements
Grading Status: Letter grade.
Same as: CBIO 423.

Graduate-level Courses

TOXC 701. Current Topics in Toxicology. 1 Credits.
In this course, we will read, discuss and present primary research articles, from various research groups, in order to interpret the true meaning of recent scientific findings in the field of toxicology. A general understanding of Biology, Chemistry and Human Health is required.

Rules & Requirements
Grading Status: Letter grade.

TOXC 702. Principles of Pharmacology and Physiology. 3 Credits.
Introduces students to the major areas of pharmacology and physiology and serves as a basis for more advanced courses. Three lecture hours a week.

Rules & Requirements
Requisites: Prerequisite, CHEM 430; permission of the instructor for students lacking the prerequisite.
Grading Status: Letter grade.
Same as: PHCO 702.

TOXC 707. Advanced Toxicology. 3 Credits.
Cellular and physiological basis of toxicity of environmental chemicals, with emphasis on inhalation toxicology, developmental toxicology, immunotoxicology, radiation toxicology, renal toxicology, and neurotoxicology. Three lecture hours per week.

Rules & Requirements
Requisites: Prerequisite, PHCO 702; permission of the instructor for students lacking the prerequisite.
Grading Status: Letter grade.
Same as: ENVR 707, PHCO 707.

TOXC 721. Toxicology Seminar II. 1 Credits.
Student-conducted presentations and discussions of recent advances in toxicology; emphasis on critical evaluation of published investigations and on organization and oral delivery of presentations. One hour per week.

Rules & Requirements
Grading Status: Letter grade.

TOXC 722. Toxicology Seminar III. 1 Credits.
Presentations by outside invited speakers, local faculty, advanced graduate students, and postdoctoral trainees. Topics will cover all areas of research in toxicology. One hour per week.

Rules & Requirements
Grading Status: Letter grade.
Same as: ENVR 722.

TOXC 735. Regulatory Toxicology-Interacting with regulatory agencies & approval for drug, device, and chemical. 3 Credits.
Regulatory agency fundamentals, regulatory process for drug, medical device, cosmetic and agrochemical products. Industry, regulatory agency representatives and consultants will be invited to speak directly about their regulatory policies, challenges, and expectations. Students will develop and present a regulatory submission package as part of a group project.

Rules & Requirements
Grading Status: Letter grade.
Same as: GRAD 735.

TOXC 749. Biochemical Toxicology. 3 Credits.
Required preparation, one course in biochemistry. Biochemical actions of toxicants and assessment of cellular damage by biochemical measurements. Three lecture hours per week.

Rules & Requirements
Requisites: Prerequisite, CHEM 430; permission of the instructor for students lacking the prerequisites.
Grading Status: Letter grade.
Same as: ENVR 749, BIOC 749.

TOXC 760. Toxicokinetics. 3 Credits.
A quantitative examination of the time course of absorption, distribution, metabolism, excretion, and biologic effects of agents of toxicologic interest. Three lecture hours per week.

Rules & Requirements
Grading Status: Letter grade.

TOXC 792. Seminar in Carcinogenesis. 2 Credits.
Permission of the instructor. Survey of classical and current literature on selected critical issues in carcinogenesis. Students discuss experimental methods and observations as well as theories and generalizations. Two seminar hours a week.

Rules & Requirements
Grading Status: Letter grade.
Same as: PATH 792.

TOXC 821. Scientific Writing. 1 Credits.
Doctoral candidacy in toxicology required. Workshops on scientific writing with special emphasis on fellowship applications and the doctoral research proposal. Students work on several written assignments and are expected to complete a draft of their proposals by the end of the semester.

Rules & Requirements
Grading Status: Letter grade.

TOXC 901. Research in Toxicology. 1-6 Credits.
May be repeated. Students register in this course as they formulate their doctoral research projects.

Rules & Requirements
Repeat Rules: May be repeated for credit.
Grading Status: Letter grade.

TOXC 992. Master's (Non-Thesis). 3 Credits.
Students acquire practical experience through an internship program at a non-academic institution where knowledge in toxicology is applied toward its mission. They subsequently prepare a capstone monograph (thesis substitute) that reports on their individualized experience, a requirement for the MPS in Toxicology.

Rules & Requirements
Requisites: Prerequisites, TOXC 442 and TOXC 707.
Repeat Rules: May be repeated for credit.
Grading Status: Letter grade.

TOXC 993. Master's Research and Thesis. 3 Credits.
May be repeated. Hours and credits to be arranged.

Rules & Requirements
Repeat Rules: May be repeated for credit.

TOXC 994. Doctoral Research and Dissertation. 3 Credits.
May be repeated. Hours and credits to be arranged.

Rules & Requirements
Repeat Rules: May be repeated for credit.

Contact Information

Curriculum in Toxicology
Visit Program Website (http://www.med.unc.edu/toxicology/)

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