

Graduate School of Biomedical Sciences

Thomas A. Pressley, Ph.D., Interim Dean

About the School

Development of a strong program of graduate education in the basic biomedical and related health sciences is one of the responsibilities and goals of the Texas Tech University Health Sciences Center. Present-day medicine cannot exist outside the academic framework and intellectual discipline which the biological, chemical, and medical sciences provide. Graduate training in these areas, an integral component of the overall program of the Health Sciences Center, is provided by the Graduate School of Biomedical Sciences (GSBS).

Opportunities for study and research lead to the following degrees:

Biotechnology Program

Master of Science in Biotechnology

Biomedical Sciences Program

Master of Science in Biomedical Sciences

Concentration Areas:

- Cell and Molecular Biology
- Medical Microbiology
- Pharmacology and Neuroscience
- Physiology
- Pre-Medical Sciences

Doctor of Philosophy in Biomedical Sciences

Concentration Areas:

- Biochemistry and Molecular Genetics
- Cell and Molecular Biology
- Medical Microbiology
- Pharmacology and Neuroscience
- Physiology

Pharmaceutical Sciences Program

Master of Science in Pharmaceutical Sciences

Doctor of Philosophy in Pharmaceutical Sciences

Courses and descriptions of the various programs and concentrations can be found in this course listing.

Students interested in pursuing a career in academic medicine as a physician-scientist may apply to the M.D.–Ph.D. program. The M.D.–Ph.D. program permits a student to complete the requirements of the Ph.D. degree in one of the approved Biomedical Sciences Concentrations. M.D.–Ph.D. students may receive a stipend, tuition scholarships for both the medical and graduate portions of the program, and

Tech University Graduate School. Policy information is avail-

5303. Introduction to Clinical Research (3:2:3). Students will be involved in all aspects of preparation for and execution of prospective human studies and retrospective chart reviews. The didactic training deals with the regulations and ethical considerations related to research in humans, the process of obtaining approval for a study and the requirements associated with conducting a study. Prerequisites include

preferably at least one laboratory rotation.

5310. Introduction to Statistical Methods in the Biomedical Sciences (3:3:0). Provide students explanation and application of classical test theory involving univariate statistics. The course will include discussion about classical test theory (p values, scales of measurement, assumptions of analyses, etc.) and application of this theory for various statistical analyses, such as t tests, anova, correlation. There will be a small introduction to non-parametric analyses.

5350. Laboratory Methods in Biomedical Sciences (3:3:0).

principles and techniques in basic science research. Following a lecture and/or a laboratory demonstration, students

written report on the results.

5372. Biomedical Sciences Core II (3:3:0). The structure/function relationships that underlie basic cellular processes, including translation, protein trafficking, cytoskeletal organization and motility, cell adhesion, and cell division.

5373. Biomedical Sciences Core III (3:3:0). Teaches essential

5399. Topics in Biomedical Sciences (3:0:0).

in biomedical sciences or related research not normally included in other courses. May be repeated for credit.

5471. Biomedical Sciences Core I (4:4:0). This course offers a broad coverage of biochemistry with an emphasis on structure and function of macromolecules, biosynthesis of small molecule precursors of macromolecules, and the pathways of intermediary metabolism.
year students.

Neuroscience (GIDN)

5910. Integrated Neurosciences (9:8:1). This cooperative, interdepartmental effort offers a detailed study of the

structure and function from the subcellular through the behavioral level.

Health Communications (GIHC)

5319. Seminar in Current Topics of Information Sciences (3:3:0). Prerequisite: Must be enrolled or accepted in a graduate program. Course varies each semester emphasizing information science topics and includes searching

Preventive Medicine (GIPM)

6303.

and prepare the student to read, discuss, and understand



a student may wish to do dissertation research or (2) after a student is well established in his or her dissertation research, additional rotations can be done to gain expertise in techniques applicable to the student's research but not available in the faculty advisor's laboratory. Repeatable if different methods are covered for each registration.

5113, 5213, 5313. Selected Topics in Cell and Developmental Biology (1:1:0, 2:2:0, 3:3:0). Topics vary from semester

Recent offerings have included oncogenes and molecular biology of hormone action. May be repeated provided that different topics are covered for each registration.

5121. Surgical Gross Anatomy (1:1:0). This block will provide an introduction and overview to surgical approaches to different regions of the human body from a clinical perspective. Students will observe and assist surgeons with surgical dissections of cadavers. The experience in surgical anatomy will provide students with a relevant correlation of anatomy to applied surgical procedures.

5231. Advanced Training in Histology II (2:0:2). Students will participate in the histology laboratories in the Structure

School of Medicine curriculum, attend all histology lectures, and attend all pre-laboratory meetings in preparation for the laboratory sessions. The students will also assist in preparing the practical exams. Prerequisites include successful

Sciences.

5331. Advanced Training in Histology (3:0:3). Students will participate in the histology laboratories as teaching assistants and attend all pre-laboratory meetings in preparation

for credit. 0 0 464.27425693.337313 T031 Consentp 0 0 464.27425693.337313 T63 .of the developmentpof the immune system,2 Depimmunityp 0 0

5350. against microbes and tumors, and diseases caused by inappropriate immune responses.



drug absorption, distribution, and elimination, with particular emphasis on application to design of dosage regimens.

- 5330. Pharmacokinetics (3:3:0).** A quantitative treatment at the graduate level of the dynamics of drug disposition in the body and the rational design of drug dosage regimens.
- 5335. Physiology-based Pharmacology Part 1. (3:3:0).**

macology & Neuroscience faculty. Weekly seminars are designed to provide training in research data presentation and analysis or critical evaluation and presentation of a manuscript in press. A required course for pharmacology and neuroscience graduate students, it is taken during the fall and spring semesters. The course is designed such that students must interact by participating in the questions and answer component of all seminars as well as during lunch with invited speakers. Grades are determined by faculty evaluation of seminar presentation, and by participation during seminars.

8000-8010. Doctoral Dissertation (V1-12).

5904. Systems Physiology (9:4:0). This course provides the student with a basic understanding of the organ systems of the human body. Their functions, regulation and interactions are emphasized.

6000-6010.

Physiology (GPHY)

Luis Reuss, M.D., Chairperson for the School of Medicine
Department of Cell Physiology and Molecular Biophysics
Raul Martinez-Zaguilan, Ph.D., and Roger Sutton, Ph.D.,
Graduate Advisors

Primary Faculty: Altenberg, Artigas, Cuello, Fowler, Guan,
Jansen, Lutherer, Martinez-Zaguilan, Perez-Zoghbi,
Pressley, Reuss, Sutton

Associate Faculty: Blanton, Heavner, Jumper, Laski, Prien,
E. Reuss, Terreros

About the Concentration

The concentration has a research interest focused on the structural biology of membrane proteins ranging from their structure to their function in health and disease, and utilizes both cellular and molecular approaches to study these areas. The research involves studying ion transport and the role of ligand- and electric-gated ion channels in normal physiology and pathophysiological conditions. The concentration is also involved in structural modeling of transporters that include the sodium-potassium pump and proton pumps, and structure-function studies of voltage-gated potassium channels. State-of-the-art approaches and techniques such as X-ray crystallography, patch clamp electrophysiology, and confocal microscopy are used to carry out the various research endeavors. The School of Medicine Department of Cell Physiology and Molecular Biophysics has established the Center for Membrane Protein Research and Center for Cardiovascular Disease and Stroke to enhance research efforts.

GPHY Courses:

5302. Human Physiology (3:2:0). This introductory graduate course provides the student with a basic understanding of the organ systems of the human body, including the functions, regulation and interactions. No prerequisites are required.

5350. Laboratory Methods in Physiology (3:0:3). Fundamental principles of physiology are explored through a series of hands-on laboratory exercises. Numerous techniques

5360. Laboratory Rotations as an Introduction to Modern Physiological Research (3:3:0). Prerequisite: Consent

an ongoing research project or conducting an independent research effort.

5400. General Physiology (4:4:0). An introduction to the physical properties that underlie physiology at the molecular and cellular level. Lecture material will be supplemented by readings from the textbook, as well as discussion of seminar papers. There are no prerequisites; completion of an undergraduate course in physical chemistry or thermodynamics is recommended.