

# PHYSIOLOGY

Office: 5374 Scott Hall; 313-577-1520

Chairperson: Jian-Ping Jin

<http://physiology.med.wayne.edu> (<http://physiology.med.wayne.edu/>)

Physiologists study the functions of living organisms, tissues and/or isolated cells. The emphasis in physiology is on the functional interrelationships between healthy, as opposed to diseased tissues, cells and sub-cellular components. Increasingly, the discipline focuses on the properties of single cells and their sub-cellular components with the availability and application of molecular biology techniques. However, whether at the level of the single cell or the whole organism, the aim of the physiologist is to understand complex functional interrelationships between body tissues.

The Department of Physiology offers programs leading to the Master of Science and Doctor of Philosophy degrees. The degree of Master of Science is frequently the first step toward a Ph.D. Students planning a career in teaching or research in physiology are advised to complete the requirements for the Doctor of Philosophy degree. A Reproductive Sciences Concentration is an option in the Doctor of Philosophy program. It incorporates the teaching, research and physical resources of both the Physiology and the Obstetrics and Gynecology Departments, offering interdisciplinary doctoral training in the reproductive sciences with the degree earned through the Department of Physiology.

CALA, STEVEN E.: Ph.D., Indiana School of Medicine; M.A., Texas A & M University; B.S., Purdue University; Associate Professor Emeritus

CHEN, XUEQUN: Ph.D., University of Michigan; M.S., B.S., Nankai University; Associate Professor

CHUNG, CHARLES S.: Ph.D., B.S., Washington University; Assistant Professor

DEGRACIA, DONALD J.: Ph.D., Wayne State University; B.S., Michigan Technological University; Professor

DUNBAR, JOSEPH C.: Ph.D., Wayne State University; M.S., Texas Southern University; B.S., Alcorn College; Professor

HONG, FELIX T.: Ph.D., Rockefeller University; M.D., National Taiwan University School of Medicine; Professor Emeritus

JENA, BHANU P.: Ph.D., Iowa State University; B.S., Utkal University; University Professor

JIN, JIAN-PING: M.D., Fourth Military Medical University, Xi'an, China; Ph.D., University of Iowa; Professor and William T. Traitel Endowed Chair

LASLEY, ROBERT D.: Ph.D., State University of New York; M.S., University of Virginia; B.A., University of North Carolina-Chapel Hill; Professor and Graduate Officer

LAWSON, DAVID M.: Ph.D., Cornell University; M.S. and B.S., Virginia Polytechnic Institution; Professor Emeritus

MATEIKA, JASON H.: Ph.D., M.S., University of Toronto; B.S. University of Guelph; Professor

MUELLER, PATRICK: Ph.D., St. Louis University; Associate Professor

O'LEARY, DONAL S.: Ph.D., University of Texas; B.A., Miami University; Professor

PRZYKLENK, KARIN: Ph.D., University of Western Ontario; B.S., University of Saskatchewan; Professor

RAM, JEFFREY L.: Ph.D., California Institute of Technology; B.A., University of Pennsylvania; Professor

RILLEMA, JAMES A.: Ph.D., M.S., Michigan State University; B.S., Calvin College; Professor

SHISHEVA, ASSIA C.: Ph.D., B.S., Sofia University; Professor

SKAFAR, DEBRA F.: Ph.D., Vanderbilt University; B.S., Ohio University; Associate Professor

SUN, FEI: M.D., Nanjing Medical University; Ph.D., University of Alabama; Assistant Professor

WALZ, DANIEL A.: Ph.D., Wayne State University; M.S., St. Louis University; B.S., St. John Fisher College; Professor

WESSELLS, ROBERT J.: Ph.D., The Ohio State University; B.S., Miami University; Assistant Professor

YINGST, DOUGLAS ROY: Ph.D., University of Southern California, Los Angeles; B.A., McPherson College; Associate Professor Emeritus

ZHANG, ZHIBING: M.D., Ph.D., Tongji Medical School, Huazhong University of Science & Technology; Associate Professor

- Physiology (M.S.) (<http://bulletins.wayne.edu/graduate/school-medicine/programs/physiology/physiology-ms/>)
- Physiology (Ph.D.) (<http://bulletins.wayne.edu/graduate/school-medicine/programs/physiology/physiology-phd/>)

## PSL 5010 Individual Research I Cr. 2-5

Direct participation in laboratory research in the physiological sciences under the supervision of a departmental faculty advisor. Introduction to experimental protocol and current related scientific literature. Offered Every Term.

**Restriction(s):** Enrollment limited to students with a class of Junior or Senior.

**Repeatable for 5 Credits**

## PSL 5680 Basic Endocrinology Cr. 3

Basic description of the human endocrine system, the endocrine control of several physiologic processes (growth, development, metabolism and reproduction), and a description of common endocrine disorders. Offered Fall.

**Prerequisites:** BIO 3200 with a minimum grade of C- or BIO 4120 with a minimum grade of C-

**Equivalent:** BIO 5680

## PSL 6010 Advanced Exercise Physiology Cr. 3

Metabolic, neuromuscular, cardiovascular, and respiratory adjustments to acute and chronic exercise in health and disease, including body composition and weight control, nutritional considerations, and the effects of different environments on exercise performance. Offered Fall.

**Equivalent:** PT 6310

## PSL 6300 Biotechnology: Techniques and Applications Cr. 2

Various biotechnical methodologies currently used in research and industry; application of these methodologies in scientific inquiries. Offered Fall.

## PSL 6310 Biotechnology: Techniques and Applications Lab Cr. 2-5

Students choose one of the biotechnology techniques discussed in PSL 6300 and spend the semester in an active research laboratory learning the practice of the technique through hands-on experience. Offered Winter.

**Prerequisites:** PSL 6300 with a minimum grade of C (may be taken concurrently)

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7010 Basic Graduate Physiology Lecture I Cr. 4**

Introduction to basic human physiology. Offered Fall.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7011 Basic Integrative Graduate Physiology I Cr. 4**

Offered Fall.

**Restriction(s):** Enrollment is limited to students with a major in Physiology.

**PSL 7020 Basic Graduate Physiology Laboratory I Cr. 2**

Introductory laboratory exercises to measure cell and membrane function; neuronal activity; electrophysiology; and hormonal actions. Offered Fall.

**Restriction(s):** Enrollment is limited to students with a major in Physiology.

**Course Material Fees:** \$50

**PSL 7030 Basic Graduate Physiology Lecture II Cr. 4**

Functional mechanisms of the human body. Offered Winter.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7031 Basic Integrative Graduate Physiology II Cr. 4**

Offered Winter.

**Restriction(s):** Enrollment is limited to students with a major in Physiology.

**PSL 7040 Basic Graduate Physiology Laboratory II Cr. 2**

Experimental physiology of organ systems. Offered Winter.

**Restriction(s):** Enrollment is limited to students with a major in Physiology.

**Course Material Fees:** \$50

**PSL 7060 Current Literature in Physiology Cr. 1**

Students are required to present published papers at least once each semester, and must attend all class meetings. Offered Fall, Winter.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7215 Nanobioscience Cr. 3**

Introduction to interdisciplinary research field of nanobioscience, at the interphase of biology, chemistry, and physics; specific properties of nanoscale objects. Offered Fall.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7400 Advanced Respiratory Physiology Cr. 2**

Advanced topics in respiratory physiology; guidance in critical reading and discussion of the literature. Offered Every Other Winter.

**Prerequisite:** PSL 7030 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate or Medical level students.

**PSL 7420 Organizing and Communicating Hypothesis Testing in Physiology Cr. 2**

Understanding the development of physiologically relevant hypotheses, testing hypotheses, and both written and oral presentation of physiologic studies/proposals. Students will develop substantial components of a training fellowship proposal. Offered Winter.

**Prerequisite:** PSL 7011 with a minimum grade of C and PSL 7031 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7550 Advanced Renal Physiology Cr. 2**

A detailed study of the physiological mechanisms promoting homeostasis of the body fluid volumes and ionic composition in the mammal. Offered Every Other Fall.

**Prerequisites:** PSL 7030 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7600 Advanced Cardiovascular Physiology Cr. 2**

Basic principles of heart dynamics and control techniques in measurement of cardiac function. Offered Fall.

**Prerequisites:** PSL 7030 with a minimum grade of C

**Restriction(s):** Enrollment is limited to students with a major in Physiology; enrollment is limited to Graduate level students; enrollment limited to students in a Doctor of Philosophy or Master of Science degrees.

**PSL 7610 Biological Basis of Sleep Cr. 2**

Basic physiology of human sleep; role of sleep in cognitive and physical performance; sleep disorders (such as sleep apnea, narcolepsy). Offered Every Other Winter.

**Prerequisites:** PSL 7030 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7640 Cell and Molecular Physiology Cr. 3**

Lecture and discussion. Research in atomic force microscopy, molecular structure, exocytosis, insulin signal transduction, glucose transport, estrogen receptors, ion channels, Na, K-ATPase, Na/Ca exchanger, hormonal regulation of ion transport. Offered Every Other Winter.

**Prerequisites:** PSL 7010 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7660 Advanced Neurophysiology Cr. 3**

Current topics in cognitive neurosciences ranging from cellular and molecular aspects to systems, network dynamics, and cognitive functions as well as neurological diseases. Offered Every Other Fall.

**Prerequisites:** PSL 7010 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7680 Endocrinology Cr. 4**

A detailed emphasis on current research. Student participation encouraged; each student required to present a one hour lecture. Offered Winter.

**Prerequisites:** PSL 7010 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7690 Principles and Techniques of Reproductive Biology Cr. 3**

Principles and techniques in reproduction including endocrinology, gametogenesis, fertilization, implantation, embryogenesis, stem cell determination, pregnancy and parturition. Offered Every Other Fall.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7700 Embryonic Stem Cell Biology Cr. 3**

Methods involved in production and utilization of embryonic stem cells. Lectures supplemented with text, reviews, and recent papers. Offered Every Other Winter.

**Prerequisite:** PSL 7690

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7710 Disease States and Reproductive Processes Cr. 1**

Diseases and areas in reproductive medicine where additional research is required. Students accompany clinicians during rounds in hospital and out-patient clinics. Offered Spring/Summer.

**Restriction(s):** Enrollment is limited to students with a major in Medicine; enrollment is limited to Graduate level students.

**PSL 7730 Reproductive Sciences: Teratology Cr. 3**

Principles of the science of birth defects; focus on impact of environmental poisons, medicines, and drugs of abuse on developing germ cells, embryos and fetuses. Roles of pharmacological/toxicological, physiological (maternal, placental, and fetal), genetic and nutritional factors in the teratogenic response are examined. Texts and current readings. Offered Every Other Fall.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7775 Current Research Topics in Reproductive Science Cr. 1**

Lectures covering current topics in reproductive biology, health, and medicine. Offered Fall.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7825 Membrane Physiology: Protein Transport, Lipid Metabolism and Human Diseases Cr. 2**

Covers the basic concepts of membrane transport in the mammalian secretory pathway with an emphasis on the dysregulation of key transport steps and the defective mutations of key regulators which lead to human diseases (e.g. neurodegenerative diseases, diabetes and coronary heart diseases). Offered Winter.

**Prerequisite:** IBS 7015 with a minimum grade of C

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7880 Special Problems in Physiology Cr. 1-8**

Topics individually arranged with faculty. Offered Every Term.

**Restriction(s):** Enrollment is limited to Graduate level students.

**Repeatable for 8 Credits**

**PSL 7890 Seminar Cr. 1**

For graduate students in physiology. Participation in weekly departmental seminars. Offered Fall, Winter.

**Restriction(s):** Enrollment is limited to Graduate level students.

**Repeatable for 6 Credits**

**PSL 7910 Molecular Male Reproduction and Chromatin Cr. 1**

Students write topic-specific essays. Offered Fall.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 7996 Arranged Research Cr. 1-15**

Graduate level experiences in research techniques. Special research topics in specified areas arranged with individual faculty member. Offered Every Term.

**Restriction(s):** Enrollment is limited to Graduate level students.

**Repeatable for 15 Credits**

**PSL 8999 Master's Thesis Research and Direction Cr. 1-8**

Offered Every Term.

**Restriction(s):** Enrollment limited to students with a class of Candidate Masters; enrollment is limited to Graduate level students.

**Repeatable for 8 Credits**

**PSL 9990 Pre-Doctoral Candidacy Research Cr. 1-8**

Research in preparation for doctoral dissertation. Offered Every Term.

**Restriction(s):** Enrollment is limited to Graduate level students.

**Repeatable for 12 Credits**

**PSL 9991 Doctoral Candidate Status I: Dissertation Research and Direction Cr. 7.5**

Offered Every Term.

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 9992 Doctoral Candidate Status II: Dissertation Research and Direction Cr. 7.5**

Offered Every Term.

**Prerequisite:** PSL 9991 with a minimum grade of S

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 9993 Doctoral Candidate Status III: Dissertation Research and Direction Cr. 7.5**

Offered Every Term.

**Prerequisite:** PSL 9992 with a minimum grade of S

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 9994 Doctoral Candidate Status IV: Dissertation Research and Direction Cr. 7.5**

Offered Every Term.

**Prerequisite:** PSL 9993 with a minimum grade of S

**Restriction(s):** Enrollment is limited to Graduate level students.

**PSL 9995 Candidate Maintenance Status: Doctoral Dissertation Research and Direction Cr. 0**

Offered Every Term.

**Restriction(s):** Enrollment is limited to Graduate level students.

**Course Material Fees:** \$370.26

**Repeatable for 0 Credits**