Anatomy and Neurobiology

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Ivan Soltesz, Department Chair
Martin A. Smith, Department Vice Chair
David C. Lyon, Departmental Graduate Advisor

Research programs in the Department of Anatomy and Neurobiology in the School of Medicine focus on the neurosciences. Faculty interests range across all areas of basic and clinical research including cellular and molecular neurobiology, mechanisms of development, ion channel physiology, experimental neuroanatomy, structure and function of sensory and motor systems, response to injury and regeneration. The Department maintains facilities for electron microscopy, laser confocal microscopy, and computer-based imaging and informatics. Students performing graduate work in the Department are encouraged to become proficient in multiple areas of study using interdisciplinary techniques.

The Department offers graduate training under the auspices of the School of Medicine in conjunction with the Interdepartmental Neuroscience Program (INP). Students are eligible to enter the Department program after meeting the specific requirements of the INP gateway curriculum or by direct application to the Department. The Department program leads to the M.S. or Ph.D. degree in Biomedical Sciences, awarded after successful completion of all requirements.

In concert with other departments, a combined neuroscience core curriculum has been developed which includes offerings in systems neurobiology, neurophysiology, and cellular, molecular, and developmental neurobiology that may be taken as complete or partial fulfillment of the requirements of the INP. Students admitted into the INP who subsequently select a research advisor in the Department begin following the departmental requirements for the Ph.D. at the beginning of their second year. Students may take additional elective courses at their own option, but are strongly encouraged to attend departmental seminars and participate in the Journal Club and an annual “Grad Day” symposium. The research topic for a student’s dissertation is chosen by the student in consultation with the research advisor. Students are expected to advance to candidacy by the end of the third year by presenting and defending a proposal for their research dissertation. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years.

Faculty

Aileen J. Anderson: Interactions of transplanted stem cells within the injured niche; role of inflammatory mechanisms in degeneration and regeneration in the injured CNS

Tallie Z. Baram: Mechanisms and consequences of epilepsy and stress; learning/memory, epigenetics

Anne L. Calof: Stem cells in neural development, regeneration, and human genetic disease

Steven C. Cramer: Mapping and treating neurorecovery in humans

Brian Cummings: Human neural stem cells, regeneration and repair, and neurotrauma (spinal cord injury and traumatic brain injury)

James H. Fallon (Emeritus): Human and molecular brain imaging, growth factors and adult stem cells in injured brain

Mark Fisher: Mechanisms of stroke

Lisa Flanagan: Neural stem cell fate potential and transplantation for neural repair

Christine M. Gall: Neurotrophic factors, integrins, and synaptic plasticity

Roland A. Giolli (Emeritus): Experimental neuroanatomy; visual system

Alan L. Goldin: Ion channels and CNS disease

Ranjan Gupta: Peripheral nerve injury

Leif Havton: Spinal cord injury and repair

Hans S. Keirstead: Axon and myelin regeneration following spinal cord injury

Herbert P. Killackey: Developmental neuroanatomy; somatosensory system

Leonard M. Kitzes (Emeritus): Auditory system physiology and development

Frances M. Leslie: Effects of drugs of abuse on central nervous system development

Gary Lynch: Cytoskeletal remodeling; synaptic plasticity, and learning

David C. Lyon: Anatomy and physiology of visual cortex; animal models of autism

Diane K. O’Dowd: Regulation of neuronal excitability; development of functional synaptic connections

Daniele Piomelli: Function of endogenous cannabinoids and other lipid derived messengers

David Reinkensmeyer: Motor control and learning; robot-assisted movement rehabilitation after neurologic injury

Charles E. Ribak (Emeritus): Changes in neural circuitry in the epileptic brain

Richard T. Robertson: Developmental neurobiology

Justin T. Schafer: Comparative biomechanics, functional morphology, and kinesiology

Steven S. Schreiber: Mechanisms of neuronal degeneration in CNS after injury and therapeutic applications

Martin A. Smith: Mechanisms of neuronal excitability and synaptic plasticity

Ana Solodkin: Brain networks associated with neurological illnesses

Ivan Soltesz: Modulation of CNS inhibition

Oswald Steward: Mechanisms of recovery from injury

John H. Weiss: Mechanisms of neural degeneration

Jamie Wikenheiser: Medical education, pediatric cardiology, pediatric and adult urology
Courses

ANATOMY 200. Research in Anatomy. 2-12 Units.
Individual research supervised by a particular faculty member.

Repeatability: May be repeated for credit unlimited times.

ANATOMY 200R. Research in Anatomy and Neurobiology for First-Year Students. 2-12 Units.
Independent research within the laboratories of graduate training faculty in the Department of Anatomy and Neurobiology for first-year Ph.D. students.

Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be taken for credit 3 times.

ANATOMY 201. Human Gross Anatomy. 8 Units.
Study and dissection of the human body, including muscular, skeletal, nervous, and cardiovascular systems. Emphasis on both normal and abnormal structure and function.

Restriction: Graduate students only.

ANATOMY 202B. Human Neuroscience. 4 Units.
Study of the human nervous system at the systems level including the physiology and anatomy of sensory, motor, and integrative functions.

Prerequisite: ANATOMY 202A.

ANATOMY 203A. Human Microscopic Anatomy. 3 Units.
Lecture and laboratory course on human microscopic anatomy. Emphasis is on functional implications of structure of cells and tissues.

Restriction: Graduate students only.

ANATOMY 203B. Human Microscopic Anatomy. 3 Units.
Lecture and laboratory course on human microscopic anatomy. Emphasis is on functional implications of structure of cells and tissues.

Prerequisite: ANATOMY 203A.

Restriction: Graduate students only.

ANATOMY 206. Tutorial in Anatomy. 3 Units.
Series of tutorials on advanced topics in anatomy.

Repeatability: May be repeated for credit unlimited times.

ANATOMY 210A. Systems Neuroscience. 5 Units.
Study of the mammalian nervous system at the systems level. Anatomy and physiology of sensory, motor, and integrative functions.

Prerequisite: NEURBIO 208A.

Repeatability: May be taken for credit 2 times.

Same as NEURBIO 208B.

Restriction: Neurobiology and Behavior graduate students only.

ANATOMY 215. Epilepsy as a Window to Mechanisms of Neuronal Plasticity. 4 Units.
Understanding the mechanisms of brain disorders provides novel insights into the normal function of neurons and circuits. Discusses approaches to studying mechanisms of brain function ranging from imaging, the use of models and others to study epilepsy.

Grading Option: Satisfactory/unsatisfactory only.

ANATOMY 227A. Current Topics in Neuroscience. 1-4 Units.
Focuses on critical reading, presentation, and discussion of current literature in neuroscience research.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.

ANATOMY 227B. Current Topics in Neuroscience. 1-4 Units.
Focuses on critical reading, presentation, and discussion of current literature in neuroscience research.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.

ANATOMY 227C. Current Topics in Neuroscience. 1-4 Units.
Focuses on critical reading, presentation, and discussion of current literature in neuroscience research.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.

ANATOMY 230. Topics in Stem Cells. 2-4 Units.
One-hour seminar presentation by participating faculty or guest lecturer and open to the science community, followed by one-hour student discussion of the lecture topic or related topic. Students are responsible for presentations and readings for the course.

ANATOMY 230A. Molecular, Cellular, & Developmental Neurobiology. 4 Units.
Molecular aspects of the structure and function of neurons and glia including neurotransmission, synaptic modulation, and channels. Neural development at the cellular and molecular level including neurogenesis, pattern formation, trophic factors, axonal growth, and synaptic rearrangement.

Restriction: Graduate students only.
ANATOMY 292A. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

ANATOMY 292B. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

ANATOMY 292C. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.