Cell biology is one of the primary disciplines in medical research, influencing all areas of basic and clinical investigation. The future holds great opportunities in cell biology research due to inventories of the genes and proteins from which cells are built, new experimental techniques and various model organisms. Further discoveries about the cell biology of human genes will continue to translate into therapeutics. Also on the horizon is a better understanding of how proteins and sets of proteins (e.g., macromolecular complexes) are assembled and integrated to produce function.

The Department of Cell Biology and Physiology is ranked among the top 10 cell biology departments in the country, and the research carried out by its faculty covers a broad range of fields within cellular physiology and molecular cell biology. A unifying theme is the study of fundamental processes and their regulation. These cellular processes include genome maintenance, apoptosis, cell cycle control, dynamic cell motility, angiogenesis, signal transduction and membrane trafficking, presynaptic processes, prion protein misfolding, RNA metabolism, and the structure and function of ion channels. The department's research activities provide a foundation for studies in cancer biology, immunobiology, developmental biology, neurobiology and vascular biology. Its faculty use model organisms as well as human stem cells and a variety of techniques such as deep-etch electron and confocal microscopy to carry out their research. Cellular imaging is a particular strength of the department.

The Department of Cell Biology and Physiology oversees the physiology contents within the Washington University School of Medicine’s Gateway curriculum, which is designed to provide first-year medical students with a foundation for their further study of clinical and applied physiology. The Molecular Cell Biology course for first-year graduate students conveys an understanding of fundamental cell biology research strategies and principles. In addition, advanced courses open to medical and graduate students provide for more detailed study of specific areas of cell biology, physiology and cellular biophysics.

Website: http://cellbiology.wustl.edu

Faculty

David W. Piston, PhD (http://cellbiology.wustl.edu/People/Faculty/piston_d/)
Department Head

Visit our website for more information about our faculty (http://www.cellbiology.wustl.edu/faculty/) and their appointments.

A

Ghazaleh Ashrafi, Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Assistant Professor of Genetics
Doctor of Philosophy, Harvard University, 2020

B

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Bachelor of Arts, Rice University, 1977
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C

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Doctor of Medicine, Stanford University, 1993

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Doctor of Philosophy, University of Minnesota, 2018

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Doctor of Philosophy, University of Wisconsin Madison, 2002

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Doctor of Philosophy, Bogomoletz Institute of Physiology of NAS of Ukraine, 2000

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Bachelor of Science, Michigan State University, 1973
Doctor of Philosophy, University of Utah, 1977

Grigory Maksaev, M.S., Ph.D.
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Doctor of Philosophy, Moscow Institute of Physics and Technology, 2002

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Bachelor of Science, University of Belgrade, 1999
Doctor of Philosophy, University of Tubingen, 2006

David William Piston, M.S., Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Head of the Department of Cell Biology and Physiology
Edward Mallinckrodt, Jr. Professorship in Cell Biology and Physiology
Bachelor of Science, Grinnell College, 1984
Champaign, 1985
Champaign, 1989

Helen Piwnica-Worms, Ph.D.
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Bachelor of Arts, Saint Olaf College, 1979
Doctor of Philosophy, Duke University, 1984

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Bachelor of Science, University of Belgrade, 1997
Doctor of Philosophy, University of Illinois Chicago (Duplicate of University of Illinois at Chicago), 2005

Paul Henry Schlesinger, Ph.D., M.D.
Associate Professor of Cell Biology and Physiology (primary appointment)
Champaign, 1966
Doctor of Medicine, University of Chicago, 1970
Doctor of Philosophy, University of Chicago, 1973

Philip Damien Stahl, Ph.D.
Edward Mallinckrodt Jr Professor Emeritus
Bachelor of Science, West Liberty State College, 1964
Doctor of Philosophy, West Virginia University, 1967

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Doctor of Philosophy, University of Missouri Columbia, 2010

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Champaign, 1995
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Shizhen Wang, Ph.D.

Adjunct Instructor in Cell Biology and Physiology
Doctor of Philosophy, Tsinghua University, China (Duplicate of Tsinghua University (###)), 2007

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Master of Arts, University of Texas Austin, 1970
Doctor of Philosophy, University of Texas Austin, 1974

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Bachelor of Science, University of Missouri in St Louis, 2013
Doctor of Philosophy, University of Wisconsin Madison, 2017

Zhongsheng You, M.S., Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Professor of Medicine
Bachelor of Science, Zhejiang University (National Che Kiang University) (###), 1994
Master of Science, Shanghai Institute of Biochemistry and Cell Biology, 1997
Doctor of Philosophy, University of California San Diego, 2002

Emily Zarbock, Ph.D.
Instructor in Cell Biology and Physiology (primary appointment)
Bachelor of Science, University of North Carolina at Chapel Hill, 2013
Doctor of Philosophy, University of Wisconsin, 2017

Research Electives

Cell Biology and Physiology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

Ghazaleh Ashrafi, PhD
510 McDonnell Sciences Building
Phone: 314-273-5518
Uncovering novel regulators of glycolytic and mitochondrial metabolism at the synapse and their role in the pathology of Alzheimer’s disease.

Kendall J. Blumer, PhD
506 McDonnell Sciences Building
Phone: 314-362-1668
Signaling mechanisms in cardiovascular and neurological disorders.
Understanding extracellular vesicle (EV)-mediated signaling during homeostatic and pathologic metabolic regulation.

Sergej Djuranovic, PhD
514 McDonnell Sciences Building
Phone: 314-362-9706
Molecular mechanisms of translational control; cellular processes regulated by changes in RNA metabolism.

Denis Goldfarb, PhD
406 McDonnell Sciences Building
Phone: 314-273-3669
Computational mass spectrometry, proteomics, and their applications in biology.

James E. Huettner, PhD
4900 South Building
Phone: 314-273-1852
Excitatory amino acid receptors and synaptic transmission in the central nervous system; neural differentiation of embryonic stem cells.

Silvia Jansen, PhD
4900 South Building
Phone: 314-273-1853
This lab’s focus is on elucidating the molecular mechanisms that regulate the architecture, dimensions and dynamics of actin filament networks and then tuning them to support essential cellular functions that range from cell migration and cytokinesis to neurogenesis.

David J. Kast, PhD
4900 South Building
Phone: 314-273-1852
The long-term goal of this lab’s research is to understand the fundamental cellular and molecular mechanisms that drive the biogenesis and dynamics of intracellular membrane compartments, including the endocytic vesicles, the endoplasmic reticulum, the Golgi apparatus and the mitochondria.

Vitaly Klyachko, PhD
501 McDonnell Sciences Building
Phone: 314-362-5517
Mechanisms and regulation of neurotransmitter release at individual synapses; functional roles of presynaptic processes in synaptic plasticity and information processing.

Polina Lishko, PhD
1127 Couch Biomedical Research Building
Phone: 314-362-6672
The role of bioactive lipid signaling and bioelectricity in the physiology of the inverted epithelia of the brain and retina. Physiology and pathophysiology of steroid signaling in reproduction, aging and neurodegeneration.

Michael Benjamin Major, PhD
406 McDonnell Sciences Building
Phone: 314-273-3669
The Major lab studies how perturbation of specific signal transduction pathways contributes to the initiation, progression and dissemination of cancer.

Colin G. Nichols, PhD
9611 BJC Institute of Health
Phone: 314-362-6630
Ion channel biology; multiple levels of analysis from the molecular basis of channel function to in vivo physiology and disease.

Slavica Pavlovic Djuranovic, PhD
416 McDonnell Sciences Building
Phone: 314-362-6675
Identifying new targets and possible therapies to treat malaria.

David W. Piston, PhD
4912 South Building
Phone: 314-362-9121
The intracellular and intercellular dynamics of cells within the islets of Langerhans play a key role in the regulation of blood glucose levels. The islets are made up of different cell types, but very little is known about the interplay between the different cell types and how this affects their secretion of various hormones. The islets’ a-cells secrete insulin in response to increased blood sugar and also in response to neurotransmitters and hormones. Glucagon also plays a key role in blood glucose homeostasis, and it is secreted by the islets’ a-cells. High glucose levels inhibit glucagon secretion from a-cells within the islets but not from dispersed a-cells, and the mechanism underlying this phenomenon has not been defined. We use quantitative live cell microscopy to measure single-cell parameters within intact islets held within microfluidic devices in order to uncover their cellular and molecular basis of channel function to in vivo physiology and disease.
Courses

The Department of Cell Biology and Physiology also offers courses through Arts & Sciences. For current courses, please visit the university’s online course listings (https://courses.wustl.edu/CourseInfo.aspx?sch=L&dept=L41&crslvl=5:9).

Visit the online course listings to view offerings for M75 CellBio (https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M75).