Department of Cell Biology and Physiology

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 (http://cellbiology.wustl.edu) 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

Kendall Jay Blumer, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Bachelor of Arts, Rice University, 1977
Doctor of Philosophy, Duke University, 1986

C

Chun-Kan Chen, M.S., Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Assistant Professor of Genetics
Doctor of Philosophy, Harvard University, 2020

Clair Lorraine Crewe, Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Assistant Professor of Medicine
Bachelor of Science, Oklahoma Christian University, 2009
Doctor of Philosophy, University of Oklahoma Health Sciences Center, 2015

Panyue Deng, M.S., Ph.D., M.D.
Associate Professor of Cell Biology and Physiology (primary appointment)
Doctor of Medicine, Hunan Medical University, 1995
Master of Science, University of Science, Malaysia, 2001
Doctor of Philosophy, University of Science, Malaysia, 2004

Lai Kuan Dionne, Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, University of Colorado Boulder, 2010

Sergej Djuranovic, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Universität Tubingen, 2006

Denis Goldfarb, Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Assistant Professor of Medicine
Bachelor of Science, Rensselaer Polytechnic Institute, 2010
Doctor of Philosophy, University of North Carolina at Chapel Hill, 2019
Subhadra C Gunawardana, M.S., Ph.D.
Associate Professor of Cell Biology and Physiology (primary appointment)
Master of Science, Iowa State University, 1995
Doctor of Philosophy, Cornell University, 2002

Phyllis I Hanson, Ph.D., M.D.
Adjunct Professor of Cell Biology and Physiology
Bachelor of Arts, Yale University, 1985
Doctor of Philosophy, Stanford University, 1993
Doctor of Medicine, Stanford University, 1993

John E Heuser, M.D.
Professor Emeritus of Cell Biology and Physiology
Bachelor of Science, Harvard University, 1964
Doctor of Medicine, Harvard University, 1969

James E Huettner, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Professor of Biomedical Engineering
Bachelor of Science, Indiana University Bloomington, 1980
Bachelor of Arts, Indiana University Bloomington, 1981
Doctor of Philosophy, Harvard University, 1987

Silvia Jansen, M.S., Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Master of Science, Katholieke Universiteit Leuven, 2003
Doctor of Philosophy, Katholieke Universiteit Leuven, 2007

David John Edward Kast, M.S., Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Bachelor of Science, University of Minnesota, 2000
Master of Science, University of Minnesota, 2004
Doctor of Philosophy, University of Minnesota, 2018

Vitaly A Klyachko, M.S., Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Professor of Biomedical Engineering
Professor of Neuroscience
Bachelor of Science, Moscow State University, 1997
Master of Science, Moscow State University, 1998
Doctor of Philosophy, University of Wisconsin Madison, 2002

Sun Joo Lee, M.S., Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Bachelor of Science, Handong Global University, 2000
Master of Science, Gwangju Institute of Science & Technology, 2002
Doctor of Philosophy, Washington University in St Louis, 2010

Polina V. Lishko, M.S., Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Master of Science, National Taras Shevchenko University of Kyiv, 1996
Doctor of Philosophy, Bogomoletz Institute of Physiology of NAS of Ukraine, 2000

Michael Benjamin Major, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Professor of Otolaryngology
Alan A. and Edith L. Wolff Professorship in Cell Biology and Physiology
Bachelor of Science, Michigan State University, 1997
Doctor of Philosophy, University of Utah, 2004

Grigory Maksaev, M.S., Ph.D.
Instructor in Cell Biology and Physiology (primary appointment)
Bachelor of Science, Moscow Inst of Physics & Techn, 1998
Doctor of Philosophy, Moscow Institute of Physics and Technology, 2002

Dario Maschi, Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Universidad de Buenos Aires, 2012

Robert Paul Mecham, Ph.D.
Professor Emeritus of Cell Biology and Physiology
Bachelor of Science, University of Utah, 1973
Doctor of Philosophy, Boston University, 1977

Robert W Mercer, Ph.D.
Professor Emeritus of Cell Biology and Physiology
Bachelor of Arts, San Jose State University, 1974
Doctor of Philosophy, Syracuse University, 1980

Colin G Nichols, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Carl F Cori Professor
Bachelor of Science, University of Leeds, 1982
Doctor of Philosophy, University of Leeds, 1985

David James Pagliarini, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Professor of Biochemistry and Molecular Biophysics
Professor of Genetics
Hugo F. and Ina C. Urbauer Professorship
Doctor of Philosophy, University of California San Diego, 2005

Slavica Pavlovic Djuranovic, Ph.D.
Assistant Professor of Cell Biology and Physiology (primary appointment)
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)
Adjunct Instructor in Cell Biology and Physiology
Doctor of Philosophy, Tsinghua University, China (Duplicate of Tsinghua University (####)), 2007

Robert S Wilkinson, M.A., Ph.D.
Professor Emeritus of Cell Biology and Physiology
Bachelor of Arts, Rice University, 1968
Master of Arts, University of Texas Austin, 1970
Doctor of Philosophy, University of Texas Austin, 1974

Y

Nathaniel Walter York, Ph.D.
Instructor in Cell Biology and Physiology (primary appointment)
Bachelor of Science, University of Missouri in St Louis, 2013
Doctor of Philosophy, University of Wisconsin Madison, 2018

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

Z

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.
**Clair Crewe, PhD**  
1127 Couch Biomedical Research Building  
Phone: 314-362-3240  
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**  
4929 South Building  
Phone: 314-362-6628  
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.

**David J. Pagliarini, PhD**  
1127 Couch Building  
Phone: 314-273-2330  
We are an interdisciplinary team of scientists driven to understand the biochemical underpinnings of mitochondrial dysfunction in human diseases. Together, we integrate large-scale methodologies with traditional biochemistry to investigate the modulation, adaptation, and basic metabolic function of mitochondria.

**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 patently
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).