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

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

D

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, 2010

Sergej Djuranovic, Ph.D.
Associate Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, University of Tubingen, 2007

G

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, 1980
Bachelor of Arts, Indiana University, 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, 2003
Doctor of Philosophy, Katholieke Universiteit, 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
Ju Inst. Of Sci & Tech, 2002
Doctor of Philosophy, Washington University in St Louis, 2010

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)
Master of Science, Moscow Inst of Physics & Techn, 1998
Doctor of Philosophy, Moscow State University, 2002

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

Robert Paul Mecham, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
Professor of Biomedical Engineering
Professor of Medicine
Professor of Pediatrics
Alumni Endowed Professor of Cell Biology and Physiology
Bachelor of Science, University of Utah, 1973
Doctor of Philosophy, Boston University, 1977

Robert W Mercer, Ph.D.
Professor of Cell Biology and Physiology (primary appointment)
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, 2020

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)
Head of the Department of Cell Biology and Physiology
Edward Mallinckrodt, Jr. Professorship in Cell Biology and Physiology
Bachelor of Science, Grinnell College, 1984
Master of Science, University of Illinois, 1985
Doctor of Philosophy, University of Illinois, 1989  
Helen Piwnica-Worms, Ph.D.  
Adjunct Professor of Cell Biology and Physiology  
Bachelor of Arts, Saint Olaf College, 1979  
Doctor of Philosophy, Duke University, 1984  

Jasmina Profirovic, Ph.D.  
Adjunct Assistant Professor of Cell Biology and Physiology  
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)  
Bachelor of Science, University of Illinois, 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

Sheila Stewart-Wigglesworth, Ph.D.  
Professor of Cell Biology and Physiology (primary appointment)  
Professor of Medicine  
Gerty Cori Professor of Cell Biology and Physiology  
Vice Chair - Cell Biology and Physiology  
Bachelor of Science, University of Minnesota, 1990  
Doctor of Philosophy, University of California Los Angeles, 1996

Amber Nicole Stratman, Ph.D.  
Assistant Professor of Cell Biology and Physiology (primary appointment)  
Assistant Professor of Developmental Biology  
Bachelor of Science, Truman State University, 2006  
Doctor of Philosophy, University of Missouri Columbia, 2010

Heather L. True, M.S., Ph.D.  
Professor of Cell Biology and Physiology (primary appointment)  
Associate Director of the Division of Biology and Biomedical Sciences  
David English Smith Distinguished Professorship in Medicine  
Bachelor of Science, University of Wisconsin Madison, 1992  
Master of Science, University of Illinois, 1995  
Doctor of Philosophy, University of Illinois, 1998

Shizhen Wang, Ph.D.  
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

Zhongsheng You, M.S., Ph.D.  
Associate Professor of Cell Biology and Physiology (primary appointment)  
Associate Professor of Medicine  
Bachelor of Science, Zhejiang Medical University, 1994  
Master of Science, Rappaport Faculty of Medicine, 1997  
Doctor of Philosophy, University of California San Diego, 2002

Peng Yuan, Ph.D.  
Associate Professor of Cell Biology and Physiology (primary appointment)  
Bachelor of Science, University of Science & Tech, 1997  
Doctor of Philosophy, University of Pennsylvania, 2008

Emily Zarbock, Ph.D.  
Instructor in Cell Biology and Physiology (primary appointment)  
Bachelor of Science, University of North Carolina, 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.

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.

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.

Robert P. Mecham, PhD
4606 Cancer Research Building
Phone: 314-362-2254
This lab strives to understand the complex process of extracellular matrix assembly and organization, including studying the intracellular pathways used to transport matrix components to the cell surface and identifying helper or accessory proteins that facilitate trafficking and matrix assembly. We also study cell-matrix interactions in development and cellular mechanisms associated with connective tissue remodeling in vascular disease and heritable diseases of the connective tissues.

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.

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 expose them to...
spatially heterogeneous levels of various stimuli. The resulting data are fit using mathematical models of islet functional dynamics, which we are continually modifying to better fit the observed islet physiology.

Sheila A. Stewart, PhD
7610 BJC Institute of Health
Phone: 314-362-7437

Delineation of the molecular mechanisms by which aged stromal cells contribute to tumorigenesis and the molecular mechanisms that ensure high-fidelity telomere replication and genomic stability.

Amber N. Stratman, PhD
416 McDonnell Sciences Building
Phone: 314-273-7928

Mechanisms regulating blood vessel formation, stabilization, and blood flow sensing during development and disease.

Heather L. True-Krob, PhD
413 McDonnell Sciences Building
Phone: 314-362-3934

Biological consequences of yeast prions, in both their capacity to function as novel epigenetic elements and their utility to serve as a tractable model for the analysis of protein misfolding and aggregation that occurs in several neurodegenerative disorders.

Zhongsheng You, PhD
514 McDonnell Sciences Building
Phone: 314-362-9893

Studies of the cellular responses to DNA damage and their cancer relevance, focusing on the functional interplays between the DNA damage checkpoint, DNA repair and chromatin structure.

Peng Yuan, PhD
9608 BJC Institute of Health
Phone: 314-747-3793

The focus of this lab is on the structure and function of ion channels and transporters, which play essential roles in human physiology and disease. How do channels and transporters recognize their specific substrate ions? How do they respond to various stimuli, including chemical ligand, temperature, membrane voltage and mechanical force? How do they interact with the lipid membrane where they reside? To answer these fundamental questions, we use multidisciplinary approaches, including X-ray crystallography, biochemistry, biophysics and electrophysiology. Dysfunction of these membrane proteins could lead to a variety of diseases, such as asthma, hypertension, cancer, heart failure, diabetes, chronic pain and many more. The long-term goal is to provide a detailed mechanistic understanding of ion channels and transporters, which will offer novel strategies for drug development and better treatment of diseases.

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).

M75 CellBio 900 Research Elective - Cell Biology and Physiology
Research opportunities may be available. If interested, please contact the Department of Cell Biology & Physiology.