

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 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
Department Head

Visit our website for more information about our 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

Dhaval Paresh Bhatt, M.S., Ph.D., Bachelor

Instructor in Cell Biology and Physiology (primary appointment)

Bachelor's degree, CM College of Pharmacy, 2005

Master of Science, Gujarat University, 2007

Doctor of Philosophy, University of North Dakota, 2013

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

Michael J. Bridge, Ph.D.

Instructor in Cell Biology and Physiology (primary appointment)

Bachelor of Science, Purdue University-Main Campus, 1995

Doctor of Philosophy, University of Utah, 2006

C

Chun-Kan Chen, M.S., Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)

Bachelor of Science, National Taiwan University, 2010

Master of Science, University of Southern California, 2013

Doctor of Philosophy, California Institute of Technology, 2017

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

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 Anschutz Medical Campus, 2010

Sergej Djuranovic, Ph.D.

Professor of Cell Biology and Physiology (primary appointment)

Doctor of Philosophy, Universität Tübingen, 2006

F

Ziao Fu, Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Columbia University, 2019

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

H

Phyllis I Hanson, Ph.D., M.D.

Voluntary Research Professor of Cell Biology and Physiology
Bachelor of Arts, Yale University, 1985
Doctor of Philosophy, Stanford University, 1993
Doctor of Medicine, Stanford University, 1993

Xueyan He, Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Nanjing University, 2015

John E Heuser, M.D.

Professor Emeritus of Cell Biology and Physiology
Bachelor of Science, Harvard University, 1964
Doctor of Medicine, Harvard University, 1969

J

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

K

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 Neuroscience
Professor of Biomedical Engineering
Bachelor of Science, Moscow State University, 1997
Master of Science, Moscow State University, 1998
Doctor of Philosophy, University of Wisconsin Madison, 2002

Kwang Woo Ko, M.S., Ph.D.

Instructor in Cell Biology/Physiology (primary appointment)
Bachelor of Science, Yonsei University, 2004
Master of Science, Gwangju Institute of Science & Technology, 2007
Doctor of Philosophy, University of Texas Austin, 2015

L

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

M

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 Institute of Physics and Technology, 2002

George Edward Marti

Assistant Professor of Cell Biology/Physiology (primary appointment)

Jackie Lee Martin, M.A., M.B.A., M.D.

Voluntary Clinical Professor of Anesthesiology
Bachelor of Arts, Howard University, 1976
Master of Arts, Meharry Medical College, 1980
Doctor of Medicine, Meharry Medical College, 1984
Master of Business Administration, John Hopkins University (Duplicate of Johns Hopkins University), 2010

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

Jongyun Myeong, Ph.D.

Instructor in Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Seoul National University, 2016

N

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

P

David James Pagliarini, Ph.D.

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

Giovanni Pauletti, M.S., Ph.D.

Voluntary Research Professor of Anesthesiology
Master of Science, Swiss Fed Inst Tech (EPFL), 1987
Doctor of Philosophy, Swiss Fed Inst Tech (EPFL), 1994

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 Tübingen, 2006

David William Piston, M.S., Ph.D.

Professor of Cell Biology and Physiology (primary appointment)
Edward Mallinckrodt, Jr. Professorship in Cell Biology and Physiology
Head of the Department of Cell Biology and Physiology
Co-Director for Center for Quantum Leaps (CQL)
Bachelor of Science, Grinnell College, 1984
Master of Science, University of Illinois at Urbana-Champaign, 1985
Doctor of Philosophy, University of Illinois at Urbana-Champaign, 1989

Helen Piwnicka-Worms, Ph.D.

Voluntary Research Professor of Cell Biology and Physiology
Bachelor of Arts, Saint Olaf College, 1979
Doctor of Philosophy, Duke University, 1984

Jasmina Profirovic, Ph.D.

Voluntary Research 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

R

Eduardo Rosa-Molinar, Ph.D.

Professor of Cell Biology and Physiology (primary appointment)
Professor of Neuroscience
Bachelor of Science, University of Alabama in Tuscaloosa, 1994

Doctor of Philosophy, University of Nebraska Medical Center, 1997

S

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)
Gerty Cori Professor of Cell Biology and Physiology
Vice Chair - Cell Biology and Physiology
Professor of Medicine
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 (Formerly Northeast Missouri State University), 2006
Doctor of Philosophy, University of Missouri Columbia, 2010

T

Heather L. True, M.S., Ph.D.

Professor of Cell Biology and Physiology (primary appointment)
David English Smith Professorship in Medicine
Associate Director of the Division of Biology and Biomedical Sciences
Bachelor of Science, University of Wisconsin Madison, 1992
Master of Science, University of Illinois at Urbana-Champaign, 1995
Doctor of Philosophy, University of Illinois at Urbana-Champaign, 1998

W

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

Peng Yuan, Ph.D.

Voluntary Research Associate Professor of Cell Biology and Physiology
Bachelor of Science, University of Science and Technology of China (#####), 1997

Doctor of Philosophy, University of Pennsylvania, 2008

David W. Piston, PhD

Department Head

Visit our website for more information about our faculty and their appointments.

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.

Chun-Kan Chen, PhD

4614 Cancer Research Building

Phone: 314-273-2787

The Chen lab utilizes multi-omic and high-throughput screening approaches to systematically investigate the regulation and function of circRNA in cells and to develop novel circRNA technologies for translational applications. Signaling mechanisms in cardiovascular and neurological disorders are also studied.

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

4612 Cancer Research Building

Phone: 314-362-9706

Molecular mechanisms of translational control; cellular processes regulated by changes in RNA metabolism.

Ziao Fu, PhD

9610 BJC Institute of Health

Phone: 314-273-4416

The Fu Lab specializes in understanding protein structures in their native environments using cryo-electron microscopy. Current projects explore their roles in membrane organization, trafficking, and responses to mechanical forces, with a particular emphasis on their involvement in pediatric kidney diseases and neurological disorders.

Denis Goldfarb, PhD

406 McDonnell Sciences Building

Phone: 314-273-3669

Computational mass spectrometry, proteomics, and their applications in biology.

Xue-Yan He, PhD

5516 Cancer Research Building

Phone: 314-362-5296

The He Lab is dedicated to advancing knowledge of the mechanisms responsible for colorectal tumor progression, with a specific focus on stress and its influence on the tumor microenvironment.

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' α -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' α -cells. High glucose levels inhibit glucagon secretion from α -cells within the islets but not from dispersed α -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.