

CURRICULUM VITAE

Kevin P. Campbell, Ph.D.

Personal Data

Place of Birth: Brooklyn, New York
 Citizenship: United States
 Marital Status: Married; Three Children

Home Address: 931 Evergreen Court
 Iowa City, IA 52245

Current Position

Investigator, Howard Hughes Medical Institute
 Chair, Department of Molecular Physiology and Biophysics
 Director, Wellstone Muscular Dystrophy Cooperative Research Center
 Roy J. Carver Biomedical Research Chair in Molecular Physiology and Biophysics
 Professor of Neurology

University of Iowa Roy J. and Lucille A. Carver College of Medicine

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 University of Iowa
 285 Newton Road
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Web Addresses: Lab: <http://www.physiology.uiowa.edu/campbell/>
 Department: <https://medicine.uiowa.edu/physiology/>
 HHMI: http://www.hhmi.org/research/investigators/campbell_bio.html
 Wellstone Muscular Dystrophy Center: <https://medicine.uiowa.edu/mdcrc/>

Education

| | | |
|------|-------|---|
| 1979 | Ph.D. | Biophysics, University of Rochester, School of Medicine & Dentistry, Rochester, New York |
| 1976 | M.S. | Biophysics, University of Rochester, School of Medicine & Dentistry, Rochester, New York |
| 1973 | B.S. | Physics, Manhattan College, Bronx, New York |

Post-Graduate Education

| | | |
|-----------|---------------------|--|
| 1978-1981 | Postdoctoral Fellow | Banting and Best Department of Medical Research University of Toronto Toronto, Ontario, Canada Advisor: Dr. David MacLennan |
|-----------|---------------------|--|

Academic Appointments

| | |
|--------------|--|
| 2005-present | Director, Wellstone Muscular Dystrophy Specialized Research Center |
| 2005-present | Chair & Department Executive Officer, Department of Molecular Physiology and Biophysics, University of Iowa |
| 2005-present | Professor, Department of Internal Medicine, University of Iowa |
| 2002-2005 | Interim Department Chair, Department of Physiology and Biophysics, University of Iowa |
| 1999-present | Carver Trust - Roy J. Carver Biomedical Research Chair in Physiology and Biophysics, University of Iowa |
| 1997-present | Professor, Department of Neurology, University of Iowa |
| 1989-present | Investigator, Howard Hughes Medical Institute |
| 1989-1999 | University of Iowa Foundation Distinguished Professor of Physiology and Biophysics |
| 1988-present | Professor, Department of Molecular Physiology and Biophysics, University of Iowa |
| 1985-1988 | Associate Professor, Department of Physiology and Biophysics, University of Iowa |
| 1981-1985 | Assistant Professor, Department of Physiology and Biophysics, University of Iowa |
| 1978-1981 | Postdoctoral Fellow with Dr. David MacLennan, Banting and Best Department of Medical Research, University of Toronto, Toronto, Ontario, Canada |
| 1976-1978 | Teaching Assistant, Undergraduate and Graduate Biochemistry, University of Rochester |
| 1973-1977 | Graduate Fellow, Biophysics Training Grant, Department of Radiation Biology and Biophysics, University of Rochester |

Honors and Awards

| | |
|------|---|
| 2020 | Tamio Yamakawa Award, The Japan Consortium for Glycobiology and Glycotechnology |
| 2020 | Herbert Tabor Research Award, American Society for Biochemistry and Molecular Biology |
| 2017 | Society for Glycobiology President's Innovator Award |
| 2017 | UI Senior Student Recognition List |
| 2016 | Lifetime Achievement Fellow, American Society for Cell Biology |
| 2016 | Greg Marzolf, Jr. Foundation Symposium Visiting Lecture Award |
| 2016 | UI Senior Student Recognition List |
| 2015 | Inaugural Fellow, American Physiological Society |
| 2014 | UI Senior Student Recognition List |
| 2010 | A. Ross McIntyre Award |
| 2009 | March of Dimes Prize in Developmental Biology |
| 2007 | Presidential Lecturer, The University of Iowa |
| 2006 | American Academy of Arts and Sciences |
| 2005 | Carver College of Medicine Distinguished Mentor Award |
| 2004 | National Academy of Sciences |
| 2004 | American Academy of Microbiology |
| 2004 | American Academy of Neurology Lecturer Award |
| 2004 | Rochester Distinguished Scholar Award |
| 2003 | University of Manitoba Samuel Weiner Distinguished Visitor Award |
| 2001 | Elsevier Science Award at the World Muscle Society Meeting |
| 2001 | S. Mouchly Small, MDA Scientific Achievement Award |
| 2001 | Weil Award for Best Paper in Experimental Neuropathology |
| 2000 | G. Conte Prize 2000 for Basic Research |
| 1999 | National Academy of Medicine (formerly Institute of Medicine) of the National Academy of Sciences |
| 1999 | Carver Trust - Roy J. Carver Biomedical Research Chair in Molecular Physiology and Biophysics |
| 1999 | Fellow of the Biophysical Society |
| 1997 | Duchenne-Erb-Preis Award (German Muscular Dystrophy Association) |
| 1996 | Esther Benjamin Memorial Lecture Award |
| 1996 | Landacre Society Lecture Award |
| 1996 | American Academy of Neurology Decade of the Brain Award |
| 1995 | INSERM/Académie des Sciences Prix |
| 1994 | McGill University F.L. McNaughton Lecturer |

1994 Vanderbilt University 1994 Lamson Memorial Lecturer
 1994 ASBMB-AMGEN Award
 1994 International Albrecht Fleckenstein Award
 1993 Muscular Dystrophy Association Service Merchandise Leadership Award
 1992 The Emilio Trabucchi Foundation Medal
 1989 Howard Hughes Medical Institute Investigator
 1989 University of Iowa Foundation Distinguished Professor of Physiology and Biophysics
 1990 Regent's Award for Faculty Excellence
 1984 Finalist for 1984 Louis N. Katz Research Prize for Young Investigators
 1984-1989 American Heart Association Established Investigator
 1978 National Science Foundation - NATO Postdoctoral Fellowship
 1978-1981 Medical Research Council of Canada Postdoctoral Fellowship
 1977-1978 Elon Huntington Hooker Fellowship
 1974-1977 Graduate Fellowship - NIH Biophysics Training Grant
 1973 Sigma Pi Sigma Bendix Award
 1973 Phi Beta Kappa
 1972 Sigma Xi

Professional Activities

Affiliations

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| American Academy of Arts and Sciences | Biophysical Society |
| American Academy of Neurology | National Academy of Medicine, National Academy of Sciences |
| American Association for Advancement of Science | National Academy of Sciences |
| American Chemical Society | New York Academy of Sciences |
| American Society for Biology and Molecular Biology | Society for Developmental Biology |
| American Society of Biological Chemistry | Society For Glycobiology |
| American Society for Cell Biology | Society for Neuroscience |
| American Society for Gene Therapy | Society of General Physiologists |
| American Society of Human Genetics | Sigma Xi |
| American Society for Matrix Biology | World Muscle Society |
| American Society for Microbiology | |
| American Physiological Society | |

Editorial Boards

2010-present *Skeletal Muscle*, Founding Co-Editor-in-Chief
 2013-present *Journal of Neuromuscular Diseases*
 2012-present *Experimental Neurology*
 2011-present *PLoS Currents: Muscular Dystrophy*
 2004-present *Neuromuscular Disorders*
 2004-2006 *Molecular and Cellular Biochemistry*
 2003-2006 *Drug Discovery Today: Therapeutic Strategies*
 2002-2006 *NeuroMolecular Medicine*
 2001-present *Acta Myologica*
 2001-2004 *American Society for Biochemistry and Molecular Biology*
 1999-2004 *Journal of Cell Biology*
 1996-2001 *Journal of Biological Chemistry*
 1995-1997 *Physiological Reviews*
 1988-1993 *Cell Calcium*
 1988-1993 *Journal of Biological Chemistry*
 1987-1993 *Circulation Research*

Reviewer (Journals)

Acta Neuropathologica
American Journal of Human Genetics
American Journal of Pathology
American Journal of Physiology
Annals of Neurology
Archives of Biochemistry and Biophysics
Biochimica et Biophysica Acta
BioMed Central
Biophysical Journal
Cardiovascular Research
Cell
Cell Metabolism
Circulation
Circulation Research
Current Biology
Development
Developmental Biology
Developmental Cell
eLife
EMBO Molecular Medicine
European Journal of Human Genetics
FASEB
FEBS
FEBS Letters
Genome Research
Glycobiology
Human Gene Therapy
Human Molecular Genetics
Journal of Biological Chemistry
Journal of Cell Biology
Journal of Cell Science
Journal of Clinical Investigation
Journal of Comparative Neurology
Journal of Molecular and Cellular Cardiology
Journal of Neurochemistry
Journal of Neuroscience
Journal of Neuropathology and Experimental Neurology
Journal of the Neurological Sciences
Journal of Physiology
Matrix Biology
Molecular and Cellular Biology
Molecular and Cellular Neuroscience
Molecular Biology of the Cell
Molecular Brain Research
Molecular Pharmaceutics
Molecular Pharmacology
Molecular Therapy
Nature
Nature Cell Biology
Nature Genetics
Nature Medicine
Nature Neuroscience
Nature Review Molecular Cell Biology
Neurobiology of Disease
Neurogenetics
Neurology
Neuromuscular Disorders
Neuron
Neuroscience
New England Journal of Medicine
PLoS Medicine
PLoS ONE
Proceedings of the National Academy of Science
Science
Science Translational Medicine
Stem Cell
Traffic
Trends in Neuroscience
Trends in Pharmacological Sciences
Virology

Reviewer (Grants)

2017-present Coalition to Cure Calpain 3
2013-present Reviewer, HHMI Medical Fellows Program Group
2008 Inserm, Myology Lab Site Visit (Paris, France)
2005-2007 Council Member, National Arthritis and Musculoskeletal and Skin Disease Advisory Council
2003 March of Dimes Grant Reviews
2001-2005 NIH Skeletal Muscle Biology and Exercise Physiology Study Section
1999 NIH, Grant Reviews
1996-2009 Member, MDA Scientific Advisory Committee
1992 NIH, Site Visit (Indiana University)
1991-1995 NIH, Physiology Study Section
1989-1995 Member, MDA Fellowship Review Committee
1989-1992 Member, AHA's Cell Transport and Metabolism Research Study Committee
1988 NIH, Site Visit (University of Miami)
1987 NIH, Site Visit (University of Washington)

1986 NIH, NIADDK Conference Grant
 1986 Member, NSF - Presidential Young Investigator Advisory Panel
 1985-1988 Member, Research Peer Review Committee, AHA - Iowa Affiliate

National & International Committees

2019-present Member, ASBMB Awards Committee
 2015-present Scientific Advisory Board, Spinal Muscular Atrophy Foundation
 2013-present Member, Committee on Honors, American Physiological Society
 2011-present Vanderbilt Prize in Biomedical Science External Review Committee
 2010-present T32 External Networking Committee, The Ohio State University
 2010-present Member, Biomedical Science Advisory Board, Vanderbilt University
 2009-present Scientific Advisor, Gavriel Meir Trust
 2006-2010 Scientific Advisory Board Committee, Duke NUS-Graduate Medical School, Singapore
 2004-present Scientific Advisory Board, Cure Duchenne
 2004-2005 President, Society of General Physiologists
 2003-2006 Council Member, American Society of Matrix Biology
 2001-2004 Pharmaceutical Research, MyoContract
 2001-2003 NIH Skeletal Muscle Biology Study Section
 2001-2006 Member, Executive Board of the World Muscle Society
 1998-2004 Member, Muscular Dystrophy Association's Gene Therapy Task Force
 1997 Steering Committee for Huntington's Disease Society of America
 1993-1995 Council Member, Society of General Physiologists
 1988-1991 Officer of the Biophysical Society Council

University Committees and Programs

2019-present Steering Committee, UI Strategic Planning Process
 2018-present UI Health Care System Operations Committee
 2018-2019 Micro/Immuno Chair Search Committee
 2018-present Enterprise Committee
 2018-present Finance Subcommittee
 2018-present Funds Flow Working Group
 2015-present Chair, Carver College of Medicine Research Investment Fund Committee
 2000-present Member, Holden Comprehensive Cancer Center
 2011-2012 Search Committee for the Dean of the Carver College of Medicine
 2009-2011 Carver College of Medicine Research Advisory Council
 2009-2010 Internal Advisory Committee on Genetics for the Carver College of Medicine
 2008-2009 Animal Care Facilities Planning Task Force
 2007 Intercollegiate Task Force on the Organization of Research and Education in the Life Sciences
 2007-2012 Office of Animal Resources Advisory Committee
 2006 Distinguished Mentor Nomination Committee
 2003 Holden Comprehensive Cancer Center Space Committee
 2003-2008 Molecular Biology Executive Committee
 2003-2004 Steering Committee, Presidential Biological Scholar Program
 2003-2004 Search Committee for Department Executive Officer, Department of Internal Medicine
 2002-2009 Executive Committee, Neuroscience Program
 2002-present Medical Council
 2001-present University of Iowa Gene Therapy Center Program Member
 2001-present University of Iowa Cancer Center Program Member
 2001-2005 Curriculum Committee, Neuroscience Program
 2000-2004 College of Medicine Molecular Biology Building B Planning Committee
 2000-2002 Task Force on Animal Imaging

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|--------------|---|
| 1997-2006 | Member, Neuromuscular Disease Conference |
| 1997 | Medical Scientist Training Program Review Committee |
| 1996-present | Diabetes Endocrinology Research Center Program Member |
| 1996-2003 | College of Medicine Capital Planning Liaison Committee |
| 1995-2005 | Howard Hughes Medical Institute, College of Medicine Seminar Series |
| 1995-2003 | College of Medicine Research Advisory Council |
| 1995-2000 | College of Medicine Research Week Committee |
| 1995-2000 | Hybridoma Facility Advisory Committee |
| 1995-1996 | Search Committee for Department Executive Officer, Department of Biochemistry |
| 1994-1999 | Committee for the Initiative in the Biosciences |
| 1994-1995 | Search Committee for Associate Dean for Research, College of Medicine |
| 1993-present | Executive Committee of the Cardiovascular Center |
| 1993-1994 | Review Committee for Vice President for Research |
| 1991-1994 | Search Committee for the Dean of the College of Medicine |
| 1990-1991 | Microbiology Review and Search Committee for Department Executive Officer |
| 1990 | Radiation Research Laboratory Review Committee |
| 1989-1992 | Medical Bio-Science Subcommittee of the University Radiation Protection Committee |
| 1988-1992 | AHA Medical Student Research Fellowship Program Selection Committee |
| 1987-present | University of Iowa Medical Scientist Training Program Faculty Mentor |
| 1986-1989 | College of Medicine Research Committee |

Departmental Committees

| | |
|-----------|--|
| 1995 | Co-Chairman, Physiology and Biophysics Computer Committee |
| 1993 | Chairman, Dr. Charles Wunder Review |
| 1991 | Physiology and Biophysics Faculty Search Committee |
| 1990 | Chairman, Neuroscience Workshop |
| 1989-1990 | Chairman, Physiology and Biophysics Faculty Search Committee |
| 1989-2002 | Chairman, Physiology Workshop |
| 1987-2002 | Departmental Executive Committee |
| 1986-1987 | Chairman, Physiology and Biophysics Seminar Committee |
| 1984-1986 | Physiology and Biophysics Computer Committee |
| 1983-1986 | Chairman, Physiology and Biophysics Graduate Admissions Committee |
| 1982-1986 | Chairman, Physiology and Biophysics Graduate Recruiting Poster Committee |
| 1982-1986 | Physiology and Biophysics Graduate Admissions Committee |
| 1982-1984 | Physiology and Biophysics Equipment User Committee |
| 1981-1983 | Physiology and Biophysics Faculty Search Committee |

Reviews of Academic Departments and Centers

| | |
|--------------|--|
| 2013 | Vanderbilt Wellstone Scientific Advisory Committee Review of Vanderbilt University's Paul and Sheila Wellstone Muscular Dystrophy Center |
| 2010-present | Vanderbilt Biomedical Science Advisory Board Review of the Vanderbilt University School of Medicine |
| 2006-2011 | Duke-NUS Graduate Medical School, Singapore Scientific Advisory Board Review of the University of Duke University Graduate Medical School, Singapore |
| 2005-2009 | Minnesota Wellstone Scientific Advisory Committee Review of the University of Minnesota's Paul and Sheila Wellstone Muscular Dystrophy Center |
| 2005 | University of Pennsylvania School of Medicine |

Review of the University of Pennsylvania School of Medicine Department of Physiology

2004 **Duke University**
Review of the Duke University School of Medicine Department of Cell Biology

Organization of Scientific Meetings

2009-present **Organizer, Iowa Wellstone Face-to-Face Meeting, University of Iowa Wellstone MD Center**

2008 **Organizer and Session Chair, Iowa Congenital Muscular Dystrophy Meeting, University of Iowa Wellstone MD Center**

2007 **Organizer, Congenital Muscular Dystrophy and Dystroglycan Glycosylation Meeting, *World Muscle Society***

2006 **Organizer, Frontiers in Myogenesis Meeting, *Society for Muscle Biology***

2004 **Organizer, College of Medicine/HHMI Seminar Series**
Rosela Tupler, John Faulkner, Hannele Ruohola-Baker, Jeffrey Molkenin, James Ervasti, Gregory Cox

2003 **Organizer, College of Medicine/HHMI Seminar Series**
David J. Glass, Stuart Kornfeld, Ulrich Mueller, Giulio Cossu, Yukio Fukuyama, Francesco Muntoni, Peter Agre, Anton Bennett and Joshua Sanes

2002 **Organizer, College of Medicine/HHMI Seminar Series**
Luis Parada, Martin Chalfie, Sriram Subramaniam, Anthony Wynshaw-Boris and Yukiko Goda

2001 **Organizer, College of Medicine/HHMI Seminar Series**
Wolfhard Almers, Pietro DeCamilli, Brian Duling and Steven Burden

2000 **Organizer, College of Medicine/HHMI Seminar Series**
Morgan Sheng, Susan McConnell, Richard Scheller and Thomas Südhof

1999 **Organizer, College of Medicine/HHMI Symposium, *Phenotypic Analysis of Genetically Engineered Mice: Insights to Biology and Human Disease***
Sally Camper, Mario Capecchi, William Dove, Reinhard Fassler and Joseph Takahashi

1998 **Organizer, Carver Symposium, *The Molecular Basis of Neurogenetic Diseases***
Xandra Breakfield, Kay Davies, Kurt Fischbeck, Ulrike Heberlein, Erik Kandel, David MacLennan, Jeffrey Noebels, Mihael Polymeropoulos, Dennis Selkoe, Chris Walsh, Steve Warren and Huda Zoghbi

1997 **Organizer, College of Medicine Research Week, *Cancer Biology: Molecular and Genetic Approaches***
Wen-Hwa Lee, Erkki I. Ruoslahti, Ayraham Raz, Mina J. Bissell and Carlo Croce

1996 **Organizer and Chair, College of Medicine/HHMI Symposium, *Cell-Extracellular Matrix Interactions in Development and Disease***
Angela Christiano, David Cheresch, Brigid Hogan, James Kramer and Louis Reichardt

1996 **Organizer and Chair, College of Medicine Research Week, *Neurobiology: Molecular, Genetic and Clinical Approaches***
Robert H. Brown, Antonio R. Damasio, Ted M. Dawson, Story C. Landis and Katherine Kalil

1992 **Chairperson and Organizer, FASEB Conference, *Calcium and Cell Function***

1989 **Co-Chair, FASEB Conference, Calcium and Cell Function**

Scientific Advisory Boards & Consulting

2019-present **Vertex Pharmaceuticals, Inc.**
Scientific Advisory Board

2019-present **Amicus Therapeutics, Inc.**
Consultant

2019 **Walking Fish Therapeutics Inc.**
Consultant

2018 **TREAT-NMD Advisory Committee for Therapeutics (TACT)**
Consultant

2018-present **Satellos Bioscience**
Consultant

2017-2018 **Audentes Therapeutics, Inc.**
Consultant

2017-2019 **MNG Laboratories**
Scientific Advisory Board

2015-2018 **Spinal Muscular Atrophy Foundation**
Scientific Advisory Board

2013-2015 **Genzyme Corporation**
Scientific Advisory Board

2010-present **Coalition to Cure Calpain 3**
Consultant

2010-2011 **NGM Biopharmaceuticals, Inc.**
Consultant

2010-2011 **Five Prime Therapeutics, Inc.**
Consultant

2010-2011 **Eleven Biotherapeutics**
Consultant

2010-2018 **The Duchenne Research Fund**
Scientific Advisory Board

2010-present **Vanderbilt University**
Biomedical Science Advisory Board

2008-2012 **ARMGO Pharmaceutical, Inc.**
Scientific Advisory Board

2006-2010 **Duke NUS Graduate Medical School Singapore**
Scientific Advisory Board Committee

2004-present **Cure Duchenne**
Scientific Advisory Board

2001-2004 **MyoContract**
Pharmaceutical Research (Basel, Switzerland)

Teaching Activities

University of Iowa

| <u>Course Title</u> | <u>Course No.</u> | <u>Year(s)</u> | <u>Registered</u> | <u>Effort</u> |
|--|--------------------------|-----------------------|--------------------------|----------------------|
| Neuromuscular Diseases: Case-Based Seminar | | 1997-current | | |
| Human Organ Systems | 140:250 | 1996-2012 | 200 | 15 % |
| Medical Cell Biology | 60:116 | 1996-2012 | 200 | 5 % |
| Human Physiology for PA Students | 72:164 | 2002-2008 | 40 | 5 % |
| Survival Skills for a Research Career | 060:204 | 2000-2006 | 150 | 5 % |
| Mini Medical School Lecture, April 10, 2007 | n/a | 2007 | 200 | 5% |
| Neurobiology of Disease | 132:235:001 | 2006 | 25 | 5% |
| Experimental Approaches to Human Disease | 060:208 | 2001-04 | 20 | 5 % |
| Fundamental Neuroscience | 132:180 | 2000 | 20 | 5 % |
| Principles of Molecular and Cell Biology (Facilitator) | 156:201 | 2000-02 | 80 | 5 % |
| Medical Neuroscience | 72:234 | 1992 | 200 | 5 % |
| Medical Neuroscience, Course Co-Director | 72:234 | 1991 | 200 | 5 % |
| Neuroscience Seminar | 132:265 | 1990-91 | 14 | 100 % |
| Cell Biology II | 142:255 | 1990 | 15 | 30 % |
| Medical Physiology, Course Director | 72:212 | 1988-90 | 190 | 30 % |
| Membrane Seminar | 72:255 | 1984-89 | 10 | 100 % |
| Intermediate Physiology | 72:150 | 1983-84 | 235 | 15 % |
| Graduate Physiology | 72:214 | 1983-84 | 8 | 15 % |
| Medical Physiology | 72:212 | 1982-95 | 190 | 20 % |
| Structure and Function of Biological Membranes | 72:241 | 1982-92 | 10 | 100 % |
| Advanced Biomedical Studies | 50:198 | 1982 | 10 | 10 % |
| Cell Biology | 72:111 | 1981 | 10 | 10 % |

International Teaching Positions

January 2006 Masters Class in Molecular Mechanisms of Disease Glycogenetics and Neuromuscular Diseases
Nijmegen School of Molecular Life Sciences (NCMLS)
Nijmegen, The Netherlands

Personal Statement

My laboratory is focused on understanding the molecular, cellular and physiological basis of various forms of muscular dystrophy, and on developing therapeutic strategies to treat these diseases. My early studies at the University of Iowa focused on elucidating the structure and function of calcium channels and calcium release channels (ryanodine receptors) in skeletal muscle. For the past twenty years, however, my laboratory has actively investigated the molecular pathogenesis of muscular dystrophy. We have used biochemical, cell biological, genetic and physiological techniques to identify and define disease mechanisms that cause various forms of muscular dystrophy. We cloned and characterized dystroglycan, and demonstrated that it links the cytoskeleton to the extracellular matrix in skeletal muscle. My studies on dystroglycan have since led to significant insights into its basic function as an extracellular matrix receptor in skeletal muscle, its role in the maintenance of muscle-cell membrane integrity and its role in the molecular pathogenesis of glycosylation-deficient muscular dystrophy. As head of the laboratory, I have been dedicated to maintaining the highest standards in research and providing outstanding research training and mentorship for many undergraduates, graduate students, and postdoctoral and clinical fellows at the University of Iowa. Many of my former trainees have embarked on promising research and clinical careers and are now leaders in the fields of physiology, neurology, molecular genetics, and cellular biology.

Research and Training

1. Skeletal muscle excitation-contraction coupling and calcium channels

Muscle contraction is initiated by a depolarization of the transverse tubular membrane which in turn signals the release of Ca^{2+} from the junctional sarcoplasmic reticulum. One goal of my early research was to understand the structure and

function of protein components of the junctional sarcoplasmic reticulum membrane. We purified the ryanodine receptor of rabbit muscle sarcoplasmic reticulum and showed that it can mediate single channel activity identical to that of the Ca^{2+} release channels of the sarcoplasmic reticulum. The morphology of the purified ryanodine receptor has revealed that the ryanodine receptor is identical to the "SR feet" and thus indicates that it plays a dual role in excitation-contraction coupling as the Ca^{2+} release channel and as the bridging structure in the junctional gap. A second goal of my research on excitation-contraction coupling concerned the dihydropyridine-sensitive Ca^{2+} channel of skeletal muscle and its dual role as a voltage sensor for excitation-contraction coupling and a Ca^{2+} channel. The dihydropyridine receptor was purified from rabbit skeletal muscle and shown to consist of four subunits (α_1 , $\alpha_2\delta$, β and γ). We have determined the structure of the $\alpha_2\delta$ subunit and γ -subunit of the dihydropyridine receptor. We demonstrated that the β -subunit binds to a conserved domain within the α_1 subunit of the calcium channel. Mutations within conserved domain alter the characteristic current stimulation and kinetic changes induced by the β -subunit and hence identify the critical importance of this interaction site in calcium channel regulation.

- Jay, SD, Ellis, SB, McCue, AF, Williams, ME, Vedvick, TS, Harpold, MM and **Campbell, KP.** (1990) Primary Structure of the γ Subunit of the DHP-Sensitive Calcium Channel from Skeletal Muscle. *Science* 248:490-492. PMID: 2158672 (Cited 274 times)
- De Waard, M, Pragnell, M and **Campbell, KP.** (1994) Ca^{2+} Channel Regulation by a Conserved β Subunit Domain. *Neuron* 13:495-503. PMID: 8060623 (Cited 286 times)
- Pragnell, M, De Waard, M, Mori, Y, Tanabe, T, Snutch, TP and **Campbell, KP.** (1994) Calcium Channel β Subunit Binds to a Conserved Motif in the I-II Cytoplasmic Linker of the α_1 -Subunit. *Nature* 368:67-70. PMID: 7509046 (Cited 640 times)
- Gurnett, CA, De Waard, M and **Campbell, KP.** (1996) Dual Function of the Voltage-Dependent Ca^{2+} Channel $\alpha_2\delta$ Subunit in Current Stimulation and Subunit Interaction. *Neuron* 16:431-440. PMID: 8789958 (Cited 285 times)

2. Dystrophin-glycoprotein complex

In 1989 I began a series of experiments aimed at identifying membrane proteins that associate with dystrophin—the protein encoded by the Duchenne muscular dystrophy (*DMD*) gene—in order to understand its function in normal skeletal muscle. Using both biochemistry and molecular biology, I discovered the dystrophin-glycoprotein complex and established that it is essential for linking dystrophin (and thereby the cytoskeleton) to the extracellular matrix in skeletal muscle, and thereby protects the muscle-cell membrane from contraction-induced injury. Subsequent studies by my laboratory and others showed that mutations in genes encoding various components of the dystrophin-glycoprotein complex cause distinct forms of limb-girdle muscular dystrophy, as well as other congenital forms of muscular dystrophy.

- **Campbell, KP** and Kahl, SD. (1989) Association of Dystrophin and an Integral Membrane Glycoprotein. *Nature* 338:259-262. PMID: 2493582 (Cited 545 times)
- Ervasti, JM, Ohlendieck, K, Kahl, SD, Gaver, M and **Campbell, KP.** (1990) Deficiency of a Glycoprotein Component of the Dystrophin Complex in Dystrophic Muscle. *Nature* 345:315-319. PMID: 2188135 (Cited 931 times)
- Ervasti, JM and **Campbell, KP.** (1991) Membrane Organization of the Dystrophin-Glycoprotein Complex. *Cell* 66:1121-1131. PMID: 1913804 (Cited 1269 times)
- Matsumura, K, Tomé, FMS, Collin, H, Azibi, K, Chaouch, M, Kaplan, J-C, Fardeau, M, and **Campbell, KP.** (1992) Deficiency of the 50K Dystrophin-Associated Glycoprotein in Severe Childhood Autosomal Recessive Muscular Dystrophy. *Nature* 359:320-2. PMID: 1406935 (Cited 297 times)

3. Dystroglycan: Novel extracellular matrix receptor.

In 1992, my laboratory cloned dystroglycan and elucidated its function as an extracellular matrix receptor in muscle. We established that dystroglycan serves as an essential structural link between the cytoskeleton and the basement membrane that surrounds the cell, and that disruption of its expression and/or ability to interact with these structures is responsible for the pathogenesis of Duchenne muscular dystrophy. Although dystroglycan has been studied extensively, as late as 2011 no patient mutation had been identified in the encoding gene (*DAG1*). At that point, my laboratory identified a dystroglycan missense mutation in a patient with mild muscular dystrophy accompanied by cognitive impairment. Interestingly, the missense mutation in *DAG1* leads to selective impairment of LARGE-mediated functional modification of the phosphorylated O-mannosyl residues on dystroglycan (i.e., that required for high-affinity laminin binding). Overall, my laboratory's studies revealed that the T192M substitution in mouse recapitulates both the biochemical and pathological phenotypes of patients with dystroglycanopathies, even though all of the glycosyltransferases are normally expressed.

- Ibraghimov-Beskrovnaya, O, Ervasti, JM, Leveille, CJ, Slaughter, CA, Sernett, SW, and **Campbell, KP.** (1992) Primary Structure of Dystrophin-Associated Glycoproteins Linking Dystrophin to the Extracellular Matrix. *Nature* 355:696-702. PMID: 1741056 (Cited 1304 times)
- Ervasti, JM and **Campbell, KP.** (1993) A Role for the Dystrophin-Glycoprotein Complex as a Transmembrane Linker Between Laminin and Actin. *J. Cell Biol.* 122:809-23. PMID: 8349731 (Cited 1216 times)

- Henry, MD and **Campbell, KP.** (1998) A Role for Dystroglycan in Basement Membrane Assembly. *Cell.* 95:859-70. PMID: 9865703 (Cited 368 times)
- Hara, Y, Balci, B, Kanagawa, M, Beltran-Valero de Bernabe, D, Gundesli, H, Yoshida-Moriguchi, T, Willer, T, Satz, JS, Burden, SJ, Oldstone, MBA, Accardi, A, Talim, B, Muntoni, F, Topaloglu, H, Dincer, P and **Campbell, KP.** (2011) A Dystroglycan Mutation Associated with Limb-Girdle Muscular Dystrophy. *N. Eng. J. Med.* 364: 939-46. PMID: 21388311; PMC3071687 (Cited 172 times)

4. Disruption of the post-translational processing of dystroglycan and congenital muscular dystrophies

In 2002, we found that O-linked glycosylation of α -dystroglycan is required for its binding to extracellular matrix ligands and that abnormal post-translational processing of α -dystroglycan results in loss of its function as an extracellular matrix receptor in various congenital muscular dystrophies. We demonstrated that glycosylation defects in dystroglycan are central to the skeletal muscle pathology and the developmental brain abnormalities seen in congenital muscular dystrophies including Walker-Warburg syndrome, muscle-eye-brain disease and Fukuyama congenital muscular dystrophy. Overall, this research has revolutionized our understanding of the molecular basis of these devastating diseases and has profound clinical implications for the diagnosis and treatment of congenital muscular dystrophies with developmental brain abnormalities.

- Michele, DE, Barresi, R, Kanagawa, M, Saito, F, Cohn, RD, Satz, JS, Dollar, H, Nishino, I, Kelley, RI, Somer, H, Straub, V, Mathews, KD, Moore, SA and **Campbell, KP.** (2002) Post-translational Disruption of Dystroglycan-Ligand Interactions in Congenital Muscular Dystrophies. *Nature* 418:417-422. PMID: 12140558 (Cited 704 times)
- Moore, SA, Saito, F, Chen, J, Michele, DE, Henry, MD, Messing, A, Cohn, RD, Ross-Barta, SE, Westra, S, Williamson, RA, Hoshi, T, **Campbell, KP.** (2002) Deletion of Brain Dystroglycan Recapitulates Aspects of Congenital Muscular Dystrophy. *Nature* 418:422-5. PMID: 12140559 (Cited 482 times)
- Barresi, R, Michele, DE, Kanagawa, M, Harper, HA, Dovico, SA, Satz, JS, Moore, SA, Zhang, W, Schachter, H, Dumanski, JP, Cohn, RD, Nishino, I and **Campbell, KP.** (2004) LARGE Can Functionally Bypass α -Dystroglycan Glycosylation Defects in Distinct Congenital Muscular Dystrophies. *Nat. Med.* 10:696-703. PMID: 15184894 (Cited 246 times)
- Kanagawa, M, Saito, F, Kunz, S, Yoshida-Moriguchi, T, Barresi, R, Kobayashi, YM, Muschler, J, Dumanski, JP, Michele, DE, Oldstone, MB and **Campbell, KP.** (2004) Molecular Recognition by LARGE is Essential for Expression of Functional Dystroglycan. *Cell* 117:953-64. PMID: 15210115 (Cited 230 times)

5. LARGE modification of dystroglycan

Despite extensive efforts—by several groups and over the course of nearly twenty years—to identify the laminin-binding moiety on alpha-dystroglycan, its identity remained a mystery. At least 17 gene products, many of which are glycosyltransferases, are involved in biosynthesis of the functional alpha-dystroglycan modification. In 2010, we discovered that this modification is initiated by a unique O-linked trisaccharide, GalNAc- β 1,3-GlcNAc- β 1,4-Man-Ser/Thr, which is phosphorylated at position 6 of the mannose residue. This phosphorylated trisaccharide is required for laminin binding, via an unknown mechanism. In 2012, we showed that the bifunctional like-acetylglucosaminyltransferase (LARGE) synthesizes a polysaccharide that is comprised of alternating glucuronic acid (GlcA) and xylose (Xyl) residues. The LARGE-synthesized [-GlcA- β 1,3-Xyl- α 1,3-]_n heteropolysaccharide (termed matriglycan) was shown bind LG domain-containing proteins *in vitro*. We also demonstrated that LARGE glycans on dystroglycan function as a tunable matrix scaffold to prevent dystrophy. These findings led us to propose that the ultrastructural organization of the basement membrane can be modified by extension of the LARGE-glycan. Our findings both redefine the cellular significance of dystroglycan and support a new model for the underpinnings of dystroglycan-related disease. Most recently, Dr. Campbell used a multidisciplinary approach to determine the structural basis of the high-affinity binding of laminin to dystroglycan. Crystal structures of the laminin LG4-5 region in complex with a LARGE-synthesized oligosaccharide revealed an unprecedented mechanism of carbohydrate recognition among animal lectins: one GlcA- β 1,3-Xyl disaccharide unit straddles a calcium ion in the LG4 domain, with oxygen atoms from both sugars replacing calcium-bound water molecules. This chelating binding mode accounts for the unusually high affinity of this protein-carbohydrate interaction.

- Yoshida-Moriguchi, T, Yu, L, Stalnaker, SH, Davis, S, Kunz, S, Oldstone, MBA, Schachter, H, Wells, L and **Campbell, KP.** (2010) O-Mannosyl Phosphorylation of Alpha-Dystroglycan is Required for Laminin Binding. *Science* 327:88-92. PMID: 20044576; PMC2978000 (Cited 272 times)
- Inamori, K, Yoshida-Moriguchi, T, Hara, Y, Anderson, ME, Yu, L and **Campbell, KP.** (2012) Dystroglycan Function Requires Xylosyl- and Glucuronyltransferase Activities of LARGE. *Science* 335: 93-96. PMID: 22223806; PMC3702376 (Cited 171 times)
- Yoshida-Moriguchi, T, Willer, T, Anderson, ME, Venzke, D, Whyte, T, Muntoni, F, Lee, H, Nelson, SF, Yu, L., **Campbell, KP.** (2013). SGK196 is a Glycosylation-Specific O-Mannose Kinase Required for Dystroglycan Function. *Science* 341: 896-9. PMID: 23929950; PMC3848040 (Cited 106 times)

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- Briggs, D., Yoshida-Moriguchi, T., Zheng, T., Venzke, D., Anderson, M., Strazzulli, A., Moracci, M., Yu, L., Hohenester, E., **Campbell, KP**. Structural Basis of Laminin Binding to the LARGE Glycans on Dystroglycan. *Nat Chem Biol*. 2016 Oct; 12(10):810-814. PMID: 27526028; PMC5030134 (Cited 9 times)

Graduate Students

| <u>Name and Degree</u> | <u>Current Employment Organization</u> | <u>Current Title</u> |
|--|--|---|
| Jyothi Arikath, Ph.D. (1997-2002) | Munroe-Meyer Institute for Genetics and Rehabilitation, Department of Developmental Neurology, University of Nebraska Medical Center | Assistant Professor |
| Dimple Bansal, Ph.D. (1998-2003) | Biocon, Oncology Business Unit, Bangalore, India | Head of Marketing and Strategy |
| Wei Guo, Ph.D. (1992-1995) | University of Pennsylvania, Department of Biology, Philadelphia, PA | Professor |
| Christina Gurnett, M.D./Ph.D. (1992-1997) | Washington University School of Medicine, Department of Neurology, Division of Pediatric and Developmental Neurology, St. Louis, MO | Professor, Director, Division of Pediatric and Developmental Neurology |
| Scott Jay, M.D./Ph.D. (1984-1991) | Wellmont CVA Heart Institute: Laughlin Campus, Greeneville, TN | Staff Cardiologist |
| Myoung-Goo Kang, Ph.D. (1998-2003) | Institute for Basic Science, Center for Cognition and Sociality, Daejeon, Korea University of Texas Medical Branch, Galveston, TX | Principal Investigator and Adjunct Faculty |
| Michael Knudson, M.D./Ph.D. (1985-1992) | University of Iowa, Department of Pathology, Iowa City, IA | Clinical Professor |
| Albert T. Leung, M.D./Ph.D. (1986-1989) | New York, NY | Independent Clinical Science Consultant |
| Leland Lim, M.D./Ph.D. (1993-1999) | Stanford University School of Medicine and Veterans Affairs Palo Alto Healthcare System, Department of Neurology, Palo Alto, CA | Staff Physician and Clinical Assistant Professor |
| Hongyan Liu, Ph.D. (1992-1997) | New York, NY | Homemaker |
| David R. Pepper, M.S./M.D. (1984-1986) | Contra Costa Regional Medical Center, Martinez, CA; UCSD, Department of Family and Community Medicine, San Francisco, CA | Family Medicine Physician and Assistant Clinical Professor |
| Peter McPherson, Ph.D. (1988-1993) | McGill University, Department of Neurology, Neurosurgery, and Anatomy and Cell Biology; Montreal Neurological Institute; Montreal Neurological Institute, Montreal, Canada | James McGill Chair and Director, Neurodegenerative Disease Research Group |
| Marlon Pragnell, Ph.D. (1990-1994) | Juvenile Diabetes Research Foundation New York, NY | Senior Scientific Program Manager |
| Jakob Satz, Ph.D. (1999-2007) | Jackson Laboratories, Bar Harbor, ME | Postdoctoral Fellow |

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|-------------------------------------|--|---|
| Alan H. Sharp, Ph.D. (1983-1988) | Alan Sharp Pty Ltd, Victoria, Australia | Physician, Allergy and Clinical Immunology Specialist |
| Bin Yang, Ph.D. (1991-1995) | Genentech, Inc./Roche San Francisco, CA | Scientist/Group Leader |

Postdoctoral Fellows

| <u>Name and Degree</u> | <u>Current Employment Organization</u> | <u>Current Title</u> |
|---|--|---|
| Valerie Allamand, Ph.D. (1996-2000) | INSERM Institut de Myologie, Center for Research in Myology, Paris, France | Group Leader |
| Rita Barresi, Ph.D. (1998-2006) | NSCT Diagnostic & Advisory Service for Rare Neuromuscular Diseases Muscle Immunoanalysis Unit, Newcastle upon Tyne, United Kingdom | Consultant Clinical Scientist and Head of Muscle Immunoanalysis Unit |
| Aaron Beedle, Ph.D. (2003-2007) | SUNY Binghamton University, Department of Pharmaceutical Sciences, Binghamton, NY | Vice-Chair and Associate Professor |
| Daniel Beltrán, Ph.D. (2004-2013) | Invitae Research Institute, San Francisco, CA | Lead of Metabolic Operations |
| Oxana Beskrovanya-Ibraghimov, Ph.D. (1990-1994) | Dyne Therapeutics, Waltham, MA | Senior Vice President, Head of Research |
| Gloria Biddlecome, Ph.D. (1997-1999) | Summer Stream Homes, LLC, Bakersfield, CA | Self-employed |
| Chien-Chang Chen, Ph.D. (1998-2004) | Academia Sinica, Institute of Biomedical Sciences, Taipei, Taiwan | Director, Department of International Affairs and Research Fellow |
| Ronald Cohn, M.D. (1998-2001) | University of Toronto, Division of Clinical and Metabolic Genetics, Center for Genetic Medicine, The Hospital for Sick Children, Toronto, Canada | President & CEO of The Hospital for Sick Children |
| Ramon Coral-Vazquez, Ph.D. (1996-1999) | Escuela Superior de Medicina, Intituto Politenico Nacional, Mexico City, Mexico | Senior Researcher |
| Rachelle Crosbie Watson, Ph.D. (1995-1999) | UCLA, Department of Integrative Biology and Physiology, Los Angeles, CA | Professor and Chair, Department of Integrative Biology and Physiology |
| Jessica de Greef, Ph.D. (2010-2015) | Department of Human Genetics, Leiden University Medical Center, The Netherlands | Senior Researcher |
| Michel de Waard, Ph.D. (1991-1995) | Institute of Thorax, Nantes, France | Group Leader |
| Franck Duclos, Ph.D. (1994-1998) | Bristol-Myers Squibb Pharmaceutical Research Institute, Pennington, NJ | Principal Scientist |

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| Madeleine Durbeej-Hjalt, Ph.D. (1997- 2001) | Lund University, Department of Experimental Medical Science, Lund, Sweden | Professor |
| Toru Egashira, M.D./Ph.D. (2014-2019) | Keio University School of Medicine, Department of Cardiology, Tokyo, Japan | Assistant Professor |
| James M. Ervasti, Ph.D. (1989-1992) | University of Minnesota, Department of Biochemistry, Molecular Biology and Biophysics; Paul and Sheila Wellstone Muscular Dystrophy Center, Minneapolis, MN | Professor; Research Director |
| Ricardo Felix, M.D./Ph.D. (1995-1998) | Center for Research and Advanced Studies of the National Polytechnic, Department of Cell Biology, Mexico City, Mexico | Professor |
| Elena Gertsen, M.D./Ph.D. (2005-2007) | East Tennessee State University, Department of Pathology, Johnson City, TN | Clinical Assistant Professor |
| Matthew Goddeeris, Ph.D. (2007-2014) | Eloxx Pharmaceuticals, Waltham, MA | Vice President, Research |
| Severine Groh, Ph.D. (2001-2007) | Delta State University, Division of Biological and Physical Sciences, Cleveland, MS | Associate Professor |
| Renzhi Han, Ph.D. (2003 - 2009) | Ohio State University, Wexner Medical Center, Columbus, OH | Associate Professor |
| Yuji Hara, Ph.D. (2005-2012) | Graduate School of Engineering, Kyoto University, Department of Synthetic Chemistry and Biological Chemistry, Kyoto, Japan | Associate Professor |
| Michael Henry, Ph.D. (1995-1999) | University of Iowa, Department of Molecular Physiology and Biophysics, Iowa City, IA | Professor, Deputy Director for Research, Holden Comprehensive Cancer Center |
| Kathleen Holt, Ph.D. (1995-2000) | Locus Biosciences, Inc., Morrisville, NC | Senior Director, Eukaryotic Research |
| Toshiaki Imagawa, Ph.D. (1985-1989) | Hokkaido University, Graduate School of Science, Division of Chemistry, Biochemistry, Sapporo, Japan | Associate Professor |
| Kei-ichiro Inamori, Ph.D. (2006-2013) | Institute of Molecular Biomembrane and Glycobiology, Tohoku Medical and Pharmaceutical University, Sendai, Miyagi, Japan | Associate Professor |
| Daniel Jung, Ph.D. (1993-1996) | Laval University, Hema-Quebec Research & Development, Quebec, Canada | Associate Professor |
| Motoi Kanagawa, Ph.D. (2001-2005) | Ehime University Graduate School of Medicine, Department of Molecular Cardiovascular Biology and Pharmacology, Ehime, Japan | Professor |
| Yvonne Kobayashi, Ph.D. (2000-2004) | Eli Lilly & Company, Indianapolis, IN | Senior Director, Emerging Technology & Innovation |

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|---|---|--|
| Kazuhiro Kobuke (2003 - 2009) | Kandai University Faculty of Medicine, Department of Cardiovascular Medicine, Osaka, Japan | Instructor |
| Hajime Kusano, Ph.D. (2000-2005) | Business Development & Licensing, Tokyo, Japan | Manager |
| Connie Lebakken, Ph.D. (1997-2001) | Stem Pharm, Inc., Madison, WI | President and Chief Operating Officer |
| Jennifer Levy, Ph.D. (2008-2016) | Coalition to Cure Calpain 3, Bryn Mawr, PA | Scientific Director |
| John Lueck, Ph.D. (2008-2014) | University of Rochester Medical Center, Department of Pharmacology and Physiology, Rochester, NY | Assistant Professor |
| Kiichiro Matsumura, M.D. (1990-1993) | Teikyo University Medical School, Department of Neurology, Tokyo, Japan | Professor |
| Daniel Michele, Ph.D. (2000-2004) | University of Michigan, Department of Molecular and Integrative Physiology, Ann Arbor, MI | Professor and Graduate Program Director |
| Kay Ohlendieck, Ph.D. (1989-1991) | National University of Ireland, Department of Biology, Maynooth, County Kildare, Ireland | Professor and Chair |
| Jan Parys, Ph.D. (1990-1992) | University of Leuven, Department of Cellular and Molecular Medicine, Leuven, Belgium | Professor and Head |
| Federica Piccolo, Ph.D. (1998-2002) | Guido Berlucci Foundation Brescia, Italy | Funding Programme Manager |
| Erik Rader, Ph.D. (2006-2012) | National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Morgantown, WV | Associate Service Fellow |
| Steve Roberds, Ph.D. (1992-1995) | Tuberous Sclerosis Alliance Silver Spring, MD | Chief Scientific Officer |
| Fumiaki Saito, M.D./Ph.D. (1999-2002) | Teikyo University School of Medicine, Department of Neurology, Tokyo, Japan | Associate Professor |
| Yoshiaki Saito, M.D./Ph.D. (2003-2004) | National Center Hospital of Neurology and Psychiatry, Department of Child Neurology, Tokyo, Japan | Chief of Inpatient Ward |
| Junshi Sakamoto, Ph.D. (1989-1991) | Kyushu Institute of Technology, Department of Bioscience and Bioinformatics, Fukuoka, Japan | Professor |
| Jakob Satz, Ph.D. (2007-2009) | Jackson Laboratories, Bar Harbor, ME | Postdoctoral Fellow |

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|--|--|------------------------------|
| Victoria E. Scott, Ph.D. (1994-1996) | Abbott Laboratories, Abbott Park, IL | Principal Research Scientist |
| Volker Straub, M.D./Ph.D. (1995-1998) | University of Newcastle upon Tyne, The John Walton Muscular Dystrophy Research Centre Institute of Human Genetics, Tyne, United Kingdom | Director and Professor |
| Yoshihide Sunada, M.D./Ph.D. (1993-1996) | Kawasaki Medical School, Department of Neurology, Okayama, Japan | Vice Dean and Professor |
| Barry Timms, M.D./Ph.D. (1985-1988) | University of South Dakota, Sanford School of Medicine, Division of Basic Biomedical Sciences, Vermillion, SD | Professor |
| Rolf Turk, Ph.D. (2005-2014) | Integrated DNA Technologies, Molecular Genetics Division, Coralville, IA | Research Scientist I |
| Tobias Willer, Ph.D. (2004-2013) | Amicus Therapeutics, Philadelphia, PA | Principal Investigator |
| Derrick Witcher, Ph.D. (1991-1995) | Lilly Research Laboratory Indianapolis, IN | Senior Research Advisor |
| Hiroki Yamada, M.D. (1996-1999) | Tokyo Metropolitan Hiroo Hospital, Division of Neurology, Tokyo, Japan | Division Chief |
| Takahiro Yonekawa, M.D./Ph.D. (2014-2018) | Mie University Graduate School of Medicine, Department of Pediatrics, Mie, Japan | |
| Takako Yoshida-Moriguchi (2003-2008) | Sigilon Therapeutics, Inc., Cambridge, MA | Director, Metabolic Diseases |

Co-Op Exchange Students

| <u>Name</u> | <u>Dates in Laboratory</u> | <u>Post-Graduate Education</u> | <u>Current Position</u> |
|---|-----------------------------------|--|--|
| Emma Hiscutt (University of Bath) | June 1997-August 1997 | M.D., University of Oxford, UK | Dermatologist, Private Practice, Victoria, Australia |
| Sara Treweek (University of Bath) | June 1997-September 1997 | Ph.D. Cancer Research UK – Clare Hall Laboratories, London, UK | Senior Research Scientist, TPP Global Development, Ltd., Edinburgh, UK |
| Anne Mullen Grey (McMaster University) | May 2002-August 2002 | Ph.D. Pharmacology and Toxicology, University of Toronto, Toronto, Ontario, Canada | Medical Student, University of Toronto Faculty of Medicine, Toronto, Ontario, Canada |

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|---|---------------------------------|--|---|
| Chris McLaughlin (McMaster University) | May 2002- December 2002 | Ph.D., Cellular and Molecular Medicine, University of Ottawa, Ontario, Canada M.D., McMaster University, Ontario, Canada | Resident, Department of Ophthalmology, McMaster University, Ontario, Canada |
| Robert Svensson (University of Bath) | August 2002-August 2003 | Ph.D., Molecular Physiology and Biophysics, University of Iowa, Iowa City, IA | Senior Scientist, Nimbus Therapeutics, Cambridge, MA |
| Daniel Nicholson (University of Bath) | August 2003-July 2004 | M.S., Molecular and Cellular Biology, University of Bath, Bath, UK M.S., History and Philosophy of Science, University of Leeds, Leeds, UK Ph.D., Philosophy, University of Exeter, Exeter, UK | Research Fellow, Centre for the Study of Life Sciences (Egenis), University of Exeter, Exeter, UK |
| Jeeyoung Oh (Ewha Woman's University Mokdong Hospital) | September 2003- August 2004 | | Department of Neurology, Konkuk University School of Medicine, Seoul, South Korea |
| Stephane Vassilopoulos (Joseph Fourier University) | February 2005- August 2005 | Ph.D., Biochemistry and Cell Biology, University Joseph Fourier, Grenoble, France | Therapie des maladies du muscle strie, Institut de Myologie, INSERM, Paris, France |
| Viviane Muniz (Universidad de Santo Amaro) | March 2006- February 2007 | Ph.D. Dept. of Molecular and Cellular Biology, University of Iowa, Iowa City, IA | Postdoctoral Research Scholar, Department of Pharmacology, University of Iowa, Iowa City, IA |
| Kathryn 'Conley' Flynn (University of Iowa) | September 2011- January 2013 | M.Ed. Dept. of Teaching and Learning, Vanderbilt University, Nashville, TN (in progress) | Science Teacher, Cherry Creek High School, Green Village, CO |

Post-Baccalaureate Students

| <u>Name</u> | <u>Dates in Laboratory</u> | <u>Education</u> | <u>Current Position</u> |
|--------------------|--------------------------------|-----------------------------|--|
| Nicolette Johnson | August 2014- May 2015 | B.S. Biomedical Engineering | University of Pennsylvania, M.D./Ph.D. program |
| Raul O'campo Landa | May 2015- May 2016 | B.S. Human Physiology | University of Iowa, M.D. program |
| Adam Mackey | January 2016- May 2017 | B.S. Biology | Columbia University, Lab Manager and Research Assistant, Dr. Adolfo Ferrando's Laboratory |

Megan Devereaux

December 2016- B.S. Human Physiology
June 2017

Kirkwood Community College,
Dental Hygiene program;
University of Iowa, Campbell
Laboratory, Research Assistant

Wellstone Education Programs (2005 – present)

The Wellstone Muscular Dystrophy Cooperative Research Center (MDCRC) has major research training and education missions. It supports two Medical Student Fellowships, a Postdoctoral Fellowship, a Post-Baccalaureate Research Internship, an Undergraduate Research Fellowship, and a two-day conference at which patients and their advocates are educated about muscular dystrophy research. The medical and postdoctoral fellows and the intern are mentored by both Drs. Campbell and Mathews (Pediatric Neurology), and the undergraduate fellow is mentored by one or the other. The educational efforts of the Center are vital because there is an urgent need for basic scientists and clinicians who can partner to develop and test muscular dystrophy therapies.

Wellstone Medical Student Fellowship

The goal of the Medical Student Fellowship is to train the next generation of neurologists in translational medicine related to muscular dystrophy. This full-time fellowship enables two medical students per year to participate in all aspects of the Center, including: care of muscular dystrophy patients in the neuromuscular disease clinics; clinical evaluation of patients participating in Project 2, under the supervision of Dr. Mathews; evaluation of muscle biopsies with Dr. Steven Moore (Neuropathology); and study of patient cells in Dr. Campbell's laboratory. In addition, these students present their findings from interesting cases at the Neuromuscular Disease Conference once a month.

Wellstone Postdoctoral Research Fellowships

The Postdoctoral Research Fellowship trains scientists in the basic research of muscular dystrophy, by providing a PhD, MD, or MD/PhD graduate with an intensive research experience in Dr. Campbell's laboratory. This experience is complemented by observation of patient care in a clinical setting, enhancing the fellow's understanding and appreciation of the clinical side of translational medicine.

Wellstone Post-Baccalaureate Research Internship and Undergraduate Research Fellowship

The Post-Baccalaureate Research Internship is designed to encourage recent college graduates interested in pursuing graduate degrees to move into translational science by providing a one-year intensive research experience in the Center before s/he enters graduate school. The Undergraduate Research Fellowship has a similar purpose, but is awarded to students who are still enrolled at the University of Iowa; these individuals work closely with a postdoctoral fellow in the Center.

Wellstone Family Conference

The Center has a strong tradition of involving patients and patient advocates by hosting a two-day conference and tours of its laboratories for patients and their families. The goal of the conference is to educate the patients about ongoing translational medicine in the MDCRC, and to provide a forum where they can ask questions concerning muscular dystrophy research. The current fellows and intern all participate in this conference. Through these activities, the Center is accelerating the education mission of the MDCRC, and providing a vibrant training environment for clinician scientists.

Departmental Chair Activities (2002 – present)

Overview

The Department of Molecular Physiology and Biophysics of the Roy J. and Lucille A. Carver College of Medicine is an outstanding basic science department that makes major contributions to the college's three-part mission of teaching, research and service. The department is nationally and internationally recognized for its strength and accomplishments in research, and is renowned for its exceptional contributions to medical school teaching. The Department of Molecular Physiology and Biophysics is comprised of a highly interactive, intellectually stimulating and productive faculty of scientists and educators. At present, the department has 18 research faculty and one full-time teaching faculty member. Faculty are recruited to the department for their independent basic science research programs; however, most faculty have a component of translational medicine and participate in strong clinical collaborations. The department has a strong commitment to diversity, which is evidenced by its two female faculty members, one African American faculty member and three members of Asian and Pacific

Islander descent. All faculty members lead active and productive research programs that are supported by external funding. We currently have 11 faculty that average over 63% salary support from grants and/or teaching.

Faculty Recruitment as Departmental Chair

| <u>Name and Degree</u> | <u>Year Recruited</u> | <u>Previous Institution (Postdoc Advisor)</u> |
|--------------------------|-----------------------|--|
| Rainbo Hultman, Ph.D. | 2019 | Duke University (Patrick Casey) |
| Ted (Edwin) Abel, Ph.D. | 2017 | University of Pennsylvania (Eric Kandel) |
| Julien Sebag, Ph.D. | 2013 | Vanderbilt University (Roger Cone) |
| Janice Robertson, Ph.D. | 2013 | Brandeis University (Christopher Miller) |
| Christopher Ahern, Ph.D. | 2012 | University of British Columbia (Richard Horn) |
| Amy Lee, Ph.D. | 2008 | Emory University (William Catterall) |
| Mike Wright, Ph.D. | 2008 | University of California, Davis (Ruedi Aebersold) |
| Charles Harata, Ph.D. | 2007 | Stanford University (Richard Tsien) |
| Alessio Accardi, Ph.D. | 2007 | Brandeis University (Christopher Miller) |
| Michael Henry, Ph.D. | 2003 | Millenium Pharmaceuticals, Inc. (Kevin Campbell) |
| Michael Anderson, Ph.D. | 2003 | The Jackson Laboratory (Simon John) |

Faculty Recruitment as Search Committee Chair

| <u>Name and Degree</u> | <u>Year Recruited</u> | <u>Current Position</u> |
|------------------------|-----------------------|---|
| Jeffrey Pessin, Ph.D. | 1983 | Diabetes Center Director, Albert Einstein |
| Bruce Bean, Ph.D. | 1983 | Professor, Harvard Medical School, Boston, MA |
| Hollis Cline, Ph.D. | 1990 | Professor, The Scripps Research Institute |
| Roberto Malinow, Ph.D. | 1990 | Professor, Section of Neurobiology, UCSD |
| Toshinori Hoshi, Ph.D. | 1992 | Professor, Department of Physiology, Univ. Penn |
| Sarah England, Ph.D. | 1997 | Professor, Washington University, St. Louis, MO |

Graduate Student Education

- Established the Molecular Physiology and Biophysics Graduate Student Symposium
- Established the Ramon D. Buckley Graduate Student Scholarship
- Established Paper of the Year award for a departmental graduate student with an outstanding publication

Postdoctoral Fellow Education

- Established the Departmental Postdoc Career Enhancement group
- Developed a postdoctoral seminar mentoring program by faculty members
- Established the Peter A. Getting Postdoctoral Scholar Award

Undergraduate Education

- Developed and implemented a training program for undergraduate students (Coop Exchange Program).
- Developed and implemented an internship program for recent graduates (Post-Baccalaureate Program).

Departmental Chair Talks

DEO Department Review/SWOT Meeting with Dean Schwinn and administration of the Carver College of Medicine, "Department Review" University of Iowa, Iowa City, Iowa, 2015.

Presentation at "DEO Metrics, Spring 2010" University of Iowa Department of Molecular Physiology & Biophysics Faculty Meeting, Iowa City, Iowa, May 11, 2010.

DEO Department Review/SWOT Meeting with Dean Rothman & CCOM Administration, "SWOT Analysis and Department Review" University of Iowa, Iowa City, Iowa, February 16, 2009.

"The Interview" presentation to University of Iowa Department of Molecular Physiology & Biophysics Postdoc Career Enhancement Group, Iowa City, Iowa, November 10, 2008.

"Applying and Preparing for Faculty Positions" presentation at the University of Iowa Department of Molecular Physiology & Biophysics Postdoc Professional Development Series, Iowa City, Iowa, November 13, 2006.

"CV and Resume Preparation" presentation at the University of Iowa Department of Molecular Physiology & Biophysics Postdoc Professional Development Series, Iowa City, Iowa, August 14, 2006.

"Physiology and Biophysics" presentation at the University of Iowa Carver College of Medicine (CCOM) Executive Committee Meeting, Iowa City, Iowa, September 12, 2005.

"Physiology and Biophysics" orientation presentation to University of Iowa Biosciences Program Students as Professor and Interim Head, Iowa City, Iowa August 19, 2004.

Financial Resource Support (Grants and Contracts)

Current Grants

| <u>Title</u> | <u>Period</u> | <u>Amount</u> |
|--|----------------------|----------------------|
| Investigator, Howard Hughes Medical Institute (Renewed 10/19) | 10/01/89-11/30/24 | |
| NIH/NINDS 5 U54 NS053672-11 Senator Paul D. Wellstone Muscular Dystrophy Cooperative Research Center "Therapeutic Strategies for Congenital and Limb-Girdle Muscular Dystrophies" (PI: KP Campbell) | 06/08/05-06/30/20 | \$1,017,766 |

Recent Past Grants

| <u>Title</u> | <u>Period</u> | <u>Amount</u> |
|---|----------------------|----------------------|
| Muscular Dystrophy Association 238219 "Protein O-mannosylation: Classification of New Players in Muscular Dystrophy" (PI: KP Campbell) | 08/01/12-07/31/15 | \$113,637/year |
| Muscular Dystrophy Association "Pathways and Consequences of Non-dysferlin Mediated Membrane Repair" (PI: Jennifer Levy-Keiser) | 8/01/11-07/31/14 | \$60,000/year |
| Muscular Dystrophy Associate "Pathophysiology of Muscle Weakness and Wasting in Myotonic Dystrophy" (PI: John Lueck) | 02/01/11-01/31/14 | \$60,000/year |

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| 5 T32 HL 7121-37 Iowa Cardiovascular Center Institutional Training Grant "Dystroglycan-dependent anchoring of dystrophin prevents muscular dystrophy" (PI: Rolf Turk) | 08/15/12-08/14/13 | \$58,000/year |
| Muscular Dystrophy Association "Molecular Basis of Glycosylation-Deficient Muscular Dystrophy" (PI: KP Campbell) | 01/01/10-12/31/12 | \$144,203/year |
| Ruth L. Kruschstein NRSA Fellowship "Mechanisms Required for Dystroglycan Posttranslational Modification" (PI: M Goddeeris, Co-PI: KP Campbell) | 01/15/09-01/14/12 | \$57,094/year |
| NIH/NINDS 1 RC2 NS069521-01 (GO Grant) "High-Throughput Genetic & Small-Molecule Screening for Therapeutic Modifiers" (PI: KP Campbell) | 09/30/09-08/31/11 | \$1,233,893 |
| Myotonic Dystrophy Fellowship "The Role of Sarcolemmal Membrane Fidelity in DM Muscle Pathogenesis" (PI: J Lueck, Co-PI: KP Campbell) | 04/01/09-03/31/11 | \$50,000/year |
| Cardiovascular Center Institutional Research Fellowship "Roles of Dynamin 2 in Myofiber Organization and Centronuclear Myopathy" (PI: J Levy, Co-PI: KP Campbell) | 01/01/09-12/31/10 | \$47,429/year |
| Muscular Dystrophy Association Research Development Grant "Role of Muscle Development/Regeneration in the Pathology of Dystroglycanopathy" (PI: A Beedle, Co-PI: KP Campbell) | 01/01/09-12/31/10 | \$60,000/year |
| Muscular Dystrophy Association Research Development Grant "Efficacy of LARGE as a Therapeutic Strategy for Limb-Girdle Muscular Dystrophy" (PI: EP Rader; Co-PI: KP Campbell) | 01/01/08-12/31/10 | \$45,000/year |
| NIH/NIAMS 3 R01 AR051199-05S1 (R01 Supplement) "Therapeutic potential of α -sarcoglycan in the treatment of limb-girdle muscular dystrophy type 2D (LGMD-2D)" (PI: KP Campbell) | 09/23/09-09/22/10 | \$325,990 |
| NIH/NIAMS 5 R01 AR051199 "Therapeutic Potential of ϵ -sarcoglycan in the Treatment of LGMD Type 2D" (PI: KP Campbell) | 04/01/04-03/31/10 | \$218,366 |

Physical Facilities

Office and Laboratory – Carver Biomedical Research Building, 4283 CBRB, 2500 sq. ft.

Current Personnel Supervised

Postdoctoral Fellows

Hidehiko Okuma
Soumya Joseph
Jeffrey Hord
Tiandi Yang

Previous University

Teikyo University
Australian National University
Texas A&M University
Imperial College London

Start Date

2016
2016
2016
2017

Degree

M.D., Ph.D.
Ph.D.
Ph.D.
Ph.D.

Research Assistants

Mary Anderson
Keith Garringer
Sally Prouty
David Venzke

Post-Baccalaureate Research Interns

Megan Devereaux

Administrative Support

Jaeda Harmon
Amber Mower
Rachel Poe

Undergraduate Lab Assistants

Sarah Burns
Anna Ford
Mercedes Juelfs
Carmin Martinez
Shelly Melton
Saul O'campo Landa
Ben Yeo

Graduate Students

Ameya Walimbe (MSTP)

Clinical and Translational Activities

- 1997-present **Wellstone Muscular Dystrophy Cooperative Research Center**
Director: Kevin Campbell
Exploration of therapeutic strategies for the treatment of various muscular dystrophies by enabling translational research on muscular dystrophies and providing advanced diagnostic services.
- 1997-present **Neuropathology Meeting**
Organizers: Kevin Campbell (Molecular Physiology & Biophysics), Katherine Mathews (Pediatrics and Neurology), Steven Moore (Pathology)
Review and discussion of recent neuromuscular disease patients seen at University of Iowa Hospitals and Clinics or muscle biopsies sent to neuropathology at the University of Iowa for analysis.
** for a more detailed description of the Neuromuscular Disease Group, please see appendix XI*
- 2000-2007 **Limb-Girdle Muscular Dystrophy Study**
Coordinating Center: Ohio State University
PI: Jerry R. Mendell (*Ohio State University*)
Co-PIs: Steven Moore, Kevin P. Campbell (*University of Iowa*)
Members: Katherine Mathews (*University of Iowa*), Robert C. Griggs (*University of Rochester*), Alan Pestronk (*Washington University*), Gerald Fenichel (*Vanderbilt University*), Hansel Stedmann (*University of Pennsylvania*)
Aims:
 1. Establish a registry of LGMD patients in North America with defined gene mutations, for purposes of determining the incidence and natural history of specific disorders in this outbred population.
 2. Establish a cohort of LGMD patients with defined gene mutations to participate in clinical trial involving gene transfer.
 3. Define appropriate end points for clinical efficacy for clinical trials including gene transfer in LGMD.

Invited Seminars (2004 – Present)

- 2004 New Directions in Biology and Disease of Skeletal Muscle, San Diego, California
University of Pennsylvania Children's Hospital, Philadelphia, Pennsylvania
Keystone Symposium on Molecular Biology and Cardiac Disease, Keystone, Colorado
Cincinnati Children's Hospital Medical Center Rachford Lecture, Cincinnati, Ohio
Ohio State University Research Day, Columbus, Ohio
University of Washington Department of Biochemistry, Seattle, Washington
University of California, San Diego, California
American Academy of Neurology Plenary Session, Frontiers in Clinical Neuroscience-Beyond the Decade of the Brain, San Francisco, California
University of Rochester, Rochester, New York
George H. Bishop Lecture Series, Washington University, St. Louis, Missouri
Howard Hughes Medical Institute Scientific Meeting, Chevy Chase, Maryland
Gordon Research Conference on Basement Membranes, Bristol, Rhode Island
Muscular Dystrophy Scientific Workshop Toward Therapeutics, Foundation to Eradicate Duchenne, Inc., La Jolla, California
43rd Annual Iowa Branch American Association for Laboratory Animal Science, Iowa City, Iowa
American Society for Matrix Biology, San Diego, California
University of Iowa Neurology Grand Rounds, Iowa City, Iowa
- 2005 European Neuro Muscular Centre International Workshop on Congenital Muscular Dystrophy, Naarden, The Netherlands
Third Annual Neuromuscular Conference and EMG Workshop, London Health Sciences Centre, London, Ontario, Canada
University of Iowa Internal Medicine Grand Rounds, Iowa City, Iowa
University of Connecticut Health Center Cardiovascular Grand Rounds, Farmington, Connecticut
International Congress of Physiological Sciences, San Diego, California
University of Columbia Colleen Giblin Lecture, New York, New York
Duke CMB Symposium, Duke University, Durham, North Carolina
Mini Medical School Program, University of Iowa, Iowa City, Iowa
AFM Scientific Congress on Myology, Nantes, France
Johns Hopkins Neurology Grand Rounds, Johns Hopkins University, Baltimore, Maryland
Yale Pharmacology Lecture, Yale University, New Haven, Connecticut
Harvard Children's Hospital Orthopedic Research Seminar, Boston, Massachusetts
FASEB Summer Research Conference "Skeletal Muscle Satellite and Stem Cells," Tucson, Arizona
26th Annual David W. Smith Workshop on Malformations and Morphogenesis, The University of Iowa
World Muscle Society Meeting, Iguassu Falls, Brazil
Society for Glycobiology, Boston, Massachusetts
Scripps Research Institute, San Diego, California
- 2006 Masters Class in Molecular Mechanisms of Disease Glycogenetics and Neuromuscular Diseases, Nijmegen School of Molecular Life Sciences (NCMLS), Nijmegen, The Netherlands
Harvard Cell Biology Seminar, Boston, Massachusetts
Neuroscience Program Seminar, The University of Iowa, Iowa City, Iowa
79th Annual Japanese Pharmacological Society, Yokohama, Japan
Osaka University Seminar, Osaka, Japan
Department of Molecular Biology and Genetics Seminar, Johns Hopkins University, Baltimore, Maryland
New Directions in Biology and Disease of Skeletal Muscle Meeting, Dallas, Texas
Frontiers in Myogenesis Meeting, Callaway Gardens, Pine Mountain, Georgia
Department of Defense Military Health Research Forum, San Juan, Puerto Rico
Genetics In-Service Special Presentation, The University of Iowa, Iowa City, Iowa
Neurosurgery Research Conference, The University of Iowa, Iowa City, Iowa
XVI International Congress of Neuropathology, San Francisco, California
HHMI Science Meeting. Janelia Farm Research Campus, Ashburn, Virginia
UT Southwestern Grand Rounds, UT Southwestern, Dallas, Texas
Neuromuscular Plasticity Symposium, University of Florida, Gainesville, Florida
- 2007 Keystone Symposium: Molecular Pathways in Cardiac Development and Disease, Breckenridge, Colorado
Neurosciences Seminar Series, Stanford University, Stanford, California
Presidential Lecture, The University of Iowa, Iowa City, Iowa
Mini Medical School, The University of Iowa, Iowa City, Iowa
Medical College of Wisconsin Student Choice Lecture, Milwaukee, Wisconsin

- The 20th Anniversary of the DMD Gene Discovery: Impact on Muscle Biology, Disease and Therapy, Ottawa
 Neurology Grand Rounds, The University of Iowa, Iowa City, Iowa
 Cornell Biomedical Sciences, Neuroscience Program, and Institute of Cell and Molecular Biology
 Distinguished Lecture, Cornell University, Ithaca, New York
 Genzyme Seminar, Boston, Massachusetts
 Jain Foundation First Annual Dysferlin Conference, Bermuda
 HHMI Scientific Meeting-Molecular Transport and Trafficking, Ashburn, Virginia
 Faculty of Medicine: Perceptions of the Cell, Vancouver, British Columbia, Canada
 Brain Research Centre, Vancouver, British Columbia, Canada
 University of Michigan Symposium, Ann Arbor, Michigan
 World Muscle Society, Giardini Naxos, Italy
- 2008 ENMC Workshop on CMD, Naarden, The Netherlands
 Neuromuscular Disease Seminar, Leiden, The Netherlands
 Banbury Center Meeting, Cold Spring Harbor, New York
 Loyola University White Lecture, Maywood, Illinois
 SGH 17th Annual Scientific Meeting, Singapore
 New Directions in Biology and Disease of Skeletal Muscle, New Orleans, Louisiana
 International Workshop for Glycosylation Defects in Muscular Dystrophy, Charlotte, North Carolina
 Sloan-Kettering Cancer Center Seminar, New York, New York
 Harvard Medical School Grand Rounds, Boston, Massachusetts
 Gordon Research Conference on Basement Membranes, Biddeford, Maine
 Iowa Congenital Muscular Dystrophy Meeting, Iowa City, Iowa
 Society for General Physiologists, Woods Hole, Massachusetts
 University of Kentucky Distinguished Speaker Series, Lexington, Kentucky
 4th Banbury Conference on SMA: Taking on New Complexities in SMA Biology, Cold Spring Harbor
 CFA Symposium, Philadelphia, Pennsylvania
- 2009 HHMI Science Meeting, Chevy Chase, Maryland
 The Scripps Research Institute Bernard Field Lecture, La Jolla, California
 Vanderbilt Discovery Lecture, Nashville, Tennessee
 Columbia University Making Muscle in the Embryo and Adult joint meeting with Frontiers in Myogenesis,
 New York, New York
 March of Dimes Prize in Developmental Biology Acceptance Lecture, Baltimore, Maryland
 Novartis Institutes for BioMedical Research, Inc., Cambridge, Massachusetts
 Boston Biomedical Research Institute (BBRI), Watertown, Massachusetts
 CMD Therapeutic Target Conference, Atlanta, Georgia
 Keynote Speaker, Society of General Physiologists, Woods Hole, Massachusetts
 Society of Glycobiology, San Diego, California
 49th American Society for Cell Biology Annual Meeting, San Diego, California
- 2010 ENMC Workshop on Dysferlinopathy, Naarden, The Netherlands
 UC Santa Barbara, Santa Barbara, California
 Loyola University Chicago, Chicago, Illinois
 Genzyme Corp., Framingham, Massachusetts
 University of Georgia, Athens, Georgia
 The Ottawa Conference on New Directions in Biology & Disease in Skeletal Muscle, Ottawa, Ontario,
 Canada
 University of Nebraska Medical Center, Omaha, Nebraska
 University of Minnesota, Lilliehei Heart Institute, Minneapolis, Minnesota
 University of Texas Health Science Center – Houston, Institute of Molecular Medicine, Houston, Texas
 XII International Congress on Neuromuscular Diseases, Naples, Italy
 University of Wisconsin, Cardiovascular Research Conference, Madison, Wisconsin
 American Society of Matrix Biology meeting, Charleston, South Carolina
 University of Texas Southwestern, Dallas, Texas
 Muscular Dystrophy Workshop, Charlotte, North Carolina
 Children’s National Medical Center, Washington, District of Columbia
- 2011 NGM Biopharmaceuticals, Inc., San Francisco, California
 UC San Diego, San Diego, California
 Glycobiology Symposium, San Diego, California
 2nd Annual SBMRI Rare Disease Symposium, San Diego, California

- UC Davis, Davis, California
 UC San Francisco, Gladstone Institute, San Francisco, California
 1st Chinese conference on translational research in Duchenne muscular dystrophy, Guangzhou, China
 The Sanford-Burnham Medical Research Institute, La Jolla, California
 Nationwide Children's Hospital, The Ohio State University, Columbus, Ohio
 AANP Annual Meeting, Presidential Symposium, Seattle, Washington
 Gordon Research Conference on Collagen, New London, New Hampshire
 Consortium for Functional Glycomics PI Meeting, Bethesda, Maryland
 International Conference on Muscle Wasting 2011, Ascona, Switzerland
 Coalition to Cure Calpain3 LGMD2A Workshop, Santa Monica, California
 Kurt Ebner Discovery Lecture, University of Kansas Medical Center, Kansas City, Kansas
 ENMC Dystroglycan and Dystroglycanopathies Workshop, Naarden, The Netherlands
- 2012 Iowa State University, Ames, Iowa
 CMD: Exploring the Role of Myomatrix, Reno, Nevada
 University of Nebraska-Lincoln, Lincoln, Nebraska
 Yeshiva University, Einstein College of Medicine, Bronx, New York
 Frontiers in Myogenesis Meeting, New York, New York
 New Directions in Biology and Disease of Skeletal Muscle Conference, New Orleans, Louisiana
 Institut Pasteur, Paris, France
 Duke University, Durham, North Carolina
 World Muscle Society Meeting, Perth, Australia
 Panel Discussion: Disease Pathogenesis, Wellstone Centers Meeting, Watertown, Massachusetts
 College of Medicine Dean's Distinguished Lecture, University of Kentucky, Lexington, Kentucky
 Center for Muscle Biology Fall Retreat, University of Kentucky, Lexington, Kentucky
- 2013 Glycobiology Research Conference, Ventura, California
 Glycosylation Workshop, Charlotte, North Carolina
 ASBMB Annual Meeting, Boston, Massachusetts
 HHMI Scientific Meeting, Ashburn, Virginia
 Johnson-Sokatch Lectureship, University of Oklahoma, Oklahoma City, Oklahoma
 Dept. of Biological Chemistry Seminar Program, Johns Hopkins University, Baltimore, Maryland
 55th Annual Meeting of the Japanese Society of Child Neurology, Oita, Japan
 Segawa Neurological Clinic for Children Symposium, Tokyo, Japan
 John and Margaret Faulkner Lectureship, University of Michigan, Ann Arbor, Michigan
 EMBO Workshop on Muscle Wasting, Ascona, Switzerland
 Cornell University Physiology Biophysics and Systems Biology Seminar Series, New York, New York
 University of Georgia, Athens, Georgia
- 2014 Cincinnati Children's Heart Institute Seminar Series, Cincinnati, Ohio
 Pediatrics Frontiers in Research seminar, University of Iowa, Iowa City, Iowa
 Neurology Grand Rounds, University of California Los Angeles, Los Angeles, California
 Baylor College of Medicine Seminar, Baylor University, Houston, Texas
 Presentation to the Carver Trust, University of Iowa, Iowa City, Iowa
 Neurogenetics Symposium, University of Iowa, Iowa City, Iowa
 Texas A&M University Neuroscience Seminar, Texas A&M University, College Station, Texas
 Duke University Biochemistry Seminar, Duke University, Durham, North Carolina
- 2015 Frontiers in Biomedical Research Symposium, Scripps Research Institute, Indian Wells, California
 Muscular Dystrophy Association Scientific Conference, Washington, DC
 Biochemistry, Biophysics and Molecular Biology Seminar, Iowa State University, Ames, Iowa
 Alexion Muscular Dystrophy Symposium, Cheshire, Connecticut
 Physics Education Group Meeting, Washington, DC
 Workshop for Glycosylation Defects in Muscular Dystrophy, Charlotte, North Carolina
 National Academy of Sciences Meeting, Washington, DC

- Pfizer Frontiers in Human Disease Symposium, New York, New York
 University of Minnesota Biochemistry Seminar, Minneapolis, Minnesota
 Translational Biology and Molecular Medicine Bench to Bedside Seminar, Baylor University, Houston, Texas
 ENMC Workshop on Animal Models for Congenital Muscular Dystrophies, Naarden, The Netherlands
 Parent Project Muscular Dystrophy Meeting, Washington, DC
 UPS Workshop on Glycosylation Analysis for Biopharmaceuticals, Rockville, Maryland
 Society of General Physiologists Symposium, Woods Hole, Massachusetts
 Muscle Wasting Meeting, Ascona, Switzerland
 Ottawa Conference on Neuromuscular Biology, Disease, and Therapy, Ottawa, Canada
 Wellstone Centers Network Meeting, Seattle, Washington
 University of Virginia Seminar, Charlottesville, Virginia
 Howard Hughes Medical Scientific Meeting, Chevy Chase, Maryland
 Society for Glycobiology Meeting, San Francisco, California
 Vanderbilt Biomedical Science Advisory Board Meeting, Nashville, Tennessee
 ARMGO Meeting, New York City, New York
- 2016 ENMC Workshop on Fukutin Related Protein – Related Myopathies, Naarden, The Netherlands
 University of California, San Diego Seminar, San Diego, California
 Oregon State University Seminar, Corvallis, Oregon
 Howard Hughes Medical Institute Scientific Meeting, Chevy Chase, Maryland
 National Academy of Sciences Meeting, Washington, DC
 Spinal Muscular Atrophy Foundation, Muscle Advisory Board Meeting, New York City, New York
 Vanderbilt University Seminar, Nashville, Tennessee
 ENMC Workshop on Dystroglycan and the Dystroglycanopathies, Naarden, The Netherlands
 Society for Muscle Biology Meeting, Asilomar, California
 Genzyme Scientific Advisory Board Meeting, Framingham, Massachusetts
 10th International Symposium on Glycosyltransferases, Toronto, Canada
 Parent Project Muscular Dystrophy Annual Connect Conference, Orlando, Florida
 New Directions in Biology and Disease of Skeletal Muscle Conference, Orlando, Florida
 Salk Meeting on Post-translational Regulation of Cell Signaling, La Jolla, California
 BioMed Central Editors' Conference, New York, New York
 University of Maine GSBSE Seminar, Orono, Maine
 University of Iowa Neuromuscular-Neurogenetics Symposium, Iowa City, Iowa
 International Congress of The World Muscle Society, Granada, Spain
 American Society for Matrix Biology Meeting, St. Petersburg, Florida
 Muscular Dystrophy Coordinating Committee Meeting (NIH), Bethesda, Maryland
 Vanderbilt University Biomedical Science Advisory Board Meeting, Nashville, Tennessee
 University of Minnesota, Marzolf Symposium, Minneapolis, Minnesota
- 2017 Advances in Skeletal Muscle Biology in Health & Disease Conference, Gainesville, Florida
 UCLA Clinical and Translational Science Institute Seminar Series, Los Angeles, California
 International Workshop for Glycosylation Defects in Muscular Dystrophy, Charlotte, North Carolina
 George Karpati Lecture, McGill University, Montreal Canada
 FASEB Meeting - From Unfolded Proteins in the ER to Disease Conference, Saxton's River, Vermont
 CMD Science & Family Conference, Washington, DC
 University of Georgia Center for Molecular Medicine Symposium, Athens, Georgia
 University of Iowa Neuromuscular-Neurogenetics Symposium, Iowa City, Iowa
 Society of Glycobiology Innovators Award Lecture, Portland, Oregon
 Howard Hughes Medical Institute Scientific Meeting, Chevy Chase, Maryland
 UT Southwestern, Fouad A. and Val Imm Bashour Distinguished Lectureship in Physiology, Dallas, Texas
 American Society for Cell Biology/European Molecular Biology Organization Meeting, Philadelphia, Pennsylvania
 Vanderbilt University Biomedical Science Advisory Board Meeting, Nashville, Tennessee
 Tufts University, Sakler School of Graduate Biomedical Sciences Seminar, Medford, Massachusetts

- 2018 Sanford Burnham Prebys Rare Disease Day Symposium & Congenital Disorders of Glycosylation Family Conference, San Diego, California
 University of Vermont Pharmacology Seminar, Burlington, Vermont
 Kyoto University, Katsura Campus Seminar, Kyoto Japan
 Graduate School of Medicine Kobe University Seminar, Kobe, Japan
 Japan Muscle Society Meeting, Kurashiki, Japan
 University of Iowa Neuromuscular-Neurogenetics Symposium, Iowa City, Iowa
 Muscle Wasting Meeting, Ascona, Switzerland
 Harvard Glycoscience Symposium, Boston, Massachusetts
- 2019 International Workshop for Glycosylation Defects in Muscular Dystrophies, Charlotte, North Carolina
 100 Years of Neurology at the University of Iowa Centennial Symposium, Iowa City, Iowa
 University of Iowa Neuromuscular-Neurogenetics Symposium, Iowa City, Iowa
 5th Ottawa International Conference on Neuromuscular Disease & Biology, Ottawa Canada
 University of Iowa First-Generation Student Awards and Recognition Ceremony, Iowa City, Iowa
 Wellstone Centers Network Meeting, Rochester, New York
- 2020 University of California, San Diego Cellular & Molecular Medicine Seminar, San Diego, CA
 San Diego Glycobiology Symposium, San Diego, CA
 Regeneron Seminar Series, Tarrytown, NY
 ASBMB Herbert Tabor Research Award & Lectureship, San Diego, CA
 American College of Rheumatology Pediatric Rheumatology Symposium, New Orleans, LA
 Howard Hughes Medical Institute Scientific Meeting, Ashburn, VA
 Amicus Therapeutics Seminar, Philadelphia, PA
 12th International GlycoT Conference, Boston, MA
 ENMC Workshop, Hoofddorp, The Netherlands
 Tamio Yamakawa Award Lecture, Tokyo, Japan

Patents

1. Title: Immunogen Conjugates and the Use Thereof in a Dihydropyridine Assay
 Inventor: Kevin P. Campbell
 Patent No: 4,784,955 Patent Issue: November 15, 1988
2. Title: Dihydropyridine Receptor and Antibodies Thereto
 Inventors: Kevin P. Campbell, Toshiaki Imagawa and Albert T. Leung
 Patent No: 4,912,202 Patent Issue: March 27, 1990
3. Title: Measuring Non-Dystrophin Proteins and Diagnosing Muscular Dystrophy
 Inventors: Kevin P. Campbell, James M. Ervasti, Kay Ohlendieck, Mitchell G. Gaver and Steven D. Kahl
 Patent No: 5,187,063 Patent Issue: February 16, 1993
4. Title: Diagnosing Malignant Hyperthermia Susceptibility by Detection of Abnormal Proteolytic Enzyme Digestion Fragments of the Ryanodine Receptor
 Inventors: Kevin P. Campbell, C. Michael Knudson, Steven D. Kahl, Charles F. Louis and James R. Mickelson
 Patent No: 5,242,801 Patent Issue: September 7, 1993
5. Title: Nucleic Acids Encoding Dystrophin-Associated Proteins
 Inventors: Kevin P. Campbell, Oxana Ibraghimov-Beskrovnaya, James M. Ervasti and Cynthia J. Leveille
 Patent No: 5,260,209 Patent Issue: November 9, 1993
6. Title: Diagnosis of Autosomal Muscular Dystrophy
 Inventors: Kevin P. Campbell and Kiichiro Matsumura
 Patent No: 5,308,752 Patent Issue: May 3, 1994
7. Title: Calcium Channel Compositions and Methods

Inventors: Scott Jay, Steven B. Ellis, Michael M. Harpold and Kevin P. Campbell
Patent No: 5,386,025 Patent Issue: January 31, 1995

8. Title: Measuring Non-Dystrophin Proteins and Diagnosing Muscular Dystrophy
Inventors: Kevin P. Campbell, James M. Ervasti, Kay Ohlendieck, Mitchell G. Gaver and Steven D. Kahl
Patent No: 5,413,910 Patent Issue: May 9, 1995
9. Title: Method for Screening for Cardiomyopathy
Inventors: Kevin P. Campbell
Patent No: 5,418,139 Patent Issue: May 23, 1995
10. Title: Purified, Native Dystrophin
Inventors: Kevin P. Campbell, Steven D. Kahl and James M. Ervasti
Patent No: 5,430,129 Patent Issue: July 4, 1995
11. Title: Nucleic Acid Encoding Dystrophin-Associated Protein
Inventors: Kevin P. Campbell, Steven L. Roberds and Richard D. Anderson
Patent No: 5,449,616 Patent Issue: September 12, 1995
12. Title: Diagnosing Malignant Hyperthermia Susceptibility by Detection of Abnormal Proteolytic Enzyme Digestion Fragments of the Ryanodine Receptor
Inventors: Kevin P. Campbell, C. Michael Knudson, Steven D. Kahl, Charles F. Louis and James R. Mickelson
Patent No: 5,462,857 Patent Issue: October 31, 1995
13. Title: Immunogenic Ryanodine Derivative and Related Uses
Inventors: Kevin P. Campbell, Derrick R. Witcher, Peter McPherson, Steven D. Kahl, John D. Windass, Terence Lewis and Philip Bentley
Patent No: 5,492,839 Patent Issue: February 20, 1996
14. Title: β -Sarcoglycan Nucleic Acid Sequence, Deleterious Mutations and Applications
Inventors: Kevin P. Campbell, Leland Lim, Franck Duclos, Yoshihide Sunada, Jacques Beckmann, Odile Broux, Fernando M. S. Tomé, Michel Fardeau and Charles E. Jackson
Patent No: 5,672,694 Patent Issue: September 30, 1997
15. Title: Polyclonal and Monoclonal Antibodies Against a 43 kDa Dystrophin Associated Protein
Inventors: Kevin P. Campbell, Oxana B. Ibraghimov, James M. Ervasti and Cynthia J. Leveille
Patent No: 5,686,073 Patent Issue: November 11, 1997
16. Title: Recombinant Production of Mammalian Calcium Channel Gamma Subunits
Inventors: Scott D. Jay, Steven B. Ellis, Michael M. Harpold and Kevin P. Campbell
Patent No: 5,726,035 Patent Issue: March 10, 1998
17. Title: Methods for Detecting Primary Adhalinopathy
Inventors: Kevin P. Campbell, Steven Roberds, Yoshihide Sunada, Federica Piccolo, Marc Jeanpierre and Jean-Claude Kaplan
Patent No: 5,733,732 Patent Issue: March 31, 1998
18. Title: δ -Sarcoglycan Nucleic Acid Sequences
Inventor: Kevin P. Campbell, Daniel Jung, Franck Duclos, Volker Straub and John McPherson
Patent No: 5,837,537 Patent Issue: November 17, 1998
19. Title: Merosin Deficiency-Type Congenital Muscular Dystrophy
Inventors: Kevin P. Campbell, Yoshihide Sunada, Fernando M.S. Tomé, Michel Fardeau
Patent No: 5,863,743 Patent Issue: January 26, 1999

20. Title: Arenavirus Receptor and Methods of Use.
Inventors: Kevin P. Campbell, Michael Henry, Hiroki Yamada, Roger Williamson, Wei Cao, Michael Oldstone
Patent No: 6,083,911 Patent Issue: July 4, 2000
21. Title: Method for Aiding the Diagnosis of In-Frame Deletion Type Congenital Muscular Dystrophy
Inventors: Kevin P. Campbell, Valérie Allamand, Yoshihide Sunada, Voker Straub, Mustafa Salih
Patent No: 6,136,546 Patent Issue: October 24, 2000
22. Title: Pathogenesis of Cardiomyopathy
Inventors: Kevin P. Campbell, Ramon Coral, Ronald Cohn, Roger Williamson and Madeleine Durbeej
Patent No: 6,201,168 B1 Patent Issue: March 13, 2001
23. Title: Sarcospan-Deficient Mouse as a Model for Clinical Disorders Associated with Sarcospan Mutations
Inventors: Kevin P. Campbell, Connie Lebakken, Rachelle Crosbie, Roger Williamson
Patent No: 6,207,878 B1 Patent Issue: March 27, 2001
24. Title: δ -Sarcoglycan Nucleic Acid Sequences, Amino Acid Sequences and Applications
Inventors: Kevin P. Campbell, Daniel Jung, Franck Duclos, Volker Straub and John McPherson
Patent No: 6,211,340 B1 Patent Issue: April 3, 2001
25. Title: Gene Replacement Therapy for Muscular Dystrophy
Inventors: Kathleen H. Holt, Franck Duclos, Leland E. Lim, Volker Straub, Beverly Davidson, Roger Williamson and Kevin P. Campbell
Patent No: 6,262,035 B1 Patent Issue: July 17, 2001
26. Title: Receptor for Mycobacterium Leprae and Methods of Use Thereof
Inventors: Anura Rambukkana, Vincent A. Fischetti and Kevin P. Campbell
Patent No: 6,331,405 B1 Patent Issue: December 18, 2001
27. Title: Genes Encoding Neuronal Voltage-Gated Calcium Channel γ Subunits
Inventors: Verity A. Letts, Wayne N. Frankel, Kevin P. Campbell, Ricardo Felix, Gloria Biddlecome
Patent No: 6,365,337 B1 Patent Issue: April 2, 2002
28. Title: Evaluation of Adenocarcinoma of the Prostate and Breast Using Anti-Dystrglycan Antibodies
Inventors: Kevin P. Campbell, Michael Henry, Michael B. Cohen
Patent No: 6,379,893 B1 Patent Issue: April 30, 2002
29. Title: Disruption of the Sarcoglycan-Sarcospan Complex in Vascular Smooth Muscle: A Novel Mechanism in the Pathogenesis of Cardiomyopathy and Muscular Dystrophy.
Inventors: Kevin P. Campbell, Roger Williamson, Ramon Coral, Ronald D. Cohn
Patent Application: August 20, 1999
30. Title: Increasing Functional Glycosylation of α -Dystrglycan in the Treatment of Muscle Degeneration.
Inventors: Kevin P. Campbell and Rita Barresi
Patent No: 8,119,766 B2 Patent Issue: February 21, 2012
31. Title: Inhibitors of Phosphodiesterase Type 5A for Treating or Preventing Muscle Disease or the Symptoms Thereof in a Patient.
Inventors: Kevin P. Campbell, Yvonne Kobayashi, and Robert Crawford
Patent No: 9,387,210 B2 Patent Issue: July 12, 2016
32. Title: Inhibitors of Phosphodiesterase Type 5A for Reducing Skeletal Muscle Fatigue, Edema, and Damage in a Patient Having Muscle Fatigue due to Increased Age of Exercise.
Inventors: Kevin P. Campbell, Yvonne Kobayashi, and Robert Crawford
Patent No: 9,943,518 B2 Patent Issue: April 17, 2018

Bibliography

Reviews, Book Chapters, and Editorials

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Campbell, K.P. and Tortorelli, P. Application of Mossbauer Spectroscopy to the Study of Ferritin. *The Manhattan Scientist*. 27, 4-10, 1974.

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MacLennan, D.H., Reithmeier, R.A.F., Shoshan, V., Campbell, K.P., LeBel, D., Herrmann, T.R. and Shamoo, A.E. Ion Pathways in Proteins of the Sarcoplasmic Reticulum. *Ann. N.Y. Acad. Sci.* 358, 138-148, 1980.

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MacLennan, D.H., Campbell, K.P., Takisawa, H. and Tuana, B.S. A Calmodulin-Dependent Protein Kinase System from Skeletal Muscle Sarcoplasmic Reticulum. In: Advances in Cyclic Nucleotide and Protein Phosphorylation Research. (P. Greengard, G.A. Robison, R. Paoletti and S. Nicosia, eds.) Raven Press, New York, Vol. XVII, pp. 393-401, 1984.

Campbell, K.P. Protein Components and Their Roles in Sarcoplasmic Reticulum Function. In: Sarcoplasmic Reticulum in Muscle Physiology. (M.L. Entman and W.B. Van Winkle, eds.) CRC Press, Boca Raton, Florida, Vol. I, pp. 65-99, 1986.

Campbell, K.P., Leung, A.T. and Sharp, A.H. The Biochemistry and Molecular Biology of the Dihydropyridine-Sensitive Calcium Channel. *Trends Neurosci.* 11, 425-430, 1988.

Campbell, K.P., Leung, A.T. and Imagawa, T. Structural Characterization of the Nitrendipine Receptor of the Voltage-Dependent Ca²⁺ Channel: Evidence for a 52,000 Dalton Subunit. *J Cardiovasc Pharmacol.* 12(Suppl.4), S86-S90, 1988.

Campbell, K.P., Leung, A.T., Sharp, A.H., Imagawa, T. and Kahl, S.D. Ca²⁺ Channel Antibodies: Subunit-Specific Antibodies as Probes for Structure and Function. Proceedings from the Bayer Centenary Symposium. In: The Calcium Channel: Structure, Function and Implications. (M. Morad, W. Nayler, S. Kazda, M. Schramm, eds.) Springer-Verlag Berlin Heidelberg, Germany, pp. 586-600, 1988.

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