

Cole M. Haynes, Ph.D.

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PROFESSIONAL POSITIONS

Associate Member 2009-present
Cell Biology Program
Memorial Sloan Kettering Cancer Center
New York, NY 10065

Associate Professor, Gerstner Sloan-Kettering Graduate School
Associate Professor, BCMB Program, Weill Cornell Medical College

EDUCATION

Ph.D. Cell Biology and Biophysics 2003
University of Missouri-Kansas City

B.S. Biology 1998
Truman State University

RESEARCH EXPERIENCE

Postdoctoral Fellow 2004-2009
New York University School of Medicine
Department of Cell Biology
Laboratory of David Ron
"Identification and Characterization of UPR^{mt} Signaling Components"

Graduate Student 1998-2003
University of Missouri-Kansas City
Department of Cell Biology and Biophysics
Laboratory of Antony Cooper
"Protective adaptations to endoplasmic reticulum dysfunction"

HONORS, AWARDS, PATENTS

Bristol-Myers Squibb/James D. Robinson III Junior Faculty Chair 2014
Boyer Award in Basic Research 2014
Award to an outstanding basic scientist under forty
University of Missouri-KC Alumni Achievement Award from the 2014
School of Biological Sciences

Ellison Medical Foundation New Scholar in Aging	2011
Alfred W. Bressler Scholar	2010
Gerstner Young Investigator Award	2009
Ruth L. Kirschstein National Research Service Award	2005
U.S. Patent: Modulators of Alpha-Synuclein Toxicity Application No. US2005045560	2005
Distinguished Dissertation Fellowship, University of Missouri	2003
Chancellor's Interdisciplinary Fellowship, University of Missouri	2003
University of Missouri, Travel Grant	2001
Truman State University, Chancellor's Scholarship	1994-1998
Missouri Public Service, Scholarship for Undergraduate Studies	1994
University of Missouri, Curator's Scholarship (declined)	1994

ACADEMIC SERVICE

Weill-Cornell BCMB ACE Committee	2010-2014
Gerstner Sloan Kettering Graduate School Admissions Committee	2011-
SKI Graduate Fellowship Committee	2011
Chair of the Weill-Cornell BCMB Qualifying Exam (ACE)	2014-
Gerstner Sloan Kettering Graduate Program First Year Mentor	2011
Graduate Thesis Committees	
GSK Program: Justine Miller, Jens Hamman	2010-
BCMB Program: Aneesh Sheth, Matej Krajcovic, Brittany Carson	2011-
Tri-Institutional MD, PhD: Maxime Kinet, Salihah Dick	2013-
Summer Undergraduate Research Students (GSK-SURP)	2010-2014
Daniel Triner, Mark Dombrowski, Oyin Ogundi, Brian Randall	
Mentored graduate students:	
Christopher J. Fiorese, Weill-Cornell BCMB	2010-
Seungjae Moon, Weill-Cornell BCMB	MS 2011-2013
Pan Deng, Weill-Cornell BCMB	2013-
External Graduate Student Thesis Committees:	
1. Thesis exam committee: Daniel Pullman, Lab of Holly Van Remmen "The UPR ^{mt} and metabolic adaptation in a mouse model with mitochondrial dysfunction and extended lifespan"	2011-
2. Thesis exam committee: Annie Bie, Lab of Peter Bross. The role of "Hsp60 and mitochondrial protein quality control in zebrafish and mammals"	2014-

TEACHING

Gerstner Sloan Kettering Core Course lecturer	2010-
<i>Topic:</i> Errors in Protein Folding in Cancer Mitochondria and Endoplasmic Reticulum	
Weill Cornell BCMB Cell Biology and Development Course	2010-
<i>Topic:</i> Protein Folding in a Cell	
BCMB Program Cell Structure and Function Focus Group Course Director. <i>Topic:</i> Mitochondria and Apoptosis	2011

PROFESSIONAL MEMBERSHIPS AND OTHER SERVICES

Member ASCB	2010-
Member ASBMB	2012-
New York Academy of Sciences	2009-2012

GRANT REVIEWS AND STUDY SECTIONS

NIH Study Sections

Cellular Mechanisms of Aging and Development, <i>ad hoc</i>	Feb 7-8, 2015
Synapses, Cytoskeleton and Trafficking. Special emphasis panel.	April 9, 2013
Cellular Mechanisms of Aging and Development, <i>ad hoc</i>	Feb 7-8, 2013

Additional

European Research Council (ERC), Advisory Panel	2015
European Research Council (ERC), <i>ad hoc</i>	2015
National Science Foundation, <i>ad hoc</i>	2015
American Foundation for Aging Research National Scientific Advisory Council	2009-
Army Research Office Core Grants	2013-

AD HOC REVIEWER

Nature, Science, eLife, PNAS, Science Signaling, Cell Metabolism, Molecular Biology of the Cell, Molecular Cell, Cell Reports, Current Biology, Nature Reviews Molecular Cell Biology, Aging Cell, PLoS Genetics, Nature Communications, Molecular and Cellular Biology, BMC Biology, Human Molecular Genetics, Oncogene, FASEB, PLoS One, Journal of Cell Science, JoVE, Disease Models and Mechanisms, Cell Death and Differentiation, Worm, Biochemical Journal, Experimental Gerontology, Mammalian Genome

INVITED TALKS

Seminars:

EPFL Distinguished Speaker Lecture, Lausanne, Switzerland. Feb 1	2016
Peking-Tsinghua Center for Life Sciences, Beijing, China. Oct 19	2015
Joslin Diabetes Center, Boston, Mass, Feb 26	2015
University of Massachusetts-Amherst, Dept. of Biochemistry, Oct 28	2014
University of Nebraska, Redox Biology Center, Oct 14	2014
Hunter University, City University of New York, Biology Department, Oct 6	2014
Buck Institute for Research on Aging, Sept 5	2014
University of Washington, Nathan Shock Center in the Basic Biology of Aging, May 8	2014
University of Missouri-Kansas City, School of Biological Sciences, April 4	2014
Yale University, Department of Genetics, April 15	2014
Oklahoma Medical Research Foundation. April 10	2014
Stanford University, Symposium on Protein Quality Control. Feb 7	2014
Mount Sinai School of Medicine, January 10	2014

Sloan-Kettering Institute Scientific Colloquium. Oct 21 Protecting the Powerhouse: Maintaining Metabolic Homeostasis Via Mitochondria-to-Nuclear Signaling	2013
University of California-Los Angeles. Molecular Biology Institute Interdepartmental Seminar. Los Angeles, CA. Spring.	2013
Iowa State University. Department of Biomedical Sciences. Ames, IA. April 18	2013
University of Southern California, Keck Graduate School. "Cellular Homeostasis Seminar Series." Los Angeles, CA. March 14	2013
Max Planck Institute for Biology of Aging Departmental Seminar. Cologne, Germany. Jan 16	2013
New York University School of Medicine, Department of Cell Biology "From Cell to Organism." Dec 4	2012
Goethe University. Department of Neuroscience Seminar. Frankfurt am Main, Germany. May 31	2012

Meetings and Conferences:

ER-Mitochondrial Signaling in Health and Disease, Featured Speaker NIH/NHLBI, Bethesda, Maryland May 18-19	2016
Cell Symposium, Multifaceted Mitochondria Chicago, IL, July 19-21	2015
Stress Proteins in Growth, Development and Disease Gordon Research Conference, Lucca, Italy July 5-10	2015
America Aging Association, "What role do mitochondria play in aging?" San Antonio, Texas. May 31	2014
Mitochondrial Dynamics and Physiology Keystone Symposia, Santa Fe, New Mexico Feb 18-23	2014
Aging-Pushing the Limits of Cellular Quality Control Keystone Symposia, Steamboat Springs, Colorado Jan 12-17	2014
American Society for Cell Biology, Mitochondria Subgroup. New Orleans, Louisiana. Dec 14	2013
The 4 th International Symposium on Dynamics of Mitochondria Okinawa, Japan. Oct 28-Nov 1	2013
New York Cell Death Meeting The Rockefeller University, NY, June 20	2013
Stress Proteins in Growth, Development and Disease Gordon Research Conference, Mount Snow, VT July 7-12	2013
Aging, Stress, Pathogenesis and Small RNAs in <i>C. elegans</i> University of Wisconsin. July 12-15	2012
ASBMB Special Symposia on Mitochondria. Michigan State University. June 27-29	2012
Sixth Annual Division of Aging Biology New Investigators Forum. National Institutes of Health. June 19-21	2012
Cold Spring Harbor. Molecular Chaperones and Stress Responses May 1-5	2012
Keystone Meeting. Cell Death Pathways: Beyond Apoptosis Banff, Canada. March 19-24	2012
Fifth Cell Stress Society Congress. Quebec City, Canada. Aug. 21-25	2011
The Expanding Roles of Mitochondria in Cell Biology and Disease. Janelia Farms. May 9-12.	2011
ASCB Annual Meeting. Cellular Stress Response Minisymposium. Philadelphia, Pennsylvania. Dec. 11-15	2010

Aging, Stress, Pathogenesis and Small RNAs in *C. elegans* 2010
University of Wisconsin. July 12-15

Lab Member Talks

Amrita Nargund 2014
Keystone Symposia. Aging-Pushing the Limits of Cellular Quality Control

FUNDING

Active

National Institutes of Health (NIA) R01AG040061 9/15/11 - 8/31/16
"Maintenance of mitochondrial protein folding as an aging effector"
Role: PI

National Institutes of Health (NIA) R01AG047182 2/1/15 – 1/31/20
"Coordinated repair and regeneration of defective mitochondria"
Role: PI

National Institutes of Health (NIGMS) R01HL127891-01 4/1/15 – 2/28/19
"The role of the mitochondrial UPR in ischemia protection"
Role: Co-PI

Ellison Medical Foundation 8/15/11 - 8/14/15
"The impact of increased mitochondrial unfolded protein response signaling on
aging and age-associated stress"
Role: PI

Past

Lucille Castori Center for Microbes, Inflammation 7/1/12 – 6/30/14
and Cancer Seed Grant
"Identification and development of a *Pseudomonas aeruginosa*-produced UPR^{mt}
inhibitor"

Louis V. Gerstner, Jr. Young Investigator Award 6/1/10-5/31/13
Role: PI

Alfred W. Bressler Award 7/1/10-6/30/13
Role: PI

Haynes Laboratory Postdoctoral Funding

German Research Foundation 1/1/2015-12/31/2016
"Regulation of cancer cell metabolic adaptations via the UPR^{mt}"
Role: Mentor Postdoc receiving award: Anna Schulz

The Parkinson's Disease Foundation 7/1/13 – 6/30/14
"Characterization of a novel component that functions upstream of PINK1 linking the
mitochondrial unfolded protein response to mitophagy"
Role: Mentor Postdoc receiving award: Yi-Fan Lin

National Institutes of Health (NIGMS) F32GM102974 9/22/13 – 9/21/14

“ATFS-1 mediates the coordination of mitochondrial and nuclear genome expression”
Role: Mentor Postdoc receiving award: Amrita M. Nargund

PUBLICATIONS

Schulz AM, **Haynes CM**. (2015) UPR^{mt}-mediated cytoprotection and organismal aging. *Biochim Biophys Acta*. In press.

Nargund AN, Fiorese CJ, Pellegrino MW, Deng P, **Haynes CM**. (2015) Mitochondrial and nuclear accumulation of the transcription factor ATFS-1 promotes OXPHOS recovery during the UPR^{mt}. *Mol Cell*. April 2;58(1):123-33.

Pellegrino MW, **Haynes CM**. (2015) Mitophagy and the UPR^{mt} in neurodegeneration and bacterial infection. *BMC Biology*. April 3;13(1): 22. doi: 10.1186/s12915-015-0129-1.

Mohrin M, Shin J, Liu Y, Brown K, Luo H, Xi Y, **Haynes CM**, Chen D. (2015) A mitochondrial UPR-mediated metabolic checkpoint regulates hematopoietic stem cell aging. *Science*. March 20;347(6228): 1374-1377.

Pellegrino MW, Nargund AN, Kirienko NV, Gillis R, Fiorese CJ, **Haynes CM**. (2014) Mitochondrial UPR-regulated innate immunity provides resistance to pathogen infection. *Nature*. Dec 18;516(7531): 414-417.

Haynes CM, Fiorese CJ, Lin YF. (2013) Evaluating and responding to mitochondrial dysfunction: the mitochondrial unfolded protein response and beyond. *Trends in Cell Biology*. July;23(7): 311-318.

Nargund AN*, Pellegrino MW*, Fiorese CJ, Baker BM, **Haynes CM**. (2012) Mitochondrial import of ATFS-1 regulates mitochondrial UPR activation. *Science*. Aug 3;337(6094): 587-90.

Published in *ScienceExpress*.

Previewed in *Developmental Cell* by Vogtle and Meisinger.

Recommended by *F1000*.

Wojtovich AP, Smith CO, **Haynes CM**, Nehrke KW, Brookes PS. (2013) Physiological consequences of complex II inhibition for aging, disease, and the mKATP channel. *Biochim Biophys Acta*. May;1827(5): 598-611.

Baker BM, Nargund AN, Sun T, **Haynes CM**. (2012) Protective coupling of mitochondrial function and protein synthesis via the eIF2 α kinase GCN-2. *PLoS Genetics*. Jun;8(6): e1002760.

Pellegrino MW, Nargund AN, **Haynes CM**. (2013) Signaling the mitochondrial unfolded protein response. *Biochim Biophys Acta-Mol Cell Res*. Feb;1833(2); 410-16.

Florey O, Kim SE, Sandoval CP, **Haynes CM**, Overholtzer M. (2011) Autophagy machinery mediates macroendocytic processing and entotic cell death by targeting single membranes. *Nat Cell Biol*. Oct 16;13(11): 1335-43.

Baker BM, **Haynes CM**. (2011) Mitochondrial Protein Quality Control: Biogenesis and Old Age. *Trends in Biochemical Sciences*. May; 36(5): 254-61.

Haynes CM*, Ron D. (2010) The mitochondrial UPR: protecting organelle protein homeostasis. *The Journal of Cell Science*. Nov 15;123: 3849-55. *corresponding author

Haynes CM*, Yang Y, Blais S, Neubert TA, Ron D*. (2010) The matrix peptide exporter HAF-1 signals a mitochondrial UPR by activating the bZip transcription factor ZC376.7 in *C. elegans*. *Molecular Cell*. Feb 26;37(4): 529-40. *corresponding author

Wiseman RL, **Haynes CM**, Ron D. (2010) Snapshot: The unfolded protein response. *Cell*. Feb 19;140(4): 590.

Wiseman RL, Zhang Y, Lee, KP, Harding HP, **Haynes CM**, Price J, Sicheri F, Ron D. (2010) Flavonol activation defines an unanticipated ligand-binding site in the kinase-RNase domain of IRE1. *Molecular Cell*. Apr 23;38(2): 291-304.

Wiseman RL, Chin KT, **Haynes CM**, Stanhill A, Xu C, Roguev A, Krogan NJ, Neubert TA, Ron D. (2009) Thioredoxin-related protein is an arsenite-regulated thiol reductase of the proteasome 19S particle. *J Biol Chem*. May 29;284(22): 15233-45.

Yun C, Stanhill A, Yang Y, **Haynes CM**, Xu CF, Neubert TA, Mor A, Philips MR, Ron D. (2008) Proteasomal adaptation to environmental stress links resistance to proteotoxicity with longevity in *Caenorhabditis elegans*. *Proc Natl Acad Sci USA*. May 13;105(19): 7094-9.

Haynes CM, Petrova K, Benedetti C, Yang Y, Ron D. (2007) ClpP mediates activation of a mitochondrial unfolded protein response in *C. elegans*. *Dev Cell*. Oct;13(1): 1-14.

Stanhill A, **Haynes CM**, Zhang Y, Min G, Steele MC, Kalinina J, Martinez E, Pickart CM, Kong XP, Ron D. (2006). An arsenite-inducible 19S regulatory particle-associated protein adapts proteasomes to proteotoxicity. *Mol Cell*. Sept 15;23(6): 875-885.

Benedetti C, **Haynes CM**, Yang Y, Harding HP, Ron D. (2006) Ubiquitin-like protein 5 positively regulates chaperone gene expression in the mitochondrial unfolded protein response. *Genetics*. Sept;174(1): 229-239.

Cooper AA, Gitler AD, Cashikar A, **Haynes CM**, Hill KJ, Bhullar B, Liu K, Xu K, Strathearn KE, Liu F, Cao S, Caldwell KA, Caldwell GA, Marsischky G, Kolodner RD, Labaer J, Rochet JC, Bonini NM, Lindquist S. (2006) Alpha-synuclein blocks ER-Golgi traffic and Rab1 rescues neuron loss in Parkinson's models. *Science*. July;313(5785): 324-328.

Haynes CM, Titus EA, Cooper AA. (2004) Degradation of misfolded proteins prevents ER-derived oxidative stress and cell death. *Mol Cell*. Sept 10;15(5): 767-76.

Haynes CM, Caldwell S, Cooper AA. (2002) An *HRD1/DER*-independent ER quality control mechanism involves Rsp5p-dependent ubiquitination and ER-Golgi transport. *Jour of Cell Biol*. July 8;158(1): 91-101.

MEDIA COVERAGE

Cole Haynes: On the trail of mitochondrial dysfunction. (2015) *Jour of Cell Biol*. Jan 19;208(2): 140-141.

The enemy's telltale mark: Researchers find novel way body defends against harmful bacteria

(2014) <http://www.mskcc.org/blog/enemy-s-telltale-mark-researchers-find-novel-way-body-defends-against-harmful-bacteria>