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Mahlon Collins, PhD

Education

2016 **PhD**, Neurobiology, University of Pittsburgh, Pittsburgh, PA, USA

2009 **MS**, Experimental Psychology, Central Michigan University, Mount Pleasant, MI, USA

2006 **BS**, *summa cum laude,* Neuroscience, Central Michigan University, Mount Pleasant, MI, USA

Professional Experience

2016–present **Postdoctoral Research Associate**
Department of Genetics, Cell Biology, and Development
University of Minnesota, Minneapolis, MN, USA
Mentor: Dr. Frank Albert
Conceived and developed a novel, statistically powerful approach for characterizing how individual genetic differences inluence protein degradation. Results from this project provided the first genome-wide view of the genetics of protein degradation and revealed how natural genetic variation shapes the full sequence of molecular events in cellular protein degradation.

2018–present **Consultant**
Decibio Consulting
Los Angeles, CA, USA
Presented overviews of next-generation sequencing and proteomic technologies to clients and evaluated the scientific and market potential of new technologies 4-5 times per year.

2010–2016 **Graduate Research Associate**
Department of Neurobiology
University of Pittsburgh, Pittsburgh, PA, USA
Mentor: Dr. Robert Bowser
Developed a new method for mass-spectrometric biofluid proteomics. Used machine learning and cerebrospinal fluid proteomic profiles to identify amyotrophic lateral sclerosis (ALS) disease biomarkers, therapeutic targets, and molecular mechanisms. Discovered a mechanism by which RNA binding protein entrapment in nuclear stress bodies contributes to ALS pathogenesis.

2004–2009 **Student Research Associate**
Department of Neuroscience
Central Michigan University, Mount Pleasant, MI, USA
Mentor: Dr. Justin Oh-Lee
Investigated the molecular mechanisms by which the Parkinson's disease therapeutic levodopa loses efficacy following chronic administration. Identified a mechanism by which phosphorylation of NMDA and AMPA glutamate receptors contributes to reduced levodopa efficacy and developed pharmacological interventions to counteract these effects.

Research Funding

Grant Number	*Title*	*Role*	*Years*	*Source*
F32 GM128302	Genetic influences on protein degradation in large yeast populations	PI	2019–2020	NIGMS
F31 NSO80614	The functional role of RBM45 in gene expression and neurodegeneration	PI	2012–2014	NINDS
5T32 NS007433	Predoctoral training in basic neuroscience	Trainee	2009–2010	NINDS

Awards and Honors

2023 University of Minnesota Department of Genetics, Cell Biology, and Development Michael O'Connor Award for Excellence in Postdoctoral Research

2021 Keystone Symposia Travel Award recipient

2020 International Conference of Quantitative Genetics Travel Award recipient

2020 Selected for and completed BioKansas Scientific Writing Program

2019 Selected for and completed Cold Spring Harbor Laboratory short course "Computational Genomics"

2019 Selected for Genetics Society of America Early Career Scientist Leadership Program

2019 Minnesota Microbial and Plant Genomics Institute Travel Grant recipient

2018 University of Minnesota Umyconet Octoberfest Best Figures Award

2017 Minnesota Microbial and Plant Genomics Institute Travel Grant recipient

2017 Selected for and completed Genetics Society of America Peer Review Training Program

2015 Toastmasters Advanced Leader and Advanced Communicator Awards

2013 Toastmasters Advanced Leader and Competent Communicator Awards

2013 Selected for and completed Mount Desert Island Biological Laboratory short course "Quantitative Fluorescence Microscopy"

2010 Achievement Rewards for College Scientists (ARCS) Graduate Fellowship

2008 Central Michigan University Outstanding Graduate Research Award

2006 Central Michigan University Graduate Research Fellowship

2006 Central Michigan University Neuroscience Program Outstanding Graduate Award

2005 Central Michigan University Outstanding Undergraduate Research Award

2004 Central Michigan University Summer Research Fellowship

Publications

A complete, self-updating publication list is available at my Google Scholar page.

*: co-corresponding authors

2023 **Collins MA***, Avery R, Albert, FW*, Substrate-specific effects of natural genetic variation on proteasome activity, *PLoS Genetics*.
PMID: 37126494
DOI: 10.1371/journal.pgen.1010734

2022 **Collins MA***, Mekonnen G, Albert, FW*, Variation in ubiquitin system genes creates substrate-specific effects on proteasomal protein degradation, *eLife*.
PMID: 36218234
DOI: 10.7554/eLife.79570

2020 **Collins MA**, Li Y, Bowser R, RBM45 associates with nuclear stress bodies and forms intranuclear inclusions during chronic cellular stress and in neurodegenerative diseases, *Acta Neuropathologica Communications*.
PMID: 32586379
DOI: 10.1186/s40478-020-00965-y

2016 Li, Y, **Collins MA**, An J, Geiser R, Tegeler T, Tsantilas K, Garcia K, Pirotte P, Bowser R, Immunoprecipitation and mass spectrometry defines an extensive RBM45 protein-protein interaction network, *Brain Research*.
PMID: 26979993
DOI: 10.1016/j.brainres.2016.02.047

2015 Li, Y, **Collins MA**, Geiser R, Bakkar N, Riascos D, Bowser R, RBM45 homo-oligomerization mediates association with ALS-linked proteins and stress granules, *Scientific Reports*.
PMID: 26391765
DOI: 10.1038/srep14262

2015 **Collins MA**, An J, Hood BL, Conrads TP, Bowser R, LC-MS/MS proteomic analysis of cerebrospinal fluid identifies protein/pathway alterations and candidate biomarkers for amyotrophic lateral sclerosis, *Journal of Proteome Research*.
PMID: 26401960
DOI: 10.1021/acs.jproteome.5b00804

2015 **Collins MA**, An J, Peller D, Bowser R, Total protein is an effective loading control for cerebrospinal fluid western blots, *Journal of Neuroscience Methods*.
PMID: 26004848
DOI: 10.1016/j.jneumeth.2015.05.011

2012 **Collins MA**, Riascos D, Kovalik T, An J, Krupa K, Krupa K, Hood BL, Conrads TP, Renton AE, Traynor BJ, Bowser R, The RNA-binding motif 45 (RBM45) protein accumulates in inclusion bodies in amyotrophic lateral sclerosis (ALS) and frontotemporal lobar degeneration with TDP-43 inclusions (FTLD-TDP) patients, *Acta Neuropathologica*.
PMID: 22993125
DOI: 10.1007/s00401-012-1045-x

2007 Smith CP, Oh JD, Bibbiani F, **Collins MA**, Avila I, Chase TN, Tamoxifen effect on L-DOPA induced response complications in parkinsonian rats and primates, *Neuropharmacology*.
PMID: 17116309
DOI: 10.1016/j.neuropharm.2006.08.018

2005 Bibbiani F, Oh JD, Kielaite A, **Collins MA**, Smith C, Chase TN, Combined blockade of AMPA and NMDA glutamate receptors reduces levodopa-induced motor complications in animal models of PD, *Experimental Neurology*.
PMID: 16203001
DOI: 10.1016/j.expneurol.2005.08.017

Book Chapters

2017 **Collins MA**, Bowser R, Molecular mechanisms of amyotrophic lateral sclerosis. In *"Molecular and Cellular Therapies for Motor Neuron Diseases"*, Boulis N, O'Connor D, Donsante A, Eds, Elsevier, ISBN: 9780128022573
DOI: 10.1016/B978-0-12-802257-3.00004-3

Popular Press Articles

2021 **Collins MA**, Yeast models provide new insights into neurodegenerative diseases, *The Scientist*. Web Link

Patents

Patent Number	*Title*	*Date of Patent*	*Inventors*
US10359436B2	Nuclear stress response in motor neuron disease and other neurological diseases	July 23, 2019	Mahlon Collins Robert Bowser

Oral Presentations

2022 Genetic variation in the ubiquitin system creates complex, pathway-specific effects on proteasomal protein degradation.
Yeast Genetics Meeting

2022 Genetic variation in the ubiquitin system creates complex, pathway-specific effects on proteasomal protein degradation.
Cold Spring Harbor Biology of Genomes Meeting

2018 Genetic mapping of ubiquitin-proteasome system activity in large yeast populations.
Cold Spring Harbor Ubiquitins, Autophagy, and Disease Meeting (lightning talk)

2018 Genetic mapping of ubiquitin-proteasome system activity in large yeast populations.
University of Minnesota UMycoNet Octoberfest Meeting

2017 Mapping genetic effects on cellular protein degradation.
University of Minnesota Developmental Biology Retreat

2011 Intracellular inclusions of the RNA Binding Protein RBM45 in ALS and FTLD patients.
22nd Annual International Symposium on ALS/Motor Neuron Disease

Poster Presentations

2021 Genetic basis of variation in ubiquitin-proteasome system activity.
Keystone eSymposia "Targeted Protein Degradation"

2019 Mapping genetic influences on ubiquitin-proteasome system activity.
Cold Spring Harbor Ubiquitins, Autophagy, and Disease Meeting

2018 Mapping genetic influences on ubiquitin-proteasome system activity.
29th Annual International Conference on Yeast Genetics and Molecular Biology

2013 Mapping genetic influences on ubiquitin-proteasome system activity.
Cold Spring Harbor Biology of Genomes Meeting

2014 The role of the RNA binding protein RBM45 and nuclear stress bodies in ALS and FTLD.
25th Annual International Symposium on ALS/Motor Neuron Disease

2014 The role of the RNA binding protein RBM45 and nuclear stress bodies in ALS and FTLD.
Society for Neuroscience Annual Meeting

2013 The RNA binding protein RBM45 associates with nuclear stress bodies during cellular stress events.
24th Annual International Symposium on ALS/MND.

2013 The RNA binding protein RBM45 associates with nuclear stress bodies during cellular stress events.
Society for Neuroscience Annual Meeting

2012 RBM45 pathology in sporadic and C9ORF72-linked amyotrophic lateral sclerosis.
23rd Annual International Symposium on ALS/MND

2012 RBM45 pathology in sporadic and C9ORF72-linked amyotrophic lateral sclerosis.
Society for Neuroscience Annual Meeting

2011 Intracellular inclusions of the RNA binding protein RBM45 in ALS and FTLD patients.
Society for Neuroscience Annual Meeting

2010 Altered perineuronal net morphology and tenascin-R expression in amyotrophic lateral sclerosis.
Society for Neuroscience Annual Meeting

2010 Altered perineuronal net morphology and tenascin-R expression in amyotrophic lateral sclerosis.
21st Annual International Symposium on ALS/MND

2008 The effects of progesterone in the fear-potentiated elevated plus maze model.
Association for Psychological Science Annual Meeting

2005 Effects of haloperidol-induced dopamine receptor antagonism on shuttle box performance in a rat cognitive assessment
Society for Neuroscience 35th Annual Meeting

Teaching

2011 **Teaching Assistant**
School of Medicine
University of Pittsburgh, Pittsburgh, PA, USA USA
Instructor: Dr. Allen Humphries
Teaching assistant for "Medical Neuroscience" (MED5133), a course that provides a comprehensive overview of nervous system structure and function to medical students.

2007–2008 **Instructor**
Department of Psychology
Central Michigan University, Mount Pleasant, MI, USA USA
Instructor for "Applications of Research Methods" (PSY 385), a research capstone course that requires students to design and implement a semester-long psychology research project.

2007 **Instructor**
Department of Psychology
Central Michigan University, Mount Pleasant, MI, USA USA
Instructor for "Behavioral Neuroscience" (PSY 387), a course that provides an overview of the neurological processes underlying organismal behaviors.

Scientific Service

2023–2024 **Mentor**
Early Career Scientist Alumni Mentorship Program
Genetics Society of America

2022 **Facilitator**
Gopher Equity Project
University of Minnesota College of Biological Sciences

2020–present **Abstract reviewer (Spring, Summer, Fall)**
Undergraduate Research Opportunities Program
University of Minnesota

2019–2021 **Liaison**
Steering Committee
Genetics Society of America Early Career Scientist Leadership Program

2019–2021 **Committee Member**
Communications and Outreach Committee
Genetics Society of America Early Career Scientist Leadership Program

2017–present **Peer Reviewer**
GENETICS

2017 **Facilitator**
"Meeting the Brain" Course and Workshop
University of Minnesota Continuing Education Center

Mentoring

2023–present Providing remote career mentoring to a graduate student, Eshna Jash, as part of the Genetics Society of America Alumni Mentorship Program.

2018–present Mentored a graduate student, Randi Avery (2018–present) and a research technician Gemechu Mekonnen (2019–2020) in the laboratory of Dr. Frank Albert.

2012–2016 Mentored 4 undergraduate students (Danielle Peller, Casey Rice, Kristin Krupa, and Kelly Krupa) in the labroatory of Dr. Robert Bowser.

2005-2009 Mentored 3 undergraduate students (Katelyn Saltarelli, Christy Martin, and Rachel Gerber) in the laboratory of Dr. Justin Oh-Lee.