DERRICK J. MORTON, PH.D.
ASSISTANT PROFESSOR
MOLECULAR AND COMPUTATIONAL BIOLOGY
DEPARTMENT OF BIOLOGICAL SCIENCES
MORTOND@USC.EDU

Research Focus

The primary research goal of my lab is to study the fundamental mechanisms of post-transcriptional regulation of gene expression with an emphasis on RNA processing factors mutated in complex brain disorders. Specifically, we are interested in the post-transcriptional activities of a multi-subunit RNA processing enzyme, the RNA exosome complex, in human neurodevelopment and disease. In my lab, we couple *in vivo Drosophila* genetics with *in vitro* 2D/3D human iPSC-derived neuronal cultures to understand how defects in subunits of the ubiquitous and essential RNA exosome complex cause cell-specific and/or brain region-specific pathology.

Positions

8/2021-present	Tenure-track Assistant Professor	Biological Sciences	University of Southern California
6/2020-present	Visiting Associate	BBE	California Institute of Technology

Education

2016-2020	Postdoctoral Fellow	Biology	Emory University *Advisor: Anita H. Corbett, PhD*
2011-2016	PhD	Biological Sciences	Clark Atlanta University *Advisor: Jaideep Chaudhary, PhD*
2006-2009	B.S.	Biology	Eastern Kentucky University

Advising

PhD Students

- Emily Arnold 2023- "Functional Consequences on RNA exosome mutations in hiPSC-derived motor neurons"
- Nina Barr 2022- "hiPSC-derived Cerebellar Organoid Model of Pontocerebellar Hypoplasia Type 1b"
- Lauryn Higginson 2022- "*Drosophila* Model of RNA exosome-linked Disease"

Research Associates

- James Burford 2022- "Functional characterization of pathogenic RNA exosome mutations modeled in hiPSC-derived neuronal cultures"
- Anoothi Seth 2021- "Organoid Model of Cerebellar Development and Disease"
- Xingjun Wang 2023- "Genome mapping of R-loops in *Drosophila*"

Undergraduate Students

- Jash Gada 2022- "Transcriptomic Signatures of Neurodegeneration in *Drosophila*"
- Rylee Kang 2022- "Transcriptomic Signatures of Neurodegeneration in *Drosophila*"
- Rishi Nair 2022 "*Drosophila* Model of Pontocerebellar Hypoplasia Type 1b"
- Maggie Torstrick 2022- "Transcriptomic Signatures of Neurodegeneration in *Drosophila*"

Courses Taught

Molecular Genetics and Biochemistry (BISC 502A) – Gene Expression and RNA regulation Module
USC Molecular and Computational Biology PhD Program Core Course

Advanced Reading in Molecular Biology (BISC 544) – Advanced training for molecular biology graduate students in reading primary journal articles. Emphasis on critical analyses of primary scientific literature.

Scientific Writing & Hypothesis Design (BISC 599) - Grant writing course designed for graduate students in the Molecular Biology PhD program. This course focuses on writing an NIH F31 grant proposal, but the skills developed in the course translate to any other granting mechanism.

RNA Biology and Biotechnology (BISC 402) (Spring 2024) - The purpose of this course is to introduce students to the fundamental concepts of RNA biology and to state-of-the-art biotechnologies that use RNA for medical and industrial applications. The course draws on the recent developments of utilizing RNA as medicine, providing a platform to discuss aspects of RNA processing, disease mechanism, steps taken to move from the bench to the bedside and consider the socioeconomic implications of developing and delivering such a treatment.

Publications

Peer-reviewed publications

1. Jalloh B, Lancaster CL, Rounds JC, Brown BE, Leung SW, Banerjee A, Morton DJ, Bienkowski RS, Fasken MB, Kremsky IJ, Tegowski M, Meyer K, Corbett A, Moberg K. The *Drosophila* Nab2 RNA binding protein inhibits m^6A methylation and male-specific splicing of *Sex lethal* transcript in female neuronal tissue. *Elife*. 2023 Jul 17;12:e64904. doi: 10.7554/eLife.64904. PMID: 37458420; PMCID: PMC10351920.
2. Phillips MA, Arnold KR, Vue Z, Beasley HK, Garza-Lopez E, Marshall AG, Morton DJ, McReynolds MR, Barter TT, Hinton A Jr. Combining Metabolomics and Experimental Evolution Reveals Key Mechanisms Underlying Longevity Differences in Laboratory Evolved *Drosophila melanogaster* Populations. Int J Mol Sci. 2022 Jan 19;23(3):1067. doi: 10.3390/ijms23031067. PMID: 35162994; PMCID: PMC8835531.
3. Morton DJ, Jalloh B, Kim L, Kremsky I, Nair RJ, Nguyen KB, Rounds JC, Sterrett MC, Brown B, Le T, Karkare MC, McGaughey KD, Sheng S, Leung SW, Fasken MB, Moberg KH, Corbett AH. A Drosophila model of Pontocerebellar Hypoplasia reveals a critical role for the RNA exosome in neurons. PLoS Genet. 2020 Jul 9;16(7):e1008901. doi: 10.1371/journal.pgen.1008901. PMID: 32645003; PMCID: PMC7373318. **Co-corresponding Authors.*
4. de Amorim, J., Fasken MB, Slavotinek, A., Corbett, AH, Morton, DJ. *Modeling Pathogenic Variants in the RNA Exosome. RNA & Disease 2020 June 6; Vol 7 (2020). Review. doi: 10.14800/rd.1166*
5. Morton DJ, Kuiper EG, Jones SK, Leung SW, Corbett AH, Fasken MB. The RNA exosome and RNA exosome-linked disease. *RNA*. 2018;24(2):127-42. Epub 2017/11/03. doi: 10.1261/rna.064626.117. PubMed PMID: 29093021; PubMed Central PMCID: PMCPMC5769741.
6. Morton DJ, Patel D, Joshi J, Hunt A, Knowell AE, Chaudhary J. ID4 regulates transcriptional activity of wild type and mutant p53 via K373 acetylation. *Oncotarget*. 2017;8(2):2536-49. Epub 2016/12/03. doi: 10.18632/oncotarget.13701. PubMed PMID: 27911860; PubMed Central PMCID: PMCPMC5356822.
7. Joshi JB, Patel D, Morton DJ, Sharma P, Zou J, Hewa Bostanthirige D, et al. Inactivation of ID4 promotes a CRPC phenotype with constitutive AR activation through FKBP52. *Mol Oncol*. 2017;11(4):337-57. Epub 2017/03/03. doi: 10.1002/1878-0261.12028. PubMed PMID: 28252832; PubMed Central PMCID: PMCPMC5378613.
8. Komaragiri SK, Bostanthirige DH, Morton DJ, Patel D, Joshi J, Upadhyay S, et al. ID4 promotes AR expression and blocks tumorigenicity of PC3 prostate cancer cells. *Biochem Biophys Res Commun*. 2016;478(1):60-6. Epub 2016/07/28. doi: 10.1016/j.bbrc.2016.07.092. PubMed PMID: 27462022; PubMed Central PMCID: PMCPMC4991035.
9. Korang-Yeboah M, Patel D, Morton DJ, Sharma P, Gorantla Y, Joshi J, et al. Intra-tumoral delivery of functional ID4 protein via PCL/maltodextrin nano-particle inhibits prostate cancer growth. *Oncotarget*. 2016;7(42):68072-85. Epub 2016/08/04. doi: 10.18632/oncotarget.10953. PubMed PMID: 27487149; PubMed Central PMCID: PMCPMC5340093.
10. Rohani L*, Morton DJ*, Wang XQ, Chaudhary J. Relative Stability of Wild-Type and Mutant p53 Core Domain: A Molecular Dynamic Study. *J Comput Biol*. 2016;23(2):80-9. Epub 2015/12/18. doi: 10.1089/cmb.2015.0163. PubMed PMID: 26675082. **Co-first authors*
11. Patel D, Morton DJ, Carey J, Havrda MC, Chaudhary J. Inhibitor of differentiation 4 (ID4): From development to cancer. *Biochim Biophys Acta*. 2015;1855(1):92-103. Epub 2014/12/17. doi: 10.1016/j.bbcan.2014.12.002. PubMed PMID: 25512197; PubMed Central PMCID: PMCPMC4312723.

12. Smith BN, Burton LJ, Henderson V, Randle DD, Morton DJ, Smith BA, et al. Snail promotes epithelial mesenchymal transition in breast cancer cells in part via activation of nuclear ERK2. *PLoS One*. 2014;9(8):e104987. Epub 2014/08/15. doi: 10.1371/journal.pone.0104987. PubMed PMID: 25122124; PubMed Central PMCID: PMCPMC4133359.
13. Knowell AE, Patel D, Morton DJ, Sharma P, Glymph S, Chaudhary J. Id4 dependent acetylation restores mutant-p53 transcriptional activity. *Mol Cancer*. 2013;12:161. Epub 2013/12/18. doi: 10.1186/1476-4598-12-161. PubMed PMID: 24330748; PubMed Central PMCID: PMCPMC3866570.
14. Vo BT, Morton DJ., Komaragiri S, Millena AC, Leath C, Khan SA. TGF-beta effects on prostate cancer cell migration and invasion are mediated by PGE2 through activation of PI3K/AKT/mTOR pathway. *Endocrinology*. 2013;154(5):1768-79. Epub 2013/03/22. doi: 10.1210/en.2012-2074. PubMed PMID: 23515290; PubMed Central PMCID: PMCPMC3628025

Book Chapter

15. Fasken MB, Morton DJ, Kuiper EG, Jones SK, Leung SW, Corbett AH. The RNA Exosome and Human Disease. Methods Mol Biol. 2020;2062:3-33. doi: 10.1007/978-1-4939-9822-7_1. Erratum in: Methods Mol Biol. 2020;2062:C1-C4. PMID: 31768969.

Peer-reviewed Articles/Commentaries on Mentoring and DEI Advocacy

16. Mays A, Byars-Winston A, Hinton A Jr, Marshall AG, Kirabo A, August A, Marlin BJ, Riggs B, Tolbert B, Wanjalla C, Womack C, Evans CS, Barnes C, Starbird C, Williams C, Reynolds C, Taabazuing C, Cameron CE, Murray DD, Applewhite D, Morton DJ, Lee D, Williams DW, Lynch D, Brady D, Lynch E, Rutaganira FUN, Silva GM, Shuler H, Saboor IA, Davis J, Dzirasa K, Hammonds-Odie L, Reyes L, Sweetwyne MT, McReynolds MR, Johnson MDL, Smith NA, Pittman N, Ajijola OA, Smith Q, Robinson RAS, Lewis SC, Murray SA, Black S, Neal SE, Andrisse S, Townsend S, Damo SM, Griffith TN, Lambert WM, Clemons WM Jr. Juneteenth in STEMM and the barriers to equitable science. Cell. 2023 Jun 8;186(12):2510-2517. doi: 10.1016/j.cell.2023.05.016. Epub 2023 Jun 8. PMID: 37295396.
17. Marshall AG, Brady LJ, Palavicino-Maggio CB, Neikirk K, Vue Z, Beasley HK, Garza-Lopez E, Murray SA, Martinez D, Shuler HD, Spencer EC, Morton DJ, Hinton AJ. The importance of mentors and how to handle more than one mentor. Pathog Dis. 2022 Jun 22;80(1):ftac011. doi: 10.1093/femspd/ftac011. PMID: 35446416.
18. Marshall AG, Palavicino-Maggio CB, Neikirk K, Vue Z, Beasley HK, Garza-Lopez E, Murray SA, Martinez D, Crabtree A, Conley ZC, Vang L, Davis JS, Powell-Roach KL, Campbell S, Dal AB, Shao B, Alexander S, Vang N, Vue N, Vue M, Shuler HD, Spencer EC, Morton DJ, Hinton A. Using Champion-Oriented Mindset to Overcome the Challenges of Graduate School: Impact of Workshop for Graduate School Skills on Underrepresented Minority Retention. Pathog Dis. 2022 Jun 24:ftac024. doi: 10.1093/femspd/ftac024. Epub ahead of print. PMID: 35749569.
19. Marshall AG, Vue Z, Palavicino-Maggio CB, Neikirk K, Beasley HK, Garza-Lopez E, Murray SA, Martinez D, Crabtree A, Conley ZC, Vang L, Davis JS, Powell-Roach KL, Campbell S, Brady LJ, Dal AB, Shao B, Alexander S, Vang N, Vue N, Vue M, Shuler HD, Spencer EC, Morton DJ, Hinton A. An effective workshop on "How to be an Effective Mentor for Underrepresented STEM Trainees". Pathog Dis. 2022 Jul 6;80(1):ftac022. doi: 10.1093/femspd/ftac022. PMID: 35709418; PMCID: PMC9258687.
20. Lancaster CL, Higginson L, Chen B, Encarnacion-Rivera L, Morton DJ, Corbett AH. How to Select a Graduate School Program for a PhD in Biomedical Science. Curr Protoc. 2022 Jun;2(6):e450. doi: 10.1002/cpz1.450. PMID: 35735740; PMCID: PMC9245324.
21. Marshall AG, Vue Z, Palavicino-Maggio CB, Neikirk K, Beasley HK, Garza-Lopez E, Murray SA, Martinez D, Crabtree A, Conley ZC, Vang L, Davis JS, Powell-Roach KL, Campbell S, Brady LJ, Dal AB, Shao B, Alexander S, Vang N, Vue N, Vue M, Shuler HD, Spencer EC, Morton DJ, Hinton A. The role of mentoring in promoting diversity equity and inclusion in STEM Education and Research. Pathog Dis. 2022 Jul 21;80(1):ftac019. doi: 10.1093/femspd/ftac019. PMID: 35713493; PMCID: PMC9302695.

Selected Presentations

Invited Talks

1. Emory University, An Conventional Journey to RNA Biology and Molecular Neuroscience (December 2023)

2. University of Iowa, Functional consequences of RNA exosome mutations in complex neurodevelopmental disorders (November 2023)
3. NIH/NIA, Butler Williams Scholars, R-loops and Age-Related Neurodegeneration: Convergent and Divergent Pathomecanisms (August 2023)
4. Vanderbilt University, Investigating RNA Dysregulation in Complex Brain Disorders (April 2023)
5. University of Michigan, Navigating Intersecting Identities: An Unconventional Journey to RNA Science and Neurobiology (April 2023)
6. Rocky Mountain RNA Symposium, Investigating RNA Dysregulation in Complex Brain Disorders (April 2023)
7. Black In Computational Biology, Dysregulation of RNA processing factors in Neurological Disease (January 2022)
8. Emory University, Mechanism of RNA exosome Dysfunction in Neurological Disease, (October 2021)
9. University of Oregon, A *Drosophila* Model of Pontocerebellar Hypoplasia Type 1b Reveals a Critical Role for the RNA Exosome in Neurons. (December 2020)
10. Georgia Institute of Technology, Modeling RNA Exosome-linked Disease in *Drosophila* (November 2020)
11. RNase Complexes in Pontocerebellar Hypoplasia RNA Decay FASEB Meeting (May 2020) (Canceled due to COVID-19)
12. Exploiting *Drosophila* to examine RNA Exosome-linked Disease. Department of Biology and Biochemistry, Bowdoin College. Brunswick, ME (April 2019)

Active Funding

Project Number: R01NS131620-01
Name of PD/PI: Derrick Morton
Source of Support: NIH/NINDS
Primary Place of Performance: University of Southern California
Title: Investigating RNA Dysregulation in Neurological Disease through Study of Pontocerebellar Hypoplasia Type 1b
Project/Proposal Start and End Date: 04/15/2023-3/31/2028

Project Number: FG-2023-20698
Name of PD/PI: Derrick Morton
Source of Support: Alfred P. Sloan Fellowship in Neuroscience
Primary Place of Performance: University of Southern California
Title: Toward Understanding the Molecular Basis of RNA Exosome-linked Neurological Disorders
Project/Proposal Start and End Date: 09/15/2023-8/31/2025

Honors and Awards

- American Society of Human Genetics, Human Genetic Scholars Initiative, Advisory Board Member (three-year term: 2024-2027)
- Alfred P. Sloan Research Fellow in Neuroscience, 2023-2025
- NIH Reviewer, Temporary Member, Molecular Neurogenetics Study Section, 2023
- NIH NIA Butler-Williams Scholar, 2023
- NINDS MINDS (Mentoring Institute for Neuroscience Diversity Scholars) Fellow, 2023
- 100 Inspiring Black Scientists in America, Cell Press CrossTalk, February 2020
- Excellence in Human Genetics Award, American Society of Human Genetics, October 2019
- Keystone Symposia Fellow Award, 2019
- Rising Star in Biomedical, Massachusetts Institute of Technology (MIT), Boston, MA, 2018
- FASEB: Post-transcriptional regulation and RNA Decay Meeting Travel Award, Scottsdale, AZ, 2018
- Ruth L. Kirschstein NRSA Postdoctoral Fellowship, 2017- 2020
- Burroughs Wellcome, Postdoctoral Career Development Award, 2017-2020
- NIH Institutional Research and Career Development Award (IRACDA) – Fellowships in Research and Science Teaching (FIRST) Postdoctoral Fellow, 2016-2019

Previous Non-Tenure Track Academic Appointments

2020-2021	Assistant Professor, Kaiser Permanente School of Medicine
2016-2020	NRSA-funded Postdoctoral Fellow, Emory University
	NIH IRACDA FIRST Postdoctoral Fellow, Emory University
2019	Instructor, Concepts in Biology, Emory University
2018	Instructor, Genetics, Emory-Tibetan Science Initiative, Mundgod, India
2017-2018	Instructor, Biochemistry, Atlanta Metropolitan College
2011-2016	Graduate Teaching Assistant, Clark Atlanta University