
Christopher A. Johnston, PharmD, PhD

201 Castetter Hall
Department of Biology
University of New Mexico
Albuquerque, NM, 87131-001

email: johnstca@unm.edu
fax: 505-277-0304
personal: 919-360-8434
<https://sites.google.com/view/johnstonlab/home>

EDUCATION and PROSESSIONAL WORK EXPERIENCE

- July 2018-
Present** University of New Mexico
Department of Biology
Albuquerque, NM
Associate Professor
(Assistant Professor 2012-2018)
- August 2007-
July 2012** University of Oregon
Institutes of Molecular Biology and Neuroscience
Eugene, OR
Postdoctoral Fellow
Mentor: Drs. Chris Q. Doe and Kenneth E. Prehoda
*Project: "Molecular Basis for Mitotic Spindle Orientation
During Asymmetric Cell Division"*
- August 2003-
August 2007** University of North Carolina, Chapel Hill
School of Medicine, Department of Pharmacology
Chapel Hill, NC
Doctor of Philosophy (August 6, 2007)
Advisor: Dr. David P. Siderovski
*Thesis: "Molecular Mechanism of Heterotrimeric G-
protein Activation"*
- August 1997-
May 2003** Purdue University
College of Pharmacy
West Lafayette, IN
Doctor of Pharmacy (With Highest Distinction)
Advisor: Dr. Val J. Watts
*Thesis: "Mechanisms of Adenylate Cyclase Sensitization
Following Chronic D2-dopamine Receptor Activation"*

AWARDS AND HONORS

- 2014** New Faculty Teacher of the Year Nominee
University of New Mexico
- 2008** Damon Runyon Cancer Research Foundation Postdoctoral
Fellowship Award (Dennis and Marsha Dammerman Fellow)
- 2006** Ruth Kirchstein National Research Service Award
- 2005** American Heart Association Predoctoral Training Award
- 2003** Doctor of Pharmacy, Purdue University
(With Highest Distinction)
Eli Lilly & Co. Achievement Award
Merck Scholar Award

SELECTED PUBLICATIONS

(Full bibliography: <https://www.ncbi.nlm.nih.gov/myncbi/14KcgxolxanQy/bibliography/public/>)

Cutillas V and **Johnston CA**. (2021) Mud binds the kinesin-14 Ncd in *Drosophila*.
Biochemistry and Biophysics Reports. May 13;26.

Dewey EB, Parra AS, **Johnston CA**. (2020) Loss of the spectraplakins gene Short stop
induces a DNA damage response in *Drosophila* epithelia. *Scientific Reports*. Nov
19;10(1):20165.

Parra AS, **Johnston CA**. (2020) Mud Loss Restricts Yki-Dependent Hyperplasia in
Drosophila Epithelia. *Journal of Developmental Biology*. Dec 13;8(4).

Vaziri P, Ryan D, **Johnston CA**, Cripps RM. (2020) A Novel Mechanism for Activation
of Myosin Regulatory Light Chain by Protein Kinase C-Delta in *Drosophila*.
Genetics. Sep;216(1):177-190. PubMed PMID: 32753389.

Ingersol LJ, Yang J, Kc K, Pokhrel A, Astashkin AV, Weiner JH, **Johnston CA**, Kirk ML.
(2020) Addressing Ligand-Based Redox in Molybdenum-Dependent Methionine
Sulfoxide Reductase. *Journal of the American Chemical Society*. Feb
12;142(6):2721-2725.

Dewey EB, Parra AS, and **Johnston CA**. (2019) Use of *Drosophila* S2 cells for
live imaging of cell division. *JoVE*. (150), e60049, doi:10.3791/60049.

Sepahi A, Kraus A, Casadei E, **Johnston CA**, 6 others, and Salinas I. (2019) Olfactory sensory neurons mediate ultrarapid antiviral immune responses in a TrkA-dependent manner. *PNAS*. 116(25):12428-12436.

Johnston CA. (2017) A kinase duet performance in the asymmetric division of *Drosophila* neuroblasts. *Journal of Developmental Biology*. 5,7; doi:10.3390

Dewey EB and **Johnston CA**. (2017) Diverse mitotic functions of the cytoskeletal crosslinking protein Shortstop suggest a role in Dynein/Dynactin activation. *Molecular Biology of the Cell*. 28(19):2555-68.

Dewey EB, Taylor DT, and **Johnston CA**. (2016) Rolling in the Mud: Hippo controls oriented cell division. *Cell Cycle*. 15(5):607-8.

Dewey EB, Taylor DT, and **Johnston CA**. (2015) Cell Fate Decision Making Through Oriented Cell Division. *Journal of Developmental Biology*. 3(4):129-157.

Dewey EB, Sanchez D, and **Johnston CA**. (2015) Warts phosphorylates mud to promote pins-mediated spindle orientation in *Drosophila*, independent of Yorkie. *Current Biology*. 25(21):2751-62.

Garcia JG, Dewey EB, and **Johnston CA**. (2014) Dishevelled binds the Discs large Hook domain to activate Guk Holder-mediated spindle orientation. *PLoS One*. 9(12):e114235

Johnston CA*, Manning L, Lu MS, Golub O, Doe CQ, and Prehoda KE*. (2013) Formin-mediated actin polymerization cooperates with Mushroom body defect (Mud)-Dynein during Frizzled-Dishevelled spindle orientation. *Journal of Cell Science*. 126(19):4436-44. (*, co-corresponding authors)

Lu MS and **Johnston CA**. (2013) Molecular pathways regulating mitotic spindle orientation in animal cells. *Development* **140(9)**:1843-1856.

Johnston CA, Doe CQ, Prehoda KE. (2012) Structure of an enzyme-derived phosphoprotein recognition domain. *PLoS One* **7(4)**:e36014.

Wee B, **Johnston CA**, Prehoda KE, Doe CQ. (2011) Canoe binds RanGTP to promote PinsTPR/Mud-mediated spindle orientation. *Journal of Cell Biology* **195(3)**:369-376.

Johnston CA, Whitney DS, Volkman BF, Doe CQ, Prehoda KE. (2011) Conversion of the enzyme guanylate kinase into a mitotic-spindle orienting protein by a single mutation that inhibits GMP-induced closing. *PNAS*. **108(44)**:E973-978.

Ricketson D, **Johnston CA**, Prehoda KE. (2010) Multiple tail domain interactions stabilize nonmuscle myosin II bipolar filaments. *PNAS*. **107(49)**:20964-20969.

Ségalen M, **Johnston CA**, Martin CA, Dumortier JG, Prehoda KE, David NB, Doe CQ, Bellaïche Y. (2010) The Fz-Dsh planar cell polarity pathway induces oriented cell division via Mud/NuMA in *Drosophila* and zebrafish. *Developmental Cell* **19(5)**:740-752.

Lambert NA, **Johnston CA**, Cappell SD, Kuravi S, Kimple AJ, Willard FS, Siderovski DP. (2010) Regulators of G-protein signaling accelerate GPCR signaling kinetics and govern sensitivity solely by accelerating GTPase activity. *PNAS*. **107(15)**:7066-7071.

Johnston CA, Hirono K, Prehoda KE, Doe CQ. (2009) Identification of an Aurora-A/Pins/LINKER/Dlg spindle orientation pathway using induced cell polarity in S2 cells. *Cell* **138(6)**:1150-1163.

Johnston CA, Afshar K, Snyder JT, Tall GG, Gonczy P, Siderovski DP, Willard FS. (2008) Structural determinants underlying the temperature-sensitive nature of a Galpha mutant in asymmetric cell division of *Caenorhabditis elegans*. *Journal of Biological Chemistry*. **283(31)**:21550-21558.

Johnston CA, Temple BR, Chen JG, Gao Y, Moriyama EN, Jones AM, Siderovski DP, Willard FS. (2007) Comment on "A G protein coupled receptor is a plasma membrane receptor for the plant hormone abscisic acid". *Science* **318(5852)**:914.

Johnston CA, Taylor PJ, Gao Y, Kimple AJ, Grigston JC, Chen JG, Siderovski DP, Jones AM, Willard FS. (2007) GTPase acceleration as the rate-limiting step in *Arabidopsis* G protein-coupled sugar signaling. *PNAS*. **104(44)**:17317-17322.

Johnston CA, Lobanova E, Shavkunov A, Low J, Ramer JK, Blaesius R, Fredericks Z, Willard FS, Kuhlman B, Arshavsky V, and Siderovski DP. (2006) Minimal determinants for binding activated G α from the structure of a G α i1/peptide dimer. *Biochemistry* **45(38)**:11390-11400.

Johnston CA, Willard FS, Fredericks Z, Bodor ET, Jones MB, Rainer B, Harden TK, Watts VJ, Ramer JK, and Siderovski DP. (2005) Structure of G α i1 bound to a GDP-selective peptide provides insight into guanine nucleotide exchange. *Structure* **13(7)**:1069-1080.

Afshar K, Willard FS, Colombo K, **Johnston CA**, McCudden CR, Siderovski DP, and Gonczy P. (2004) Ric-8 is required for GPR-1/2-dependent Galpha function during asymmetric division of *C. elegans* embryos. *Cell* **119(2)**:219-30.

PROFESSIONAL PRESENTATIONS

- Johnston CA.** Molecular mechanisms controlling mitotic spindle orientation. Invited talk at the Front Range Cytoskeleton Meeting. Denver, CO. 2017.
- Johnston CA.** Controlling mitotic spindle orientation: *hippo* 'roles' in the *mud*. Invited talk at Keystone Symposium on Hippo signaling, Taos, NM. May 2015.
- Johnston CA.** Evolution of a Pins/Dlg spindle orientation pathway in the asymmetric cell division of *Drosophila* neuroblasts. *American Society for Pharmacology and Experimental Therapeutics* (ASPET) Annual Meeting 2011 (speaker).
- Johnston CA** and Siderovski DP. A structural basis for nucleotide exchange on $G\alpha_i$ subunits and receptor coupling specificity. Abstract and poster at 7th Annual GPCR Retreat (2006).
- Johnston CA**, Ranier JK, Willard FS, Bodor ET, Jones MB, Harden TK, Watts VJ, and Siderovski DP. Structure of $G\alpha_i1$ bound to a GDP-selective phage display peptide provides insight into guanine nucleotide exchange. Abstract and poster at 5th Annual GPCR Retreat (2004).
- Johnston CA**, Cumbay MG, and Watts VJ. Negative Regulation of Adenylate Cyclase Activity by Type IX Adenylate Cyclase. Abstract and poster at Annual Society for Neuroscience Meeting (2003).
- Johnston CA**, Beazely MA, Vancura AF, and Watts VJ. Heterologous Sensitization of Adenylate Cyclase Activity in CAD-D_{2L} Cells is PKA-Dependent. Abstract and poster at Annual Society for Neuroscience Meeting (2001), Merck-AACP Annual Meeting (2001), and Pfizer Annual S.U.R.F. Meeting (2002).

ONGOING RESEARCH SUPPORT

PENDING RESEARCH PROPOSAL SUBMISSIONS

National Science Foundation 07/01/22-
Total costs: \$909,476
Molecular principles of spindle orientation complex organization and function

COMPLETED RESEARCH SUPPORT

National Institutes of Health (1R01GM108756) 09/30/14-08/31/20
Total costs: \$1,422,587
Cytoskeletal-mediated Regulation of Spindle Orientation

TEACHING AND MENTORING

Professional mentoring:

Past:

Mr. Vincent Cutillas
MS granted July 2021
“Role of Mushroom body defect (Mud) in mitotic spindle assembly”

Dr. Amalia Parra
PhD granted May 2021
“Role of RNA-binding proteins in neural stem cell homeostasis”

Dr. Evan Dewey
PhD granted May 2019
“Role of the cytoskeletal crosslinking agent Shortstop in mitosis”

Dr. Danielle Taylor
Postdoctoral fellow 2015-2016
“Role of Hippo kinase in epithelial cell spindle orientation”

Current:

Ms. Maryam Bahmani
MS expected Spring 2022
“Role of the cytoskeletal adaptor protein Hts in asymmetric cell division”

Undergraduate student mentoring:

BIOL 499: Undergraduate Problems (2013-present) – I have mentored ~25 undergraduate students in my lab through this mechanism. Students in my 499 class get hands-on laboratory experience, actively participating in current research projects. I provide opportunities to learn basic laboratory skills, including fundamental techniques in molecular biology, biochemistry, cell biology, and *Drosophila* genetics. Most of these students have or are in the process of matriculating to graduate school, medical school, or other professional education programs.

Initiative for Maximizing Student Development (IMSD) – I have mentored one IMSD student, Mr. Joshua Garcia (2013-2015). Josh was an outstanding student who published a first-author paper during his IMSD fellowship. Josh is currently a graduate student in the pharmacology program at UC Denver.

Classroom Teaching (Current):

Fall semesters:

BIOL 401: Pharmacology – Mechanisms of Drug Action (2015-present) – I designed this course (started Fall 2015) specifically to meet the demands of our predominantly pre-health professional undergraduate students. The course also serves graduate students in the department as well. The course has met capacity registration of 100 students in each of its first two years. I have increased the cap to 120 for Fall 2017 (current registration is 116). The course begins by covering fundamentals of medicinal chemistry, pharmacology, pharmacodynamics, and pharmacokinetics. This is followed by focused discussions of cardiovascular pharmacology, CNS pharmacology, and cancer chemotherapy. Each block describes the pathophysiology of common disease states and discusses in detail the drugs used to treat them. A large percent of students successfully matriculate to professional school (medical, pharmacy, dental, etc), often here at UNM.

Spring semesters:

BIOL 2110 (BA/MD section): Cell and Molecular Biology (2013-present) – My section is a small (48 students) class designed to help improve student outcomes within the BA/MD program. In addition to the smaller classroom size, I have worked over the past 4 years to revamp the course in ways that have reduced formal lecture times to ~50% while increasing group-based active learning approaches the other ~50% of class time. These activities focus heavily on critical thinking skills and conceptual application of basic principles. Moreover, they are specifically designed to appeal to pre-medical students by incorporating real world scenarios relating cell biology to medicine.

SERVICE (CURRENT)

Journal editorial service:

2017-Current:

Journal of Developmental Biology – Editorial board member

University of New Mexico Department of Biology and College of Arts & Sciences:

Fall 2012-Current:

Member on the Committee on Curriculum and Student Progress (CCSP):
Discussion and evaluation of BA/MD curriculum and student assessment

Member on the BA/MD Basic Science Subgroup Committee: Discussion of core
science course curriculum and student assessment and progress within the
BA/MD program

Fall 2015-Current:

Library liaison – work with Amy Jankowski for Library Services to ensure library
needs of the Biology department are being met.

Fall 2018-Current:

Senator, UNM Faculty Senate