

CHANDRA L. TUCKER, Ph.D.
Associate Professor
Department of Pharmacology,
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EDUCATION

B.S. (1990) Biology, California Institute of Technology, Pasadena, CA

Ph.D. (1999) Biochemistry, University of Washington, Seattle, WA
Advisor: Dr. James B. Hurley, Professor, Department of Biochemistry, University of Washington. *Thesis: Structural and Functional Studies of Retinal Guanylyl Cyclase*

Postdoctoral Training, University of Washington, Seattle, WA
Advisor: Dr. Stanley Fields, Professor, Howard Hughes Medical Institute and Department of Genome Sciences

ACADEMIC APPOINTMENTS

7/08 – 8/11 Assistant Research Professor, Department of Biology, Duke University

9/1/11 – 6/30/15 Assistant Professor, Pharmacology, University of Colorado School of Medicine

7/1/15 – present Associate Professor, Pharmacology, University of Colorado School of Medicine

AWARDS, HONORS, and SERVICE

2016 Co-organizer, Janelia Farm Workshop, Genetic Manipulation of Neuronal Activity IV
2016 German Research Foundation Study Section, 'Optogenetics', Frankfurt, Germany
2015 Organizer – Keystone Conference on Optogenetics 2015
2015 NIH Reviewer – NIDA Cutting Edge Basic Research Awards (CEBRA)
2013 McKnight Technological Innovations in Neuroscience Award
2014 NIH Study Section Reviewer – BRAIN Initiative RFA, "Development and Validation of Novel Tools to Analyze Cell-Specific and Circuit-Specific Processes in the Brain."
2009 – 2014 Scientific Advisory Board, Oxalosis and Hyperoxaluria Foundation
2012 Awarded best paper published in 2012 in Journal of Biological Chemistry in 'Plant Biology' field
2010 Session Chair – Primary Hyperoxaluria Workshop – Aug 2010
2000 – 2003 National Institutes of Health Postdoctoral Fellowship (NRSA)
1999 National Eye Institute Travel Fellowship Grant
1994 – 1998 NIH Training Grant Recipient in Vision Research

INVITED PRESENTATIONS

2016 Stanford University, Bio-X Seminar Series, Palo Alto, CA
2016 Structural Biology and Biochemistry Graduate Program Retreat, Denver, CO
2015 Neurotechnology Symposium, Center for Neurobiological Engineering, MIT, Boston, MA
2015 SUNY Buffalo, Department of Biological Sciences, Buffalo, NY
2015 Washington University, Department of Anesthesiology, St. Louis, MO
2015 Keystone Conference on Optogenetics, Denver, CO.
2015 Max Planck Institute, Jupiter, FL.
2014 Genetic Manipulation of Neuronal Activity III, Janelia Farm Research Campus, MD

2014 American Society for Cell Biology Annual Meeting, Session “Harnessing Biological Processes: Optogenetics vs. Non-optogenetics”, Philadelphia, PA
2014 University of Wyoming, Department of Molecular Biology, Laramie WY.
2014 University of Denver, Department of Chemistry and Biochemistry, Denver, CO
2014 Primary Hyperoxaluria Workshop, Chicago, IL
2014 Gordon Conference on Photosensory Receptors, Braggia, Italy
2014 Fred Hutchinson Cancer Research Center, Current Biology Seminar Series, Seattle, WA
2013 Molecular Biology Graduate Program Workshop, ‘Synthetic Biology’, Aurora, CO
2013 Conference on Lasers and Electro-optics (CLEO), San Jose, CA
2013 Center for Cell Analysis and Modeling, University of Connecticut Health Center, Farmington, CT.
2012 Biophysical Society 56th Annual Meeting, San Diego, CA, Workshop: Optogenetics:
Development of Novel Optical Tools for Controlling Protein Cellular Behavior
2012 INSERM Workshop, Bordeaux, France, Photocontrol and optogenetic of biological systems and functions.
2012 Rocky Mountain Yeast Meeting, University of Colorado School of Medicine, Aurora, CO, 2012 Gevo, Englewood, CO
2012 American Society of Photobiology, Montreal, Canada
2012 Yale Microscopy Workshop, New Haven, CT
2011 Synthetic Biology Symposium, Duke University, Durham, NC
2010 Pharmacology and Cancer Biology Seminar Series, Duke University, Durham, NC
2010 Primary Hyperoxaluria Workshop, New York, NY
2010 New Technology and Resources Symposium, International Yeast Genetics and Molecular Biology Meeting, Vancouver, BC
2007 Primary Hyperoxaluria Workshop, London, England
2008 Chemical Genomics and Genetics Workshop, International Yeast Genetics and Molecular Biology Meeting, Toronto, ON

PUBLICATIONS

1. Chen, J., **Tucker, C.L.**, Woodford, B., Szel, A., Lem, J., Gianella-Borradori, A., Simon, M. I., and Bogenmann, E. (1994) The human blue opsin promoter directs transgene expression in short-wave cones and bipolar cells in the mouse retina. *Proc. Natl. Acad. Sci. U.S.A.* 91, 2611-2615.
2. Baskar, J.F., Smith, P. P., Ciment, G. S., Hoffmann, S., **Tucker, C.**, Tenney, D. J., Colberg-Poley, A. M., Nelson, J. A., and Ghazal, P. (1996) Developmental analysis of the cytomegalovirus enhancer in transgenic animals. *J. Virol.* 70, 3215-3226.
3. **Tucker, C. L.**, Laura, R. P., and Hurley, J. B. (1997) Domain-specific stabilization of photoreceptor membrane guanylyl cyclase by adenine nucleotides and guanylyl cyclase activating proteins (GCAPs). *Biochemistry* 36, 11995-2000.
4. **Tucker, C. L.**, Hurley, J. H., Miller, T. R., and Hurley, J. B. (1998) Two amino acids convert a guanylyl cyclase, RetGC-1, into an adenylyl cyclase. *Proc. Natl. Acad. Sci. U.S.A.* 95, 5993-5997.
5. **Tucker, C. L.**, Woodcock, S. C., Kelsell, R. E., Hunt, D. M., and Hurley, J. B. (1999) Biochemical analysis of a dimerization domain mutation in RetGC-1 associated with dominant cone-rod dystrophy. *Proc. Natl. Acad. Sci. U.S.A.* 96, 9039-9044.
6. Ramamurthy, V., **Tucker, C.**, Wilkie, S.E., Daggett, V., Hunt, D.M., and Hurley, J.B. (2001) Interactions within the coiled-coil domain of RetGC-1 guanylyl cyclase are optimized for regulation rather than high affinity. *J. Biol. Chem.* 276, 26218-26229.
7. **Tucker, C. L.**, Gera, J. F. and Uetz, P. (2001) Towards an understanding of complex protein networks. *Trends Cell Biol.* 11, 102-106.

8. **Tucker, C. L.** and Fields, S. (2001) Engineering a yeast sensor of ligand binding. *Nature Biotechnology* 19, 1042-1046. (reviewed in: *Nature Biotechnology* 19, 1022-1023; *Nature Reviews Drug Discovery* 1, 6-7; *Analytical Chemistry* 74, 13A)
9. Brockerhoff, S. E., Rieke, F., Matthews, H. R., Taylor, M. R., Kennedy, B., Ankoudinova, I., Niemi, G. A., **Tucker, C. L.**, Xiao, M., Cilluffo, M. C., Fain, G. L., and Hurley, J. B. (2002) Light stimulates a transducin-independent increase of cytoplasmic Ca²⁺ and suppression of current in cones from the zebrafish mutant *nof*. *J. Neurosci.* 23, 470-480.
10. **Tucker, C. L.** (2002) High-throughput cell-based assays in yeast. *Drug Discovery Today* 7 (Suppl.), S125-S130.
11. **Tucker, C. L.** and Fields, S. (2003) Lethal Combinations. *Nature Genet.* 35, 204-205.
12. **Tucker, C. L.**, Ramamurthy, V., Pina, A., Loyer, M., Dharmaraj, S., Li, Y., Maumenee, I., Hurley, J. B., and Koenekoop, R. K. (2004) Functional analyses of mutant recessive GUCY2D alleles identified in Leber congenital amaurosis patients. *Mol. Vision* 10, 297-303.
13. **Tucker, C. L.** and Fields, S. (2004) Quantitative genome-wide analysis of yeast deletion strain sensitivities to oxidative and chemical stress. *Comp. & Funct. Genomics* 5, 216-224.
14. Hopper, E. D., Pittman, A.M.C., Fitzgerald, M.C., and **Tucker, C. L.** (2008) In vivo and in vitro examination of stability of primary hyperoxaluria-associated human alanine:glyoxylate aminotransferase. *J. Biol. Chem.*, 283, 30493-30502.
15. ***Tucker, C. L.**, Peteya, L., Pittman, A.M.C, and Zhong, J. (2009) A genetic test for yeast two-hybrid bait competency using RanBPM. *Genetics*, 182, 1377-1379 (*corresponding author)
16. Hopper, E. D., Pittman, A.M.C., **Tucker, C. L.**, Campa, M. J., Patz, E. F., and Fitzgerald, M. C. (2009) Hydrogen/deuterium exchange- and protease digestion-based screening assay for protein-ligand binding detection. *Anal. Chem.* 81, 6860-6867.
17. West, G. M., **Tucker, C. L.**, Xu, T., Park, S. K., Han, X., Yates, J. R., and Fitzgerald, M. C. (2010) Quantitative proteomics approach for identifying protein-drug interactions in complex mixtures using protein stability measurements. *Proc. Natl. Acad. Sci. U.S.A.* 107, 9078-9082.
18. Kennedy, M.J., Hughes, R.M., Peteya, L.A., Schwartz, J.W., Ehlers, M.D., and **Tucker, C.L.** (2010) Rapid blue light induction of protein interactions in living cells. *Nature Methods.* 7, 973-975.
19. Pajerowska-Mukhtar, K.M., Wang, W., Tada, Y., Oka, N., **Tucker, C.L.**, Fonseca, J.P., and Dong, X. (2012) The HSF-like transcription factor TBF1 is a major molecular switch for plant growth-to-defense transition. *Curr Biol.* 22, 103-112.
20. **Tucker, C.L.** (2012) Manipulating cellular processes using optical control of protein-protein interactions. *Prog. Brain Res.* 196, 95-117.
21. Hughes, R.M., Vrana, J.D., Song, J., and **Tucker, C.L.** (2012) A light-dependent, dark-promoted interaction of Arabidopsis cryptochrome 1 and phytochrome B. *J. Biol. Chem.* 287, 22165-22172. ***Paper of the Week* **Awarded best plant biology paper in JBC in 2012****
22. Hughes, R.M., Bolger, S., Tapadia, H., and **Tucker, C.L.** (2012) Light-mediated control of DNA transcription in yeast. *Methods* 58, 385-391.
23. Pittman, A.M., Lage, M.D., Poltoratsky, V., Vrana, J., Paiardini, A., Roncador, A., Cellini, B., Hughes, R.M., and **Tucker, C.L.** (2012) Rapid profiling of disease alleles using a tunable reporter of protein misfolding. *Genetics* 192, 831-842. ****Highlighted in Nature Reviews Genetics**
24. Pathak, G.P., Vrana, J.D., and **Tucker, C.L.** (2013) Optogenetic control of cell function using engineered photoreceptors. *Biol Cell* 105, 59-72.
25. Lage, M.D., Pittman, A.M., Roncador, A., Cellini, B., and **Tucker, C.L.** (2014) Allele-specific characterization of alanine:glyoxylate aminotransferase variants associated with primary hyperoxaluria. *PLOS ONE* 9, e94338 doi: 10.1371/journal.pone.0094338
26. **Tucker, C.L.**, Vrana, J.D., and Kennedy, M.J. (2014) Tools for controlling protein interactions with light. *Curr. Protoc. Cell Biol.* 64, 17.16.1 – 17.16.20

27. Hansen, M.G., Fregoso, V., Vrana, J.D., **Tucker, C.L.**, and Niswander, L. (2014) Peripheral nervous system defects in a mouse model for peroxisomal biogenesis disorders. *Dev. Biol.* doi:10.1016/ydbio.2014.08.026
28. Taslimi, A., Vrana, J.D., Chen, D., Borinskaya, S., Mayer, B., Kennedy, M.J., and **Tucker, C.L.** An optimized optogenetic clustering tool for probing protein interaction and function. (2014) *Nature Commun.* 5: 4925. doi 10.1038/ncomms5925 ****Highlighted in Nature Methods, Nov 2014 issue****
29. Pathak, G., Strickland, D., Vrana, J.D., and **Tucker, C.L.** (2014) Benchmarking optical dimerizer systems. *ACS Synthetic Biology*, 2014 Oct 28.
30. Schindler, S.E., McCall, J.G., Yan, P., Hyre, K.L., Li, M., **Tucker, C.L.**, Lee, J., Bruchas, M.R., and Diamond, M.I. Photo-activatable Cre recombinase regulates gene expression *in vivo*. (2015) *Sci. Rep.* 5, 13627.
31. Taslimi, A., Zoltowski, B., Miranda, J.G., Pathak, G., Hughes, R.M., and **Tucker, C.L.** Optimized second generation CRY2/CIB dimerizers and photoactivatable Cre recombinase. (*in press*, *Nature Chemical Biology*).