

CURRICULUM VITA

Christopher S. Wallace, Ph.D.
Dr. Robert F. Welty Associate Professor of Biology
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EDUCATION AND DEGREES

British Studies Centre, Canterbury, England, 1980-1981
B.A., English, Univ. Illinois, Urbana-Champaign, 1983
B.S., Psychology, Univ. Illinois, Urbana-Champaign, 1983
Ph.D., Neuroscience, Univ. Illinois, Urbana-Champaign, 1993

ACADEMIC APPOINTMENTS

Whitman College
Associate Professor of Biology, 2007 – present
Assistant Professor of Biology, 2001 – 2007
Visiting Assistant Professor of Neurobiology, 2000 - 2001
Research Assistant Scientist
Oregon Health and Sciences University, 1998 – 2005
Postdoctoral Fellow
University of Virginia, with Dr. O. Steward, 1993 – 1997

TEACHING EXPERIENCE

Assistant Professor of Biology, Whitman College, 2001 – present.
Courses: Principles of Biology, Neurobiology
Visiting Assistant Professor of Biology, Whitman College, 2000-2001
Courses: Principles of Biology, Developmental Biology, Neurobiology
T.A. for Techniques in Biological Psychology, UIUC, 1984-1987
T.A. for Laboratory in Physiological Psychology, UIUC, 1985
T.A. for Comparative Development, Univ. Illinois (UIUC), 1983

RESEARCH INTERESTS

The dendrite is a part of neuron that acts as the primary sites for reception and processing of synaptic inputs, such that the cell biology of this structure has direct implications for the regulation of information flow—and storage—within nervous systems. Working with long-term collaborator Ginger Withers and undergraduate research assistants of “Team Dendrite,” my research is currently addressing the hypothesis that non-neural cells called astrocytes are intimately involved in both the development of dendrites and their continuing capacity for functional modification in response to the demands on individual experience.

ACADEMIC AWARDS AND OTHER DISTINCTIONS

Robert F. Welty Chaired Associate Professorship, 2007 - present
Phi Beta Kappa
NIH National Research Service Award NSO9793, 1995-1997
NIH Postdoctoral Trainee NSO7199, 1993-1995
University of Illinois Neuroscience Student Research Grant, 1992
University of Illinois Neuroscience Merit Award, 1989
Midwest Soc. for Electron Microscopy Student Research Award, 1988
NIH National Research Service Award Trainee, 1984-1987

RESEARCH and CURRICULAR FUNDING

Howard Hughes Medical Institute Undergraduate Science Education Program, Whitman College: Cultivating webs of connection in science education through integrative life sciences and global health. PI, C.S. Wallace (\$1,300,000, submitted 10/11, not funded).

NIH 1R15HD061831-01, Glia as a source of signals for neuron development. (\$225,000, 09/09 – 09/13) PI, G.S. Withers, CoPI, C.S. Wallace

NSF MRI: Acquisition of a laser scanning confocal microscope to build an integrative life sciences imaging program and create new research opportunities at Whitman College. (\$549,000, 09/10 – 08/13) PI, G.S. Withers, CoPIs, C. Wallace, L. Knight, D. Vernon, D. Juers

NIH/NIEHS, 1 P42 NS10338, Hazardous chemicals and brain developmental plasticity, PI, Christopher Wallace (\$500,000, 2000-2005)

Keck Foundation Summer Research Grant (\$13,220, 2005)

Whitman College CDTLI Workshop Brain, Behavior and Mind. C.S. Wallace, Coordinator (Summer 2011, \$13,190)

Whitman College Abshire Award, 2007, 2013

Whitman College Innovation in Teaching and Learning Award (\$12,220, 2008) “Building new science courses and labs around discovery: integrated inquiry-based instructional units and ‘clabinar’ courses”, coPIs, G.S. Withers, C.S. Wallace and D. Vernon

Columbia Genome Consortium/Teagle Foundation, “Teaching Big Science at Small Colleges: Combining anatomical and genomics tools to engage intermediate and upper level Biology and Neuroscience undergraduates in an integrative analysis of nervous system evolution” coPIs, G.S. Withers, C.S. Wallace, Whitman College, and K.Susman, Vassar College (2008-9, \$9,000)

PEER REVIEW ACTIVITY

NSF Panel Reviewer for Integrative and Organizational Biology, SP '09,
NIH (ad hoc reviewer '09), National Institute of Environmental Health Sciences (ad hoc reviewer)
Journal of Comparative Neurology, '11

PROFESSIONAL SOCIETIES AND AFFILIATIONS

Society for Neuroscience, Sigma Xi, Faculty in Undergraduate Neuroscience (FUN),
Council on Undergraduate Research, American Association for the Advancement of Science,
American Society for Cell Biology.

PUBLICATIONS

(undergraduate co-authors indicated with *)

SCIENCE EDUCATION PUBLICATIONS

Banta, L.M., Crespi, E.J., Nehm, R.H., Singer, S., Schwarz, J.A., Manduca, C.A., Bush, E.C., Collins, E., Constance, C.M., Dean, D., Esteban, D., Fox, S., Paul, C.A., Quinan, G., Raley-Susman, K.M., Smith, M.L., Wallace, C.S., Withers, G.S., Caporale, L. (2012). *Letter to the Editor: Integrating Genomics Research throughout the Undergraduate Curriculum: A Collection of Inquiry-Based Genomics Lab Modules*. J. Cell Biol. Education 11:1-5, **republished as a feature in “CBE Highlights of the Year” 2012.**

Withers, G.S., Wallace, C.S. (2007). Inexpensive Digital Microscopy Workstations Engage Students in Integrative Biology. in A. Mendez-Vilas, J. Diaz (Eds.) *Modern Research and Educational Topics in Microscopy*, 3rd Ed. Vol 2, p. 1028-1033.

PEER REVIEWED RESEARCH PAPERS

- Withers, G.S., Wallace, C.S., Gibbs, E.M.*, Emery, I.R.*, Applegate, M.L.* (2011). Synapses on demand require dendrites at the ready: How defining stages of dendritic development in culture could inform studies of brain information storage. Developmental Psychobiology, 53(5):443-55.
- Wallace, C.S., Withers, G.S., Farnand, A.*, Lobinger, B.T.*, McCleery, E.J.* (2011). Evidence that angiogenesis lags behind neuron and astrocyte growth in experience dependent plasticity. Developmental Psychobiology, 53(5):435-42.
- Withers, G.S., Day, N.F.*, Talbot, E.*, Dobson, H.E.M., Wallace, C.S. (2008). Experience-dependent plasticity in the mushroom bodies of the solitary bee *Osmia lignaria* (Megachilidae). Developmental Neurobiology, 68 (1) 73-82, epub ahead of print in October 2007.
- Ikeda, M., Sugiyama, T., Wallace, C.S., Gompf, H.S., Yoshioka, T., Miyawaki, A., Allen, C.N. (2003). Circadian dynamics of cytosolic and nuclear Ca²⁺ in single suprachiasmatic nucleus neurons. Neuron, 38:253-263.
- Wallace, C.S., Reitzenstein, J.*, Withers, G.S. (2003). Diminished experience-dependent neuroanatomical plasticity: Evidence for an improved biomarker of subtle neurotoxic damage to the developing rat brain. Environmental Health Perspectives, 111:1294 – 1298.
- Steward, O., Wallace, C.S., Lyford, G.L., Worley, P.F. (1998). Synaptic activation causes the mRNA for the IEG for *Arc* to localize selectively near activated postsynaptic sites on dendrites. Neuron, 21:741-751.
- Wallace, C.S., Lyford, G.L., Worley, P.F., Steward, O. (1998). Differential intracellular sorting of immediate early gene mRNAs depends on signals in the mRNA sequence. The Journal of Neuroscience, 18(1):26-35.
- Steward, O., Wallace, C.S. (1995). mRNA distribution within dendrites: relationship to afferent innervation. Journal of Neurobiology, 26(3):447-458.
- Wallace, C.S., Withers, G.S., Weiler, I.J., George, J.M., Clayton, D.F., Greenough, W.T. (1995). Correspondence between sites of NGFI-A induction and sites of morphological plasticity following exposure to environmental complexity. Molecular Brain Research, 32, 211-220.
- Wallace, C.S., Kilman, V.L.*, Withers, G.S., Greenough, W.T. (1992). Increases in dendritic length following a brief period of differential housing in weanling rats. Behavioral and Neural Biology, 58:64-68.
- Boppart, S.A., Wheeler, B.C., Wallace, C.S. (1992). A flexible perforate microelectrode array for extended neural recordings. IEEE Transactions on Biomedical Engineering, 39(1):37-42.
- Black, J.E., Sirevaag, A.M., Wallace, C.S., Savin, M.H.*, Greenough, W.T. (1989). Effects of complex experience on somatic growth and organ development in rats. Developmental Psychobiology, 22(7):727-752.

INVITED REVIEWS & BOOK CHAPTERS

- Steward, O., Wallace, C.S., Worley, P.F. (2001). Synaptic plasticity in epileptogenesis: cellular mechanisms underlying long-lasting synaptic modifications that require new gene expression. *International Review of Neurobiology*, **45**:269-292.
- Steward, O., Worley, P.F., Wallace, C.S. (2001) Synapse-specific gene expression of the IEG Arc: Insights into molecular mechanisms that may play a role in memory consolidation. In Gold, P.E., Greenough, W.T. (Eds), *Memory consolidation: Essays in honor of James L. McGaugh*. APA Books, pp 35-58.
- Steward, O., Wallace, C.S., Worley, P.F. (2000). Synaptic regulation of messenger RNA trafficking within neurons. In Baudry, M., Davis, J.L., Thompson, R.F. (Eds.), *Advances in Synaptic Plasticity*. Cambridge: MIT Press, pp 33-52.
- Greenough, W.T., Wallace, C.S., Alcantara, A.A., Anderson, B.J., Hawrylak, N., Sirevaag, A.M., Weiler, I.J., Withers, G.S. (1992). Development of the brain: Experience affects the structure of neurons, glia and blood vessels. In Anastasiow, N., Harel, S. (Eds.), *Proc. from the 3rd International Workshop on the At Risk Infant*. Baltimore:Paul H. Brookes, 173-185.
- Wallace, C.S., Hawrylak, N., Greenough, W.T. (1991). Studies of synaptic structural modifications following LTP and kindling: Context for a molecular morphology. In Baudry, M., Davis, J.L. (Eds.), *LTP: A Debate of Current Issues*. Cambridge: MIT Press, pp. 189-232.
- Greenough, W.T., Withers, G.S., Wallace, C.S. (1990). Morphological changes in the nervous system arising from behavioral experience: What is the evidence that they are involved in learning and memory? In Squire, L.R., Lindenlaub, E. (Eds.), *The Biology of Memory, Symposia Medica Hoescht 23*. F.K. Stuttgart-New York: Schattauer Verlag, pp. 159-183.
- Greenough, W.T., Black, J.E., Wallace, C.S. (1987). Experience and brain development. *Child Development*, **58**:539-559.
(Reprinted (1993 and 2002) In Johnson, M.H., Munakata, Y., Gilmore, R.O., *Brain Development and Cognition, 1st and 2nd Ed.*, Oxford: Blackwell Publishing).

SELECTED RECENT POSTERS AND ABSTRACTS

- Withers, G.S., Farley, J. *, Sterritt, J. R. *, Chory, K. *, Guggenheim, J. *, and C.S. Wallace (2013). Contact-dependent and independent effects by astroglia on cultured hippocampal neuron development. International Soc. Neurochemistry Satellite Meeting, Emerging Topics in Synapse Function: Molecular Mechanisms, Circuit Function and Disease, Playa del Carmen, Mexico, April 2013.
- Withers, G.S., Chory, K. *, Sterritt, J.R. *, Guggenheim, J. *, Wallace, C.S. (2011) Synapse formation and dendritic development in vitro are influenced by astrocytes in a contact dependent manner. International Brain Research Organization Meeting Abstracts, C013
- Withers, G.S., Lambruschi, L. *, Brown, L. *, Wallace, C.S. (2008). The absence of glia leads to increased dendritic growth in cultured hippocampal neurons. *Soc. for Neuroscience Meeting Abstracts*, 524.17.

- Day, N.F.*, Talbot, E.*, Dobson, H.E.M., Wallace, C.S., Withers, G.S. (2005). Separating experience-expectant organization from experience-expectant plasticity in the mushroom bodies of the solitary bee *Osmia lignaria*. Undergraduate Poster Session, Society for Neuroscience Annual Meeting, Washington DC, Nov. 11- 15.
- Day, N.F.*, Talbot, E. *, Dobson, H.E.M., Wallace, C. S., Withers, G.S. (2005). Evidence that foraging experience alters the mushroom bodies of the solitary bee *Osmia lignaria*. Pacific Branch of the Entomological Society of America Annual Meeting, February 27-March 2, Pacific Grove, CA
- Wallace, C.S., Withers, G.S. (2004). Affordable digital microscopy workstations engage students in integrative biology. Crossing Boundaries: Innovations in Undergraduate Research, the 10th National Conference Proceedings, Council on Undergraduate Research, p 23.
- Withers, G.S., Wallace, C.S. (2003). An affordable imaging system introduces undergraduates to digital microscopy. Society for Neuroscience Annual Meeting Abstracts, **33**, 25.7.
- Withers, G.S., Wallace, C.S., Banker, G. (2001). Preferential positioning of GFP-staufen beneath dendritic spines. Society for Neuroscience Annual Meeting Abstracts, **31**, 250.7.

INVITED PRESENTATIONS

- Wallace, C.S. “Approaching the onset of plasticity as “social cell biology.” Symposium honoring the retirement of Professor W.T. Greenough, University of Illinois, Champaign-Urbana, June 6-7, 2009.
- Wallace, C.S. Faults in neuroanatomical plasticity reveal low level neurotoxic damage to the brain. University of Idaho Neuroscience Program Seminar Series, March 25, 2004.
- Wallace, C.S. Experience-dependent plasticity of dendrites: Functional relevance and molecular regulation. Lake Forest College, Department of Biology and Summer Research Program, Lake Forest, IL, July 7, 2004
- Wallace, C.S. Imaging molecular targeting in living neural cultures. Microscopy & Microanalysis Conference Symposium: "Highlights of Biological Microscopy in the Pacific Northwest." Organizer: C.Meshul. Portland, OR, August 1-5, 1999.
- Wallace, C.S. Rapid dendritic transport of Arc mRNA: Implications for Neural Plasticity. Winter Conference on Neural Plasticity Symposium "Molecular mechanisms of plasticity: Localization of specific mRNAs to axons, dendrites and glial cells." Chair: I.R.Brown. St. Lucia, Caribbean, Feb 22-Mar 1, 1997.
- Wallace, C.S. Dendritic Trafficking of Arc mRNA and localization of the Arc Protein. Winter Conference on Brain Research Workshop "Proteins and Plasticity: Mediation of Long-term Events in the Brain." Chair: R.H. Lenox. Breckenridge, CO, Jan 25-Feb 1, 1997.
- Wallace, C.S. Dendritic Export of the Inducible mRNA *Arc*: Implications for Transport Mechanism and Sorting Signal. FASEB Summer Research Conference “Cellular and Intracellular Transport of RNA.” Snowmass, CO, June 22-28, 1996.