

LAUREN PATRICE WILLS, Ph.D.

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Assistant Professor | Biology | Charleston Southern University

EDUCATION

December 2008

Ph.D. Environmental Science, Duke University

Advisor: Richard T. Di Giulio, Ph.D.; richd@duke.edu

Thesis: The role of biotransformation on the interactive toxic effects of polycyclic aromatic hydrocarbons in the Atlantic killifish (*Fundulus heteroclitus*)

Certificate in Toxicology

May 2002

B.S. Biology, University of Maryland Baltimore County

Meyerhoff Scholar

Magna cum laude

PROFESSIONAL EXPERIENCE

2016-present

Charleston Southern University | Charleston SC

Assistant Professor, Biology

- Taught and developed introductory and upper level courses in Biology for majors and non-majors, including: Foundations of Biology/Lab, Introduction to Environmental Law and Policy, and Environmental Toxicology and Risk Assessment

2013-2015

The Citadel | Charleston, SC

Adjunct Professor, Biology

- Taught and developed introductory and upper level courses in Biology for majors and non-majors, including: General Biology/Lab

2012-2015

MitoHealth Inc. | Charleston, SC

Research Specialist

- Provided contract services to assess the effects of diverse chemicals on mitochondrial function

2009-2012

Medical University of South Carolina | Charleston, SC

Postdoctoral Researcher, Drug Discovery and Biomedical Sciences

- Developed a respirometric assay using the novel XF 96-well Extracellular Flux Analyzer; successfully completed multiple high-throughput screens measuring the effects of chemical exposure on mitochondrial respiration in primary rabbit renal proximal tubules.

FELLOWSHIPS + AWARDS

2011-2012	Ruth L. Kirschstein Individual National Research Service Award Postdoctoral Fellowship, F32-ES020103-01, Identification and Characterization of Mitochondrial Toxicants, Medical University of South Carolina
2010	First Prize Postdoctoral Oral Presentation, Southeastern Society of Toxicology
2009-2011	Ruth L. Kirschstein National Research Service Award Postdoctoral Training Grant, T32-CA119945-04 Training in Cancer Therapeutics, Medical University of South Carolina
2004-2006	Integrated Toxicology and Environmental Health Program Graduate Fellowship, Duke University
2006	Abel Award for Academic Excellence, Duke University
2004	Society of Toxicology and Chemistry Annual Meeting Travel Award
2002-2004	James B. Duke Graduate Fellowship, Duke University
2002	Phi Beta Kappa, University of Maryland Baltimore County
2001	National Science Foundation, REU Summer Fellowship, Shoals Marine Laboratory, Cornell University
2000	Leadership Alliance Summer Fellowship, Shoals Marine Laboratory, Cornell University
1998-2002	Meyerhoff Scholarship, University of Maryland Baltimore County

PUBLICATIONS

Wills, L.P. 2017. The use of high-throughput screening techniques to evaluate mitochondrial toxicity. *Toxicology* 391: 34-41.

Harmon, J.L., **Wills, L.P.**, McOmish, C.E., Demireva, E.Y., Gingrich, J.A., Beeson, C.C., Schnellmann, R.G. 2016. 5-HT₂ Receptor Regulation of Mitochondrial Genes: Unexpected Pharmacological Effects of Agonists and Antagonists. *Journal of Pharmacology and Experimental Therapeutics* 357(1): 1-9.

Wills, L.P., Beeson, G.C., Hoover, D.B., Schnellmann, R.G., Beeson, C.C. 2015. Assessment of ToxCast Phase II for mitochondrial liabilities using a high-throughput respirometric assay. *Toxicological Sciences* 146(2): 226-34.

- Jesinkey, S.R., Funk, J.A., Stallons, L.J., **Wills, L.P.**, Megyesi, J.K., Beeson, C.C., Schnellman, R.G. 2014. Formoterol restores mitochondrial and renal function after ischemia-reperfusion injury. *Journal of the American Society of Nephrology* 25(6): 1157-62.
- Bozinovic, G., Sit, T.L., Di Giulio, R., **Wills, L.P.**, Oleksiak, M.F. 2013. Genomic and physiological responses to strong selective pressure during late organogenesis: few gene expression changes found despite striking morphological differences. *BioMed Central Genomics* 14: 779.
- Whitaker, R.M., **Wills, L.P.**, Stallons, L.J., Schnellmann, R.G. 2013. cGMP-Selective phosphodiesterase inhibitors stimulate mitochondrial biogenesis and promote recovery from AKI. *Journal of Pharmacology and Experimental Therapeutics* 347(3): 626-234.
- Peterson, Y.K., Cameron, R.B., **Wills, L.P.**, Trager, R.E., Lindsey, C.C., Beeson, C.C., Schnellmann, R.G. 2013. β_2 -adrenoceptor agonists in the regulation of mitochondrial biogenesis. *Bioorganic and Medicinal Chemistry Letters* 23(19): 5376-5381.
- Wills, L.P.**, Beeson, G.C., Trager, R.E., Lindsey, C.C., Beeson, C.C., Peterson, Y.K., Schnellmann, R.G. 2013. High-throughput respirometric assay identifies predictive toxicophore of mitochondrial injury. *Toxicology and Applied Pharmacology* 272(2): 490-502.
- Wills, L.P.**, Trager, R.E., Beeson, G.C., Lindsey, C.C., Peterson, Y.K., Beeson, C.C., Schnellmann, R.G. 2012. The β_2 -adrenoceptor agonist formoterol stimulates mitochondrial biogenesis. *Journal of Pharmacology and Experimental Therapeutics* 342(1): 106-118.
- Cummings, B.S., **Wills, L.P.**, Schnellmann, R.G. 2012. Measurement of cell death in Mammalian cells. *Current Protocols in Pharmacology*. Chapter12: Unit 12.8.
- Wills, L.P.**, Schnellmann, R.G. 2011. Telomeres and telomerase in renal health. *Journal of the American Society of Nephrology* 22(1): 39-41.
- Wills, L.P.**, Jung, D., Koehn, K., Zhu, S., Willett, K.L., Hinton, D.E., Di Giulio, R.T. 2010. Comparative chronic liver toxicity of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. *Environmental Health Perspectives* 118(10): 1376-1381.[PMCID: PMC2957915].
- Wills, L.P.**, Schnellmann R.G. 2010. Telomere shortening and regenerative capacity after acute kidney injury. *Journal of the American Society of Nephrology* 21(2): 202-204.
- Wills, L.P.**, Matson, C.W., Landon, C.D., Di Giulio, R.T. 2010. Characterization of the recalcitrant CYP1 phenotype found in Atlantic killifish (*Fundulus heteroclitus*) inhabiting a Superfund site on the Elizabeth River, VA. *Aquatic Toxicology* 99(1): 33-41. [PMCID: PMC2883677].
- Wills, L.P.**, Zhu, S., Willett, K.L., Di Giulio, R.T. 2009. Effect of the CYP1A inhibitor fluoranthene on the biotransformation of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. *Aquatic Toxicology* 92: 195-201. [PMCID: PMC2668722].

Wassenberg, D.M., Nerlinger, A.L., **Battle, L.P.**, Di Giulio, R.T. 2005. Effects of the PAH-heterocycles, carbazole and dibenzothiophene, on *in vivo* and *in vitro* CYP1A activity and PAH-derived embryotoxicity in *Fundulus heteroclitus*. *Environmental Toxicology and Chemistry* 24: 2526-32.

ORAL + POSTER PRESENTATIONS

A. Oral Presentations |

Wills, L.P. (2018). Love your neighbor: a discussion on environmental toxicology, justice, and faith. *Baylor Symposium on Faith and Culture: Stewardship of Creation, Waco, TX.*

Wills, L.P., Beeson, G.C., Trager, R., Lindsey, C., Peterson, Y.K., Beeson, C.C., Schnellmann, R.G. (2010). Identification and characterization of mitochondrial toxicants. *Southeastern Society of Toxicology Fall Meeting, Athens, GA.*

Battle, L.P., Jung, D., Koehn, K., Hinton, D.E., Di Giulio, R.T. (2006). Comparative chronic liver toxicity of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different sensitivities. *Society of Environmental Toxicology and Chemistry North America 27th Annual Meeting, Montreal, Canada.*

Battle, L.P., Jung, D., Koehn, K., Hinton, D.E., Di Giulio, R.T. (2006). Comparative chronic liver toxicity of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different sensitivities. *Superfund Basic Research Program and Annual Meeting, San Diego, CA.*

B. Poster Presentations |

Wills, L.P., Beeson, G.C., Schnellmann, R.G., Beeson, C.C. (2015). Assessing ToxCast Phase II for mitochondrial liabilities using a high-throughput respirometric assay and cheminformatics. *Fifty-fourth Annual Meeting for the Society of Toxicology, San Diego, CA.*

Wills, L.P., Beeson, G.C., Schnellmann, R.G., Beeson, C.C. (2014). High-throughput respirometric assay identified mitochondrial toxicants in ToxCast Phase II. *Fifty-third Annual Meeting for the Society of Toxicology, Phoenix, AZ.*

Wills, L.P., Trager, R., Beeson, G.C., Lindsey, C., Beeson, C.C., Peterson, Y.K., Schnellmann, R.G. (2013). High-throughput respirometric assay identifies predictive toxicophore of mitochondrial injury. *Fifty-second Annual Meeting for the Society of Toxicology, San Antonio, TX.*

Wills, L.P., Trager, R., Beeson, G.C., Lindsey, C., Beeson, C.C., Peterson, Y.K., Schnellmann, R.G. (2011). Characterization of a μ_2 adenoceptor pharmacophore that predicts mitochondrial

biogenesis. *Fourty-fourth Annual Meeting for the American Society of Nephrology, Philadelphia, PA.*

Wills, L.P., Trager, R., Beeson, G.C., Lindsey, C., Beeson, C.C., Peterson, Y.K., Schnellmann, R.G. (2011). Identification and characterization of mitochondrial toxicants. *Fiftieth Annual Meeting for the Society of Toxicology, Washington, D.C.*

Di Giulio, R.T., Jung, D., **Wills, L.P.** (2011). Comparative DNA damage and chronic liver toxicity of benzo[a]pyrene in two populations of the Atlantic killifish (*Fundulus heteroclitus*) with different exposure histories. *Fiftieth Annual Meeting for the Society of Toxicology, Washington, D.C.*

Battle, L.P., Zhu, S., Willett, K.L., Di Giulio, R.T. (2008). Effect of the CYP1A inhibitor fluoranthene on the biotransformation of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. *Fourth Meeting for Aquatic Animal Models of Human Disease, Durham, NC.*

Battle, L.P., Zhu, S., Willett, K.L., Di Giulio, R.T. (2008). Effect of the CYP1A inhibitor fluoranthene on the biotransformation of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different exposure histories. *Forty-seventh Annual Meeting for the Society of Toxicology, Seattle, WA.*

Battle, L.P., Jung, D., Koehn, K., Hinton, D.E., Di Giulio, R.T. (2007). Comparative chronic liver toxicity of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different sensitivities. *North Carolina Society of Toxicology Spring Meeting, Research Triangle Park, NC.*

Battle, L.P., Zhu, S., Willett, K.L., Di Giulio, R.T. (2006) Effect of CYP1A inhibitor fluoranthene on the teratogenicity of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different sensitivities. *Superfund Basic Research Program Annual Meeting, New York Academy of Medicine, New York, NY.*

Battle, L.P., Zhu, S., Willett, K.L., Di Giulio, R.T. (2006). Effect of CYP1A inhibitor fluoranthene on the teratogenicity of benzo[a]pyrene in two populations of *Fundulus heteroclitus* with different sensitivities. *North Carolina Society of Toxicology Spring Meeting, 2006. Research Triangle Park, NC.*

Battle, L.P., Di Giulio, R.T. (2004). Interactive effects of pentachlorophenol with polycyclic aromatic hydrocarbons on teratogenesis and cytochrome P450A activity in *Fundulus heteroclitus* embryos. *Society of Environmental Toxicology and Chemistry Fourth World Congress, Portland, OR.*

TEACHING EXPERIENCE

1. Charleston Southern University

*Foundations of Biology**Foundations of Biology Lab**Environmental Policy and Law***Environmental Toxicology and Risk Assessment**

* Please note that I designed and implemented these courses after receiving approval from the curriculum committee.

2. The Citadel

*General Biology**General Biology Lab**Bioterrorism (Lecturer)*

3. Medical University of South Carolina

*Drug Discovery and Molecular Pharmacology (Lecturer)**Introduction to Pharmacy and Medicinal Chemistry (Lecturer)**Techniques in Scientific Writing (Facilitator)*

4. Duke University

*Environmental Toxicology (Teaching Assistant)**Chemical Fate of Organics (Teaching Assistant)**Building Opportunities and Overtures in Science and Technology (Science Coach, Instructor)*

5. University of Maryland Baltimore County

*Meyerhoff Summer Bridge Program**Africana Studies (Teaching Assistant)**Calculus I (Teaching Assistant)*

LABORATORY SKILLS

Respirometric assays (Seahorse Biosciences Extracellular Flux Analyzer), biochemical assays for enzyme activity and production of reactive oxygen species, breeding and maintenance of salt water fish, cell culture, fluorescent and bright-field microscopy, protein analysis, quantitative PCR, rodent handling.