Sara E. Hershberger, Ph.D., DABT

SENIOR SCIENTIST II

CONTACT INFORMATION

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PROFESSIONAL PROFILE

Dr. Sara Hershberger is a toxicologist in ToxStrategies' Biopharmaceutical/Pharmaceutical practice, with six years of experience as a Study Director at two Contract Research Organizations (CROs) in which she specialized in Developmental and Reproductive Toxicology (DART). During her time as a Study Director, she directed nonclinical embryo-fetal development, fertility, pre- and postnatal, and juvenile studies, and she was responsible for the study design, interpretation, analysis, and reporting of results. Dr. Hershberger also developed particular expertise in conducting large DART studies (fertility, pre and postnatal, and juvenile) utilizing the New Zealand White rabbit, which are often well suited for large-molecule compounds. In addition, Dr. Hershberger is well versed in OECD (Organisation for Economic Co-operation and Development) DART study designs, which are suited for crop protection and chemical development. She was also cross trained as a Study Director in general toxicology, where she oversaw small-animal studies.

Working in the CRO arena, Dr. Hershberger routinely hosted learning seminars for technicians to provide continuing education on the various types of study designs, scientific rationale, and study results. She became the Study Director trainer within the DART department of a CRO, generated study proposals, attended pre-initiation meetings, and peer reviewed reports.

At ToxStrategies, Dr. Hershberger works closely with clients to identify the most appropriate CRO to perform various *in vitro* studies, as well as *in vivo* studies in small and large animal species, including non-human primates, by various routes of administration for small- and large-molecule drug candidates. She oversees all aspects of study conduct, including cost management, protocol development, study monitoring, report finalization, and regulatory submission support.

Dr. Hershberger holds a doctorate in Toxicology and is a Diplomate of the American Board of Toxicology (DABT). She has published widely in the scientific literature and regularly presents at scientific conferences.

EDUCATION AND DEGREES EARNED

2016 Ph.D., Toxicology, Purdue University, West Lafayette, IN

2011 M.S., Toxicology, Purdue University, West Lafayette, IN

2010 B.S., Biology, Minnesota State University, Mankato

PROFESSIONAL ASSOCIATIONS

2021–Present Diplomate of the American Board of Toxicology (DABT)

2016–Present Teratology Society

2011–Present Society of Toxicology (SOT), Associate Member

SELECTED PROFESSIONAL EXPERIENCE

Served as a subject-matter expert (SME) during the conduct of rabbit fertility and pre- and postnatal developmental and reproductive toxicology studies.

Conducted extended one-generation studies.

Worked closely with business development and scientific teams to bring a large DART study package to the CRO employer. Generated clinical evaluation reports and peer reviewed reports by others.

Provided evaluation, determination, and documentation of biological safety.

Developed protocols and ensured their approval and compliance with SOPs, GLPs, and regulatory agency guidelines.

Developed proposal template and draft protocols for OECD DART study designs, to advance competitive advantages and generate revenue in a new area for a CRO employer.

Reviewed cost estimates to ensure inclusion of all protocol/amendment work scope specifications.

For a CRO employer:

- Coordinated efforts of the study team
- Monitored progress and status of assigned studies
- Peer reviewed protocols and study reports for colleagues
- Generated study proposal outlines for costing/clients.

Stays current with general toxicology and DART study designs and techniques.

MANUSCRIPTS

Caballero-Gallardo K, **Wirbisky-Hershberger S**, Olivero-Verbel J, de la Rosa J, Freeman JL. 2018. Embryonic exposure to an aqueous coal dust extract results in gene expression alterations associated with development and function of connective tissue and the hematological system, immunological and inflammatory disease and cancer in zebrafish. Metallomics 10(3):463–473.

Zhou W, Pal AS, Hsu AY, Gurol T, Zhu X, **Wirbisky-Hershberger SE**, Freeman JL, Kasinski AL, Deng Q. 2018. MicroRNA-223 supresses the canonical NF-kB pathway basal keratinocytes to dampen neutrophilic inflammation. Cell Reprod 13:1810–1823.

Wirbisky-Hershberger SE, Sanchez OF, Horzmann KA, Thanki D, Yuan C, Freeman JL. 2017. Atrazine exposure decreases the activity of DNMTs, global DNA methylation levels, and *dnmt* expression. Food Chem Toxicol 109:727–734.

Wirbisky SE, Freeman JL. 2017. Atrazine exposure elicits copy number alterations in the zebrafish genome. Comp Biochem Physiol C Toxicol Pharmacol 194:1–8.

Cui Y, Li J, Weng L, **Wirbisky SE**, Freeman JL, Liu J, Liu Q, Yuan X, Irudayaraj J. 2016. Regulatory landscape and clinical implication of MBD3 in human malignant glioma. Oncotarget 7(49):81698–81714.

Wirbisky SE, Weber GJ, Schlotman KE, Sepúlveda MS, Freeman JL. 2016. Embryonic atrazine exposure alters zebrafish and human miRNAs associated with angiogenesis, cancer, and neurodevelopment. Food Chem Toxicol 98:25–33.

Bi P, Yue F, Sato Y, **Wirbisky S**, Liu W, Shan T, Wen Y, Zhou D, Freeman J, Kuang S. 2016. Stage-specific effects of notch activation during skeletal myogenesis. Elife 5:e17355.

Bi P, Yue F, Karki A, Castro B, **Wirbisky SE**, Wang C, … Kuang, S. 2016. Notch activation drives adipocyte dedifferentiation and tumorigenic transformation in mice. J Exp Med 213(10):2019–2037.

Wirbisky SE, Sepúlveda MS, Weber GJ, Jannasch AS, Horzmann KA, Freeman JL. 2016. Embryonic atrazine exposure elicits alterations in genes associated with neuroendocrine function in adult male zebrafish. Toxicol Sci 153:149–164.

Wirbisky SE, Weber GJ, Sepúlveda MS, Lin TL, Jannasch AS, Freeman JL. 2016. An embryonic atrazine exposure results in reproductive dysfunction in adult zebrafish and morphological alterations in their offspring. Sci Rep 19:21337, doi 10.1038/srep21337.

Wirbisky SE, Damayanti NP, Mahapatra CT, Sepúlveda MS, Irudayaraj J, Freeman JL. 2016. Mitochondrial dysfunction, disruption of F-actin polymerization, and transcriptomic alterations in zebrafish larvae exposed to trichloroethylene. Chem Res Toxicol 29:169–179.

Wirbisky SE, Freeman JL. 2015. Atrazine exposure and reproductive dysfunction through the hypothalamus-pituitary-gonadal (HPG) axis. Toxics 3:414–450.

Wirbisky SE, Weber GJ, Sepúlveda MS, Xiao C, Cannon JR, Freeman JL. 2015. Developmental origins of neurotransmitter and transcriptome alterations in adult female zebrafish exposed to atrazine during embryogenesis. Toxicology 333:156–167.

Wirbisky SE, Weber GJ, Lee JW, Cannon JR, Freeman JL. 2014. Novel dose-dependent alterations in excitatory GABA during embryonic development associated with lead (Pb) neurotoxicity. Toxicol Lett 229:1–8.

Schlotman KE, **Wirbisky SE**, Freeman JL. 2014. An epigenetic look at atrazine toxicity: An analysis of microRNA-126 Expression in developing zebrafish exposed to the herbicide atrazine. J Purdue Undergrad Res 4:Article 8.

BOOK CHAPTER

Wirbisky SE, Freeman JL. 2014. Using zebrafish to define mechanisms of lead (Pb) developmental neurotoxicity. Chapter 11 in: Lessman CA, Carver EA (eds), Zebrafish: Topics in Reproduction, Toxicology, and Development. Nova Science Pub Inc., pp. 225–244.