

Sarah E. Brown, M.S.
Regional Unit Manager
Toxicologist

Paustenbach and Associates
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Education and Degrees Earned

- M.S., Environmental Health Science, Specialization: Toxicology, University of Massachusetts Amherst, 2017
- B.S., Biology, Saint Michael's College, 2012

Experience Summary (Professional Career)

Paustenbach and Associates
Regional Unit Manager
Toxicologist
Boulder, Colorado Office
May 2021 – Present

- Consultant specializing in toxicology, occupational health, industrial hygiene, risk assessment, and state of the art.
- Managed projects that evaluated the health effects of human exposure to nitrosamines (specifically NDMA and NDEA) in pharmaceuticals.
- Conducted scientific analyses of electronic nicotine delivery systems (ENDS) which includes evaluating the harmful or potentially harmful chemicals (HPHCs), nicotine, flavoring ingredients, methylglyoxal, and diacetyl.
- Conducted numerous assessments that evaluated occupational exposures to low airborne concentrations of chrysotile asbestos.
- Mentored, trained, managed, and evaluated performance of staff in the Boulder, CO office.
- Started, set-up, and oversaw operations of the Paustenbach and Associates Boulder, CO office.

Cardno ChemRisk

Senior Associate Health Scientist II

Boulder, CO

Mar 2017 – May 2021

- Consultant specializing in toxicology, chemical risk characterization, exposure and risk assessment, and toxicological profiles of numerous chemicals found in the workplace, consumer products, foods, and pharmaceuticals.
- Evaluated the health effects of both consumer and occupational exposures to a wide variety of chemicals including asbestos, talc, DEHP, PCBs, parabens, and various flavoring ingredients and harmful or potentially harmful chemicals (HPHCs) in electronic and oral nicotine delivery systems.
- Managed multiple large projects consisting of up to 40 staff members on tight timelines.

Graduate Teaching Assistant

University of Massachusetts Amherst; Amherst, MA

September 2014 - May 2016

- Introduction to Environmental Health Sciences (EHS 303) (3 Semesters)
 - Conducted teaching sessions to assist students who were taking this undergraduate course.
 - Responsible for grading exams and assignments as a aid to the instructor/professor.
- Public Health Senior Capstone (PUBHLTH 494CI) (1 Semester)
 - Primary mentor leading undergraduate teams in the evaluation, interpretation, and analysis of various environmental health issues.

Key Projects (Partial List)

Regulatory Support

1. **Managed multiple projects as technical support for various manufacturers of alternative tobacco products in their submission of FDA Premarket Tobacco Applications (PMTAs).** These projects involved the evaluation of potential health effects, and characterization of the toxicological hazards of exposure to flavoring ingredients and HPHCs used in electronic nicotine delivery systems (ENDS) and in oral nicotine products. Oversaw the execution and review of, and provided technical review for over 350 toxicological profiles for inhalation and oral nicotine product constituents and ingredients.
2. **Assisted a company in the review and development of internal occupational exposure limits (OELs) for various chemicals.** These efforts included: reviewing and summarizing toxicological and epidemiological literature on chemicals of interest, and drafting a support document for use by the company industrial hygienists.

Litigation Support

1. **Nitrosamines in pharmaceuticals.** Managed a project that provided advice to a large pharmaceutical company regarding trace contamination of N-nitrosodimethylamine (NDMA) and N-nitrosodiethylamine (NDEA) in their pharmaceutical product. Conducted a human health risk assessment on individuals who ingested the pharmaceuticals during the time that the contamination was present.
2. **Electronic Nicotine Delivery Systems (ENDS).** Managed a project that evaluated the potential health effects of human exposures to aerosols and e-cigarette liquids associated with ENDS produced by the client.
3. **Asbestos.** Managed multiple projects providing litigation support to testifying expert witnesses related to adverse health effects allegedly associated with potential exposures to asbestos from electrical products, friction products (i.e., brakes, clutches, and gaskets), and gasket and packing materials.
4. **Asbestos.** Conducted quantitative exposure assessments regarding occupational, non-occupational, para-occupational, and bystander exposure to asbestos-containing products. Oversaw the process of summarizing and evaluating alleged exposures and health claims, based on information included in relevant case materials. Organized and delegated project research tasks, and oversaw the execution of project deliverables.
5. **Cosmetic talc.** Supported litigation expert reports and witness testimony related to adverse health effects allegedly associated with exposures to cosmetic talc. Performed comprehensive reviews and summaries of relevant scientific literature, plaintiff and expert testimony, and applicable case material. Conducted quantitative exposure assessments regarding occupational, non-occupational, para-occupational, and bystander exposure to cosmetic talc. Organized and delegated project research tasks, and oversaw the execution of project deliverables.
6. **Methyl tert-butyl ether (MTBE).** Provided litigation support in a case involving potential acute health effects from accidental environmental exposure to MTBE. Reviewed and interpreted scientific literature and case materials for use in preparation of expert report.
7. **Industrial wind turbines.** Provided litigation support in a case involving potential health effects of noise emissions (primarily low frequency noise, and audible noise) from industrial wind turbines. Reviewed and interpreted the epidemiologic literature for use in preparation of expert report.
8. **Polychlorinated biphenyls (PCBs).** Provided litigation support in a case involving claims of exposure to PCBs. Performed a comprehensive literature review to evaluate and interpret different potential health endpoints for use in preparation of expert report.

Toxicological Research (Graduate Research)

1. Planned and conducted laboratory work and experiments investigating the toxicological mechanisms of butylparaben in zebrafish embryos. Examined how early exposures to butylparaben affect embryonic development, specifically the developing pancreas, using a zebrafish model. Investigated whether butylparaben causes oxidative stress in zebrafish embryos by measuring the redox potentials of antioxidants glutathione and cysteine, and by measuring the gene expression of glutathione-related genes. Observed pancreatic and morphologic deformities in butylparaben-exposed zebrafish embryos at different days that are critical to both pancreatic and morphologic development. Examined the gene expression of endocrine pancreatic hormones in response to butylparaben exposure.
2. Developed a novel assay that allows for the observation of glutathione *in vivo*, utilizing the molecular probe monochlorobimane.

Peer Reviewed Publications

1. **Brown, S. E.**, Sant, K. E., Fleischman, S. M., Venezia, O., Roy, M. A., Zhao, L., & Timme-Laragy, A. R. (2018). Pancreatic beta cells are a sensitive target of embryonic exposure to butylparaben in zebrafish (*Danio rerio*). *Birth defects research*. 110(11), pp. 933-948.
2. Khalil, A., Parker, M., **Brown, S.E.**, Cevik, S.E., Guo, L.W., Jensen, J., Olmsted, A., Portman, D., Wu, H. and Suvorov, A., (2017). Perinatal exposure to 2, 2', 4' 4'-Tetrabromodiphenyl ether induces testicular toxicity in adult rats. *Toxicology*. 389, pp. 21-30.
3. Rastogi, A., Clark, C.W., Conlin, **S.M.**, **Brown, S.E.** and Timme-Laragy, A.R. (2019). Mapping glutathione utilization in the developing zebrafish (*Danio rerio*) embryo. *Redox biology*, 26, pp. 101235.

Presentations at Scientific Conferences

1. 2019. (March). Weight-of-evidence analysis to assess the potential of PFOA to act as a steroidogenesis inducer and inhibitor. Accepted Poster Presentation at Society of Toxicology (SOT) Annual Meeting, March 10-14, 2019, Baltimore, MD.
2. 2019. (March). Examining the impact of DEHP exposure via food on reproductive function in adult men. Accepted Poster Presentation at Society of Toxicology (SOT) Annual Meeting, March 10-14, 2019, Baltimore, MD.
3. 2016. (June). Effects of Butylparaben exposure on pancreatic development in zebrafish (*Danio rerio*) embryos. Podium presentation at North Atlantic Chapter of the Society of Environmental Toxicology and Chemistry (NAC SETAC) Annual Meeting, June 13-15, 2016, Amherst, MA.

4. 2016. (March). Effects of Butylparaben exposure on pancreatic development in zebrafish (*Danio rerio*) embryos. Accepted Poster Presentation at Society of Toxicology (SOT) Annual Meeting, March 13-17, 2016, New Orleans, LA.
5. 2015. (November). Measuring Tissue-specific Glutathione (GSH) Utilization in the Developing Embryo. Accepted Poster Presentation at Society for Redox Biology and Medicine (SFRBM) Annual Meeting, November 29-December 2, 2017, Boston, MA.
6. 2015. (October). Measuring tissue-specific glutathione (GSH) utilization in the developing embryo. Accepted Poster Presentation at Northeast Regional Chapter meeting of the Society of Toxicology, October 30, 2015, Boston, MA.
7. 2015. (October). Measuring Tissue-specific Glutathione (GSH) Utilization in the Developing Embryo. Accepted Poster Presentation at North Atlantic Chapter of the Society of Environmental Toxicology and Chemistry (NAC SETAC) Annual Meeting. October, 2015, Freeport, ME.

Published Abstracts

1. H. C. O'Neill, M. J. Vincent, A. A. Han, **S. E. Brown**, A. M. Hazell, M. L. Krieder, Aa.K. Madl. March 2021. Hazard and risk banding framework for prioritization and bridging of e-liquids for toxicity testing. Poster Presentation at Society of Toxicology Annual Meeting (SOT). Remote meeting.
2. **S.E. Brown**, E.M. Beckett, D.R. Cheatham, H.A. Reamer, and M.L. Kreider. March, 2019. Weight-of-evidence Analysis to Assess the Potential of PFOA to Act as a Steroidogenesis Inducer and Inhibitor. Poster Presentation at Society of Toxicology Annual Meeting (SOT). Baltimore, MD.
3. **S.E. Brown**, M.R. Monroe, D.A. Drechsel. March, 2019. Examining the Impact of DEHP Exposure via Food on Reproductive Function in Adult Men. Poster Presentation at Society of Toxicology Annual Meeting (SOT). Baltimore, MD.
4. **S.E. Brown**, K.E. Sant, S.M. Fleischman, L. Zhao, A.R. Timme-Laragy. June, 2016. Effects of Butylparaben exposure on pancreatic development in zebrafish (*Danio rerio*) embryos. Podium Presentation at North Atlantic Chapter of the Society of Environmental Toxicology and Chemistry (NAC SETAC) Annual Meeting. Amherst, MA.
5. **S.E. Brown**, K.E. Sant, S.M. Fleischman, L. Zhao, A.R. Timme-Laragy. June, 2016. Effects of Butylparaben exposure on pancreatic development in zebrafish (*Danio rerio*) embryos. Poster Presentation at Society of Toxicology Annual Meeting (SOT). New Orleans, LA.
6. **S.E. Brown**, K.E. Sant, K Melendez and A.R. Timme-Laragy. November 2015. Measuring Tissue-specific Glutathione (GSH) Utilization in the Developing Embryo. Poster Presentation at Society for Redox Biology and Medicine (SFRBM). Boston, MA.
7. **S.E. Brown**, K.E. Sant, K Melendez and A.R. Timme-Laragy. October 2015. Measuring Tissue-specific Glutathione (GSH) Utilization in the Developing Embryo. Poster Presentation at Northeast Regional Chapter meeting of the Society of Toxicology, Boston, MA.

8. **S.E. Brown**, K.E. Sant, K Melendez and A.R. Timme-Laragy. October 2015. Measuring Tissue-specific Glutathione (GSH) Utilization in the Developing Embryo. Poster Presentation at North Atlantic Chapter of the Society of Environmental Toxicology and Chemistry (NAC SETAC) Annual Meeting. Freeport, ME.

Professional Honors/Awards

- Recipient of Northeast Regional Chapter meeting of the Society of Toxicology (SOT) Poster Award, 2015, for “Measuring Tissue-specific Glutathione (GSH) Utilization in the Developing Embryo”.

Membership and Service to Professional Societies

- Society of Toxicology (Full member)