Alexandria G. Lau, Ph.D., DABT

SENIOR SCIENTIST I

CONTACT INFORMATION

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PROFESSIONAL PROFILE

Dr. Alexandria Lau is a toxicologist with a decade of experience in the food and beverage industry. She has extensive knowledge of global regulations related to consumer products, including pesticides (EPA), food and packaging (FDA, EFSA, and Codex), and alcoholic beverages (TTB). Dr. Lau has worked effectively with cross-functional teams and external partners to support product development, including evaluations of fragrances and flavors in household products, and additives and contaminants in food and beverages. Her advanced technical skill set includes assessing hazards associated with agricultural chemicals and pesticides, as well as heavy metals and allergens.

Working for a prominent vineyard/winery, Dr. Lau managed the company's global quality and food safety efforts, decreasing pesticide use and overseeing growers and vintners to ensure global regulatory compliance and supply-chain flexibility. She also developed and produced training materials for COVID-19 modules. For a major food-product manufacturer, she managed a large portfolio of products and food safety initiatives, developing and maintaining global policies, standards, and programs for everything from contaminant/allergen management to labeling and stakeholder communication. Dr. Lau also served at a senior level for a global manufacturer of consumer products, working in safety assessment and regulatory toxicology to support development of pest-control products, ensuring regulatory compliance that included California Proposition 65.

Dr. Lau earned her Ph.D. in Toxicology and Pharmacology from the University of Arizona, Tucson. She maintains a current and robust body of expertise through frequent continuing education and participation in professional associations and scientific conferences. She is often an invited speaker for association and industry events, and she has published extensively in the scientific literature. She also serves as an invited reviewer for the journals *Toxicology Research and Application* and *Toxicological Sciences*. Dr. Lau became a Diplomate of the American Board of Toxicology in the fall of 2021.

EDUCATION AND DEGREES EARNED

2012 Doctor of Philosophy (Ph.D.)
Toxicology and Pharmacology, University of Arizona at Tucson

2006 Bachelor of Science (B.S.)
Molecular and Cellular Biology, University of Arizona at Tucson

HONORS AND AWARDS

2018 Alumni of the Year, Honors College, University of Arizona

2012 Carl C. Smith Award, First Place, Mechanism Specialty Section, Society of Toxicology

2011–2012 Graduate Student Travel Award and Novartis Award, Society of Toxicology

2011 Arthur Furst Best Student Poster Award and Graduate Student Travel Award, American College of Toxicology

2011–2012 Outstanding Researcher Award, University of Arizona, Department of Pharmacology and Toxicology

2011–2012 Jean Lu Student Scholarship Award, American Association of Chinese in Toxicology, Society of Toxicology.

2011–2012 Vera W. Hudson & Elizabeth K. Weisburger Student Scholarship Award, Women in Toxicology, Society of Toxicology

2010 Appreciation Award, Mountain West Society of Toxicology

2009–2010 Caldwell Health Sciences Research Fellowship for Graduate Students, University of Arizona

PROFESSIONAL ASSOCIATIONS

2010–present Society of Toxicology
- Regulatory and Safety Evaluation
- Risk Assessment
- Food Safety
- Women in Toxicology

2020–present Toxicology Forum

2018–present International Association for Food Protection

SELECTED PROFESSIONAL EXPERIENCE

Wine Industry: Quality and Food Safety

Streamlined and optimized analytical testing to a science- and risk-based approach for chemical hazards, including agrochemicals/pesticides, heavy metals, and allergens.

As a subject-matter expert (SME), managed the agrochemical/pesticide list for the grower network and provided technical expertise on residues and tolerances/maximum residue limits (MRLs) to achieve global compliance and enhance supply-chain flexibility.

Designed vineyard trials for new-to-market pesticides to determine optimal applications to meet regulatory tolerances/MRLs.

Engaged with pesticide manufacturers, grape growers, and trade associations, as well as regulatory authorities, to influence policy and regulatory changes.

Developed scientifically valid and relevant advice on toxicology and human health risk assessments for novel ingredients.

Evaluated safety of new products/ingredients or product compositions based on scientific literature and available data to support product development.

Worked with cross-functional teams in product development, innovation, and research chemistry to provide food safety and toxicology expertise during product and process development.

Performed scientific monitoring and horizon scanning related to food safety and toxicology, including contaminants, heavy metals, pesticides, and allergens.

In the face of a possible corporate challenge, updated hazard analysis for food safety plans, informed internal stakeholders, anticipated product and process changes, and developed appropriate messaging.

Drafted scientific opinions and developed corporate programs to mitigate food safety risk and toxicology-related problems.

Engaged with internal and external organizations to address food safety risks in quality and safety systems, including verifications and validations related to chemical hazards and toxicology.

Communicated complicated technical information to all levels of the enterprise, including hourly manufacturing employees, management, senior executives, external organizations and trade associations, and consumers.

Designed training materials and recorded voiceovers for allergens, pesticides, and hand washing for COVID-19 modules.

Food Industry: Quality and Regulatory Compliance

Corporate SME for food allergens and toxicology, managing a diverse portfolio of projects and food safety initiatives.

Gained broad knowledge of best practices and regulations governing allergens, food production, chemical contaminants, and the use and safety of food ingredients, including GRAS determinations and notifications.

Assessed chemical hazards, calculated exposure, and conducted risk assessments to meet regulatory requirements, including California Proposition 65.

Developed and maintained global policies and programs related to the management of allergens and chemical contaminants.

Developed and implemented global standards for allergen advisory labeling and global sanitation standards for allergen cleaning.

Conducted chemical risk assessments for issues and incidents involving potential contaminants.

Analyzed, interpreted, and synthesized scientific information to communicate effectively to various stakeholder audiences.

Responded to consumer allergen inquiries and/or food safety. Collaborated with cross-functional teams to resolve emerging allergen and/or chemical food safety issues.

Consumer Products: Global Safety and Regulatory Compliance

Accountable for global product safety assessment and regulatory toxicology to support the development, registration, and commercialization of priority projects in pest control, ensuring compliance with regulations that included Proposition 65.

Contracted and managed Good Laboratory Practice (GLP) safety studies to support the development and registration of pest control products.

Developed global process flows to ensure global product safety and regulatory compliance while increasing efficiency and speed to market. Collaborated with multiple cross-functional teams to accelerate development and launch of new products.

Reviewed, developed, and observed consumer test protocols, plans, and master labels. Participated in central location tests for fragrance variations in pest control products and traveled to Indonesia to understand consumer habits and practices associated with new concepts and products.

Interacted with external organizations and task forces to build partnerships and support corporate- and industry-wide safety and regulatory initiatives.

PUBLISHED ARTICLES

Godefroy S, Yeung J, Albornoz G, Almy D, Green AB, Bhandari S, Brown R, Da Costa P, Digonnet V, Doi H, Garber E, Gene T, Gilboa-Geffen A, Goodwin P, Haas-Lauterbach S, Kavolis D, Koerner T, Lacorn M, **Lau A**, et al. 2018. Standard Method Performance Requirements (SMPRs®) 2017.020: Quantitation of chicken egg by ELISA-based methods. J AOAC Int 101(4):1236–1237, doi: 10.5740/jaoacint.SMPR2017.020.

Godefroy S, Yeung J, Albornoz G, Almy D, Green AB, Bhandari S, Brown R, Da Costa P, Digonnet V, Doi H, Dubois A, Garber E, Gene T, Gilboa-Geffen A, Goodwin P, Haas-Lauterbach S, Kavolis D, Koerner T, Lacorn M, **Lau A**, et al. 2018. Standard Method Performance Requirements (SMPRs®) 2018.003: Quantitation of milk by ELISA-based methods. J AOAC Int 101(4):1276–1278, doi: 10.5740/jaoacint.SMPR2018.003.

Wu T, Wang XJ, Tian W, Jaramillo MC, **Lau A**, Zhang DD. 2014. Poly(ADP-ribose)polymerase-1 modulates Nrf2-dependent transcription. Free Radic Biol Med 67:69–80, doi: 10.1016/j.freeradbiomed.2013.10.806.

Villeneuve NF, Tian W, Wu T, Sun Z, **Lau A**, Chapman E, Fang D, Zhang DD. 2013. USP15 negatively regulates Nrf2 through deubiquitination of Keap1. Mol Cell 51(1):68–79, doi: 10.1016/j.molcel.2013.04.022.

Lau A, Zheng Y, Tao S, Wang H, Whitman SA, White E, Zhang DD. 2013. Arsenic inhibits autophagic flux activating the Nrf2-Keap1 pathway in a p62-dependent manner. Mol Cell Biol 33(12):2436–2446, doi: 10.1128/MCB.01748-12.

Lau A, Whitman SA, Jaramillo MC, Zhang DD. 2013. Arsenic-mediated activation of the Nrf2-Keap1 antioxidant pathway. J Biochem Mol Toxicol 27(2):99–105, doi: 10.1002/jbt.21463.

Lau A, Tian W, Whitman SA, Zhang DD. 2012. The predicted molecular weight of Nrf2: It is what it is not. Letter to the Editor, Antiox Redox Signal 18(1):91-93, doi:10.1089/ars.2012.4754.

Chen W, Jiang T, Wang H, Tao S, **Lau A**, Fang D, Zhang DD. 2012. Does Nrf2 contribute to p53-mediated control of cell survival and death? Antioxid Redox Signal 17(12):1670–1675, doi: 10.1089/ars.2012.4674.

Bray K, Mathew R, **Lau A**, Kamphorst JJ, Fan J, Chen J, Chen HY, Ghavami A, Stein M, DiPaola RS, Zhang D, Rabinowitz JD, White E. 2012. Autophagy suppresses RIP kinase-dependent necrosis enabling survival to mTOR inhibition. PLoS One 7(7):e41831, doi: 10.1371/journal.pone.0041831.

Sun Z, Wu T, Zhao F, **Lau A**, Birch CM, Zhang DD. 2011. KPNA6 (Importin{alpha}7)-mediated nuclear import of Keap1 represses the Nrf2-dependent antioxidant response. Mol Cell Biol 31(9):1800–1811, doi: 10.1128/MCB.05036-11.

Ren D, Villeneuve NF, Jiang T, Wu T, **Lau A**, Toppin HA, Zhang DD. 2011. Brusatol enhances the efficacy of chemotherapy by inhibiting the Nrf2-mediated defense mechanism. Proc Nat Acad Sci USA 108:1433–1438, doi:10.1073/pnas.1014275108.

Villeneuve NF, **Lau A**, Zhang DD. 2010. Regulation of the Nrf2-Keap1 antioxidant response by the ubiquitin proteasome system: An insight into cullin-ring ubiquitin ligases. Antiox Redox Signal 13:1699–1712, doi:10.1089/ars.2010.3211.

Babic A, Loftin IR, Stanislaw S, Wang M, Miller R, Warren SM, Zhang W, **Lau A**, Miller M, Wu P, et al. 2010. The impact of pre-analytical processing on staining quality for H&E, dual hapten, dual color in situ hybridization and fluorescent in situ hybridization assays. Methods 52:287–300, doi: 10.1016/j.ymeth.2010.08.012.

Lau A, Wang XJ, Zhao F, Villeneuve NF, Wu T, Jiang T, Sun Z, White E, Zhang DD. 2010. A noncanonical mechanism of Nrf2 activation by autophagy deficiency: Direct interaction between Keap1 and p62. Mol Cell Biol 30:3275–3285, doi:10.1128/MCB.00248-10.

Lau A, Villeneuve NF, Sun Z, Wong PK, Zhang DD. 2008. Dual roles of Nrf2 in cancer. Pharmacol Res 58:262–270, doi: 10.1016/j.phrs.2008.09.003.

Finnerty K, Choi JE, **Lau A**, Davis-Gorman G, Diven C, Seaver N, Linak WP, Witten M, McDonagh PF. 2007. Instillation of coarse ash particulate matter and lipopolysaccharide produces a systemic inflammatory response in mice. J Toxicol Environ Health Part A 70:1957–1966, doi: 10.1080/15287390701549229.

BOOK CHAPTER

Lau A. 2016. Allergen preventive controls. Chapter 4 in: Industry Handbook for Safe Processing of Nuts. Grocery Manufacturers Association and Peanut and Tree Nut Processors Association.

SPEAKING AND OUTREACH

Codex Alimentarius: Not a Secret Society (co-organizer), International Association for Food Protection (IAFP), Phoenix, AZ, and virtual, 2021.

Chocolate and Wine: A Perfect Toxicology Career Pairing. Guest lecturer for NSM 90 – Biomedical Research Seminars at California State University, Sacramento, 2021.

From cellar to market: The impact of losing MRLs on long-term stored food products (co-organizer). Accepted for 260th ACS National Meeting but cancelled due to COVID, 2020.

Who will win the race to zero? Analytical challenges in the food industry (co-organizer). International Association for Food Protection (IAFP), virtual meeting, 2020.

Forecasting hot topics: Strategies that signal the occurrence of emerging chemical threats (co-organizer). International Association for Food Protection (IAFP), virtual meeting, 2020.

An evolution of risk assessment for potential carcinogens in food—Has the time arrived? (co-organizer). 44th Annual Winter Meeting of The Toxicology Forum, McLean, VA, 2020.

Threshold of toxicological concern — A modern day challenge (author of presentation). International Wine Trade Summit (IWTS), Lodi, CA, 2018.

The science of pesticides and BPA (presenter), for the session, Science, Safety, and Sanity: Hot Topics in Food Toxicology. International Association for Food Protection (IAFP), Salt Lake City, UT, 2018.

Food Safety Culture — Allergens (presenter). Food Allergy and Anaphylaxis Connection Team (FAACT) Global Food Industry and Research Summit, Las Vegas, NV, 2015.

ABSTRACTS

(*Presenter)

Lau A,* Wang H, Zhang DD. The effect of arsenic on the Nrf2-Keap1 pathway. Abstract for poster presentation, 51st Annual Meeting and ToxExpo, Society of Toxicology, San Francisco, CA, March 2012.

Lau A,* Wang H, Zhang DD. Arsenic induces chronic Nrf2 activation. Abstract for poster presentation, American College of Toxicology, 32nd Annual Meeting of the American College of Toxicology, Phoenix, AZ, November 2011.

Lau A,* Wang H, Zhang DD. Arsenic and Nrf2: What's p62 got to do with it? Abstract for poster presentation, 2011 Student Showcase, Biological Sciences category, Tucson, AZ, November 2011.

Lau A,* Wang XJ, Zhang DD. Arsenic activates the Nrf2 antioxidant response pathway via autophagy. Abstract for poster presentation, Arizona Health Science Center Frontiers in Biomedical Research Poster Forum, Tucson, AZ, November 2011.

Lau A, Whitman SA, Wang H, Zhang DD.* The protective role of Nrf2 in arsenic-induced toxicity and carcinogenicity. Abstract for poster presentation, Outstanding New Environmental Scientist Symposium, National Institute of Environmental Health Sciences, Research Triangle Park, NC, July 2011.

Lau A,* Wang SJ, Zhang DD. Arsenic activates the Nrf2 antioxidant response pathway via autophagy. Abstract for poster presentation, Undergraduate and Oxidative Stress and Redox Biology Poster Sessions, 50th Annual Meeting and ToxExpo of the Society of Toxicology, Washington, DC, March 2011.

Lau A,* Zhang DD.* The Nrf2-Keap1-ARE signaling pathway: dual roles of Nrf2 in cancer. Abstract for poster presentation, University of Arizona, Department of Pharmacology and Toxicology Student Recruitment, Tucson, AZ, February 2011.

Lau A,* Wang XJ, Zhao F, Villeneuve NF, Wu T, Jiang T, Sun Z, White E, Zhang DD. A novel mechanism of Nrf2 activation by autophagy deficiency: A direct interaction between Keap1 and p62. Abstract for poster presentation, International Conference on Frontiers in Biomedical and Environmental Health Sciences, Beijing, China, May 2010.

Lau A,* Wang XJ, Zhao F, Villeneuve NF, Wu T, Jiang T, Sun Z, White E, Zhang DD. A novel mechanism of Nrf2 activation by autophagy deficiency: A direct interaction between Keap1 and p62. Abstract for poster presentation, Keystone Symposia, Cell Death Pathways: Apoptosis, Autophagy, and Necrosis, Vancouver, B.C., Canada, March 2010.

Lau A,* Wang XJ, Zhao F, Villeneuve NF, Wu T, Jiang T, Sun Z, White E, Zhang DD. p62 sequesters Keap1 into autophagosomes, preventing the Keap1-dependent ubiquitination and degradation of Nrf2. Abstract for poster presentation, 49th Annual Society of Toxicology Meeting, Salt Lake City, UT, March 2010.

Lau A,* Zhang DD.* The Nrf2-Keap1-ARE signaling pathway: Dual roles of Nrf2 in cancer. Abstract for poster presentation, University of Arizona, Department of Pharmacology and Toxicology Student Recruitment, Tucson, AZ, February 2010.

Lau A,* Wang XJ, Zhao F, Villeneuve NF, Wu T, Jiang T, Sun Z, White E, Zhang DD. p62 sequesters Keap1 into autophagosomes, preventing the Keap1-dependent ubiquitination and degradation of Nrf2. Abstract for poster presentation, 3rd Biennial Research Frontiers in Nutritional Science Conference, Tucson, AZ, November 2009.

Lau A,* Wang XJ, Zhang DD. Arsenic induces autophagy and upregulates the Nrf2-dependent antioxidant response pathway through p62. Abstract for oral presentation, 27th Annual regional Chapter Meeting of the Mountain West Society of Toxicology, Albuquerque, NM, September 2009.

ADDITIONAL TRAINING

2017 Hazard Analysis and Critical Control Points (HACCP), Red24, Modesto, CA

2016 Preventive Control Qualified Individual (PCQI), Food Safety Preventive Control Alliance, Grocery Manufacturers Association, Hershey, PA

2016 Decision Making, American Management Association, Hershey, PA

2016 Getting Results Without Authority, American Management Association, Hershey, PA

2016 How to Turn Data Into Compelling Visual Presentations, American Management Association, Hershey, PA

2015 Creating a Food Safety Culture, Executive Education, Michigan State University, East Lansing, MI

2013 Human Health Hazard, Exposure and Risk Assessment (BPD/BPR), Akademie Fresenius, Mainz, Germany

2013 Basic Principles of Human Risk Assessment Continuing Education Course, Society of Toxicology, San Antonio, TX.

2013 Practical Methods in In Vitro Toxicology Workshop, Institute for In Vitro Sciences (IIVS), Gaithersburg, MD.