2022 Annual Report

MISSION

The Department of Pharmacology and Toxicology will ensure academic excellence and achievement of regional, national, and international recognition for the quality of its educational, research, and service activities. Guided by the University of Louisville and the School of Medicine Strategic Plans, the mission of the Department of Pharmacology and Toxicology focuses on five broad objectives:

- Provide instruction in pharmacology and toxicology of the highest quality for the education and preparation of medical, dental, and other health care professional students. Emphasis is placed on the fundamental principles necessary for life-long learning and the essential knowledge required for rational, effective, and safe use of drug therapy.
- Advance biomedical knowledge through high quality research and other scholarly activities, particularly in pharmacology and toxicology and other areas of focus within the University of Louisville and School of Medicine Strategic Plans.
- Provide robust research and educational experiences in pharmacology and toxicology for the education and training of future biomedical scientists who will provide and advance biomedical education, research, and service.
- Provide instruction of the highest quality in pharmacology and toxicology appropriate for students at the undergraduate, graduate, and postgraduate levels.
- Provide service to the School of Medicine, the Health Sciences Center, the University, of Louisville, the Commonwealth of Kentucky, professional organizations, the nation, and the world.

OVERVIEW

2022 was an eventful year for the Department of Pharmacology & Toxicology. Active searches for faculty members were conducted in the spring semester resulting in the appointments of Dr. Jamie Young (an alumnus of our graduate program in pharmacology and toxicology who received an NIH diversity faculty supplement) and Dr. Wenke Feng (who most recently held appointment as Associate Professor in the Department of Medicine with secondary faculty appointment in the Department of Pharmacology and Toxicology). Dr. Feng was in high demand from other universities. Transfer of Dr. Feng's appointment to the Department of Pharmacology and Toxicology convinced him to turn down an attractive offer from LSU School of Medicine, but ultimately he accepted another faculty position at Tulane University School of Medicine. A faculty search committee was formed and a national search was conducted for a Director of Graduate Studies and/or Vice Chair (see link below). Dr. Hein assumed the role of interim Director of the graduate program and Dr. Sandra Wise was appointed Assistant Director.

Applications invited for Director of the Pharmacology & Toxicology Graduate Program and/or Department Vice Chair

New graduate committees were formed, one of which focused on the PhD qualifying exam. These committees recommended significant changes in the PhD qualifying exam, which is described at the end of the report.

Other appointments included Hannah Crawford as Department Coordinator and secondary faculty appointments for Drs. Donghung Chung, Tamer Mohamed and Lisa Sandell. The department experienced the loss of six faculty with secondary appointments to retirements or to industry/other universities. In addition, Dr. Swati Joshi Barve tragically passed away.

A major highlight of the year was the competitive renewal of the UofL Superfund Research Program, directed by Dr. Sanjay Srivastava and including several PhTx faculty members and students among its leaders and participants. Further information is provided in the link below

UofL Superfund Research Center receives $10.8 million to expand studies into effects of environmental toxins

Numerous PhTx faculty and students were honored as described in the links below:

Mariam Habil PhD is 2022 University Commencement Speaker (see minutes 42-50 of YouTube video)

Dr. Jamie Young participates in film presentation and panel discussion on environmental concerns of forever chemicals

Dr. Jamie Young awarded NIH diversity research grant

PhTx PhD candidate Andrew Orwick recipient of individual F31 NIH predoctoral fellowship

Mariam Habil receives exemplary poster and video research presentation award

Sophia Sears receives travel award to present at FASEB Conference

Professors Shirish Barve and Kenneth Palmer recognized by UofL for research excellence

Professor John Wise Sr. receives 2022 President's Distinguished Teaching Professor Award
PhTx graduate student Raphael Jigo awarded Keystone Symposium Scholarship

Drs. Kidd and Corbitt lead Cancer and Health Disparity Summer Bridge Program

Pharmacology & Toxicology trainees receive research awards at annual meeting of the Society of Toxicology

A comprehensive five-year review of Dr. Hein's stewardship as department chair was carried out and he was reappointed for an additional five-year term. The report and recommendation of the faculty review committee is provided at the end of this report.

Appointment of Primary Faculty

Dr. Jamie L. Young was appointed Assistant Professor of Pharmacology and Toxicology effective July 1, 2022.

Dr. Wenke Feng was appointed Professor of Pharmacology and Toxicology effective July 1, 2022.

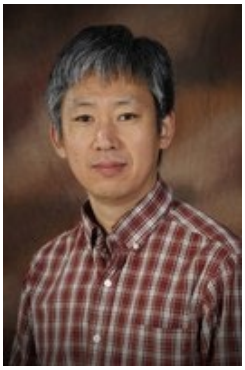
Dr. David W. Hein was appointed Interim Director of the Graduate Program effective August 1, 2022 replacing Dr. Leah Siskind.

Dr. Sandra S. Wise was appointed Assistant Director of the Graduate Program effective August 1, 2022.

Dr. La Creis R. Kidd was appointed Assistant Dean for Research Diversity in the School of Medicine effective February 1, 2022.

Appointment of Secondary Faculty

Dr. Tamer Mohamed, Associate Professor of Medicine, received a secondary faculty appointment in pharmacology and toxicology effective July 1, 2022.



Dr. Donghung Chung, Associate Professor of Microbiology and Immunology, received a secondary faculty appointment in pharmacology and toxicology effective August 1, 2022.

Dr. Lisa Sandell, Associate Professor of Oral Immunology & Infectious Diseases received a secondary faculty appointment in pharmacology and toxicology effective October 1, 2022.

Staff Appointment

Hannah Crawford was appointed Coordinator effective July 1, 2022

Departure of Primary Faculty

Wenke Feng, Ph.D.

Professor, Department of Pharmacology & Toxicology
Ph.D, Biochem/Biotech, University for Bodenkultur (1998)

Research Interests: Mechanisms of alcoholic liver disease; Mechanisms of nonalcoholic steatohepatitis; Tissue hypoxia and diabetic complications.

Departures of Secondary Faculty

Shesh N. Rai, Ph.D.

Professor of Bioinformatics and Biostatistics
Wendell Cherry Chair in Clinical Trial Research
Ph.D., Statistics, University of Waterloo (1993)

Research Interests: Clinical Trials, Survival Analysis, Bioinformatics, Mixed Effects Model, Sample Survey, Quantitative Risk Assessment

Craig S. Roberts, M.D.

Professor and Chair, Department of Orthopaedic Surgery
M.D., New York University (1986)

Research Interests: Orthopaedic trauma, fractures and their complications and outcomes.

Swati Joshi-Barve, Ph.D.

Associate Professor of Medicine
Ph.D., Biochemistry, University of Kentucky (1992)

Research Interests: Mechanisms of Steatohepatitis (nonalcoholic and alcoholic fatty liver disease); Mechanisms of Alcohol-induced Immune Dysfunction; Mechanisms of Hepatocellular Carcinoma

Jill M. Steinbach-Rankins, Ph.D.

Associate Professor of Bioengineering
Ph.D., Bioengineering, Arizona State University (2009)

Research Interests: Design and development of drug and gene delivery vehicles for physiologically difficult-to-deliver-to microenvironments.

Scott R. Whittemore, Ph.D.

Professor and Vice Chair for Research, Department of Neurological Surgery
Scientific Director, Kentucky Spinal Cord Injury Research Center

Ph.D., Physiology and Biophysics, University of Vermont (1982)

Research Interests: Using undifferentiated precursor cells, gene therapies, and transplanted neurons, the lab seeks to understand the development of these key components of the vascular and nervous system at the molecular and genetic level in order to protect them from damage and/or promote their regeneration.

Juhi Bagaitkar, Ph.D.

Assistant Professor
Ph.D., Oral Immunology and Infectious Diseases, University of Louisville (2010)

Research Interests: To understand the immunological consequences of apoptotic cell clearance during inflammation and infection.

Yiru Guo, M.D.

Professor, Department of Medicine
M.D., Xinjiang Medical University (1982)

Research Interests: Cardio-thoracic and vascular surgery, physiology, and pharmacology. Research focuses on: (i) elucidating the mechanisms of ischemic-pharmacologic- and exercise-induced preconditioning by using the ischemia/reperfusion model in genetically engineered animals, (ii) studying protection of ischemic myocardium by using gene and/or cell therapy, and (iii) elucidating adaptations to ischemia/reperfusion injury in the aging heart.

FACULTY WITH PRIMARY APPOINTMENTS

Mayukh Banerjee, Ph.D.

Assistant Professor

The Banerjee laboratory combines classical and cutting-edge research techniques to investigate the molecular etiology of environmental health issues with a strong focus on chronic arsenic toxicity. Chronic arsenic exposure affects >225 million people in over 108 countries, leading to myriads of cancerous and non-cancerous adverse health outcomes encompassing multiple tissues, organs, and developmental stages. Since arsenic does not interact with nucleic acids, the focus of Banerjee laboratory is to elucidate how direct physical interaction of arsenic with target zinc finger proteins can modulate basic biological processes operative in every cell and tissue, contributing to multi-organ toxicity. Zinc finger proteins are abundant in the human genome, often acting as apical regulators of processes related to genome, transcriptome and proteome organization, maintenance, and expression. Thus, functional disruption of such apical regulatory proteins is expected to affect multiple facets of basic biological processes across multiple cells, tissue, and organs, leading to multi-organ toxicity. Current projects in the laboratory include understanding the molecular mechanisms of chronic arsenic exposure-induced dysregulation of transcriptome, epitranscriptome, proteome and degradome and their contribution to multi-organ toxicity. The Banerjee laboratory employs both cell culture systems (primary and immortalized) and animal models, along with a wide range of molecular biological, biophysical and omics techniques to address these research questions.

Brian P. Ceresa, Ph.D.

Pharmacology Thread Director for School of Medicine Curriculum
Professor

The Ceresa lab studies the epidermal growth factor receptor (EGFR) and its role in tissue biology/wound repair and cancer. The EGFR has an essential role in many developmental processes and for homeostasis of a number of tissues, such as the cornea, epidermis, and colon. In addition, the EGFR is overexpressed and/or hyperactivated in a number of cancers, including lung, breast, gastric, pancreatic, and melanomas. The Ceresa lab is interested in the molecular mechanisms that regulate the magnitude and duration of EGFR signaling. Understanding how EGFR signaling is dysregulated may provide clues to the diagnosis, prognosis, or treatment of cancer. Conversely, deliberately perturbing these regulatory processes is a strategy to enhance corneal epithelial wound healing. They use a variety of experimental

strategies to answer our scientific questions – from purified proteins, primary and immortalized cell lines, isolated animal tissues, and whole animals.

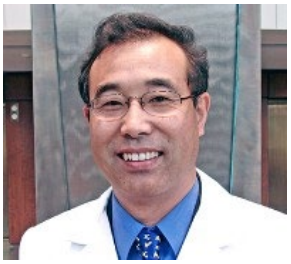
Shao-yu Chen, Ph.D.
Professor

Dr. Chen has conducted alcohol-related birth defects research for more than 20 years. His research program focuses on elucidation of cellular and molecular mechanisms of alcohol-induced birth defects. In his laboratory, a combination of state-of-the-art approaches, including RNA interference, microRNA technology and ultrasound-guide in utero microinjection are integrated with cell and whole embryo culture systems, as well as in vivo mouse and zebrafish models of Fetal Alcohol Spectrum Disorders (FASD) to elucidate the molecular mechanisms underlying FASD. Dr. Chen's laboratory has been successfully conducting innovative and pioneering research in various areas, including Nrf2, Siah1 signaling pathways and the microRNAs involved in ethanol-induced apoptosis and birth defects. These studies have provided important information regarding the mechanisms underlying ethanol-induced birth defects. His research has also clearly shown the effectiveness of a number of agents, including antioxidants, the neuroprotective peptides, and microRNA mimics, in the prevention of alcohol-induced apoptosis and structural abnormalities in embryos. These findings are expected to validate possible molecular targets and yield innovative strategies for the prevention of FASD and give hope that antioxidants, certain peptides or microRNA mimics could lessen the effects of prenatal alcohol exposure in the children of women who are unable to curtail their alcohol abuse while pregnant.

Geoffrey J. Clark PhD
Associate Professor

Ras is arguably the most important oncogene of all and may drive more than 30% of human cancers. Yet it has defied efforts to target it therapeutically. One of the most fascinating and poorly understood aspects of Ras biology is that deregulated Ras activity can promote cell death. These Ras death pathways are subverted in human tumors, allowing the transforming effects of activated Ras to dominate. I have spent a large part of the last 15 years defining the signaling mechanism used by Ras to kill cells and trying to understand how they are subverted in cancer. These studies have focused extensively on the RASSF family of Ras death effectors, the majority of which were first identified and cloned by my group. I also have a program involving the development of novel small molecules that act directly

or indirectly to suppress Ras driven tumorigenesis. The laboratory utilizes a variety of cellular and molecular biology techniques to pursue these studies.



Wenke Feng, Ph.D.

Professor

The Feng laboratory has a long-term interest in the study of the mechanisms of microbiome homeostasis, gut-liver axis, and the application of probiotics in gastro-hepatic diseases including alcohol-associated liver disease, nonalcoholic fatty liver disease, cholestatic liver disease, inflammatory bowel disease and colon cancer. Currently, the laboratory has several areas of research focus. First, the laboratory aims to elucidate the mechanisms of action of probiotic bacteria in liver diseases. We focus on intestinal regulations of immune response, anti-microbial activities, gut barrier function and bile acid homeostasis regulated by several transcription factors including hypoxia-inducible factor, farnesoid X receptor, and aryl hydrocarbon receptor. Second, the laboratory is interested in the characterization of gut bacterium-derived extracellular vesicles (EVs), the biogenesis of the EVs and the roles of these EVs in the intestine healthy. To this end, we are developing probiotic-based products and strategy for the prevention/treatment of liver diseases, and drug delivery system for cancer therapy. In a collaboration with Dr. Craig McClain, the Feng laboratory examines the efficacy of probiotic application in patients with alcohol-associated hepatitis and investigates the potential mechanisms by utilizing the clinical samples. Furthermore, the laboratory aims to determine the mechanisms of nutritional interventions and cannabinoid application in metabolic liver diseases and liver fibrosis.

Ramesh Gupta, Ph.D.

Professor, Agnes Brown Duggan Chair of Oncological Research

Dr. Gupta's current major interests are to develop new prevention and treatment strategies by intervention with dietary constituents (such as berries, common spices), novel subcutaneous polymeric implantable devices embedded with test agents for systemic and local delivery, and milk-derived exosomes as nano carriers for oral delivery of both standard drugs and natural agents with therapeutic activity, as well as identify molecular targets. The common experimental models and laboratory techniques performed routinely in his laboratory include, cell culture, wild-type and xenograft models for lung cancer and breast cancer, ^{32}P-postlabeling DNA adduct assay, qPCR, western, tumor imaging, and HPLC coupled with various detectors. His laboratory was the first to demonstrate that berries are effective beyond the GI tract by showing significant inhibition of estrogen-mediated breast cancer and lung cancer. The ongoing work with phenolics isolated from these berries

have demonstrated that berry phenolics can have significant synergistic activity towards anti-proliferation, apoptosis and anti-inflammation due to attack of different bioactives on distinct or overlapping protein targets against lung cancer. These findings have been confirmed in cell culture and tumor models. His laboratory's present major thirst is on drug delivery for enhanced therapeutic response. The most recent development is a novel technology for oral delivery of drugs using bovine milk-derived exosomes (biological nanoparticles) as a carrier for small drug molecules, as well as macromolecules such as siRNAs. This technology is emerging as a major drug delivery technology in the field with potentially wide therapeutic applications. His laboratory has trained numerous graduate students, postdoctoral scholars, residents, undergraduates and High School students. His laboratory is currently supported by a postdoctoral fellow, two PhD students and two junior faculty.

David W. Hein, PhD
Peter K. Knoefel Endowed Professor and Chair

Dr. Hein's research program in molecular epidemiology identifies individuals genetically susceptible to the development of cancer from environmental and occupational chemicals to focus treatment and prevention public health strategies on those at greatest risk. His research in pharmacogenetics/genomics and personalized medicine improves understanding of the genetic causes for drug failure and/or drug toxicity to optimize clinical drug therapy for each individual patient. His research in functional genomics improves understanding of the mechanistic and clinical consequences of genetic variation in the biotransformation of carcinogens and drugs.

Kyung U. Hong, PhD
Assistant Professor

Arylamine N-acetyltransferases (NATs) express a well-defined genetic polymorphism in humans that modifies drug and xenobiotic metabolism. Our laboratory has previously characterized the genetic variants of NAT2 and shown that they result in expression of protein of varying enzymatic activity or stability. Recent GWAS studies have reported that some of these genetic variants within the NAT2 gene are tightly linked to insulin resistance and high serum triglyceride level in humans, suggesting a previously unrecognized yet important role of these enzymes in development of metabolic disorders. However, the precise mechanism by which NAT2 exerts this role and whether or not this role is modified by NAT2 genetic polymorphism is currently unknown. Importantly, the role of NAT2 in insulin resistance and metabolism has not been investigated in model systems of human origin. Our research involves using human primary hepatocytes, adipocytes and myoblasts and characterizing their responses to insulin while modulating cellular

NAT2 12 level or activity. Human primary hepatocytes that harbor defined genetic polymorphisms of NAT2 will be also employed to see if naturally occurring genetic variants of NAT2 in humans have differential effects on cellular metabolism and insulin sensitivity.

Joshua L. Hood M.D., Ph.D.
Associate Professor

Dr. Hood's lab is focused on the translational design and implementation of biology inspired nanomedicine supported by biologic nanovesicle (exosome) investigations. Understanding exosome function and nanocarrier properties in the context of tumor angiogenesis, macrophage function and pre-metastatic niche formation are explored with a specific focus on melanoma. Other derivative projects include development of exosome-based biomarkers for cancer and synthetic nanomedicines to combat pathogenic exosomes and similarly structured viruses. Our long-term goal is to develop and translate personalized exosome-based diagnostics and therapeutics for melanoma and other cancers.

La Creis Renee Kidd, Ph.D., M.P.H.
Our Highest Potential Endowed Chair and Associate Professor

Dr. Kidd's research focuses on the utilization of state of the art bioinformatics tools to identify and validate genetic susceptibilities related to cancer risk and poor disease prognosis (i.e., high tumor grade/stage, disease/biochemical recurrence). Although Dr. Kidd is intrigued by major cancer malignancies, a majority of her work has centered on prostate cancer. Her earlier work focused on complex interactions among xenobiotic metabolism, DNA repair, oxidative stress-related genes, and angiogenesis in relation to prostate and breast cancer outcomes. She was a lead author on the first study on the role of genomic anomalies in the chemokine ligand 5 (CCL5) and chemokine receptor 5 (CCR5) associated genetic alterations in prostate cancer risk among men of African and Caribbean Descent (Hered Cancer Clin Pract. 2012 Nov 20; 10(1): 16). A majority of her work focuses on understanding the role genetic plays in high cancer incidence and mortality rates among underserved populations. She has 3 patents for important prostate cancer predictors from her population-based studies (61/240089, 61/313,595, 61/655,243). Dr. Kidd was a significant contributor of a multi-center genome wide study for genetic susceptibility genes for prostate cancer among men of African and European descent.

Since 2012, Dr. Kidd's lab started to work on the role of miRNAs in prostate cancer in partnership with her former graduate student (Dominique Reed) and various faculty members engaged in basic research. Micro-RNAs (miRNAs), are non-coding RNAs that regulate the expression of genes. Dr. Kidd became interested miRNAs after learning these mini gene regulators can suppress or accelerate aggressive cancer behavior by

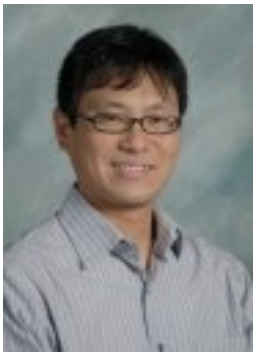
inhibiting the expression of oncogenic or tumor suppressor genes, respectively. MiRNAs are promising cancer biomarkers for many reasons. First, miRNAs are stably expressed in tumor tissue and biological fluids (i.e., urine, serum, plasma). Second, they regulate the expression of genes involved in the hallmarks of cancer (e.g., cell proliferation, cell survival, anchorage independent growth, invasion, migration, cell survival, angiogenesis). Third, dysregulation of miRNAs corresponds with aggressive prostate cancer phenotypes. Fourth, tissue/blood-based miRNAs may distinguish between lethal and non-lethal forms of cancer. Fifth, miRNAs may help investigators find potential therapeutic targets for the effective treatment of cancer.

Recently, Dr. Kidd's lab demonstrated the up-regulation of one particular miRNA, miR-186-5p in metastatic prostate cancer cell lines and serum from prostate cancer patients. Her lab also demonstrated a decrease in cell proliferation, colony formation and cell invasion in miR-186 depleted metastatic prostate cancer cell lines. Based on pre-clinical studies, the decrease in cell invasion may be related to an up-regulation of AKAP12 following the repression of miR-186 in metastatic prostate cancer cell lines. Presumably, AKAP12, a tumor suppressor gene, inhibits pAkt, which in turn suppresses beta-catenin, a gene essential for cell invasion, epithelial mesenchymal transition and chemo-sensitivity. These findings are currently under review for publication consideration in BMC Cancer.

It is her hope that her research findings will lead to the discovery of therapeutic targets for the effective treatment of aggressive and lethal forms of cancer. Such efforts will help to reduce the burden of this disease among cancer patients and their families.

J. Calvin Kouokam, Ph.D.
Assistant Professor

My main research focus is the development of plant produced proteins for the treatment of human diseases. Our current projects involve safety, pharmacodynamic and pharmacokinetic evaluation of antivirals targeting HIV-1 and other enveloped viruses, including HSV-2. Notably, we are assessing the safety and efficacy of the potent antiviral lectin Griffithsin (GRFT) in the context of colorectal pathologies (e.g. ulcerative colitis and colorectal cancer). In addition, we are interested in plant derived lectins as anticancer agents. Such lectins will be produced in Nicotiana benthamiana plants. Finally, we plan in the near future to assess natural products from various African plants for their therapeutic activities.



Nobuyuki Matoba, Ph.D.
Professor

Dr. Matoba's research is focused on the development of protein pharmaceuticals. To this end, they utilize a plant-based transient protein production system. This technology enables quick transition of candidate proteins from discovery and preclinical studies to clinical testing and ultimately provides cost-effective vaccines and therapeutics for developing countries. They employ multidisciplinary experimental methodologies including protein engineering, biochemistry, analytical chemistry, antiviral research and immunology. Currently, one of their projects is developing a vaccine against inflammatory bowel disease and colitis-associated colon cancer. Another project is investigating the cancer diagnostic and therapeutic potentials of a "lectibody", an antibody-lectin chimera that can recognize a broad spectrum of cancer cells. Our projects are funded by NIH, DoD and Helmsley Charitable Trust.

Kenneth E. Palmer, Ph.D.

Professor & Helmsley Chair in Pharmaceutical Plant-based Research; Director, Center for Predictive Medicine

Dr. Kenneth Palmer's primary research focus is in developing vaccines and antivirals that address pathogen diversity and counteract immune evasion strategies. His laboratory has been developing a lectin, Griffithsin, as a broad-spectrum antiviral biopharmaceutical for prevention of human immunodeficiency virus and genital herpes virus transmission. This product is advancing to a first-in-humans clinical trial. Dr. Palmer is the Director of the University of Louisville Center for Predictive Medicine, which has state-of-the-art facilities for BSL-3 biocontaiment research. His group is developing broad-spectrum antiviral strategies for prevention and treatment of emerging and re-emerging viral infections of public health concern, including highly pathogenic influenza and coronaviruses. Dr. Palmer is the Helmsley Charitable Trust Endowed Chair in Plant-based Pharmaceutical Research, which recognizes that the core products and technologies that drive his research program originate in plants, or use plants as recombinant protein expression systems. The Palmer laboratory is supported by grants from the National Institutes of Health and private philanthropy from the Helmsley Charitable Trust.

Leah J. Siskind, Ph.D
Professor

The Siskind laboratory has several different areas of interest and combines expertise at the biophysical, molecular, cellular, and animal level with the goal of translating findings to the clinic. The laboratory has several areas of focus. First, the Siskind laboratory aims to protect the kidney from the toxic effects of chemotherapeutics so that they can be more effectively utilized to treat cancer. Current chemotherapies such as cisplatin often have the deleterious side-effect of kidney toxicity which in almost 30% of cancer patients limits their use. Data from the Siskind laboratory indicates that repeated dosing of chemotherapeutics induces pro-fibrotic signaling pathways in the kidney, leading to long-term loss of kidney 0function. The Siskind laboratory aims to target these signaling pathways to protect the kidney from chemotherapeutics so that they can be utilized better to reduce tumor burden. In addition, the Siskind laboratory in collaboration with the laboratory of Dr. Levi Beverly studies fundamental cancer cell biology utilizing 3-dimentional models of tumors in culture to understand how interactions between cancer cells and the extracellular matrix alters tumor cell proliferation, migration, invasion, and metastasis. In a collaboration with the laboratories of Drs. Beverly and Clark, the Siskind lab aims to develop a porcine model of lung cancer. They aim to determine if pigs represent a model system that more closely resemble the progression and metastasis of human cancer patients. Furthermore, the lab aims to treat pigs with standard of care chemotherapeutic regimens, exactly as human patients would be treated, and determine if tumors demonstrate a similar response, as seen in patients. Finally, they aim to determine if pigs can be used as a model for the testing of immune-modulatory therapeutics that are now being tested in humans. Interestingly, they have found that the most exciting the therapies used in humans that target CTLA4 and PD-1 also bind to their porcine counterpart, raising the exciting possibility that these therapeutics will be able to be used in co-clinical trials in pigs to guide their usage in humans.

Zhoe-Hui (Joe) Song, Ph.D
Professor

The current research focuses of Dr. Song's laboratory are the molecular targets of cannabinoids. Cannabinoids are composed of three categories, including phytocannabinoids (the active chemical components of cannabis), endocannabinoids (the cannabinoid-like substances in our body), and synthetic cannabinoids. We are studying the ligand binding and signal transduction mechanisms of CB1 and CB2 cannabinoid receptors, two proven molecular targets for cannabinoids. In addition, we are investigating GPR3, GPR6 and GPR12, a family of orphan receptors that have been recently shown by us to be novel molecular targets for cannabidiol (CBD). CBD is

the major non-psychoactive of marijuana and has been proposed to have therapeutic potentials for a variety of illnesses, including glaucoma, neurological/psychiatric disorders and cancer. Therefore, our research on GPR3, GPR6 and GPR12 will not only help to understand the mechanisms of action for CBD, it will also explore the viability of these three receptors as novel therapeutic targets.

J. Christopher States, Ph.D.
Professor; Vice Chair for Research

The major interests of the laboratory are arsenic toxicology, DNA repair and development of mitosis disrupting drugs for cancer chemotherapy. Currently, the laboratory is investigating the role of miRNA dysregulation in arsenic induced skin carcinogenesis. The lab has determined miRNA profiles of arsenic-induced squamous and basal cell carcinomas and premalignant hyperkeratoses. Currently, the lab is extending these results by characterizing miRNA and mRNA expression changes that occur during arsenic transformation of a human keratinocyte cell line. These studies led to characterization of differential alternative mRNA splicing as well. Dysregulation of miRNA expression and alternative mRNA splicing lead to disturbances in the proteome and dysfunction of molecular machines, such as those involved in DNA damage signalling and repair. The interest in mitotic disruption includes investigation of both structural and numerical aneuploidy induced by miR-186 overexpression. Compounds that inhibit function of the anaphase promoting complex/cyclosome that may lead to new cancer chemotherapeutics are also under investigation. Other interests include induction of chronic adult diseases by early life/in utero arsenic exposure and enhancement of cisplatin sensitivity by co-administration of arsenicals.

John P. Wise, Sr., Ph.D.
Professor

The Wise Laboratory studies cancer and seeks to understand how environmental chemicals transform normal cells into tumor cells. Their work focuses on chromosomes and how changes in the number and structure of chromosomes leads to cancer. The Wise Laboratory has made important advances in understanding DNA damage, DNA repair, mitosis, and centrosome biology; discovering how chemical impacts on these processes lead to chromosome instability and carcinogenesis. The Wise Laboratory then compares these outcomes in humans, to similar endpoints in whales, alligators and sea turtles to discover novel adaptations and to better conserve

wildlife. In addition, to these efforts, The Wise Laboratory pioneers studies on how zero gravity changes these processes during space exploration. Some of the new directions in the Laboratory include stem cell research, autophagy and three-dimensional cell culture as they consider how metals impact or create cancer stem cells in their carcinogenic mechanism and preventative studies as they seek to understand if natural products like berries and beets can reduce or reverse toxicity. The Wise Laboratory contextualizes their studies in a “one” environmental health perspective, which considers data from their studies of wildlife, domestic animal, and ecosystem health, together with data from their human health studies. Thus, work in the Wise Laboratory includes laboratory-based mechanistic investigations using state-of-the-art cellular and molecular toxicology tools in their laboratories on the UofL Medical School campus combined with ship-and-shore-based work at field sites in Vieques, Puerto Rico; Cape Canaveral, Florida; and the Gulfs of Maine, Mexico and California.

Sandra S. Wise, Ph.D.
Assistant Professor

Dr. Wise’s research interests include how environmental chemicals, such as hexavalent chromium, depleted uranium and oil and dispersed oil products, can transform normal cells into cancer cells. These studies have focused on DNA repair deficiency and its impact on chromosome instability as a driving mechanism to cellular transformation and the development of disease. Currently, she is pursuing how cells exposed to these chemicals induce DNA and chromosomal damage yet are able to survive and evade the normal cell death pathways that should occur in order to protect the organism from disease.

Jamie L. Young, Ph.D.
Assistant Professor
The Young laboratory seeks to develop insight into how environmental toxicants affect health and cause disease, focusing on environmental liver disease (ELD). Chronic liver disease kills over 2 million people in the United States each year. However, despite advances at the bench and in the clinic, the prevalence of non-alcoholic fatty liver disease (NAFLD), the most common chronic liver disease, has more than doubled in last two decades and remains on the rise. A “two hit” hypothesis has been used to explain the multifaceted nature of NAFLD with one factor causing a ‘first hit’ sensitizing the liver to a ‘second hit’, resulting in disease progression. The “two hit”

hypothesis has focused on factors that alter lipid metabolism, constricting the paradigm to a single hit – fat accumulation. Thus, the second hit driving disease remains unknown. The Young laboratory takes a novel approach to investigating liver disease by studying chromosome instability, a form of genomic instability that occurs when a cell has an abnormal number of chromosomes or altered chromosome structure, as the second hit driving NAFLD severity and progression. Studies include investigating how sex and age modulate these effects while promoting advances in risk assessment and management of two environmental chemicals of major health concern that are commonly found together: hexavalent chromium [Cr(VI)], an established human carcinogen and inducer of chromosome instability, and per- and polyfluoroalkyl substances (PFAS), established metabolic toxicants associated with hepatic lipid dysregulation and accumulation. Research in the Young laboratory spans molecular, cellular, animal and population-based studies with the goal of providing a platform for the creation of novel target therapies and diagnostic tools related to sex (as a biological variable) and age differences in disease etiology.

Faculty with Secondary Appointments

Juhi Bagaitkar, Ph.D.

Associate Professor, Department of Oral Immunology and Infectious Diseases
Ph.D., Oral Immunology and Infectious Diseases, University of Louisville (2010)

Research Interests: To understand the immunological consequences of apoptotic cell clearance during inflammation and infection.

Gregory Barnes, Ph.D.

Professor, Department of Neurology
M.D., University of Kentucky (1992)
Ph.D., Biochemistry, University of Kentucky (1990)

Shirish Barve, Ph.D.

Professor of Medicine
Ph.D., Molecular Pathogenesis, University of Kentucky (1990)

Research Interests: Effects of alcohol on molecular mechanisms of cytokine action, gene expression and liver injury.

Levi J. Beverly, Ph.D.

Associate Professor, Department of Medicine
Ph.D., Molecular Genetics, Biochemistry and Microbiology, University of Cincinnati (2007)

Research Interests: Regulation of anti-apoptotic proteins in cancer progression and treatment.

Aruni Bhatnagar, Ph.D., FAHA

Smith and Lucille Gibson Chair and Professor, Department of Medicine;
Director, Envirome Institute
Ph.D., Kanpur University, India (1985)

Research Interests: Cardiovascular toxicology; oxidative mechanisms of cardiovascular disease; lipid peroxidation in atherosclerosis; gene expression; secondary complications of diabetes.

Michael E. Brier, Ph.D.

Professor, Department of Medicine
Ph.D., Industrial and Physical Pharmacy, Purdue University (1986)

Research Interests: Clinical pharmacokinetics/dynamics; Drug dosing in renal failure.

Jian Cai, Ph.D.

Assistant Professor of Medicine
Ph.D., Pharmacology and Toxicology, University of Louisville (1999)

Research Interests: Application of mass spectrometry in biomedical research; Drug and metabolite identification and quantification; Protein identification and post-translational modification; Hemoglobin adducts as biomarkers of chemical exposure and pathogenesis.

Jun Cai, M.D., Ph.D.

Assistant Professor, Department of Pediatrics
M.D., Tianjin Medical College (1993)
Ph.D., Biochemistry and Molecular Biology, Tianjin Medical University (1997)

Lu Cai, M.D., Ph.D.

Professor, Department of Pediatrics, Director of Pediatric Research Institute
M.D., Norman Bethune University of Medical Sciences (1983)
Ph.D., Radiation Biology/Oncology, Norman Bethune University of Medical Sciences (1987)

Research Interests: Diabetic cardiomyopathy and nephropathy

Matthew C. Cave, M.D.

Associate Professor, Department of Medicine
M.D., University of Kentucky (2001)

Research Interests: Steatohepatitis and liver cancer related to environmental and occupational chemical exposures; Complementary and alternative medicine in liver disease; Alcoholic and nonalcoholic fatty liver disease; Treatment of Hepatitis C.

Joseph Chen, Ph.D.

Assistant Professor, Department of Bioengineering
Ph.D. in Biomedical Engineering, Vanderbilt University (2015)

Jason A. Chesney, M.D., Ph.D.

Professor and Brinkley Chair in Lung Cancer Research, Department of Medicine
Ph.D., Biomedical Sciences/Immunology, University of Minnesota (1997)
M.D., University of Minnesota (1998)

Research Interests: Novel regulators of cancer cell metabolism; identification of emerging viruses and the development of immune-based therapies against widely metastatic cancers.

Donghoon Chung, Ph.D.

Associate Professor, Department of Microbiology and Immunology
Ph.D., Virology/Medicinal Biotechnology and Microbiology, Korea University (2003)

Research Interests: Discovery and development of antiviral therapeutics and vaccines for emerging RNA viruses with a pandemic potential. My research endeavors are driven by the urgent needs for effective treatments and prophylactics for viral diseases such as alphaviruses, flaviviruses, and coronaviruses which present the current and future threats to the global public health. I believe my research is critical to benefit the general public at the global level by providing effective therapeutics and vaccines as pandemic preparedness strategies.

Daniel J. Conklin, Ph.D.

Professor, Department of Medicine
Ph.D., University of Notre Dame (1995)

Research Interests: Environmental cardiology; cardiovascular toxicology.

Ayman El-Baz, Ph.D.

Associate Professor and Chair of Bioengineering
Ph.D., Electrical and Computer Engineering, University of Louisville (2006)

Research Interests: Dr, El-Baz directs UofL's BioImaging Laboratory. The primary focal point of the BioImaging Lab is to develop and implement innovative and ground-breaking techniques for use in image-guided surgeries, and the creation of non-invasive image-based diagnostic systems, which can help to revolutionize the early diagnosis of numerous diseases and brain disorders.

Wenke Feng, Ph.D.

Associate Professor, Department of Medicine
Ph.D, Biochem/Biotech, University for Bodenkultur (1998)

Research Interests: Mechanisms of alcoholic liver disease; Mechanisms of nonalcoholic steatohepatitis; Tissue hypoxia and diabetic complications.

Herman B. Frieboes, Ph.D.

Associate Professor, Department of Bioengineering
Ph.D., Biomedical Engineering, University of California, Irvine (2006)

Research Interests: Develop and apply realistic, predictive biocomputational models integrated with clinical and laboratory data to study disease progression and treatment; design of patient-specific therapies; and design of multiscale biocomputational models to describe the complex interactions between treatment and the immune system.

Lelia Gobejishvili, Ph.D.

Associate Professor, Department of Physiology
Ph.D. Physiology. I. Beritashvili Institute of Physiology, Georgian Academy of Sciences (1995)

Research Interests: Alcohol induced changes in innate immunity; alcohol mediated epigenetic changes of pro-inflammatory cytokines; role of phosphodiesterase 4 enzymes in a) modulating cAMP signaling in hepatic parenchymal and non-parenchymal cells (e.g. Kupffer cells, hepatic stellate cells) and b) pathogenesis of alcoholic and non-alcoholic liver disease.

Evelyne Gozal, Ph.D.

Associate Professor, Department of Pediatrics
Ph.D., Toxicology, University of Southern California (1997)

Research Interests: Signal transduction pathways involved in neuronal cell survival and neuronal cell death during hypoxia; cellular mechanisms underlying brain adaptation to chronic and intermittent hypoxia; identification of the kinases and transcription factors activated by hypoxia, leading to gene induction and to adaptation to oxygen deprivation.

Yiru Guo, M.D.

Professor, Department of Medicine
M.D., Xinjiang Medical University (1982)

Research Interests: Cardio-thoracic and vascular surgery, physiology, and pharmacology. Research focuses on: (i) elucidating the mechanisms of ischemic-pharmacologic- and exercise-induced preconditioning by using the ischemia/reperfusion model in genetically engineered animals, (ii) studying protection of ischemic myocardium by using gene and/or cell therapy, and (iii) elucidating adaptations to ischemia/reperfusion injury in the aging heart.

Petra Haberzettl, Ph.D.

Assistant Professor, Department of Medicine
Ph.D., Biochemistry, Heinrich-Heine University (2006)

Research Interests: Mechanisms by which air pollution exposure affects pulmonary and cardiovascular health.

Michal Hetman, M.D., Ph.D.

Professor, Department of Neurological Surgery
Endowed Professor of Molecular Signaling
M.D., Warsaw Medical School (1994)
Ph.D., Experimental and Clinical Medicine, Polish Academy of Sciences (1997)

Research Interests: Role of signaling kinases in neuronal repair and demise.

Bradford G. Hill, Ph.D.

Associate Professor, Department of Medicine
Ph.D., Biochemistry, University of Louisville (2007)

Research Interests: The broad theme of my research entails understanding how changes in metabolism contribute to cardio-metabolic health and disease. This involves the critical examination of glycolysis, mitochondria, and other pathways of intermediary metabolism and the development of causal relationships between metabolic defects or signatures and (patho)physiology.

Jiapeng Huang, M.D., Ph.D.

Professor and Vice Chair, Department of Anesthesiology and Preioperative Medicine
M.D., Beijing Medical University
Ph.D., Biochemistry and Molecular Biology, University of Southern California (2002)

Research Interests: Environmental factors for pulmonary hypertension and heart failure, molecular mechanisms of heart failure, COVID-19 and immune dysregulation, clinical and translational research.

Steven P. Jones, Ph.D.

Professor of Medicine and University Scholar
Director, Diabetes and Obesity Center
Ph.D., Physiology, Louisiana State University Health Sciences Center, Shreveport (2002)
Postdoctoral Fellowship, Mitochondrial Biology, Johns Hopkins University (2004)

Research Interests: My group is interested in understanding why the heart fails and developing strategies to mitigate pump failure. We are primarily focused on the immunometabolic factors that reshape the extracellular matrix in the remodeling ventricle.

Swati Joshi-Barve, Ph.D.

Associate Professor of Medicine
Ph.D., Biochemistry, University of Kentucky (1992)

Research Interests: Mechanisms of Steatohepatitis (nonalcoholic and alcoholic fatty liver disease); Mechanisms of Alcohol-induced Immune Dysfunction; Mechanisms of Hepatocellular Carcinoma

Irina Kirpich, Ph.D., M.P.H.

Associate Professor of Medicine

Ph.D., Biology and Physiology, Pomor State University (1997)
M.P.H, University of Louisville (2014)

Research Interests: Gut-liver interactions in alcoholic and non-alcoholic liver disease; alcohol and dietary fat mediated intestinal and liver injury; gut barrier, microbiome, probiotics; epigenetics and hepatic steatosis; Oxidized Metabolites of Linoleic Acid (OXLAMs).

Chi Li, Ph.D.

Associate Professor of Medicine
Ph.D., Molecular Biology, Columbia University (1998)

Research Interests: Mechanisms of apoptotic pathways initiated from different intracellular organelles. Molecular and cellular mechanisms that affect inflammation and immunity.

Yan Li, M.D., Ph.D.

Associate Professor of Surgery
M.D., Liaoning University of Chinese Medicince (1987)
Ph.D., Chengdu University of Chinese Medicine (1998)

Research Interests: Endocrine fibroblast growth factor (FGF21 and FGF15/19), nonalcoholic steatohepatitis and hepatocellular carcinoma

Robert C.G. Martin, II, M.D., Ph.D.

Professor and Sam and Lolita Weakley Endowed Chair in Surgical Oncology
M.D., University of Louisville (1995)
Ph.D., Pharmacology & Toxicology, University of Louisville (2008)

Research Interests: Genetic predisposition to cancer.

Craig J. McClain

Professor of Medicine
M.D., University of Tennessee-Memphis (1972)

Research Interests: Role of cytokines in liver injury and other forms of hepatotoxicity, interactions with nutrition and toxicology.

Kelly M. McMasters, M.D., Ph.D.

Professor and Chair of Surgical Oncology
Ph.D., Cell and Developmental Biology, Rutgers University (1988)
M.D., University of Medicine and Dentistry of New Jersey (1989)

Research Interests: Melanoma therapies-Adenovirus-mediated gene therapy; Radio guided surgery for breast, melanoma, and parathyroid tumors as well as gastrointestinal, hepatic, and pancreaticobiliary tumors

Michael L. Merchant, Ph.D.
Associate Professor of Medicine
Ph.D., Chemistry, University of Arkansas (1994)

Research Interests: Translational research - the discovery and understanding of biomarkers of renal disease; Basic Research - Mechanisms of renal function decline and fibrosis; Basic Research - Mechanisms for the transition from acute to chronic disease.

Tamer Mohammed, Ph.D.
Associate Professor of Medicine
Ph.D., Cardiovascular and Molecular Medicine, University of Manchester (2008)

Research Interests: Identify novel therapies for heart failure focusing on endogenous heart repair and regeneration mechanisms

Chin K. Ng, Ph.D.
Associate Professor of Radiology
Ph.D., Medical Physics, University of Wisconsin (1989)

Research Interests: Validating and characterizing novel imaging probes for multimodality imaging (MRI, PET, SPECT, CT and Optical); Exploring approaches for early detection and monitoring of treatment efficacy of multiple diseases such as infectious diseases, cancer, spinal cord injury, brain diseases, diabetes and heart diseases; Developing thermal laser ablation devices for treating spinal metastases in a MRI environment.

Matthew A. Nystoriak, Ph.D.
Associate Professor, Department of Medicine
Ph.D., Pharmacology, University of Vermont (2010)

Research Interests: Regulation of vascular calcium signaling and blood flow in diabetes.

Martin G. O'Toole, Ph.D.
Assistant Professor, Department of Bioengineering
Ph.D., Chemistry, University of Louisville (2008)

Research Interests: Development of stimulus-responsive biomaterials for use in medical applications of drug-delivery, wound healing, and tissue engineering. Development of

stimulus-responsive biomaterials of clinical relevance for diagnosing and treating various diseases.

Timothy E. O'Toole, Ph.D.
Assistant Professor, Department of Medicine
Ph.D. Biological Chemistry, University of Michigan (1987)

Research Interests: To develop a molecular understanding of the cardiovascular pathology induced by exposure to air pollution or volatile organic compounds.

M. Michele Pisano, Ph.D.
Professor of Surgical and Hospital Dentistry
Ph.D., Anatomy, Thomas Jefferson University (1985)

Research Interests: Molecular developmental toxicology; gene-environment interactions in normal and abnormal embryonic development; growth factor directed cellular signal transduction in embryonic cell growth and differentiation.

Shesh N. Rai, Ph.D.
Professor of Bioinformatics and Biostatistics
Wendell Cherry Chair in Clinical Trial Research
Ph.D., Statistics, University of Waterloo (1993)

Research Interests: Clinical Trials, Survival Analysis, Bioinformatics, Mixed Effects Model, Sample Survey, Quantitative Risk Assessment

Craig S. Roberts, M.D.
Professor and Chair, Department of Orthopaedic Surgery
M.D., New York University (1986)

Research Interests: Orthopaedic trauma, fractures and their complications and outcomes.

Lisa Sandell, Ph.D.
Associate Professor, Department of Oral Immunology & Infectious Diseases
Ph.D. Molecular Biology, University of Washington (1994)

Research Interests: Our studies focus on identifying how Vitamin A and retinoic acid regulate normal embryonic development, and how disturbances of these molecules may contribute to congenital abnormalities. We use mouse as a model system to investigate how Vitamin A metabolism and retinoic acid regulate development of craniofacial structures and salivary glands.

David A. Scott, Ph.D.

Professor of Oral Immunology & Infectious Diseases
Ph.D., Microbiology and Immunology, McGill University (1997)

Research Interests: Tobacco-induced alterations to microbial-associated molecular patterns of Porphyromonas gingivalis; Tobacco-induced alterations to innate-pathogen interactions; Tobacco alkaloid amplification of endogenous anti-inflammatory pathways; Identification of gingivitis- and periodontitis-specific infrared molecular signatures.

Theodore Smith, Ph.D.

Associate Professor of Medicine
Ph.D., Experimental Psychology, Miami University (1992)

Sanjay Srivastava, Ph.D.

Professor of Medicine
Ph.D., Chemistry, University of Lucknow (1993)

Research Interests: Delineating the mechanisms by which environmental pollutants cause endothelial activation, vascular inflammation, insulin resistance and atherosclerosis

Jill M. Steinbach-Rankins, Ph.D.

Associate Professor of Bioengineering
Ph.D., Bioengineering, Arizona State University (2009)

Research Interests: Design and development of drug and gene delivery vehicles for physiologically difficult-to-deliver-to microenvironments.

Janice E. Sullivan, M.D.

Professor
Vice Chair for Research, Department of Pediatrics
M.D., University of Minnesota (1988)

Research Interests: Clinical Pharmacology with a focus on underserved and rural populations; Mentoring.

Yi Tan, Ph.D.

Assistant Professor of Pediatrics
Ph.D., Biomedical Engineering, Chongqing University (2004)

Research Interests: Signaling pathways and therapeutic strategies in diabetic complications including cardiomyopathy, cardiac insulin resistance, stem cell mobilization and ischemic angiogenesis.

Walter H. Watson, Ph.D.
Assistant Professor of Medicine
Ph.D., Toxicology, University of Kentucky (1999)

Research Interests: Oxidative stress and redox signaling; Mechanistic toxicology; Alcoholic and nonalcoholic fatty liver disease.

Scott R. Whittemore, Ph.D.
Professor and Vice Chair for Research, Department of Neurological Surgery
Scientific Director, Kentucky Spinal Cord Injury Research Center
Ph.D., Physiology and Biophysics, University of Vermont (1982)

Research Interests: Using undifferentiated precursor cells, gene therapies, and transplanted neurons, the lab seeks to understand the development of these key components of the vascular and nervous system at the molecular and genetic level in order to protect them from damage and/or promote their regeneration.

Marcin Wysoczynski, Ph.D.
Assistant Professor of Medicine
Ph.D. Pomeranian Medical University (2009)

Research Interests: Innate immunity in myocardial repair.

Jun Yan, M.D., Ph.D.
Professor of Medicine and Endowed Chair in Translational Research
M.D., Jiangsu University School of Medicine (1985)
Ph.D., Immunology, Shanghai Jiaotong University School of Medicine (1997)

Research Interests: Immunotherapy and vaccines for treatment of cancer and infectious diseases.

Xiang Zhang, Ph.D.
Professor of Chemistry
Ph.D., Bioanalytical Chemistry, Purdue University (2001)

Research Interests: Molecular systems biology, by exploiting practical and efficient high throughput technologies for analyses of complex mixtures to facilitate the development of preventive, predictive and personalized medicine for the promotion of health and wellness.

FACULTY WITH EMERITUS APPOINTMENTS

Benz, Frederick W., Professor Emeritus, Ph.D., Pharmacology, University of Iowa (1970).

Chen, Theresa, Professor Emerita; Ph.D., University of Louisville (1971).

Hurst, Harrell E., Professor Emeritus, Ph.D., Toxicology, University of Kentucky (1978).

Kang, Y. James, Professor Emeritus, Ph.D., Toxicology and Zoology, Iowa State University (1989)

Nerland, Donald E., Professor Emeritus, Ph.D., Medicinal Chemistry, University of Kansas (1974)

Pierce Jr., William M., Professor Emeritus, Ph.D., Pharmacology and Toxicology, University of Louisville (1981)

Rowell, Peter P., Professor Emeritus, Ph.D., Pharmacology and Therapeutics, University of Florida (1975).

Williams, W. Michael, Professor Emeritus, Ph.D., University of Louisville (1970); M.D., University of Louisville (1974).

FACULTY WITH ADJUNCT APPOINTMENTS

Kevyn E. Merten, Adjunct Assistant Professor of Pharmacology and Toxicology, PhD, Pharmacology and Toxicology, University of Louisville School of Medicine (2007)

Shesh N. Rai, Adjunct Assistant Professor of Pharmacology and Toxicology; PhD, Statistics, University of Waterloo (1993)

Arnold J. Schecter, Adjunct Professor of Pharmacology and Toxicology, MD, Howard University Medical School (1962); MPH, Columbia University (1975)

Jill M. Steinbach-Rankins, Adjunct Assistant Professor of Pharmacology and Toxicology, PhD, Arizona State University (2009)

Irina Tcherepanova, Adjunct Professor of Pharmacology and Toxicology; PhD, Molecular Pharmacology, Albert Einstein College of Medicine (1996)

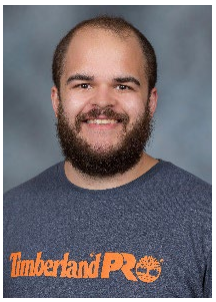
Joshua M. Thornburg, Adjunct Assistant Professor of Pharmacology and Toxicology, PhD, Pharmacology and Toxicology, University of Louisville School of Medicine (2007)

ADMINISTRATIVE STAFF

Sonya Cary Fin/Ops Department Manager - HSC

Hannah Crawford Coordinator

2022 NEW GRADUATE STUDENT CLASS



Jacob Hahn
B.S., Biochemistry, Clemson University

Katarina Mayer
B.S., Biology, University of Louisville

Disha Moholkar
B.Sc.-M.Sc, Nanoscience and Biotechnology, Shivavi University

Dianet Sanchez
B.A., Biochemistry, Hanover College

Graduate Students

Abersold, Alyssa
Adiele, Ngozi
Bodduluri, Neil
Bolatimi, Oluwanifemi
Cathey, Dakota
Cecil, Wendy
Dwenger, Marc
El-Baz, Nagawa
Gomes, Daniel
Gripshover, Tyler
Habil, Mariam
Hahn, Jacob
Hammouri, Dana
Jiang, Mengwei
Jigo, Raphael
Lu, Hayan
Mayer, Katarina
McFall, Samantha
Meaza Isusi, Idoia
Miller, Hunter
Moholkar, Disha
Orwick, Andrew
Raph, Sean
Reeves, Micaela
Richardson, Andre
Sanchez, Dianet
Shrader, Sarah
Sloan, Lucy
Tarvestad, Kate
Taylor, Breandon
Toyoda, Jennifer
Walls, Kennedy
Whitt, Aaron
Williams, Aggie
Wilkerson, Caitlin
Vielee, Samuel

2022 Graduates

Sean M. Raph	Ph.D.	2022	Matthew A. Nystoriak, Ph.D.	Voltage gated potassium channel dependent mechanisms of cardiovascular adaptation to chronic exercise
Nagwa El-Baz	Ph.D.	2022	Martin G. O'Toole Ph.D.	The impact of pegylation on cellular uptake and in vivo biodistribution of gold nanoparticle MRI contrast agents
Breandon S. Taylor	M.S.	2022	Sanjay Srivastava, Ph.D.	The impact of volatile organic compound exposure on subclinical biomarkers of cardiovascular injury
Mariam R. Habil	Ph.D.	2022	David W. Hein, Ph.D.	Investigation of human N-acetyltransferases (NAT1 and NAT2) genetic polymorphisms in susceptibility to aromatic amine and alkylaniline genotoxicity
Samantha A. McFall	M.S.	2022	Sanjay Srivastava, Ph.D.	The effect of volatile organic compounds on endothelial function and atherogenesis
Kate Tarvestad	M.S.	2022	Brian P. Ceresa, Ph.D.	HGF-mediated c-Met signaling in human corneal epithelial cells
Haiyan Lu	Ph.D.	2022	John P. Wise, Sr., Ph.D.	Translating particulate hexavalent chromium-induced chromosome instability from human lung cells to experimental animals, human lung tumors, and whale cells
Alyssa S. Aebersold	Ph.D.	2022	Zhao-hui (Joe) Song, Ph.D.	Application of cannabidiol to occular pharmacokinetics and pharmacodynamics
Andre D. Richardson	Ph.D.	2022	Daniel J. Conklin, Ph.D.	Tobacco-derived aldehydes, platelets and thrombogenicity: Role of transient receptor potential ankyyrin-1
Jennifer H. Toyoda	Ph.D.	2022	John P. Wise, Sr., Ph.D.	Molecular mechanisms of hexavalent chromium-induced centrosome amplification
Hunter A. Miller	Ph.D.	2022	Hermann B. Frieboes, Ph.D.	A modeling platform to predict cancer survival and therapy outcomes using tumor tissue derived metabolomics data
Aaron G. Whitt	Ph.D.	2022	Chi Li, Ph.D.	The roles of PON2 in mitochondrial physiology, lung tumor cell proliferation, and lung tumorigenesis
Mengwei Jiang	Ph.D.	2022	Wenke Feng, Ph.D.	Extracellular vesicles from Lactobacillus rhamnosus GG protect against alcohol-induced liver injury

				through suppression of intestinal miR194 and subsequent activation of FXR in mice
Aggie R. Williams	M.S.	2022	John P. Wise, Sr., Ph.D.	Particulate hexavalent chromium inhibits homologous recombination repair by targeting RAD51 paralogs in human lung fibroblasts
Lucy J. Sloan	M.S.	2022	Zhao-hui (Joe) Song, Ph.D. & Shigeo Tamiya, Ph.D.	Cannabinoids and retinal fibrotic disorders

PRIMARY FACULTY HONORS

Banerjee, Mayukh

- 1st place Young Investigator Platform Presentation Award, Ohio Valley SOT Regional Chapter Annual Meeting; University of Louisville, KY

Chen, Shao-Yu

- Distinguished University Scholar, University of Louisville

Hein, David

- Distinguished University Scholar Award renewed

Hood, Joshua

- Certificate of Completion, STAR: Spaceflight Technology, Applications and Research Course, NASA Science Mission Directorate, Biological and Physical Sciences Division, 2022, NASA Space Biosciences Division. The applicant pool for 2021 was highly competitive, with over 100 applicants from 19 countries.
- Won an internal competition to represent the University of Louisville in submitting a Brain Research Foundation Grant application *(only one application is permitted per approved University).*

Hong, Kyung

- Nominated for Faculty Favorites Awards, Delphi Center for Teaching and Learning

Kidd, LaCreis

- "Our Highest Potential" Endowed Chair in Cancer Research, James Graham Brown Cancer Center, University of Louisville (UofL), School of Medicine
- Community Service Award by Global Intervention & Ventures in Education (G.I.V.E., 2022).
-

Matoba, Nobuyuki

- Nominated for 2022 Student Champion Award
- Ka'Lynn Collins, a UofL Bioengineering undergraduate intern student in my lab, received 1st place in the R25 NCI Cancer Education Program Norbert Burzynski Award (undergraduate student category)

Palmer, Kenneth E.

- University of Louisville Researcher of the Year in 2022.
- Invited to present the Abraham J. Gitlitz Memorial Lecture at the Association of Clinical Scientists 143rd Meeting Louisville, KY May 11-14, 2022.

Siskind, **Leah J**

- Student Champion Award, University of Louisville, 2022
- Faculty Favorite Nominee

States, Christopher

- School of Medicine Outstanding Faculty Award for Excellence in Research
- Provost Award for Student Champion

Wise, John

- Distinguished University Scholar, University of Louisville
- NIH R35 Merit Award
- SOT Toxicologist Mentoring Award, Society of Toxicology (SOT)
- Distinguished Faculty Award for Teaching Medallion, University of Louisville
- Research Recognition Certificate, University of Louisville

Wise, Sandra

- SOT Science Communications Training Award

Young, Jamie

- Commissioned as a *Kentucky Colonel* by the Commonwealth of Kentucky and Governor Andy Beshear, September 2022

PRIMARY FACULTY PUBLICATIONS

Banerjee, Mayukh

1. **Banerjee M**., Al-Eryani L., Srivastava S., Rai S. N., Pan J., Kalbfleisch T. S., States J. C. (2022). Delineating the Effects of Passaging and Exposure in a Longitudinal Study of Arsenic-Induced Squamous Cell Carcinoma in a HaCaT Cell Line Model. Toxicol Sci. 185(2):184-196. doi: 10.1093/toxsci/kfab129. PMID: 34730829.
2. Ferragut Cardoso A.¶, **Banerjee M. ¶**, Al-Eryani L., Sayed M., Wilkey D. W., Merchant M. L., Park J. W., States J. C. (2022). Temporal Modulation of Differential Alternative Splicing in HaCaT Human Keratinocyte Cell Line Chronically Exposed to Arsenic for up to 28 Wk. Environ Health Perspect. 130(1):17011. doi: 10.1289/EHP9676. PMID: 35072517. [¶Joint First Authors].
3. Ghosh S., **Banerjee M.**, Bodduluri H., Jala V. (2022). Urolithin A attenuates arsenic-induced gut barrier dysfunction. Arch Toxicol. 96(4):987-1007. doi: 10.1007/s00204-022-03232-2. PMID: 35122514.
4. Nail A. N., McCaffrey L. M., **Banerjee M.**, Ferragut Cardoso A., States J. C. (2022). Chronic arsenic exposure suppresses ATM pathway activation in human keratinocytes. Toxicol Appl Pharmacol. 446:116042. doi: 10.1016/j.taap.2022.116042. PMID: 35513056.

Chen, Shao-yu

1. Fan H, Li Y, Yuan F, Lu L, Liu J, Feng W, Zhang HG, **Chen SY**. Up-regulation ofmicroRNA-34a mediates ethanol-induced impairment of neural crest cell migration invitro and in zebrafish embryos through modulating epithelial-mesenchymal transition by targeting Snail1. Toxicology Letters. 358:17 -26, 2022. PMID: 35038560.
2. Jiang M, Li F, Liu Y, Gu Z, Zhang L, Lee J, He L, Vatsalya V, Zhang H, Deng Z, ZhangX, **Chen SY**, Guo G, Barve S, McClain CJ, Feng W. Probiotic-derived nanoparticles inhibit ALA through intestinal miR194 suppression and subsequent FXR activation. Hepatology, 2022. PMID: 35689610.
3. Sundaram K, Mu J, Kumar A, Behera J, Lei C, Sriwastva MK, Xu F, Dryden GW, ZhangL, **Chen SY,** Yan J, Zhang X, Park JW, Merchant ML, Tyagi N, Teng Y, Zhang HG. Garlicexosome-like nanoparticles reverse high-fat diet induced obesity via the gut/brain axis. Theranostics, 12: 1220-1246. 2022. PMID: 35154484. PMCID: PMC8771565.

Clark, Geoffrey

1. Guo Y, Lu X, Chen Y, Clark G, Trent J, Cuatrecasas M, Emery D, Song ZH, Chariker J, Rouchka E, Postigo A, Liu Y, Dean DC. Opposing roles of ZEB1 in the cytoplasm and nucleus control cytoskeletal assembly and YAP1 activity. Cell Rep. 2022 Oct 4;41(1):111452. doi: 10.1016/j.celrep.2022.111452. PMID: 36198275.

Feng, Wenke

1. He L, Vatsalya V, Ma X, Klinge CM, Cave MC, **Feng W**, McClain CJ, Zhang X. Metabolic Analysis of Nucleosides/Bases in the Urine and Serum of Patients with Alcohol-Associated Liver Disease. Metabolites. 2022 Nov 28;12(12):1187. doi: 10.3390/metabo12121187. PMID: 36557225; PMCID: PMC9783452.
2. Lei C, Sun R, Xu G, Tan Y, **Feng W**, McClain CJ, Deng Z. Enteric VIP-producing neurons maintain gut microbiota homeostasis through regulating epithelium fucosylation. Cell Host Microbe. 2022 Oct 12;30(10):1417-1434.e8. doi: 10.1016/j.chom.2022.09.001. Epub 2022 Sep 22. PMID: 36150396; PMCID: PMC9588764.
3. Jiang M, Li F, Liu Y, Gu Z, Zhang L, Lee J, He L, Vatsalya V, Zhang HG, Deng Z, Zhang X, Chen SY, Guo GL, Barve S, McClain CJ, **Feng W**. Probiotic-derived nanoparticles inhibit ALD through intestinal miR194 suppression and subsequent FXR activation. Hepatology. 2022 Jun 11:10.1002/hep.32608. doi: 10.1002/hep.32608. Epub ahead of print. PMID: 35689610; PMCID: PMC9741667.
4. Sagaram M, Parthasarathy R, Condon SL, Closson CF, Kong M, Schwandt ML, Jophlin LL, **Feng W**, Barve AJ, Vatsalya V. Theragnostic Efficacy of K18 Response in Alcohol Use Disorder with Clinically Significant Fibrosis Using Gut-Liver Axis. Int J Mol Sci. 2022 May 23;23(10):5852. doi: 10.3390/ijms23105852. PMID: 35628661; PMCID: PMC9143806.
5. Sun R, Gu X, Lei C, Chen L, Chu S, Xu G, Doll MA, Tan Y, **Feng W**, Siskind L, McClain CJ, Deng Z. Neutral ceramidase-dependent regulation of macrophage metabolism directs intestinal immune homeostasis and controls enteric infection. Cell Rep. 2022 Mar 29;38(13):110560. doi: 10.1016/j.celrep.2022.110560. PMID: 35354041; PMCID: PMC9007044.
6. Sun R, Lei C, Chen L, He L, Guo H, Zhang X, **Feng W**, Yan J, McClain CJ, Deng Z. Alcohol-driven metabolic reprogramming promotes development of RORγt-deficient thymic lymphoma. Oncogene. 2022 Apr;41(16):2287-2302. doi: 10.1038/s41388-022-02257-2. Epub 2022 Mar 4. PMID: 35246617; PMCID: PMC9018612.
7. Fan H, Li Y, Yuan F, Lu L, Liu J, Feng W, Zhang HG, Chen SY. Up-regulation of microRNA-34a mediates ethanol-induced impairment of neural crest cell migration in vitro and in zebrafish embryos through modulating epithelial-mesenchymal transition by targeting Snail1. Toxicol Lett. 2022 Apr 1;358:17-26. doi: 10.1016/j.toxlet.2022.01.004. Epub 2022 Jan 14. PMID: 35038560; PMCID: PMC9058190.

Gupta, Ramesh

1. Aqil, F. and **Gupta RC**. Exosomes in Cancer Therapy. Editorial. Cancers, 2022, 14, 1500.
2. Kumar DK, Chaudhuri, A., Aqil F, Dehari D, Munagala R, Singh S, **Gupta RC** and Agrawal AK. Exosomes as Emerging Drug Delivery and Diagnostic Modality for Breast Cancer: Recent Advances in Isolation and Application. Cancers, 2022, 14, 1435.

3. Saeed M., Shoaib A., Kandimalla, R., Javed, S., Almatroudi, A., **Gupta RC** and Aqil F. Microbes Based Therapies for Colorectal Cancer: Advantages and Limitations. Seminars in Cancer Biology. 86 (3): 652-665 (Corresponding Author).
4. Wallen, M., Aqil, F., Kandimalla, R., Jeyabalan, J., Auwardt, S., Tyagi, N., Schultz, D. Spencer, W., **Gupta, RC**. Antiviral siRNA Therapeutics using Exosome-Based Delivery. Molecular Therapy, 2022, 29, 691-704.

Hein, David

1. Oladipupo I, Ali T, **Hein DW**, Pagidas K, Bohler H, Doll MA, Mann ML, Gentry A, Chiang JL, Pierson RC, Torres S, Reece E, Taylor KC. Association between cigarette smoking and ovarian reserve among women seeking fertility care. PLoS One. 2022;17(12):e0278998. doi: 10.1371/journal.pone.0278998. eCollection 2022. PubMed PMID: 36512605. PubMed Central PMCID: PMC9746951.
2. Habil MR, Salazar-González RA, Doll MA, **Hein DW**. N-acetyltransferase 2 acetylator genotype-dependent N-acetylation and toxicity of the arylamine carcinogen β-naphthylamine in cryopreserved human hepatocytes. Arch Toxicol. 2022 Dec;96(12):3257-3263. doi: 10.1007/s00204-022-03381-4. Epub 2022 Sep 16. PubMed PMID: 36112171; PubMed Central PMCID: PMC9641657.
3. Hong KU, Gardner JQ, Doll MA, Stepp MW, Wilkey DW, Benz FW, Cai J, Merchant ML, **Hein DW**. Dataset for proteomic analysis of arylamine N-acetyltransferase 1 knockout MDA-MB-231 breast cancer cells. Data Brief. 2022 Dec;45:108634. doi: 10.1016/j.dib.2022.108634. eCollection 2022 Dec. PubMed PMID: 36426076; PubMed Central PMCID: PMC9679541.
4. Hong KU, Salazar-González RA, Walls KM, **Hein DW**. Transcriptional regulation of human arylamine N-acetyltransferase 2 gene by glucose and insulin in liver cancer cell lines. Toxicol Sci. 2022 Nov 23;190(2):158-172. doi: 10.1093/toxsci/kfac103. PubMed PMID: 36156098. PubMed Central PMCID: PMC9702998.
5. Habil MR, Salazar-González RA, Doll MA, **Hein DW**. Differences in β-naphthylamine metabolism and toxicity in Chinese hamster ovary cell lines transfected with human CYP1A2 and NAT2*4, NAT2*5B or NAT2*7B N-acetyltransferase 2 haplotypes. Arch Toxicol. 2022 Nov;96(11):2999-3012. doi: 10.1007/s00204-022-03367-2. Epub 2022 Aug 30. PubMed PMID: 36040704; PubMed Central PMCID: PMC10187863.
6. Habil MR, Doll MA, **Hein DW**. Acetyl coenzyme A kinetic studies on N-acetylation of environmental carcinogens by human N-acetyltransferase 1 and its NAT1*14B variant. Front Pharmacol. 2022;13:931323. doi: 10.3389/fphar.2022.931323. eCollection 2022. PubMed PMID: 36386142; PubMed Central PMCID: PMC9650386.
7. Wise JTF, Salazar-González RA, Walls KM, Doll MA, Habil MR, **Hein DW**. Hexavalent chromium increases the metabolism and genotoxicity of aromatic amine carcinogens 4-aminobiphenyl and β-naphthylamine in immortalized human lung epithelial cells. Toxicol Appl Pharmacol. 2022 Aug 15;449:116095. doi:

10.1016/j.taap.2022.116095. Epub 2022 Jun 2. PubMed PMID: 35662664; PubMed Central PMCID: PMC9382885.
8. Hong KU, Gardner JQ, Doll MA, Stepp MW, Wilkey DW, Benz FW, Cai J, Merchant ML, **Hein DW**. Proteomic analysis of arylamine N-acetyltransferase 1 knockout breast cancer cells: Implications in immune evasion and mitochondrial biogenesis. Toxicol Rep. 2022;9:1566-1573. doi: 10.1016/j.toxrep.2022.07.010. eCollection 2022. PubMed PMID: 36158865; PubMed Central PMCID: PMC9500399.
9. Doll MA, Ray AR, Salazar-González RA, Shah PP, Vega AA, Sears SM, Krueger AM, Hong KU, Beverly LJ, **Hein DW**. Deletion of arylamine N-acetyltransferase 1 in MDA-MB-231 human breast cancer cells reduces primary and secondary tumor growth in vivo with no significant effects on metastasis. Mol Carcinog. 2022 May;61(5):481-493. doi: 10.1002/mc.23392. Epub 2022 Feb 8. PubMed PMID: 35133049; PubMed Central PMCID: PMC9018511.
10. Wise JTF, Salazar-González RA, Habil MR, Doll MA, **Hein DW**. Expression of arylamine N-acetyltransferase 2 activity in immortalized human bronchial epithelial cells. Toxicol Appl Pharmacol. 2022 May 1;442:115993. doi: 10.1016/j.taap.2022.115993. Epub 2022 Mar 27. PubMed PMID: 35353990; PubMed Central PMCID: PMC9112076.
11. **Hein DW**, Doll MA, Habil MR. Human N-Acetyltransferase 1 and 2 Differ in Affinity Towards Acetyl-Coenzyme A Cofactor and N-Hydroxy-Arylamine Carcinogens. Front Pharmacol. 2022;13:821133. doi: 10.3389/fphar.2022.821133. eCollection 2022. PubMed PMID: 35281898; PubMed Central PMCID: PMC8914035.
12. Doll MA, **Hein DW**. 560G>A (rs4986782) (R187Q) Single Nucleotide Polymorphism in Arylamine N-Acetyltransferase 1 Increases Affinity for the Aromatic Amine Carcinogens 4-Aminobiphenyl and N-Hydroxy-4-Aminobiphenyl: Implications for Cancer Risk Assessment. Front Pharmacol. 2022;13:820082. doi: 10.3389/fphar.2022.820082. eCollection 2022. PubMed PMID: 35273499; PubMed Central PMCID: PMC8902414.
13. Leggett CS, Doll MA, Salazar-González RA, Habil MR, Trent JO, **Hein DW**. Identification and characterization of potent, selective, and efficacious inhibitors of human arylamine N-acetyltransferase 1. Arch Toxicol. 2022 Feb;96(2):511-524. doi: 10.1007/s00204-021-03194-x. Epub 2021 Nov 16. PubMed PMID: 34783865; PubMed Central PMCID: PMC8837702.
14. Salazar-González RA, Doll MA, **Hein DW**. Arylamine N-Acetyltransferase 1 Activity is Regulated by the Protein Acetylation Status. Front Pharmacol. 2022;13:797469. doi: 10.3389/fphar.2022.797469. eCollection 2022. PubMed PMID: 35153780; PubMed Central PMCID: PMC8828969.
15. Upregulation of cytidine deaminase in NAT1 knockout breast cancer cells. **Hong KU*,** Tagnedji AH, Doll MA, Walls KM, Hein DW. J Cancer Res Clin Oncol. 2022 Nov 3. doi: 10.1007/s00432-022-04436-w. Online ahead of print. PMID: 36329350.

Hong, Kyung

1. Dataset for proteomic analysis of arylamine N-acetyltransferase 1 knockout MDA-MB-231 breast cancer cells. **Hong KU**, Gardner JQ, Doll MA, Stepp MW, Wilkey DW, Benz FW, Cai J, Merchant ML, Hein DW. Data Brief. 2022 Sep 24;45:108634. doi: 10.1016/j.dib.2022.108634. eCollection 2022 Dec. PMID: 36426076.
2. Upregulation of cytidine deaminase in NAT1 knockout breast cancer cells. **Hong KU*,** Tagnedji AH, Doll MA, Walls KM, Hein DW. J Cancer Res Clin Oncol. 2022 Nov 3. doi: 10.1007/s00432-022-04436-w. Online ahead of print. PMID: 36329350. *, Co-corresponding author.
3. Proteomic analysis of arylamine N-acetyltransferase 1 knockout breast cancer cells: Implications in immune evasion and mitochondrial biogenesis. **Hong KU**, Gardner JQ, Doll MA, Stepp MW, Wilkey DW, Benz FW, Cai J, Merchant ML, Hein DW. Toxicol Rep. 2022 Jul 19;9:1566-1573. doi:10.1016/j.toxrep.2022.07.010. eCollection 2022. PMID: 36158865.
4. Transcriptional Regulation of Human Arylamine N-Acetyltransferase 2 Gene by Glucose and Insulin in Liver Cancer Cell Lines. **Hong KU*,** Salazar-González RA, Walls KM, Hein DW. *Toxicol Sci*. 2022 Nov 23;190(2):158-172. doi: 10.1093/toxsci/kfac103. PMID: 36156098. *, Co-corresponding author.

Hood, Joshua

1. Thomas JJ, Harp KO, Bashi A, **Hood JL**, Botchway F, Wilson MD, Thompson WE, Stiles JK, Driss A. MiR-451a and let-7i-5p loaded extracellular vesicles attenuate heme-induced inflammation in hiPSC-derived endothelial cells. Front Immunol. 2022;13. doi: 10.3389/fimmu.2022.1082414. (https://pubmed.ncbi.nlm.nih.gov/36618355/).
2. Kumar A, Sundaram K, Teng Y, Mu J, Sriwastva MK, Zhang L, **Hood JL,** Yan J, Zhang X, Park JW, Merchant ML, Zhang HG. Ginger nanoparticles mediated induction of Foxa2 prevents highfat diet-induced insulin resistance. Theranostics. 2022;12(3):1388-403. Epub 2022/02/15. doi: 10.7150/thno.62514. PubMed PMID: 35154496; PMCID: PMC8771553. (https://pubmed.ncbi.nlm.nih.gov/35154496/).
3. Shiri F, Feng H, Petersen KE, Sant H, Bardi GT, Schroeder LA, Merchant ML, Gale BK, **Hood J L** (corresponding author). Separation of U87 glioblastoma cell-derived small and medium extracellular vesicles using elasto-inertial flow focusing (a spiral channel). Sci Rep. 2022;12(1):6146. Epub 2022/04/14. doi: 10.1038/s41598-022-10129-8. PubMed PMID: 35414673; PMCID: PMC9005724 (https://pubmed.ncbi.nlm.nih.gov/35414673/).

Kouokam, Calvin

1. **Kouokam JC**, Meaza I, Wise JP Sr. Inflammatory effects of hexavalent chromium in the lung: A comprehensive review. Toxicol Appl Pharmacol. 2022 Nov 15;455:116265. doi: 10.1016/j.taap.2022.116265. Epub 2022 Oct 5. PMID: 36208701.

2. Wise SS, Lu H, Speer RM, Wise JP Jr, Young J, Toyoda JH, Meaza I, Croom-Perez TJ, **Kouokam JC**, Specht A, Liu KJ, Hoyle GW, Wise JP Sr. Chromium distribution in an oropharyngeal aspiration model for hexavalent chromium in rats. Toxicol Appl Pharmacol. 2022 Oct 22;457:116294. Doi: 10.1016/j.taap.2022.116294. Epub ahead of print. PMID: 36283442.
3. Speer RM, Meaza I, Toyoda JH, Lu Y, Xu Q, Walter RB, Kong M, Lu H, **Kouokam JC**, Wise JP Sr. Particulate hexavalent chromium alters microRNAs in human lung cells that target key carcinogenic pathways. Toxicol Appl Pharmacol. 2022 Mar 1;438:115890. doi: 10.1016/j.taap.2022.115890. Epub 2022 Jan 29. PMID: 35101437; PMCID: PMC8938933.

Matoba, Nobuyuki

1. Oh YJ, Dent MW, Zhou Q, Freels AR, Merchant ML, Lebrilla C, **Matoba N*.** (2022) Antitumor activity of a lectibody targeting cancer-associated high-mannose glycans. Mol Ther 30(4): 1523-1535. PMID: 35077861.
2. Tusé D#, Reeves M#, Royal J, Hamorsky KT, Ng H, Arolfo M, Green C, Trigunaite A, Parman T, Lee G, **Matoba N*.** (2022) Pharmacokinetics and safety studies in rodent models support development of EPICERTIN as a novel topical wound-healing biologic for ulcerative colitis. J Pharmacol Exp Ther 380(3): 162-170. (#co-first authors) PMID: 35058349.
3. Matsuda R*, **Matoba N.** (2022) Biopharmaceutical protein production in plant factories. Climate in Biosphere in press. Article in Japanese.
4. Dent M, Mayer KL, Verjan Garcia N, Guo H, Kajiura H, Fujiyama K, **Matoba N*.** (2022) Impact of glycoengineering and anti-drug antibodies on the anti-cancer activity of a plant-made lectin-Fc fusion protein. Plant Biotechnol J (11):2217-2230. PMID: 35900183.

Palmer, Kenneth

1. Teleshova N, Keller MJ, Fernández Romero JA, Friedland BA, Creasy GW, Plagianos MG, Ray L, Barnable P, Kizima L, Rodriguez A, Cornejal N, Melo C, Cruz Rodriguez G, Mukhopadhyay S, Calenda G, Sinkar SU, Bonnaire T, Wesenberg A, Zhang S, Kleinbeck K, **Palmer K**, Alami M, O'Keefe BR, Gillevet P, Hur H, Liang Y, Santone G, Fichorova RN, Kalir T, Zydowsky TM (2022). Results of a phase 1, randomized, placebo-controlled first-inhuman trial of griffithsin formulated in a carrageenan vaginal gel. PLoS One. 2022 Jan 20;17(1):e0261775. doi: 10.1371/journal.pone.0261775. PMID: 35051209; PMCID: PMC8775213.
2. Nguyen LC, Yang D, Nicolaescu V, Best TJ, Gula H, Saxena D, Gabbard JD, Chen SN, Ohtsuki T, Friesen JB, Drayman N, Mohamed A, Dann C, Silva D, Robinson-Mailman L, Valdespino A, Stock L, Suárez E, Jones KA, Azizi SA, Demarco JK, Severson WE, Anderson CD, Millis JM, Dickinson BC, Tay S, Oakes SA, Pauli GF, **Palmer KE**; National COVID Cohort Collaborative Consortium, Meltzer DO, Randall G, Rosner MR (2022). Cannabidiol inhibits SARS-CoV-2 replication through induction of the host ER stress and innate immune responses. Science Advances.

2022 Feb 25;8(8):eabi6110. doi: 10.1126/sciadv.abi6110. Epub 2022 Feb 23. PMID: 35050692.

3. Holm RH, Brick JM, Amraotkar AR, Hart JL, Mukherjee A, Zeigler J, Bushau-Sprinkle AM, Anderson LB, Walker KL, Talley D, Keith RJ, Rai SN, **Palmer KE**, Bhatnagar A, Smith T (2022) Public Awareness of and Support for the Use of Wastewater for SARS-CoV-2 Monitoring: A Community Survey in Louisville, Kentucky. ACS ES&T Water DOI: 10.1021/acsestwater.1c00405.
4. Huxol H, Yaddanapudi K, Bushau-Sprinkle A, **Palmer K**, Bickel S, Morton R, Harris C (2022). COVID-19 Disease in Children with Medical Complexity in a Pediatric Long-term Care Facility: A Case Series. Pediatr Infect Dis J. 2022 Sep 1;41(9):e403-e405. doi: 10.1097/INF.0000000000003587. Epub 2022 May 27. PMID: 35622420; PMCID: PMC9359677.
5. Amraotkar AR, Bushau-Sprinkle AM, Keith RJ, Hamorsky KT, **Palmer KE**, Gao H, Rai SN, Bhatnagar A (2022). Pre-Existing Comorbidities Diminish the Likelihood of Seropositivity after SARS-CoV-2 Vaccination. Vaccines (Basel). 2022 Aug 20;10(8):1363. doi: 10.3390/vaccines10081363. PMID: 36016250; PMCID: PMC9416221.
6. Smith T, Holm RH, Keith RJ, Amraotkar AR, Alvarado CR, Banecki K, Choi B, Santisteban IC, Bushau-Sprinkle AM, Kitterman KT, Fuqua J, Hamorsky KT, **Palmer KE**, Brick JM, Rempala GA, Bhatnagar A (2022). Quantifying the relationship between sub-population wastewater samples and community-wide SARS-CoV-2 seroprevalence. Sci Total Environ. 2022 Dec 20;853:158567. doi: 10.1016/j.scitotenv.2022.158567. Epub 2022 Sep 6. PMID: 36084773; PMCID: PMC9444845.
7. Nabeta HW, Lasnik AB, Fuqua JL, Wang L, Rohan LC, **Palmer KE** (2022). Antiviral lectin QGriffithsin suppresses fungal infection in murine models of vaginal candidiasis. Front Cell Infect Microbiol. 2022 Oct 18;12:976033. doi: 10.3389/fcimb.2022.976033. PMID: 36329822; PMCID: PMC9623022.
8. Nabeta HW, Zahin M, Fuqua JL, Cash ED, Leth I, Strauss M, Novak J, Wang L, Siegwald A, Sheppard R, Rai SN, Rohan LC, Hillier S, Dryden GW, Potts KL, **Palmer KE** (2022). A Phase 1a/1b Clinical Trial Design to Assess Safety, Acceptability, Pharmacokinetics and Tolerability of Intranasal Q-Griffithsin for COVID-19 Prophylaxis. Univ Louisville J Respir Infect. 2022 Nov 17;6(1):a22. doi: 10.55504/2473-2869.1250.

Siskind, Leah

1. Sun R, Gu X, Lei C, Chen L, Chu S, Xu G, Doll MA, Tan Y, Feng W, **Siskind LJ,** McClain CJ, and Deng Z. (2022) Neutral Ceramidase-dependent Regulation of Mcrophage Metabolism Directs Intestinal Immune Homeostasis and Controls Enteric Infection. Cell Reports. 38(13): 110560. doi: 10.1016/j.celrep.2022.110560. PMID: 35354041.
2. Hukriede NA, Soranno DE, Sander V, Perreau T, Starr MC, Yuen PST, **Siskind LJ**, Hutchens MP, Davidson AJ, Burmeister DM, Faubel S, de Caestecker MP. (2022) Experimental models of acute kidney injury for translational research. Nature

Reviews Nephrology. 18(5):277-293. doi: 10.1038/s41581-022-00539-2 PMID: 35173348.

3. Sears SM, Vega AA, Kurlawala Z, Oropilla G, Krueger A, Shah PP, Doll MA, Miller R, Beverly LJ, and **Siskind LJ** (2022) F4/80hi Resident Macrophages Contribute to CisplatinInduced Renal Fibrosis. Kidney360. 3(5):818-833. DOI: 10.34067/KID.0006442021 PMID: 36128491.
4. Sears SM, Orwick A, and **Siskind LJ**. (2022) Modeling Cisplatin-Induced Kidney Injury to Increase Translational Potential. Nephron Jul 6;:1-4. doi: 10.1159/000525491. [Epub ahead of print] PMID: 35793615.
5. Sears SM, Feng JL, Orwick A, Vega AA, Krueger AM, Shah PP, Doll MA, Beverly LJ, **Siskind LJ**. (2022) Pharmacological inhibitors of autophagy have opposite effects in acute and chronic cisplatin-induced kidney injury. Am J Physiol Renal Physiol. 323(3):F288-F298. doi: 10.1152/ajprenal.00097.2022. PMID: 35796459.
6. Sears SM, Dupre TV, Shah PP, Davis DL, Doll MA, Sharp CN, Vega AA, Megyesi J, Beverly LJ, Snider AJ, Obeid LM, Hannun YA, and **Siskind LJ**. (2022) Neutral Ceramidase deficiency protects against cisplatin-induced acute kidney injury. Journal of Lipid Research. 63(3):100179. doi: 10.1016/j.jlr.2022.100179. Epub 2022 Feb 10. PMID: 35151662.
7. Shah PP, Saurabh K, Kurlawala Z, Vega AA, **Siskind LJ**, Beverly LJ. (2022) Towards a molecular understanding of the overlapping and distinct roles of UBQLN1 and UBQLN2 in lung cancer progression and metastasis. Neoplasia. 25:1-8. doi: 10.1016/j.neo.2021.11.010. PMID: 35063704.

Song, Zhao-Hui

1. The Effects of Cannabidiol on Aqueous Humor Outflow and Trabecular Meshwork Cell Signaling Aebersold AS, **Song ZH*** Cells. 2022 Sep 27;11(19):3006. doi: 10.3390/cells11193006.
2. Opposing roles of ZEB1 in the cytoplasm and nucleus control cytoskeletal assembly and YAP1 activity Guo Y, Lu X, Chen Y, Clark G, Trent J, Cuatrecasas M, Emery D, **Song ZH**, Chariker J, Rouchka E, Postigo A, Liu Y, Dean DC. Cell Rep. 2022 Oct 4;41(1):111452. doi: 10.1016/j.celrep.2022.111452.

States, Christopher

1. Temporal Modulation of Differential Alternative Splicing in HaCaT Human Keratinocyte Cell Line Chronically Exposed to Arsenic for up to 28 Wk. Ferragut Cardoso AP, Banerjee M, Al-Eryani L, Sayed M, Wilkey DW, Merchant ML, Park JW, **States JC**. Environ Health Perspect. 2022 Jan;130(1):17011. doi: 10.1289/EHP9676. Epub 2022 Jan 24.PMID: 35072517 Free PMC article.
2. Delineating the Effects of Passaging and Exposure in a Longitudinal Study of Arsenic-Induced Squamous Cell Carcinoma in a HaCaT Cell Line Model. Banerjee M, Al-Eryani L, Srivastava S, Rai SN, Pan J, Kalbfleisch TS, **States JC.** Toxicol Sci. 2022 Jan 24;185(2):184-196. doi:10.1093/toxsci/kfab129.PMID: 34730829 Free PMC article.

3. Chronic arsenic exposure suppresses ATM pathway activation in human keratinocytes. Nail AN, McCaffrey LM, Banerjee M, Ferragut Cardoso AP, **States JC**. Toxicol Appl Pharmacol. 2022 Jul 1;446:116042. doi: 10.1016/j.taap.2022.116042. Epub 2022 May 2. PMID: 35513056.
4. Zinc supplementation prevents arsenic-induced dysregulation of ZRANB2 splice function. Bastick JC, Banerjee M, **States JC**. Environ Toxicol Pharmacol. 2022 Aug;94:103921. doi: 10.1016/j.etap.2022.103921. Epub 2022 Jun 25.PMID: 35764259.
5. Zinc supplementation prevents mitotic accumulation in human keratinocyte cell lines upon environmentally relevant arsenic exposure. Banerjee M, Yaddanapudi K, **States JC**. Toxicol Appl Pharmacol. 2022 Nov 1;454:116255. doi: 10.1016/j.taap.2022.116255. Epub 2022 Sep 24.PMID: 36162444.

Wise, John

1. Cheng, Z., Li, Y., Young, J.L., Cheng, N., Yang, C., Papandonatos, G.D., Kelsey, K.T., **Wise, Sr**., J.P. Kunchong, S., Zheng, T, Liu, S. and Bai, Y. Long-term association of serum selenium levels and the incidence risk of diabetes: Findings from a case-control study nested in the prospective Jinchang Cohort. Science of the Total Environment. 18: 151848, 2022. doi: 10.1016/j.scitotenv.2021.151848. Epub 2021 PMID: 34822883 PMCID: PMC8909917.
2. Speer, R.M., Meaza, I., Toyoda, J.H., Lu, Y., Xu, Q., Walter, R., Kong, M., Lu, H., Kouokam, J.C., and **Wise, Sr**., J.P. Particulate hexavalent chromium alters microRNAs in human lung cells that target key carcinogenic pathways. Toxicology and Applied Pharmacology. 438:115890, 2022 doi: 10.1016/j.taap.2022.115890.. PMID: 35101437. PMCID: PMC8938933.

Young, Jamie

1. **Young, J.L**., Xin, Y., Rajesh, M., & Cai, L. (2022). Editorial: Cardiovascular diseases related to diabetes and obesity - volume II. Frontiers in Endocrinology. 13, 1044326. PMID: 36277685. PMCID: PMC9583653. DOI: 10.3389/fendo.2022.1044326.
2. Wise, S. S., Lu, H., Speer, R. M., Wise, J. P., Jr, **Young,** J., Toyoda, J. H., Meaza, I., Croom-Perez, T. J., Kouokam, J. C., Specht, A., Liu, K. J., Hoyle, G. W., & Wise, J. P., Sr (2022). Chromium distribution in an oropharyngeal aspiration model for hexavalent chromium in rats. Toxicology and applied pharmacology, 457, 116294. PMID: 36283442. DOI: 10.1016/j.taap.2022.116294.
3. Gripshover, T. C., Wahlang, B., Head, K. Z., **Young, J**. L., Luo, J., Mustafa, M. T., Kirpich, I. A., & Cave, M. C. (2022). Environmental pollutant, polychlorinated biphenyl 126, alters liver function in a rodent model of alcohol-associated liver disease. Alcoholism, clinical and experimental research, 10.1111/acer.14976. PMID: 36377258. DOI: 10.1111/acer.14976.

PRIMARY FACULTY ABSTRACTS

Banerjee, Mayukh

1. **Banerjee, M.,** Ferragut Cardoso A., Al-Eryani L., Kalbfleisch T. S., Srivastava S., Pan J., Rai S. N., States J. C. Longitudinal dynamic transcriptome changes in a HaCaT cell line model of arsenic-induced squamous cell carcinogenesis. (2022). Toxicol Sci. 186(S1): 130. Abstract 3248.
2. Bastick J. C., **Banerjee M.,** States J. C. Zinc Prevents Arsenic-Induced Dysregulation of ZRANB2 Splice Function. (2022). Toxicol Sci. 186(S1): 130. Abstract 3250.
3. Cardoso A., Nail A. N., **Banerjee M.,** Wise S. S., States J. C. Overexpression of miR-186 Accelerates Chromosomal Instability in Arsenic-Exposed Human Keratinocytes. (2022). Toxicol Sci. 186(S1): 132. Abstract 3260.
4. Nail A. N., McCaffrey L., Cardoso A., **Banerjee M.,** States J. C. Chronic Arsenic Exposure Reduces DNA Damage Response Activation in Human Keratinocytes. (2022). Toxicol Sci. 186(S1): 142. Abstract 3305.
5. Ghosh S., **Banerjee M.,** Bodduluri H., Jala V. R. Microbial metabolite mitigates arsenic induced oxidative stress, inflammation, and barrier dysfunction in gut epithelia. (2022). FASEB J. 36(S1): R3691.
6. Nail A. N., Montero L., Cardoso A., **Banerjee M.,** States J. C. Chronic Arsenic Exposure Reduces ATM Pathway Activation in Human Keratinocytes. 2022. 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Canada, October, 2022.
7. Reynolds C., Nail A. N., **Banerjee M.,** States J. C. Does Cadmium Reduce DNA Damage Signaling by the MRN Complex in Lung Epithelial Cells? Undergraduate Research Poster Session for R25 CEP Undergraduates. August, 2022. University of Louisville, Louisville.
8. Martinez M., Nail A. N., Cardoso A., States J. C., **Banerjee M.** Effect of Arsenic Exposure on m6A Methylation in Human Keratinocytes. Undergraduate Research Poster Session for R25 CEP Undergraduates. August, 2022. University of Louisville, Louisville.
9. Nail A. N., Montero L., Cardoso A., **Banerjee M.,** States J. C. Chronic Arsenic Exposure Reduces ATM Pathway Activation in Human Keratinocytes. 2022. Research!Louisville. September, 2022. University of Louisville, Louisville.
10. Reynolds C., Nail A. N. **Banerjee M.,** States J. C. Does Cadmium Reduce DNA Damage Signaling by the MRN Complex in Lung Epithelial Cells? Research!Louisville. September, 2022. University of Louisville, Louisville.
11. Martinez M., Nail A. N. Cardoso A., States J. C., **Banerjee M.** Effect of Arsenic Exposure on m6A Methylation in Human Keratinocytes. Research!Louisville. September, 2022. University of Louisville, Louisville.
12. Augenstein I., **Banerjee M.,** Cardoso A., Nail A. N., States J. C. Chronic Arsenic Exposure Inhibits Both Autophagy and Proteasomal Protein Degradation in Human Keratinocytes. Research!Louisville. September, 2022. University of Louisville, Louisville.
13. Nail A. N., Montero L., Cardoso A., **Banerjee M.,** States J. C. Chronic Arsenic Exposure Reduces ATM Pathway Activation in Human Keratinocytes. 2022. Ohio Valley Chapter Society of Toxicology, Louisville, KY, October, 2022.

Chen, Shao-Yu

1. Yuan F, Lu L, Liu J, **Chen S-Y**. Ethanol exposure impaired the migration of human neural crest cells by reducing the activity of the putative enhancers of TFAP2A. Alcohol Clin ExpRes 46: S1, 143A, 2022.
2. Lu L, Yuan F, Liu J, **Chen S-Y**. Ethanol disrupted the formation of radial glial processes and impaired the generation and migration of outer radial glia cells in forebrain organoids. Alcohol Clin Exp Res 46: S1, 143A, 2022.
3. Lu L, Yuan F, Liu J, **Chen S-Y**. Exposure of human forebrain organoids to ethanol disrupted the formation of radial glial processes and impaired the generation, migration, and transformation of outer radial glia cells. Birth Defects Research 114: 397, 2022. (P15).
4. Yuan F, Lu L, Liu J, **Chen S-Y**. Reduction in the activity of the putative enhancers ofTFAP2A contributes to ethanol-induced impairment of the migration of human neural crest cells. Birth Defects Research 114: 418, 2022. (P56).

Clark, Geoffrey

1. Jigo, von Baby, Ferrill, Trent and **Clark**: RAS Inhibition of Luminal B Breast Cancer as a Novel Therapeutic Approach keystone Phenotypic Drug Discovery conference, Denver Co, May 22, 2022.
2. Donninger, Ferrill, von Baby, Burlison, Trent and **Clark**: A novel pan-RAS inhibitor for Malignant Peripheral Nerve Sheath Tumors, NCI Ras symposium Frederick MD, October 17th -20th, 2022.
3. Donninger, Ferrill, von Baby, Arshad, Burlison, Trent and **Clark**: A novel RAS inhibitor for Pancreatic cancer. NCI Ras symposium Frederick MD, October 17th - 20th, 2022.
4. Donninger, Ferrill, von Baby, Burlison, Trent and **Clark**: RALGDS inhibitors for pancreatic cancer. Keystone Phenotypic Drug Discovery conference, Denver Co, May 22, 2022.
5. Howard Donninger* PhD, Tariq Arshad, Joe Burlison* PhD, John O. Trent* PhD, **Geoffrey J Clark** PhD. A novel RAS inhibitor for pancreatic cancer. ASCO, Sept 7, 2022.
6. A novel pan-RAS inhibitor for Malignant Peripheral Nerve Sheath Tumors Howard Donninger* PhD, Joe Burlison* PhD, Tariq Arshad, Mike Sabo* John O. Trent* PhD, **Geoffrey J Clark** PhD. ASCO, Sept 7, 2022.'

Feng, Wenke

1. Fengyuan Li, Jiyeon Lee, Craig McClain, Wenke **Feng**. Probiotics, Bacterial Intestinal AhR Activation and Gut Barrier Function in Liver Disease. EB2022, Philadelphia, PA, April 2022
2. L He, V Vatsalya, X Yin, R Xu, X Ma, S Kim, **W Feng**, CJ McClain, X Zhang. MODIFIED NUCLEOSIDES AND BASES DETECTED IN HUMAN URINE AND SERUM SERVE AS DIAGNOSTIC MARKERS FOR THE SEVERITY OF

ALCOHOL-ASSOCIATED LIVER DISEASE. ALCOHOLISM-CLINICAL AND EXPERIMENTAL RESEARCH 46, 181A-182A

3. V Vatsalya, **W Feng**, M Mitchell, G Szabo, A McCullough, S Dasarathy, S Radaeva, B Barton, CJ McClain, A THE BENEFICIAL EFFECTS OF LACTOBACILLUS GG THERAPY ON THE GUT-LIVER AXIS AND DRINKING BEHAVIOR IN MICE AND PATIENTS WITH ALD. ALCOHOLISM-CLINICAL AND EXPERIMENTAL RESEARCH 46, 19A-1A
4. M Sunkara, M Jiang, F Li, J Lee, L Zhang, CJ McClain, **W Feng**. TAURINE SUPPLEMENTATION ATTENUATES ALCOHOL-ASSOCIATED LIVER DISEASE THROUGH SUPPRESSION OF miRNA194 BY Tug1 WITH SUBSEQUENT STIMULATION OF FXR-FGF15 SIGNALING IN MICE. HEPATOLOGY 76, S987-S988
5. F Li, J Lee, L Zhang, V Vatsalya, CJ McClain, **W Feng**. ORALLY ADMINISTERED FECAL EXTRACELLULAR VESICLES FROM ALCOHOL-ASSOCIATED HEPATITIS PATIENTS EXACERBATED ALCOHOL-INDUCED LIVER STEATOSIS IN MICE. HEPATOLOGY 76, S175-S176
6. J Chen, F Li, M Jiang, L Zhang, CJ McClain, **W Feng**. CRAMP DEFICIENCY ATTENUATED LIVER INJURY FROM HIGH FAT DIET PLUS ALCOHOL THROUGH REGULATION OF FGF21/ADIPONECTIN SIGNALING AND GUT MICROBIOTA IN MICE. HEPATOLOGY 76, S986-S986
7. M Sagaram, J Frimodig, F Li, H Hu, **W Feng**, M Kong, V Vatsalya. ONE-MONTH ASSESSMENT OF TH-17 CELL AXIS ASSOCIATED CYTOKINES, IL-17, AND IL-22 AND THEIR ROLE IN ALCOHOL-ASSOCIATED LIVER DISEASE. HEPATOLOGY 76, S973-S9735.
8. Manasa Sunkara, Mengwei Jiang, Fengyuan Li, Jiyeon Lee, Lihua Zhang, Craig McClain, Wenke **Feng**. Taurine Supplementation Attenuates Alcohol-Associate Liver Disease through Enhancement of Intestinal FXR-FGF15 Signaling in Mice. Research!Louisville, Oct 2022

Gupta, Ramesh

1. Aqil, F., Kandimalla, R., Jeyabalan, J. Moholkar, D., Spencer, W. and **Gupta RC.** Biodistribution of colostrum exosomes and tumor targeting of exosomal-paclitaxel formulation against lung cancer. Annual Conference of International Society of Extrasellar Vesicles, 2022, Lyon, France.
2. **Gupta RC**., Wallen, M., Kandimalla, R., Jeyabalan, J., Moholkar, D., Munagala, R., Spencer, W., and Aqil., F. Colostrum exosome-based delivery of siRNAs and inhibition of lung cancer. Annual Conference of International Society of Extrasellar Vesicles, 2022, Lyon, France.
3. Kandimalla, R., Moholkar, D., Jeyabalan, J., Spencer, W., **Gupta RC**. and Aqil, F. Exosomal-paclitaxel formulation, alone and in combination with cisplatin, enhances drug's efficacy against lung cancer. Annual Meeting of Am Assoc Cancer Res. 2022, New Orleans.

4. Moholkar, D., Kandimalla, R., Aqil, F. and **Gupta RC**. Biodistribution and tumor targeting of exosomes using mouse models. Annual Meeting of Am Assoc Cancer Res. 2022, New Orleans.
5. Aqil, F., Kandimalla, R., Tyagi, N., Saeed, M., and **Gupta, RC**. Celastrol targets multiple pathways and suppress cell invasion in lung cancer growth and metastasis. Annual Meeting of Am Assoc Cancer Res. 2022, New Orleans. Abstract # 22-A-3480-AACR.
6. Kandimalla, R., Aqil, F. Moholkar, D., Samantha, S.K., and **Gupta RC**. Mahanine, a carbazole alkaloid attenuates lung cancer progression. Annual Meeting of Am Assoc Cancer Res. 2022, New Orleans.
7. Aqil, F., Kandimalla, R., Saxena, D., Wallen, M., Moholkar, D., Jeyabalan, J., Spencer, W., Gabbard, JD., Palmer, KE., **Gupta, RC**. Plant polyphenolics as potential antiviral candidates against SARS-CoV-2. Annual Conference of International Society of Extrasellar Vesicles, 2022, Lyon, France.
8. Aqil, F., Tyagi, N., Kandimalla, R., Saeed, M., Almatroudi, A., **Gupta, RC**. Exosomal delivery of celastrol for lung cancer management. Annual Conference of International Society of Extrasellar Vesicles, 2022, Lyon, France.
9. Aqil, F., Wallen, M., Jeyabalan, J., Kandimalla, R., Moholkar, D., Spencer, W., **Gupta, R**. Extracellular vesicle-based nano 'platform' technology for RNA and DNA delivery. ISEVxTECH - EV Technology & Methods Summit. Nov 15-18, 2022, Hawaii, USA.
10. **Gupta, R**., Jeyabalan, J., Wallen, M., Kandimalla, R., Moholkar, D., Spencer, W., Aqil, F. Isolation of small extracellular vesicles from bovine colostrum powder using a combination of techniques. ISEVxTECH - EV Technology & Methods Summit. Nov 15-18, 2022, Hawaii, USA.

Hein, David

1. Habil, M.R., Doll, M.A., and **Hein, D.W**.: The impact of N-acetyltransferase 2 (NAT2) haplotype on beta-naphthylamine metabolism and its associated mutagenesis. Proceedings of the annual meeting of the Society of Toxicology, Abstract 3153, San Diego, California, March 2022.
2. Walls, K.M., **Hein, D.W.** and Hong, K.U.: Heterocyclic amines induce changes in glucose production and insulin signaling in human hepatocytes. Proceedings of the annual meeting of the Society of Toxicology, Abstract 3414, San Diego, California, March 2022.
3. Salazar-González, R.A., Doll, M.A. and **Hein, D.W**.: Metabolism and genotoxicity of new psychoactive substances (NPS) and 4,4'-oxydianiline (ODA) is modified by N-acetyltransferase 2 genetic polymorphism. Proceedings of the annual meeting of the Society of Toxicology, Abstract 3617, San Diego, California, March 2022.
4. Wise, J.T.F., Salazar-González, R.A., Doll, M.A. and **Hein, D.W**.: Incubation with hexavalent chromium increases the N-acetylation and genotoxicity of aromatic amine carcinogens 4-aminobiphenyl and β-naphthylamine in human lung cells. Proceedings

of the annual meeting of the Society of Toxicology, Abstract 3733, San Diego, California, March 2022.

5. Habil, M.R., Doll, M.A., and **Hein, D.W**.: The impact of N-acetyltransferase 2 (NAT2) haplotype on beta-naphthylamine metabolism and its associated mutagenesis. Graduate Research Conference, University of Louisville, Louisville, Kentucky March 2022.
6. Tagnedji, A.H., Hong, K.U., and **Hein, D.W**.: The effects of N-acetyltransferase 1 gene knockout on the cytotoxicity of pyrimidine biosynthesis inhibitors in human breast cancer cells. Kentucky Honors Roundtable Conference, Murray, Kentucky March 2022.
7. Tagnedji, A.H., Hong, K.U., and **Hein, D.W**.: The effects of N-acetyltransferase 1 gene knockout on the cytotoxicity of pyrimidine biosynthesis inhibitors in human breast cancer cells. Southern Regional Honors Council, Birmingham, Alabama March-April 2022.
8. Tagnedji, A.H., Hong, K.U., and **Hein, D.W**.: The effects of N-acetyltransferase 1 gene knockout on the cytotoxicity of pyrimidine biosynthesis inhibitors in human breast cancer cells. 16th Annual ACC Meeting of the Minds, University of Virginia, Charlottesville Virginia April 2022.
9. Salazar-González, R.A. and **Hein, D.W**.: Influence of N-acetyltransferase polymorphism in the N-acetylation of asparagine and putrescine. Proceedings of Experimental Biology 2022 annual meeting, Abstract R4723, Philadephia, Pennsylvania published in FASEB Journal 36: Suppl 1. https://doi.org/10.1096/fasebj.2022.36.S1.R4723, 2022.
10. Tagnedji, A.H., Hong, K.U., and **Hein, D.W**.: The effects of N-acetyltransferase 1 gene knockout on the cytotoxicity of pyrimidine biosynthesis inhibitors in human breast cancer cells. Proceedings of annual meetings of the American Association for Cancer Research, Abstract 4037, New Orleans, Louisiana, April 2022. Cancer Research 82 (12_Suppl): Abstract 4037, 2022. https://doi.org/10.1158/1538-7445.AM2022-4037
11. **Hein, D.W**.: Acetylation pharmacogenomics: Paradigm for informed individual risk assessment following environmental carcinogen exposure. Presented at the Association for Clinical Scientists Annual Meeting, published in Annals of Clinical and Laboratory Science 52: no. 3, abstract 2, 2022. (PubMed)
12. Habil, M.R., Salazar-González, R. Doll, M.A., and **Hein, D.W**.: Beta-naphthylamine (BNA) induced genotoxicity in Chinese hamster ovary cells expressing different human NAT2 alleles. Annual meeting of the Genetic Toxicology Association, May 2022.
13. Wise, J.T.F., Salazar-González, R.A., Walls, K. M., Habil, M.R., Doll, M.A. and **Hein, D.W**.: Immortalized human bronchial fibroblasts exhibit N-acetyltransferase 1 and 2 activities. Ohio Valley Society of Toxicology Virtual Trainee Summer Meeting, July 2022.
14. Walls, K.M., Hong, K.U., Salazar-González, R.A. and **Hein, D.W**.: Transcriptional regulation of human arylamine N-acetyltransferase 2 gene by glucose and insulin in

liver cancer cell lines. Ohio Valley Society of Toxicology Virtual Trainee Summer Meeting, July 2022.

15. Habil, M.R., Doll, M.A. and **Hein, D.W**.: 3,4- Dimethylaniline genotoxicity in Chinese hamster ovary (CHO) cells expressing human N-acetyltransferase 1. Ohio Valley Society of Toxicology Virtual Trainee Summer Meeting, July 2022.
16. Tagnedji, A.H., Hong, K.U., Doll, M.A. and **Hein, D.W**.: Upregulation of cytidine deaminase in NAT1 knockout breast cancer cells. Undergraduate Research Showcase, University of Louisville, Louisville, Kentucky July 2022.
17. Habil, M.R., Salazar-González, R. Doll, M.A., and **Hein, D.W**.: Effect of human N-acetyltransferase 1 allelic variants on metabolism, mutagenicity, DNA damage and oxidative stress induced by 3,4-dimethylaniline in Chinese hamster ovary cells. Proceedings of Research!Louisville, Abstract GRD-11, Louisville, Kentucky September 2022.
18. Walls, K.M., Hong, K.U., and **Hein, D.W**.: Hepatic metabolism of heterocyclic amines contributes to induction of glucose production and glucogenic gene expression in hepatocytes. Proceedings of Research!Louisville, Abstract GRD-31, Louisville, Kentucky September 2022.
19. Wise, J.T.F., Salazar-González, R.A., Doll, M.A. and **Hein, D.W**.: Effect of the N-acetyltransferase 2 genetic polymorphism on metabolism and genotoxicity of 4,4'-oxydianiline (ODA). Proceedings of Research!Louisville, Abstract PRF-10, Louisville, Kentucky September 2022.
20. Hong, K.U., Walls, K.M. and **Hein, D.W**.: Transcriptional regulation of human arylamine N-acetyltransferase 2 gene by glucose and insulin in liver cancer cell lines. Proceedings of Research!Louisville, Abstract F-10, Louisville, Kentucky September 2022.
21. Kidd, L.R. and **Hein, D.W**.: R25 cancer education experience influences interest in basic, clinical, and population-based research. Proceedings of Research!Louisville, Abstract F-11, Louisville, Kentucky September 2022.
22. Kidd, L.R. and **Hein, D.W**.: R25 cancer education experience influences interest in clinical or translational cancer research using social mentoring. Proceedings of the 2022 International Cancer Education Conference, Abstract 4C-3, College Park, Maryland, October 2022.
23. Tagnedji, A.H., Hong, K.U., Doll, M.A. and **Hein, D.W**.: Upregulation of cytidine deaminase in NAT1 knockout breast cancer cells. Annual Meeting of the Ohio Valley Society of Toxicology, Abstract #UG5, University of Louisville, Louisville, Kentucky October 2022.
24. Habil, M.R., Salazar-González, R.A., Doll, M.A., Wise, J.T.F., Walls, K.M., Hong K.U. and **Hein, D.W**.: Double-edged sword nature of N-acetyltransferase polymorphisms. Annual Meeting of the Ohio Valley Society of Toxicology, Abstract #PHD9, University of Louisville, Louisville, Kentucky October 2022.
25. Walls, K.M., Hong, K.U., and **Hein, D.W**.: Hepatic metabolism of heterocyclic amines contributes to induction of glucose production and glucogenic gene

expression in hepatocytes. Annual Meeting of the Ohio Valley Society of Toxicology, Abstract #PHD18, University of Louisville, Louisville, Kentucky October 2022.

26. Wise, J.T.F., Salazar-González, R.A., Doll, M.A. and **Hein, D.W**.: Effect of the N-acetyltransferase 2 genetic polymorphism on metabolism and genotoxicity of 4,4'-oxydianiline (ODA). Annual Meeting of the Ohio Valley Society of Toxicology, Abstract #PD5, University of Louisville, Louisville, Kentucky October 2022.
27. Tagnedji, A.H., Hong, K.U., and **Hein, D.W**.: The effects of N-acetyltransferase 1 gene knockout on the cytotoxicity of pyrimidine biosynthesis inhibitors in human breast cancer cells. National Collegiate Honors Council Conference, Dallas, Texas November 2022.
28. Walls, K.M., Hong, K.U., and **Hein, D.W**.: Hepatic metabolism of heterocyclic amines contributes to induction of glucose production and glucogenic gene expression in hepatocytes. Annual Meeting of the Superfund Research Program, Raleigh, North Carolina December 2022.

Hong, Kyung

1. "Heterocyclic Amines Induce Changes in Glucose Production and Insulin Signaling in Human Hepatocytes" Kennedy M. Walls, M.S., **Kyung U. Hong**, Ph.D., David W. Hein, Ph.D. Society of Toxicology (SOT) annual meeting – March 27-31, 2022; San Diego, CA.
2. "Transcriptional Regulation of Human Arylamine N-Acetyltransferase 2 Gene by Glucose and Insulin in Liver Cancer Cell Lines." Kennedy M. Walls, **Kyung U. Hong**, Raúl A. Salazar-González, and David W. Hein. Ohio Valley OVSOT summer student meeting – July 29, 2022; virtual.
3. "Hepatic metabolism of heterocyclic amines contributes to induction of glucose production and gluconeogenic gene expression in hepatocytes" Kennedy M. Walls, M.S., **Kyung U. Hong**, Ph.D., David W. Hein, Ph.D. Research! Louisville – September 19 -23, 2022; Louisville, KY.
4. "Transcriptional Regulation of Human Arylamine N-Acetyltransferase 2 Gene by Glucose and Insulin in Liver Cancer Cell Lines." **Kyung U. Hong**, Kennedy M. Walls, David W. Hein. Research Louisville 2022.
5. "Hepatic metabolism of heterocyclic amines contributes to induction of glucose production and gluconeogenic gene expression in hepatocytes" Kennedy M. Walls, M.S., **Kyung U. Hong**, Ph.D., David W. Hein, Ph.D. Ohio Valley OVSOT annual fall meeting – October 14, 2022; Louisville, KY.
6. "Hepatic metabolism of heterocyclic amines contributes to induction of glucose production and gluconeogenic gene expression in hepatocytes" Kennedy M. Walls, M.S., **Kyung U. Hong**, Ph.D., David W. Hein, Ph.D. Superfund Research Program (SRP) Annual Meeting. Raleigh, NC. Dec, 2022.
7. "The Effects of N-acetyltransferase 1 Gene Knockout on the Cytotoxicity of Pyrimidine Biosynthesis Inhibitors in Human Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D, and David W. Hein, Ph.D. American Association for Cancer Research 2022 Meeting, New Orleans Louisiana. April, 2022.

8. "Upregulation of Cytidine Deaminase in NAT1 Knockout Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. University of Louisville STEM admission Trips, Owensboro Kentucky. Sep 30, 2022.
9. "Upregulation of Cytidine Deaminase in NAT1 Knockout Breast Cancer Cells. Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. 9/23/2022 September University of Louisville Board of Trustees Meeting. Sep 23, 2022.
10. "Upregulation of Cytidine Deaminase in NAT1 Knockout Breast Cancer Cells" Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. Kentucky Science Center Youth Summit Louisville, Kentucky. Nov 10, 2022.
11. "Upregulation of Cytidine Deaminase in NAT1 Knockout Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. RESEARCH! Louisville Undergraduate Student Poster Session, Louisville, Kentucky. Aug 5, 2022.
12. "The Effects of N-acetyltransferase 1 Gene Knockout on the Cytotoxicity of Pyrimidine Biosynthesis Inhibitors in Human Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. 4/1-3/ 2022 ACC Meeting of Minds University of North Carolina, North Carolina.
13. "Upregulation of Cytidine Deaminase in NAT1 Knockout Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. Society of Toxicology Ohio Valley Region Presentation, University of Louisville Kentucky. Oct. 14, 2022.
14. "The Effects of N-acetyltransferase 1 Gene Knockout on the Cytotoxicity of Pyrimidine Biosynthesis Inhibitors in Human Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. National Collegiate Honors Council Conference. Dallas, Texas. Nov. 2-6, 2022.
15. "The Effects of N-acetyltransferase 1 Gene Knockout on the Cytotoxicity of Pyrimidine Biosynthesis Inhibitors in Human Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. Southern Regional Honors Conference Birmingham Alabama. March 20, 2022.
16. "The Effects of N-acetyltransferase 1 Gene Knockout on the Cytotoxicity of Pyrimidine Biosynthesis Inhibitors in Human Breast Cancer Cells." Afi H. Tagnedji, **Kyung U. Hong**, Ph. D., Mark Doll, and David W. Hein, Ph.D. Kentucky Honors Roundtable Conference, Murray Kentucky. March 4, 2022.

Kidd, LaCreis

1. Overton, K., Rai, S., **Kidd, L.R**. Environmental, Social and Genetic Variables that Influence the Progression of Lupus, Research!Louisville, Louisville, Kentucky, October 2022.
2. Wichman, E., **Kidd, L.R**. The Impact of Circadian Rhythm Susceptibility Genetic Variants on Prostate Cancer Outcomes, Undergraduate SSRP/R25 Research Poster Symposium, Louisville, Kentucky, August 5, 2022 (Received 2nd round of judging for oral poster presentation).

3. Wichman, E., **Kidd, L.R**. The Impact of Circadian Rhythm Susceptibility Genetic Variants on Prostate Cancer Outcomes, Research Louisville, Louisville, Kentucky, Ocotober 2022 (won 2nd place for the NCI Cancer Education Program Norbert J. Burzynski Award Undergraduate Student Category).
4. **Kidd, L.R.,** Hein, D.W. R25 Cancer Education Experience Influences Interest in Cancer Research among College and Medical Students, Research!Louisville, Louisville, Kentucky, October 2022.
5. **Kidd, L.R**., Hein, D.W. R25 cancer Education Experience Influences Interest in Cancer Research using Faculty & Near-peer Mentoring, International Cancer Education Conference, College Park, MD, September 2022.

Kouokam, Calvin

1. **Kouokam, J.C**., Speer, R.M., Meaza, I., Toyoda, J.H., Lu, H., Kong, M. and Wise, Sr., J.P. Analysis of the effects of particulate hexavalent chromium on global gene expression in human fibroblasts reveal the involvement of inflammation. Society of Toxicology (SOT) 2022.
2. Duncan, A., Oyeleye, S., Wise, Sr., J.P. and **Kouokam, J.C**. Betanin, a Beetroot derived Food Colorant, Decreases Cr(VI)-induced Toxicity in Human Lung Fibroblasts by Relieving Oxidative Stress. Research!Louisville, September 2022.
3. Oyeleye, S., Duncan, A., Lechner J., Wise, Sr., J.P. and **Kouokam, J.C.** Could E162 Prevent Hexavalent Chromium-induced Cancer? A Study of Human Lung Fibroblasts. Research!Louisville, September 2022.
4. Hamilton, M., Patel, R., Lechner J., Wise, Sr., J.P. and **Kouokam, J.C.** Betanin, a Beetroot-derived Food Colorant, Decreases Cr(VI)-induced Toxicity in Human Lung Epithelial Cells. KY Academy of Sciences, Morehead State University, November 2022.
5. Wise, Jr., J.P., Vielee, S., Isibor, J., Williams, A.R., Meaza, I.I., Toyoda, J.H., Wise, S.S., **Kouokam, J.C**., Young, J.L., Wise, Sr., J.P., Cai, J. and Cai L. A Toxic Aging Coin: Case for Cr(VI) Neurotoxicity and Gerontogenicity. Metals Conference Montreal, August 2022.
6. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., **Kouokam, J.C**., Young J.L., Cai, L., Kondo, K., Wise, Sr., J.P. Particulate hexavalent chromium inhibits homologous recombination repair in rat lung. Annual Meeting of the Society of Toxicology (SOT), March 2022.
7. Toyoda, J.H., Speer, R.M., Meaza, I., Lu, H., **Kouokam, J.C**., Williams, A.R., and Wise, Sr., J.P. Hexavalent Chromium Induces Numerical Chromosome Instability Via Securin Disruption in Human Cells but Not in Whale Cells. Society of Toxicology Annual Meeting, March 2022.
8. Williams, A.R., Meaza, I., Toyoda, J., Speer, R.M., Browning, C.L., **Kouokam, J.C**., Wise, S.S. and Wise Sr. J.P. Particulate Hexavalent Chromium Exposure Suppresses BCDX2 Complex Response in Human lung Cells. SOT. March 27-31, 2022.
9. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J.H., Wise, S. S., **Kouokam, J.C**., and Wise, Sr. J.P. Hexavalent Chromium Inhibits RAD51 Function through Impaired RAD51D. 3MT flash talk. OVSOT Summer 2022.

10. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J.H., Wise, S. S., **Kouokam, J.C**., and Wise, Sr. J.P. Particulate Hexavalent Chromium Exposure Inhibits RAD51 Paralog Complex (BCDX2) Response in Human Lung Cells. Environmental Mutagenesis & Genomics Society (EMGS) 2022.
11. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J.H., Wise, S. S., **Kouokam, J.C**., and Wise, Sr. J.P. Particulate Hexavalent Chromium Exposure Induces RAD51D Loss Leading to Impaired function with each successive generation in Human Lung Cells. OVSOT October 2022.
12. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J.H., Wise, S. S., **Kouokam, J.C**., and Wise, Sr. J.P. Particulate Hexavalent Chromium Exposure Inhibits RAD51 Paralog Complex (BCDX2) Response in Human Lung Cells. Research!Louisville 2022.
13. Meaza I., Toyoda H. J., **Kouokam J.C**., Cahill C.C. and Wise J.P. Sr., Cohesin Malfunction, a New Mechanism for Hexavalent Chromium-Induced Carcinogenesis. Annual Society of Environment Toxicology and Chemistry meeting, Pittsbugh, November 2022.
14. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., **Kouokam, J.C**., and Wise, Sr., J.P. Missing Protein! Have You Seen it? Reward: to Cure Cancer. 3 Minute Thesis for the annual meeting of the Society of Toxicology (SOT), March 2022.
15. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., **Kouokam, J.C**., and Wise, Sr., J.P. Particulate Hexavalent Chromium Causes DNA Double Strand Breaks and RAD51 Inhibition. Leading to Increased Chromosome Instability in Human Bronchial Epithelial Cells. Genetic Toxicology Association, Virtual Meeting, May 2022.
16. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., **Kouokam, J.C**., and Wise, Sr., J.P. Prolonged Chromate Exposure Causes Inhibition of RAD51 Response and Increases Chromosome Instability in Human Bronchial Epithelial Cells. Presented at the International Conference of Trace Elements and Minerals, Aachen, June 2022.
17. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., **Kouokam, J.C**., and Wise, Sr., J.P. Prolonged Chromate Exposure Causes Inhibition of RAD51 Response and Increases Chromosome Instability in Human Bronchial Epithelial Cells. Presented at the Annual Graduate Student Regional Research Conference, Louisville, Kentucky, March 2022.
18. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., **Kouokam, J.C**., Young J.L., Cai, L., Kondo, K., Wise, Sr., J.P. Subchronic Particulate Hexavalent Chromium Exposure Inhibits Homologous Recombination Repair in Rat Lung. Presented at the 15th Annual Graduate Student Regional Research conference (GSC), March 2022.
19. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., **Kouokam, J.C**., Young, J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T., Wise, Sr., J.P. Environmental Carcinogenesis in the Gulf Coast and Southern States: Translating the Genotoxic and DNA Repair Impacts of Particulate Hexavalent Chromium from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at the 2nd Southern Genome Maintenance Conference, Florida, June 2022.
20. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., **Kouokam, J.C**., Young, J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T., Wise, Sr., J.P. The Carcinogenic Mechanism for Particulate

Hexavalent Chromium (Cr[VI]) Translates from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.

21. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., **Kouokam, J.C**., Young, J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T., Wise, Sr., J.P. Translating Particulate Hexavalent Chromium-Induced Genotoxic and DNA Repair Impacts from Human Lung Cells to In Vivo Lung Tissue. Presented at the annual meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), October 2022.
22. Toyoda, J.H., Speer, R.M., Meaza, I., Lu, H., **Kouokam, J.C**., Williams, A.R., and Wise, Sr., J.P. Hexavalent Chromium Induces Numerical Chromosome Instability Via Securin Disruption in Human Cells but Not in Whale Cells. Toxicological Sciences, 186: 3174, 2022.
23. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., **Kouokam, J.C**., Young J.L., Cai, L., Kondo, K., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits Homologous Recombination Repair in Rat Lung Tissue. Toxicological Sciences, 186: 3732, 2022.
24. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., **Kouokam, J.C**., and Wise, Sr., J.P. Prolonged Exposure to Particulate Hexavalent Chromium Induces Inhibition of RAD51 and Increased Chromosome Instability in Human Bronchial Epithelial Cells. Environmental and Molecular Mutagenesis Volume 63, Issue S1, p.47, 2022.
25. Toyoda, J.H., Speer, R.M., Meaza, I., Lu, H., **Kouokam, J.C**., Williams, A.R., Wise, Sr., J.P. Hexavalent Chromium Targets Securin and Causes Numerical Chromosome Instability in Human Cells but Not in Whale Cells. Environmental and Molecular Mutagenesis, 63 (S1): 143, 2022.

Matoba Nobuyuki

1. Cecil W*, **Matoba N**. Biochemical Characterization of Epicertin Variants for Investigation of Wound Healing Mechanisms. Research!Louisville, October 26, 2022, Louisville, KY.
2. Mayer K*, Verjan-Garcia N & **Matoba N**. Characterization of a High-Mannose-Binding Lectibody as a Novel Anti-Ovarian Cancer Therapeutic. Research!Louisville, October 25, 2022, Louisville, KY.
3. Collins K*, Santisteban Celis I, Mayer K, **Matoba N**. The Purification and Development of a Lectikine Targeting Tumor-associated High-Mannose Glycans. Research!Louisville, October 25, 2022, Louisville, KY.
4. **Matoba N***, "Manufacturing, characterization, and mode of action of the novel mucosal healing protein EPICERTIN" The International Society for Plant Molecular Farming (ISPMF) online workshop, Mar 8, 2022, online.
5. **Matoba N***, "Molecular farming of biopharmaceuticals" The 22nd Annual Meeting of the Japan Society of Molecular Neurosurgery, Kanazawa, Ishikawa, Japan, July 23, 2022. Invited talk.

Palmer, Kenneth

1. **Palmer KE** (2022) Abraham J. Gitlitz Memorial Lecture: Development of a Broad Spectrum Antiviral-based Intranasal Spray as a Pandemic Preparedness Strategy. Abstracts of Presentations at the Association of Clinical Scientists 143rd Meeting Louisville, KY May 11-14,2022. Ann Clin Lab Sci. 2022 May;52(3):511-525. PMID: 35777803.

Siskind, Leah

1. Sears SM, Vega AA, Doll MA, Shah PP, Beverly LJ, **Siskind LJ**. (June 2022). F480hi resident macrophages contribute to cisplatin-induced kidney fibrosis and M2 polarization. American Physiological Society Control of Renal Function in Health and Disease, Charlottesville, VA.
2. Sears SM, Feng JL, Orwick A, Vega AA, Krueger A, Shah PP, Doll MA, Beverly LJ, **Siskind LJ**. (May 2022). Paradoxical roles of autophagy highlight biological differences between acute and chronic cisplatin-induced kidney injury. Federation of American Societies for Experimental Biology The 2nd Acute Kidney Injury Conference: From Bench to Bedside, Banff Canada.
3. Orwick A, Sears S, Doll MN, Sharp CN, Shah P, Beverly LJ, and **Siskind LJ** (2022) Lung cancer induces kidney fibrosis and primes the kidney for cisplatin-induced nephrotoxicity. Abstract 3764214, American Society of Nephrology Conference, Orlando, FL, November 2022.

Song, Zhao-Hui (Joe)

1. Effects of n-oleyl dopamine on porcine retinal pigment epithelial cells Lucy Sloan, Shigeo Tamiya, **Song ZH**. International Cannabinoid Research Society Annual Conference, Galway, Ireland, June 2022.
2. Cannabidiol alters aberrant immune cell populations in a model of idiopathic autism spectrum disorder Sarah H. Shrader, Nicholas Mellen, Gregory Barnes, **Song ZH**. International Cannabinoid Research Society Annual Conference, Galway, Ireland, June 2022.
3. Effects of N-Oleoyl Dopamine on Fibrotic Marker Expression in Retinal Cells. Kyle Funk, Lucy Sloan, Tamiya S, **Song ZH**. Research! Louisville October 2022.
4. Cannabidiol Alters Aberrant Immune Cell Populations in a Model of Idiopathic Autism Spectrum Disorder. Sarah H. Shrader, Nicholas Mellen, Gregory Barnes, **Song ZH**. Research! Louisville October 2022.

States, Christopher

1. Nail AN, Ferragut Cardoso AP, Banerjee M. **States JC**. 'Circulating miRNAs as Biomarkers of Toxic Heavy Metal Exposure' (Chapter 4), in Sahu S (ed) Genomic and Epigenomic Biomarkers of Toxicology and Disease, Wiley, 2022.

Wise, John

1. Kouokam, J.C., Speer, R.M., Meaza, I., Toyoda, J.H., Lu, H., Kong, M. and **Wise, Sr**., J.P. Analysis of the effects of particulate hexavalent chromium on global gene expression in human fibroblasts reveal the involvement of inflammation. Toxicological Sciences, 186: 3735, 2022.
2. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., and **Wise, Sr**., J.P. Particulate Hexavalent Chromium Exposure Suppresses BCDX2 Complex Response in Human Lung Cells. Toxicological Sciences, 186: 3734, 2022.
3. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young J.L., Cai, L., Kondo, K., and **Wise, Sr**., J.P. Particulate Hexavalent Chromium Inhibits Homologous Recombination Repair in Rat Lung Tissue. Toxicological Sciences, 186: 3732, 2022.
4. Meaza I., Toyoda, J.H., Lu, H., Williams, A.R., and **Wise Sr**. J.P. Chromate Induced Loss of RAD51 and Increased Chromosome Instability in Human Bronchial Epithelial Cells. Toxicological Sciences, 186: 3135, 2022.
5. Lu, H., Wise, S.S., Toyoda, J.H., Wise Jr. J.P., Speer, R.M, Bolt, A.M., Meaza, I., Wise, C.F., Wise, J.T.F., Young, J.L., and **Wise Sr**. J.P. Of Whales and Men, How Great Whales Evade Metal Induced Cancer. Toxicological Sciences, 186: 1064, 2022.
6. Toyoda, J.H., Speer, R.M., Meaza, I., Lu, H., Kouokam, J.C., Williams, A.R., and **Wise, Sr**., J.P. Hexavalent Chromium Induces Numerical Chromosome Instability Via Securin Disruption in Human Cells but Not in Whale Cells. Toxicological Sciences, 186: 3174, 2022.
7. Wise, Jr., J.P., Young, J.L., Lu, H., Meaza, I.I., Toyoda, J., Wise, S.S., Speer, R., Croom-Perez, T., Cai, L., and **Wise, Sr**., J.P. A Toxic Aging Coin: Cr(VI) Neurotoxicity and Gerontogenicity. Toxicological Sciences, 186: 3771, 2022.
8. Wise, S.S., Toyoda, J.H., Lu, H., Meaza, I., **Wise, Sr**., J.P. Chromosome Instability and Cellular Transformation of Human Lung Cells Chronically Treated with Particulate Hexavalent Chromium. Toxicological Sciences, 186: 3261, 2022.
9. Flores, M., and **Wise, Sr**., J.P. Space Toxicology: An Emerging Environmental Health Field. Toxicological Sciences, 186: 3602, 2022.
10. **Wise, Sr**., J.P. and Wise, C.F. All for One and One for All: One Environmental Health in Toxicology. Toxicological Sciences, 186: 1060, 2022.
11. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., Kouokam, J.C., and **Wise, Sr**., J.P. Missing Protein! Have You Seen it? Reward: to Cure Cancer. Presented at the Annual Meeting of the Society of Toxicology (SOT), March 2022.
12. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., Kouokam, J.C., and **Wise, Sr**., J.P. Prolonged Chromate Exposure Causes Inhibition of RAD51 Response and Increases Chromosome Instability in Human Bronchial Epithelial Cells. Presented at the 15th Annual Graduate Student Regional Research conference (GSC), March 2022.
13. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., Wise, S.S., Kouokam, C.J., and **Wise, Sr**., J.P. Particulate Hexavalent Chromium Inhibits DNA Repair by Targeting the BCDX2 Complex in Human Lung Cells. Presented at the 15th Annual Graduate Student Regional Research conference (GSC), March 2022.
14. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young J.L., Cai, L., Kondo, K., and **Wise, Sr**., J.P.

Subchronic Particulate Hexavalent Chromium Exposure Inhibits Homologous Recombination Repair in Rat Lung. Presented at the Graduate Student Regional Research Conference, Louisville, Kentucky, March 2022.

15. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., Kouokam, J.C., and **Wise, Sr**., J.P. Particulate Hexavalent Chromium Causes DNA Double Strand Breaks and RAD51 Inhibition. Leading to Increased Chromosome Instability in Human Bronchial Epithelial Cells. Presented at the Genetic Toxicology Association, Virtual Meeting, May 2022.
16. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., Kouokam, J.C., and **Wise, Sr**., J.P. Prolonged Chromate Exposure Causes Inhibition of RAD51 Response and Increases Chromosome Instability in Human Bronchial Epithelial Cells. Presented at the Biennial Meeting of the International Conference of Trace Elements and Minerals, Aachen, Germany, June 2022.
17. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T., and **Wise, Sr**., J.P. Environmental Carcinogenesis in the Gulf Coast and Southern States: Translating the Genotoxic and DNA Repair Impacts of Particulate Hexavalent Chromium from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at the Second Meeting of the Southern Genome Maintenance Conference, Miami, Florida, June 2022.
18. Vielee, S.T., Williams, A.R., Meaza, I., Toyoda, J.H., Isibor, J., **Wise, Sr**., J.P. and Wise, Jr., J.P.. Aging at the flip of a coin: A mechanistic approach to describing the gerontogenic effects of Cr(VI). Presented at the Ohio Valley Society of Toxicology Summer Meeting, 2022.
19. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., Wise, S., Kouokam, J.C., and **Wise, Sr**., J.P. Hexavalent Chromium Inhibits RAD51 Function through Impaired RAD51D. Presented at the Ohio Valley Society of Toxicology Summer Meeting, 2022.
20. Meaza, I., Toyoda, J.H., Lu. H., Williams, A.R., Kouokam, J.C., and **Wise, Sr**., J.P. Prolonged Exposure to Particulate Hexavalent Chromium Induces Inhibition of RAD51 and Increased Chromosome Instability in Human Bronchial Epithelial Cells. Environmental and Molecular Mutagenesis, 63 (S1): 47, 2022.
21. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., Wise, S.S., Kouokam, C.J., and **Wise, Sr**., J.P. Particulate Hexavalent Chromium Inhibits RAD51 Paralog complex (BCDX2) Response in Human Lung Cells. Environmental and Molecular Mutagenesis, 63 (S1): 105, 2022.
22. Toyoda, J.H., Meaza, I., Lu. H., Kouokam, J.C., Williams, A.R., and **Wise, Sr**., J.P. Hexavalent Chromium Targets Securin and Causes Numerical Chromosome Instability in Human Cells but Not in Whale Cells. Environmental and Molecular Mutagenesis, 63 (S1): 143, 2022.
23. Vielee, S.T., Williams, A.R., Meaza, I., Toyoda, J.H., **Wise, Sr**., J.P. and Wise, Jr., J.P. Evidence to Classify Cr(VI) as a Gerontogen: A Mechanistic Approach to Making Heads or Tails of a Toxic Aging Coin. Environmental and Molecular Mutagenesis, 63 (S1): 41, 2022.
24. Wise, Jr., J.P., Vielee, S.T., Williams, A.R., Meaza, I., Toyoda, J.H., Wise, S.S., Kouokam, J.C., Young, J.L., **Wise, Sr**., J.P., Cai, J., Cai, L. A Toxic Aging Coin:

Case for Cr(VI) Neurotoxicity and Gerontogenicity. Environmental and Molecular Mutagenesis, 63 (S1): 41, 2022.

25. Vielee, S.T., Williams, A.R., Meaza, I., Toyoda, J.H., **Wise, Sr**., J.P. and Wise, Jr., J.P. A Mechanistic Approach to Categorizing Cr(VI) as a Gerontogen Using a Toxic Aging Coin. Presented at the Ohio Valley Society of Toxicology (OVSOT) Meeting, October 2022.
26. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., Wise, S., Kouokam, J.C., and **Wise, Sr**., J.P. Particulate Hexavalent Chromium Exposure Induces RAD51D Loss Leading to Impaired Function with Each Successive Generation in Human Lung Cells. Presented at the Ohio Valley Society of Toxicology (OVSOT) Meeting, October 2022.
27. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young, J.L, Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T., and **Wise, Sr**., J.P. Translating Particulate Hexavalent ChromiumInduced Genotoxic and DNA Repair Impacts from Human Lung Cells to In Vivo Lung Tissue. Presented at the Ohio Valley Society of Toxicology (OVSOT) Meeting, October 2022.
28. Meaza I., Cahill C.C. and **Wise Sr**., J.P. The Unloading of Cohesin from Chromatin a New Mechanism for Hexavalent Chromium-Induced Carcinogenesis. Presented at the Annual Ohio Valley Chapter of Society of Toxicology (OVSOT) Meeting, October, 2022.
29. Young, J.L., Bolatimi, O.E., Toyoda, J.H., Lu, H., Meaza, I., Williams, A.R., Wise, S.S., Kouokam, J.C., Lin, Q., **Wise, Sr**. J.P., Wise, Jr., J.P., Cai, L., and Cave, M.C. Environmental Liver Disease and YOU: How Sex, Diet and Metals Interact. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.
30. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M., Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young, J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T. and **Wise, Sr**., J.P. The Carcinogenic Mechanism for Particulate Hexavalent Chromium Translates from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.
31. Wise, Jr., J.P., Vielee, S., Isibor, J., Williams, A.R., Meaza, I.I., Toyoda, J.H., Wise, S.S., Kouokam, J.C., Young, J.L., **Wise, Sr**., J.P., Cai, J. and Cai L. A Toxic Aging Coin: Case for Cr(VI) Neurotoxicity and Gerontogenicity. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.
32. **Wise, Sr**., J.P. Wise, Jr., J.P., Wise, S.S., Young, J.L., Wise, J.T.F., Wise, C.F., Browning, C.L., Perkins, C.R., Kerr, I., and Zheng, T. Of Whales and Men: A Multi-Year Study of Metals in Whales from the Gulf of Maine. Presented at the Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Pittsburgh, Pennsylvania, 2022.
33. Meaza I., Toyoda H. J., Kouokam C. J., Cahill C.C., and **Wise J.P. Sr**., Cohesin Malfunction, a New Mechanism for Hexavalent Chromium-Induced Carcinogenesis. Presented at the Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Pittsburgh, Pennsylvania, 2022.

34. Hamilton, M., Patel, R., Lechner J., **Wise, Sr., J.P**., and Kouokam, J.C. Betanin, a Beetroot-derived Food Colorant, Decreases Cr(VI)-induced Toxicity in Human Lung Epithelial Cells. Presented at KY Academy of Sciences, Morehead State University, November 2022.200. Patel, R., Hamilton, M., Lechner J., Wise, Sr., J.P. and Kouokam, J.C. Beetroot-derived E162 Alleviates Hexavalent Chromiuminduced Toxicity in Human Lung Epithelial Cells. Presented at Research!Louisville, September 2022.
35. Duncan, A., Oyeleye, S., **Wise, Sr., J.P**. and Kouokam, J.C. Betanin, a Beetrootderived Food Colorant, Decreases Cr(VI)-induced Toxicity in Human Lung Fibroblasts by Relieving Oxidative Stress. Presented at Research!Louisville, September 2022.
36. Oyeleye, S., Duncan, A., Lechner J**., Wise, Sr., J.P**. and Kouokam, J.C. Could E162 Prevent Hexavalent Chromium-induced Cancer? A Study of Human Lung Fibroblasts. Presented at Research!Louisville, September 2022.
37. Vielee, S.T., Williams, A.R., Meaza, I., Toyoda, J.H. **Wise, Sr., J.P.** and Wise, Jr., J.P. The Tale of Heavy Metals in Aging: Cr(VI) Induces Senescence in DNA Damage Repair Deficient Cells. Presented at Research!Louisville, September 2022.
38. Cahill C.C, Meaza I. and **Wise J.P. Sr**. Mechanism of Hexavalent Chromium Carcinogenesis: The Unloading of Cohesin from Chromatin. Presented at Research Louisville! October 2022.
39. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., Wise, S., Kouokam, J.C., and **Wise, Sr., J.P**. Particulate Hexavalent Chromium Exposure Inhibits RAD51 Paralog Complex (BCDX2) Response in Human Lung Cells. Presented at Research Louisville! October 2022.
40. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young, J., Olapeju, E., Cai, L., Kondo, K., and **Wise, Sr., J.P.** Translating Particulate Hexavalent Chromium-Induced DNA Damage and DNA Repair Impacts from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at Research Louisville! October 2022.
41. Fernando, J. Williams, A.R., Wise, S.S., and **Wise, Sr., J.P**. Carcinogenic Chromium Disrupts RAD51 and RAD51D Function in Homologous Recombination in Human Lung Cells. Presented at Research Louisville! October 2022.

Wise, Sandra

1. Lu, H., **Wise, S.S**., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young J.L., Cai, L., Kondo, K., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits Homologous Recombination Repair in Rat Lung Tissue. Toxicological Sciences, 186: 3732, 2022.
2. **Wise, S.S**., Toyoda, J.H., Lu, H., Meaza, I., Wise, Sr., J.P. Chromosome Instability and Cellular Transformation of Human Lung Cells Chronically Treated with Particulate Hexavalent Chromium. Toxicological Sciences, 186: 3261, 2022.
3. Lu, H., **Wise, S.S**., Toyoda, J.H., Wise Jr. J.P., Speer, R.M, Bolt, A.M., Meaza, I., Wise, C.F., Wise, J.T.F., Young, J.L., and Wise Sr. J.P. Of Whales and Men, How Great Whales Evade Metal Induced Cancer. Toxicological Sciences, 186: 1064, 2022.

4. Wise, Jr., J.P., Young, J.L., Lu, H., Meaza, I.I., Toyoda, J., **Wise, S.S**., Speer, R., Croom-Perez, T., Cai, L., and Wise, Sr., J.P. A Toxic Aging Coin: Cr(VI) Neurotoxicity and Gerontogenicity. Toxicological Sciences, 186: 3771, 2022.
5. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., **Wise, S.S**., Kouokam, C.J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits DNA Repair by Targeting the BCDX2 Complex in Human Lung Cells. Presented at the 15th Annual Graduate Student Regional Research conference (GSC), March 2022.
6. Lu, H., **Wise, S.S**., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young J.L., Cai, L., Kondo, K., and Wise, Sr., J.P. Subchronic Particulate Hexavalent Chromium Exposure Inhibits Homologous Recombination Repair in Rat Lung. Presented at the Graduate Student Regional Research Conference, Louisville, Kentucky, March 2022.
7. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., **Wise, S.S**., Kouokam, C.J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits RAD51 Paralog complex (BCDX2) Response in Human Lung Cells. Annual Meeting of Environmental Mutagenesis and Genomics Society, Ottawa, Ontario, 2022.
8. Toyoda, J.H., **Wise, S.S**., Liu, K-J., Holmes, A.L., Martino, J., The Mechanisms of Chromium Carcinogenesis: A One Environmental Health Perspective. Presented at the Biennial Meeting of the International Conference of Trace Elements and Minerals, Aachen, Germany, June 2022.
9. Lu, H., **Wise, S.S**., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T., and Wise, Sr., J.P. Environmental Carcinogenesis in the Gulf Coast and Southern States: Translating the Genotoxic and DNA Repair Impacts of Particulate Hexavalent Chromium from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at the Second Meeting of the Southern Genome Maintenance Conference, Miami, Florida, June 2022.
10. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., **Wise, S**., Kouokam, J.C., and Wise, Sr., J.P. Hexavalent Chromium Inhibits RAD51 Function through Impaired RAD51D. Presented at the Ohio Valley Society of Toxicology Summer Meeting, 2022.
11. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., **Wise, S.S**., Kouokam, C.J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits RAD51 Paralog complex (BCDX2) Response in Human Lung Cells. Environmental and Molecular Mutagenesis, 63 (S1): 105, 2022.
12. Wise, Jr., J.P., Vielee, S.T., Williams, A.R., Meaza, I., Toyoda, J.H., **Wise, S.S**., Kouokam, J.C., Young, J.L., Wise, Sr., J.P., Cai, J., Cai, L. A Toxic Aging Coin: Case for Cr(VI) Neurotoxicity and Gerontogenicity. Environmental and Molecular Mutagenesis, 63 (S1): 41, 2022.
13. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., **Wise, S**., Kouokam, J.C., and Wise, Sr., J.P. Particulate Hexavalent Chromium Exposure Induces RAD51D Loss Leading to Impaired Function with Each Successive Generation in Human Lung Cells. Presented at the Ohio Valley Society of Toxicology (OVSOT) Meeting, October 2022.
14. Lu, H., **Wise, S.S**., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young, J.L Cai, L., Zhu, C., Kondo, K., Zheng, T.,

Haber, L.T., and Wise, Sr., J.P. Translating Particulate Hexavalent Chromium-Induced Genotoxic and DNA Repair Impacts from Human Lung Cells to In Vivo Lung Tissue. Presented at the Ohio Valley Society of Toxicology (OVSOT) Meeting, October 2022.

15. Young, J.L., Bolatimi, O.E., Toyoda, J.H., Lu, H., Meaza, I., Williams, A.R., **Wise, S.S**., Kouokam, J.C., Lin, Q., Wise, Sr. J.P., Wise, Jr., J.P., Cai, L., and Cave, M.C. Environmental Liver Disease and YOU: How Sex, Diet and Metals Interact. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.
16. Lu, H., **Wise, S.S**., Hoyle, G., Toyoda, J.H., Speer, R.M., Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young, J.L., Cai, L., Zhu, C., Kondo, K., Zheng, T., Haber, L.T. and Wise, Sr., J.P. The Carcinogenic Mechanism for Particulate Hexavalent Chromium Translates from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.
17. Wise, Jr., J.P., Vielee, S., Isibor, J., Williams, A.R., Meaza, I.I., Toyoda, J.H., **Wise, S.S**., Kouokam, J.C., Young, J.L., Wise, Sr., J.P., Cai, J. and Cai L. A Toxic Aging Coin: Case for Cr(VI) Neurotoxicity and Gerontogenicity. Presented at the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada, October 2022.
18. Wise, Sr., J.P. Wise, Jr., J.P., **Wise, S.S**., Young, J.L., Wise, J.T.F., Wise, C.F., Browning, C.L., Perkins, C.R., Kerr, I., and Zheng, T. Of Whales and Men: A Multi-Year Study of Metals in Whales from the Gulf of Maine. Presented at the Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Pittsburgh, Pennsylvania, 2022.
19. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., **Wise, S**., Kouokam, J.C., and Wise, Sr., J.P. Particulate Hexavalent Chromium Exposure Inhibits RAD51 Paralog Complex (BCDX2) Response in Human Lung Cells. Presented at Research Louisville! October 2022.
20. Lu, H., **Wise, S.S**., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meaza, I., Wise, Jr., J.P., Kouokam, J.C., Young, J., Olapeju, E., Cai, L., Kondo, K., and Wise, Sr., J.P. Translating Particulate Hexavalent Chromium-Induced DNA Damage and DNA Repair Impacts from Cultured Human Lung Cells to In Vivo Lung Tissue. Presented at Research Louisville! October 2022.
21. Fernando, J. Williams, A.R., **Wise, S.S**., and Wise, Sr., J.P. Carcinogenic Chromium Disrupts RAD51 and RAD51D Function in Homologous Recombination in Human Lung Cells. Presented at Research Louisville! October 2022.

Young, Jamie

1. Gripshover, T.C., Mustafa, M., Wahlang, B., Head, K.Z., Luo, J., **Young, J.L**., Cave, M.C. Investigating the Effects of PCB 126 on Gut-Liver Interaction in Mice Consuming and Ethanol Diet. Presented at the 2022 Ohio Valley Society of Toxicology Virtual Trainee Summer Meeting. July 2022.
2. Bolatimi, O.E., **Young, J.L**., Wahlang, B., Luo, J., Head, K.Z., Gripshover, T.C., Lin, Q., White, C., Adiele, N.V., Watson, W.H., Wilkerson, C., Cai, L., Cave. M.C.

Effects of Zinc Supplementation on High Fat Diet-Induced Non-Alcoholic Fatty Liver Disease. Presented at the 2022 Ohio Valley Society of Toxicology Virtual Trainee Summer Meeting. July 2022.

3. **Young, J.L**., Meaza, I., Williams, A.R., Wise, S.S., Kouokam, J.C., Lin, Q., Wise, J.P. Sr., Wise, J.P. Jr., Cai, L., Cave, M.C. Environmental Liver Disease and YOU: How Sex, Diet and Metals Interact. Presented at the 11th Metal Toxicity and Carcinogenesis Conference. Montreal, Quebec, Canada. October 2022.
4. Bolatimi, O.E., **Young, J.L**., Wahlang, B., Luo, J., Head, K.Z., Gripshover, T.C., Lin, Q., White, C., Adiele, N., Watson, W.H., Wilkerson, C., Cai, L., and Cave, M.C. Effects of zinc supplementation on high fat diet-induced non-alcoholic fatty liver disease. Presented at The Liver Meeting 2022 (American Association for the Study of Liver Diseases), November 2022.
5. Samala, N., Yogesh, S.K.M., Lele, R.S., Gripshover, T.C., Wahlang, B., Jophlin, L., McGrath, B., **Young, J.L**., Chalasani, N.P., Rai, S.N., and Cave, M.C. Per- and polyfluoroalkyl substance (PFAS) exposures are associated with liver steatosis and fibrosis in adult NHANES 2017-2018. Presented at The Liver Meeting 2022 (American Association for the Study of Liver Diseases), November 2022.
6. Gripshover, T.C., Wahlang, B., Head, K.Z., **Young, J.L**., Luo, J., Kirpich, I.A., and Cave, M.C. Environmental Pollutant, PCB 126, Alters Energy Metabolism in a Rodent Model. Presented at The Liver Meeting 2022 (American Association for the Study of Liver Diseases), November 2022.
7. Wise, Sr., J.P., Wise, Jr., J.P., Wise, S.S., **Young, J.L**., Wise, J.T.F., Wise, C.F., Browning, C.L., Perkins, C.R., Kerr, I., and Zheng, T. Of Whales and Men: A MultiYear Study of Metals in Whales from the Gulf of Maine. Presented at the SETAC North America 43rd Annual Meeting in Pittsburg, Pennsylvania. November 2022.

PRIMARY FACULTY RESEARCH GRANTS ACTIVE

Banerjee, Mayukh					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
The Jewish Heritage Fund for Excellence Research Enhancement Grant	Interplay between dysregulated differential alternative splicing and nonsense mediated decay in arsenic-induced carcinogenesis	PI	Dr. M. Banerjee	12/01/2022 - 11/30/2023	$37,500.00
NIH/NIEHS, P30ES030283- 01A1	APC11 is a novel target for arsenic-mediated zinc displacement leading to cell cycle disruption	PI	Dr. M. Banerjee	11/01/2020 – 09/30/2022	$50,000.00
NIH/NIEHS, P30ES030283 – Pilot Award	Microbial metabolites protect against arsenic induced gut barrier dysfunction	Co-I	Dr. V. Jala	09/01/2020 - 03/31/2022	$50,000.00
NIH/NIEHS, R21ES030334	Alternative splicing in arsenical skin carcinogenesis	Co-I	Dr. J. Christopher States	07/14/2020 - 06/30/2022	$429,000 (total costs)
NIH/NIEHS, R01ES027778-03	Mechanism for Arsenic Induced Carcinogenesis	Co-I	Dr. J. Christopher States	8/1/2017- 7/31/2022	$2,056,394 (total costs)

Ceresa, Brian					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH/NEI EY028911	c-Cbl Antagonists for Corneal Epithelial Regeneration	PI (30%)	Ceresa	2/1/19 – 1/31/24	$373,450
NIH/NIEHS T32 ES011564	UofL Environmental Health Sciences Training Program	Mentor	Hein/Wise	4/1/16 – 3/31/21	$2,183,597
NIH/NEI T35EY026509	Summer Vision Sciences Training Program	Co-PI (5%)	Ceresa/ McCall	07/1/17 – 04/28/26	$35,777

JHFRE	EGFR Ubiquitylation in Corneal Epithelial Homeostasis	PI (25%)	Ceresa	6/15/22 – 6/14/23	$75,000

Chen, Shao-yu					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
R01 NIAAA/AA028435	Role of exosomes in the coordinated migration of neural crest cells and placodes and ethanol-induced teratogenesis	PI	Shao-yu Chen	8/1/20 – 7/31/25	$ 1,953,438
P50 NIAAA/ AA024337 Alcohol Center grant	The role of nutrition in the development/progression of alcohol-induced organ injury. Project 3: Enhancer-mediated transcriptional dysregulation in neural crest cells and ethanol-induced teratogensis	Project 3 PI	McClain	05/2021 – 04/2026	$7,184,970 (Total P50) Project 3 budget: $1,291,795
R01 NIAAA/AA030424	Intestine FXR activation by LGG-derived nanoparticles in alcohol-associated liver disease	Co-I	Feng	9/22 – 8/27	$2,659,795
P20 NIGMS/ GM113226	UofL Hepatobiology and Toxicology COBRE	Faculty mentor	McClain	4/21 – 3/31/26	$11,700,000
T32 NIEHS/ ES011564	UofL environmental health sciences training program	Faculty mentor	Hein/ Wise	7/2016 – 6/2026	$2,575,255
T35 NIEHS/ ES014559	Summer Environmental Health Sciences Training Program	Faculty mentor	States	04/2016 03/2026	$290,347
R25 NCI/CA134283	Cancer Education Program for Professional and Undergraduate Students	Faculty mentor	David Hein/ LaCreis Kidd	4/2017 – 3/2022	$1,620.000
P30 NIEHS/ ES030283	University of Louisville Center for Integrated Environmental Health Sciences	Member	States	7/15/20 – 3/31/25	$6,473,751

Clark, Geoffrey					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
Qualigen Inc	Small Molecule RAS inhibitors	PI		4/1/19-9/5/23	$2,727,204
CDMRP W81XWH1910417	Novel inhibitors of MPNST	PI		7/15/2019 - 7/14/2023 (NCE)	$805,553
American Lung Association	RALGDS inhibitors for lung cancer	PI		7/1/22-6/30/24	$200,000
Kosair Charities Pediatric Oncology	Discovery of small molecule inhibitors of PD-1 for pediatric brain cancer	Co-I	Chesney	12/1/22-6/30/23	$25,000
NIEHS T32	UofL Environmental Health Sciences Training Program	Mentor	Hein Wise	7/1/21-6/30/26	$2,587,675
Feng, Wenke					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH/NIAAA R01AA023190	Mechanisms of Probiotics in Alcoholic Liver Disease	PI	Wenke Feng	8/1/22 - 7/31/23	$436,806
NIH/NIAAA R01AA030424	Intestine FXR activation by LGG-derived nanoparticles in alcohol-associated liver disease	PI	Wenke Feng	8/15/22-5/31/23	$531,959
NIH/NIAAA P50AA024337	Probiotic-derived nano-particles in alcoholic liver disease	Project PI	Craig McClain	5/1/22-4/30/23	$82,738
Gupta, Ramesh					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH R41-OD031942	Engineered Exosomes for Targeted Delivery of CRISPR/Cas0 Genome-editor	PI		6/2022-5/2023	$264,000
State Matching Grant R41 OD031942	Engineered Exosomes for Targeted Delivery of CRISPR/Cas0 Genome-editor	Pi		7/2022-6/2023	$100,000

Agnes Brown Duggan Endowment		PI		7/2022-6/2023	$75,000
3P Biotechnologies Contract	Effect of Exosomal Formulations on Lung and Breast Cancer	PI	Gupta, Aqil (MPI)	7/2018-7/2022	$173,250
3P Biotechnologies Contract	Exosomes and eExosomes – Biodistribution and Efficacy	PI	Gupta, Aqil (MPI)	9/2020-12/2023	$300,000

Hein, David					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NCI R25- CA134283	University of Louisville Cancer Education Program	Contact PI	Hein & Kidd	04/01/2017 - 03/31/2023	$1,593,000
NIEHS T35-ES014559	Summer Environmental Health Sciences Training Program	Mentor	States	05/15/2016 - 03/31/2022	$186,540
NIEHS T32 ES011564	UofL Environmental Health Sciences Training Program	Contact PI	Hein & J. Wise	07/01/2016 – 03/31/2022	$2,314,825
NIEHS P42-ES023716	Environmental Exposure and Cardiometabolic Disease Program	Director, Training Core	Srivastava	09/01/2017 – 03/31/2022	$6,700,000
NIH-NIEHS/P30 ES030283	University of Louisville Center for Integrated Environmental Health Sciences	Faculty member	States	07/15/2020 - 06/30/2025	$6,473,751
Society of Toxicology	First integrated international workshop: acetyltransferases, sulfotransferases, and UDP-glucuronosyltransferases	PI	Hein	11/02/2019 - 11/30/2022	$2,000
NIEHS T32-ES011564	UofL Environmental Health Sciences Training Program	PI	Hein & J. Wise	07/14/2021 - 06/30/2026	$2,575,255
NIEHS T35-ES014559	Summer Environmental Health Sciences Training Program	Mentor	States	04/01/2022 – 03/31/2026	$290,347
UofL Center for Integrative Environmental Health Sciences	Gene-environmental interactions of novel psychoactive chemicals substituting for illegal drugs of abuse	PI	Hein	05/01/2021 - 06/30/2022	$40,000
UofL School of Medicine	Effect of Heterocyclic Amines and NAT2 Metabolism on Insulin Sensitivity	Co-I; Faculty Mentor	Hong	10/01/2020 – 03/31/2022	$21,028

NIH P20-GM113226	Hepatobiology and Toxicology COBRE	Deputy Director; Director for faculty development	McClain	04/01/2021 – 03/31/2026	$11,356,981

Hood, Joshua					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
2 R25 CA134283-06A1	University of Louisville Cancer Education Program	Faculty Mentor	Hein, Kidd	4/1/17 - 3/31/22	$1,593,000
2 P20 GM113226-06	Extracelluar vesiclebased immunotherapy for hepatocellular carcinoma	PI (Project 2)	McClain	4/1/21-3/31/24	$11,722,500, $655,900 (Hood)
NIH NIEHS T32-ES011564	UofL Environmental Health Sciences Training Program	Faculty Mentor	Hein, Wise Sr.	7/1/21 - 6/30/26	$2,575,255

Kidd, LaCreis					
Agency/Number	**Title**	**Role**	**PI**	**Period**	**Budget Award**
NIH, NIEHS T32-ES011564	UofL Environmental Health Science Training Program	Mentor	Hein & Wise	4/1/16-3/31/21	$2,183,597
NIH, NCI R25-CA134283-10	University of Louisville Cancer Education Program	Multiple PI, Cancer Education Coordinator, Mentor	Hein/ Kidd	9/1/17-3/31/23 (NCO)	$1,620,000
Kentucky Council on Post Secondary Education	Cancer Health Disparity Summer Bridge	Contact PI & Multiple PI	Kidd/ Corbitt	5/1/22-4/30/23	$200,000

Kouokam, Calvin					
Agency/Number	**Title**	**Role**	**PI**	**Period**	**Budget Award**
NIEHS/3R01ES016893-14S1	Particulate Cr(VI) Toxicology in Human Lung Epithelial Cells and Fibroblasts	Co-I	JPW	1/1/22-2/8/22	$7,633
3R35ES032876-01S1	Chromosome Instability in Metal-Induced Lung Cancer	Co-I	JPW	2/9/22-6/30/24	$294,423

Matoba, Nobuyuki					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH/NIGMS 5P20GM135004-02	Center for Cancer Immunology and Immunotherapy (CCII) Pilot project title: Development of Lectikines for Immunotherapy against Ovarian Cancer	Pilot project PI	Yan/ Chesney	9/01/21 - 8/31/22	Total direct costs: $50,000
NIH/NIDDK 1 R01 DK123712-01A1	Preclinical validation of oral therapeutic lead proteins targeting epithelial GM1	PI	Matoba	6/20/20 – 3/31/24	Year 3 Direct Costs: $298,009
NIH/NCI 3P30 CA047904 32S5	Cancer Center Support Grant Supplement: Clinical evaluation of a QGRFT nasal spray for prevention of SARS-CoV-2	Subcontract Co-I	Ferris	09/21/20 – 7/31/21 NCE to 7/31/23	$231,310 (UofL Subaward)
DoD/Medical CBRN Defense Consortium MCDC2006-010	PREVENT-CoV: A Q-Griffithsin Inranasal Spray	Co-I	Palmer	12/03/20– 11/30/21 NCE to 6/30/23	$7,489,612 (total costs)
NIH/NIDDK 1R41DK131634-01A1	EPICERTIN for Mucosal Healing in Ulcerative Colitis	Partner Institution PI	Tusé (GROW Biomedicine LLC)	9/19/22-8/31/23	$273,556 (total costs); $141,438 (UofL Subaward total)
NIH /NIEHS 2T32ES011564	UofL Environmental Health Sciences Training Program	Faculty mentor	Hein / Wise	7/14/21 – 6/30/26	$453,336 (Year 2 total)

NIH/ NIAID T32AI132146	Inflammation and Pathogenesis Training Program	Faculty mentor	Mitchell / Lamont	8/01/18 – 7/31/23	$152,801 (Year 5 total)

Palmer, Kenneth					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
National Institutes of Health/NIGMS P20 GM125504	Functional Microbiomics, Inflammation and Pathogenicity COBRE	Mentor, Internal Advisory Board	Richard Lamont	3/1/2018-2/28/2023	$2,544,491
National Institutes of Health/NCI 3P30 CA04790432S5	Cancer Center Support Grant Supplement: Clinical evaluation of a QGRFT nasal spray for prevention of SARS-CoV-2	Subaward PI	Ferris	9/21/20-7/31/23	$1,042,029
Department of Defense JPEO CBRN through ATI International W15QKN-16-9-1002 / MCDC 2006-010	PREVENT-CoV: A Q-Griffithsin Intranasal Spray	Program Director and PI	Palmer	12/2/20-3/31/23	$8,547,848
National Institutes of Health / NIAID 1G20 AI167407-01	Upgrading infectious disease research facilities at University of Louisville RBL	PI	Palmer	9/23/21-2/28/24	$3,333,333
National Institutes of Health / NIAID 3G20 AI167407-01S1	Upgrading infectious disease research facilities at University of Louisville RBL – Supplement	PI	Palmer	8/24/22-2/28/22	$1,219,669
National Institutes of Health / NIGMS 3P20GM113226-07S2	COVID effects on experimental alcohol-associated liver disease and the impact of novel nutritional interventions	Co-I	McClain	9/1/22-3/31/23	$939,000

National Institutes of Health / NIAID 1R01AI172873-01	Neutrophil Heterogeneity and Immunopathogenesis of COVID-19 ARDS	Co-I	Yan et al.	9/23/22-3/31/26	$3,724,365

Siskind, Leah					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH 1R01DK124112	The role of neutral ceramidase in acute kidney injury and progression to chronic kidney disease	PI (25%)	Siskind	1/10/20-12/31/23	$322,500 Annual Direct Costs
NIH R01 DK115406	CSN8 regulation of S1P-enriched extracellular vesicles to modulate NAFLD by gut-liver axis	Co-I (10%)	Deng	7/20/18-4/30/23	$270,000 Annual Direct Costs
NIH-F31 DK130609	The role of PGC-1 alpha in repeated low-dose cisplatin-induced kidney injury and the progression to chronic kidney disease	Sponsor	Orwick	5/1/22-4/30/25	$32,123 Annual Direct Costs
Song, Zhao-Hui (Joe)					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
R21EY030186	The effect of cannabidiol and the role of GPR3 in experimental autoimmune uveitis	Multi-PI	Hui Shao ZH Song	4/1/19-3/31/22	$423,500
R25CA134283-06	University of Louisville Cancer Education Program	Faculty Mentor	Hein Kidd	9/1/16-8/31/21	$1,620,000
Autism Speaks Predoctoral Fellowship #11863	Phytocannabinoids as Behavioral and Immunological Modulators in Autism Spectrum Disorders	Primary Mentor	Sarah Shrader	1/1/20-2/28/22	$70,000

States, Christopher					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIEHS/P30ES030283	University of Louisville Center for Integrative Environmental Health Sciences	PI	States	7/15/20-3/31/25	$6,473,751 (total costs)
NIEHS/P30ES030283-03S1	University of Louisville Center for Integrative Environmental Health Sciences (Diversity Supplement)	PI	States	6/1/22 -	$340,909
NIEHS/R01ES027778	Mechanism for arsenic induced carcinogenesis	PI	States	8/1/17-7/31/23	$2,064,565
NIEHS/ R21ES030334	Alternative splicing in arsenical skin carcinogenesis	Pi	States	7/14/20-6/3/23	$429,000
NIEHS/T35ES014559	Summer Environmental Health Sciences Training Program	Contact-PI	States Cave Conklin	8/13/21-2/28/27	$248,690
Wise, John					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIEHS/R35 ES032876	Chromosome Instability in Metal-Induced Lung Cancer	PI	Wise, J	8/01/21-7/31/29	$6,694,253
NIEHS/R35 ES032876-S1	Chromosome Instability in Metal-Induced Lung Cancer	PI	Wise, J	8/01/21-2/28/24	$294,368
NIEHS/R35 ES032876-S2	Chromosome Instability in Metal-Induced Lung Cancer	PI	Wise, J	8/23/22-6/30/23	$358,563
NIEHS R15 ES033800	Molecular Structure of Chromium-DNA Adducts	PI (Multi)	Vincent Woski Wise	7/1/22-6/30/25	$436,580
NIEHS/T32 ES011564	UofL Environmental Health Sciences Training Program	PI (Multi)	Hein Wise, J.	4/1/16-3/31/26	$2,183,597
NIEHS/T35ES014559	Summer Environmental Health Sciences Training Program	Mentor	States	04/01/06 – 04/30/26	$516,565

NIEHS/P30 ES030283	University of Louisville Center for Integrated Environmental Health Sciences	Deputy Director	States	04/01/20-03/31/25	$7,700,000
Bureau of Ocean Energy Management 13087812	Demonstration Project, Integrating DNA Profiles, Genomics and Photo-Identification Data	Collaborator	Baker	09/01/20-08/31/22	$426,932
NIEHS/ R01ES029082	A nested case-control study of exposure to toxic metals, essential metals and their interaction on the risk of type 2 diabetes	Consultant	Zheng	03/15/19-02/28/23	$2,690,000
NIEHS/R21ES033327	Cr(VI)-Induced DNA Damage Contributes to Brain Aging	Collaborator	Wise Jr., J.	10/01/21 09/30/23	$429,625
NIEHS/ P42-ES023716	Environmental Exposure and Cardiometabolic Disease	Internal Advisory Board	Srivastava	4/1/22-3/31/27	Information unavailable

Wise, Sandra					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIEHS/ 1RO1ES02778-01A1	Mechanism for arsenic induced carcinogenesis	Co-I	States	7/01/17-6/30/22	$2,488,085
NIEHS/R35 ES032876	Chromosome Instability in Metal-Induced Lung Cancer	Co-I	Wise, J	08/01/21-07/31/29	$6,694,253

Young, Jamie					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH/NIEHS P30 ES030283 (Supplement:5P30ES030283-03S1)	University of Louisville Center for Integrated Environmental Health Sciences (Diversity Supplement)	Diversity Supplement Awardee	States	4/1/19-3/31/24	$6,473,751
University of Louisville	Jewish Heritage Fund for Excellence Faculty Recruitment Grant Program	PI	Young	6/30/22-6/30/24	$200,000
Gheens Foundation Grant from the UofL Office of Community	"Community-engaged research focused on PFAS in Western Kentucky"	PI	Young	10/1/22-9/30/23	$1,000

PRIMARY FACULTY RESEARCH PROPOSALS SUBMITTED

Banerjee, Mayukh					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
National Institutes of Health – NIEHS/ 1 R01 ES034737-01	Interplay between dysregulated differential alternative splicing and nonsense mediated decay in arsenic-induced carcinogenesis	PI	Banerjee (Contact PI), States (MPI)	9/1/22-8/31/27	$2,499,995
National Institutes of Health – NIEHS/ 1 R01 ES035034-01	RING finger proteins as direct arsenite targets mediating multi-organ toxicity	PI	Banerjee	4/1/23-3/31/28	$2,499,995

Ceresa, Brian					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH/NEI	EGFR Ubiquitylation in Corneal Epithelial Homeostasis	Co-PI (20%)	Ceresa	4/1/22 – 3/31/27	$2,281,570
NIH/NEI	Zeb1 regulation of corneal neovascularization	Co-I (2.5%)	Y. Liu	7/1/21 – 6/30/26	$1,953,959
NIH/NEI T35EY026509	Summer Vision Sciences Training Program	Co-PI (5%)	Ceresa/ McCall	07/1/17 – 04/28/22	$267,410
NSF	Center for Health Organization Transformation	Co-I (1%)	Jennings	08/1/22 – 07/31/25	$100,000

Chen, Shao-Yu					
Agency/Number	**Title**	**Role**	**PI**	**Project**	**Budget Request**
R25/NIEHS	KEEP: Kentucky Environmental Education Pipeline, A program to retain a diverse and equitable scientific trainee	Mentor	Neal/ Corbitt		

R25/NCI	Cancer Education Program for Professional and Undergraduate Students	Mentor	Hein/Kidd		

Clark, Geoff					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
CDMRP	RAS inhibition as a new therapeutic approach to Luminal B breast cancer	PI	Clark	8/1/2021- 8/1/2022	450K
NCI	Targeting Luminal B breast cancer with an anti-RAS agent	PI	Clark	01/7/2021 - 01/7/2023	275K
NIDDK	A Novel role for NORE1A in NAFLD	PI	Clark	7/01/22- 6/30/2027	2.499 million
NCI	Inhibition of the RAL pathway in RAS driven lung cancer	PI	Clark	01/7/2021 - 01/7/2023	275K
NIH (CIEHS Pilot)	The effects of PVCs on NORE1A in the liver	PI	Clark	03/01/2022- 30/02/2023	50K
CDMRP	Direct inhibition of RAS to treat Neurofibromatosis	PI	Clark	7//1/2022- 6/30/2025	525K
CDMRP	RAS inhibitors for RAS driven melanoma	PI	Clark	7/1/2022- 6/30/2024	200K
American Lung Association	Targeted inhibition of RALGEFS as a novel approach to lung cancer	PI	Clark	7/1/2022- 6/30/2024	200K
CDMRP	Ras inhibitors as a novel therapeutic approach for breast cancers driven by deregulated RAS	PI	Clark	7/1/2022- 6/30/2025	800K

Feng, Wenke					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH/NIAAA R21AA031172	Cannabidiol as a treatment for alcoholic liver disease	mPI	Zhao-Hui Song and Wenke Feng	7/1/23-6/30/25	$430.375
NIH/NIAAA R01AA030756	Characterization of the role of neuropeptide VIP-mediated fucosylation in alcohol-associated liver disease	Co-I	Zhong-Bin Deng	7/1/23-6/30/28	~$2,250,000
Gupta, Ramesh					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH STTR Phase I	"Engineered Exosomes for Targeted Delivery of the CRISPR/Cas9 Genome-editor"	MPI	Gupta Spencer(MPI)	7/22 – 6/25	
NCI SBIR Phase II	"Novel exosome vector for siRNA delivery"	MPI	Gupta Spencer (MPI)	07/01/21 – 06/30/22	
NCI SBIR Phase II	"Targeted delivery of exosomal paclitaxel against lung cancer"	MPI	Gupta, Spencer	11//21 – 10/23	
NIAAD STTR Phase I	"Exosome-Mediated Delivery of siRNA Therapeutics against SARS-CoV-2"	MPI	Gupta R; Spencer W (MPI)	07/22 – 06/23	
DoDBreakThrough Research Award Level II	"Antiviral Activity of Nano Formulations of Herb and Spice extracts against CoV-2"	MPI	Gupta, Spencer	7/22 – 6/25	
NIAAD SBIR Phase I	"Targeted Exosomal Formulations of Plant Phenolics Against SARS-CoV-2"	MPI	Spencer W; Gupta R (MPI)	07/22 – 06/23	

Hein, David					
Agency/ Number	**Title**	**Role**	**PI**	**Project Period (requested**	**Budget Request**
U54 CA280880	Transforming Institutional Culture: UL Inclusive Excellence Biomedical Workforce Program	Multi-PI Leader, Administrative Core	Jones, F.	04/01/2023 – 03/31/2028	$16,033,425
NCI R25- CA134283	University of Louisville Cancer Education Program	Multi-PI	Kidd & Hein	04/01/2023 - 03/31/2028	$2,160,000
R21 ES035156-01	Mechanistic Study on Bladder Cancer Risk Allele, rs1495741	Multi-PI	Hong	04/01/2023 - 03/31/2025	$430,375
K99-ES034825	Hexavalent chromium drives human lung carcinogenesis via metabolic changes	Faculty Co-Mentor	James Wise	09/01/2023 - 08/31/2027	$932,616
UofL CIEHS Medium Voucher Application	Transcriptomic Analysis of Human Hepatocytes Exposed to Heterocyclic Amines	Multi-PI	Hong	01/01/2023 - 03/31/2023	$4,434
Brain Research Foundation	N-acetyltransferase 1 promotes glioma-derived small extracellular vesicle induction of macrophage polarity	Co-I	Hood	06/01/23 - 05/31/25	$80,000 (direct)

Hong, Kyung					
Agency/ Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
CIEHS, University of Louisville, Pilot Project	Arylamine N-Acetyltransferase 2 SNP, rs1495741, and Bladder Cancer Risk	PI	Hong	4/1/2021- 3/31/2022	$50,000 (Not funded)

James Graham Brown Cancer Center, Center for Cancer Immunology and Immunotherapy, Pilot Project	Role of Arylamine N-Acetyltransferase I (NAT1) in Interplay Between Breast Cancer and Immune System	PI	Hein Hong Hood	Aug. 2021- July 2022	$50,000 (Not funded)

Hood, Joshua					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NSF - KY Multiscale Seed Program	A Microfluidic Device to Fractionate Colloidal Suspensions of Nanoparticles and Nanovesicles	MPI	Hood (contact), Aebersold	4/1/2021-8/30/21	$1,000 Direct
NIH Score SC1	Small extracellular vesicle microRNAs and malaria pathogenesis	Project Mentor	Driss, (Morehouse School of Medicine	1/1/22 - 12/31/25	$1,000,000 Direct (~15% effort)
NIH, UofL Center for Cancer Immunology and Immunotherapy (CCII)	Role of Arylamine N-Acetyltransferase I (NAT1) in Interplay Between Breast Cancer and Immune System	Co-I	Hong (PI), Hein (Co-I)	8/2/21 - 8/1/22	$50,000 Direct
KY SBIR/STTR Matching Funds Program (Hummingbird Nano, LLC.)	Significant Technological and Commercial Additions to New Manufacturing Technology for Nanoscale Fluidicsspecies	Consultant	Stephens	1/1/22 - 12/31/22	$100,000 Direct (~9% effort)
NSF 21-656 (Hummingbird Nano, LLC.)	Automation and Development of Dynamic Configurable Liquid Molding Prototype	Consultant	Stephens	4/1/22 - 3/31/24	$1,000,000 Direct

Kidd, LaCreis					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH U54CA272234-01	Transforming Institutional Culture: UL Inclusive Excellence Biomedical Workforce Program	Co-Director of Administrative Core	Jones, Hein, Joshua, Antle	7/1/2022-6/30/2027	16,033,425 (total)

Kouokam, Calvin					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
CIEHS P30 (PILOT PROJECT PROGRAM)	The inflammatory response in the rat lung after exposure to particulate hexavalent chromium [Cr(VI)]	PI	JCK	July 20-June 21	$50,000 (not funded)

Matoba, Nobuyuki					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
Kynetic grant	Anti-cancer Activity of a Lectibody Targeting Ovarian Cancer-associated	Co-PI	Dent/ Matoba	07/01/21 – 12/31/21	$50,000 direct costs
W81XWH-19-OCRP-PA Ovarian Cancer Research Program 2020GRANT12902681	High-Mannose Glycans as a Potential Target for Ovarian Cancer Immunotherapy	PI	Matoba	09/01/22 – 08/31/24	$250,000 direct costs
NIH/NIGMS 5P20GM135004-02	Center for Cancer Immunology andImmunotherapy (CCII) Pilot project title: Development of Lectikines for Immunotherapy against Ovarian Cancer	Pilot project PI	Yan / Chesney	09/01/21 – 08/31/22	Total direct costs: $50,000 - awarded
NIH/NIDDK 1 R41 DK131634-01	EPICERTIN for mucosal healing in ulcerative colitis	Sub PI	Tuse	01/01/22 – 12/31/22	$140,975 (subaward total)
NIH/NIDDK 1 R01 DK132757-01	Development of a neutrophil degranulation inhibitor for lupus nephritis therapy	Co-I	Powell and McLeish (MPI)	04/01/22 – 03/31/26	$2,290,766 (total)

Palmer, Kenneth					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**

NIH/NIAID 1G20 AI167407-01	Upgrading infectious disease research facilities at University of Louisville RBL	PI	Palmer	23Sept21 – 23 Mar23	$3,333,333 total costs AWARDED

Siskind, Leah					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH 1R01CA264876-01	Controlling Cancer Metastasis via Stimulation of Trained Innate Immunity By Natural Compound Beta-Glucan	Yan	Yan	1/1/2022-12/31/27	
DoD Breast Cancer Breakthrough I BC210941	Elucidating the role of Ubiquilin proteins in breast cancer biology and metastatic progression	Co-I (5%)	Beverly	7/1/2022 - 6/30/2025	Direct costs: $450,000
NIH R21AG079420	Nature vs. Nurture: Beginning to Explore the cell intrinsic and extrinsic factors driving inverse incidences of Alzheimer's Disease and Cancer	Co-I (5%)	Beverly	7/1/2022 - 6/30/2024	Total directs: $275,000
NIH R01CA266126	Molecular mechanisms of Ubiquilin1/2 mediated tumor and metastatic suppression	Co-I (10%)	Beverly	9/1/2021 - 8/31/2026	Total directs: $1,250,000
NIH R01CA266034	Targeting methionine metabolism and SAM biosynthesis in MLL rearranged leukemia	Co-I (10%)	Beverly	9/1/2021 - 8/31/2026	Total directs: $1,940,000
NIH DP1 DP1OD031223	Nature Vs. Nurture: Exploring the cell intrinsic and extrinsic factors driving inverse incidences of Alzheimer's Disease and Cancer	Collaborator	Beverly	9/1/2021 - 8/31/2026	Total directs: TBD

Song, Zhao-Hui (Joe)					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH R21 EY034263-01	The effects of cannabidiol on intraocular pressure	PI	ZH Song	07/01/2022-06/30/2024	$420,231
NIH R03TR003661-01A1	The potential roles of GPR3 in regulating intraocular pressure	PI	ZH Song	04/01/2022-03/31/2023	$153,882
NIH R03TR003661-01A1	The potential roles of GPR3 in regulating intraocular pressure	PI	ZH Song	04/01/2022-03/31/2023	$153,882
DoD AR210152	The Potential Therapeutic Effects of Cannabidiol and Cannabidivarin for Autism Spectrum Disorders	MPI	Song/Barnes	02/01/2022-01/31/2025	$550,000
NIH T35 EY026509	Summer Vision Science Training Program	Mentor	Ceresa	04/01/2022-03/31/2027	$267,410

States, Christopher					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH-NIEHS/ R01 ES034019	Genomic Instability in Arsenic Induced Skin Cancer	PI	States	04/01/2022 – 3/31/2027	$2,410,779
NIH-NCI/ U54 CA272234	Transforming Institutional Culture: UL Inclusive Excellence Biomedical	Core Co-lead	Jones	07/01/2022-06/30/2027	$10,245,000

	Workforce Program				
NIH-NIEHS / F32 ES033901	Arsenic-induced Chromosomal Instability and DNA Damage Response Dysregulation	Mentor	Nail	09/01/2021-08/31/2023	$139,374
NIH-NIEHS / R01 ES033657	Elucidating the molecular signaling of Cadmium Carcinogenesis	Co-I	Damodaran	07/01/21-06/30/26	$3,120,802

Wise, John					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIEHS/ R15 ES033800	Molecular Structure of Chromium-DNA Adducts	MultiPI	Wise	09/01/21-08/31/24	$436,580
NIH/U54-CA272234	Transforming Institutional Culture: UL Inclusive Excellence Biomedical Workforce Program	Co-I, faculty development	Wise	07/01/22-06/30/27	$10,245,000
NIEHS/ P42-ES023716	Environmental Exposure and Cardiometabolic Disease	Internal Advisory Board)	Hein & Wise,J.	04/01/22-03/31/27	Information unavailable
NIEHS/R25 ES033870	KEEP: Kentucky Environmental Education Pipeline	Mentor	Ottinger	12/01/21 - 11/30/26	$500,000

INVITED SCIENTIFIC PRESENTATIONS

Faculty with Primary Appointments

Banerjee, Mayukh

1. Chronic Arsenic Exposure Dysregulates Genome-wide Alternative Splicing – Workshop on Toxicology, Transcriptomics and Alternative Splicing hosted by BioSpyder Inc., Society of Toxicology 61st Annual Meeting, San Diego, USA, March, 2022.
2. "Longitudinal dynamic transcriptome changes in a HaCaT cell line model of arsenic-induced squamous cell carcinogenesis." Poster Presentation. 61st Society of Toxicology Annual Meeting, San Diego, CA, March, 2022.
3. "Zinc supplementation prevents mitotic accumulation in human keratinocyte cell lines upon environmentally relevant arsenic exposure." Young Faculty Oral Presentation. Annual Meeting of the Ohio Valley SOT Regional Chapter; University of Louisville, October, 2022.
4. "Zinc supplementation prevents mitotic accumulation in human keratinocyte cell lines upon environmentally relevant arsenic exposure." Poster Presentation. Research!Louisville, University of Louisville, Louisville, KY, September, 2022.
5. Dynamic modulation of m 6 A mRNA methylation in human keratinocytes by chronic arsenic exposure. Oral Presentation. CIEHS Cancer Research Interest Group Meeting, University of Louisville, October, 2022.
6. Dynamic modulation of m 6 A mRNA methylation in human keratinocytes by chronic arsenic exposure. Oral Presentation. CIEHS Career Development Meeting, University of Louisville, October, 2022

Chen, Shao-yu

1. Keystone Symposia ePannel event: Leveraging Nanoparticle Technologies for Novel Vaccines and Therapeutics, April. 27, 2022
2. Webinar: New discoverites in m6A epitranscriptomics – From cancer, cardiovascular, to covid-19" March 24, 2022.
3. Impact of Covid-19 on the Nervous System. 30th Annual Neuroscience Day, the Louisville Chapter of the Society for Neuroscience. April 8, 2022.
4. Webinar: Diving deeper into the new NIH data management and sharing policy. NIH, Sept. 22, 2022.

Ceresa, Brian

1. University of Louisville – Pharmacology and Toxicology - EGFR Trafficking in The Corneal Epithelium: New Strategies To Promote Wound Healing – January 18, 2022
2. University of Louisville – Department of Ophthalmology and Vision Sciences - Designing Novel Therapeutics to Promote Corneal Epithelial Homeostasis – January 21, 2022.
3. University of Nebraska – Department of Biochemistry - Enhancing Corneal Epithelial Wound Healing via the Endocytic Pathway. May 18, 2022

Clark, Geoff

1. Invited to present short talk "Novel RAS inhibitors for MPNST" at AACR Special conference on RAS. Orlando FL, Jan 7th, 2022.

Feng, Wenke

1. The Intestinal mechanisms of liver disease, can probiotic help? Department of Physiology, LSUHSC. April 2022
2. Intestinal targets and probiotic application in alcohol-associated liver disease. Department of Structural and Cellular Biology, Tulane University, April 2022
3. Intestinal Targets of Probiotic-Derived Extracellular Vesicles in Alcohol-Associated Liver Disease. Gordon Conferences- Alcohol and End-of-Organ Injury, Ventura, CA, April 2022.
4. Mengwei Jiang, Fengyuan Li, Craig J McClain, Lihua Zhang, Jiyeon Lee. Probiotic LGG-derived exosome-like nanoparticles inhibit ALD through intestinal FXR activation in mice: role of miR194 and bile acids. EASL 2022, London, UK. Jun 2022.

Hein, David

1. Acetylation Pharmacogenomics: Paradigm for Informed Individual Risk Assessment Following Environmental Carcinogen Exposure. Association of Clinical Scientists Annual Meeting, Louisville, Kentucky May 2022.
2. Gene-Environmental Interactions of Novel Psychoactive Chemicals Substituting for Illegal Drugs of Abuse. CIEHS Presentations at R!L, University of Louisville, Louisville, Kentucky September 2022.

Hood, Joshua

1. Hood (presenting author), J. L., Schroeder, L. A., & Bardi, G. T. (2022, April 5). A reducible comparison of 2D vs. 3D HepG2 culture-derived sEV characteristics and cancer pathway-related miRNA content. Experimental Biology 2022. Philadelphia, PA: Experimental Biology.
2. Hood (presenting author) (2022, January 24). HepG2 extracellular vesicles: induction of macrophage inflammation-related mRNA content and 3D spheroid sourcing. University of Louisville: Hepatobiology and Toxicology COBRE.
3. Hood (presenting author) (2022, January 28). Hepatocellular carcinoma (HCC)-derived small extracellular vesicles (sEVs) induce inflammation-related mRNAs in macrophages. Hepatobiology and Toxicology COBRE external advisor meeting. University of Louisville: Hepatobiology and Toxicology COBRE.

Kouokam, Calvin

1. Hexavalent Chromium: Inflammation and Chromosome Instability in Lung Carcinogenesis (NIEHS Diversity Supplement Recipient Science Sharing Meeting, July 19, 2022).

Matoba, Nobuyuki

1. Invited talk, "Manufacturing, characterization, and mode of action of the novel mucosal healing protein EPICERTIN" The International Society for Plant Molecular Farming (ISPMF) online workshop, Mar 8, 2022, online.
2. Invited talk, "Molecular farming of biopharmaceuticals" The 22 nd Annual Meeting of the Japan Society of Molecular Neurosurgery, Kanazawa, Ishikawa, Japan, July 23, 2022.

Palmer, Kenneth

1. Palmer KE (2022) Abraham J. Gitlitz Memorial Lecture: Development of a Broad Spectrum Antiviral-based Intranasal Spray as a Pandemic Preparedness Strategy. Abstracts of Presentations at the Association of Clinical Scientists 143 rd Meeting Louisville, KY May 11-14,2022. Ann Clin Lab Sci. 2022 May;52(3):511-525. PMID: 35777803.
2. Palmer KE (2022) Preclinical and clinical development of Q-Griffithsin nasal spray for broad-spectrum coronavirus prophylaxis. International Society for Plant Molecular Farming Mucosal Product Symposium, March 2022.
3. Palmer KE (2022). Preparing for the next pandemic: preclinical and clinical development of a Q-Griffithsin nasal spray. International Society for Plant Molecular Farming Conference, Rome, Italy. September 2022.

Siskind, Leah

1. Invited Grand Rounds, Nephrology, University of California San Diego, November 2022
2. Invited Short-talk, FASEB 2nd Annual Meeting Acute Kidney Injury from Bench to Bedside, Title: Paradoxical roles of autophagy in acute vs. chronic, repeat dose cisplatin-induced AKI, Banff, Canada, May 2022
3. Invited talk, O'Brien Center for AKI Research, Critical Care Research and Therapeutics, San Diego, CA, May 2022
4. Invited Speaker, Gordon Conference on Glycolipids and Sphingolipids, March 2022, Italy

States, J. Christopher

1. Dysregulation of RNA Metabolism in Arsenic Exposed Cells, Oregon State University, Corvallis, OR (10/7/22)
2. M.S./Ph.D. Program in Pharmacology & Toxicology at the University of Louisville, Department of Zoology, University of Rajasthan, Jaipur, India (11/7/22)

3. Dysregulation of RNA Metabolism in Arsenic Exposed Cells, Department of Zoology, University of Rajasthan, Jaipur, India (11/9/22)
4. Heavy Metals: Toxicity and Treatment, IIS (designated University), Jaipur, India (11/10/22)

Wise, John

1. Invited Speaker: "The Carcinogenic Mechanism for Particulate Hexavalent Chromium Translates from Cultured Human Lung Cells to In Vivo Lung Tissue". the 11th Conference on Metal Toxicity and Carcinogenesis, Montreal, Quebec Canada.
2. Invited Speaker: "The Mechanisms of Chromium Carcinogenesis: A One Environmental Health Perspective". The 14th Conference of the International Society for Trace Element Research in Humans (ISTERH) part of the International Conference of Trace Elements and Minerals (ICTEM), Aachen, Germany
3. Invited Speaker: "A Whale of a Tale: Mechanisms of Metal-Induced Chromosome Instability from a One Environmental Health Perspective". Florida International University, Miami, Florida
4. Invited Speaker: "Chromium-Induced Chromosome Instability from a One Environmental Health Perspective". University of Massachusetts, Amherst, Amherst, Massachusetts
5. Invited Speaker: "Mechanisms of Metal-Induced Chromosome Instability" the Inaugural Creighton University Cancer Research Symposium, Virtual
6. Invited Speaker: "Of Whales and Men, How Great Whales Evade Metal Induced Cancer" Presented in the All for One and One for All– One Environmental Health in Toxicology! Symposium. Presented at the Annual Meeting of the Society of Toxicology (SOT), San Diego, California.
7. Invited Speaker: "Chromosome Instability, Disease and Aging- A Fishy Business and a Whale of a Tale", Mount Desert Island Biological Laboratory, Bar Harbor, Maine
8. Invited Speaker: "Gators and Turtles and Whales – OH MY! Tales of Chromosome Instability & Disease Spanning from Molecules to Populations", Presented at the University of Florida, Gainesville, Florida

INVENTIONS, DISCLOSURES, LICENSE/OPTION AGREEMENTS, PATENT AWARDS, AND BUSINESS STARTUPS

Faculty with Primary Appointments

Ceresa, Brian

Disclosure

1. Cbl E3 Ubiquitin Ligase Antagonist to promote corneal re-epithelialization

Gupta, Ramesh

Patents published:

1. U.S. Patent Application 62/797,825, filed 28 January 2020. Exosome-Mediated Transfection for Delivery of Nucleic Acids. Gupta RC, Munagala R, Jeyabalan J, Wallen RM, Spencer WA, Aqil F. US Patent App. 17/425,928; Patent # 20220347109 – A1: Date of Publication: 11.03.2022

Licensing/Sublicensing:

1. Milk exosome technology developed in Dr. Gupta's lab at UofL was licensed to 3P Biotechnology, Inc. for all applications in 2017. 3P Biotechnologies licensed this technology for human pharmaceuticals to PureTech Health, a clinical-stage Biotech company in Boston in August 2017, followed by sublicensing for delivery of anti-sense oligos to Hoffman La Roche, the 2nd largest pharmaceutical company in July 2018.

Business startups:

1. Dr. Gupta founded a biotechnology company (3P Biotechnologies, Inc.) which became operational in 2013. 3P acquired exclusive license of the UofL milk exosome drug delivery technology in February 2017. 3P has licensed this technology for applications to human pharmaceuticals to PureTech Health and Hoffman Las Roche. 3P continues to explore possibilities of licensing to other applications (human nutraceuticals, veterinary pharmaceuticals etc.).

Hood, Joshua

Business startup:

1. Founder and registered agent for Fusion BioNano LLC: Biomedical consulting, specializing in extracellular vesicle education, research, diagnostics, therapeutics, and NIH SBIR and STTR applications.

Matoba, Nobuyuki

Patent applications:

1. Application Number: PCT/US2022/012853 (filing date: 01/19/2022)
   Title: Actinohivin variant polypeptides and related methods (ULRF #21033)
2. Application Number: PCT/US2022/070961 (filing date: 03/04/2022)
   Title: Actinohivin variant polypeptides and related methods (ULRF #20034)

Business startup:

1. Founding member and Chief Scientific Officer, Grow Biomedicine, LLC (7/2019–present)

License Agreement:

1. Evaluation license agreement (ULRF 22106-LA) with Protalix Ltd on our Avaren-Fc technologies (ULRF No. 11001, 16014, 20034, and 21033)

Palmer, Kenneth

1. Issued patent: US Patent 11,339,919B2 Griffithsin mutants. O'Keefe BR, Moulaei, T, **Palmer KE**, Rohan LC, Fuqua JL, Kramzer LF. Assignee: University of Louisville Research Foundation.

Siskind, Leah

1. **Siskind LJ** and Doll MN, Provisional Patent, Docket No. 11258-007PV1, Cell Lines, Systems, Kits, and Methods for Determining the Specificity and/or Potency of Ceramidase Inhibitors.

DEPARTMENTAL COURSES

The Department team taught several courses for graduate students. The individual courses and course directors are listed below:

Spring 2022

•	1021	Regular	PHTX 606	01	SEMINAR	Hong, K.
•	1402	Regular	PHTX 617	01	LAB ROTATION	Siskind, L
•	1022	Regular	PHTX 618	01	TOPICS- PHAR & TOXIC	Siskind, L
•	1023	Regular	PHTX 619	01	RESEARCH	Siskind, L
•	1350	Regular	PHTX 642	01	PHARMACOLOGY II	Song, Z
•	1351	Regular	PHTX 644	01	TOXICOLOGY II	Clark, G
•	1024	Regular	PHTX 661	01	MOLECULAR TOXICOLOGY	States, J Klinge, C., States, C.

Summer 2022

•	1851	Regular	PHTX 617	01	LAB ROTATION	Siskind, L
•	1070	Regular	PHTX 619	01	RESEARCH	Siskind, L
•	1695	Summ 2	PHTX 632	01	DATA ANALYSIS	Kidd, L

Fall 2022

•	1035	Regular	PHTX 606	01	SEMINAR	Hong, K
•	1455	Regular	PHTX 617	01	LAB ROTATION	Wise, S.
•	1037	Regular	PHTX 619	01	RESEARCH	Hein, D.
•	1042	Regular	PHTX 625	01	SCIENTIFIC WRITING	Kidd, L., Kirpich, I.
•	1416	Regular	PHTX 641	01	PRINCIPLES PHARM	Ceresa, B. Siskind, L.
•	1417	Regular	PHTX 643	01	ENVIRONMENTAL TOX	Wise, J.

NON-DEPARTMENTAL COURSES

Dr. Hood directed the required 3 credit Dental Pharmacology and Therapeutics course for D1 students in the School of Dentistry.

Dr. Hein directed the required 3 credit Dental Pharmacology and Therapeutics course for D3 students in the School of Dentistry.

Dr. Hong directed the required 3 credit pharmacology course for Dental Hygiene students in the School of Dentistry.

Several faculty members directed undergraduate research courses listed in other departments and medical student research courses in the School of Medicine.

STANDING COMMITTEES

Graduate Program Recruitment, Admissions and Student Success Council (GPRASSC)

Director of Graduate Program (Chair) [David Hein, Acting]
Director of Graduate Admissions and Recruitment [Geoff Clark]
Assistant Graduate Program Director [Sandra Wise]
Director of Department Seminar Program [Kyung Hong]
Dr. Brian Ceresa
Dr. Shao-yu Chen
Dr. La Creis Kidd
Dr. Nobuyuki Matoba
Dr. John Wise Sr.
Dr. Jamie Young
Idoia Meaza Isusi (Graduate Student Representative)

PhD Qualifying Exam Committee

Dr. David Hein (Chair; Acting Director of Graduate Programs)
Dr. Sandy Wise (Assistant Director of Graduate Programs)
Dr. Calvin Kouokam
Dr. Zhao-hui Song
Dr. Ramesh Gupta
Dr. Jamie Young

Faculty Search Committee

Dr. La Creis Kidd, Chair
Dr. Brian Ceresa
Dr. Kyung Hong
Dr. Joshua Hood
Dr. Sandy Wise

SIBUP/Grievance Committee

Nobuyuki Matoba (Chair)
Dr. Ramesh Gupta
Dr. Zhao-hui (Joe) Song
Dr. Michael Merchant

Teaching Evaluation Committee

Dr. John Wise Sr. (Chair)
Dr. Joshua Hood
Dr. Joshua Fuqua
Dr. Kyung Hong

Climate, Diversity & Inclusion Committee

Dr. La Creis Kidd (Chair)
Dr. Calvin Kouokam
Dr. John Wise Sr.

2022 UofL Cancer Education Program Undergraduates and Faculty Mentors

Last	First	University	Faculty Mentor
Abubakar	Abubakar	UofL	Haixun Guo
Amirneni	Kamal	UofL	Kavitha Yaddanpudi
Collins	Ka'Lynn	UofL	Nobuyuki Matoba
Fernando	Jeraan	UofL	John Wise
Funk	Kyle	UofL	Zhao-hui Song
George	Joan	Centre College	Susan Galandiuk
Greene	Brandon	UofL	Karlynn Brintzenhofeszoc
Jaganathan	Vaitheesh	UofL	Susan Galandiuk
Littlefield	Andrew	Hanover College	Susan Galandiuk
Luulay	Bana	UofL	Banrida Wahlang
Martinez	Madeline	UofL	Mayukh Banerjee
Nguyen	Hoa	UofL	Stephanie Boone
Oyeleye	Ayomikun	UofL	Calvin Kouokam
Palmer	Iona	UofL	Liz Cash
Schwender	Monica	UofL	Sucheta Telang
Southern	Alexander	Indiana University	Joshua Hood
Wichman	Leigh	UofL	La Creis Kidd
Vemuri	Sreevasa	UofL	Sham Kakar

2022 UofL Cancer Education Program Medical Student Participants and their Faculty Mentors

Last	First	Faculty Mentor
Augenstein	Isabell	J. Christopher States
Batista Torres	Ramon	Kelly McMasters
Cahill	Caitlin	John Wise Sr.
Clements	Noah	Robert Martin
Cox	Raven	Haixun Guo
Edwards	Campbell	Rodolfo A Zamora
Filson	Anthony	Robert Martin
Forry	Bryce	Scott Silva
Graves	Danielle	Kathy Baumgartner
Huffines	Rhiannon	Mollie Aleshire
Kabithe	Alyssa	Liz Cash
Osborne	William	Robert Martin
Pierce	Katherine	Robert Martin
Polzin	Baylee	Liz Cash
Wadhwa	Shruti	Michael Egger
West	Natalie	Michael Egger
Wilson	Megan	Norm Lehman
Xu	Manting	J. Christopher States

APPENDIX K: Department of Pharmacology and Toxicology
PhD Written Qualifying Examination

The PhD written qualifying examination is accomplished thru preparation of a PhD dissertation proposal written in the style of an NIH grant proposal (other formats may be acceptable if the PhD proposal is to be submitted to another funding agency). In general, the written PhD proposal with the following elements should be submitted to the members of the advisory committee and deposited in CardBox for review by all department faculty at least two weeks in advance of the scheduled written and oral PhD qualifying exams.

- Abstract (1/2 page)
- NIH current style biosketch
- Budget and budget justification
- Specific Aims (1-page maximum)
- Research Strategy (6 page maximum) including:
    - Background
    - Significance
    - Innovation
    - Approaches including:
        - potential pitfall/alternative approaches
        - statistical analysis
        - justification or prospective power calculation if using vertebrate animals or human subjects
        - data rigor and reproducibility
        - timeline
- Literature Cited

External Reviewer: The student, with their PI, will propose 2 possible choices for an external reviewer to be approved by the PhD qualifying exam committee. This should be a faculty member (UofL faculty are eligible) with expertise related to the area of study. Nominations of the external reviewer should be presented to the qualifying exam committee **a minimum of two months in advance of the PhD proposal defense**; please include a 1-2 paragraph description of their experience/expertise. The qualifying exam committee will choose and inform the student and PI within 1 week.

Evaluation: Each member of the PhD dissertation committee as well as the external advisor will evaluate the PhD dissertation proposal and provide scores and written listings of strengths and weaknesses in each category as outlined on the accompanying evaluation form. This listing will provide a basis for the NIH scoring system (1-9) in each area as well as in overall impact of the proposal. These evaluations will be shared with the PhD student to facilitate **the oral defense of the dissertation proposal before the members of the committee and the external reviewer** and to facilitate submission of the dissertation proposal for extramural funding. The PhD student should revise their PhD dissertation proposal in response to the recommendations of the dissertation committee and the external reviewer to successfully pass the written qualifying examination. The final written and oral qualifying exam result (following revisions to the dissertation proposal if needed) is signed by all committee members (Form EE).

PhD written qualifier evaluation form (additional pages can be added as needed)

Student:

Title of PhD dissertation proposal:

Date of Review:

Evaluator:

Significance:

Investigator:

Innovation:

Approach:

Environment:

Overall impact:

Selection of the thesis/dissertation advisory committee:

Dissertation Committee: Doctoral and Master's dissertation/thesis committees shall be composed of a minimum of four qualified members that includes the dissertation committee chair (Research Mentor). Each person on the committee must be a member of the University of Louisville Graduate Faculty.

Selection of dissertation committee members requires the following:

1. The dissertation committee chair (primary faculty mentor, i.e., Research Mentor) must have Graduate Research Training Faculty Status approved by the Department of Pharmacology and Toxicology.
2. The dissertation committee must have at least one member of the primary PhTx faculty with Graduate Research Training Faculty Status[1].
3. The dissertation committee must have at least one member outside the primary PhTx faculty with Graduate Research Training Faculty Status.
4. All members of the committee must have graduate faculty status[2].
5. Another faculty member not on the committee will serve as the external reviewer. Two names should be submitted to the DGS and the final selection will be made by the PhD qualifying exam committee.

Once a Research Mentor has been selected the student in consultation with the mentor will submit to DGS the names of at least four faculty members that they wish to request to serve on their dissertation committee so that the DGS can ensure that the committee has the appropriate composition and that there are no conflicts of interest. (In cases where there is a potential conflict of interest additional requirements may be imposed. For instance, if a committee member is dependent on the mentor, then a sixth member must be appointed.) This is done by submitting a committee approval form (FORM AA). The DGS will review the committee composition, either making modification request or granting approval. Upon approval, the student needs to complete and submit a Thesis/Dissertation Advisory Committee Form (FORM BB), signed by all committee members. Since this dissertation committee must approve the student's research proposal, the appointment of the committee should occur as soon as possible after the faculty mentor has been selected. Upon receiving signatures from all committee members, the form is further signed by the DGS or ADGS if DGS is unavailable, and then by the Department Chair. The completed form is then forwarded to the School of Medicine Office of Graduate and Postdoctoral Studies for the Associate Dean's signature. A copy of the fully signed form is kept on record by the Graduate School, the department, and the student.

[1]Graduate Research Training Faculty status entitles faculty to all the rights and responsibilities of Graduate Faculty status, and in addition the right to mentor graduate students and serve as chair of dissertation or thesis committees. This level of appointment requires evidence of teaching, active research and scholarly activity as provided by recent publications, abstracts and extramural grants. It also requires at least a 20% work assignment in research indicated on the faculty members annual work plan. Graduate faculty status will be reviewed at the time of the faculty member's periodic career review.

[2]Graduate Faculty status entitles faculty to teach in graduate courses, mentor Audiology clinical research/service projects, direct Speech Pathology graduate projects and serve on graduate student thesis

and dissertation committees. It requires an earned doctorate/terminal degree in the teaching discipline or a related discipline; evidence of experience in either: research, teaching, scholarship or creative activity; and a commitment to graduate education.

CONFIDENTIAL

University of Louisville School of Medicine
Pharmacology & Toxicology Chair Review
2016-2020
Report to Dr. Toni Ganzel, Dean
(October 26, 2022)

CONFIDENTIAL

University of Louisville School of Medicine
Pharmacology & Toxicology Chair Review
2016-2020
Report to Dr. Toni Ganzel, Dean

1. Introduction

In July 2022 Dr. Toni Ganzel, Dean of the School of Medicine, appointed a committee to review the stewardship of David Hein, PhD. as Chair of the Department of Pharmacology & Toxicology for the period 2016-2020. The Committee met for the first time on August 30, 2022 and was charged by Dr. Ron Paul on behalf of the Dean to conduct the review in accordance with the applicable policies and guidelines of the University of Louisville and the School of Medicine. After receiving its charge, the Committee elected Dr. Haribabu Bodduluri as Chair.

Dr. Hein was appointed Chair on August 1, 1997. This is the fourth review of Dr. Hein's performance as Chair.

This report includes a listing of information resources used by the Committee, a summary of the key findings, and the Committee's recommendation to the Dean. Copies of survey results are included as an appendix to this report.

2. Committee Membership

Haribabu Bodduluri, Ph.D., Professor, Department of Microbiology & Immunology
Rodrigo Cavalazzi, M.D., Associate Professor, Department of Medicine
Nicole Herring, PhD., Associate Professor, Department of Anatomical Sciences & Neurobiology
Chithra Ram, M.B.B.S., Associate Professor, Department of Radiology
David Samuelson, Ph.D., Associate Professor, Department of Biochemistry and Molecular Genetics

3. Materials Reviewed

A. Questionnaires
B. Narrative Performance Evaluations (internal and external)
C. Dr. Hein's current Curriculum Vitae
D. Dr. Hein's 5-year progress report

4. Interviews Conducted

A. Dr. Hein – Introductory meeting with full Committee
B. Faculty of the Department

5. Summary of Committee Findings

Overview:

The department of Pharmacology and Toxicology has immensely benefited from the exemplary leadership of Dr. David Hein over two decades. His unique leadership qualities are evident from the sustained role as department chair for over 40 years at various institutions. The surveys, questionnaires, and interviews with faculty members at all levels further attest that Dr. Hein is providing an outstanding leadership to the department. One of the key issues that emerged from these discussions is his anticipation of potential upcoming issues and prepare well for different scenarios. The pandemic has created some unexpected changes in the operation of graduate program, finances, and retirement related teaching overloads. He has assumed the responsibilities of operating the graduate program as well as taking on major teaching assignment besides running a productive research enterprise in direct demonstration of the phrase ***leading from the front***. The department continues to be a leader in the teaching and research mission of the School of Medicine. There has been a significant improvement in the extramural funding, student graduations, research publications, and awards in the department during the past five years. Some areas of concern include the lag in faculty replacement as retirements and relocations and consequent overload of work for some faculty, as was apparent from the Chair's own work assignment. It is also an appropriate to develop a succession plan for the departmental leadership. Dr. Hein has outlined some measures to mitigate these issues and with the support of SOM, the department will continue to do well. In general, the committee finds that the faculty members, staff, and students are all satisfied with his leadership role and would like to have him chair for the next five years.

A. Academic Program:

Under the leadership of Dr. Hein, the Pharmacology Department has played a major and diverse role in the Academics Program on the Health Sciences campus including numerous graduate courses for students from different departments, a pharmacology course for the Dental Hygiene program, a pharmacology and dental therapeutics course for Dental students, and pharmacology instruction in the integrated curriculum for the 1st and 2nd year medical students. With a relatively expansive teaching mission for both graduate and health professional students, there is not only a need for faculty to support the graduate program, but also for dedicated educational faculty for the health sciences professional students.

In regard to overall student education, several faculty in the department have retired or been recruited to other institutions over the review period. Additionally, the Director of

Graduate Studies has recently stepped down with Dr. Hein filling the role as Acting Director in the Department. Both Dr. Hein and faculty in the department noted that the department is stretched thin in its teaching mission. The current focus is to recruit a graduate program director and vice chair. Faculty have noted that Dr. Hein is often the first person to take on additional duties and this is supported not only by his current role as Acting Director of Graduate Studies, but also the heavier teaching load Dr. Hein currently has undertaken. The hiring practice in the department of bringing faculty into Centers and Institutes for research or a combination of teaching and research may be limiting the educational mission of the Department as faculty have not been recruited for their educational merits or for an education focused track.

The Department has a large and robust graduate program. During this review period, the Department conferred nearly 100 graduate degrees in Pharmacology & Toxicology. The Department has invested in mentoring of students including hosting an NCI R25 and two NIH T35 training grants for medical students (with the NIH R25 also supporting undergraduate students), and an NIH T32 training grant for graduate students and postdoctoral fellows. Additional grant funds maintained by the faculty in the Department extensively has also supported mentoring of medical students, graduate students, and undergraduate students. The graduate student survey data is positive for education and research. Faculty did note a need to assess graduate student recruitment as the number of students has decreased over the years. This has been due in part to the phasing out of international partnerships. With departmental faculty spread out across several Centers & Institutes with diverse focuses, there is concern from both faculty and students regarding continued student success, support, and well-being especially with the lack of a permanent Director of Graduate Studies. Faculty also noted that the Department may need to revitalize the Graduate Program to better fit the modern needs of students.

In regard to the educational missions of the Department, Dr. Hein is to be commended for the diverse roles the Department serves in the education of graduate, medical, dental, & dental hygiene students. These missions have been retained even with a significant loss of faculty and throughout the turbulence of the pandemic years. Dr. Hein should also be praised for his leadership in undertaking additional educational responsibilities as the needs presented themselves. However, this also indicates that the current teaching load per faculty work effort and distribution to research and service is not sustainable. In looking ahead, there will be large vacancies in the educational missions when Dr. Hein retires that will not be able to be fulfilled by the current faculty or simply by the hiring of a full-time Director of Graduate Studies

B. Research:

The department of pharmacology and toxicology has a strong research component. Collectively, the department had 364 publications from 2016-2022, which is an average of 73 publications per year. NIH funding to the department averaged $4.5 million per year from 2016-2020. Major funding mechanisms were from NIEHS (P30, P42, T32) and NIGMS (COBRE). Investigator initiated grant awards are funded by NCI, NEI, NIAA, NIAID, NIDDK, NIEHS, and DoD. The University of Louisville Department of

Pharmacology & Toxicology ranks 24th on the Blue Ridge Institute's medical research ranking of pharmacology departments. Overall, the department has an excellent research portfolio. Dr. Hein's independent research program was also highly productive from 2016-2020. Dr. Hein published 23 peer-reviewed articles as corresponding author and three as supporting author during the review period. He also contributed intellectual material for two book chapters during that time. His productivity easily provides an inspirational benchmark for the departmental faculty.

Based on faculty interviews, it was clear that Dr. Hein, as department chair, is highly supportive of research and principal investigators in the department. There was a majority view that the department would benefit from external faculty hires and more graduate students to further improve the research portfolio. Some faculty expressed a desire for more departmental support for equipment purchases and equipment maintenance. It was generally agreed that the department's research environment and abilities would be enhanced and better supported if the institution provided a centralized location to house faculty labs and offices. It would further strengthen the department research enterprise if it was able to support future faculty hires with departmental funds instead of depending on support from centers to pay faculty salaries.

C. Department Administration:

Dr. Hein has been described as an advocator for his faculty. He is considered selfless, and some faculty pointed out that he fills in roles when needed and leads by example. He has been described as very approachable. While most faculty felt that department finances were openly discussed, one felt there could be more clarity on funding support from the department.

More than one faculty highlighted that his approach is inclusive and supportive of minorities. Several have described him as professional and fair. He also has been described as financially conservative and extremely knowledgeable of regulatory issues and rules.

Some of the challenges he is facing is a perception by more than one faculty of a lack of adequate University infrastructure. This does not necessarily reflect Dr. Hein's management performance, but it is nonetheless a challenge which may have an impact on his role as a chair. According to the notes obtained from his interview, Dr. Hein himself recognizes the need for a departmental office and more space.

Dr. Hein will be recruiting a Vice Chair/program director, and this may have important implications in the in the succession plan and future of the department. While this may not be the most productive channel for hiring a future chair, it should certainly alleviate the issue of faculty loss due to attrition and migration. It was also noted there has been effort to bring junior faculty. Indeed, the junior faculty interviewed felt very supported by Dr. Hein. Challenges include continued recent loss of faculty members, and the perceived difficulty in co-recruiting faculty with the Centers and Institutes.

D. Finances:

As to the Funding status of the Department, they receive help from the school and their support themselves through their various research grants. Recently, a P42 Superfund research proposal was approved for $11 million on Sep.1 2022. They have 2 NIH training grants for medical and high school students. Pre and post doc grants were obtained first by the Pharmacology dept.

Based on the financial statements review, their fund balance/ reserve has declined over the years but still is very good and positive during the COVID times [from 5.78 mil in 2016 to 2.72 mil in 2020]. When questioned about it, Dr. Hein shared that it has been difficult during the recent times and COVID made it much harder. Mention was also made about a large cut to the budget from institutional funds in 2016.

Staff and faculty comments showed their respect for him as a leader, who is wise, resourceful and empathic. It appears that the information regarding the departmental budget and resources have been shared with the faculty on a regular basis. Various faculty recollected it to varying extent but the general consensus was that it was shared and available for discussion. There was a senior faculty who stated that he liked working with Dr. Hein and respected him but also voiced some concern regarding inadequate additional departmental support for his research project. When further discussed with different faculty and the business manager about fund allocation within the department, it appeared that the junior faculty and those without adequate grant help were helped a little more than some with their own grants. Resource sharing seemed to be based on equity and available budgeted resources at that time.

Some financial concerns include budget cuts from the medical school like the legacy amount in 2016. Future budget cuts relating to Distinguished scholar funding which supplements up to 40% of some faculty salary, is to be discontinued from December 2023. These could affect faculty retention and hiring. When asked about the chairman's future plans to improve their budget, Dr. Hein said one of his concerns was regarding unfunded research. This department helps various other departments with their research but isn't remunerated adequately and the chairman is planning to find a balance between supporting others while also getting some monetary support in return for his department. They are also looking to hire a prominent outside faculty as vice chair and get additional packages and grants for their department. Though Dr. Hein can work a few more years, he wondered if his retirement as chair could help his department gain a new outside faculty as Chairman with better packages and a newer vision.

6. Committee Recommendation

The Committee unanimously recommends that David Hein, Ph.D. be re-appointed as Chair. We believe that Dr. Hein has been leading the department with professionalism, fairness, and high level of expertise and knowledge of regulatory issues. Our recommendation is to offer him the opportunity to remain in his role as chair of the department of Pharmacology if he is willing to serve in this role.

CONFIDENTIAL

During the review process, several items came to the Committee's attention that the Committee believes would be worthy of Dr. Hein's consideration during the next five years. These items are listed below:

- Most faculty are concerned about the health of the graduate program. While this may be a nationwide problem exacerbated by the pandemic some department specific issues have to be resolved, starting with the recruitment of a program director.
- A succession plan needs to be in place for transition of the leadership to preserve the legacy of the outstanding contributions of Dr. Hein over two decades.

Respectfully submitted,

Pharmacology & Toxicology Chair Review Committee

Haribabu Bodduluri, PhD, Committee Chair

Rodrigo Cavalazzi, M.D.

Nicole Herring, PhD.

Chithra Ram.

Chithra Ram, M.B.B.S.

David Samuelson, Ph.D.