2021 Annual Report

Overview

The Department of Pharmacology and Toxicology FY2021 NIH funding level ranked 24th among all Departments of Pharmacology in US medical schools and its total extramural funding ranked 2nd among all UofL School of Medicine Departments. Notable funding included **a $6.7M NIEHS grant through the Revolutionizing Innovative, Visionary Environmental Health Research (RIVER) program** to Professor John Wise Sr., and renewals of the NIEHS T32 training grant in environmental health sciences and the NIGMS P30 Hepatobiology and Toxicology COBRE.

Some of the highlights of the year are presented below with hyperlinks to further information:

- **Professor John Wise Sr. recipient of $6.7M NIEHS grant through the Revolutionizing Innovative, Visionary Environmental Health Research (RIVER) program**
- **Society of Toxicology honors PhTx faculty and students**
- **Professor John Wise Sr. receives Outstanding Career Achievement in Education Award from School of Medicine**
- **Sophia Sears and Sarah Shrader receive K.C. Huang Outstanding Graduate Student Awards**
- **Superfund Program announces KC Donnelly Externship Award Winner and Posts Information Film**
- **NIEHS T32 and T35 training grants in environmental health sciences receive 5-year funding renewals**
- **Pharmacology and Toxicology welcomes 8 new graduate students**
- **PhTx graduate students sweep presentation awards at annual meeting of the Genetic Toxicology Association**
- **PhTx graduate students receive top presentation awards at summer meeting of the Ohio Valley Society of Toxicology**
- **Three PhTx graduate students receive foundation awards from Society of Toxicology**
- **Hepatobiology and Toxicology Center receives $11.3M additional NIH funding**
- **UofL team identifies coronavirus variants in waste water; receives $8.6M grant to estimate prevalence**

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.

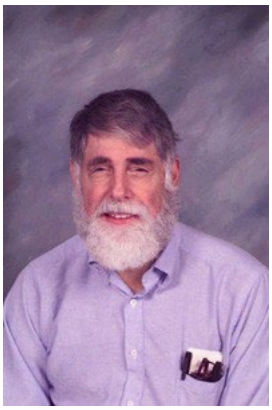
Promotion of Primary Faculty Members

Joshua Hood, M.D. Ph.D. was promoted to Associate Professor with Tenure.

Retirement of Primary Faculty Members

Igor S. Lukashevich, M.D., Ph.D., D.Sc.

Retirement of Secondary Faculty Members



George C Rodgers, M.D., Ph.D.
Professor of Pediatrics

Departures of Primary Faculty Members

Joshua L. Fuqua, Ph.D.
Assistant Professor of Pharmacology and Toxicology
Ph.D., Anatomy and Neurobiology, University of Kentucky – 2010
Dr. Fuqua accepted a position as Director of Process Development and Clinical Manufacturing at Kbio.

Jonathan H. Freedman, Ph.D.
Professor of Pharmacology and Toxicology
Ph.D., Molecular Pharmacology, Albert Einstein College of Medicine – 1986
Dr. Freedman accepted a faculty position at the University of North Carolina-Chapel Hill.

New Appointments of Secondary Faculty Members

Jiapeng Huang, MD, PhD, FASA, FASE, D.ABA, D.NBE
Professor, Department of Anesthesiology and Perioperative Medicine
M.D., Beijing Medical University, 1997
Ph.D., Biochemistry and Molecular Biology, University of Southern California, 2002

Departures of Secondary Faculty Members

Chendil Damodaran, Ph.D.
Associate Professor, Department of Urology,
Ph.D., Environmental Toxicology (Cancer Biology) University of Madras, India - 1994

Lee Donghan, Ph.D.
Associate Professor of Medicine, Director, Brown Cancer Center NMR Facility
Ph.D., Biophysics, Swiss Federal Institute of Technology (ETH) - 2003

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
Professor and Director of Graduate Admissions and Recruitment

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.

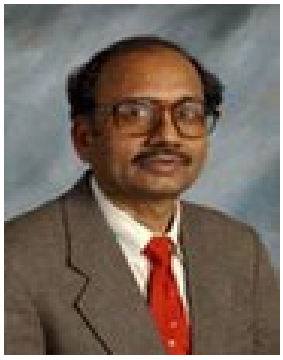
Jonathan H. Freedman, Ph.D.
Professor

Dr. Freedman's research interests can be divided into two broad categories: basic and applied. The tools developed as part of the applied research program are used to advance basic research. Likewise, mechanistic information derived through basic research projects is adapted and then developed into applied protocols. The basic research program involves understanding how exposures to environmental factors contribute the development and/or exacerbation of human diseases. Our group is focused in the roles of transition metals (cadmium and zinc) and diet in the etiology of cancer, metabolic syndrome (e.g., type II diabetes) and Autism Spectrum Disorder. We are applying a systems biological approach; where interactions among phenotypes, genetics, transcriptomics and environmental factors at the molecular, cellular, organ and whole organism level are characterized in an integrated manner. This holistic approach allows us to develop novel models to delineate the mechanism(s) by which multiple factors come together to produce human disease. Our group utilizes model organisms (*Caenorhabditis elegans* and mice) and mammalian cell culture, as well as high-throughput screening technologies to explore the environmental contributions to these human diseases.

The applied research program is focused on the development of alternative organisms for *in vivo* toxicological testing. This project is part of the international effort to reduce, refine and replace mammalian species in toxicity testing. We utilize the technologies and statistical methods already developed in the laboratory for high-throughput toxicity testing using *C. elegans* to other biomedically-relevant model organisms; *Daphnia*, *Drosophila*, Zebrafish and *Xenopus*.

Joshua L. Fuqua, Ph.D.
Assistant Professor

Development of proteins and biologic for therapeutic and diagnostic indications in infectious disease, cancer, and neurodegenerative disease. Dr. Fuqua has experience in preclinical product development ranging from drug manufacturing to toxicology studies. He has familiarized himself with Project Management and Regulatory Affairs applications in the pharmaceutical industry through external certificate programs and practice.



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.

Kyung U. Hong, Ph.D.

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

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.
Assistant Professor

Dr. Hood's lab is focused on the translational design and implementation of biology inspired nanomedicines supported by nanoscale biologic extracellular vesicle (EV) investigations. Understanding EV function and nanocarrier properties in the context of tumor angiogenesis, macrophage function and pre-metastatic niche formation are explored in the context of melanoma, lung and liver cancer. Other derivative projects include development of small EV/exosome-based biomarkers for cancer and synthetic nanomedicines to combat pathogenic EVs and similarly structured viruses. Our long-term goal is to develop and translate personalized EV-based diagnostics and therapeutics for cancer.

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 in order 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 in order 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.

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.

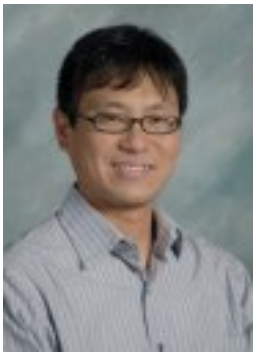
It is her hope that her research findings will lead to the discovery of therapeutic targets for the effective treatment of aggressive and lethal forms of cancer. Such efforts will help to reduce the burden of this disease among cancer patients and their families.

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.

Igor S. Lukashevich, M.D., Ph.D., D.Sc.
Professor

Dr. Lukashevich research interest includes pathogenesis of liver dysfunctions caused by highly pathogenic RNA viruses causing hemorrhagic fevers (HFs). In collaboration with Dr. Arteel's team, he discovered a novel mechanism of liver involvement in pathogenesis of viral HFs. According to this mechanism, the virus-induced pathophysiological hepatocyte proliferation is accompanied by cell cycle arrest and contributes to expansion of the infection to parenchymal cells. Elevated levels of plasma transaminases are likely explained, at least in part, by aborted hepatocyte proliferation causing apoptotic events and induction of oval cells, the "second line" of liver protection against the injury. These results may lead to the development of new therapeutic interventions for devastating diseases caused by HF viruses (e.g., Lassa, Machupo, Ebola). Development of new preventive vaccines based on advanced vaccine technologies is another scientific avenue in Dr. Lukashevich lab. He designed several promising vaccine candidates against Lassa HF, the most prevalent HF in West Africa, and against South American HFs. He co-invented infectious DNA (iDNA) technology to improve existing and experimental live-attenuated vaccines against Yellow Fever, Venezuelan Equine Encephalitis, Japanese Encephalitis, and Chikungunya. This technology combines advantages of naked DNA immunization and high efficacy of live-attenuated vaccines. The iDNA-launched vaccines are "manufactured" in vaccinated individuals and do not require traditional vaccine manufacturing facility and technology.



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; Director, Graduate Program

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.

ADMINISTRATIVE STAFF

Sonya Cary Fin/Ops Department Manager - HSC

Faculty with Secondary Appointments

Gregory Barnes, M.D., Ph.D.

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

Research Interests: The long-term goals of this research is to conduct studies in models of autism and epilepsy to aid in the identification of therapeutic drug targets to ameliorate the burden of neurologic disease in these children.

Shirish Barve, Ph.D.

Professor, Department 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.

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

Research Interests: gene-environment interactions in development, diseases, and regeneration of the CNS.

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.

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)

Research Interests: Investigating the mechanobiological drivers of disease progression, with a focus on neurodegeneration and glioblastoma invasion

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.

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, Department 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.
Assistant Professor, Department of Medicine
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.

Petra Habberzettl, 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, MD, PhD, FASA, FASE, D.ABA, D.NBE

Professor, Department of Anesthesiology
M.D., Beijing Medical University, 1997
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.
Assistant Professor of Medicine
Ph.D., Cardiovascular and Molecular Medicine, University of Manchester

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 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 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.

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)

Research Interests: Health promotion in urban environments

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.
Associate Professor, Department 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, Department of Medicine
Ph.D. Pomeranian Medical University (2009)

Research Interests: Innate immunity in myocardial repair.

Jun Yan, M.D., Ph.D.
Professor, Department of Surgery 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

John C. Lipscomb, Adjunct Associate Professor of Pharmacology and Toxicology; PhD, Pharmacology and Toxicology, University of Arkansas for Medical Sciences (1991)

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

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

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)

2021 NEW GRADUATE STUDENT CLASS

Ngozi V. Adeile

B.S., Pharmaceutical Sciences: Pharmacology and Toxicology, University of Toledo

Oluwanifemi Esther Bolatami

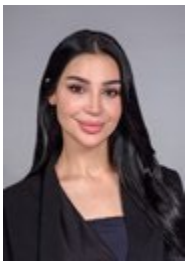
B.A., Biochemistry and Molecular Biology, Lewis and Clark College
M.S., Applied Anatomy, Case Western Reserve University

Dakotah Cathey

B.S., Chemistry, University of Louisville

Wendy M. Cecil

B.S., Molecular Technology; B.S. Biochemistry
Western Kentucky University



Dana Hammouri

B.S., Pharmacy; M.S., Clinical Pharmacy, Jordan University of Science and Technology

Ariel A. Magee

B.A., Biology; B.A., Chemistry, Greenville University

Samuel T. Vielee

B.S., Biology, University of Alabama

Caitlin C. Wilkerson

Class of 2021
B.S., Biochemistry and Molecular Biology, Bellarmine University

Graduate Students

Abersold, Alyssa
Adeile, Ngozi
Amin ElNagdy, Mohamed
Attia, Rasha
Bodduluri, Neil
Bolatami, Oluwanifemi
Cathey, Dakota
Cecil, Wendy
Croom-Perez, Taylor
Dent, Mathhew
Dwenger, Marc
El-Baz, Nagwa
Gomes, Daniel
Gripshover, Tyler
Hammouri, Dana
Hoffman, Nicholas
Jiang, Mengwei
Jigo, Raphael
Kim, Christine
Krueger, Austin
Lu, Haiyan
Lykoudi, Angeliki
Magee, Ariel
McFall, Samantha
Meaza Isusi, Idoia
Miller, Hunter
Orwick, Andrew
Raph, Sean
Reeves, Micaela
Sears, Sophie

Shrader, Sarah
Slone, Lucy
Tarvestad, Kate
Taylor, Breandon
Toyoda, Jennifer
Walls, Kennedy
Wei, George
Whitt, Aaron
Williams, Aggie
Wilkerson, Caitlin
Vielle, Samuel

Angeliki Lykoudi	M.S.	2021	J. Christopher States, Ph.D.	Assessing the role of arsenic exposure and miRNA-186 in skin tumorigenesis and chromosomal instability
Matthew W. Dent	Ph.D.	2021	Nobuyuki Matoba, Ph.D.	Preclinical development of Avaren-FC: A novel lectin-FC fusion protein targeting cancer-associated high-mannose glycans
Nicholas A. Hoffman	M.S.	2021	Leah Siskind, Ph.D.	The role of sphingolipids in AKI and the progression to CKD: potential therapeutic targets
Idoia Meaza Isus	M.S.	2021	John P. Wise, Sr., Ph.D.	Translating particulate Cr(VI)-induced chromosome instability, loss of homologous recombination repair and targeting of RAD51 from human lung fibroblasts to bronchial epithelial cells
Sophia M. Sears	Ph.D.	2021	Leah Siskind, Ph.D. & Levi Beverly, Ph.D	Characterizing the role of macrophages in cisplatin-induced kidney injury and progression to chronic kidney disease
Marc M. Dwenger	Ph.D.	2021	Matthew A. Nystoriak, Ph.D.	Pyridine nucleotide redox potential in coronary smooth muscle couples myocardial blood flow to cardiac metabolism
Srineil Bodduluri	M.S.	2021	Shirish Barve, Ph.D.	Histone deacetylases in alcohol associated liver disease
George Z. Wei	Ph.D.	2021	Scott R. Whittemore, Ph.D. & Michal Hetman, M.D., Ph.D.	Oligodendrocyte responses after spinal cord injury
Tyler C. Gripshover	M.S.	2021	Matthew C. Cave, M.D.	Investigating the effects of perfluorooctanoic sulfonate (PFOS) and ethanol on fatty liver disease using a modified NIAAA model
Andrew J. Orwick	M.S.	2021	Leah Siskind, Ph.D. & Levi Beverly, Ph.D.	The role of PGC-1α in repeated low-dose cisplatin-induced kidney injury and the progression to chronic kidney disease
Kennedy M. Walls	M.S	2021	David W. Hein, Ph.D. & Kyung U. Hong, Ph.D.	Heterocyclic amines and arylamine N-acetyltransferase 2 polymorphism in pathogenesis of insulin resistance
Austin M. Krueger	M.S.	2021	Leah Siskind, Ph.D. & Levi Beverly, Ph.D.	Characterizing the role of Src in NSCLC cell and fibroblast migration on 3D cell-derived matrix
Micaela A. Reeves	M.S.	2021	Nobuyuki Matoba, Ph.D.	Preclinical development of Epicertin, a novel biotherapeutic for the treatment of ulcerative colitis

Mohamed A. Elnagdy	M.S.	2021	Leila Gobejishvili, Ph.D.	PDE4 inhibition: A novel therapeutic strategy of liver fibrosi
Sean M. Raph	M.S.	2021	Matthew A. Nystoriak, Ph.D.	Myocardial blood flow control by oxygen sensing vascular KVβ proteins
Christine Kim	Ph.D.	2021	Brian P. Ceresa, Ph.D.	Assessing the role of arsenic in the EGFR signaling axis

FACULTY HONORS

Chen, Shao-Yu

- Distinguished University Scholar, University of Louisville
- Appointed to the Publication Committee, Society for Birth Defects Research and Prevention.
- Appointed to Associate Editor of the Journal of Hazardous Materials (Impact factor: 9.038).

Hood, Joshua

- 2021, Nominated as a basic science faculty representative of the School of Medicine, who teaches a course in the DMD curriculum, for The DMD Program Curriculum Committee.
- Accepted into the NASA STAR (Spaceflight Technology, Applications and Research) program., 2021, NASA Space Biosciences Division. The applicant pool for 2021 was highly competitive, with over 100 applicants from 19 countries.

Kidd, LaCreis

- Multicultural Teaching Award, University of Louisville, School of Medicine
- Coming to America: Bridging the Gap Award - This Award identifies selfless individuals who are working for the betterment of the global inclusion of Black people in their various communities and workspace. By tackling issues and differences through cultural exchange, education, empowerment and humanitarian
- "Our Highest Potential" Endowed Chair in Cancer Research, James Graham Brown Cancer Center, University of Louisville (UofL), School of Medicine
- Recognition of contributions in service in the field of Cancer Research among men of African, European and Caribbean Descent, Honorable Jefferson County Commissioner District C and the National Action Network Louisville, KY State Chapter
- One of Four Inspiring Black Scientist in Kentucky, Recognized by Kentucky IDeA Networks of Biomedical Research Excellence
- Student Champion Award, Recognized for devotion to student success by the President of UofL
- Nomination for Presidential Multicultural Teaching Award by School of Medicine, University of Louisville
- One of Four Inspiring Black Scientist in Kentucky, Recognized by Kentucky Ideal Networks of Biomedical Research Excellence

Matoba, Nobuyuki

- Appointed as the R&D Director of Biopharmaceutical Research Unit at the Center for Predictive Medicine (10/2021 – present)

Palmer, Kenneth E.

- Healthcare Hero Award from Louisville Business First.

- Nominee and finalist for University of Louisville Faculty Excellence Award in Basic and Applied Research Category.
- University of Louisville Student Champion Award.

Siskind, **Leah J**
- Student Champion Award, University of Louisville, 6/30/2021

States, Christopher
- UofL Distinguished University Scholar

Wise, John
- Distinguished University Scholar, University of Louisville
- Faculty Excellence Award, Career Achievement in Education, University of Louisville, School of Medicine
- Faculty Excellence Award, Career Achievement in Education, University of Louisville, School of Medicine
- Faculty Excellence Award, Career Achievement in Education, University of Louisville, School of Medicine

STUDENT HONORS

Jigo, Raphael (Clark)
- 1st Place, Research!Louisville, Master's Basic Science Graduate Student Award

Schroder, Luke (Hood)
- Research Elevator Pitch Award, 1st place, Undergraduate Student Category, 2021, Research!Louisville, October 29, 2021, Louisville, KY
- NCI Cancer Education Program, Norbert J. Burzynski Award, 3rd place, Undergraduate Student Category, Research!Louisville, October 29, 2021, Louisville, KY

Nabeta, Henry (Palmer)
- graduated Ph.D. in December 2021 and Received the Graduate School Dean's Citation.

Sears, Sophie (Siskind)
- 2021 ASN Kidney STARS Award Recipient Ms. Sarah Shrader: International Cannabinoid Research Society travel award certificate for the annual meeting at Galway, Ireland (meeting canceled due to COVID).

Nail, Alexandra (States)
- Research!Louisville 2021 1st Place, NCI Cancer Education Program, Norbert J. Burzynski Award, Professional Student Category.

Toyoda, Jennifer (Wise, J)

- First Place, Three Minute Thesis (3MT), Ohio Valley Society of Toxicology (OVSOT)
- First Place, (Jennifer Toyoda), Best Graphical Abstract, Ohio Valley Society of Toxicology (OVSOT)
- Dissertation Completion Award, University of Louisville
- Envoronmental Mutagenesis and Genomic Society Emerging Scientist Award, Environmental Mutagenesis Society
- First Place, Three Minute Thesis, University of Louisvile

Lu, Haiyan (Wise, J)

- First Place, (Haiyan Lu), Three Minute Thesis (3MT), Ohio Valley Society of Toxicology (OVSOT)
- GTA "Exemplary Abstract" Award, (Haiyan Lu), Genetic Toxicology Association
- First place, (Haiyan Lu), Three Minute Thesis (3MT), Society of Toxicology (SOT)

Meaza, Idoia (Wise, J)

- First Place, Graduate Student Platform Presentation, Ohio Valley Society of Toxicology (OVSOT)
- First Place, Three Minute Thesis (3MT), Ohio Valley Society of Toxicology (OVSOT summer meeting)
- Environmental Carcinogenesis Merit Award for Graduate Students, Carcinogenesis Section of the Society of Toxicology

Doyle, Cates

- Third Place (Cates Doyle), 90 Second Elevator Pitch, University of Louisville

Williams, Aggie

- GTA "Exemplary Abstract" Award, Genetic Toxicology Association
- First place, People Choice Award "3 Minute Thesis" Competition, Society of Toxicology (SOT)

PHARMACOLOGY & TOXICOLOGY PUBLICATIONS

Faculty with Primary Appointments and Students/Post-Doctoral Fellows

1. Ferragut Cardoso, A., Nail, A. N., **Banerjee, M.**, States, J. C. mirna dysregulation is an emerging modulator of genomic instability. Semin Cancer Biol. 76:120-131. doi: 10.1016/j.semcancer.2021.05.004.
2. **Banerjee M.**, Ferragut Cardoso A., Al-Eryani L., Pan J., Kalbfleisch T. S., Srivastava S., Rai S. N., States J. C. (2021). Dynamic alteration in miRNA and mRNA expression profiles at different stages of chronic arsenic exposure-induced carcinogenesis in a human cell culture model of skin cancer. Arch Toxicol. 95:2351-2365. doi: 10.1007/s00204-021-03084-2.
3. Nail A. N., Ferragut Cardoso, A., **Banerjee, M.**, States, J. C. 2021. Circulating mirnas as biomarkers of toxic heavy metal exposure. In: Sahu SC, editor. Genomic and epigenomic biomarkers of toxicology and disease: Clinical and therapeutic actions. John Wiley & Sons Ltd. p.
4. Crotchett, B.L.M. and **Ceresa, B.P.** (2021) Knockout of c-Cbl Slows EGFR Endocytic Trafficking and Enhances EGFR Signaling Despite Incompletely Blocking Receptor Ubiquitylation, *Pharm. Res. & Persp*., 9(2):e00756. PMCID: PMC8019067
5. Baratta, R.O., del Buono, B., Schlumpf, E., **Ceresa, B.P.,** Calkins, D.J., (2021) Collagen Mimetic Peptides Promote Corneal Epithelial Cell Regeneration, *Frontiers in Pharmacology*, Aug 16;12:705623. PMCID: PMC8415399
6. Kim, C., **Ceresa, B.P**. (2021) Using *In Vitro* Models To Dissect The Molecular Effects Of Arsenic Exposure In Skin and Lung Cancer, *Applied in vitro Toxicology*. https://doi.org/10.1089/aivt.2020.0026
7. **Ceresa, B.P.** (2021) Prime Time for the Recycling Endosome *EMBO J*, 40(14):e108758. PMCID: PMC8447598
8. **Ceresa, B.P.** and Peterson, J.L., (2021) Epidermal Growth Factor Receptor in the Corneal Epithelium, *Cells* Sep 13;10(9):2409. PMCID: PMC8470622.
9. Donninger H, Harrell-Stewart D, **Clark GJ**. Methods Mol Biol. *Detection of Endogenous RASSF1A Interacting Proteins*. 2021;2262:303-310. doi: 10.1007/978-1-0716-1190-6_18.
10. Donninger H and **Clark GJ.** *RASSF2 and the PAR-4 connection*. Chapter 9. pp253-262. In Tumor Suppressor Par-4: Structural Features, Molecular Mechanisms and Function. Editor Ragnakar V. Pub. Springer.
11. Rashed MZ, Kopechek JA, Priddy MC, Hamorsky KT, **Palmer KE**, Mittal N, Valdez J, Flynn J, Williams SJ (2021). Rapid detection of SARS-CoV-2 antibodies using electrochemical impedance-based detector. *Biosens Bioelectron.* 2021 **1**;171:112709. PubMed PMID: 33075724.
12. Kramzer LF, Hamorsky KT, Graebing PW, Wang L, Fuqua JL, Matoba N, Lasnik AB, Moncla BJ, Zhang J, **Palmer KE**, Rohan LC (2021) Preformulation characterization of Griffithsin, a biopharmaceutical candidate for HIV prevention. *AAPS PharmSciTech.* **22**(3): 83. PMID: 3365602
13. Minooei F, Fried JR, Fuqua JL, **Palmer KE**, Steinbach-Rankins JM. (2021) In vitro study on synergistic interactions between free and encapsulated Q-Griffithsin and antiretrovirals against HIV infection. *Int. J. Nanomedicine* **16:** 1189-1206. PMID 33623382.

14. Teng Y, Xu F, Zhang X, Mu J, Sayed M, Hu X, Lei C, Sriwastva M, Kumar A, Sundaram K, Zhang L, Park JW, Chen SY, Zhang S, Yan J, Merchant ML, Zhang X, McClain CJ, Wolfe JK, Adcock RS, Chung D, **Palmer KE**, Zhang HG. (2021). Plant-derived exosomal microRNAs inhibit lung inflammation induced by exosomes SARS-CoV-2 Nsp12. *Mol. Ther.* **29**(8):2424-2440. PMID: 33984520.
15. Drayman N, DeMarco JK, Jones KA, Azizi SA, Froggatt HM, Tan K, Maltseva NI, Chen S, Nicolaescu V, Dvorkin S, Furlong K, Kathayat RS, Firpo MR, Mastrodomenico V, Bruce EA, Schmidt MM, Jedrzejczak R, Muñoz-Alía MÁ, Schuster B, Nair V, Han KY, O'Brien A, Tomatsidou A, Meyer B, Vignuzzi M, Missiakas D, Botten JW, Brooke CB, Lee H, Baker SC, Mounce BC, Heaton NS, Severson WE, **Palmer KE**, Dickinson BC, Joachimiak A, Randall G, Tay S. (2021). Masitinib is a broad coronavirus 3CL inhibitor that blocks replication of SARS-CoV-2. *Science* **373** (6657): 931-936. PMID 33625602.
16. Rouchka EC, Chariker JH, Alejandro B, Adcock RS, Singhal R, Ramirez J, **Palmer KE**, Lasnik AB, Carrico R, Arnold FW, Furmanek S, Zhang M, Wolf LA, Waigel S, Zacharias W, Bordon J, Chung D. (2021). Induction of interferon response by high viral loads at early stage infection may protect against severe outcomes in COVID-19 patients. *Scientific Reports.* **11**(1): 15715. PMID: 34344959.
17. Nabeta H, Kouokam JC, Lasnik AB, Fuqua JL, **Palmer KE** (2021). Novel antifungal activity of Q-Griffithsin, a broad-spectrum antiviral lectin. *Microbiology Spectrum* Sep 8:e0095721; PMID 34521900
18. Hamorsky KT, Bushau-Sprinkle AM, Kitterman K, Corman JM, DeMarco J, Keith RJ, Bhatnagar A, Fuqua, JL, Lasnik A, Joh J, Chung D, Klein J, Flynn J, Gardner M, Barve S, Ghare SS, **Palmer KE** (2021). Serological assessment of SARS-CoV-2 infection during the first wave of the pandemic in Louisville Kentucky. *Scientific Reports* **11**(1): 18285. PMID 34494857

19. DeMarco JK, Royal JM, Severson WE, Gabbard J, Hume S, Morton J, Swope K, Simpson CA, Shepherd JW, Bratcher B, **Palmer KE**, Pogue GP (2021). CoV-RBD121-NP vaccine candidate protects against symptomatic disease following SARS-CoV-2 challenge in K18-hACE2 mice and induces protective responses that prevent COVID-19-associated immunopathology. *Vaccines* **9**(11): 1346. PMID: 34835277.
20. Gu, X, Sun R, Chen L, Chu S, Doll MA; Li X, Feng W, **Siskind L**, McClain CJ, Deng, Z (2021) Neutral ceramidase mediates nonalcoholic steatohepatitis by regulating monounsaturated fatty acids and gut IgA+ B cells. *Hepatology*. 73(3):901-919. doi: 10.1002/hep.31628. PMID: 33185911
21. Kurlawala Z, Saurabh K, Dunaway R, Shah PP, **Siskind LJ**, Beverly LJ. (2021) Ubiquilin proteins regulate EGFR levels and activity in lung adenocarcinoma cells. *J Cell Biochem*. 2021 Jan;122(1):43-52. doi: 10.1002/jcb.29830. Epub 2020 Jul 28. PMID: 32720736
22. Bushau-Sprinkle AM, Barati MT, Zheng Y, Watson WH, Gagnon KB, Khundmiri SJ, Kitterman KT, Clark BJ, **Siskind LJ**, Doll MA, Brier ME, Coventry S, Lederer ED. (2021) Na/H Exchange Regulatory Factor 1 Deficient Mice Show Evidence of Oxidative Stress and Altered Cisplatin Pharmacokinetics. Antioxidants (Basel). 10(7):1036. doi:10.3390/antiox10071036. PMID: 34203453

23. Sears SM and **Siskind LJ**. (2021). Potential Therapeutic Targets for Cisplatin-Induced Kidney Injury: Lessons from Other Models of AKI and Fibrosis. *Journal of the American Society of Nephrology*; 32(7): 1559-1567. doi: 10.1681/ASN.2020101455
24. Li Y, Fan H, Yuan F, Lu L, Liu J, Feng W, Zhang HG, Chen SY. Sulforaphane protects against ethanol-induced apoptosis in human neural crest cells through diminishing ethanol-induced hypermethylation at the promoters of the genes encoding the inhibitor of apoptosis proteins. Frontiers in Cell and Developmental Biology. 9: 622152, 2021. PMID: 33634123. PMCID: PMC7900432.
25. Li, F, Chen J, Liu Y, Gu Z, Jiang M, Zhang L, Chen SY, Deng Z, McClin CJ, Feng W. Deficiency of cathelicidin attenuates high-fat diet plus alcohol-induced liver injury through FGF21/adiponectin regulation. Cells 10 (12): 3333, 2021. Doi: 10.3390/cells10123333
26. Lei C, Teng Y, He L, Sayed M, Mu J, Xu F, Zhang X, Kumar A, Sundaram K, Sriwastva, M, Zhang L, Chen SY, Feng W, Zhang S, Yan J, Park J, Merchant ML, Zhang X, and Zhang HG. Lemon exosome-like nanoparticles enhance stress survival of gut bacteria by Rnase P-mediated specific tRNA decay. iScience, 24, 102511, 2021. PMID: 34142028 PMCID: PMC8188359.
27. Arnold, F. Teng Y, Xu F, Zhang X, Mu J, Sayed M, Hu X, Lei C, Sriwastva M, Kumar A, Sundaram K, Zhang L, Park J, Chen SY, Zhang S, Yan J, Merchant ML, Zhang X, McClain CJ, Wolfe JK, Adcock RS, Chung D, Palmer KE, Zhang HG. Plant- derived exosomal microRNAs inhibit lung inflammation induced by exosomes SARS-CoV-2 Nsp12. Molecular Therapy 29 (8), 2021. PMID: 33984520. PMCID: PMC8110335.
28. Gu Z, Li F, Liu Y, Jiang M, Zhang L, He L, Wilkey DW, Merchant M, Zhang X, Deng ZB, Chen SY, Barve S, McClain CJ, Feng W. Exosome-like nanoparticles from Lactobacillus rhamnosus GG protect against alcohol-associated liver disease through intestinal aryl hydrocarbon receptor in mice. Hepatology Communications, 5: 846 – 864, 2021. PMID: 34027273, PMCID: PMC8122379.
29. Sears SM, Siskind LJ. (2021). Potential Therapeutic Targets for Cisplatin-Induced Kidney Injury: Lessons from Other Models of AKI and Fibrosis. Journal of the American Society of Nephrology; 32(7): 1559-1567. doi: 10.1681/ASN.2020101455
30. Munagala R, Aqil F, Jeyabalan J, Kandimalla R, Wallen M, Tyagi N, Wilcher S, Yan J, Schultz DJ, Spencer W & Gupta RC. Exosome-mediated delivery of RNA and DNA for gene therapy. Cancer Letters, 505, 58-72, 2021. PMID 26604130
31. Kandimalla R, Aqil F, Alhakeem SS, Jeyabalan J, Tyagi N, Agrawal A, Yan J, Spencer W, Bondada S, Gupta RC. Targeted Oral Delivery of Paclitaxel Using Colostrum-Derived Exosomes. Cancers (Basel). 2021 Jul 23;13(15). doi: 10.3390/ cancers13153700. PubMed PMID: 34359601; PubMed Central PMCID: PMC8345039.
32. Aqil F, Jeyabalan J, Munagala R, Ahmad I, Schultz DJ, Gupta RC. Cumin Prevents 17β-Estradiol-Associated Breast Cancer in ACI Rats. Int J Mol Sci. 2021 Jun 8;22 (12). doi: 10.3390/ijms22126194. PubMed PMID: 34201250; PubMed Central PMCID: PMC8228322.
33. Saeed M, Shoaib A, Kandimalla R, Javed S, Almatroudi A, Gupta RC, Aqil F. Microbe-based therapies for colorectal cancer: Advantages and limitations. Semin Cancer Biol. 2021 May 18;. doi: 10.1016/j.semcancer. 2021. 05.018. [Epub ahead of print] PubMed PMID: 34020027.

34. Kandimalla R, Aqil F, Tyagi N, Gupta RC. Milk exosomes: A biogenic nanocarrier for small molecules and macromolecules to combat cancer. Am J Reprod Immunol. 2021 Feb;85(2):e13349. doi: 10.1111/aji.13349. Epub 2020 Oct 6. PubMed PMID: 32966664.
35. Mudd AM, Gu T, Munagala R, Jeyabalan J, Mostafa F, Egilmez NK and Gupta RC. Berry anthocyanidins inhibit intestinal polyps and colon tumors by modulation of Scr EGFR and the colon inflammation environment, Oncoscience, 8: 120-133, 2021. PMID: 34926717
36. Wallen M, Aqil F, Kandimalla R, Jeyabalan J, Auwardt S, Tyagi N, Schultz DJ, Spencer W &
Gupta RC. Antiviral siRNA therapeutics using exosome-based delivery. 2021.
37. Kumar N, Chaudhuri A, Aqil F, Dehari D, Munagala R, Singh S, Gupta R & Agrawal A. Exosomes as an emerging drug delivery and diagnostic modality for efficient management of breast cancer. 2021
38. Shiri, F., Gale, B. K., Sant, H., King, B., Bardi, G. T., Hood (corresponding author), J. L., & Petersen (corresponding author), K. E. (2021). Development and Testing of a Continuous Flow-Electrical-Split-Flow Lateral Transport Thin Separation System (Fl-El-SPLITT). Analytical Chemistry. (https://pubmed.ncbi.nlm.nih.gov/33476126/)
39. Petersen, K., Shiri, F., Tasci, T. O., Sant, H., Hood, J. L., & Gale, B. (2021). Experiment, Theory, and Simulation of a Flow-Electrical-Split Flow Thin Particle Separation Device. Journal of Chromatography A, 462634. (https://pubmed.ncbi.nlm.nih.gov/34739962/)
40. Bardi, G. T., Burroughs, M. J., Jones, J. B., & Hood (corresponding author), J. L. (2021). Induction of mixed M1/M2 THP-1 macrophage polarity supportive of pro-tumor inflammatory processes by human HepG2 liver tumor-derived small extracellular vesicles. Extracellular Vesicles and Circulating Nucleic Acids (EVCNA).
41. Shiri, F., Feng, H., Petersen, K. E., Sant, H., Bardi, G. T., Schroeder, L.A., Gale, B. K., & Hood (corresponding author), J. L. (2021). Separation of U87 glioblastoma cell-derived small and medium extracellular vesicles using elasto-inertial flow focusing (a spiral channel). Scientific Reports
42. Kumar, A., Sundaram, K., Teng, Y., Mu, J., Sriwastva, M. K., Zhang, L., Hood, J.L., Yan, J., Zhang, X., Park, J.W., Merchant, M.L., and Zhang, H.-G. (2021). Ginger nanoparticles mediated induction of Foxa2 prevents high-fat diet-induced insulin resistance. Theranostics.
43. Nabeta HW, Kouokam JC, Lasnik AB, Fuqua JL, Palmer KE. Novel Antifungal Activity of Q-Griffithsin, a Broad-Spectrum Antiviral Lectin. Microbiol Spectr. 2021 Oct 31;9(2):e0095721. doi: 10.1128/Spectrum.00957-21.
44. Dent M, Hamorsky KT, Vausselin T, Dubuisson J, Miyata Y, Morikawa Y, Matoba N*. (2021)
Safety and Efficacy of Avaren-Fc Lectibody Targeting HCV High-Mannose Glycans in a Human
Liver Chimeric Mouse Model. Cell Mol Gastroenterol Hepatol 11(1):185-198. (PMID: 32861832)
45. Morris DA, Reeves MA, Royal JM, Hamorsky KT, Matoba N*. (2021) Isolation and detection
of a recombinant KDEL-tagged cholera toxin B subunit from Nicotiana benthamiana. Process

Biochem 101:42-49. (PMID: 33304198)
46. Kramzer LF, Hamorsky KT, Graebing PW, Wang L, Fuqua JL, Matoba N, Lasnik AB, Moncla BJ,
Palmer KE, Rohan LC. (2021) Preformulation Characterization of Griffithsin, a Biopharmaceutical
Microbicide Candidate for HIV and SARS-CoV-2 Prevention. AAPS PharmSciTech 22(3):83.
(PMID: 33625602)
47. Fujiuchi N, Matoba N, Fujiwara K, Matsuda R. (2021) Effects of lighting conditions on Agrobacterium-mediated transient expression of recombinant hemagglutinin in detached Nicotiana benthamiana leaves inoculated with a deconstructed viral vector. Plant Cell Tissue Organ Cult 145:679-688. DOI: https://doi.org/10.1007/s11240-021-02037-y
48. Reeves MA, Royal JM, Morris DA, Jurkiewicz JM, Matoba N*, Hamorsky KT*. (2021) Spray
dry formulation of Epicertin, a recombinant cholera toxin B subunit variant that induces mucosal healing. Pharmaceutics 13(4): 576. (PMID: 33919585)
49. Wu J, Chen N, Liu Y, Godlewski G, Kaplan HJ, Shrader SH, Song ZH*, Shao H. Studies of involvement of G-protein coupled receptor-3 in cannabidiol effects on inflammatory responses of mouse primary astrocytes and microglia. PLoS One. 2021;16(5):e0251677. doi: 10.1371/journal.pone.0251677. eCollection 2021. PubMed PMID: 33984046; PubMed Central PMCID: PMC8118243.
50. Aebersold A, Duff M, Sloan L, Song ZH (corresponding author). Cannabidiol Signaling in the Eye and Its Potential as an Ocular Therapeutic Agent. Cell Physiol Biochem. 2021 May 14;55(S5):1-14. doi: 10.33594/000000371. PubMed PMID: 33984199.
51. Leggett CS, Doll MA, States JC, Hein DW. Acetylation of putative arylamine and alkylaniline carcinogens in immortalized human fibroblasts transfected with rapid and slow acetylator N-acetyltransferase 2 haplotypes. Arch Toxicol. 2021 Jan;95(1):311-319. doi: 10.1007/s00204-020-02901-4. PMID: 33136180 PMCID: PMC7855884
52. Ferragut Cardoso AP, Banerjee M, Nail AN, Lykoudi A, States JC. miRNA dysregulation is an emerging modulator of genomic instability. Semin Cancer Biol. 2021 76:120-131. doi: 10.1016/j.semcancer.2021.05.004. PMID: 33979676
53. Banerjee M, Ferragut Cardoso A, Al-Eryani L, Pan J, Kalbfleisch TS, Srivastava S, Rai SN, States JC. Dynamic alteration in miRNA and mRNA expression profiles at different stages of chronic arsenic exposure-induced carcinogenesis in a human cell culture model of skin cancer Arch Toxicol. 2021 Jul;95(7):2351-2365. doi: 10.1007/s00204-021-03084-2. PMID: 34032870 PMCID: PMC8241660
54. Meaza, I., Toyoda, J.H., Wise, Sr., J.P. (2021) Microplastics in Sea Turtles, Marine Mammals and Humans: A One Environmental Health Perspective. Frontiers in Environmental Science. 2921. https://doi.org/10.3389/fenvs.2020.575614. PMID: 34765609. PMCID: PMC857982.
55. Swovick, K., Firsanov, D., Welle, K.A., Hryhorenko, J.R., Wise, Sr., J.P., George, C., Sfromo, T., Seluanov, A., Gorbunova, V., Ghaemmaghami, S. Interspecies Differences in Proteome Turnover Kinetics Are Correlated with Lifespans and Energetic Demands.

Molecular & Cellular Proteomics 2021. https://doi.org/10.1074/mcp.RA120.002301 PMID: 33372049. PMCID: PMC7950207.
56. Poirier, M.C., Marsili, L., Fossi, M.C., Godard-Codding, C.A.J., Hernandez-Ramon, E.H., Si, N., Divi, K.V., Divi, R.L., Kerr, I., Wise, Jr., J.P., Wise, C.F., Wise, S.S., Aboueissa, A.E., Wise, J.T. and Wise, Sr., J.P. Polycyclic Aromatic Hydrocarbon-DNA Adducts in Gulf of Mexico Sperm Whale Skin Biopsies Collected in 2012. Toxicological Sciences, 181(1):115-124, 2021. PMID: 33566103 PMCID: PMC8081012.
57. Patierno, B.M., Foo, W-C, Allen, T., Somarelli, J.A. Ware, K.E., Gupta, S. Wise, S.S. Qin, X., Zhang, D., Xu, L., Li, Y., Chen, X., Inman, B.A., McCall, S.J., Huanf J., Kittles, R.A. Owzar, K., Gregory, S., Armstrong, A.J., George, D.J., Patierno, S.R., Hsu, D.S. Freedman, J.A. Characterization of a castrate-resistant prostate cancer xenograft derived from a patient of West African ancestry. Prostate Cancer Prostatic Disease, 1-11, 2021. PMID: 34645983
58. Hein, D.W. and Millner, L.M.: Arylamine N-acetyltransferase acetylation polymorphisms: paradigm for pharmacogenomic-guided therapy- a focused review. Expert Opinion on Drug Metabolism and Toxicology 17: 9-21, 2021. doi.org/10.1080/17425255.2021.1840551. (PubMed) [PMCID: PMC7790970]
59. Leggett, C.S., Doll, M.A., States, J.C., and Hein, D.W.: Acetylation of putative arylamine and alkylaniline carcinogens in immortalized human fibroblasts transfected with rapid and slow acetylator N-acetyltransferase 2 haplotypes. Archives of Toxicology 95: 311-319, 2021. (PubMed) [PMCID: PMC7855884] doi: 10.1007/s00204-020-02901-4.
60. Carlisle, S.M., Trainor, P.J., Doll, M.A. and Hein, D.W.: Human arylamine N-acetyltransferase 1 (NAT1) knockout in MDA-MB-231 breast cancer cell lines leads to transcription of NAT2. Frontiers in Pharmacology 12: 803254, 2021. doi: 10.3389/fphar.2021.803254. (PubMed) [PMCID: PMC8762260]

PHARMACOLOGY & TOXICOLOGY ABSTRACTS
Faculty with Primary Appointments and Students

Banerjee, Mayukh

1. **Banerjee. M.*** Revising Biology: Alternative Splicing in Toxicology. In: The Toxicologist: Supplement to Toxicological Sciences, 180 (1), Society of Toxicology, 2020. Abstract no. 1207. [*Abstract introducing an Innovations in Toxicological Sciences session as the Chair].
2. **Banerjee M**., Cardoso, A., Lykoudi, A., Wilkey, D. W., Watson, W. H., Garbett, N. C., Merchant, M. L., Pan J., Rai, S. N., States, J. C. Arsenite Displaces Zinc from ZRANB2 Zinc Finger Motifs and Leads to Altered Splicing. In: The Toxicologist: Supplement to Toxicological Sciences, 180 (1), Society of Toxicology, 2020. Abstract no. 2088.

Ceresa, Brian

1. Sociedad Mexicana de Bioquimica A.C. 8th annual Meeting of the Mexican Society of Biochemistry – EGFR Trafficking in the corneal epithelium: New Strategies to promote wound healing.

Chen, Shao-Yu

1. Yuan F, Lu L, Liu J, Chen S-Y. Sulforaphane epigenetically modulates the activity of the selected enhancers and the expression of their cognate genes in human neural crest cells exposed to ethanol. Alcohol Clin Exp Res 45: S1, 99A, 2021.
2. Yuan F, Lu L, Liu J, Chen S-Y. Reduction in the activity of the putative enhancers of TFAP2A contributes to ethanol-induced repression of TFAP2A and apoptosis in human neural crest cells. Alcohol Clin Exp Res 45: S1, 99A, 2021.
3. Lu L, Yuan F, Liu J, Wilkey DW, Merchant ML, Chen S-Y. Ethanol exposure altered the expression of proteins associated with the development of radial glial scaffold in human embryonic stem cell-derived forebrain organoids. Alcohol Clin Exp Res 45: S1, 99A, 2021.
4. Yuan F, Lu, L, Liu J, Chen S-Y. Ethanol-induced reduction in the activity of the putative enhancers of TFAP2A contributes to the repression of TFAP2A and apoptosis in ethanol-exposed human neural crest cells. Birth Defects Research 113: 803, 2021.
5. Lu L, Yuan F, Liu J, Wilkey DW, Merchant ML, Chen S-Y. Alteration of the expression of proteins associated with radial glial scaffold development in ethanol-exposed forebrain organoids derived from human embryonic stem cells. Birth Defects Research 113: 786, 2021.
6. Lu L, Yuan F, Liu J, Wilkey DW, Merchant ML, Chen S-Y. Ethanol exposure altered the expression of proteins associated with the development of radial glial scaffold in human embryonic stem cell-derived forebrain organoids. Research!Louisville, 2021.
7. Yuan F, Lu L, Liu J, Chen S-Y. Sulforaphane epigenetically modulates the activity of the selected enhancers and the expression of their cognate genes in human neural crest cells exposed to ethanol. Research!Louisville, 2021.

Hein, David

1. Habil, M.R., Doll, M.A. and Hein, D.W.: Acetyl coenzyme A affinity for N-acetyltransferases encoded by reference and variant alleles. Proceedings of the annual meeting of the Society of Toxicology, Abstract 2018/P119, March 2021.

2. Salazar-González, R.A., Doll, M.A. and Hein, D.W.: Acetylation of arylamine N-acetyltransferase 1 in breast cancer as a regulator of catalytic activity and expression. Proceedings of the annual meeting of the Society of Toxicology, Abstract 2015/P116, March 2021.
3. Wise. J.T.F., Salazar-González, R.A., Doll, M.A. and Hein, D.W.: Impact of metals on aromatic amine N-acetyltransferase metabolism in human lung cells. Proceedings of the annual meeting of the Society of Toxicology, Abstract 2095/P186, March 2021.

4. 4. Walls, K.M., Hong, K.U. and Hein, D.W.: Changes in insulin signaling and gluconeogenic gene expression in human hepatocytes following exposure to heterocyclic amines. FASEB Journal 35: Suppl 1; Abstract 02168, May 2021.
5. Habil, M.R., Salazar-González, R.A., Doll, M.A. and Hein, D.W.: Role of N-acetyltransferase 2 (NAT2) genetic polymorphism in mutagenicity of β-naphthylamine and 4,4'-methylenebis(2-chloroaniline) in Chinese hamster ovary (CHO) cells. Proceedings of the annual meeting of the Genetic Toxicology Association, May 2021.

6. Wise. J.T.F., Salazar-González, R.A., Doll, M.A. and Hein, D.W.: Human bronchial epithelial cells exhibit N-acetyltransferase 2 activity. Proceedings of the 2021 OVSOT Virtual Student & Post-Doctoral Researchers' Summer Meeting, July 2021.
7. Walls, K.M., Hong, K.U. and Hein, D.W.: Changes in insulin signaling, gluconeogenic gene expression, and glucose production in primary human hepatocytes following exposure to heterocyclic amines. Proceedings of the 2021 OVSOT Virtual Student & Post-Doctoral Researchers' Summer Meeting, July 2021.

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. Undergraduate Poster Session, University of Louisville, Louisville Kentucky July 2021.
9. 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. Undergraduate Poster Session, University of Louisville, Louisville Kentucky July 2021.
10. Hong, K.U., Salazar-González, R.A., Walls, K.M., and Hein, D.W.: Transcriptional regulation of human arylamine N-acetyltransferase 2 (NAT2) by glucose and insulin. Proceedings of Research!Louisville, Abstract F-8, Louisville, Kentucky October 2021.
11. Kidd, L.R. and Hein, D.W.: The UofL R25 Cancer Education Program experience improves interest in academic or clinical cancer research. Proceedings of Research!Louisville, Abstract F-9, Louisville, Kentucky October 2021.

12. Salazar-González, R.A., Doll, M.A. and Hein, D.W.: Role of N-acetyltransferase 2 genetic polymorphism in the metabolism and toxicity of new psychoactive substances (NPS) and 4,4'-oxydianiline (ODA). Proceedings of Research!Louisville, Abstract PRF-11, Louisville, Kentucky October 2021.

13. 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 Research!Louisville, Abstract UCE-19, Louisville, Kentucky October 2021.
14. Walls, K.M., Hong, K.U., and Hein, D.W.: Changes in insulin signaling, gluconeogenic gene expression, and glucose production in human hepatocytes following exposure to heterocyclic amines. Proceedings of Research!Louisville, Abstract GRD-28, Louisville, Kentucky October 2021.
15. Wise, J.T. F., Salazar-González, R.A., Doll, M.A. and Hein, D.W.: Human bronchial epithelial cells exhibit N-acetyltransferase 2 activity. Proceedings of Research!Louisville, Abstract PRF-14, Louisville, Kentucky October 2021.
16. Habil, M.R., Doll, M.A., and Hein, D.W.: N-acetyltransferase 1 (NAT1) allele NAT1*14B phenotype is substrate-dependent. Annual Meeting of the Ohio Valley Society of Toxicology, November 2021.
17. 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. Annual Meeting of the Ohio Valley Society of Toxicology, November 2021.
18. Walls, K.M., Hong, K.U., and Hein, D.W.: Changes in metabolism and insulin signaling in human hepatocytes following treatment with heterocyclic amines. Annual Meeting of the Ohio Valley Society of Toxicology, November 2021.
19. Wise, J.T. F., Salazar-González, R.A., Doll, M.A. and Hein, D.W.: What happens to the metabolism of aromatic amines during incubation with hexavalent chromium in human lung cells? Annual Meeting of the Ohio Valley Society of Toxicology, November 2021.
20. Habil, M.R., Doll, M.A., and Hein, D.W.: Polymorphism of N-acetylation of benzidine. Proceedings of the Southeast Regional IDeA Conference, San Juan, Puerto Rico, November 2021.

Hong, Kyung

1. Changes in Insulin Signaling and Gluconeogenic Gene Expression in Human Hepatocytes Following Exposure to Heterocyclic Amines.Kennedy M. Walls, Kyung U. Hong, David W. Hein. ASPET Annual Meeting at EB 2021 (April 2021).
2. Changes in insulin signaling, gluconeogenic gene expression, and glucose production in primary cryopreserved human hepatocytes following exposure to heterocyclic amines. Kennedy M. Walls, Kyung U. Hong, David W. Hein. 2021 OVSOT Student & Postdoctoral Researchers' Virtual Summer Meeting (August 2021).
3. Changes in insulin signaling, gluconeogenic gene expression, and glucose production in primary cryopreserved human hepatocytes following exposure to heterocyclic amines. Kennedy M. Walls, Kyung U. Hong, David W. Hein. Research Louisville (October 2021).

4. Transcriptional Regulation of Human Arylamine N-Acetyltransferase 2 (NAT2) by Glucose and Insulin.Kyung U. Hong, Raúl A. Salazar-González, Kennedy M. Walls, and David W. Hein. Research Louisville (October 2021).
5. The effects of N-acetyltransferase 1 knockout on the cytotoxicity of pyrimidine biosynthesis inhibitors in human breast cancer cells. Afi H. Tagnedji, Kyung U. Hong, and David W. Hein. Research Louisville (October 2021).
6. Changes in insulin signaling, gluconeogenic gene expression, and glucose production in primary cryopreserved human hepatocytes following exposure to heterocyclic amines. Kennedy M. Walls, Kyung U. Hong, David W. Hein. OVSOT Annual Fall Meeting (November 2021).

Hood, Joshua

1. Schroeder (student presenter), L. A., Bardi, G. T., & Hood (corresponding author), J. L. (2021). Development of a 3D HepG2 suspension culture system to enable reducible investigations into 2D vs. 3D HepG2 culture-derived sEV biophysical properties and cancer pathway-related miRNA content. In 2021 Research!Louisville Abstracts. Louisville, KY: University of Louisville.
2. Bardi, G. T., Burroughs, M. J., Jones, J. B., Aebersold, J. W., Slusarczyk, A. S., Driss, A., & **Hood (corresponding author), J. L.** (2021). Abstract 1326: Hepatocellular carcinoma-derived exosomes induce pro-tumor macrophages. In HEPATOLOGY (Vol. 74, p. 794A). AASLD.

Kidd, Lacreis

1. **Kidd, L.R**., Hein, D.W. The UofL R25 Cancer Education Experience Improves Interest in Academic or Clinical Cancer Research, Louisville, Kentucky, October 2021
2. King, D., **Kidd, L.R.** The Impact of Multiple Type 2 Diabetes Susceptibility Genetic Variants on Prostate Cancer Outcomes. Undergraduate SSRP/R25 Research Poster Symposium, Louisville, Kentucky, July 31, 2021 **(Received 2nd round of judging for oral poster presentation)**
3. King, D., **Kidd, L.R.** The Impact of Multiple Type 2 Diabetes Susceptibility Genetic Variants on Prostate Cancer Outcomes. Research!Louisville, Louisville, Kentucky, October 2021

Kouokam, Calvin

1. Kouokam, J.C., Speer, R.M., Meaza, I., Toyoda, J.H., Lu, H., Kong, M., and Wise, Sr., J.P. The involvement of the inflammatory response in particulate hexavalent chromium-induced toxicity. To be presented at Research!Louisville, July 2021.2. Brian, E., Temgoua, L., Lechner J., Wise, S., Wise, Sr., J.P., and Kouokam, J.C. Effects of Beetroot-Derived E162 on Cr(VI)-Induced Cytotoxicity. Presented at Research!Louisville, July 2021.

2. Brian, E., Temgoua, L., Lechner J., Wise, S., Wise, Sr., J.P., and Kouokam, J.C. Effects of Beetroot-Derived E162 on Cr(VI)-Induced Cytotoxicity. Presented at Research!Louisville, July 2021.
3. Kouokam, J.C., Speer, R. M., Meaza, I., Toyoda, J. H., Lu, H., Kong, M. and Wise, Sr, J.P. Particulate hexavalent chromium-induced toxicity involves the inflammatory response in human lung fibroblasts. Environmental Mutagenesis and Genomics Society 2021.
4. 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. Submitted to the 2022 Society of Toxicology (SOT) meeting.
5. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meazza, I., Wise, Jr., J.P., Kouokam, J.C., Cai, L., Wise, Sr., J.P. Particulate hexavalent chromium induces DNA double strand breaks in rat lung. Presented at Research!Louisville, Louisville, Kentucky, October 2021.
6. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meazza, 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. Presented at the Ohio Valley Chapter of the Society of Toxicology (OVSOT) annual meeting, November 2021.
7. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meazza, 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. Will Present at the Annual Meeting of the Society of Toxicology (SOT), March 2022.
8. 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.
9. Toyoda, J.H., Cahill, C.R., Wise, S.S., Speer, R.M., Lu, H., Kouokam, J.C., and Wise, Sr., J.P. Securin Disruption and Chromosome Instability Persist After Chronic Hexavalent Chromium Exposure. Ohio Valley Society of Toxicology Annual Meeting, November 2021.
10. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., Kouokam, J.C., and Wise, Sr., J.P. Particulate Hexavalent Chromium Induces Loss of the BCDX2 Complex Leading to Loss of Homologous Recombination Repair. Ohio Valley Chapter of Toxicology (OVSOT). November 5 2021
11. 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.

Matoba Nobuyuki

1. Dent M*, Oh YJ, Matoba N. Development of a novel lectin-Fc fusion targeting cancerassociated
   oligomannose glycans. 21st Annual PepTalk, Jan 17-19, 2021, online.
2. Dent M*, Matoba N. Glycoengineering of a novel lectin-Fc fusion protein improves its

antitumor activity and protects against B16F10 tumors. Research!Louisville, October 26, 2021, Louisville, KY.

3. Reeves M*, Royal J, Hamorsky K, Matoba N. Preclinical Pharmacokinetics and Safety Studies Support Development of EPICERTIN as a Novel Biologic Drug for Ulcerative Colitis. Research!Louisville, October 26, 2021, Louisville, KY.
4. Mayer K*, Dent M, Matoba N. Anti-Ovarian Cancer Activity of a Lectibody Targeting Tumorassociated High-Mannose Glycans. Research! Louisville, October 26, 2021, Louisville, KY.
5. Matoba N*. "EPICERTIN: A plant-derived recombinant Cholera Toxin B Subunit variant withmucosal healing activity in colitis" 4th International Society for Plant Molecular Farming conference, Sep 28 – 29, 2021, online.
6. Dent M*, Oh YJ, Matoba N. Plant-based expression of a lectibody, its variants, and their anti-cancer activities. 2nd Asian Conference for Plant Made Pharmaceuticals (PMPAsia 2021), Nov 9 – 10, 2021, online.
7. Matoba N*. "EPICERTIN: A plant-derived recombinant Cholera Toxin B Subunit variant with mucosal healing activity in colitis" 2nd Asian Conference for Plant Made Pharmaceuticals (PMPAsia 2021), Nov 9 – 10, 2021, online. Invited talk.

Palmer, Kenneth

1. Nabeta H, Kouokam JC, Lasnik A, Fuqua J, **Palmer KE**. Novel antifungal activity of Q-Griffithsin, a broad-spectrum antiviral lectin. Microbiology Society Candida and Candidiasis Virtual Meeting 21-27 March 2021. Poster abstract 077A

Siskind, Leah

1. Sears SM**,** Vega AV, Shah P, Doll MA, Beverly LJ, Siskind LJ. (November 2021). F4/80hi Resident Macrophages Contribute to Cisplatin-Induced Kidney Fibrosis and M2 Polarization in C57BL/6 Mice. American Society of Nephrology Kidney Week, Virtual Event.
2. Sears SM**,** Vega AV, Shah P, Doll MA, Beverly LJ, Siskind LJ. (2021). F4/80hi Resident Macrophages Contribute to Cisplatin-Induced Kidney Fibrosis and M2 Polarization in C57BL/6 Mice. Research! Louisville
3. Feng J, Sears S, Doll MA, Shah P, Beverly LJ, and **Siskind LJ** (2021) Inhibition of autophagy protects from cisplatin-induced kidney injury in a repeated low dose model. Research! Louisville. 2nd place undergraduate poster award

Song, Zhao-Hui (Joe)

1. Cannabidiol Alters Social and Repetitive Behaviors in a Model of Idiopathic Autism Spectrum Disorders
   Sarah Shrader, Nicholas Mellen, Gregory Barnes and Zhao-Hui Song
   International Cannabinoid Research Society Annual Conference, June 2021 (virtual meeting due to COVID-19).
2. Cannabidiol Inhibits Angiogenic Processes in Retinal Microvascular Endothelial Cells
   Lucy J. Sloan, Wei Liang, Max Duff, Yongqing Liu and Zhao-Hui Song

International Cannabinoid Research Society Annual Conference, June 2021 (virtual meeting due to COVID-19).

3. Effects of Cannabidiol on Mouse Retinal Microvascular Endothelial Cells
   Jenna Tinnell1, Lucy Sloan, Douglas Dean, Yongqing Liu, Zhao-Hui Song
   Research! Louisville, October 2021
4. The Effects of N-acyl Dopamine Compounds on Porcine Retinal Cells
   Lucy Sloan, Jenna Tinnell, Tamiya Shigeo, Zhao-Hui Song
   Research! Louisville, October 2021

States, Christopher

Published abstracts:

1. Ferragut Cardoso AP, Banerjee M, Al-Eryani L, Sayed M, Park JW, and States JC. Chronic Arsenic Exposure Induces Unique Alternative Splicing Landscapes in Human Keratinocytes), Society of Toxicology March 2021 abstract # 2096
2. Banerjee M, Ferragut Cardoso AP, Lykoudi A, Wilkey DW, Watson WH, Garbett NC, Merchant ML, Pan J, Rai SN, and States JC. Arsenite Displaces Zinc from ZRANB2 Zinc Finger Motifs and Leads to Altered Splicing, Society of Toxicology March 2021 abstract # 2088
3. Banerjee M, Ferragut Cardoso A, Al-Eryani L, Kalbfleisch TS, Srivastava S, Pan J, Rai SN, States JC. Longitudinal Dynamic Transcriptome Changes in a HaCaT Cell Line Model of Arsenic-induced Squamous Cell Carcinogenesis. Research!Louisville, University of Louisville, Louisville, KY, October 28, 2021
4. Ferragut Cardoso A, States JC. miR-186 Overexpression Suppresses BUB1 and CDC27 in Immortalized Human Keratinocytes. Research!Louisville, University of Louisville, Louisville, KY, October 27, 2021
5. Nail AN, McCaffrey LM, Ferragut Cardoso A, Banerjee M, States JC. Reduced DNA Damage Response Activation in Keratinocytes Chronically Exposed to Toxicologically Relevant Concentrations of Sodium Arsenite. Research!Louisville, University of Louisville, Louisville, KY, October 27, 2021
6. Frye WJ E, Banerjee M, Trent JO, States JC. Inhibiting the Anaphase Promoting Complex/ Cyclosome: An Innovative Approach for Cancer Chemotherapy. Research!Louisville, University of Louisville, Louisville, KY, October 27, 2021
7. Bastick III JC. Banerjee M, States JC. Zinc Mitigates Arsenic-Induced Dysregulation of ZRANB2 Splice Function. Research!Louisville, University of Louisville, Louisville, KY, October 26, 2021
8. Rogers MN, Ferragut Cardoso A, States JC. UV and Arsenic Exhibit Differential Modulation of MAPK Pathways in HaCaT and Ker-CT Cell Lines. Research!Louisville, University of Louisville, Louisville, KY, October 26, 2021
9. McCaffrey LM, Ferragut Cardoso A, Banerjee M, Nail AN, States JC. DNA Damage Response Dysregulation in Keratinocytes Chronically Treated with Low Dose Arsenic. Research!Louisville, University of Louisville, Louisville, KY, October 26, 2021

10. Ferragut Cardoso A, States JC. miR-186 Overexpression Suppresses BUB1 and CDC27 in Immortalized Human Keratinocytes. Ohio Valley Chapter Society of Toxicology, Virtual Meeting, November 5, 2021
11. Nail AN, McCaffrey LM, Ferragut Cardoso A, Banerjee M, States JC. Reduced DNA Damage Response Activation in Keratinocytes Chronically Exposed to Toxicologically Relevant Concentrations of Sodium Arsenite. Ohio Valley Chapter Society of Toxicology, Virtual Meeting, November 5, 2021

Wise, John

1. Meaza, I., Speer, R.M., Toyoda, J.H., Lu, Y., Xu, Q., Walter, R., Kong, M. and Wise, Sr., J.P. Particulate Hexavalent Chromium Altered the Expression of miRNAs Involved in Carcinogenesis Pathways. Toxicological Sciences, 180:2073, 2021.
2. Toyoda, J.H., Martino, J., Speer, R.M., Wise, S.S., and Wise, Sr., J.P. Divided We Fall: Particulate Hexavalent Chromium Targets Securin Driving Premature Centriole Separation. Toxicological Sciences, 180:2078, 2021.
3. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits DNA Repair by Targeting RAD51 Paralogs. Toxicological Sciences, 180:2081, 2021.
4. Lu, H., Wise, S.S., Toyoda, J.H., Speer, R.M., Bolt, A., and Wise, Sr., J.P. Whale Cells Resist Cr(VI)-Induced Loss of Homologous Recombination Repair. Toxicological Sciences, 180:2087, 2021.
5. Wise, S.S., and Wise, Sr., J.P. Cells Exposed Chronically to Hexavalent Chromium Escape Cell Death and Develop Permanent Chromosome Instability. Toxicological Sciences, 180:2012, 2021.
6. Wise, Jr., J.P. Cai, L., and Wise, Sr., J.P. Evaluation of Cr(VI) Neurotoxicity and Its Potential as a Brain Gerontogen. Toxicological Sciences, 180: 2469, 2021.
7. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., and Wise, Sr., J.P. Lung Cancer Secret Revealed! RAD51D: Culprit Protein Found! Presented at the annual meeting of the Society of Toxicology (SOT), March 2021.
8. Meaza, I., Wise, S.S., Perkins, C., and Wise, Sr., J.P. Save the Whales a Solution to a Climate in Crisis! Presented at the annual meeting of the Society of Toxicology (SOT), March 2021
9. Lu, H., Wise, S.S., and Wise, Sr., J.P. Can Whales Resist Chromium-Induced Cancer? Presented at the Annual Meeting of the Society of Toxicology (SOT), March 2021.
10. Wise, Jr., J.P. Cai, L., and Wise, Sr., J.P. Two Sides of Toxic Coin: Heavy Metals and Aging. Presented at the Annual Meeting of the Society of Toxicology (SOT), March 2021.
11. Toyoda, J.H., Martino, J., and Wise, Sr., J.P. When Your Chainsaw Loses Its Safety Lock: A Hypothesis for Metal-Induced Lung Cancer. Presented at the Annual Meeting of the Society of Toxicology (SOT), March 2021.
12. Toyoda, J.H., Martino, J., Speer, R.M., Wise, S.S, and Wise, Sr., J.P. Divided We Fall: Particulate Hexavalent Chromium Targets Securin Driving Premature Centriole Separation. Graduate Student Regional Research Conference, March 2021.
13. Toyoda, J.H., Martino, J., Speer, R.M., Wise, S.S., and Wise, Sr., J.P. Particulate Hexavalent Chromium Targets Securin, Disrupts Centriole Engagement, and Induces Chromosome

Instability. Presented at the annual meeting of the Genetic Toxicology Association, May 2021.

14. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Inhibits RAD51 Paralog Proteins-Key to lung Cancer Progression. Presented at the annual meeting of the Genetic Toxicology Association, May 2021.
15. Meaza, I., Speer, R.M., Toyoda, J.H., Lu, Y., Xu, Q., Walter, R., Kong, M. and Wise, Sr., J.P. Particulate Hexavalent Chromium Induces Global miRNA Downregulation and Altered the Expression of miRNAs Involved in Carcinogenesis Pathways. Presented at the annual meeting of the Genetic Toxicology Association, May 2021.
16. Lu, H., Wise, S.S., Toyoda, J.H., Speer, R.M, Bolt, A., and Wise, Sr., J.P. Whale cells are resistant to Cr(VI)-induced chromosome instability. Presented at the annual meeting of the Genetic Toxicology Association, May 2021.
17. Meaza, I., Speer, R.M., Toyoda, J.H., Lu, Y., Xu, Q., Walter, R., Kong, M. and Wise, Sr., J.P. Particulate Hexavalent Chromium [Cr(VI)] Exposure Alters miRNA Profiles and Targets miRNAs Involved in Pathways of Cr(VI) Carcinogenesis. Presented at the summer meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), July 2021.
18. Toyoda, J.H., Cahill, C.R., Wise, S.S., and Wise, Sr., J.P. Chronic Hexavalent Chromium Exposure Causes Persistent Securin Disruption, and Induces Chromosome Instability. Environmental and Molecular Mutagenesis Volume 62, Issue S1, p.44, 2021.
19. Meaza, I., Toyoda, J.H., Lu, H., Williams, A.R., Wise, S.S., and Wise Sr. J.P. Particulate Hexavalent Chromium Induces Loss of RAD51 Leading to Increased Genomic Instability, A Driver of Carcinogenesis. Environmental and Molecular Mutagenesis Volume 62, Issue S1, p57, 2021.
20. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Targets RAD51 Paralogs Leading to Loss of Homologous Recombination Repair in Metal Carcinogenesis. Environmental and Molecular Mutagenesis Volume 62, Issue S1, p.63, 2021.
21. Lu, H., Wise, S.S., Toyoda, J.H., Speer, R.M, Bolt, A., and Wise, Sr., J.P. A Whale of a Tale: Whale Lung Cells Resist Particulate Cr(VI)-Induced Chromosome Instability. Environmental and Molecular Mutagenesis Volume 62, Issue S1, p.63-64, 2021.
22. Kouokam, J.C., Speer R. M., Meaza I., Toyoda J. H., Lu H., Kong M. and Wise, Sr, J.P. Particulate hexavalent chromium-induced toxicity involves the inflammatory response in human lung fibroblasts. Presented at the Annual Meeting of the Environmental Mutagenesis and Genomics Society (EMGS), 2021.
23. Toyoda, J.H., Cahill, C.R., Wise, S.S. and Wise, Sr., J.P. Securin Deregulation and Chromosome Instability Persist After Chronic Hexavalent Chromium Exposure. Presented at Research!Louisville, October 2021.
24. Cahill, C.R., Toyoda, J.H., Wise, S.S. and Wise, Sr., J.P. Securin Deregulation Persists After Chronic Hexavalent Chromium Exposure. Presented at Research!Louisville, October 2021.
25. Meaza, I., Toyoda, J.H., Lu, H., Williams, A.R., Wise, S.S. and Wise Sr. J.P. Particulate Hexavalent Chromium Targets RAD51, the Key Protein in Homologous Recombination Repair, Leading to Increased Genomic Instability, A Driver of Carcinogenesis at Research Louisville! Presented at Research!Louisville, October 2021.
26. Hoang, L., Meaza I. and Wise Sr. J.P. Particulate Cr(VI) Targets Separase in Human Lung Cells. Presented at Research!Louisville, October 2021.

27. Williams, A., Meaza, I., Toyoda, J.H., Speer, R.M. Browning, C.L. and Wise, Sr., J.P. Particulate Hexavalent Chromium Targets the BCDX2 Complex in Homologous Recombination Repair. Presented at Research!Louisville, October 2021.
28. Kouokam, J.C., Speer, R.M., Meaza, I., Toyoda, J.H., Lu, H., Kong, M. and Wise, Sr., J.P. The involvement of the inflammatory response in particulate hexavalent chromium-induced toxicity. Presented at Research!Louisville, October 2021.
29. 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., Cai, L. and Wise, Sr., J.P. Particulate hexavalent chromium induces DNA double strand breaks in rat lung. Presented at Research!Louisville, October 2021.
30. Doyle, C., Williams, A.W., Browning, C.L., Wise, S., and Wise, Sr., J.P. Particulate Hexavalent Chromium Exposure Induces Persistent and Heritable Loss of RAD51D. Presented at Research!Louisville, July/October 2021.
31. Brian, E., Temgoua, L., Lechner J., Wise, S., Wise, Sr., J.P., and Kouokam, J.C. Effects of Beetroot-Derived E162 on Cr(VI)-Induced Cytotoxicity. Presented at Research!Louisville, July/October 2021.
32. Wise, Jr., J.P., Young, J.L., Lu, H., Meaza, I., Toyoda, J.H., Wise, S.S., Speer, R.M., Croom-Perez, T.J., Cai, L., and Wise, Sr., J.P. A Toxic Aging Coin: Cr(VI) Neurotoxicity and Gerontogenicity. Presented at the annual meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), November 2021.
33. Williams, A.R., Speer, R.M., Browning, C.L., Meaza, I., Toyoda, J., and Wise, Sr., J.P. Particulate Hexavalent Chromium Induces Loss of the BCDX2 Complex Leading to Loss of Homologous Recombination Repair. Presented at the annual meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), November 2021.
34. 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. Presented at the annual meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), November 2021.
35. Meaza I., Toyoda, J.H., Lu, H., Williams, A.R., and Wise Sr. J.P. Particulate Hexavalent Chromium Causes DNA Repair Inhibition Leading to Increased Chromosome Instability in Human Bronchial Epithelial Cells. Presented at the annual meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), November 2021.
36. Toyoda, J.H., Cahill, C.R., Wise, S.S., Speer, R.M., Lu, H., Kouokam, J.C., and Wise, Sr., J.P. Securin Disruption and Chromosome Instability Persist After Chronic Hexavalent Chromium Exposure. Presented at the annual meeting of the Ohio Valley Chapter of the Society of Toxicology (OVSOT), November 2021.

Wise, Sandra

1. Toyoda, J.H., Martino, J., Speer, R.M., Wise, S.S., and Wise, Sr., J.P. Divided We Fall: Particulate Hexavalent Chromium Targets Securin Driving Premature Centriole Separation. Toxicological Sciences, 180:2078, 2021.
2. Toyoda, J.H., Cahill, C.R., Wise, S.S., Wise, Sr., J.P. Chronic Hexavalent Chromium Exposure Causes Persistent Securin Disruption and Induces Chromosome Instability. Environmental Mutagenesis and Genomic Society (EMGS) 2021 Annual Meeting, September 2021.

3. Lu, H., Wise, S.S., Toyoda, J.H., Speer, R.M., Bolt, A., and Wise, Sr., J.P. Whale Cells Resist Cr(VI)-Induced Loss of Homologous Recombination Repair. Toxicological Sciences, 180:2087, 2021.
4. Wise, S.S., and Wise, Sr., J.P. Cells Exposed Chronically to Hexavalent Chromium Escape Cell Death and Develop Permanent Chromosome Instability. Toxicological Sciences, 180:2012, 2021.
5. Toyoda, J.H., Martino, J., Speer, R.M., Wise, S.S., and Wise, Sr., J.P. Divided We Fall: Particulate Hexavalent Chromium Targets Securin Driving Premature Centriole Separation. Graduate Student Regional Research Conference, March 2021.
6. Toyoda, J.H., Martino, J., Speer, R.M., Wise, S.S., and Wise, Sr., J.P. Particulate Hexavalent Chromium Targets Securin, Disrupts Centriole Engagement, and Induces Chromosome Instability. Genetic Toxicology Association Annual Meeting, May 2021.
7. Lu, H., Wise, S.S., Toyoda, J.H., Speer, R.M, Bolt, A., and Wise, Sr., J.P. Whale cells are resistant to Cr(VI)-induced chromosome instability. Genetic Toxicology Association (GTA), May 2021.
8. Toyoda, J.H., Cahill, C.R., Wise, S.S., and Wise, Sr., J.P. Chronic Hexavalent Chromium Exposure Causes Persistent Securin Disruption and Induces Chromosome Instability. Presented at the Environmental Mutagenesis and Genomic Society (EMGS) 2021 Annual Meeting, September 2021.
9. Meaza, I., Toyoda, J.H., Lu, H., Williams, A.R., Wise, S.S., and Wise Sr. J.P. Particulate Hexavalent Chromium Induces Loss of RAD51 Leading to Increased Genomic Instability, A Driver of Carcinogenesis. Presented at the Environmental Mutagenesis and Genomic Society (EMGS) 2021 Annual Meeting, September 2021.
10. Lu, H., Wise, S.S., Toyoda, J.H., Speer, R.M, Bolt, A., and Wise, Sr., J.P. A Whale of a Tale: Whale Lung Cells Resist Particulate Cr(VI)-Induced Chromosome Instability. Presented at the Environmental Mutagenesis and Genomic Society (EMGS) 2021 Annual Meeting, September 2021.
11. Wise, Jr., J.P., Wise, S.S., Young, J.L., Wise, J.T.F., Wise, C.F., Browning, C.L., Zheng, T., Perkins, C.R., Gianios, Jr. C. Xie, H., Kerr, I., and Wise, Sr., J.P. Thar She Blows: 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), Portland, Oregon, November. 2021.
12. Lu, H., Wise, S.S., Hoyle, G., Toyoda, J.H., Speer, R.M, Croom-Perez, T.J., Meazza, 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. Presented at the Ohio Valley Chapter of the Society of Toxicology (OVSOT) annual meeting, November 2021.
13. Toyoda, J.H., Cahill, C.R., Wise, S.S., Speer, R.M., Lu, H., Kouokam, J.C., and Wise, Sr., J.P. Securin Disruption and Chromosome Instability Persist After Chronic Hexavalent Chromium Exposure. Ohio Valley Society of Toxicology Annual Meeting, November 2021

RESEARCH GRANTS ACTIVE

Banerjee, Mayukh					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
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 – 03/31/2022	$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	1/1/19 – 1/31/24	$1,925,088
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/ Guido	07/1/17 – 04/28/22	$193,732
NIH/NCI R25 CA134283	UofL Cancer Education Program	Mentor	Hein/Kidd	9/4/11 – 4/1/21	$318,584
Chen, Shao-yu					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**

R01 NIAAA/ AA028435	Role of exosomes in the coordinated migration of	PI	Shao-yu Chen	08/01/2020 – 07/31/2025	$ 1,953,438
R01 NIAAA/AA021434	Role of microRNA in ethanol-induced apoptosis and teratogenesis	PI	Shao-yu Chen	07/2013 – 06/2021	$ 1,687,500
P50 NIAAA/ AA024337 Alcohol Center grant	The role of nutrition in the Project 3: Sulforaphane- mediated epigenetic modulation of ethanol-induced	3 PI	McClain	05/2021 – 04/2026	$ 7,184,970 (Total P50) Project 3 budget: $ 1,291,680
P20 NIGMS/ GM113226	UofL Hepatobiology and Toxicology COBRE	Faculty mentor	McClain	04/2021 – 03/31/2026	$11,700,000
T32 NIEHS/ ES011564	UofL environmental health sciences training program	Faculty mentor	Hein/ Wise	07/2016 – 06/2026	$2,575,255
T35 NIEHS/ ES014559	Summer Environmental Health Sciences Training	Faculty mentor	States	04/2016 03/2026	$290,347
NCI/**R25** CA134283	Cancer Education Program for Professional and Undergraduate StudentsUndergraduate Students	Faculty mentor	David Hein/ LaCreis Kidd	04/2017 – 03/2022	$1,620.000
P30 NIEHS/ ES030283	University of Louisville Center for Integrated Environmental Health Sciences	Member	States	07/15/20 – 03/31/25	$6,473,751

Clark, Geoffrey					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
CDMRP (DOD)NF180094	Novel Inhibitors of MPNST	PI		01/07/2019- 2/06/2022	525K

NCI R21 R21CA216722	A novel RALGEF inhibitor for Pancreatic cancer	PI		2018-2021	275K Direct
Qualigen LCC	Development of RAS inhibitors	PI	Co-I Trent Bates	01/03/2019 - 12/31/2022	~700K
R25CA134283	University of Louisville Cancer Education Program	Mentor	Hein	09/01/16-08/31/21	$1,500,000
KOSAIR Charities	Development of PD-1 inhibitors	PI	Co-I Trent Bates	01/01/20-12/30/2021	50K
Gupta, Ramesh					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NCI SBIR Phase II CA-221487-01	Exosomal Drug Delivery	MPI	Gupta, Spencer	09/17–8/21	$1,700,000
3P Bio Contract	Effect of Exosomal Formulations on Lung and Breast cancer	MPI	Gupta, Aqil	07/18–7/22	$173,250
3P Bio Contract	"Exosomes and eExosomes - Biodistribution and Efficacy"	MPI	Gupta, Aqil	9/20-8/22	$300,00
PureTech Health, Boston	Sponsored Research Funding	PI	Gupta	9/18– 8/21	$500,000
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	
NIEHS T35-ES014559	Summer Environmental Health Sciences Training Program	Mentor	States	04/01/2017-03/31/2023	
NIEHS T32 ES011564	UofL Environmental Health Sciences Training Program	Contact PI	Hein & J. Wise	07/01/2016 – 03/31/2022	$1,593,000
NIEHS P42-ES023716	Environmental Exposure and Cardiometabolic Disease Program	Director, Training Core	Srivastava	09/01/2017 – 03/31/2022	$186,540

NIH P20-GM113226	Hepatobiology and Toxicology COBRE	Director for faculty career developme nt; project lead renovation	McClain	06/10/2016 – 03/31/2021	$11,530,145
NIH-NIEHS/P30 ES030283	University of Louisville Center for Integrated Environmental Health Sciences	Faculty member	States	07/15/2020 - 06/30/2025	$2,314,825
Society of Toxicology	First integrated international workshop: acetyltransferases, sulfotransferases, and UDP-glucuronosyltransferases	PI	Hein	11/02/2019-06/30/2021	$6,473,751
NIEHS T32-ES011564	Summer Environmental Health Sciences Training Program	PI	Hein & J. Wise	07/14/2021-06/30/2026	$440,700
NIEHS T35-ES014559	Summer Environmental Health Sciences Training Program	Mentor	States	04/01/2022 – 03/31/2026	$2,000
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	
UofL School of Medicine	Effect of Heterocyclic Amines and NAT2 Metabolism on Insulin Sensitivity	Faculty Mentor	Hong	10/01/2020 – 09/30/2021	
NIH P20-GM113226	Hepatobiology and Toxicology COBRE	Deputy Director; Director for faculty developme	McClain	04/01/2021 – 03/31/2026	
Hong, Kyung					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
University of Louisville, EVPRI, Research II Grant	Effect of Heterocyclic Amines and NAT2 Metabolism on Insulin Sensitivity	PI	Hong	06/01/20 – 05/31/21	$10,000

University of Louisville, School of Medicine, Basic Research Grant	Effect of Heterocyclic Amines and NAT2 Metabolism on Insulin Sensitivity	PI	Hong	10/01/20 – 09/30/21	$25,000

Hood, Joshua					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
Elsa U. Pardee Foundation	Tuning exosomes to activate anti-lung cancer macrophages	PI	Hood	10/01/18-9/30/21	$185,241
2 R25 CA134283-06A1	University of Louisville Cancer Education Program	Faculty Mentor	Hein, Kidd	4/1/17 - 3/31/22	$1,593,000
U of L Hepatobiology and Toxicology COBRE Pilot Project Application	Differential modulation of immune-relevant RNAs in hepatocellular carcinoma-derived small extracellular	PI	Hood	2/1/20 - 3/31/21	$156,250
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)
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
U54 CTRHD (Morehouse School of Medicine - RCMI)	Role of miR-1976 in malaria pathogenesis	Project Mentor	Driss	1/1/21 - 5-31-21	$50,000
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	04/1/16-3/31/21	$2,310,776

R25-CA134283-06	University of Louisville Cancer Education Program	Co-I, Cancer Education Coordinator Mentor	Hein/ Kidd	9/1/17-03/31/23 (NCO)	$1,620,000
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	July 1-Oct 31	$105,054
CIEHS P30 (ITEMFC Research Voucher Program)	The inflammatory response in human lung cells after exposure to particulate hexavalent chromium [Cr(VI)], a key event in Cr(VI) carcinogenesis	PI	JCK	July 20-June 21	$5,000
Lukashevich, Igor					
Agency/Number	**Title**	**Role**	**PI**	**Period**	**Budget Award**
NIH/NIAD R43AI152717-01	Novel Chikungunya vaccine with rearrangement genome	PI on sub		04/03/20-03/31/22	$80,000
NIH/NIAID 1R56AI1357700	Reverse Genetics to Forward The Pan-Lassa Fever Vaccine Lead Candidate ML29	MPI		08/01/20-7/31/20 NCE	$256,666
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	Matoba/ Chesney	09/01/21 – 08/31/22	Total direct costs: $50,000
NIH/NIDDK 1 R01 DK123712-01A1	Preclinical validation of oral therapeutic lead proteins targeting epithelial GM1 ganglioside for ulcerative	PI	Matoba	06/20/20 – 03/31/24	Year 2 Direct Costs: $336,076
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	$231,310 (UofL Subaward) NCE to 7/31/22
DoD/Medical CBRN Defense Consortium MCDC2006-010	PREVENT-CoV: A Q-Griffithsin Inranasal Spray	Co-I	Palmer	12/03/20– 11/30/21	$7,489,612 (total costs) NCE to 9/30/22
NIH NIAID/ U19 AI113182-6663	Griffithsin-based Rectal Microbicides for PREvention of	PI	Matoba	7/01/14 – 6/30/19	Year 5 Direct Costs: $378,149 NCE to 6/30/21
NIH NCI / 1R21CA216447-01A1	Investigation of a lectibody targeting tumor-associated oligomannose glycans	PI	Matoba	2/08/18 – 1/31/20	Year 2 Direct Costs: $126,585 NCE to 1/31/22
NIH /NIEHS 2T32ES011564	UofL Environmental Health Sciences Training Program	Faculty mentor	Hein / Wise	07/14/21 – 06/30/26	$400,713 (Year 1 total)
NIH/ NIAID 5T32AI132146-04	Inflammation and Pathogenesis Training Program	Faculty mentor	Mitchell / Lamont	08/01/18 – 07/31/23	$144,220 (Year 4 total)
Palmer, Kenneth					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**

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
Department of Defense JPEO CBRN W15QKN-16-9-1002 / MCDC 2006-010	PREVENT-CoV: A Q-Griffithsin Intranasal Spray	PI	Palmer	02Dec20 - 30Nov22	$8,547,848 total costs
NIH/NIGMS P20 GM 125504	Functional Microbiomics, Inflammation and Pathogenicity	Member, Internal Advisory Board	Lamont	03/01/18-02/28/23	$2,544,491
NIH/NIAID 1UC6AI066844	Center for Predictive Medicine for Biodefense	PI and Director	Palmer	09/01/05 - 08/31/30	Construction grant with ongoing operations obligations $21,945,188
NIH/NCI 3P30 CA047904 32S5	Cancer Center Support Grant Supplement: Clinical evaluation of a QGRFT nasal spray for prevention of SARS-CoV-2	PI of subaward	Ferris	09/21/20 - 7/31/22	$1,042,029
NIH/NIAID 1U19AI113382	Griffithsin-based rectal microbicides for Prevention of Viral Entry (PREVENT)	PI	Palmer	01Jul14 – 30Jun21	$14,703,126 total costs
Qualigen Inc.	AS1411 to Prevent or Treat COVID-19	PI	Palmer, Bates	11/15/20-05/14/21	$430,432
DoD/W15QKN-16-9-1002	PREVENT-CoV: A Q-Griffithsin Intranasal Spray	Program Director	Palmer	12/02/20-11/30/21	$8,547,848
NIH/NCATS 1U18 TR003787-01	A handheld microchip for GC analysis of breath to screen for COVID-19	Co-Investigator	Fu, Nantz	12/21/21 – 11/30/22	$1,026,672
NIH/NIAID R44AI150235	Deimmunized Griffithsin Microbicide	PI of sub-award	Bailey-Kellogg	20Dec19 – 30 Nov21	$89,516 (UofL subaward)
Siskind, Leah					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**

NIH 1R01DK124112-01	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 F31 DK126400-01	Role of macrophages in cisplatin-induced kidney injury and progression to chronic kidney disease	Sponsor	Sears	5/1/20 – 4/30/23	$32,123 Annual Direct Costs
NIH R01 DK115406	CSN8 regulation of S1P-enriched extracellular vesicles to modulate NAFLD by gut-liver axis	Co-I (10%)	Deng	07/20/18-4/30/23	$270,000 Annual Direct Costs
Song, Zhao-Hui (Joe)					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
R21EY030186-01	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	David W. Hein and La Creis R. Kidd	9/1/2016 -8/31/2021	$1,620,000
Autism Speaks Predoctoral Fellowship #11863	Phytocannabinoids as Behavioral and Immunological Modulators in Autism Spectrum Disorders	Primary Mentor	Sarah Shrader	1/1/20-12/31/22	$70,000
States, Christopher					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIH-NIEHS/ R01ES027778	Mechanism for Arsenic Induced Carcinogenesis	PI	States	8/1/2017-7/31/2022	$2,056,394
NIEHS 1P30ES030283-01A1	UNIVERSITY OF LOUISVILLE CENTER FOR INTEGRATIVE	PD	States	7/15/20-3/31/25	$6,473,751 (total costs);

	ENVIRONMENTAL HEALTH SCIENCES				$1,170,401 (current year total costs)
NIH-NIEHS 1R21ES030334- 01A1	ALTERNATIVE SPLICING IN ARSENICAL SKIN CARCINOGENESIS	PI	States	7/14/20-6/30/22	$429,000 (total costs)
NIH/NCI R25CA134283-09	University Of Louisville Cancer Education Program	Mentor	Hein	09/14/11-03/31/22	$3,089,675 (total costs)
NIH/NIEHS, T32ES011564	UofL Environmental Health Sciences Training Program	Mentor	Hein	07/01/04 – 06/30/26	$2,316,985 (total costs)
NIH-NIEHS 5T35ES014559	SUMMER ENVIRONMENTAL HEALTH SCIENCES TRAINING PROGRAM	PI	States	05/01/19 – 07/31/26	$79,024
Wise, John					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
Kentucky Lung Cancer Research Program	Particulate Hexavalent Chromium-Induced Exosome Release in Human Lung Cells	PI	Wise, J.	07/01/18 - 06/30/21	$150,000
NIEHS/R35 ES032876	Chromosome Instability in Metal-Induced Lung Cancer	PI	Wise, J	08/01/21-07/31/29	$6,694,253
NIEHS/R01 ES016893	Particulate Cr(VI) Toxicology in Human Lung Epithelial Cells and Fibroblasts	PI	Wise, J	07/01/08 - 10/31/23	$3,090,764
NIEHS/T32 ES011564	UofL Environmental Health Sciences Training Program	PI (Multi)	Hein & Wise, J.	04/01/16-03/31/26	$2,183,597
University of Louisville School of Medicine	Survival Pathways in Metal Induced Carcinogenesis	Collaborator	Wise, S	06/15/18-05/14/20	$25,000
NCI/R25CA134283	University of Louisville Cancer Education Program	Mentor	Hein and Kidd	09/01/16-08/31/21	$1,500,000
NIGMS/P20GM113226	Hepatobiology & Toxicology COBRE	Mentor	McClain	06/10/16-03/31/21	$11,250,000
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
Wise, Sandra					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Award**
NIEHS/1RO1ES02778-01A1	Mechanism for arsenic induced carcinogenesis	Co-I	States	07/01/17 06/30/22	$2,488,085
NIEHS/R01 ES016893	Particulate Cr(VI) Toxicology in Human Lung Cells	Co-I	Wise, J	07/01/08 - 10/31/23	$3,090,764
NIEHS/R35 ES032876	Chromosome Instability in Metal-Induced Lung Cancer	Co-I	Wise, J	08/01/21-07/31/29	$6,694,253

RESEARCH PROPOSALS SUBMITTED

Banerjee, Mayukh

Agency/Number	Title	Role	PI	Project Period	Budget Request
National Institutes of Health – NIEHS/ 1 R01 ES034010-01	Mechanism of Arsenic Mediated Cell Cycle Dysregulation in Skin Cancer and its Mitigation by Zinc Supplementation	PI	Banerjee, Mayukh	04/01/2022-03/31/2027	$2,943,957

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
R01/NIAAA AA030424	Intestine FXR activation by LGG-derived nanoparticles in alcohol-associated liver disease.	Co-I	Feng	07/01/2022-06/31/2027	$3,441,079
R25/NIEHS	KEEP: Kentucky Environmental Education Pipeline, A program to retain a diverse and equitable scientific tranee	Mentor	Neal	04/01/2022 – 03/31/2027	
R25/NIH	The University of Louisville Clinician Neuroscientist Training	Mentor	Barnes	04/01/2022 – 03/31/2027	

Clark, Geoff

Agency/Number	Title	Role	PI	Project Period	Budget Request
CDMRP	RAS inhibition as a new	PI	Clark	8/1/2021-	450K

	therapeutic approach to Luminal B breast cancer			8/1/2022	
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

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 R; Spencer W (MPI)	7/22 – 6/25	
NCI SBIR Phase II	"Novel exosome vector for siRNA delivery"	MPI	Gupta R and Spencer	07/01/21 – 06/30/22	

			W (MPI)		
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-CA267782	Transforming Institutional Culture: UL Inclusive Excellence Biomedical Workforce Program	Multi-PI Leader, Administrative Core	Jones, F.	09/01/2021 – 08/31/2026	$16,032,175
U54 CA272234	Transforming Institutional Culture: UL Inclusive Excellence Biomedical Workforce Program	Multi-PI Leader, Administrative Core	Jones, F.	07/01/2022 – 06/30/2027	$16,033,425
NIH F31	Heterocyclic Amines and N-acetyltransferase 2 Polymorphism in Pathogenesis of Insulin Resistance	Faculty Mentor	Walls	04/01/2022 – 03/31/2025	$103,777
NIH R21 DA056001	Genetic susceptibility to toxic drugs of abuse	PI	Hein	04/01/2022 – 03/31/2024	$430,204
NIEHS P42-ES023716	Environmental Exposure and Cardiometabolic Disease	Director, Training Core	Srivastava	04/01/2022 – 03/31/2027	$13,748,501
UofL Center for Integrative Environmental Health Sciences	Gene-environmental interactions of novel psychoactive chemicals substituting for illegal drugs of abuse	PI	Hein	04/01/2021-03/31/2022	$40,000

UofL Center for Integrative Environmental Health Sciences	Arylamine N-acetyltransferase 2 SNP rs495741 and bladder cancer risk	CO-I	Hong	04/01/2021-03/31/2022	$50,000
KYNETIC Product Development Grant Pre-Application – Cycle #3	Point of care test to determine acetylator phenotype	Faculty Mentor	Salazar-Gonzalez & Hein	07/01/2021 – 12/31/20211	$50,000

Hong, Kyung

Agency/Number	Title	Role	PI	Project	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, Atlanta,	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)
Lukashevich, Igor					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
NIH/NIAD 1 R01 AI156139-01	Safety and Attenuation of Novel VEEV Vaccine with Rearranged Genome	PI on sub		12/01/20-11/30/25	$1,876,100
Matoba, Nobuyuki					
Agency/Number	**Title**	**Role**	**PI**	**Project Period**	**Budget Request**
Kynetic grant	Anti-cancer Activity of a Lectibody Targeting Ovarian Cancer-associated Oligomannose Glycans	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, 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 R21 EY033466-01	GPR3, a potential novel therapeutic target for lowering intraocular pressure	PI	ZH Song	9/01/2021-08/31/2023	$419,643
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

Wise, Sandra

Agency/Number	Title	Role	PI	Project Period	Budget Request

INVITED SCIENTIFIC PRESENTATIONS

Faculty with Primary Appointments

Chen, Shao-yu

1. Alteration of the expression of proteins associated with radial glial scaffold development in ethanol-exposed forebrain organoids derived from human embryonic stem cells. Society for Birth Defects Research and Prevention 2021 Annual Meeting (Virtual), June 29, 2021.

Ceresa, Brian

1. November 24, 2021 – Universidad Autonoma de San Luis Potosi, Mexico and Centro de Investigación y de Estudios Avanzados del IPN, México "EGFR Trafficking in The Corneal Epithelium: New Strategies To Promote Wound Healing" (Platform Oral presentation, given via Zoom)

Clark, Geoff

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

Freedman, Jonathan

1. Presentation to the leadership group of the Institute for Environmental Health Solutions at UNC-CH

Fuqua, Joshua

1. Wastewater Virology for SARS-CoV-2 at Research!Louisville. Sept. 15th , 2020
2. Regional Biocontainment Laboratory: AS1411 & Q-GRFT. State Health Commissioner Steven Stack, MD Visit. Nov. 18th, 2020.

Hein, David

1. Two plenary presentations scheduled for international meetings were postponed due to the COVID-19 pandemic.

Hood, Joshua

1. Bardi, G. T., Burroughs, M. J., Jones, J. B., Aebersold, J. W., Slusarczyk, A. S., Driss, A., & Hood (presenter, corresponding author), J. L. (2021, November). Hepatocellular carcinoma-derived exosomes induce pro-tumor macrophages. AASLD, The Liver Meeting® 2021. Virtual: American Association for the Study of Liver Diseases (AASLD).
2. Schroeder (student presenter), L. A., Bardi, G. T., & Hood (corresponding author), J. L. (2021, July). Development of a 3D HepG2 suspension culture system to enable reducible investigations into 2D vs. 3D HepG2 culture-derived sEV biophysical properties and cancer pathway-related miRNA content. NCI R25 Cancer Education Program Undergraduate Research Session. Louisville, KY: University of Louisville.
3. Hood, J. L. (2021, March). Macrophage induction by natural and attenuated tumor exosomes. Hepatobiology and Toxicology Research Seminar. Louisville, KY: University of Louisville School of Medicine, Hepatobiology & Toxicology COBRE.

4. Hood, J. L. (2021, May). The influence of natural and attenuated tumor exosomes on macrophage polarization. Pharmacology and Toxicology Research Seminar. Louisville, KY: University of Louisville School of Medicine, Department of Pharmacology and Toxicology.

Hong, Kyung

1. ***Investigating the Role of Arylamine N-Acetyltransferase 1 (NAT1) in Breast Cancer.*** Brown Cancer Center Seminar, University of Louisville. July 2021. Speaker: Kyung U. Hong.

Kouokam, Calvin

1. The inflammatory response in human lung cells after exposure to particulate hexavalent chromium [Cr(VI)], a key event in Cr(VI) carcinogenesis (Research

Lukashevich, Igor

1. Dylan M Johnson, Kevin J Sokoloski, Peter Pushko, **Igor S Lukashevich** Novel Venezuelan Equine Encephalitis Vaccine V4020 has Increased Safety and Stability over TC-83. *2020 ASM Biothreats* meeting, January 28–30, 2020, the Hyatt Regency Crystal City, Arlington, VA
2. Irina Tretyakova, Dylan M Johnson, Alexander Tibbens, **Igor S Lukashevich**, Peter Pushko Development of manufacturing process for reassortant Lassa virus vaccine ML29. *2020 ASM Biothreats* meeting, January 28–30, 2020, the Hyatt Regency Crystal City, Arlington, VA

Matoba, Nobuyuki

1. Invited seminar, “Plant-made Biologics" BE 601 Seminar Series, Department of Bioengineering, University of Louisville, March 19, 2021.
2. Invited talk, “EPICERTIN: A plant-derived recombinant Cholera Toxin B Subunit variant with mucosal healing activity in colitis” 2nd Asian Conference for Plant Made Pharmaceuticals (PMPAsia 2021), Nov 9 – 10, 2021, online.
3. Invited seminar, “Plant-made bio-pharmaceuticals under controlled environment” Indoor Ag Science Café, Dec 7, 2021, online.

Palmer, Kenneth

1. Invited Plenary Speaker: Spring Meeting of the Kentucky-Tennessee Branch of the American Society for Microbiology on April 16-17, 2021. “Novel Therapeutics for SARS-CoV-2”

Siskind, Leah

1. Seminar at the International Sphingolipid Interest Group, “The Role of Sphingolipids in Cisplatin-induced Acute Kidney Injury,” May 3, 2021, talk recording: https://www.youtube.com/watch?v=vczLzmn8A1Y
2. Invited Speaker, 9th International Singapore Lipid Symposium, “The role of glucosylceramide synthase in tertiary lymphoid structure formation”, March 2021

States, J. Christopher

1 "MicroRNA Dysregulation and Chromosome Instability in Arsenic Carcinogenesis", Department of Molecular Biology and Genetics, Democritus University of Thrace, Greece, 3/20/20
2 "M.S./Ph.D. Program in Pharmacology & Toxicology at the University of Louisville", Department of Molecular Biology and Genetics, Democritus University of Thrace, Greece, 3/20/20

Wise, John

1 Invited Speaker: "Chromium-Induced Chromosome Instability from a One Environmental Health Perspective". Presented at the University of New Mexico, Albuquerque, New Mexico.
2 Speaker: "Chromium-Induced Chromosome Instability from a One Environmental Health Perspective". Presented at the University of Louisville, Louisville, Kentucky.
3 Several presentations cancelled due to travel restrictions around COVID-19

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

Faculty with Primary Appointments

Clark, Geoff

- INHIBITORS OF THE RAS ONCOPROTEIN, METHODS OF MAKING AND METHODS OF USE THEREOF. Filed Nov. 20, 2020

Fuqua, Joshua

- "GRIFFITHSIN-BASED MICROBIAL DETECTION." Fuqua JL, Steinbach-Rankins J, Palmer KE, Hamorsky KT. Filed March 25, 2020, Provisional application 62/994,724.
- • "ANTI-VIRAL COMPOSITIONS AND METHODS OF MAKING AND USING." Fuqua JL, Hamorsky KT. Filed September 10, 2020, as application PCT/US2020/050200.
- • "COMPOSITIONS AND METHODS FOR PREVENTION OF CORONAVIRUS INFECTION." Fuqua JL, Palmer KE. Provisional Filed May 20, 2020, ULRF20072-01.
- • Founded GROW Biomedicine, LLC in 2019 – UofL focused Biotech start-up o Received an STTR in 2020 1R41AI152919-01 Phase 1 STTR Awarded 4/01/20 – 3/31/2021 NIH / NIAID $299,874 GROW Biomedicine Q-GRFT Enema Development Supporting a Multi-Administration Clinical Study Role: PI

Gupta, Ramesh

- Patents filed in 2020 - Non-Provisional Utility Patent Application PCT application filed on January 27, 2020 titled "Exosome-Mediated Transfection for Delivery of Nucleic Acids". Inventors: **Gupta R**, Munagala R, Jeyabalan J, Wallen M, Spencer W and Aqil F.
- Non-Provisional Utility Patent Application PCT application filed for The US titled "Exosome- Mediated Delivery of siRNA to Knockdown Exogenously Expressed Viral Antigens". Inventors: Gupta R, Wallen M, Auwardt S, and Spencer W.

- Licensing/Sublicensing - 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 - 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.).

Matoba, Nobuyuki

- ULRF Research Disclosures:
    1. Anti-ovarian cancer activity of Avaren-Fc (ULRF #20034)
    2. Spray dried formulation of a cholera toxin B subunit variant (CTB^{SEKDEL}) (ULRF #21021)
- Patent awarded: Patent Number: US 10,758,605 B2 (awarded on Sep 1, 2020)
  Title: Compositions and methods for treating cancer and promoting wound healing
- Business startup: Chief Scientific Officer (2019 – present), GROW Biomedicine LLC (Louisville, KY)

Palmer, Kenneth

- Issued US Patent: O'Keefe; Barry R., Moulaei; Tinoush, *Palmer; Kenneth* E. , Rohan; Lisa C., Fuqua; Joshua L. , Kramzer; Lindsay F. US Patent 10,501,507. "Griffithsin mutants"
- Established TWO CLIA Diagnostic Laboratories, and oversaw operations of the CPM Emerging Infectious Diseases Laboratory (CLIA), which conducted over 10,000 COVID-19 tests during the pandemic.
- Co-Founded GROW Biomedicine LLC, a Kentucky-based biotech startup company.

States, J. Christopher

- States JC, Wu J. "Immortalized human keratinocytes (HaCaT) stably expressing hsa-miR-186", Applied Biological Materials, Inc., non-exclusive license, 8/6/2020
- States JC, Taylor BF, Trent JO. Compounds for treating cancer, for administering, and for pharmaceutical compositions. US Patent # 10,849,863; 12/1/20

DEPARTMENTAL COURSES

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

Spring 2021

•	1021	Regular	PHTX 606	01	SEMINAR	Hong, K.
•	1419	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
•	1371	Regular	PHTX 631	01	RISK ASSESSMENT	Lipscomb, J States, J
•	7602	Regular	PHTX 634	01	INTRO TO MED REG AFFAIRS	Fuqua, J*
•	1364	Regular	PHTX 642	01	PHARMACOLOGY 2	Song, Z
•	1365	Regular	PHTX 644	01	TOXICOLOGY 2	Clark, G
•	1024	Regular	PHTX 661	01	MOLECULAR TOXICOLOGY	States, J Klinge, C

Summer 2021

•	1968	Regular	PHTX 617	01	LAB ROTATION	Siskind, L
•	1082	Regular	PHTX 619	01	RESEARCH	Siskind, L
•	1776	Summ 2	PHTX 632	01	DATA ANALYSIS	Kidd, L

Fall 2021

•	1036	Regular	PHTX 606	01	SEMINAR	Hong, K
•	1040	Regular	PHTX 616	01	ADV. PHARMACOLOGY	Siskind, L
•	1521	Regular	PHTX 617	01	LAB ROTATION	Siskind, L
•	1037	Regular	PHTX 618	01	TOPICS- PHAR & TOXIC	Siskind, L
•	1038	Regular	PHTX 619	01	RESEARCH	Siskind, L
•	1043	Regular	PHTX 625	01	SCIENTIFIC WRITING	Kirpich, I Kidd, L
•	1471	Regular	PHTX 641	01	PHARMACOLOGY I	Siskind, L Ceresa, B
•	1472	Regular	PHTX 643	01	TOXICOLOGY I	Wise, J

STANDING COMMITTEES

Graduate Affairs and Committee

Dr. Leah Siskind (Chair)
Dr. Geoff Clark (ex officio)
Dr. Kyung Hong (ex officio)
Dr. Brian Ceresa
Dr. Zhao-hui (Joe) Song
Dr. Nobuyuki Matoba
Student rep: Austin Krueger
Student rep: Jenny Toyoda

Graduate Recruitment and Admissions Committee

Dr. Geoff Clark (Chair)
Dr. Leah Siskind (Ex officio)
Dr. Brian Ceresa
Dr. Shao-yu Chen
Dr. John Wise Sr.
Dr. Nobuyuki Matoba
Dr. La Creis Kidd

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.

University of Louisville

MED 2021 Program Directory

Summer Cancer Research

Bastick, Jonathan
jcbast01@louisville.edu

Chen, Jenny
jjchen02@louisville.edu

Mentor: States, Christopher
jcstates@louisville.edu

Mentor: Feng, Wenke
wenke.feng@louisville.edu

Botaka, Noela
nmbota01@louisville.edu

Fiechter, Casey
crfiec01@louisville.edu

Mentor: Bates, Paula
paula.bates@louisville.edu

Mentor: Galandiuk, Susan
susan.galandiuk@louisville.edu

University of Louisville

Foster, Jaleyea
Jaleyea.foster@louisville.edu

McCaffrey, Lakyn
lmmcca06@louisville.edu

Mentor: Martin, Robert
robert.martin@louisville.edu

Mentor: States, Christopher
jcstates@louisville.edu

MED 2021 Program Directory

Malkawi, Azzam
aamalk01@louisville.edu

Parks, Mary (Alex)
mapark08@louisville.edu

Mentor: Martin, Robert
robert.martin@louisville.edu

Mentor: Galandiuk, Susan
susan.galandiuk@louisville.edu

Summer Cancer Research

University of Louisville

Rogers, Max
mnroge02@louisville.edu

Mentor: States, Christopher
jcstates@louisville.edu

MED 2021 Program Directory

Schoen, Eric
ecscho01@louisville.edu

Mentor: Martin, Robert
robert.martin@louisville.edu

Summer Cancer Research

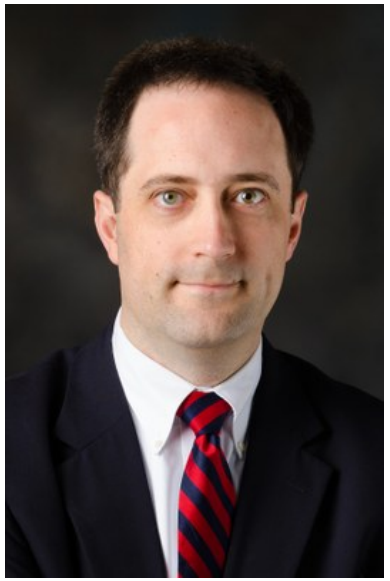
University of Louisville

UG 2021 Program Directory

Summer Cancer Research

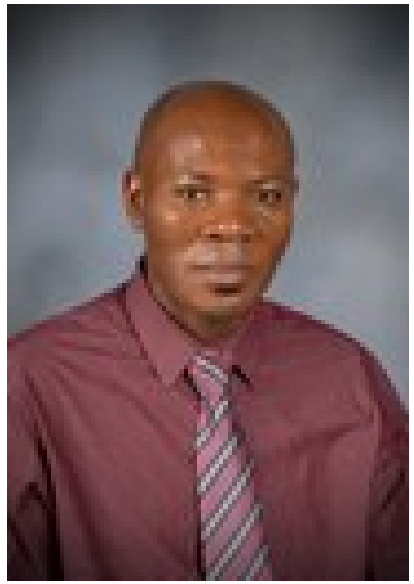
Bielema, Clarissa
College of William and Mary
c0biel01@louisville.edu

Mentor: Egger, Michael
meegge01@louisville.edu



Brian, Eric
University of Louisville
esbria02@louisville.edu

Mentor: Kouokam, Calvin
calvin.kouokam@louisville.edu



Corman, Julia
University of Louisville
jmcorm01@louisville.edu

Mentor: Fuqua, Joshua
Joshua.Fuqua@louisville.edup

Deng, Yuqing
University of Washington
y0deng04@louisville.edu

Mentor: Kavitha Yaddanapudi
kavitha.yaddanapudi@louisville.edu

University of Louisville

Diaz, Oscar
University of Kentucky
oadiaz03@louisville.edu

Mentor: Siskind, Leah
leah.siskind@louisville.edu

Eckert, Rachel
University of Louisville
rlecke01@louisville.edu

Mentor: Levi Beverly
levi.beverly@louisville.edu

UG 2021 Program Directory

Doyle, Catherine (Cates)
Georgetown University
chdoyl01@louisville.edu

Elgousi, Nada
University of Louisville
n0elgo01@louisville.edu

Mentor: Wise, John
john.wise@louisville.edu

Mentor: Telang, Sucheta
sucheta.telang@louisville.edu

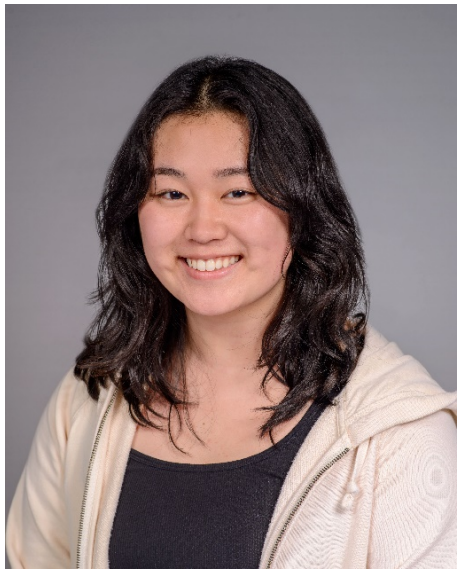
Summer Cancer Research

University of Louisville

UG 2021 Program Directory

Summer Cancer Research

Feng, Joanna
New York University
jlfeng01@louisville.edu



Greenwell, Evan
University of Louisville
ergree03@louisville.edu

Mentor: Siskind, Leah
leah.siskind@louisville.edu

King, Suzanne
snking02@louisville.edu

Frye, William
University of Louisville
wjfrye01@louisville.edu

Hawes, AJ
University of Louisville
ajhawe01@louisville.edu

Mentor: States, Christopher
jcstates@louisville.edu

Mentor: Clark, Geoff
geoff.clark@louisville.edu

University of Louisville

Kaissieh, Nada
University of Louisville
ngkais02@louisville.edu

Mentor: King, Suzanne
snking02@louisville.edu

Mayer, Katarina
University of Louisville
klmaye05@louisville.edu

Mentor: Matoba, Nobuyki
n.matoba@louisville.edu

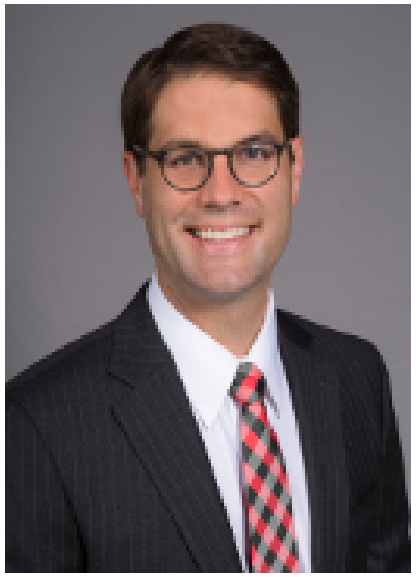
UG 2021 Program Directory

King, DeAsia
University of Louisville
deasia.kinglouisville.edu

Petersen, Madison
University of South Carolina
mepete06@louisville.edu

Mentor: Kidd, LaCreis
lrkidd01@louisville.edu

Mentor: Ellis, Tyler
clayton.ellis@louisville.edu



Summer Cancer Research

University of Louisville

Poulton, Claire
Case Western Reserve University
c0poul02@louisville.edu

Mentor: Klinge, Carolyn
cmklin01@louisville.edu

UG 2021 Program Directory

Qaissi, Zayna
University of Louisville
z0qais01@louisville.edu

Mentor: Wahlang, Banrida
b0wahl01@louisville.edu

Summer Cancer Research

University of Louisville

UG 2021 Program Directory

Summer Cancer Research

Schrepferman, Joseph
Villanova University
j0schr06@louisville.edu

Mentor: Martin, Robert
robert.martin@louisville.edu

Schroeder, Luke
University of Louisville
laschr03@louisville.edu

Mentor: Hood, Joshua
j0hood02@louisville.edu

Sears, Dietrich
Indiana University
d0sear02@louisville.edu

Mentor: Trent, John
jotren01@louisville.edu

University of Louisville

Summer Cancer Research

Mentor: Hein, David
david.hein@louisville.edu

Tagnedji, Afi
University of Louisville
afi.tagnedji@louisville.edu

Mentor: Hong, Kyung
kuhong01@louisville.edu

Tariq, Haseeb
Vanderbilt University
Haseeb.tariq@louisville.edu

Mentor: Clem, Brian
brian.clem@louisville.edu

UG 2021

Tinnell, Jenna
University of Louisville
jntinn01@louisville.edu

Mentor: Song, Joe
zhao-hui.song@louisville.edu