Research & Innovation

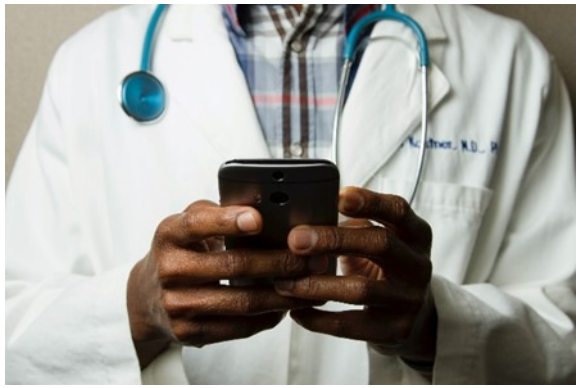
- **BioVentures** – Kevin Sexton, M.D., director
- **Division of Laboratory Animal Medicine** – Christy Simecka, DVM, director
- **IACUC** – Jerry Ware, Ph.D., director
- **Institutional Review Board** – Edith Paal, MS Journ, MPH, CIP, CHRC, director
- **Office of Research and Sponsored Programs** – Suzanne Alstadt, D.P.A., CRA, director
- **Office of Research Regulatory Affairs** – Laura Adkins, MAP, CCRP, CCRA, CRS, AdvCRS , interim director
- **Office of Sponsored Programs Administrative Network** Ty Stephens, CPA, CRA, director
  - Science Communications (SciCom) – Kerry Evans, Ph.D., sr. editor

Archived Showcase Programs

UAMS
Research & Innovation

Showcase of Medical Discoveries

Obesity Research



Wednesday
April 6, 2022
10 a.m. — Noon

A Research & Innovation virtual event featuring UAMS Investigators discussing their research and discoveries

UAMS
Research & Innovation

UAMS
Research & Innovation

Poster #9

Lipidomics Methods for Obesity Research

Andrew Morris Ph.D.

Lipidomics is the large-scale study of pathways and networks of cellular lipids in biological systems. Diet dependent obesity is characterized by adipose tissue expansion and increased synthesis of triglycerides but is more broadly associated with changes in the overall lipid composition of blood plasma, cells and tissues. These alterations in lipids are associated with many complications or co morbidities of obesity including diabetes and cardiovascular disease. Accordingly, measurements of the lipidome have promise as an approach to understand mechanisms linking obesity to increased disease risk. Mass spectrometry is an enabling technology for lipidomics. I will discuss approaches for large scale identification and measurement of lipids in biological samples using different kinds of mass spectrometry platforms available at UAMS/CAVHS and the Arkansas Children's Nutrition Research Center.

.

The UAMS division of Research and Innovation is pleased to sponsor the 30th Showcase of Medical Discoveries focused on cardiovascular research.

Check out the latest collaborative research projects by outstanding UAMS health professionals and researchers online!

https://research.uams.edu

To augment our efforts to bring you exciting up-to-date research discoveries via the Showcase format, please email Andrea McBryde (amcbryde2@uams.edu) and provide feedback, comments, and suggestions.

- Research | Innovation

Poster #1

Center for Childhood Obesity Prevention

Judy Weber, Ph.D., RD; Linda Larson-Prior, Ph.D., UAMS; and
Jami Jones, MBA, Arkansas Children's Research Institute

The Center for Childhood Obesity Prevention (CCOP), located at the Arkansas Children's Research Institute, is an NIH Center of Biomedical Research Excellence (COBRE) focused on elucidating the origins of pediatric obesity, as well as the behavioral and environmental contributors. CCOP-funded junior investigators explore underlying mechanisms that contribute to obesity, and develop and test interventions designed to prevent and treat childhood obesity and its associated complications. The CCOP accepts applications for pilot study funding annually, and once funded, investigators receive immersive research training support, and a networking peer-group to facilitate success.

Poster #8

Targeting Obesity and Cardiovascular Disease Using Integrated Omics

Rushita Bagchi, Ph.D.

Obesity is a multifactorial condition with complex pathogenesis that includes known cardiovascular disease risk factors such as type 2 diabetes, dyslipidemia, and hypertension. Obesity is therefore associated with increased incidence of cardiovascular disease. However, obesity also contributes to increased cardiovascular disease risk independently of these other risk factors. Understanding the basis of this effect would identify new approaches for clinical management of obesity associated cardiovascular diseases. I have identified roles for transcription factors and epigenetic modulators as regulators of adipose and cardiac remodeling using preclinical models and human tissue explants. I will present current progress in identifying targetable pathways linking obesity to cardiovascular disease using systems biology/ integrated omics approaches.

Poster #7

Metabolic and Immune Cell Alterations in Pediatric Obesity

Shannon Rose, Ph.D.; Reid Landes, Ph.D., UAMS; Sarah Blossom, Ph.D., Univ. of New Mexico; Elisabet Borsheim, Ph.D., ACNC; and Eugenia Carvalho, Ph.D., Univ. of Coimbra Ctr. for Neuroscience & Cell Biology

To study metabolic and immunological alterations associated with obesity and insulin resistance in children, we profiled peripheral blood mononuclear cells from normal weight (NW) and overweight/obese (OW/OB) children. We calculated homeostasis model assessment of insulin resistance (HOMA-IR), using a cut off of HOMA-IR>2.0 for insulin resistance (IR). We measured adiponectin, leptin and CRP by ELISA, PBMC bioenergetics by extracellular flux analysis, and quantified regulatory T cells (Treg) by flow cytometry. PBMCs from OW/OB IR subjects contained fewer Treg and exhibited increased mitochondrial respiration. OW/OB IR participants also exhibited elevated CRP, insulin and leptin, and decreased adiponectin. Young overweight children with IR, although still euglycemic, exhibit bioenergetics alterations in immune cells, which coupled with reduced numbers of Treg, may drive inflammation.

Poster #2

Metabolism and Bioenergetics Core to Support Obesity Research

Elisabet Borsheim, Ph.D., Emir Tas, M.D., Arkansas Children's Research Institute; and Craig Porter, Ph.D., Arkansas Children's Nutrition Center

The Metabolism and Bioenergetics Core at the Center for Childhood Obesity Prevention supports investigators in studies of substrate metabolism and bioenergetics in the development, treatment, and prevention of obesity and related metabolic disturbances. Services include support for physical activity interventions, exercise testing, stable isotope methodology, and bioenergetic measurements (high resolution respirometry and extracellular flux analysis). In an ongoing supported study, investigators seek to determine effects of high intensity interval training (HIIT) on metabolic outcomes in adolescents with obesity. Preliminary results show that HIIT is well tolerated by study participants, and has potential to shift the metabolic phenotype even before observed changes in body mass index or body composition, including decreasing intrahepatic triglycerides as measured by magnetic resonance imaging.

Poster #3

Informational Value of BMI Screening

Michael Thomsen, Ph.D., and Anthony Goudie, Ph.D.

Arkansas was the first state to adopt school-based body mass index (BMI) screening of public schoolchildren. We assessed the program's informational impact in two ways: (1) through a regression-discontinuity design that compared future BMI z-scores among children falling within a narrow band around the obese and overweight thresholds; (2) through machine-learning-based predictive models. We find little evidence of discontinuity around the thresholds but there is overwhelming evidence that the state's screening program meaningfully improves the ability to identify children at greatest risk for obesity in upper-elementary grades in comparison to sociodemographic and socioeconomic predictors that would otherwise be available to policymakers in the absence of the program. This is a heretofore unexamined benefit of school-based BMI screening.

Poster #6

Center for Childhood Obesity Prevention: A Core Service for Community Engagement

Taren Swindle, Ph.D.; Kate Stewart, MD, MPH, UAMS; Emily English, Dr.PH., MPH, MPS, UAMS; Sharon Sanders, Ph.D., Arkansas Children's Research Institute (ACNC); Anna Huff Davis, UAMS

Trustworthy engagement of parents and families, early childhood and school professionals, providers, organizations, and the broader community is critical to successful childhood obesity prevention research. An extensive body of literature exists to support such engagement and its positive impacts on health, and specifically on childhood obesity. The overarching goal of the Community Engagement (CE) Core for the Center for Childhood Obesity Prevention (CCOP) is to formally institute and provide services and activities that support investigators in effectively engaging communities in research to improve child health and prevent disease. This presentation will describe the infrastructure, services, and capacity-building initiatives of the CCOP CE Core.

Poster #5

Parental Influence on Programming of Adipose Tissue in Offspring

Umesh D. Wankhade, Ph.D.

Parental obesity negatively affects offspring health, whereas behavioral modifications are supposed to reduce offspring's predisposition to metabolic diseases. Colder temperatures is an additional environmental modification that is known to improve the metabolism, primarily through the activation of brown adipose tissue. However, the parental influence and environmental modifications during and prior to pregnancy and its role in adipose tissue development is poorly understood. We are interested in understanding the role of parental influence on offspring metabolism and obesity risk with a focus on adipose tissue. Using ambient temperature manipulation during prenatal stages, we study the parental metabolism and offspring's metabolic response to dietary challenge during postnatal stages. Findings from this work will provide mechanistic insights into developmental programming of adipose tissue.

Poster #4

Leveraging Comprehensive Metabolic Phenotyping and Housing Temperature to Optimize Rodent Models for Obesity Research

Craig Porter, Ph.D., Daniel Sadler, Ph.D., Arkansas Children's Nutrition Center, and Elisabet Borsheim, Ph.D., Arkansas Children's Research Institute

Laboratory mice are typically housed at temperatures between 20-26°C, as recommended by the National Research Council's Guide for the Care and Use of Laboratory Animals. There is a growing appreciation that these housing temperatures subject mice to cold stress. We leveraged a novel multiplexed metabolic phenotyping approach to demonstrate that transitioning mice from 24°C to 30°C reduces resting energy expenditure in both males (-36%) and females (-40%) ($P<0.05$). Accordingly, standard rodent housing temperatures result in marked hypermetabolism, significantly influencing energy balance. These data have important implications for the optimization of preclinical models of obesity and metabolic disease.