



CENTER OF EXCELLENCE IN OBESITY & CARDIOMETABOLIC RESEARCH

TEXAS TECH
Research & Innovation
Institute for One Health Innovation

◆ 11th Annual Meeting ◆

Advancing Chronic Disease Prevention:

From Translational Solutions
to Community Impact

Monday
May 4th, 2026

10:00 AM - 5:00 PM

TTUHSC
Academic Event Center

- Keynote Presentation
- Spotlight Presentation
- Faculty Short Talks
- Student Impact Talks
- Poster Competition
- Professional Development
- Lunch and Networking

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TEXAS TECH UNIVERSITY
HEALTH SCIENCES CENTER™



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TEXAS TECH™

AGENDA

11th Annual Meeting | May 4, 2026 | 10:00 AM – 5:00 PM

Advancing Chronic Disease Prevention:
From Translational Solutions to Community Impact

Dr. Kembra Albracht-Schulte, COCR Director, TTU

Dr. Jannette M. Dufour, COCR Co-Director, TTUHSC

Dr. Naima Moustaid-Moussa, IOHI Executive Director & ORI Founding Director, TTU & TTUHSC

10:00 - 10:20 Texas Tech University System Welcome Remarks

Dr. Joseph A. Heppert, Vice President for Research & Innovation, TTU

Dr. Lance R. McMahon, Executive Vice President for Research and Innovation, TTUHSC

Dr. Deborah J. Clegg, Vice President for Research, TTUHSC El Paso

10:20 - 10:30 COCR Update: Achievements and Future Directions

10:30 - 11:05 Keynote Speaker | Moderated by Dr. Naima Moustaid-Moussa

Dr. Carolyn M. Slupsky, Professor, Department of Nutrition and Department of Food Science & Technology, University of California, Davis; Nutritionist, Agricultural Experiment Station (AES)

“Programming Prevention: How Infant Nutrition Shapes Lifelong Cardiometabolic Health”

11:05 - 11:15 Q&A

11:15 - 11:40 Impact Talks | Moderated by Dr. Hushyar Azari

Mina Esmaeili, Graduate Student, Department of Biological Sciences, TTUHSC

“Relationships Between Obesity, Metabolic Dysfunction-Associated Steatotic Liver Disease Indices, Vitamin D Status, and Cognitive Impairment in a West Texas Elderly Cohort: A Project FRONTIER Study”

Adhirath Malladi, Undergraduate Student, Department of Kinesiology & Sports Management, TTU

“Validity of Hand-to-Foot and Foot-to-Foot Consumer-Grade Bioimpedance Analysis for Body Composition Estimation”

Ashti Morovati, Ph.D., Postdoctoral Research Associate, Department of Nutritional Sciences, TTU

“Glycolytic Beige Fat Activation Modulates Lipoprotein Metabolism and Atherosclerosis in Uncoupling Protein-1 Knockout Mice”

Benjamin Madura, Ph.D., Postdoctoral Research Associate, School of Veterinary Medicine, One Health Innovation, TTU

“Comparative Studies of Two Glucagon-Like Peptide-1 Receptor Agonists (Semaglutide and Tirzepatide) on Meta-bolic Dysfunction Associated Steatotic Liver Disease in Male and Female Mice”

Cole Campbell, Graduate Student, Department of Kinesiology & Sports Management, TTU

“Resveratrol Supplementation May Modulate Adaptations to Resistance Training: An Interim Analysis”

11:40 - 11:50 Q&A

11:50 - 12:30 Lunch and Networking

12:30 - 2:00 Student/Postdoc Poster Competition

2:00 - 2:20 Spotlight Presentation | Moderated by Dr. Kembra Albracht-Schulte

Irum Zaidi, MPH, Executive Director, Healthy Communities; Associate Professor, Julia Jones Matthews School of Population and Public Health, TTUHSC

“Healthy Communities Program: Innovative Healthcare Program for Rural America”

2:20 - 2:25 **Q&A**

2:25 - 2:50 **Faculty Short Talks | Moderated by Dr. Rachel L. Babcock**

Dr. Rizaldy Zapata, Assistant Professor of One Health, School of Veterinary Medicine, TTU, Amarillo
"Harnessing the Power of Nature's Experiments in Metabolic Disease Research"

Dr. Duke Appiah, Associate Professor, Department of Public Health, TTUHSC
"Shining a light on chronic disease in under-resourced populations in the Hub City"

Dr. Elyvine I. Gasana, Assistant Professor, Department of Nutritional Sciences, TTU
"Leveraging Nutrition Education Interventions to Improve Maternal and Child Health"

Dr. Balaji Rao, Assistant Professor, Department of Civil, Environmental, and Construction Engineering, TTU
"Challenges in Micro(nano)plastic Characterization"

2:50 - 3:00 **Q&A**

3:00 - 3:15 **Coffee Break**

3:15 - 3:40 **Faculty Short Talks: New Investigators | Moderated by Dr. Jannette M. Dufour**

Dr. Xue Wen Ng, Assistant Professor, Department of Cell Physiology and Molecular Biophysics, TTUHSC, Lubbock
"Intercellular islet communication in health and diabetes"

Dr. Aric Logsdon, Assistant Professor, Department of Pharmacology and Neuroscience, TTUHSC, Lubbock
"Analytical methods to quantify brain sugar composition in dementia"

Dr. Tara N. Gaire, Assistant Professor, Veterinary Epidemiology and One Health, School of Veterinary Medicine, TTU, Amarillo
"Improving Animal and Public Health Through Molecular Epidemiology and Applied Microbiome Research"

Dr. Mumtaz Yaseen Balkhi, Associate Professor, Department of Immunology and Molecular Microbiology, TTUHSC, Lubbock
"Restoring the Cytokine Axis to Reverse T Cell Exhaustion"

3:40 - 3:50 **Q&A**

3:50 - 4:40 **Student/Postdoc Professional Development Session | Moderated by Dr. Rachel L. Babcock & Dr. Hushyar Azari**

Dr. Nigel Jiwani, Assistant Professor of Kinesiology, Hope College

Dr. Kealey Wohlgenuth, Assistant Professor of Exercise Science, School of Human Services, University of Cincinnati

Dr. Christian Rodriguez, Postdoctoral Fellow in Clinical Sciences, Pennington Biomedical Research Center

4:40 - 5:00 **Award Announcements & Closing Remarks**

5:00 **Adjourn**



KEYNOTE SPEAKER



Carolyn M. Slupsky, Ph.D.

Professor, Department of Nutrition
Department of Food Science and Technology
University of California, Davis

“Programming Prevention: How Infant Nutrition Shapes Lifelong Cardiometabolic Health”

Dr. Carolyn Slupsky is Professor in the Departments of Nutrition and Food Science & Technology at the University of California, Davis. A biochemist by training, she is internationally recognized for her leadership in metabolomics, systems nutrition, and integrative multi-omics, and for advancing understanding of how diet, the gut microbiome, and host metabolism interact to shape health across the lifespan. Her research focuses on pregnancy, infancy, and early childhood, which are critical windows during which nutrition and environmental exposures influence metabolic and neurodevelopmental trajectories and may program later risk for obesity, diabetes, and cardiometabolic disease. This research is transforming our understanding of how early-life diet shapes the microbiome, metabolism, and developmental trajectories that influence lifelong risk for chronic disease. Her research has provided key insights into how infant diet, milk composition, maternal influences, microbial community structure, and microbiome-derived metabolites contribute to developmental outcomes and lifelong metabolic risk. Professor Slupsky has published more than 170 peer-reviewed papers and has been cited more than 11,000 times. She is widely recognized for foundational contributions to NMR-based metabolomics and quantitative data integration. In addition to her research, she has mentored 33 graduate students and post-doctoral fellows and was honored with the UC Davis Graduate Program Advising and Mentoring Award in 2023. She was named a Chancellor’s Fellow from 2015 to 2020 and held the Kinsella Endowed Chair in Food, Nutrition, and Health from 2016 to 2022.

ACADEMIC RANK:

Full Professor, Department of Nutrition and Department of Food Science & Technology, 2015-present
Associate Professor, Department of Nutrition and Department of Food Science & Technology, 2013-2015
Assistant Professor, Department of Nutrition and Department of Food Science & Technology, 2009-2013

EDUCATION:

1995 Doctor of Philosophy – Biochemistry, University of Alberta, Canada.
1988 Bachelors of Science – Biochemistry (Honors), University of Alberta, Canada.

EDITORIAL SERVICE:

Editorial Board – Journal of Nutritional Biochemistry, 2010-present
Editorial Board – npj Science of Food, 2016-present
Associate Editor – Nutrition Reviews, 2020-2023

AWARDS/HONORS:

UC Davis Graduate Program Advising and Mentoring Award – 2023
UC Davis Lab Safety Award – 2021
Kinsella Endowed Chair in Food, Nutrition, and Health – 2016-2022
Chancellor’s Fellow – 2015-2020
Deans’ Team Award for Excellence in Research – UCDCM 2014 (Team award)
Leukemia Research Fund Post-Doctoral Fellowship – 1997

RESEARCH:

Systems biology, Metabolomics, Gut Microbiome, Metabolic Programming, Maternal and Child
Google Scholar H-index 52.

SPOTLIGHT PRESENTATION



Irum Zaidi, MPH

Executive Director, Healthy Communities, Julia Jones Matthews School of Population and Public Health Associate Professor

“Healthy Communities Program: Innovative Healthcare Program for Rural America”

Irum Zaidi is an Associate Professor of Research at the Julia Jones Matthews School of Population and Public Health and Executive Director of the Healthy Communities – Permian Basin Program at Texas Tech University Health Sciences Center. With a background in applied large-scale population and public health programs, she brings passion for data driven programs working directly with communities to improve health outcomes.

Irum’s career has spanned across the Centers for Disease Control and Prevention and the US Department of State where she worked extensively with communities and governments in over 55 countries, driving global health initiatives and leading a transformative global data revolution. She established and utilized innovative data systems that significantly improved how health information was collected, analyzed, and applied, which enhanced responses to various infectious diseases, including HIV, H1N1, and COVID-19.

Her efforts in this role were instrumental in setting new standards for data use in public health, which facilitated more precise and effective interventions. Irum’s work in developing these novel data systems not only advanced epidemic control but also helped to optimize resource allocation and program focus on a global scale. She brings this passion and experience to her work to improve health outcomes in rural America.

NOTES

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ACKNOWLEDGMENTS

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Texas Tech University (TTU)
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Office of Research Development & Communication, TTU
Research Innovation, Collaboration, Entrepreneurship, TTUHSC
Graduate School, TTU
Department of Cell Biology & Biochemistry, TTUHSC
Department of Kinesiology & Sports Management, TTU
Graduate School of Biomedical Sciences, TTUHSC

Advisory Committee

Kembra Albracht-Schulte, TTU
Hushyar Azari, TTU
Rachel L. Babcock, TTUHSC
Munmun Chattopadhyay, TTUHSC
Rama Chemitiganti, TTUHSC
Deborah Clegg, TTUHSC
Glenn Cummins, TTU
Jannette M. Dufour, TTUHSC
Christine Garner, TTUHSC
Bibha Gautam, TTUHSC
Chanaka Kahathuduwa, TTUHSC
Wei Li, TTU
Conrad Lyford, TTU
Naïma Moustaid Moussa, TTU
Annelise Nguyen, TTU SVM
Oak-Hee Park, TTU
Clarissa Strieder Barboza, TTU
Leslie Thompson, TTU
Jason Van Allen, TTU

Poster Session Judges

Akhilesh Shakya — TTU
Anushka Shinde — TTU
Benjamin Barr — TTU
Chanda Shrestha — TTU
Chiquito Crasto — TTU
Diana Cavazos Rivera — TTU
Fahadraj Du — Other
Fernanda Trindade da Rosa — TTU
Golbarg Shabani Jafarabadi — TTU
Hushyar Azari — TTU
Irum Zaidi — TTUHSC
Jannette Dufour — TTUHSC
Kembra Albracht-Schulte — TTU
Manish Kumar — TTU
Marsa Zaroudi — TTU
Maryam Zubair — TTUHSC
Nadia Flores-Yeffal — TTUHSC
Nanahauwa Ramoni — TTU
Naima Moustaid-Moussa — TTU
Nermina Sarayli — TTUHSC
Rachel Babcock — TTUHSC
Rizaldy Zapata — TTU
Shadi Nejat — TTU
Subash Kairamkonda — TTUHSC
Surya Banerjee — TTU
Surya Niraula — TTU
Xuewen Ng — TTUHSC
Yujiao Zu — TTU
MD Khurshidul Zahid — TTU

11th Annual Meeting Planning Committee

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Megan George, TTU

Naïma Moustaid-Moussa, TTU & TTUHSC
Jannette M. Dufour, TTUHSC
Rachel L. Babcock, TTUHSC

WELCOME



Kembra Albracht-Schulte, Ph.D.

**Director, COCR | Assistant Professor, Kinesiology & Sport Management, TTU
Director of the Nutrition, Exercise, & Translational (NExT) Medicine Laboratory, TTU**

Dr. Kembra Albracht-Schulte is an Assistant Professor in the Department of Kinesiology & Sport Management at Texas Tech University and Director of the Nutrition, Exercise, & Translational (NExT) Medicine Lab. She earned her B.S. in Exercise Science from Lubbock Christian University, her M.S. in Exercise Science from Texas Tech University, and her Ph.D. in Nutritional Sciences from Texas Tech University. Dr. Albracht-Schulte's research program focuses on understanding the mechanistic and potentially synergistic effects of exercise and nutrition interventions through basic, clinical, and translational research. Her work emphasizes the prevention and treatment of obesity, cardiometabolic disease, and metabolic dysfunction through lifestyle medicine approaches. She integrates multi-omics methodologies, including metabolomics, microbiome analysis, extracellular vesicle biology, and biomarker discovery, to better understand individual responses to diet and exercise interventions. Dr. Albracht-Schulte directs human clinical trials designed to evaluate how exercise intensity, nutritional bioactives, and dietary interventions influence metabolic health outcomes. Her research has explored the interaction between omega-3 fatty acids, exercise training, inflammation, gut microbiota, and cardiometabolic risk factors in adults with obesity. She is also developing innovative research programs examining the impact of environmental exposures, such as micro- and nanoplastics, on gut health, metabolism, and chronic disease risk. In addition to leading the NExT Medicine Lab, she serves as Director of the Center of Excellence in Obesity & Cardiometabolic Research (COCR), fostering interdisciplinary collaborations across clinical, translational, and community-focused research initiatives. Through mentorship, collaborative science, and translational discovery, Dr. Albracht-Schulte aims to bridge laboratory findings with real-world applications that improve long-term health outcomes.



Jannette M. Dufour, Ph.D.

Co-Director, COCR | University Distinguished Professor and Chair in the Cell Biology & Biochemistry Department, School of Medicine, TTUHSC

Dr. Jannette M. Dufour is a University Distinguished Professor and Chair of the Department of Cell Biology & Biochemistry in the School of Medicine at Texas Tech University Health Sciences Center and Co-Director of the Center of Excellence in Obesity and Cardiometabolic Research (COCR). She received her PhD in Genetics and Cell Biology from Washington State University and trained as a postdoctoral fellow with the Islet Transplantation Group in the Surgical Medical Research Institute, Department of Surgery at the University of Alberta, Edmonton, Canada. Her research explores the therapeutic potential of immune-privileged Sertoli cells as a means to improve outcomes of transplantation. Specifically, her lab tests the feasibility of using immune privileged Sertoli cells for cell-based gene therapy and examining the mechanism(s) of Sertoli cell immune protection

to improve the survival of insulin-expressing cells as a treatment for diabetes. Her research has been funded by several national and local agencies, including the NIH, American Diabetes Association, and Texas ARP, and has been selected for the cover photo for Cell Transplantation (2008). Spermatogenesis (2012) and DNA and Cell Biology (2018) and highlighted in Biology of Reproduction (2014) and Nature Medicine (2018). She has been invited to give seminars at several universities as well as at national and international meetings, including the American Society for Reproductive Immunology (2022, 2024), American Society of Andrology (ASA; 2007, 2016, 2023), Society for the Study of Reproduction; (2012, 2016), NIAID (2017) and NIEHS (2017). She has received the TTUHSC President's Young Investigator Award (2011), the Outstanding Women Leader (OWL) Award from the West Texas Association for Women in Science (2013), the Harry M. Weitlauf Anatomy Teaching Award (2013), the Dean's Basic Science Teaching Award (2017, 2024) and the President's Team Teaching Award (2019, 2020), the Graduate School of Biomedical Sciences Dean's Teaching Award (2023) and the President's Teaching Award (2025).



Naima Moustaid-Moussa, Ph.D.

DFASN, FTOS, FAHA, FNAI

Founding Director, Obesity Research Institute

Executive Director, Institute for One Health Innovation

Paul W. Horn Distinguished Professor, TTU School of Veterinary Medicine

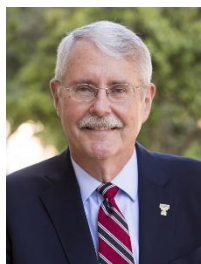
Professor, Department of Cell Biology & Biochemistry, TTUHSC

Member, National Academies' Board on Agriculture & Natural Resources (BANR)

President, American Society for Nutrition

Prof. Naima Moustaid-Moussa is the Inaugural Executive Director for the system-wide Institute for One Health Innovation (IOHI) and Founding Director of the Obesity Research Institute at TTU and TTUHSC. She is a Paul W. Horn Distinguished Professor of Nutrition and One Health at the TTU School of Veterinary Medicine, and Professor of Cell Biology and Biochemistry at the TTUHSC School of Medicine. She directs Nutrigenomics, Inflammation and One Health Research (NIOR) Lab conducting basic and integrated nutrition and obesity research, with emphasis on nutrient-gene interactions, and the role of the adipose endocrine function (renin-angiotensin system, RAS), and heat shock proteins in metabolic diseases. Her lab was among the first to identify RAS components in human adipose tissue and harness molecular tools to advance nutrition research. Current research focuses on effects of environmental factors (microplastics, contaminants) on inflammation, oxidative stress, metabolic and brain health and potential use of dietary bioactive compounds to counteract these effects. Her lab has been characterizing mechanisms by which bioactives (including fish oil, tart cherry anthocyanins, curcumin, and other polyphenols) reduce obesity-associated white fat inflammation, activate brown fat, reduce systemic, adipose- and neuroinflammation and aging-related metabolic dysfunctions, using cells, rodents, and model organisms (*C. elegans*). She published over 200 peer-reviewed papers from research primarily funded by federal agencies, national and international foundations. Her h-index is 64 with 30,483 citations (Google scholar, accessed 02/25/26).

Prof Naima is a Distinguished Fellow of ASN (DFASN), Fellow of the AHA (FAHA), a Fellow of The Obesity Society (FTOS), and a Fellow of the National Academy of Inventors (FNAI). She received several awards sponsored by ASN [2012 Outstanding Investigator award, 2015 Pfizer Consumer Healthcare Nutritional Sciences award, 2020 Korean Nutrition Society Award). She has been very dedicated to mentoring early career investigators and was awarded mentoring and scholarship awards by TTU (2018 Nancy J Bell Outstanding Graduate Mentor Award, 2019 Outstanding Faculty Mentor for Undergraduate Research, 2021 Bernie E. Rushing J. Distinguished Faculty Research Award in STEM, and the 2023 Wolfe International Scholars Award). She provided significant outreach and professional services including as member of several NIH study sections and as regular member of the clinical obesity and diabetes study section (CIDO/HSDO). Since 2022, she has been member of the National Academies' Board on Agriculture & Natural Resources (BANR). Currently, she serves as the 2025-26 President of the American Society for Nutrition (ASN).



Joseph A. Heppert, Ph.D.
Vice President for Research & Innovation, TTU

Dr. Heppert is currently Vice President for Research and Innovation and Professor of Chemistry at Texas Tech University (TTU). His office is responsible for fostering research, scholarship, and creative activity at TTU; for promoting innovation, entrepreneurship, and technology transfer programs; and for regulatory oversight of research compliance and scholarly integrity. Dr. Heppert is currently a co-PI on the NSF Southwest I-CORPS Node project. Previously, he served as Associate Vice Chancellor for Research at the University of Kansas (KU), chaired the KU Chemistry Department from 2005-2009, and was the founding director of the University's Center for Science Education from 2001-2009. He is a Fellow of the American Chemical Society, is the former chair of the American Chemical Society's Committee on Budget and Finance. He serves on the institutional advisory board for the Cancer Prevention and Research Institute of Texas and on the Board of Directors of the Oak Ridge Associated Universities. Dr. Heppert's initial research focused on organo transition metal chemistry. He has also been active in projects to improve science teaching and science teacher preparation. He is past chair of the American Chemical Society's Committee on Education. In this role he testified before the U.S. House of Representatives' Committee on Science and the National Science Board on science education policy issues. Dr. Heppert received a B.S. in Chemistry from San Jose State University in 1978, where he participated in heavy elements research at the Lawrence Livermore National Laboratory. He was awarded a Ph.D. in Inorganic Chemistry from the University of Wisconsin-Madison in 1982, and completed postdoctoral training at Indiana University.



Lance McMahon, Ph.D.
Executive Vice President for Research & Innovation
Texas Tech University Health Sciences Center

Dr. Lance R. McMahon is the Executive Vice President for Research and Innovation at Texas Tech University Health Sciences Center (TTUHSC) and Dean of the Graduate School of Biomedical Sciences. He is Distinguished Professor of Pharmaceutical Sciences in the Jerry H. Hodge School of Pharmacy, Chair of the TTUHSC Research Council, and member of the Texas Tech Research Park Board. Over his career Dr. McMahon has secured \$27M in NIH funding as PI to discover and develop central nervous system (CNS) drugs and their underlying pharmacological mechanisms resulting in 145 peer-reviewed publications. He has held leadership positions within the American Society of Pharmacology and Experimental Therapeutics and the American Association of Pharmaceutical Scientists and has served on editorial boards for several peer-reviewed scientific journals. Dr. McMahon received his bachelor's degree from the University of Pennsylvania and PhD degree from the Department of Psychology at Texas A&M University. In his capacity as Executive Vice President and Dean, Dr. McMahon builds strategic research partnerships by fostering a collegial spirit, shared vision, and strategic investment of university funds to secure TTUHSC's position as a global leader in academic health-related research.



Deborah J. Clegg, Ph.D.
Vice President, Office of Research
Texas Tech University Health Sciences Center El Paso

Dr. Clegg is a known expert in the field of obesity, sex hormones, and metabolism, with a specific interest in nutrition and how it interacts with physiology. She has authored over 200 articles in impactful journals such as The New England Journal of Medicine, JAMA, American Journal of Physiology, and the National Kidney Foundation. According to a peer-reviewed database, she is listed in the top 2% of the most cited/impactful investigators out of more than 6 million cited in science journals worldwide. Dr. Clegg is the Vice President for Research at the Paul Foster School of Medicine/Texas Tech Medical School in El Paso, Texas. Dr. Clegg and her research have been featured in many forms of media, including the television program The View and the HBO series entitled 'Weight of the Nation,' as well as in the popular press, including magazines such as Vogue, Mademoiselle, Ladies Home Journal, and Nature. Dr. Clegg has conducted her own basic science research as well as participated in clinical and translational research for over 28 years.

KEYNOTE SPEAKER

Introduced by Naïma Moustaid-Moussa, PhD, FTOS, FAHA, DFASN, Founding Director, ORI



Carolyn Slupsky, Ph.D.

Professor, Department of Nutrition
Department of Food Science and Technology
University of California, Davis

“Programming Prevention: How Infant Nutrition Shapes Lifelong Cardiometabolic Health”

IMPACT TALKS

Moderated by Dr. Hushyar Azari, M.D., PhD; Department of Kinesiology and Sport Management, TTU

Impact Talk 1

Relationships Between Obesity, Metabolic Dysfunction-Associated Steatotic Liver Disease Indices, Vitamin D Status, and Cognitive Impairment in a West Texas Elderly Cohort: A Project FRONTIER Study

Mina Esmaeili, Nicholas Vojtkofsky, Claudia Morris, S. Skawratananond, Matthew Buxton, and J. Josh Lawrence; Department of Pharmacology and Neuroscience, TTHSC

Objective: Metabolically–dysfunction–associated steatotic liver disease (MASLD) is increasingly viewed as a systemic condition, yet its relationship with cognitive function is still not fully understood. In this study, we explored how markers of liver dysfunction and vitamin D status relate to cognitive performance in an aging, community-based cohort from West Texas, with a focus on disease severity.

Methods: We analyzed data from 299 participants in the Project FRONTIER cohort. Cognitive performance was evaluated using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Liver health was assessed using both serum biomarkers and commonly used indices of steatosis and fibrosis, including FLI, HSI, FIB-4, and the NAFLD fibrosis score. Vitamin D levels were also measured. Relationships among these variables were examined using correlation and regression analyses.

Results: Lower RBANS scores were linked to higher total bilirubin and total serum protein. Among liver indices, fibrosis-related measures (FIB-4 and NAFLD fibrosis score) showed clear negative associations with cognitive performance, whereas steatosis-related indices (FLI and HSI) did not. Vitamin D showed a different pattern: lower levels tended to accompany higher metabolic and liver-related risk factors, including greater BMI, triglycerides, alkaline phosphatase, steatosis indices, and type 2 diabetes.

Significance: Together, these findings suggest that disease severity—particularly fibrosis—may matter more for cognitive outcomes than fat accumulation alone.

Conclusions: In this cohort, liver fibrosis, but not steatosis, was associated with poorer cognitive performance. This pattern supports a broader role for systemic metabolic dysfunction in cognitive aging.

Impact Talk 2

Validity of Hand-to-Foot and Foot-to-Foot Consumer-Grade Bioimpedance Analysis for Body Composition Estimation

Adhirath Malladi, Carina M. Velasquez, Christine M. Florez, Ainsley Way, Madison Sullivan, Julia Whitson, John Alexander & Grant M. Tinsley; Department of Kinesiology and Sport Management, TTU

Objective: To evaluate the validity of two widely used consumer-grade bioimpedance analysis (BIA) devices, one hand-to-foot and one foot-to-foot, for estimating body fat percentage (%BF) compared with dual-energy X-ray absorptiometry (DXA), and to determine whether BIA error changes across the range of %BF.

Methods: Eighty-three healthy adults (50 females, 33 males) completed a single testing visit. After an overnight 8-hour fast from food and fluid and at least 24 hours without exercise, participants underwent DXA (GE iDXA), hand-to-foot BIA (GE C510G), and foot-to-foot BIA (GE Fit Plus LN) assessments. Device estimates were compared with DXA using paired t-tests, Bland-Altman analyses, coefficients of determination (R^2), standard error of the estimate (SEE), and tests for proportional bias.

Results: Both consumer BIA devices significantly underestimated %BF versus DXA ($23.3 \pm 7.4\%$ and $23.3 \pm 7.6\%$ vs $27.0 \pm 8.8\%$; $p < 0.01$), with mean bias of approximately -3.7% %BF. Agreement with DXA was poor for both devices ($R^2 = 0.48-0.53$; $SEE = 6.1-6.4\%$ %BF), and Bland-Altman limits of agreement were wide ($\sim 12-13\%$ %BF). Both devices also showed proportional bias, with greater underestimation at higher %BF.

Significance: These findings show that inexpensive consumer BIA devices may produce clinically and practically misleading individual estimates.

Conclusions: Neither consumer BIA device was interchangeable with DXA for adult %BF estimation, particularly among individuals with higher %BF.

Impact Talk 3

Glycolytic Beige Fat Activation Modulates Lipoprotein Metabolism and Atherosclerosis in Uncoupling Protein-1 Knockout Mice

Ashti Morovati, Tatum Walker, Shane Scoggin, Naima Moustaid-Moussa, Yujiao Zu; Department of Nutritional Sciences, TTU

Objective: Obesity exacerbates dysregulated lipid metabolism and atherosclerosis. Classical thermogenic activation of brown and beige fat relies on uncoupling protein-1 (UCP1) and β -adrenergic signaling but shows limited effectiveness in obesity and cardiovascular disease. We identified a glycolytic beige (g-beige) fat phenotype in subcutaneous adipose tissue characterized by enhanced glycolysis and thermogenesis independent of β -adrenergic receptor (β -AR) and UCP1 signaling. We hypothesized that g-beige activation modulates atherosclerosis by protecting against diet-induced obesity, enhancing lipoprotein remnant clearance, and reducing atherosclerotic lesions.

Methods: To assess lipoprotein metabolism, male Ucp1 knockout (KO) and wild-type (WT) mice received a β -blocker (propranolol, 25 mg/kg) or saline for 5 days, followed by cold (15°C) or ambient (23°C) exposure for 5 days with continued treatment. Rhodaminetriglyceride (Rh-TG) and BODIPY-cholesterol (BO-C) labeled VLDL-like particles were injected intravenously, and plasma collected to assess clearance kinetics. For atherosclerosis studies, male Ucp1/ApoE double KO (DKO) and ApoE KO mice were fed an atherogenic diet for 16 weeks at 23°C or thermoneutral (30°C) with β -blocker or saline treatment. Aortic arch lesions were quantified.

Results: Cold-challenged Ucp1 KO mice treated with β -blocker showed reduced body weight and increased thermogenic (Cidea, Cox7a1, Elovl3) and glycolytic (Eno1, Pkm2) gene expression, indicating g-beige activation. These mice exhibited accelerated plasma clearance of RhTG and BO-C, suggesting enhanced lipid uptake. DKO mice housed at 23°C had smaller aortic arch lesions than those at 30°C , with the smallest lesions in β -blocker-treated DKO mice.

Conclusion: An alternative thermogenic pathway, independent of UCP1 and β -AR signaling, may provide a strategy for reducing obesity and atherosclerosis.

Impact Talk 4

Comparative Studies of Two Glucagon-Like Peptide-1 Receptor Agonists (Semaglutide and Tirzepatide) on Metabolic Dysfunction Associated Steatotic Liver Disease in Male and Female Mice

Benjamin Madura, Maryam Seifshahpar, MD Khurshidul Zahid, Abdelilah Arredouani, Naima Moustaid-Moussa; School of Veterinary Medicine, TTU, Amarillo

Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) affects $\sim 25\%$ of the global population and can progress to Metabolic Dysfunction-Associated Steatohepatitis (MASH). Weight loss of 5-10% is the only recommended treatment for MASLD, with no currently approved medications. Glucagon-Like Peptide-1 Receptor Agonists (GLP-1RAs) have improved

MASLD in clinical trials. This study aims to determine whether the mechanism(s) underpinning these improvements are attributable to weight loss, or activation of GLP-1R dependent molecular pathways. We used Methionine-Choline Deficient (MCD) diets, which rapidly induce fatty liver. Male (n = 10) and female (n = 10) C57BL/6J mice were divided into 4 groups; Low-fat (LF), High-fat (HF), HF + Semaglutide (SEM), and HF + Tirzepatide (TIR). Mice were fed for 8 weeks before respective GLP-1RA administration for 4 further weeks (12 weeks total). Body weight was measured throughout, Echo-MRI was conducted at week 11, livers and blood were collected at termination for further analyses. In males, SEM (P = .0008) and TIR (P = .0133) reduced body weight compared to HF. Females exhibited no body weight changes. Liver gene expression analysis revealed improvements in fatty acid oxidation markers; SEM increased Cpt1a in males (P = .0235), while TIR increased PPAR α in females (P = .0103). TGF- β 1 is a marker of fibrosis, and TIR reduced its expression in males (P = .0015). While GLP-1RAs can reduce MASLD, it remains unclear whether weight loss or directly stimulated molecular mechanisms are responsible. Ongoing work in this study will incorporate liver histology analyses and multi-omics approaches to elucidate underlying mechanisms.

Impact Talk 5

Resveratrol Supplementation May Modulate Adaptations to Resistance Training: An Interim Analysis

Cole Campbell, Hima Bindu Doddoju, Connor J. Mills, Jacob A. Mota, Arturo Figueroa, Danielle E. Levitt;
Department of Kinesiology and Sport Management, TTU

OBJECTIVE: This interim analysis assesses the potential of resveratrol to improve muscle and bone adaptations to resistance training (RT) in healthy older adults.

METHODS: As part of a larger trial (NCT06585865), participants in this interim analysis (N=5/1 [female/male]; 64.5 \pm 5 yrs; 41.8 \pm 7.4% fat) completed testing before and after 6 weeks of RT with supplementation (placebo or resveratrol [500mg/day], double-blinded). Testing included dual-energy X-ray absorptiometry (DXA), handgrip dynamometry, and 1-repetition maximum (1RM) testing (bench press, dumbbell row, leg press, lat pulldown). Data were analyzed using two-way, mixedmodel ANOVA.

RESULTS: Bench press, dumbbell row, and lat pulldown 1RM significantly (p<0.05) improved after 6 weeks of RT, with potential improvements for handgrip strength (p=0.06) and leg press 1RM (p=0.051). While 3 participants per condition was insufficient to detect time \times supplement interactions, large interaction effect sizes (η^2 =0.364-0.473) were observed for bone mass, handgrip strength, and bench press and lat pulldown 1RM.

CONCLUSIONS: Six weeks of RT improved strength among older adults. Large effect sizes in this interim analysis suggest a supplement-driven divergence in bone mass and strength adaptations to RT. If these effects are detectable following completion of data collection, results may support resveratrol supplementation to improve muscle and bone adaptations to RT.

SIGNIFICANCE: Older adults progressively lose muscle and bone mass with age, worsening metabolic profiles and reducing quality of life. While RT is a key intervention, feasible strategies to improve muscle and bone adaptations to RT are needed. This work positions resveratrol supplementation as one potential such strategy. Funding: NSCA Foundation

SPOTLIGHT PRESENTATION

Moderated by Dr. Kembra Albracht -Schulte, Department of Kinesiology and Sport Management, TTU



Irum Zaidi, MPH

Executive Director, Healthy Communities, Julia Jones Matthews School of Population and Public Health Associate Professor

“Healthy Communities Program: Innovative Healthcare Program for Rural America”

FACULTY SHORT TALKS

Moderated by Dr. Rachel Babcock, PhD; Postdoctoral Research Associate, Department of Cell Biology & Biochemistry, TTUHSC



Rizaldy Zapata, DVM, Ph.D.

Assistant Professor of One Health, School of Veterinary Medicine, TTU, Amarillo

“Harnessing the Power of Nature’s Experiments in Metabolic Disease Research”

Dr. Rizaldy Zapata earned his Doctor of Veterinary Medicine from the University of the Philippines, specializing in companion animal medicine and surgery, and his PhD in Veterinary Medicine from the University of Calgary, focusing on nutritional biochemistry. He received postdoctoral fellowship awards and underwent further training in endocrinology and metabolism at the University of California, San Diego, and in cardiovascular medicine at the University of Missouri. He recently joined the School of Veterinary Medicine in September 2025 as an Assistant Professor, where his research delves into the molecular mechanisms underlying metabolic diseases, with a focus on energy balance, nutrient signaling, and cell-to-cell communication. Today, he is excited to give you a glimpse into how he uses the One Health approach as he “Harnesses the Power of Nature’s Experiments in Metabolic Disease Research.”



Duke Appiah, Ph.D.

Associate Professor, Department of Public Health, TTUHSC

“Shining a light on chronic disease in under-resourced populations in the Hub City”

Dr. Duke Appiah is an epidemiologist, statistician and data scientist whose work has primarily focused on understanding the etiology and prevention of chronic diseases, specifically cardiovascular disease, cancer, diabetes, obesity and aging, with emphasis on women and under-resourced populations, as well as the intersection of infectious and chronic diseases on long-term health outcomes. His passion as an educator is to help students cultivate their intellectual interests, challenge their critical-thinking skills, and engage them with active-learning strategies. His dedication to excellence in research, teaching and mentoring has been recognized with several notable awards and honors including the Texas Tech System Chancellor’s Council Distinguished Teaching Award, the Graduate School Dean’s Teaching Award, eight Outstanding Faculty of the Year awards from the Student Government Association, Outstanding Faculty Mentor from the Center for Transformative Undergraduate Experiences, the Trudy Bush Fellowship for Cardiovascular Disease Research in Women’s Health from the American Heart Association, Minority-serving Institution Faculty Scholar in Cancer Research Award from American Association for Cancer Research and the Alumni Fellow Award for Public Health from the University of Louisville. Dr. Appiah is a Governor appointee on the Task Force on Infectious Disease Preparedness and Response for Texas, serves on the Board of Health for the City of Lubbock, and is an elected fellow of the American Heart Association.



Elyvine I. Gasana, Ph.D.

Assistant Professor, Department of Nutritional Sciences, TTU

“Leveraging Nutrition Education Interventions to Improve Maternal and Child Health”

Dr. Elyvine Gasana is a community nutrition researcher with extensive expertise in the design, implementation, and evaluation of community-based interventions to prevent and manage nutrition-related issues among low-income and hard-to-reach populations. She has led and collaborated on multiple international and community-based projects, with her research focusing on developing effective, culturally appropriate behavior change interventions that improve health and nutrition outcomes.



Balaji Rao , Ph.D.

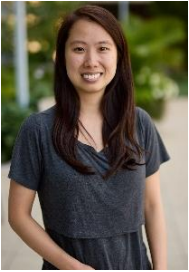
Assistant Professor, Department of Civil, Environmental, and Construction Engineering, TTU

“Challenges in Micro(nano)plastic Characterization”

Dr. Rao is an Assistant Professor at the Department of Civil, Environmental and Construction Engineering at Texas Tech. Dr. Rao obtained his MS and PhD in Environmental Engineering from Texas Tech and bachelor's in chemical engineering from Madras University, Chennai, India. Prior to his current position, he was a post-doctoral research associate at Oak Ridge National Lab where he worked on characterization and remediation of mercury in aquatic environment. Dr. Rao's current research areas are focused on evaluating and managing risks associated with both traditional and emerging contaminants including microplastic, PFAS and pharmaceutical compounds, in water and wastewater systems. He is passionate about applying the principles of engineering to solve vital environmental topics, particularly related to contaminant remediation, sustainable resource management, and food-energy-water nexus.

FACULTY SHORT TALKS: NEW INVESTIGATORS

Moderated by Dr. Jannette M. Dufour, PhD; Department of Cell Biology & Biochemistry, TTUHSC



Xue Wen Ng, Ph.D.

Assistant Professor, Department of Cell Physiology and Molecular Biophysics, TTUHSC, Lubbock

“Intercellular islet communication in health and diabetes”

Dr. Xue Wen Ng obtained her Doctor of Philosophy (PhD) degree in Chemistry on 2017 at the National University of Singapore (NUS) under the supervision of Dr. Thorsten Wohland. She studied the spatiotemporal biomolecular dynamics and organization of proteins and lipids in live cells and zebrafish. Subsequently, she received her postdoctoral research training in the laboratory of Dr. David Piston to study the molecular mechanisms that regulate pancreatic islet cell secretions through intercellular communication in the Islet of Langerhans. Thereafter, she joined the Washington University Center for Cellular Imaging (WUCCI) in Washington University in St. Louis as a staff scientist where she coordinated trainings, collaborations and maintenance at the state-of-the-art imaging core facility. She is currently an assistant professor in the Department of Cell Physiology and Molecular Biophysics at Texas Tech University Health Sciences Center.



Aric Logsdon, Ph.D.

Assistant Professor, Department of Pharmacology and Neuroscience, TTUHSC, Lubbock

“Analytical methods to quantify brain sugar composition in dementia”

Dr. Aric Logsdon is a tenure-track Assistant Professor at Texas Tech University Health Sciences Center (TTUHSC) in the Department of Pharmacology and Neuroscience. Dr. Logsdon completed his PhD from West Virginia University and his postdoctoral training with Bill Banks at the University of Washington. Dr. Logsdon has committed over 15 years of research to the fields of neuroscience and cerebrovascular biology, and he is motivated to elucidate the novel mechanism(s) underlying the onset and progression of neurodegenerative diseases. Dr. Logsdon has published over 60 peer-reviewed publications in high-impact scientific journals, including: Nature Neuroscience, Nature Metabolism, Nature Aging and Alzheimer's & Dementia. Aric is an acknowledged expert in neuroscience research and has been invited to chair sessions and present lectures of his work at over 10 national and international scientific conferences. Dr. Logsdon is also the recipient of several honors and awards from research societies, including: the Winter Conference on Brain Research, the Psychoneuroimmunology Research Society, the International Society for Cerebral Blood Flow and Metabolism, and the National Neurotrauma Society. Dr. Logsdon is now an independent Principal Investigator supported by a K22 Career Transition award from the National Institute on Aging, and a Junior Investigator award from the Texas Alzheimer's Research and Care Consortium. The Logsdon lab uses preclinical models of neuroinflammation to explore the functional role(s) of brain matrix glycans on cerebrovascular function. Dr. Logsdon developed mass spectrometry methods to quantify chondroitin sulfate (CS) sulfation in human brain tissue. Using these methods, he discovered

CS hypersulfation in brain tissue from humans with dementia. The Logsdon lab now employs these innovative methods to 1) identify CS sulfation patterns on brain endothelial cells from humans with dementia, and to 2) define the role of CS sulfation in mediating cerebrovascular function. When not in the lab, Dr. Logsdon likes to spend time outdoors with his son, Thomas.



Tara N. Gaire, Ph.D.

Assistant Professor of Epidemiology, Texas Tech University School of Veterinary Medicine, Amarillo

“Improving Animal and Public Health Through Molecular Epidemiology and Applied Microbiome Research”

Dr. Tara Gaire (DVM, MS, PhD), is an Assistant Professor of Epidemiology at Texas Tech University School of Veterinary Medicine. His research integrates molecular epidemiology, microbial genomics, microbiome science, and computational approaches to address infectious diseases, antimicrobial resistance, food safety, and One Health challenges. His program focuses on basic and applied, outcome-driven research that supports animal health, food safety, and broader public health.



Mumtaz Yaseen Balkhi, Ph.D.

Associate Professor, Department of Immunology and Molecular Microbiology, Texas Tech University Health Sciences Center, Lubbock

“Restoring the Cytokine Axis to Reverse T Cell Exhaustion”

Mumtaz Yaseen, Ph.D., faculty appointment Associate Professor (tenure-track), Department of Immunology and Molecular Microbiology, TTUHSC, Lubbock. Mumtaz joined TTUHSC on September 2023. He brings background in Immunology, Molecular Biology, and Immunotherapeutic research. Mumtaz has earned Ph.D. in Human Biology from Ludwig Maximilian University, Munich Germany in year 2007. Followed by first Postdoctoral Fellowship | 2007–2009 at Johns Hopkins University School of Medicine, Baltimore, MD in the lab of late Professor Paula M-Pitha Rowe, a leading expert on antiviral interferons. There, he published several papers including in MCB, JBC, Cell signal. Then, Mumtaz was selected to do a Visiting Postdoctoral Fellowship | 2009–2010 at National Institutes of Health (NIH)/National Cancer Institute in the laboratory of Dr. Yinling Hu. He investigated the B cell development using IKK alpha knock-in mutant mice. He published a first author paper in blood journal. This was followed by earning Ohio State University ‘Up on the Roof’ sponsored research Fellowship Award and two-time Cancer Research Pelotonia grant Award. Dr. Yaseen was recruited as Assistant Professor 2014- 2017 to Tufts University Medical Center, Boston MA.

Mumtaz is trained as an Immunologist. He has authored several high-profile publications including review articles on anti-microbial immunity and cancer Immunotherapy. One of his high impact publications appeared as cover story in Science Signaling journal. His other recent publication was highlighted in Cell Press "Crosstalk. Mumtaz has written a book on CAR Immunotherapy. Mumtaz has received several grants including from NIH and DoD.

Mumtaz has taught several courses including immunology, molecular genetics, cell biology. He has interest in developing molecular vaccinology course for the department.

Research Interests. T and NK cell exhaustion: My research interests are in reversing T and NK cell exhaustion in cancer and chronic infections. A relatively recent innovation in cancer immunotherapy has been the design and clinical success of CAR-T/NK therapies, TCR-T as well as Bispecific antibodies (BsAb). CAR-T therapies have revolutionized treatment of B cell cancers, but with limited success in other hematological malignancies as well as solid tumors. TCR-T have shown some successes against solid tumors. Bispecific antibodies (BsAb) are off-the-shelf, novel immunotherapies that have significantly improved outcomes for patients with relapsed or refractory follicular lymphoma (RR-FL). However, not all patients achieve long-term responses. The limited impact derives from diverse features, including lack of cancer-bearing costimulatory molecules and immunosuppressive impacts of the tumor microenvironment, including, prominently CAR-T/NK, TCR-T exhaustion (experienced in relation with BsAb as well). In terms of alternative approaches to enhance CAR-T/CAR-NK and BsAb therapies, my work investigates the benefit of restoring cytokines to enable resistance against exhaustion to improve in vivo

persistence, cytokine production and cytotoxicity against tumors. This work is funded by CH Foundation and Rural Cancer Collaborative Grant.

Bioelectromagnetic: My other research investigates RF-EMF-induced changes across regional immune compartments, including cutaneous (skin), mucosal (lungs), the blood-brain barrier, and eyes. Our effort focusses on two microwave frequency bands: the C-band (4-8 GHz) and the K-band (18-27 GHz). This work is currently funded by DoD and is a collaboration with Texas Tech University, Department of electrical and computer engineering.

Mumtaz's currently active fundings:

"Investigating the Impact of Radiofrequency Electromagnetic Fields on Immune System"

Mumtaz Yaseen Balkhi, Principal Investigator (2026-2028)

Funding Agency: Department of Defense/Army Research Office (DoD/ARO)

Award number: 86054-HC. Total Direct and Indirect Cost: \$1,990,469.00

"New Immunotherapy intervention in early onset breast cancer"

Mumtaz Yaseen Balkhi, Principal Investigator (2026-2027)

Funding Agency: CH Foundation. Total Direct Cost: \$50,000.00

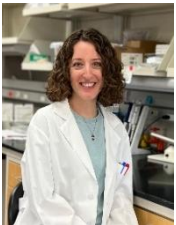
"Chimeric Antigen Receptor (CAR) therapy program: Laboratory development and in vivo testing for clinical application"

Mumtaz Yaseen Balkhi, Principal Investigator (2026-2027)

Funding Agency: Rural Cancer Collaborative Grant. Total Direct Cost: \$300,000.00

STUDENT/POSTDOC PROFESSIONAL DEVELOPMENT SESSION

Moderated by:



Rachel L. Babcock, Ph.D.

Postdoctoral Research Associate, Department of Cell Biology & Biochemistry, TTUHSC

Dr. Rachel Babcock is currently a postdoctoral research associate in the Department of Biology and Biochemistry at Texas Tech University Health Sciences Center. She received her BS in Cell & Molecular Biology from Texas Tech University in 2016, and her PhD in Immunology from UTHealth MD Anderson Cancer Center Graduate School of Biomedical Sciences in 2022. Her current research is focused on studying the immune privilege properties of testicular Sertoli cells and changes within the male reproductive tract in the context of infection under the mentorship of Dr. Jannette M. Dufour. She is also studying triple negative breast cancer (TNBC), defining novel nuclear roles of a Wnt signaling member, Dishevelled, in TNBC, with collaborative projects testing the use of cryoablation as a potential treatment for TNBC



Hushyar Azari, M.D., Ph.D.

Department of Kinesiology and Sport Management, TTU

Dr. Hushyar Azari recently defended his Ph.D. in Exercise Physiology at Texas Tech University (TTU) and holds an M.D. from Urmia University of Medical Sciences, Iran. He is currently a research assistant in the Nutrition, Exercise, and Translational Medicine (NEXt Med) Lab under the supervision of Kembra Albracht-Schulte. His research focuses on clinical studies investigating combined exercise and nutritional interventions to address obesity and its related comorbidities, with a particular emphasis on gut microbiota dysbiosis and metabolic dysfunction-associated steatotic liver disease (MASLD).

Panelists:



Nigel Jiwan, Ph.D., CISSN
Assistant Professor of Kinesiology
Hope College

Dr. Nigel C. Jiwan is an Assistant Professor of Kinesiology at Hope College, a teaching-focused institution, and the director of the Applied Performance, Ergogenics & Exercise (APEX) Lab. He earned his Bachelor's degree in Physical Therapy from Manipal Academy of Higher Education in India, followed by a Master's degree in Exercise and Sports Science from Texas State University. He completed his PhD in Exercise Physiology at Texas Tech University in 2024.

Dr. Jiwan's research focuses on practical, evidence-based strategies to enhance human performance, with particular emphasis on muscle physiology, ergogenic aids, thermal interventions (heating and cooling), and resistance exercise performance. His work aims to translate these findings to older adults and clinical populations to improve function, mobility, and quality of life.

In addition to his research, Dr. Jiwan is deeply committed to undergraduate education and mentorship. At a teaching-focused institution, he prioritizes student engagement and experiential learning. Through the APEX Lab, he actively involves students in hands-on research experiences, guiding them through study design, data collection, and dissemination at regional and national conferences.



Kealey Wohlgemuth, Ph.D., CISSN, CSCS, *D
Assistant Professor of Exercise Science, School of Human Services
University of Cincinnati

Dr. Wohlgemuth completed both her undergraduate and master's degrees in Exercise and Sport Science at the University of North Carolina at Chapel Hill. She completed her doctoral degree at Texas Tech University in Exercise Physiology and is currently an Assistant Professor of Exercise Science at the University of Cincinnati. In addition, Dr. Wohlgemuth is a Certified Strength and Conditioning Specialist (CSCS, *D) through the National Strength and Conditioning Association as well as a Certified Sports Nutritionist through the International Society of Sports Nutrition (CISSN). Her research interests include neuromuscular performance, skeletal muscle imaging, and resistance training within special populations, including aging adults and tactical athletes.



Christian Rodriguez, Ph.D., CSCS, CISSN, CPT
T32 Postdoctoral Fellow in Clinical Sciences
Pennington Biomedical Research Center

Dr. Rodriguez is currently a T32 postdoctoral fellow at Pennington Biomedical Research Center. He recently completed his PhD in Exercise Physiology at Texas Tech University under Dr. Grant Tinsley, where he successfully defended his dissertation titled "Evaluation of Accessible Technologies to Assess Body Composition, Body Water, and Metabolism in Muscular Resistance-trained Adults." While working with Dr. Tinsley, he conducted research related to metabolism, body composition, and sport nutrition. He received a Bachelor of Science degree in Kinesiology with a minor in Nutritional Sciences from Texas Tech University in 2016 and a Master of Science degree in Kinesiology, with a focus on human performance, from Texas Tech University in

2019. He is currently certified as a Certified Personal Trainer through the American College of Sports Medicine (ACSM), a Certified Strength and Conditioning Specialist (CSCS) through the National Strength and Conditioning Association (NSCA), and a Certified Sports Nutritionist (CISSN) through the International Society of Sports Nutrition (ISSN).

At Pennington Biomedical Research Center, under the mentorship of Dr. Eric Ravussin and Dr. Steven Heymsfield, Dr. Rodriguez receives rigorous training in advanced body composition and metabolism methodologies. His long-term research goal is to improve the assessment and understanding of body composition and metabolic phenotypes across the spectrum of obesity to inform more precise and equitable interventions. He would like to specifically focus on evaluating energy metabolism, body composition, and metabolic health in individuals with extreme obesity, a rapidly growing yet historically understudied population. The long-term goal of his work is to improve physiological characterization and risk stratification in individuals with extreme obesity by applying rigorous metabolic phenotyping methods that can inform targeted clinical and public health interventions.

POSTER COMPETITION ABSTRACTS

11th Annual Meeting
Advancing Chronic Disease Prevention:
From Translational Solutions to Community Impact
In-person Judging on Monday, May 4, 2026, from 12:30 PM to 2:00 PM

Undergraduate Section

Poster 1

An Analysis of Nutrition Labels and Marketing Claims on High-Protein Food Products

Natalie Brennan, Courtney D. Gibson, Department of Agricultural Education & Communications

The demand for high-protein food products is steadily increasing, due to both a spike in GLP-1 weight loss medication usage and social media messaging. Food companies rely on labeling claims to market high-protein food options. Researchers and consumers need to understand how the nutritional composition and packaging claims of these products to evaluate how nutritional information is being communicated in current markets. The purpose of this study is to examine the relationship between marketing claims and the nutritional composition of high-protein snack products. Specifically, this research analyzes how nutritional profiles vary across product types and labeling claims. This study employed a descriptive content analysis of high-protein food products available in the US markets. Data was collected from Nutrition Facts panels, ingredient lists, and package labeling claims, as well as manufacturer websites when necessary. The sample included certain high-protein food products sold at HEB, Walmart, and Sprouts. These were categorized by product types to include protein bars, shakes, powders, pastas, packaged snacks, frozen pizzas, frozen prepared chicken, cereals, and desserts. Nutritional variables, including calories, protein, sugar, fiber, fat, and carbs per serving, were recorded and compared across product categories and labeling claims. Preliminary analysis highlights variation in nutritional profiles across high-protein food products and labeling claims. This study establishes insight into the composition of high-protein food product nutrition and labeling. The research from this study broadens discoveries and discussions of product positioning, as well as nutritional communication and transparency.

Poster 2

Skeletal Muscle Mass Estimation by Dual-Energy X-Ray Absorptiometry and Bioimpedance Techniques in Muscular, Resistance Trained Adults

John R. Alexander, Christian Rodriguez, Christine M. Florez, Ethan G. Tinoco, Julia Whitson, Carina M. Velasquez, Grant M. Tinsley, Department of Kinesiology and Sport Management

Objective: Skeletal muscle mass (SMM) is related to metabolic health and disease risk. Criterion SMM estimation methods such as magnetic resonance imaging (MRI) and computed tomography are often inaccessible, so surrogate techniques like dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) are commonly utilized. However, agreement between these more accessible methods may vary by population characteristics. This study compared SMM estimates from DXA-based prediction equations and multiple BIA devices in resistance-trained adults. Methods: Forty resistance-trained participants (23 M, 17 F; age: 28.1 ± 7.9 y; BMI: 25.9 ± 2.4 kg/m²; body fat: $15.7 \pm 5.2\%$) were assessed using DXA, bioimpedance spectroscopy (BIS), multi-frequency BIA (MFBIA), single-frequency BIA (SFBIA), and consumer-grade BIA (CBIA). Participants fasted ≥ 8 hours and abstained from exercise ≥ 36 hours prior to testing. DXA appendicular lean soft tissue was used to predict total SMM using two published MRI-based prediction equations. BIA devices provided SMM estimates via published or proprietary equations. Differences between methods were analyzed using linear mixed-effects models with Bonferroni-adjusted pairwise comparisons. Results: A statistically significant effect of assessment method was observed in the entire sample and sex-specific analyses ($p < 0.0001$). CBIA produced the highest estimates, followed by DXA-based equations and MFBIA and SFBIA. BIS produced the lowest estimates and differed significantly from all other methods. Conclusion: SMM estimates varied significantly across techniques in resistance-trained individuals. These findings emphasize the impact of model assumptions and technical differences on SMM estimation, highlighting the need for population-specific validation in populations with unique body properties.

Poster 3

Effects of Açai Berry Supplementation on Pancreatic Islet Morphology and Metabolic Function in a Type 2 Diabetes Rat Model

Abid Miah; Jonathan Miranda; Rachel L. Babcock; Leslie Shen; Jannette M. Dufour, Department of Cell Biology & Biochemistry, TTUHSC

Type 2 diabetes (T2D) is a metabolic disease characterized by insulin resistance, chronic inflammation, oxidative stress, and progressive pancreatic β -cell dysfunction. Dietary polyphenols, such as anthocyanins found in açai berries, have shown promising antioxidant and anti-inflammatory effects in experimental models of metabolic disease. In this project, we investigated if açai berry supplementation affected pancreatic islet morphology and function in a high-fat diet (HFD) and streptozotocin (STZ)-induced rat model of T2D. Male Sprague-Dawley rats were assigned to three groups: low-fat diet (LFD; controls), high-fat diet (HFD), or high-fat diet supplemented with açai berries (HFD+Açai). Diabetes was induced in HFD-fed animals using a single low-dose STZ injection to model late-stage chronic T2D with β -cell damage. After 8 weeks of dietary intervention, pancreatic tissue was collected and analyzed using immunohistochemistry to observe insulin and glucagon-secreting beta and alpha cells, respectively. Additionally, pancreas and serum insulin concentrations were quantified via enzyme-linked immunosorbent assay (ELISA). As expected, HFD animals were hyperglycemic and showed damaged islet morphology and altered endocrine cell distribution compared to LFD controls. No statistically significant differences in insulin concentrations, insulin resistance, or β -cell function were observed between HFD and açai groups. These data suggest açai supplementation does not significantly preserve pancreatic morphology or endocrine function in this advanced T2D model. Promisingly, additional work will examine whether açai improves T2D-related complications, such as diabetic neuropathic pain, which can severely negatively impact patients' lives. Thus, understanding the roles of polyphenol-rich dietary interventions like açai berry supplementation may help further improve the management of diabetes.

Poster 4

Evaluating Fitts's Law: Movement Time, Reaction Time, & Online Control

Shakti Anand, Grace Tatman, Anna Kinslow, Sydney Robin, Jenna E. Mitchell, Paige van Riet Paap, Gavin Mendoza, Jarrod Blinch, Department of Kinesiology & Sports Management, Lubbock Texas

Fitts' law details a linear relationship between movement time (MT) and index of difficulty (ID) that reflects the speed-accuracy tradeoff in goal-directed movements. MT is closely related to task difficulty; hence, movements become slower with increased task difficulty due to limitations imposed by motor planning and information processing. Although the relationship between MT and ID is well documented, the relationship between reaction time (RT) and ID is not entirely clear. Fitts and Peterson (1964) reported that RT was related to ID; however, more recent findings indicate no relationship. In addition to MT, increase in task difficulty is likely to require more online control, indicated by the presence of corrective submovements and decreasing spatial variability in the latter half of the movement. The effects of effective ID on MT, RT, and indicators of online control will be determined. The movement task involved rapid goal-directed reaching movements to targets having different widths (W) and amplitudes (A), thus allowing for three levels of difficulty. ID was computed as $\log_2(2A/W)$. RT was the time between target onset and movement initiation, while MT was the time between movement initiation and target acquisition. Kinematic analysis was used to detect corrective secondary submovements. Linear

regression analysis was conducted for the association between effective ID and MT or RT. MT increased linearly with effective ID ($R^2 = .67$), consistent with Fitts' law. In contrast, RT showed no linear relationship with effective ID ($R^2 = .04$). Mean simple RT was 255 ms, [246, 263]. Secondary submovements increased with target difficulty: 0.86 [0.53, 1.19] for short targets, 1.64 [1.39, 1.89] for middle targets, and 2.50 [2.20, 2.79] for long targets, indicating greater reliance on online control as task difficulty increased. Spatial variability decreased during the latter half of movement execution. These results suggest that online control increased with ID.

Poster 5

Development of a Multiplex Lateral Flow Assay for Simultaneous Detection of Glycated Albumin and Total Albumin to Predict Diabetes Risk

Prabhav Kuruva, Nazmul Huda Ovi, Minhao Liu, Subarna Akter, Hui Chen

Diabetes Mellitus requires constant monitoring to prevent severe complications. Because Hemoglobin A1c (HbA1c) reflects a 2-3 month average of the patient's glycemic levels, it doesn't account for the volatility of the short-term blood sugar. Glycated Albumin (GA) is a much more sensitive indicator as it reflects glycemic levels of the patient over a 3-week time frame. The drawback to this is that current ways to detect GA levels require expensive laboratory equipment and complex sample dilution. This study aims to develop a rapid, low-cost multiplex AI-driven lateral flow assay (LFA) to simultaneously detect GA levels and Total Albumin levels on a single test strip. The LFA will use a sandwich aptamer format along with gold nanoparticles (AuNPs) to create a colorimetric signal across a GA line, a Total Albumin line, and a control line. By measuring the ratio between the colorimetric intensity of the GA line and the Total Albumin line using our AI device, the GA levels can be determined. This will provide the user with a quick, accurate, and efficient diagnosis. A rapid and cheap diabetes testing device will allow for earlier detection which could lead to prompt intervention. This point-of-care tool will be tested for clinical validation and could provide early and accessible diabetes risk assessments.

Clinical and Research Trainees Section

Graduate students

Poster 1

Relationships Between Field-Based Assessments and Rate of Torque Development in Older Adults: A Preliminary Analysis

Hima B. Doddoju, Skyler Barton, Arturo Figueroa, Jacob A. Mota, and Danielle E. Levitt, Metabolic Health & Muscle Physiology Laboratory, Department of Kinesiology and Sport Management, Texas Tech University, Lubbock, TX

Age- and lifestyle-related decreases in lower body function, including rate of torque development (RTD), contribute to increased fall risk. RTD predicts fall risk better than common field-based assessments, but requirement of specialized equipment limits its usage in non-laboratory settings. Understanding relationship between field-based tests and RTD is critical for optimal fall risk screening. Here, we examine associations between field-based assessments and RTD in healthy older adults. This analysis includes data from 12 testing instances across 6 participants (5F/1M; 64±5 yrs; 39.3±6.4% fat) who completed lower body assessments as part of a larger study (NCT06585865). 30-second chair stand test (CST) and timed up-and-go (TUG; normal and fastest gait speeds) and three, 3-4 second maximal voluntary isometric contractions of the leg extensors were performed. Maximal strength on leg press (LP-1RM) and leg extension (LE-1RM) were assessed. RTD was calculated as the slope of torque-time curve over pre-defined intervals (0-50, 0-100, and 0-200 ms) following contraction onset. Data were analyzed using Spearman correlations. Fast-paced TUG was associated with RTD 0-50 ($\rho = -0.700$, $p = 0.036$), 0-100 ($\rho = -0.734$, $p = 0.007$), and 0-200 ms ($\rho = -0.846$, $p < 0.001$) and LE-1RM with RTD 0-100 ms ($\rho = 0.594$, $p = 0.042$). CST, normal-paced TUG, and MLP-1RM were not associated with RTD. Overall, shorter time on fast-paced TUG showed strong associations with RTD, potentially due to rapid neuromuscular activation, highlighting its potential utility in fall risk screening. Future work examines the longitudinal predictive value of these assessments throughout a standardized 12-week resistance training program to track RTD changes among older adults. Funding: NSCA Foundation.

Poster 2

Temperature-Dependent Modulations of Transcriptomic Landscape of Sertoli Cells

Alexandra Lux, Yordi Tamayo, Alexis R. Rodriguez, Taylor Hibler, Jannette M. Dufour, Clinton C. MacDonald, Petar N. Grozdanov

Objective: Sertoli cells (SC) are essential for supporting mammalian spermatogenesis. Because spermatogenesis functions at 32 °C, SC physiology is also optimized for this temperature. However, when raised to the physiological body temperature of 37 °C, e.g., due to cryptorchidism, the increase in temperature can affect SC gene expression. While mRNA abundance changes in SC in response to heat shock (42 °C) have been studied previously, perturbations to alternative polyadenylation (APA) are less well understood. APA can influence the transcript structure, stability, and translation. Here, we examined APA patterns in SC using 3'-end sequencing, a technique sensitive to changes in APA. Methods: Sertoli cells were isolated from 13-day old mouse testes and grown at either 32 °C or 37 °C and RNA isolated for 3'-end sequencing. APA events were split into two categories: 3' most exon APA (REDu) or intronic APA (REDi) and further separated based on whether the APA event resulted in shortening or lengthening of the transcripts. Results: Many of the APA changes occurred without changes in mRNA abundance, thus suggesting that APA acts independently of differential expression of genes (DEGs). However, a limited number of APA and DEG genes overlapped, suggesting that such mechanisms are possible, but not required. Gene enrichment analysis was performed for significant APA and DEG genes. Processes related to RNA regulation, cell cycle control, and known SC functions were identified as significantly enriched. Conclusion: Overall, our results showed that APA was a common process and biologically relevant in SC. Comparing APA and gene expression analyses provides a broader view of the transcriptomic regulation in the SC and establishes a foundation for future studies of temperature-sensitive posttranscriptional control in male reproductive biology.

Poster 3

Assessing the Influence of Electrode Placement on Body Composition Measures from Bioimpedance Technologies

Carina M. Velasquez, Christine M. Florez, Christian Rodriguez, Madelin R. Siedler, Matthew T. Stratton, Patrick S. Harty, Ainsley E. Way, Madison H. Sullivan, Grant M. Tinsley, Department of Kinesiology and Sport Management

Objective: A variety of laboratory-based methods have been utilized to assess body composition. However, technical and physiological variations can influence the estimates from these devices. The purpose of this study was to assess the within- and between-day reliability of bioimpedance spectroscopy (BIS) and single-frequency bioelectrical impedance analysis (SFBIA), with varying electrode placement, for estimates of body fat percentage (BF%), fat-free mass (FFM), and fat mass (FM). Methods: Eighteen healthy young adults completed two visits to the laboratory for BIS and SFBIA assessments, separated by 1-2 days. For the first visit, duplicate assessments were performed using the same adhesive electrodes without removal (BIS same electrode [BISS], SFBIA same electrode [SFBIAS]). Another assessment was performed after replacing the electrodes (BIS different electrode [BISD], SFBIA different electrode [SFBIAD]). During the second visit, new electrodes were applied, and BIS and SFBIA measures were repeated. Test-retest reliability was established using the absolute technical error of the measurement (TEM) to determine the within-day and between-day errors for BF%, FFM, and FM. Results: All within-day measures of body composition with the same electrode placement exhibited the lowest absolute TEMs (BF%: BISS=0.06, SFBIAS=0.03; FFM (kg): BISS=0.04, SFBIAS=0.02; FM (kg): BISS=0.04, SFBIAS=0.02) followed by within-day different electrode placement (BF%: BISD=0.70, SFBIAD=0.28; FFM: BISD=0.53, SFBIAD=0.19; FM: BISD=0.53, SFBIAD=0.19), and the largest errors were observed for between-day different electrode placement (BF%: BISD=1.24, SFBIAD=1.07; FFM: BISD=0.90, SFBIAD=0.85; FM: BISD=0.81, SFBIAD=0.73) Conclusion: Electrode placement is a more important source of within-day technical error for BIS and SFBIA technologies than the analyzers themselves.

Poster 4

Effects of Omega-3 Fatty Acids and High-Intensity Interval Training in Regulating Specialized Pro-Resolving Lipid Mediators in Obesity – Preliminary Results

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Objectives: Obesity is associated with chronic low-grade inflammation, that, if left unresolved, can lead to the development of cardiometabolic disease. Omega-3 polyunsaturated fatty acids (n-3 PUFAs) effectively attenuate inflammation largely through the biosynthesis of specialized pro-resolving lipid mediators (SPMs), while high-intensity interval training (HIIT) improves body composition and inflammatory profiles in a time-efficient manner. Combined, we hypothesize that these

interventions will synergistically reduce obesity-induced inflammation. Methods: In an 8-week randomized clinical trial (NCT05295719), 47 adults with overweight or obesity (BMI ≥ 25 kg/m²) received either n-3 PUFA (FO, 3000 mg EPA and 1000 mg DHA) or safflower oil placebo (4g/day each). After 4 weeks of supplementation, participants were further randomized to HIIT (4x4-minute intervals at 85-95% HRmax) or light-intensity training (LIT, 55% HRmax), each performed 3 days/week for 4 weeks while continuing supplementation. Plasma SPMs, including maresin 1, resolvin E1, and protectin D1, were identified and quantified via liquid chromatography-mass spectrometry (LC-MS). Linear mixed-effects models assessed intervention group, time, and group \times time interaction effects. Results: Total omega-3 percentage significantly increased in HIIT+FO (5.55% vs. 7.30%, $p = .030$). Omega-6/omega-3 ratio decreased significantly in HIIT+FO (4.999 vs. 2.935, $p=.035$) and LIT+FO (5.047 vs. 3.153, $p=.048$). Resolvin E1 concentrations were significantly higher in HIIT+placebo versus LIT+placebo ($\beta=4.05$, $p=0.013$). Protectin D1 was largely undetectable and excluded from analysis. Conclusions: These findings suggest that exercise intensity may influence SPM synthesis independently of n-3 PUFA supplementation. Longer interventions with targeted nutritional guidance may be necessary to improve inflammatory signaling.

Poster 5

Evaluating the Anti-Inflammatory Potential of Diverse Turmeric Species in Caco-2 Cells

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Objective: Obesity, a global health epidemic, is becoming increasingly prominent. The characteristic low grade systemic inflammation associated with obesity may, in part, be mediated by gastrointestinal microbiota. Previous literature has examined the anti-inflammatory properties of turmeric. However, there are discrepancies related to the anti-inflammatory potential of bioactive components, outside of curcumin, found in turmeric. Therefore, we aim to examine the anti-inflammatory effects of different turmeric species/varieties and evaluate their potential to decrease obesity associated inflammation. Methods: Caco-2 cells, an intestinal epithelial-like human cell line, were cultivated in MEM media and treated with two different experimental protocols. Treatment 1, a clinically relevant treatment, consisted of LPS (10 ng/mL) treatment for 4 days, followed by treatment with turmeric (4 μ g/mL CA22 or CL39) or synthetic curcumin (10 μ M) combined with LPS (10 ng/mL) for 24 hours. In treatment 2, cells were treated with LPS (200 ng/mL) combined with turmeric (4 μ g/mL CA22 or CL39) or synthetic curcumin (10 μ M) for 24 hours. Supernatant was collected, and a HS IL-8 ELISA was run. Results: Measured IL-8 concentrations fluctuated across experimental treatments with concentrations ranging from 0.2–31 pg/mL. Turmeric treatment produced inconsistent decreases in IL-8 among samples and across different experimental treatments. Experiment repetition is necessary to elucidate these differences. Conclusion: Our project lays the groundwork for turmeric species other than *curcuma longa* to be used as a prevention and/or treatment strategy targeting obesity associated inflammation.

Poster 6

Decoupling calories from obesity: Nep15 regulates obese phenotypes via nutrient partitioning and mTOR signaling in *Drosophila*

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Obesity and cardiometabolic disorders are commonly attributed to excess nutrient intake, yet how nutrients are allocated after consumption remains poorly understood. This study aimed to determine whether Neprilysin-like 15 (Nep15) regulates nutrient partitioning independent of feeding behavior. Using *Drosophila melanogaster* as a model, quantitative feeding assays were performed to assess intake, while biochemical assays measured lipid and glycogen stores. To investigate underlying mechanisms, components of the insulin/Target of Rapamycin (TOR) signaling pathway were analyzed, including Akt phosphorylation. Physiological outcomes were evaluated through lifespan analysis and gut integrity assays. Results showed that Nep15 mutants do not differ in feeding compared to controls, indicating that nutrient intake is unchanged. However, mutants exhibited reduced lipid and glycogen levels in males and altered glycogen accumulation in females, suggesting a defect in nutrient allocation. Mechanistically, Nep15 mutants displayed reduced insulin/TOR pathway activity, consistent with impaired anabolic signaling. At the organismal level, female mutants demonstrated improved gut barrier integrity and extended lifespan, highlighting sex-specific physiological effects. These findings demonstrate that Nep15 regulates how nutrients are distributed between storage and utilization rather than how much is consumed. This work underscores nutrient partitioning as a critical and underappreciated determinant of metabolic health and identifies a conserved pathway relevant to obesity and related disorders.

Poster 7

A BCAA-Synthesizing Bacterium Exacerbates Food-Reward Responses Under a High-Fat Diet

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Background: Altered gut microbiota and their metabolites contribute to obesity. Branched-chain amino acids (BCAAs) are elevated in obesity and our recent data show that dietary BCAA manipulation alters sucrose hedonics. BCAAs can be synthesized by gut bacteria such as *Prevotella copri*. Although the gut–brain axis is recognized as a regulator of energy homeostasis, its role in food-reward behavior remains unclear. We hypothesized that *P. copri* modulate appetite to sucrose through BCAA-mediated mechanisms. Method: 48 male C57BL/6J mice were fed a high-fat diet (HFD) or standard chow for 8 weeks. During the last 3 weeks, mice received 100 μ l of *P. copri* or vehicle through oral gavage 3 times each week generating four groups: HF + *P. copri*, HF + vehicle, chow + *P. copri*, and chow + vehicle. Food reward behavior was assessed using the sucrose two-bottle choice, taste reactivity (“liking”) and progressive ratio (“wanting”) tasks. Results: Compared to the control group, chow-fed mice treated with *P. copri* increased their sucrose intake by 16%. Obese mice displayed significantly lower sucrose intake and “wanting”, as indicated by lower active lever presses, compared to lean mice. “Liking” responses across different sucrose concentrations (0.01, 0.1 and 1M) were decreased in obese mice. *P. copri* administration in obese mice revealed a trend of further reduction in sucrose “wanting” and “liking” compared to vehicle-treated obese group. Conclusion: Introducing a BCAA-producing bacterium may stimulate sucrose consumption in healthy mice and worsen HFD– induced impairments in food-reward behavior. Targeting BCAA-producing bacteria could represent a novel approach to correct sweet reward-related feeding.

Poster 8

Drosophila Indy2, a homolog of human SLC13A5 and Drosophila Indy, controls testicular nutrient and energy reserves, spermatogenesis, and sperm morphology, via mTOR signaling

Mst Hasina Begum, Riddhi Patel, Ada Salazar, Dr. Surya Jyoti Banerjee

Objective: To determine whether *Drosophila Indy2*, a testes-enriched paralog of *Indy* and homolog of human SLC13A5, regulates testicular metabolism, spermatogenesis, sperm structure, and male fertility. Methods: We combined bioinformatic, molecular, histological, and functional approaches. Transcriptomic analysis and qPCR were used to define *Indy2* expression. GFP-tagged *Indy2* flies were analyzed by immunofluorescence for subcellular localization. Homozygous *Indy2* mutants were assessed for age-dependent fecundity and fertility, glycogen and lipid storage, ATP levels, spermatogenic cell division, sperm tail actin organization, and testicular mTOR expression. Results: *Indy2* is a predicted citrate/carboxylate transporter and is specifically expressed in the fly testes, with relatively higher expression in the middle and basal regions than in the apical region. *Indy2* protein colocalized with E-cadherin and β catenin at the testicular membrane. Loss of *Indy2* markedly reduced fecundity and fertility in an age-dependent manner. Mutant testes showed decreased glycogen and lipid reserves, reduced ATP levels, fewer dividing spermatogenic cells, and disrupted filamentous actin organization in sperm tails. In addition, mTOR expression was significantly reduced in *Indy2* mutant testes. Significance and Conclusions: These findings identify *Indy2* as a critical regulator of testicular nutrient storage, energy homeostasis, spermatogenesis, and sperm morphology. Our data support a model in which *Indy2* promotes male fertility through metabolic regulation involving mTOR signaling, providing new insight into conserved citrate transporter function in reproductive biology.

Poster 9

Progressive Mitochondrial Dysfunction Across Tissues in a Drosophila Model of PLA2G6-Associated Neurodegeneration

Rubaia Tasmin, Devisri Pranvi Matam, Ruchika Theagarajan and Dr. Surya Jyoti Banerjee

PLA2G6-associated neurodegeneration (PLAN) is a rare, progressive condition caused by mutations in the PLA2G6 gene, which encodes the calcium-independent phospholipase A2 (iPLA2-VIA) involved in phospholipid remodeling and membrane homeostasis. Although mitochondrial dysfunction has been implicated in PLAN, the relationship between disrupted lipid remodeling and mitochondrial integrity across tissues and aging remains poorly understood. This study aimed to systematically characterize mitochondrial structural and functional alterations resulting from iPLA2-VIA deficiency. Using a *Drosophila melanogaster* loss-of-function model, we analyzed neuronal (head), muscular (thorax), and reproductive (ovary) tissues from young and aged flies of both sexes. Transmission electron microscopy was used to assess mitochondrial ultrastructure and abundance, while mitochondrial DNA (mtDNA) copy number, gene expression related to mitochondrial

biogenesis and dynamics, ATP production, and reactive oxygen species (ROS) levels were evaluated to determine functional consequences. iPLA2-VIA mutant flies exhibited pronounced mitochondrial abnormalities, including disrupted cristae, membrane defects, and reduced mitochondrial number across tissues, which worsened with age. These structural changes were accompanied by decreased mtDNA copy number and reduced expression of key regulators of mitochondrial biogenesis (mTOR and PGC1 α). Furthermore, selective impairment of mitochondrial dynamics was observed, including decreased expression of Opa1, Drp1, and Fis1. Functionally, mutant flies showed significantly reduced ATP production and ROS levels across most tissues, indicating compromised mitochondrial activity. Together, these findings demonstrate that loss of iPLA2-VIA leads to widespread, progressive mitochondrial defects, providing insight into how disrupted membrane lipid remodeling contributes to mitochondrial dysfunction in PLAN.

Poster 10

Regulation of mitochondrial oxidative proteins and content markers in response to chronic heat in TNF α -treated C2C12 myotubes

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Mitochondrial dysfunction in skeletal muscle contributes to insulin resistance (IR) and type 2 diabetes (T2DM), partly through reduced mitochondrial content and decreased expression of electron transport chain (ETC) proteins. We hypothesized that chronic intermittent heat (CIH) would preserve mitochondrial content and ETC proteins in IR myotubes. C2C12 myoblasts were differentiated into myotubes in media containing 0, 5, or 10 ng/mL Tnf α to induce IR. Myotubes were assigned to CIH (exposure to 40°C, 60 min/day for 8 days except day 5), or no-heat control (NC; remained at 37°C). Cells were collected 24 hours after the final heat session, and ETC subunits (Ndufb8, CoxIV) and mitochondrial content markers (Tom20, Vdac) were measured via Western blots. Ndufb8 showed a main Tnf α effect ($p < 0.001$), with lower expression in 10 vs 0 ($p = 0.015$) and 5 ($p = 0.002$) ng/mL Tnf α , independent of heat. CoxIV showed a TNF α \times heat interaction effect ($p = 0.035$). In NC cells, CoxIV was lower at 10 vs 5 ng/mL ($p = 0.036$). In CIH cells, CoxIV was lower in 10 vs 0 ($p = 0.018$) and 5 ($p = 0.01$) ng/mL Tnf α . Tom20 also showed a TNF α \times heat interaction effect ($p = 0.041$). In NC, Tom20 was greater in 10 vs 0 ($p = 0.043$) or 5 ($p = 0.049$) ng/mL Tnf α but this increase was prevented by CIH. Vdac was unchanged across groups. CIH prevented an increase in mitochondrial content, suggesting stabilization of mitochondrial content and potentially improved mitochondrial function in IR myotubes. This suggests that heat therapy might enhance insulin sensitivity in prediabetic states, though further testing is required. Funding: NIH/NIA R01AG084597 (mPIs: HL/DL).

Poster 11

Selective Binding of Autoantibodies using Polymeric Gel for Management of Autoimmune Arthritis

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Objective: To develop and evaluate a novel poly(N-isopropylacrylamide)-collagen type II (PNiPAAm+CII) monolithic sub-freezing gel column for the selective capture of collagen type II (CII)-specific autoantibodies directly from whole blood in a collagen-induced arthritis (CIA) mouse model. Methods: The PNiPAAm+CII gel was synthesized via sub-freezing gelation to obtain a monolithic, highly porous structure. Morphology and pore size were characterized, and mechanical properties were assessed using elastic Young's modulus. Biocompatibility was evaluated using the MTT assay, while hemocompatibility was determined through hemolysis testing. Blood cell adhesion and inflammatory response were assessed via incubation with whole blood and measurement of reactive oxygen species (ROS). Antibody capture efficiency was evaluated using CIA mouse serum and whole blood without pre-processing. Results: The PNiPAAm+CII gel exhibited interconnected pores (81–237 μm), enabling smooth serum flow and cell passage. It showed significantly enhanced mechanical strength (Young's modulus: 2291.3 psi) compared to control PNiPAAm gel (385.1 psi). The gel demonstrated excellent cytocompatibility and minimal hemolysis, substantially lower than the control. Low blood cell adhesion and negligible ROS production indicated strong hemocompatibility and non-inflammatory behavior. Importantly, the gel selectively captured 15.4 U mL⁻¹ of CII-specific autoantibodies from serum and 24.5 U mL⁻¹ directly from whole blood. Conclusions: The PNiPAAm+CII monolithic gel demonstrates excellent mechanical stability, biocompatibility, and selective antibody-binding capability. Its ability to directly capture antigen-specific autoantibodies from whole blood without pre-processing highlights its potential as a promising platform for targeted immunoadsorption and future therapeutic management of autoimmune arthritis.

Poster 12

Micro- and nanoplastics as Emerging Threats to Metabolic Health: Evidence, Mechanisms and Knowledge Gaps
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The rapid growth of global plastic production has led to widespread contamination by micro- and nanoplastics (MNPs), which are now detected across all environmental compartments and contribute to human exposure through ingestion, inhalation, and dermal contact. This review synthesizes evidence from human, animal, model-organism, and in vitro studies to characterize how MNPs bioaccumulate and disrupt metabolic and systemic health, and to identify key gaps that limit risk assessment. Articles were retrieved from PubMed, Web of Science, and Scopus using topic-related keywords. Six guiding questions structured the comparative analysis of exposure routes, target organs, conserved pathways, and methodological constraints. Overall, MNPs have been detected in human blood, heart, lungs, placenta, stool, urine, semen, and diseased tissues, demonstrating systemic bioavailability and organ distribution. Animal and model-organism studies showed size-dependent toxicity, with nanoplastics crossing intestinal, blood–brain, placental, and reproductive barriers and inducing oxidative stress, gut dysbiosis, mitochondrial dysfunction, endocrine and reproductive impairment, and multigenerational effects. In vitro and ex vivo models revealed charge- and size-dependent cellular uptake, tight-junction disruption, perturbation of key cell signaling pathways such as PI3K/AKT and PPAR, and ROS-mediated mitochondrial damage. Across biological systems, MNP-induced metabolic dysfunction is driven by shared mechanisms, including oxidative stress, disruption of the gut–liver axis, reprogramming of lipid and energy metabolism, and chronic NF- κ B–mediated inflammation. However, analytical non-standardization, limited nanoplastic detection tools, especially in biological specimens, ecologically unrealistic test materials, and difficulty separating particle from chemical toxicity currently impede causal inference for human disease and hinder robust risk translation.

Poster 13

Chemically cleaned pollen-based skin drug delivery

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Pollens, although inherently allergenic, can be chemically treated to remove immunogenic constituents, producing inert microcapsules widely demonstrated for oral drug delivery. In the present study, chemically cleaned *Lycopodium clavatum* pollen were repurposed for transdermal drug delivery by exploiting their natural surface roughness to induce mild mechanical abrasion of the stratum corneum. The cleaning process removed internal biomolecules while preserving the sporopollenin-rich exine. A gentle 30-second rubbing of the cleaned pollens referred as pollen-mediated mechanical abrasion (PMMA) on ex vivo porcine skin resulted in localized surface modification, including an approximate 15 μ m reduction in Stratum Corneum thickness. Skin barrier disruption was further supported by changes in integrity parameters: post PMMA the transepidermal water loss increased from $4.15 \pm 1.77 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ to $16.37 \pm 2.84 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$, electrical resistance decreased from $0.68 \pm 0.06 \Omega$ to $0.47 \pm 0.04 \Omega$, and the contact angle rose from $57.49 \pm 2.54^\circ$ to $82^\circ \pm 5.54^\circ$. Furthermore, PMMA significantly enhanced the permeation of model compounds in Franz diffusion studies, yielding ~1.6-fold higher sulforhodamine B permeation and ~2.2-fold higher patent blue permeation compared with control. Following PMMA, pollen morphology altered, as confirmed by physicochemical analyses. Collectively, these findings demonstrate a simple, eco-friendly, transdermal drug delivery approach.

Postdoctoral Research Associate

Poster 1

Effects of Tart Cherry Juice Encapsulated Prebiotic Particles on Adipose Inflammatory and Metabolic Pathways in Diet-Induced Mice

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Background: Obesity is a complex disease associated with chronic low-grade inflammation. Tart cherry juice (TCJ), a rich source of anthocyanins, reduces inflammation and improves metabolic outcomes; however, TC efficacy is limited by low bioavailability. To address these limitations, we developed prebiotic particle-encapsulated TCJ anthocyanins. This study aimed to evaluate the effects of encapsulated TCJ on adipose inflammatory and metabolic pathways in diet-induced obese male and female mice. **Methods:** Six-week-old male and female C57BL/6J mice were fed five different diets, including low-fat high-sucrose diet (LFHS), high-fat high-sucrose diet (HFHS), HFHS supplemented with tart cherry juice, HFHS supplemented with alginate bead-encapsulated TCJ (Alg-Tnano), or HFHS supplemented with void alginate beads (Alg-Vnano) for 12 weeks. Body weight was measured weekly, and adipose tissue was collected and used for gene expression analyses by qRT-PCR. **Results:** In B6 female mice, supplementation with TCJ and Alg-Tnano significantly reduced body weight compared with HFHS ($p < 0.05$), whereas no significant differences were observed in males. HFHS feeding increased inflammatory (CD11b, NLRP3) and ER stress-related (BIP, CHOP) gene expression in both sexes compared to LFHS ($p < 0.05$). In females, Alg-Tnano attenuated inflammatory markers (CD11b; $p < 0.05$) and ER stress (CHOP; $p < 0.01$) compared to HFHS while upregulating genes involved in lipid oxidation and metabolic regulation (CPT1 and PPAR γ ; $p < 0.05$). **Conclusions:** Alg-Tnano supplementation modulates adipose inflammatory, ER stress, and metabolic pathways in a sex-specific manner, which may contribute to its protective metabolic effects on obesity-related outcomes.

Medical Student

Poster 1

Pediatric Osteoarticular Infections in West Texas: A Ten-Year Experience

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Obesity has been linked to elevated C-reactive protein (CRP), which is commonly used to guide treatment and monitor resolution in osteomyelitis and septic arthritis. Additionally, BMI has been associated with an increased risk of hospitalization due to infection. The impact of pediatric obesity on CRP trends and on the morbidity of osteomyelitis and septic arthritis has not been thoroughly described. This study aims to evaluate CRP as a marker of disease resolution, identify patient factors associated with worse outcomes, and utilize cluster mapping to evaluate the source of chronic serious sequelae. We conducted a retrospective chart review of all pediatric patients ($n=151$) ages 0 – 18 years who presented for care at University Medical Center in Lubbock, TX with osteomyelitis or septic arthritis between January 1st, 2014 and December 31st, 2024. We further used a factor analysis for mixed data followed by a hierarchical clustering on principal components. We found that obesity was a significant predictor for chronic serious sequelae. Additionally, although baseline CRP values are elevated in the setting of obesity, CRP trends did not vary based on BMI. Finally, a CRP predictor tool was created from the validation of four longitudinal mixed-effects models as a way to monitor for resolution of infection. This study is one of the first to report the effect of obesity on CRP trends and chronic serious sequelae in osteoarticular infections. Future directions include evaluating CRP trends in pediatric osteoarticular infections in different regions in addition to evaluating CRP trends in adult populations.

Resident

Poster 1

Association of obesity with PICU admission and respiratory support among children hospitalized with acute asthma exacerbations: a rapid systematic review and meta-analysis

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Background: Obesity and asthma commonly coexist in children, but the relationship between obesity and severity of acute asthma exacerbations requiring hospitalization remains uncertain. **Objective:** To evaluate whether obesity or elevated body mass index is associated with PICU admission and greater respiratory support needs among children hospitalized with acute asthma exacerbations. **Methods:** We conducted a rapid systematic review and meta-analysis of observational studies evaluating hospitalized children with acute asthma exacerbations or status asthmaticus and comparing outcomes by obesity or elevated body mass index status. PubMed and Embase were searched through April 3, 2026 and supplemented by review of reference lists. The primary outcome was PICU admission. Secondary outcomes included continuous albuterol use and other markers of treatment intensity, including magnesium administration, respiratory support, and length of stay. Random-effects meta-analysis with the DerSimonian-Laird method was performed for outcomes with extractable event-

count data. Results: Seven studies met inclusion criteria. Three studies contributed data to the pooled analysis of PICU admission, and two studies contributed data to the pooled analysis of continuous albuterol use. In the primary random-effects analysis, obesity/elevated body mass index was not significantly associated with PICU admission (pooled OR 1.25, 95% CI 0.75-2.08; I²=61.2%). In a sensitivity analysis restricted to studies using similar exposure definitions of overweight/obesity versus normal weight, elevated body mass index was associated with higher odds of PICU admission (pooled OR 1.65, 95% CI 1.14-2.38; I²=0%). For continuous albuterol use, obesity/elevated body mass index was associated with increased odds of requiring continuous albuterol (pooled OR 1.62, 95% CI 1.23-2.13; I²=0%). Narrative synthesis showed mixed findings for length of stay, magnesium administration, and ICU-level care across studies. Conclusions: Among children hospitalized with acute asthma exacerbations, obesity or elevated body mass index may be associated with greater treatment intensity, particularly continuous albuterol use. The association with PICU admission is less consistent and appears sensitive to between-study differences in exposure definition. Larger pediatric studies using standardized obesity and severity measures are needed.