ORI 8th Annual Meeting

Diabetes: A Texas Sized Issue

May 3rd | 10:00 A.M. - 5:00 P.M.
TTUHSC Lubbock
Academic Event Building

Obesity Research Institute

TEXAS TECH UNIVERSITY
Office *of* Research & Innovation™

Keynote Speaker

Ralph Anthony DeFronzo, MD

Professor of Medicine, Chief of Diabetes Division University of Texas Health Science Center, Deputy Director of Texas Diabetes Institute (TDI), San Antonio, Texas

Ralph A. DeFronzo, MD, is Professor of Medicine and Chief of the Diabetes Division at the University of Texas Health Science Center and the Deputy Director of the Texas Diabetes Institute, San Antonio, Texas. Dr. DeFronzo is a graduate of Yale University (BS) and Harvard Medical School (MD) and did his training in Internal Medicine at the Johns Hopkins Hospital. He completed fellowships in Endocrinology at the National Institutes of Health and Baltimore City Hospitals and in Nephrology at the Hospital of the University of Pennsylvania. Subsequently, he joined the faculty at the Yale University School of Medicine (1975-88) as an Assistant/Associate Professor. From 1988 to present Dr. DeFronzo has been Professor of Medicine and Chief of the Diabetes Division at the University of Texas Health Science Center at San Antonio. He also serves as the Deputy Director of the Texas Diabetes Institute.

His major interests focus on the pathogenesis and treatment of type 2 diabetes mellitus and the central role of insulin resistance in the metabolic-cardiovascular cluster of disorders known collectively as the Insulin Resistance Syndrome. Using the euglycemic insulin clamp technique in combination with radioisotope turnover methodology, limb catheterization, indirect calorimetry, and muscle biopsy, he has helped to define the biochemical and molecular disturbances responsible for insulin resistance in type 2 diabetes mellitus.

For his work in this area, Dr. DeFronzo received the prestigious Lilly Award (1987) by the American Diabetes Association (ADA), the Banting Lectureship (1988) by the Canadian Diabetes Association, the Novartis Award (2003) for outstanding clinical investigation worldwide and many other national and international awards. He also is the recipient of the ADA's Albert Renold Award (2002) for lifetime commitment to the training of young diabetes investigators. Dr. DeFronzo received the Banting Award from the ADA (2008) and the Claude Bernard Award from the EASD (2008). These represent the highest scientific achievement awards given by the American and European Diabetes Associations, respectively. In 2008 Dr. DeFronzo also received the Italian Diabetes Mentor Prize and the Philip Bondy Lecture at Yale. In 2009 he received the Presidential Award for Distinguished Scientific Achievement from the University of Texas Health Science Center at San Antonio. Dr. DeFronzo received the Outstanding Clinical Investigator Worldwide Award by CODHy (2012), the Outstanding Scientific Achievement Award from the American College of Nutrition (2014), the Samuel Eichold II Memorial Award for Contributions in Diabetes from the American College of Physicians (2015), the George Cahill Memorial Lecture from the University of Montreal (2015) and the Priscilla White Memorial Lecture from the Joslin Clinic & Brigham and Women's Hospital (2015). Most recently (2017), Dr. DeFronzo received the Hamm International Prize for his many seminal observations on the pathogenesis and treatment of type 2 diabetes and the Distinction in Endocrinology Award from the American College of Endocrinology. With more than 800 articles published in peer-reviewed medical journals, Dr. DeFronzo is a distinguished clinician, teacher, and investigator who has been an invited speaker at major national and international conferences on diabetes mellitus.

Agenda

ORI 8th Annual Meeting | Diabetes: A Texas Sized Issue | May 3rd, 10:00 a.m. - 5:00 p.m. | TTUHSC Lubbock

10-10:20 a.m.	**ORI Welcome - TTUHSC Academic Event Center** **Naima Moustaid-Moussa, Ph.D., FTOS, FAHA,** Director of ORI **Jannette M. Dufour, Ph.D.,** Associate Director of ORI **Chancellor Tedd Mitchell, M.D.,** TTUS **Joseph A. Heppert, Ph.D.,** Vice President of Research & Innovation, TTU **Lance McMahon, Ph.D.,** Senior Vice President of Research & Innovation, TTUHSC **Deborah J. Clegg, Ph.D.,** Vice President, Office of Research, TTUHSC El Paso
10:20-11:05 a.m.	**Keynote Speaker Followed by Q&A Session** **Introduction: Chancellor Tedd Mitchell,** TTUS **Ralph DeFronzo, M.D.,** Professor of Medicine, Chief of Diabetes Division University of Texas Health Science Center, Deputy Director of Texas Diabetes Institute, San Antonio, Texas **"Treatment of T2DM: A Rational Approach Based Upon Its Pathophysiology"**
11:05-11:25 a.m.	**Q&A Session Moderated by Dr. Clegg**
11:30 a.m.-12:45 p.m.	**Student Poster Competition and Networking Lunch**
12:45-1:00 p.m.	**ORI Program Overview** **Naima Moustaid-Moussa, Ph.D., FTOS, FAHA,** Director of ORI **Jannette M. Dufour, Ph.D.**, Associate Director of ORI
1:00-2:00 p.m.	**Session 1 – Short Talks on Diabetes (TTUS Faculty)** **Moderator: Klementina Fon Tacer, D.V.M., Ph.D.** **Deborah J. Clegg, Ph.D.**, TTUHSC El Paso, Vice President, Office of Research **"Pre-diabetes: It is Prevalent and Preventable!"** **Jannette M. Dufour, Ph.D.,** TTUHSC Lubbock. University Distinguished Professor & Chair, Department of Cell Biology and Biochemistry, Associate Director of ORI **"Islet Transplantation for Treatment of Type 1 Diabetes"** **Munmun Chattopadhyay, M.Sc., Ph.D.**, TTUHSC El Paso, Associate Professor, Center of Emphasis in Diabetes and Metabolism **"Exercise Mediated Alleviation of Sensory Neuropathy in Diabetes"**

David P. Cistola, M.D., Ph.D., TTUHSC El Paso, Professor, CoE in Diabetes and Metabolism, Paul L. Foster School of Medicine
"Whole Blood T2P Links Hemoglobin Status to Cardiometabolic Health"

Rama Chemitiganti, M.D., TTUHSC Odessa, Director, Center of Excellence for Diabetes and Endocrinology, ECHD endowed Chair, Department of Internal Medicine
"Racial Differences in Weight Loss Response to GLP-1 Analogs- a Preliminary Report"

Bibha Gautam, Ph.D., R.N., CNE, TTUHSC Lubbock, Associate Professor, School of Nursing
"Mitigating the Burden of T2DM with the Ancient Practice of the Time Restricted Eating"

2-2:15 p.m. **Q&A Session**

2:15-2:30 p.m. **Coffee Break**

2:30-3:30 p.m. **Session 2 – Short Talks – General Topics (TTUS Faculty)**
Moderators: Shadi Nejat, D.C., Ph.D. Candidate, TTU Lubbock and
Alexis Rodriguez, B.S., Ph.D. Student, TTUHSC Lubbock

Oak-Hee Park, Ph.D., TTU Lubbock, Research Assistant Professor, College of Human Sciences, Adjunct and Graduate Faculty, Department of Nutritional Sciences
"School-based Nutrition Intervention for Adolescent Obesity Prevention in West Texas"

Wanjiku N. Gichohi, Ph.D., TTU Lubbock, Assistant Professor, Department of Nutritional Sciences
"Addressing Nutrition Issues Through a Systems Lense-opportunities and Challenges"

Kembra Albracht-Schulte, Ph.D., TTU Lubbock, Assistant Professor, Department of Kinesiology and Sport Management
"Combining Fish Oil and Exercise to Improve Obesity-Associated Inflammation"

Danielle E. Levitt, Ph.D., CSCS*D, TTU Lubbock, Assistant Professor, Department of Kinesiology and Sport Management
"At-risk Alcohol Use: Implications for Metabolic Dysregulation"

Christine Garner, Ph.D., RD, TTUHSC Amarillo, Assistant Vice President of Research, Assistant Professor, Department of Pediatrics, InfantRisk Center
"Improving Nutrition Among Mothers and Infants Experiencing Health Disparities"

Ronald Hall, Pharm.D., M.S.C.S., TTUHSC Dallas, Division Head, Clinical and Translational Sciences Division
"A Brief Overview of the DOOR Program and Obesity"

Breanna N. Harris, Ph.D., TTU Lubbock, Assistant Professor, Department of Biological Sciences
"The Harris Lab: Organismal Stress Physiology and Behavioral Endocrinology"

Travis Thompson, Ph.D., TTU Lubbock, Assistant Professor, Department of Mathematics and Statistics
"Mathematical Insights in Alzheimer's Disease: The Need to Look Towards Obesity and Diabetes in AD Research"

Subodh Kumar, M.S., Ph.D., TTUHSC El Paso, Assistant Professor, Center of Emphasis in Neuroscience, Department of Molecular and Translational Medicine
"A Multi-omics Approach to Investigate the Synapse Dysfunction in Alzheimer's Disease"

Heejin Jun, Ph.D., TTU Lubbock, Assistant Professor, Department of Nutritional Sciences
"Metabolic Benefits of Fat"

Jeremy D. Bailoo, Ph.D., TTUHSC Lubbock, Assistant Professor, Department of Cell Biology and Biochemistry
"You are What You Eat: A Closer Look at the Diets of Preclinical Animal Models"

Mahmoud Ahmed, Ph.D., TTUHSC Amarillo, Assistant Professor, Department of Pharmaceutical Sciences in School of Pharmacy
"Deciphering Molecular Insights of Meis1 and Hoxb13 Transcription Factors for Cardiac Regeneration"

Clarissa Strieder-Barboza, Ph.D., DVM, M.S., TTU Lubbock, Assistant Professor, Department of Veterinary Sciences
"Unraveling Adipose Tissue Heterogeneity Via Single-cell Analysis: A Bovine Model"

Fernanda Rosa M.S., Ph.D., TTU Amarillo, Assistant Professor, Immunology in School of Veterinary Medicine
"MicroRNAs and Adipocytes: A Major Crosstalk Between Immunity and Metabolism"

Craig W. Spellman, D.O., Ph.D., F.A.C.O.I., TTUHSC Odessa, Professor and Associate Dean Research
"Prevalence and Associations of Syndromic and Non-syndromic Obesity Genes in the Obese Hispanic/Latino Population"

3:30-3:45 p.m. **Q&A Session**

3:45-4 p.m. **ORI meeting Closing Remarks - Awards Announcement**
Drs. Moustaid-Moussa & Dufour

4-4:45 p.m. **Student/Postdoc Professional Development Session**
Sponsored by the Graduate Nutrition Organization (GNO), TTU Graduate School and TTUHSC Graduate School of Biomedical Sciences

Panel discussion: Chaired by **Shadi Nejat, D.C., Ph.D. Candidate**, TTU Lubbock and **Alexis Rodriguez, B.S., Ph.D. Student**, TTUHSC Lubbock

Jannette M. Dufour, Ph.D., TTUHSC Lubbock – Basic Research
University Distinguished Professor & Chair, Department of Cell Biology and Biochemistry, Associate Director of ORI

Rama Chemitiganti, MD, TTUHSC Odessa – Clinical Practice & Research
Director, Center of Excellence for Diabetes and Endocrinology
ECHD endowed Chair, Department of Internal Medicine

Arwa Al-Jawadi, Ph.D., Thermo Fisher Scientific San Diego – Industry Research
Technical Application Scientist (TTU Alum)

Closing Remarks:
Shadi Nejat, D.C., Ph.D. Candidate and
Alexis Rodriguez, B.S., Ph.D. Student

4:45-5 p.m. **Adjourned**

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www.depts.ttu.edu/research/obesityresearch/

Acknowledgements

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Texas Tech University
Texas Tech University Health Sciences Center Lubbock
Texas Tech Health Sciences Center- El Paso

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Wei Li
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Naima Moustaid-Moussa
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Oak-Hee Park
Alexis Rodriguez
Alex H. Scoggin Clarissa
Strieder Barboza Leslie
Thompson
Kayla Tindle
Jason Van Allen
Yujiao Zu

ORI Poster Session Judges

Kembra Albracht-Schulte
Jeremy D. Bailoo
Munmun Chattopadhyay
Klementina Fon Tacer
Lauren S. Gollahon
Hamed Khedmatgozar
Conrad Lyford
Oak-Hee Park
Jacobo Sanchez
Clarissa Strieder Barboza
Leslie Thompson
Victoria Young
Yujiao Zu

ORI Annual Meeting Planning Team

Munmun Chattopadhyay
Rama Chemitiganti
Deborah J. Clegg
Jannette Dufour
Bibha Gautam
Naima Moustaid-Moussa
Shadi Nejat
Crystal Price
Alexis R. Rodriguez
Cristal Ponciano Sanchez
Alex H. Scoggin Clarissa
Strieder Barboza

ORI Welcome

Naima Moustaid-Moussa, Ph.D., FTOS, FAHA,
Horn Distinguished Professor, Nutritional Sciences, College of Human Sciences
Associate Vice President for Research & Director of ORI, Office of Research & Innovation Texas Tech University, Lubbock, TX

Dr. Naima Moustaid-Moussa is a Paul W. Horn Distinguished Professor in Nutritional Sciences, in the College of Human Sciences, and Associate Vice President for Research and Founding Director of the Obesity Research Institute in the Office of Research and Innovation at TTU. She leads the Nutrigenomics, Inflammation and Obesity Research (NIOR) conducting basic and integrated nutrition and obesity research, with emphasis on the role of the endocrine function of adipose tissue (renin angiotensin system), heat shock proteins, and nutrient-gene interactions in metabolic diseases, breast cancer, aging and Alzheimer's disease. Current research focuses on bioactive compounds (such as fish oil, tart cherry anthocyanins, curcumin, and other polyphenols) that reduce obesity-associated white fat inflammation and activate brown fat, using cells, rodents, and model organisms. Her secondary area of interest is in obesity prevention. She published over 180 peer reviewed papers from work funded by federal agencies (NIH and USDA), foundations (AHA, ADA) and international Foundations (Qatar) as well as industry (Empirical Foods, Inc). She served in several leadership positions within the American Society for Nutrition (ASN, as member of the ASN Board of Directors), The Obesity Society (TOS Council), and the American Heart Association (AHA, Lipids Basic Science peer review committee chair). She completed recently service (2016-2022) on the NIH Human Studies of Diabetes & Obesity), and is member of several scientific journal editorial boards including Scientific Reports (Nature Springer), J. Nutritional Biochemistry (Elsevier) & JAHA (Wiley)). Dr. Moustaid-Moussa is Fellow of AHA (FAHA) and Fellow of TOS (FTOS). She received several awards sponsored by ASN (2012 Outstanding Investigator award, 2015 Pfizer Consumer Healthcare Nutritional Sciences award, 2020 Korean Nutrition Society Award). She was also awarded mentoring and scholarship awards by TTU (2018 Nancy J Bell Outstanding Mentor Award, 2019 Outstanding Faculty Mentor for Undergraduate Research, 2020 Outstanding Researcher Award). In 2021, she received the Barnie E. Rushing J. Distinguished Faculty Research Award and appointed as Paul W. Horn Distinguished Professor. She served for several years as the state of TX as Region 1 representative on the statewide Live Smart Texas, a statewide committee dedicated to obesity prevention and resources. In 2022, she was appointed to the Board on Agriculture & Natural Resources of the National Academies of Sciences, Engineering & Medicine.

Jannette M. Dufour, Ph.D.
University Distinguished Professor & Chair, Department of Cell Biology & Biochemistry Associate Director, Obesity Research Institute

Dr. Jannette M. Dufour is a University Distinguished Professor and Chair of the Department of Cell Biology and Biochemistryin the School of Medicine at Texas Tech University Health Sciences Center and Associate Director of the Obesity Research Institute. She received her PhD in Genetics and Cell Biology from Washington State University in 1999 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 from 1999-2005.

The focus of her research is to explore the therapeutic potential of immune privileged Sertoli cells as a means to improve outcomes of transplantation. Specifically, her lab is testing the feasibility of using immune privileged Sertoli cells for cell-based gene therapy and examining the mechanism(s) of Sertoli cell immune protection in order to improve 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 American Society of Andrology (ASA; 2007, 2016), Society for the Study 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) and the President's Team Teaching Award (2019).

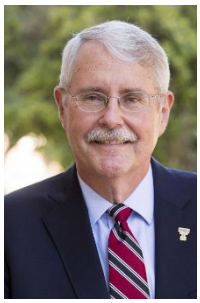
Chancellor Tedd Mitchell, M.D., TTUS

Tedd L. Mitchell, M.D., was named the fifth chancellor of the Texas Tech University System on Oct. 25, 2018.

As chancellor, Mitchell is the CEO of a $2.65 billion, five-university higher education enterprise consisting of Texas Tech University, Texas Tech University Health Sciences Center, Angelo State University, Texas Tech University Health Sciences Center El Paso and Midwestern State University. Collectively, the TTU System enrolls about 63,000 students, operates on 26 academic locations statewide and internationally and has an endowment valued at $1.7 billion.

Mitchell works collaboratively with the TTU System Board of Regents, System Administration and each university president to enhance the TTU System's profile and support shared missions of advancing higher education, health care, research and community outreach. Additionally, Mitchell guides the TTU System's engagement with state elected officials in Austin and federal leaders in Washington, D.C., to further enhance funding and support.

Mitchell first joined the TTU System as the eighth president of TTUHSC in 2010. He held a dual appointment as chancellor and president for a year until deciding to close his tenure as the longest serving president in TTUHSC history on Nov. 1, 2019.



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

Dr. Heppert is currently Vice President for Research and Innovation 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. Previously, he served as Associate Vice Chancellor for Research at the University of Kansas (KU). He 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 and currently serves on the American Chemical Society's Committee on Budget and Finance, and is on the institutional advisory board for the Cancer Prevention and Research Institute of Texas. Dr. Heppert's initial research focused on organo transition metal chemistry. This research result- ed in the isolation and characterization of the first class of air stable terminal transition metal carbide compounds. Dr. Heppert has also been active in projects to improve science teaching and science teacher preparation. He is past chair of the American Chemical Society's Commit- tee 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, studying under Donald Ganies. He completed postdoctoral training at Indiana University under the direction of Dr. Malcolm Chisholm. He joined the chemistry faculty at KU in 1985 and moved to Texas Tech University in 2017.

Lance McMahon, Ph.D.
Senior Vice President of Research & Innovation, TTUHSC

Lance R. McMahon, Ph.D., is the Senior Vice President for Research and Innovation at Texas Tech University Health Sciences Center. He is currently Professor of Pharmaceutical Sciences in the Jerry H. Hodge School of Pharmacy and Professor of Medical Education in the School of Medicine. He is chair of the TTUHSC Research Council, member of the Texas Tech Research Park Board, and member of the Steering Committee of the Center for Translational Neuroscience and Therapeutics. Dr. McMahon is committed to TTUHSC's vision to transform healthcare through innovation and collaboration, focusing on advancements in cancer, neuroscience, infectious disease, and cardiometabolic disorders.

Dr. McMahon has secured $22M in NIH funding for his research as principal investigator and has published 133 peer-reviewed publications focusing on drugs acting upon the central nervous system. He has served extensively on NIH Study Sections and DoD Programmatic Research Panels, has held leadership positions within the American Society of Pharmacology and Experimental Therapeutics and the American Association of Pharmaceutical Scientists, and has served as editor for peer-reviewed journals.

Dr. McMahon builds strategic research partnerships by fostering a collegial spirit, shared vision, and strategic investment of university funds. TTUHSC is a Hispanic-serving, Carnegie-classified research university, and is proud of its world-class faculty and doctoral trainees who have worked together to secure TTUHSC's position as a global leader in academic health-related research.

Deborah J. Clegg, Ph.D.
Vice President for Office of Research TTUHSC 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 150 articles in impactful journals such as The New England Journal of Medicine, JAMA, American Journal of Physiology, and the National Kidney Foundation and is listed in the top 2% of the most cited/impactful investigators out of more than 6 million cited in science journals worldwide, according to a peer-reviewed database. 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 has been featured in many forms of media, to include the television program The View, and HBO series entitled 'Weight of the Nation', as well as in the popular press to include 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 25 years.

Keynote Speaker

Ralph DeFronzo, M.D., Professor of Medicine, Chief of Diabetes Division University of Texas Health Science Center, Deputy Director of Texas Diabetes Institute (TDI), San Antonio, Texas

"Treatment of T2DM: A Rational Approach Based Upon Its Pathophysiology"

Ralph A. DeFronzo, MD, is Professor of Medicine and Chief of the Diabetes Division at the University of Texas Health Science Center and the Deputy Director of the Texas Diabetes Institute, San Antonio, Texas. Dr. DeFronzo is a graduate of Yale University (BS) and Harvard Medical School (MD) and did his training in Internal Medicine at the Johns Hopkins Hospital. He completed fellowships in Endocrinology at the National Institutes of Health and Baltimore City Hospitals and in Nephrology at the Hospital of the University of Pennsylvania. Subsequently, he joined the faculty at the Yale University School of Medicine (1975-88) as an Assistant/Associate Professor. From 1988 to present Dr. DeFronzo has been Professor of Medicine and Chief of the Diabetes Division at the University of Texas Health Science Center at San Antonio. He also serves as the Deputy Director of the Texas Diabetes Institute.

His major interests focus on the pathogenesis and treatment of type 2 diabetes mellitus and the central role of insulin resistance in the metabolic-cardiovascular cluster of disorders known collectively as the Insulin Resistance Syndrome. Using the euglycemic insulin clamp technique in combination with radioisotope turnover methodology, limb catheterization, indirect calorimetry, and muscle biopsy, he has helped to define the biochemical and molecular disturbances responsible for insulin resistance in type 2 diabetes mellitus.

For his work in this area, Dr. DeFronzo received the prestigious Lilly Award (1987) by the American Diabetes Association (ADA), the Banting Lectureship (1988) by the Canadian Diabetes Association, the Novartis Award (2003) for outstanding clinical investigation worldwide and many other national and international awards. He also is the recipient of the ADA's Albert Renold Award (2002) for lifetime commitment to the training of young diabetes investigators. Dr. DeFronzo received the Banting Award from the ADA (2008) and the Claude Bernard Award from the EASD (2008). These represent the highest scientific achievement awards given by the American and European Diabetes Associations, respectively. In 2008 Dr. DeFronzo also received the Italian Diabetes Mentor Prize and the Philip Bondy Lecture at Yale. In 2009 he received the Presidential Award for Distinguished Scientific Achievement from the University of Texas Health Science Center at San Antonio. Dr. DeFronzo received the Outstanding Clinical Investigator Worldwide Award by CODHy (2012), the Outstanding Scientific Achievement Award from the American College of Nutrition (2014), the Samuel Eichold II Memorial Award for Contributions in Diabetes from the American College of Physicians (2015), the George Cahill Memorial Lecture from the University of Montreal (2015) and the Priscilla White Memorial Lecture from the Joslin Clinic & Brigham and Women's Hospital (2015). Most recently (2017), Dr. DeFronzo received the Hamm International Prize for his many seminal observations on the pathogenesis and treatment of type 2 diabetes and the Distinction in Endocrinology Award from the American College of Endocrinology. With more than 800 articles published in peer-reviewed medical journals, Dr. DeFronzo is a distinguished clinician, teacher, and investigator who has been an invited speaker at major national and international conferences on diabetes mellitus.

Session 1 – Short talks on Diabetes (TTUS faculty)

Moderator: **Klementina Fon Tacer, D.V.M., Ph.D**. TTU SVM Amarillo

Klementina Fon Tacer, D.V.M., Ph.D. TTU SVM Amarillo
Assistant Professor, Director Texas Tech University School of Veterinary Medicine, Texas Center for Comparative Cancer Research (TC3R)

Dr. Fon Tacer obtained DVM and Ph.D. degrees from the University of Ljubljana, Slovenia. She did her post-doctoral training at the UTSW Medical Center in Dallas, TX, and St. Jude Children's Research Hospital in Memphis, TN. In 2020, she was recruited to TTU SVM as a Cancer Prevention and Research Institute (CPRIT) Scholar.

The overarching aim of Dr. Fon Tacer's research is to uncover the mechanisms underlying mammalian cell protection against stress, including metabolic and oxidative stress, DNA damage, and immune response. Fon Tacer lab wants to understand why and how these pathways get hijacked in cancer or deregulated in different diseases, including Prader-Willi syndrome (PWS). To address these questions, they use genes with unique tissue-specific expressions as a handle and aim to determine their function in humans and animals with comparative and multidisciplinary approaches. Their favorite genes are melanoma antigens (MAGEs), one of which is implicated in PWS. Fon Tacer lab vision is that their research will help advance therapeutic options for human and animal patients.

Fon Tacer lab is supported by funding from CPRIT, Foundation for Prader Willi Research, and TTU.

Speakers

Deborah J. Clegg, Ph.D. TTUHSC El Paso
Vice President for Office of Research

"Pre-diabetes: It is Prevalent and Preventable!"

Jannette M. Dufour, Ph.D. TTUHSC Lubbock
University Distinguished Professor & Chair, Department of Cell Biology & Biochemistry
Associate Director, Obesity Research Institute

"Islet transplantation for treatment of type 1 diabetes"

Munmun Chattopadhyay, M.Sc., Ph.D. TTUHSC El Paso
Associate Professor, Center of Emphasis in Diabetes and Metabolism

"Exercise mediated alleviation of sensory neuropathy in diabetes"

Dr. Munmun Chattopadhyay is an Associate Professor in the Department of Molecular and Translational Medicine at Texas Tech University Health Sciences Center El Paso and Chair of the Institutional Animal Care and Use Committee at TTUHSC El Paso. Dr. Chattopadhyay received her MS

degree in Zoology and Ph.D. in Neurosciences from Jiwaji University, Gwalior, India. After her post-doctoral training in molecular genetics at the National Institute of Immunology, New Delhi, India, she joined the University of Pittsburgh as a post-doctoral fellow in the Department of Neurology. She became a junior faculty in the Department of Neurology at the University of Michigan in 2010 and joined TTUHSC El Paso as an Assistant professor in 2014. Her research is focused on determining the impact of inflammatory mediators on the pathogenesis of diabetic complications. Her lab is currently investigating on the novel early biomarkers of inflammation and epigenetic modulators (histone modifications) involved in the progression of neuropathy, cardiac dysfunction and gastroparesis in diabetic animals and human subjects as well as how natural compounds and exercise could alter the progression of these complications. Dr. Chattopadhyay has been funded by NSF, ADA and other foundations; published more than 43 articles and 2 book chapters. Dr. Chattopadhyay received Faculty Service Award by Student Government Association, TTUHSC El Paso (2020), Women Worth Watching in STEM (2022) by Profiles in Diversity Journal and nominated for 3D Printing Industry (2021). She serves as an associate editor and editorial board member in a number of peer reviewed journals and panel member in several grant review committees including NIH, ADA, DoD, NSF and other international review panels including NIHR.

David P. Cistola, M.D., Ph.D. TTUHSC El Paso
Professor, CoE in Diabetes and Metabolism, Paul L. Foster School of Medicine

"Whole Blood T2P links Hemoglobin Status to Cardiometabolic Health"

David P. Cistola, M.D., Ph.D. is Professor in the Center of Emphasis in Diabetes & Metabolism at Texas Tech University Health Sciences Center El Paso. He leads a research laboratory that is discovering and translating new technologies into practical screening tests for cardiometabolic health to prevent diabetes and cardiovascular disease. Dr. Cistola has held prior positions as Vice President for Research & Innovation at the University of North Texas Health Science Center, as Associate Dean for Research and Professor in the Division of Health Sciences at East Carolina University, and as Assistant and Associate Professor at Washington University School of Medicine in St. Louis. He graduated from the M.D.-Ph.D. program at Boston University School of Medicine. He trained as a NIH Postdoctoral Fellow in the Cardiovascular Institute and held the Andrew Costello Fellowship of the Juvenile Diabetes Foundation International.

Rama Chemitiganti, M.D. TTUHSC Odessa
Director, Center of Excellence for Diabetes and Endocrinology
ECHD endowed Chair, Department of Internal Medicine

"Racial differences in weight loss response to GLP-1 analogs- a preliminary report"

Dr. Chemitiganti has been leading the Center of Excellence for Diabetes and Endocrinology.

His focus is on improving access to high-quality care for people suffering from Diabetes and other hormonal imbalances in West Texas and Eastern New Mexico. He is instrumental in setting up a free clinic, the first of its kind in the Permian Basin to care for persons with no medical insurance. His research includes identifying mechanisms to prevent and delay diabetes and its dreaded complications. His current research examines racial and ethnic differences in treatment responses to novel anti-diabetes and antiobesity medications. He is the principal investigator in a trial evaluating the use of Freehand 3D Tomographic Ultrasound Thyroid Imaging and Novel Neural Network Algorithms in the prognostication of Thyroid Nodules.

Dr. Chemitiganti has received multiple seed grants and two endowments to pursue his research and service mission respectively. He serves in a leadership position at the Texas Endocrinology Association. Dr. Chemitiganti is a Fellow of the American College of Physicians (FACP) and a Fellow of the Endocrine Alliance Academy (FEAA). His scholarship and teaching were recognized through several awards including the

"Dean's Distinguished Faculty Service Award" and more recently he was inducted into the Alpha Omega Alpha Honor Medical Society (AΩA).

Bibha Gautam, Ph.D., R.N., CNE TTUHSC Lubbock
Associate Professor for School of Nursing

"Mitigating the Burden of T2DM with the Ancient Practice of the Time Restricted Eating"

She is a nurse faculty and researchers. She has been a nurse since 1993. She teaches in accelerated BSN program. She is very passionate about nursing research and has been involved in many research studies nationally and internationally. Major areas of Dr. Gautam's research interests are: Developmental origins of obesity, Biology of Obesity, Antecedents of Obesity, and Time Restricted Eating. Some of her completed research studies include: 1) Prevention of HIV-1 transmission via breast milk, 2) Obesogenic Toxins in Breast Milk of Lactating Women, 3) Post-partum Sleep and Weight, 4) Accelerated BSN Program Coaching Model.

Within the School of Nursing, she has demonstrated her leadership in planning, coordinating, and conducting educational research studies aimed at promoting evidence-based teaching. Some of the key educational research studies that she contributed within the School of Nursing are; use of point of care technology in nursing, and assessing the needs of Accelerated BSN Program second-degree clinical coaches, and use of deliberate practice in nursing education. Currently, she is actively involved in university funded TTUHSC DEI Research Grant.

Dr. Gautam is an active member of several professional nursing organizations; Sigma Theta Tau international, American Nurses Association, Texas Nurses Association. She serves on advisory board of Society of American Nepalese Nurses (SANN) and Texas Tech University Obesity Research Institute (ORI).

Session 2 – Short Talks – general topics (TTUS faculty)

Moderators: **Shadi Nejat, D.C., Ph.D. Candidate** & **Alexis Rodriguez, Ph.D. Student**

Shadi Nejat, D.C., Ph.D. Candidate

Shadi Nejat is a Ph.D. candidate in Nutritional Sciences in the Nutrigenomics, Inflammation & Obesity Research Lab, led by Dr. Naima Moustaid-Moussa. She earned her B.S. in Biology degree from the University of Texas at Arlington; she then continued to graduate school and earned a Doctor of Chiropractic degree from Parker University in Dallas, TX and practiced as a chiropractor for 12 years prior to returning to academia to pursue her Ph.D. Shadi joined research on the HSP40/DNAJB3 project, an international collaborative project, funded by Qatar National Research Funds, to determine whether inactivation of this gene in mice leads to obesity and diabetes and dissect underlying mechanisms. Shadi served as the vice president for the Graduate Nutrition Organization (GNO) for the 2021-2022 academic year and is currently serving as the president of GNO. She also took part in poster presentations organized by the graduate school and the Obesity Research Institute and was among the winners for two consecutive years. Additionally, Shadi has shared her research in national and international conferences and was awarded a prestigious travel award by Palacky University in Olomuc, Czech Republic to present her research. She was also selected as a TEACH fellow for this academic year and plans to pursue a career in academia following graduation. Shadi's expected graduation date is December 2023.

Alexis Rodriguez, Ph.D. Student

Alexis Rodriguez is currently a PhD student in the Department of Cell Biology and Biochemistry at Texas Tech University Health Sciences Center. Received her BSA in Biology at the University of Texas at Austin in 2020 and MS in Biotechnology from Texas Tech University Health Sciences Center in 2022. Her current research focuses on studying the immune privilege of Sertoli cells to improve the outcomes of allo- and zeno-transplantation. Additionally, she is studying the mechanism by which transplanted Sertoli cells protect co-transplanted islet cells as a treatment for diabetes. Research interests include studying Sertoli cell immune privilege and immunoprotection of transplanted cells and examining the use of Sertoli cells to protect co-transplanted islet cells. Future research collaboration interests are transplantation, immune regulation and diabetes.

Speakers

Oak-Hee Park, Ph.D. TTU Lubbock
Research Assistant Professor, Collage of Human Sciences, Adjunct and Graduate Faculty, Department of Nutritional Sciences

"School-based nutrition intervention for adolescent obesity prevention in West Texas"

Oak-Hee Park has been conducting various research projects related to nutrition, food, health, and consumer behavior. Her current research areas are focusing on Nutrition Education, Food Environment, Public Health, Obesity Prevention, and Sustainable Food System. Dr. Park had worked on the East Lubbock Promise Neighborhood Grant funded by the United States Department of Education from 2013 to 2019. As a Co-PI, she established the first community-based family cooking program for underserved populations in Lubbock, Texas. She also conducts a food environment study in the Lubbock County using the NEMS-S and NEMS-R surveys, and has actively led an obesity prevention project (Sustainable Life Skills to Reduce Obesity) for adolescents at a Title I school to promote individual's self-efficacy about healthy cooking that may encourage adolescents to reduce risky eating behavior, leveraging body acceptance and mindful

eating practices for the prevention of obesity. Currently, Dr. Park and her research team expand the obesity prevention project at rural Title I schools to educate next generation who will be a model for healthy lifestyle movement in rural communities in west Texas. Other ongoing research projects include "Sorghum: Opportunities as a Sustainable Crop for Human Consumption in the U.S.", "Nutrition Benchto-Community Engaged Scholars in Texas (Nutrition BEST) REEU Program", "Ugly Fruits and Vegetables/Sustainable Food Systems Research", and "College Student's Hunger, Resources and Recovery".

Wanjiku N. Gichohi, Ph.D. TTU Lubbock
Assistant Professor, Department of Nutritional Sciences

"Addressing nutrition issues through a systems lense-opportunities and challenges"

Wanjiku Gichohi is a public health nutritionist who possesses experience in various aspects of food, nutrition and health research. She has practical experience towards engaging in international collaborative efforts that intend to alleviate malnutrition. Her career has involved engagement with a wide range of organizations ranging from International Research Institutions, Academia as well as Industry.

Her passion is in undertaking assignments that elucidate nutrition specific and sensitive approaches that work, for whom they work and where they work. In the last 10 years her efforts have revolved around addressing nutrition challenges specifically from a systemic perspective.

She is currently establishing the Food, Nutrition and Policy lab at the nutrition sciences department, Texas Tech University, USA.

Kembra Albracht-Schulte, Ph.D. TTU Lubbock
Assistant Professor, Department of Kinesiology & Sport Management

"Combining Fish Oil and Exercise to Improve Obesity-Associated Inflammation"

Dr. Kembra Albracht-Schulte is an Assistant Professor and director of the Nutrition, Exercise, & Translational (NExT) Medicine Laboratory in the Department of Kinesiology & Sport Management at Texas Tech University. She earned her M.S. in Kinesiology and her Ph.D. in Nutritional Sciences at Texas Tech University. Dr. Albracht-Schulte's research efforts aim to understand the mechanistic and potentially synergistic effects of exercise (intensity vs. duration) and nutrition (e.g. foods, nutrients, food bioactives and supplements) interventions by conducting clinical and translational research.

Danielle E. Levitt, Ph.D., CSCS*D TTU Lubbock
Assistant Professor, Department of Kinesiology & Sport Management

"At-risk Alcohol Use: Implications for Metabolic Dysregulation"

Danielle Levitt, PhD, is an Assistant Professor of Exercise Physiology in the Department of Kinesiology & Sport Management at Texas Tech University. She earned her PhD in Biology with a concentration in Exercise Physiology at the University of North Texas in Denton, TX. She then completed a postdoctoral fellowship with appointments in the Department of Physiology and the Comprehensive Alcohol-HIV/AIDS Research Center at Louisiana State University Health Sciences Center-New Orleans. Her long-term research goal is to understand the mechanisms by which lifestyle factors, particularly alcohol and substance use, contribute to metabolic dysfunction and to identify therapeutic strategies to improve metabolic outcomes in affected individuals. Her work has been funded by

the National Institute on Alcohol Abuse and Alcoholism (NIH/NIAAA), National Strength and Conditioning Association Foundation (NSCAF), and the American College of Sports Medicine-Texas Chapter (TACSM).

Christine Garner, Ph.D., RD TTUHSC Amarillo
Assistant Vice President of Research, Assistant Professor, Department of Pediatrics, InfantRisk Center

"Improving nutrition among mothers and infants experiencing health disparities"

Christine D. Garner, PhD, RD, CLC is Assistant Vice President of Research, an Assistant Professor of Pediatrics, and conducts research in the InfantRisk Center at Texas Tech University Health Sciences Center in Amarillo, TX. She obtained both her Master's and Doctoral degrees in Nutrition at Cornell University, and she trained and worked as a Registered Dietitian in Pediatrics at the University of California San Francisco. Dr. Garner's research focuses on maternal and child health with a nutrition lens during pregnancy, breastfeeding, infancy, and early childhood – the "first 1000 days." Dr. Garner is experienced in human subjects' research including investigator-initiated trials, hospitalbased interventions, qualitative (formative) research, survey research, and community-based interventions. She has worked with UNICEF, served on the board of the New York State Perinatal Association, and served as the Research Coordinator for the Academy of Nutrition and Dietetics Women's Health Dietetics Practice Group. Christine is a mom & an active researcher, author and editor on topics of nutrition, pregnancy and women's health including the online reference for clinical and medical professionals UpToDate ®.

Ronald Hall, Pharm.D., M.S.C.S. TTUHSC Dallas
Division Head of Clinical and Translational Sciences Division

"A brief overview of the DOOR program and obesity"

Dr. Hall serves as the Division Head of Clinical and Translational Sciences within the Department of Pharmacy Practice at the TTUHSC Jerry H. Hodge School of Pharmacy. He also serves as the program director for the Dose Optimization and Outcomes Research (DOOR) program. The DOOR program focuses on providing evidence to optimize the dosing and outcomes of medications for obese patients. Dr. Hall was selected as a National Institutes of Health Clinical Research Scholar in 2006. He was also the recipient of the 2008 Young Alumni Award from the St. Louis College of Pharmacy.

Breanna N. Harris, Ph.D. TTU Lubbock
Assistant Professor, Department of Biological Sciences

"The Harris Lab: Organismal stress physiology and behavioral endocrinology"

Dr. Breanna Harris is an Assistant Professor in the Department of Biological Sciences at Texas Tech University. She earned her Ph.D. in Evolution, Ecology, and Organismal Biology from the University of California, Riverside. Dr. Harris has worked with multiple organisms, including crabs, lobsters, sharks, frogs, mice, and humans to answer fundamental questions relating to stressors influence organismal function, health, and life-history tradeoffs. Her current research program focuses on two complementary central questions: 1) how does response to and recovery from stressors translate into functional consequences for organismal behavior (e.g., cognition, risk-taking, feeding), life history trade-offs, health, and evolutionary fitness? and 2) how do individual variation (e.g., sensory perception, genotype, diet, sex, life history stage), and interactions with the biotic and abiotic environment alter physiological and behavioral responses to stressors? Both questions are important for understanding animal life histories, ecological interactions, and evolutionary trade-offs, and are also relevant to human health and disease. She often collaborates with colleagues across campus, including those from Nutritional

Sciences, Psychological Sciences, and Educational Psychology and Leadership. She has received funding from NIH and NSF.

Travis Thompson, Ph.D. TTU Lubbock
Assistant Professor, Department of Mathematics and Statistics

"Mathematical insights in Alzheimer's disease: the need to look towards obesity and diabetes in AD research"

Dr. Travis Thompson received a Ph.D. in Mathematics from Texas A&M University. His postdoctoral work focused on techniques for mathematically modeling the brain and neurological pathology and spanned several research institutions, including Rice University, Simula Research Laboratory and Oxford University. Dr. Thompson joined the faculty of the Department of Mathematics and Statistics at Texas Tech University in the Fall of 2022 and became affiliated with the Obesity Research Institute in the Spring of 2023. His research focus is the development and application of mathematical methods and data-driven models to study complex biological processes on networks in addition to the brain, and neurological pathologies, such as Alzheimer's disease, sharing common mechanistic overlaps with obesity and type 2 diabetes.

Subodh Kumar, Ph.D. TTUHSC El Paso
Assistant Professor, Department of Molecular and Translational Medicine

"A multi-omics approach to investigate the synapse dysfunction in Alzheimer's disease"

Dr. Subodh Kumar is currently an Assistant Professor in the Center of Emphasis in Neuroscience, Department of Molecular and Translational Medicine, Paul L. Foster School of Medicine at Texas Tech University Health Sciences Center El Paso. He received his PhD in Molecular Genetics and Biotechnology from the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, INDIA and trained as a postdoctoral fellow in Neuroscience with Prof. P. Hemachandra Reddy, Internal Medicine Department at Texas Tech University Health Sciences Center Lubbock from 2015-2021. The focus of his research is to explore the therapeutic potential of synapse microRNAs to improve the synapse dysfunction in Alzheimer's disease. Synapse dysfunction is the initial pathological event for Alzheimer's disease progression. MicroRNAs enriched at synapse, directly regulate the local protein synthesis involved in multiple synaptic functions and governing synaptic plasticity. He is studying the impact of synaptosome miRNAs on neuron function and several synapse events such as excitatory and inhibitory synapse dysfunction in Alzheimer's disease. His lab also investigating the impact of microRNAs on mitochondrial function, synaptic activity, neurotransmitter release and synaptotoxicity. His research has been funded by National Institute of Aging, NIH. He has received Pathway to Independence Career Development Award (K99/R00) from NIH (2020).

Heejin Jun, Ph.D. TTU Lubbock
Assistant Professor, Department of Nutritional Sciences

"Metabolic Benefits of Fat"

Heejin Jun's main research interest is in investigating how nutrient and energy metabolism is regulated during physiological transitions and reprogrammed in pathological conditions. She targets fat as the primary focus of her research. Heejin Jun received her Ph.D. in nutritional biochemistry at Korea University, Seoul, South Korea. She completed her postdoctoral training at Pennington Biomedical Research Center and the University of Michigan. She joined the faculty in the Department of Nutritional Sciences at TTU as an assistant professor in 2021.

Jeremy D. Bailoo, Ph.D. TTUHSC Lubbock
Assistant Professor, Department of Cell Biology and Biochemistry

"You are what you eat: A closer look at the diets of preclinical animal models"

Jeremy Bailoo, PhD is an Assistant Professor in the Department of Cell Biology & Biochemistry at TTUHSC. He is a Developmental Psychobiologist who studies animals to gain insight into how genetic and environmental factors contribute to individual differences in health and welfare across lifespan. His research is organized under three core areas. The first evaluates whether the manner in which we house and care for laboratory animals affects their welfare, the validity of the models for which they are used, and the generalizability and reproducibility of experimental results derived from such use. The second evaluates how exposure to environmental toxins in diet, such as arsenic, are associated with presentation of behavioral and physiological correlates of neurodevelopmental disorders and neurodegenerative diseases. The third is focused on the refinement of existing as well as the development of novel behavioral phenotyping tasks for use in health-related biomedical research and for assessments of animal welfare.

Mahmoud Ahmed, Ph.D. TTUHSC Amarillo
Assistant Professor, Department of Pharmaceutical Sciences in School of Pharmacy

"Deciphering molecular insights of Meis1 and Hoxb13 Transcription factors for cardiac regeneration"

Mahmoud Salama Ahmed is an assistant professor at department of pharmaceutical sciences at Texas Tech University Health Sciences Center (TTUHSC). Prior to TTUHSC, he was trained as a medicinal chemist to receive his Ph.D. from the department of chemistry and biochemistry at South Dakota State University (SDSU). Then, he joined Kemin Industries, Iowa; as a postdoctoral research scientist. In 2018, he joined UT Southwestern medical center as a research instructor. Dr. Ahmed's research program at TTUHSC focuses on recruiting the drug discovery tools including structure-based drug design, organic synthesis, X-ray crystallography, and in vitro/in vivo biological evaluation to understand and modulate the metabolic enzymes and transcription factors regulating cardiac regeneration and cardiometabolic diseases using small molecules. Dr. Ahmed published 26 peer reviewed articles in Nature, Nature metabolism, Nature cardiovascular, Proceedings of National Academy of Sciences, and European Journal of Medicinal Chemistry.

Clarissa Strieder-Barboza, Ph.D., DVM, M.S. TTU Lubbock
Assistant Professor, Department of Veterinary Sciences

"Unraveling adipose tissue heterogeneity via single-cell analysis: A bovine model"

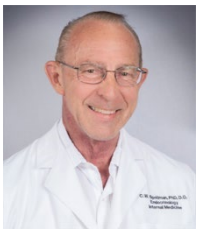
Dr. Clarissa Strieder-Barboza is an Assistant Professor at the Davis College Department of Veterinary Sciences with a shared appointment with the School of Veterinary Medicine at TTU campus in Amarillo. She earned her degree in veterinary medicine at the Universidade Federal de Santa Maria in Santa Maria, Brazil, and her master's degree in veterinary science-animal health from the Institute of Veterinary Clinical Sciences at the Universidad Austral de Chile in Valdivia, Chile. Her doctorate in comparative medicine and integrative biology is from the Michigan State University College of Veterinary Medicine's Department of Large Animal Clinical Science in East Lansing, Michigan. Prior to joining

the Tech faculty, Strieder-Barboza served as a postdoctoral research fellow in University of Michigan Medical School's Department of Surgery in Ann Arbor, Michigan, where her translational biomedical research focused on mechanisms of adipose tissue dysfunction in obesity-associated type 2 diabetes in humans. She also worked as a veterinary instructor with the College of Veterinary Medicine and Animal Science at the Universidad Cooperativa de Colombia in Colombia. Her current research program is funded by NIFA-USDA and focuses on uncovering the mechanisms by which dysfunctional adipose tissue impacts health of periparturient dairy cattle, meat quality in beef cattle, and humans with obesity.

Fernanda Rosa M.S., Ph.D. TTU SVM Amarillo
Assistant Professor of Immunology for School of Veterinary Medicine

"MicroRNAs and adipocytes: a major crosstalk between immunity and metabolism"

Dr. Rosa is an Assistant Professor of Immunology at the School of Veterinary Medicine, Texas Tech University campus Amarillo, TX. Dr. Rosa serves as the Co-Leader of the Texas Center for Comparative Cancer Research (TC3R). Dr. Rosa devotes her research efforts to evaluate bioactive molecules present in neonatal diets and their impact on the immune regulation, crosstalk with metabolism, and overall health impact on neonates. Most recently, she has been funded by USDA to investigate the role of extracellular vesicles and microRNAs transferred from the mother to their offspring and their effects on the immune system. She has multiple peer-reviewed scientific publications and has presented at national and international scientific conferences. Dr. Rosa also teaches basic immunology to Veterinarian students and advanced immunology to graduate students.



Craig W. Spellman, DO, PhD, FACOI., TTUHSC Odessa
Professor & Associate Dean Research

"Prevalence and Associations of Syndromic and Non-syndromic Obesity Genes in the Obese Hispanic/Latino Population"

Craig W. Spellman is Professor of Medicine, Division of Endocrinology, at Texas Tech University Health Sciences Center and Director of the MCH Diabetes Center at Medical Center Hospital, Odessa, Texas 2007-present.

Dr. Spellman received his PhD in Pathology from the University Utah School of Medicine and his medical degree from the Texas College Osteopathic Medicine in 1991. He is board certified in Internal Medicine and trained in diabetes and endocrinology at the University Minnesota School of Medicine. Dr. Spellman was Assistant Professor of Pathology from 1978 -1986 at the University New Mexico School Medicine, Chair of Endocrinology at the University North Texas Health Science Center from 1997-2007 and served as the Regional Associate Dean for Research at Texas Tech from 2007-2014.

Dr. Spellman's clinical research focuses on translational medicine for management of diabetes. His current basic research focuses on genomic sequencing of Hispanic/Latino persons with BMI 40+ testing for syndromic and non-syndromic obesity genes.

Dr. Spellman lectures widely throughout the USA and has more than 400 publications and presentations. He is Chairman of the subcommittees of the Texas Diabetes Council and Principal Investigator for Prevention and Delay of Diabetes Complications in Texas, Region 14. He is a member of the American Osteopathic Association, American College of Osteopathic Internists, American Diabetes Association and the American Association of Clinical Endocrinologists. In addition, Dr. Spellman is a retired ordained pastor with the TeenFLOW Youth ministry and Life Church, Midland, TX.

Student/Postdoc Professional Development Session

Sponsored by the Graduate Nutrition Organization (GNO), TTU Graduate School & TTUHSC Graduate School of Biomedical Sciences

Panel discussion: Chaired by

Shadi Nejat, D.C., Ph.D. Candidate, TTU Lubbock

Alexis Rodriguez, Ph.D. Student, TTUHSC Lubbock

Panelist:

Jannette M. Dufour, Ph.D., TTUHSC Lubbock – Basic Research
University Distinguished Professor & Chair, Department of Cell Biology & Biochemistry
Associate Director, Obesity Research Institute

Rama Chemitiganti, MD, TTUHSC Odessa – Clinical Research
Regional Chair, Department of Internal Medicine, Chief Division of Endocrinology

Arwa Al-Jawadi, Ph.D., Thermo Fisher Scientific San Diego – Industry Research Technical Application Scientist (TTU Alum)

Dr. Al- Jawadi is a Technical Application Scientist (TAS) III at Thermo Fisher Scientific. Arwa joined Dr. Naïma Moustaid-Moussa lab in 2012-2017 as a Fulbright scholar from Iraq pursuing her master and doctoral degrees in Nutritional Sciences. Her master thesis focused on understanding the effects of eicosapentaenoic acid (EPA), an omega-3 polyunsaturated fatty acid (n-3 PUFA), on muscles metabolism in C2C12 muscle cells model. After getting her master degree, Arwa pursued her doctorate, where her doctoral research focused on understand the relationship between obesity and inflammation on breast cancer, and the preventative effects of EPA using cancer cells.

After graduation, Arwa moved in 2017 to New York City, NY for her first post-doc at Rutgers New Jersey Medical School (NJMS). As a post-doc, Arwa worked with Dr. Ronaldo Ferraris where her research focused on studying the effects of Fructose on lipogenic genes in mouse small intestine using a 3D Organoids model. In 2018, Arwa joined the department of Diabetes, Obesity and Metabolism in Mount Sinai, Icahn School of Medicine for her second post-doc. Arwa worked with Dr. Susan Fried to coordinate clinical studied that aimed to understand the mechanisms underlying depot- and sex- dependent differences in adipose tissue.
In 2019, Arwa moved to San Diego, CA to join Thermo Fisher Scientific. Arwa is a TAS III with the qPCR technical support team where she supports both research and clinical customers as well as coordinate and train new team members.

ORI 8th Annual Meeting: Diabetes: A Texas Sized Issue
Oral Presentation Abstracts
In-person Judging on Wednesday, May 3rd during 11:30am-12:45pm
TTUHSC Academic Event Center

UNDERGRADUATE STUDENTS

POSTER #1

Assessing the Bioactivity of Nopal on Restoring Insulin Sensitivity in Skeletal Muscle Cells
Berenice Barrios, Lydian Delaney, Robert M. Badeau, Ph.D.
Texas Tech University, Lubbock

Objective: Increases in adipose tissue mass and density lead to localized insulin resistance and decreased circulating glucose utilization. Insulin resistance and decreased cellular glucose uptake drives type 2 diabetes pathologies. Over the past decade, major breakthroughs in the discoveries of treatment for impaired insulin resistance including gastric restriction surgeries exist, however the severity and prevalence of type 2 diabetes in the USA has not declined during this time. This prevalence has significantly increased, and this suggests that innovative interventions are needed. Significant lifestyle changes including therapeutic interventions that reduce stress, increase movement, and the tracking of daily energy balance are necessary. Several studies show that nopal, a natural alternative that has several bioactive molecules, yields hypoglycemic effects in both rodents and humans. Because studies are lacking in exploring the underlying mechanisms behind these observations, here, we aim to assess how nopal affects glucose uptake kinetics, transcription, and cell signaling in insulin-resistant cells.

Methods: We are using differentiated C2C12 myoblast cells that are insulin-resistant and treated with insulin and 6-NBDG, a fluorescent glucose analog. These are treated with 0.2, 0.4, 0.6, 0.8, and 1 mg of nopal. Controls lack nopal treatment. 6-NBDG fluorescence is measured extracellularly and intracellularly to determine differences in insulin sensitivity upon treatment.

Results: These data will show that nopal affects glucose kinetics and restores insulin sensitivity compared to controls. Significance/Conclusion: Nopal may offer an innovative treatment strategy for insulin resistance.

POSTER #2

Does Vegetable, Fruit, and Snack Consumption Affect College Students' BMI?
Savannah Hunnicutt, Mackenzie Cueto, Wasiuddin Najam, Temitope Ibiyemi & Wilna Oldewage-Theron Ph.D. (RD)SA
Department of Nutritional Sciences, College of Human Sciences, Tech University, Lubbock

College life is accompanied by dietary, weight, and lifestyle changes. Healthy dietary habits, such as increasing fruit and vegetable (F&V) intake, can be learned from a young age and later become a habit in adulthood. To date, there are conflicting reports on dietary, weight, and body mass index (BMI) changes among college first- and second-year students. Hence, this study aims to assess six-month changes in BMI and body weight among a cohort of college freshmen and sophomore students by analyzing their fruit, vegetable, and snack intake. This prospective cohort study was designed among freshmen and sophomores. The frequency of dietary intake was assessed using validated questions from the Youth Risk Behavioral Surveillance System questionnaire (YRBSS). Body weight and BMI were measured from calibrated weight scales and height was measured using a stadiometer. Preliminary analyses were done to assess the association between the frequency of dietary intake and BMI category. Statistical data analysis was performed using Fisher's exact test on the IBM SPSS, version 29, software program. From the data collected, there was no statistically significant difference in the demographic profile of participants based on BMI. Our results showed a prevalence of 37.6% over-nutrition (overweight/obese). Preliminary findings indicate fruit ($p=0.524$), vegetable ($p=0.602$), and snack ($p=0.981$) consumption was not associated with the BMI of participants. More than half (52.1 %) of participants consumed

snacks daily, compared to 22.6% that consumed vegetables and 17.2% who consumed fruits daily. These findings demonstrate that the BMI of freshmen and sophomores is not associated with fruit, vegetable, and snack consumption. Most participants are in the underweight/healthy BMI range; however, they consumed less than the daily recommended intake of F&V. Fruits and vegetables are a very important part of our diet and should be consumed daily no matter if your BMI is in the underweight/healthy range or overweight/obese range.

POSTER #3 – 1st Prize Winner for Undergraduate Student Poster

Chemogenetic Modulation of Glia Cells in the Amygdala in Preclinical Pain Conditions

Julia John, Volker Neugebauer, Nico Antenucci,
Department of Psychological Sciences, Texas Tech University, Lubbock

Pain is an unpleasant sensory and emotional experience associated with real or potential tissue damage and involves ascending and descending neural pathways. The amygdala, an almond-shaped brain area in the medial temporal lobe, plays an important role in the emotional–affective dimension of pain and, through interactions with cortical areas, also contributes to cognitive aspects such as pain-related decision-making deficits. Chronic pain is partly maintained by neuroplastic changes that result in heightened neuronal activity in the central pain pathways after painful insults. An increasing body of evidence suggests that neuroplasticity also involves neuro-inflammation in the periphery and central nervous system. A characteristic of neuro-inflammation is the activation of glial cells, such as microglia and astrocytes, in the periphery and spinal cord, resulting in the release of pro-inflammatory cytokines. It is thus possible to hypothesize that abnormal expression of inflammatory mediators results in the modulation of synaptic plasticity and in the subsequent destabilization of neuronal networks. However, the mechanisms underlying these phenomena remain to be elucidated and little is known about neuroimmune signaling in pain-related neuroplasticity in the brain. In the present project we are studying the role of microglia in neuroplasticity in the amygdala, using chemogenetic modulation, which involves genetic tools, such as designer receptors exclusively activated by designer drugs (DREADDs). Activation of DREADDs with an otherwise inert pharmacological compound can activate or inhibit targeted cells including microglia. In the present study, immunohistochemical validation of DREADDs expression in amygdalar microglia by fluorescent protein labeling was first assessed. Subsequently, we measured the effects of DREADD activation on various pain-related behaviors. The results of this study can unravel the role of neuroinflammation in chronic pain and its emotional aspects. The discovery of new mechanisms of chronic pain can lead to the development of new therapies.

POSTER #4

Shining a Light on Insulin Resistance and Obesity: Assessing the Effects of Photobiomodulation on Tissue-specific Insulin Resistance and Glucose Uptake

Fiona Supan and Robert M. Badeau
Texas Tech University, Lubbock

Objective: Insulin resistance and decreased cellular glucose uptake drives type 2 diabetes pathologies. Although there are several treatment modalities including oral and injectable treatments to manage insulin resistance and more invasive treatments such as bariatric surgery to reverse this resistance, the prevalence of type 2 diabetes in the USA has not declined over the past decade. This prevalence has increased, and this suggests that alternative treatments are needed. All treatments require significant lifestyle changes that aim to reduce stress, increase mobility, and an awareness of daily consumption of energy and energy balance. Photobiomodulation (PBM) offers an attractive solution to augment existing treatment strategies. PBM can penetrate through tissues, and it ameliorates inflammation that drives diseases such as Alzheimer's disease. It can improve stroke outcomes. Several studies show that PBM reduces adipose cell density and improves glycemic metrics. Here, we aim to assess how PBM affects cell-specific glucose uptake in insulin-resistant cell lines and to subsequently measuring transcriptional and cell-signaling targets.

Methods: We are using differentiated C2C12 myoblast cells that are insulin-resistant and treated with insulin and 6-NBDG, a fluorescent glucose analog. These are treated with 650-nm and 850-nm wavelengths for 6

seconds. A control group has cells not treated with these wavelengths. 6-NBDG fluorescence is measured extracellularly and intracellularly to determine differences in insulin sensitivity upon treatment.

Results: These data will show that PBM affects glucose uptake rates compared to controls. Significance/Conclusion: PBM may offer an additional therapeutic intervention for the treatment of insulin resistance.

GRADUATE STUDENTS

POSTER #5

Communication on Social Media and Its Potential Impact on Obesity-Related Metabolic and Chronic Disease (OMCD): A Literature Review

Sumeyya Akdilek
Texas Tech University, Lubbock

Objective: The objective of this literature review is to explore the potential impact of communication on social media on the development of OMCD. Specifically, this study aims to synthesize and critically evaluate the existing literature on how communication behaviors such as cyberbullying, peer pressure, positive reinforcement, and influence on food choices may impact an individual's risk of developing OMCD.

Methods: A systematic review of the literature was conducted using PubMed, Web of Science, and Google Scholar databases. Search terms included "social media," "communication," "obesity," "metabolic disease," and "chronic disease." Studies published between 2010 and 2022 were included in the review.

Results: The literature review found that communication on social media may have a significant impact on an individual's risk of developing OMCD. Negative communication behaviors such as cyberbullying and peer pressure were associated with increased risk of metabolic syndrome.

Significance: Study highlights the need for greater awareness and intervention in promoting healthy communication behaviors on social media. The findings have important implications for public health, emphasizing the need for further research to better understand the potential risks and benefits associated with communication on social media.

Conclusion: The available literature suggests that communication on social media may have a significant impact on an individual's risk of developing OMCD. This literature review provides important insights into the potential impact of communication behaviors on social media, emphasizing the need for interventions to promote healthy communication and dietary behaviors on social media.

POSTER #6

GIS-Aided Behavior Mapping to Measure Preschool-Aged Children's Gardening-based Physical Activity

Andalib, S Y., Trina, N., Haque, U., Monsur, M. (Corresponding)
Department of Landscape Architecture, Texas Tech University, Lubbock

Many children (0-5 years old) in the US spend most of their waking hours in licensed childcare centers and impactful intervention in childcare outdoor environments can play a major role in promoting children's health and wellbeing. Studies show that hands-on fruit and vegetable gardening has the dual potential of dietary improvement and increased physical activity, but there is a research gap for reliable tools to measure gardening-based physical activities for preschoolers (3-5 years old). Although researchers often rely on accelerometers to gather such data, it is challenging to do so because accelerometers are suitable to measure moderate-to-

vigorous physical activity (MVPA), whereas gardening activities require delicate movements such as lifting, carrying, watering, digging etc.

The study proposes a new approach that combines Behavior Mapping (BM) and Physical Activity Research and Assessment tool for Garden Observation (PARAGON) using ArcGIS Online tools. This approach was used to investigate how hands-on gardening in childcare centers can improve preschool-aged children's physical activity. Data was collected from approximately 150 children during Spring and Fall of 2022 within eight childcare centers, and physical activity data from direct and indirect measurements are being compared and analyzed to understand the validity and reliability of the new GIS-based BM approach of recording gardening related activities of children.

As interest grows in the impact of hands-on gardening on children's wellbeing, it is crucial to develop tools that can objectively measure child outcomes related to gardening. This new approach may be helpful for researchers to investigate these impacts in early childhood.

POSTER #7

The Interplay of Diet, Exercise and Anxiety

Mark Bazemore, Garrett Welch, Michaela Jansen PhD. PharmD.
School of Medicine, Texas Tech University Health Sciences Center, Lubbock

The objective was to see if university-associated individuals who obtain moderate exercise every week and are diet conscious display lower levels of self-reported anxiety. This project used the TTUHSC School of Medicine P3-1 Rec Center Survey, an online survey instrument shared with participants at the Rec Center's TEXFIT conference on March 4 and available for completion by other Rec Center participants on March 4-6. This project was approved for exempt review by the TTUHSC Institutional Review Board. Between the light exercise group and moderate exercise group, there were no significant findings between the number of times spent eating out in a week or confidence in home cooking. There was a near-significant difference between anxiety between groups. Various stressors that people experienced were split with moderate exercisers demonstrating higher, near-significant differences in disordered eating, anxiety about social interactions, and overall emotional stress. There was no difference between exercise groups in dietary consciousness a person has in a week but there may be a weak difference in the amount of anxiety experienced. This was a surprising result, but it may indicate that those who already work out are driven to work out more when experiencing higher anxiety. There is also potentially suggestive evidence to show that there may be a difference in the type of stressors experienced between exercise groups. Disordered eating, social anxiety, and emotional stress may provide good targets for stress-relief intervention. However, if any causal relationship exists, it cannot be determined from this study.

POSTER #8

Assessing the Impact of the Betty Ford Center Immersion Experience on Medical Students' Comfort Caring for Patients with Substance Use & Eating Disorders

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Addiction is a condition of the brain, and can manifest in many different ways, including substance use disorders such as eating disorders. As we delve into the symptoms of addiction, we observe a clear connection between eating disorders and obesity, which must be attended to by medical professionals (da Luz, et al., 2018). It is imperative that medical students be able to provide empathetic care for patients with eating disorders. As a result, medical students are selected to be a part of the Betty Ford Center immersion experience, in which they travel to the residential treatment center for persons with substance use disorders located in California. These students interact with patients directly, gain a general understanding of the disease, witness patients along the Twelve-Steps to recovery, and learn more about what patients experience during a course of treatment. We aim to understand the impact of the Betty Ford Center experience on how students treat addiction. We utilized the TTUHSC School of Medicine P3-1 Honors Project Omnibus Survey, an online survey instrument sent to all

TTUHSC School of Medicine medical students and other medical professionals of TTUHSC. Our preliminary findings from this survey demonstrated that students involved in the Betty Ford Center immersion experience felt more competent in their ability to manage patients with substance use disorders, including obesity, and instructing these patients through the Twelve-Steps. With these findings, we believe it is important to promote an emphasis on substance use and the utility of the Twelve-Steps in medical curriculum.

POSTER #9

Brain Metabolic Syndrome (Bmets) In Vitro Model

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Obesity and diabetes add risk factors for AD/ADRD (Alzheimer's disease and Alzheimer's disease-related dementias).

Objective: How the neural metabolic dysfunction affects cellular metabolism and resilience?

Methods: The 3 distinct brain areas connected to Bmets are the hippocampus, hypothalamus, and raphe brain. We used three embryonic rodent cell lines rat raphe RN46A, mHypo, and HT22 were subjected to high glucose, high fat, and a combination of high glucose/high-fat environments. The cells were then treated with Escitalopram to observe the beneficial effect of Selective serotonin reuptake inhibitor (SSRI) on the in vitro neurons. RN46A, mHypo, and HT22 were grown and treated with 5% glucose /5% Palmitic acid and further treated with SSRI for 24 hrs. Harvested cells will be investigated for cell toxicity, mRNA expression of nutrient sensing, neurotransmitters immune response, and mitochondrial dysfunction. Cells also be investigated for protein expression using western blot, and dot blot ELISA. The endpoint of cell respiration and metabolism will be assessed by SeaHorse.

Significance: We would like to understand if the diet induces metabolic dysfunction and also affect the brain by inducing a leaky gut. Results: In AD/ADRD we see the metabolic rate goes down and result in cell death. High-fat and high-sugar diets also impair metabolic function. So, when we treat cells with escitalopram, improves metabolic dysfunction and cellular resilience.

Conclusions: Escitalopram is an antidepressant drug; the recently discovered mechanism of serotonin increase in neurons elevates gene expression related to mitochondrial biogenesis. The increase in mitochondrial dynamics also increases cellular metabolism.

POSTER #10

Role of Green Tea Extract, Epigallocatechin Gallate in Hyperglycemic Sensory Neurons

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Diabetic peripheral neuropathy (DPN) is a debilitating complication of long-term hyperglycemia (HG) in diabetic patients. Hyperglycemia initiates oxidative stress and inflammation, which leads to peripheral nerve damage. Available treatments only treat pain but do not rescue the nerve damage and comes with adverse side effects. There is a crucial need to identify safer therapeutic approach to prevent and cure DPN. In this study, we examined the neuroprotective effects of green tea extract Epigallocatechin Gallate (EGCG) in sensory neuronal cells under diabetic or hyperglycemic conditions in vivo and in vitro conditions. EGCG is the active ingredient in green tea, belonging to the catechin family, which has anti-inflammatory and antioxidant properties. Our studies focused on various markers of nerve damage and inflammatory markers to understand whether treatment with ECGC could rescue the nerve damage. To evaluate the therapeutic effects of EGCG, F11 dorsal root ganglia (DRG) neuronal cells were exposed to high glucose conditions for 24 hours followed by EGCG treatment for another 24 hours. Hyperglycemia mediated alterations in GAP43, NRF2, CXCR4, NeuroF-H, TRPV1 and HMGB1 expression in F11 sensory neuronal cells were ameliorated following treatment of EGCG. Concurrently

in animal studies, EGCG treatment alleviated mechanical pain behavior in diabetic mice, but did not alleviate thermal pain. Western blot and immunohistochemical analysis of DRG and spinal cord demonstrated that EGCG could alleviate the markers for oxidative stress, inflammation as well as nerve damage in diabetic mice, suggesting that EGCG could be a potential therapeutic drug for diabetic neuropathy in the near future.

POSTER #11

Machine Learning (ML) and Significance Analysis of Microarray (SAM) Based Methods for Predicting Obesity of Hypothalamic Pituitary Adrenal (HPA) Axis.

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Finding pharmacological targets for the treatment and prevention of obesity has gained more attention as a result of the significant burden that obesity places on patients and the healthcare system. This involves understanding the biological mechanisms that contribute to obesity and developing drugs or other interventions that target these mechanisms. In this paper, we intended to identify dominant predisposing predictors to model the Hypothalamic Pituitary Adrenal (HPA) axis function for obesity. These will be used to develop a robust predictive model to predict the risk for obesity based on an individual's gene profile. In this regard, we incorporate two main techniques: Significance Analysis of Microarray (SAM) and Machine Learning (ML) based approaches. We employ recursive feature elimination cross-validation - support vector machine method for the feature engineering process. Additionally, these features were used to build six ML approaches namely logistic regression, k-NN, naive bayes, random forest, gradient boosting and multilayer perceptron neural network classifier. The Multilayer Perceptron Neural Network (MLP) Classifier yielded the highest accuracy (83.13%) together with the following highest evaluation metrics; AUC-ROC (75%), recall (90%), precision (85%), and the fastest model's execution time at 1.87 seconds. SAM and MLP analyses had identified 13 genes which were associated with obesity-related traits, and hence may be of highly potential biomarkers and could therefore become targets for the treatment or prevention of obesity

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POSTER #13

Dog Ownership, Physical Activity, Depression and Anxiety Symptoms in Youth

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Introduction: Research has indicated that pet dogs may be beneficial for youth across several domains. A scoping review found a positive association between dog ownership and physical activity among youth (Chase et al., 2022). Another review reported that prior studies have found beneficial effects of pet ownership on depression and anxiety (Beetz et al., 2012).

Objective: This study aims to investigate the impact that pet dogs have on youth, with a focus on physical activity and internalizing symptoms.

Methods: Participants included 209 youths aged 8-12 recruited from a community in West Texas. Youth completed symptom inventories and wore an accelerometer to estimate percent of time spent in moderate to vigorous physical activity (MVPA) for two weeks. Bivariate correlation analysis was performed to assess for potential covariates to be included within the final multivariate analysis of covariance (MANCOVA).

Results: MVPA ($F = .594$, $p = .442$), anxious symptoms ($F = .107$, $p = .744$), and depressive symptoms ($F = .180$, $p = .672$) did not significantly differ between dog- and non-dog owners, while holding significant demographic variables constant. Significance and

Conclusion: Although these data are cross-sectional, they indicate that the effects of dog ownership may be impacted by variables outside the scope of this research. Conclusion: Future research should investigate how

factors such as medical conditions (e.g., diabetes or asthma) or locale (i.e., urban or rural) may have an outsized impact on the variables of interest compared to dog ownership alone.

POSTER #14

Childhood Obesity and Its Effects on Civic Participation in Early Adulthood

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The prevalence of childhood obesity has increased rapidly in many parts of the world and is now considered a severe public health issue in many settings because of the resulting increase in cardiovascular risk, diabetes and mortality in adulthood. Childhood obesity also has adverse social and psychological ramifications, including teasing, bullying, discrimination, body shaming, isolation. These social consequences of childhood obesity may result in individuals being social excluded or having problems with social integration. As a result, childhood obesity may affect civic participation such as volunteering, neighboring, group, and religious involvement, voting behavior and political participation. By focusing on both the predictors of childhood obesity and civic participation which lead to the social exclusion, this paper will explore whether the overweight problem in childhood affects civic participation in early adulthood. To answer this question, the study uses data from waves 1-4 of the National Longitudinal Study of Adolescent to Adult Health (Add Health). The initial findings show that there is no significant association between childhood obesity and civic participation. This paper concludes with a consideration of increasing civic involvement by minimizing childhood obesity related threats that result in social exclusion.

POSTER #15

Triacylglycerol Nanofluidity by Benchtop Magnetic Resonance: Implications for Non-Invasive Monitoring of Adipose Tissue

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Introduction: Insulin sensitivity is influenced by the ratio of unsaturated-to-saturated fats in the diet, as reflected in adipose tissue. In turn, this ratio impacts the fluidity of triglyceride oil droplets, which can be monitored non-invasively using magnetic resonance. Therefore, we analyzed pure oil-phase triacylglycerols (TAGs) and TAG mixtures mimicking the fatty acid composition of human adipose tissue.

Hypothesis: Spin-spin relaxation time constants (T2) from magnetic resonance increase with fluidity and the number of cis-double bonds.

Methods: 1H T2 CPMG relaxation decay curves for oil-phase TAG samples were recorded at 37°C and ambient air using a 0.47T Bruker mq20 benchtop magnetic resonance relaxometer operating at 20 MHz for 1H. Decay curves were deconvoluted into T2 profiles using a discrete inverse Laplace transform (XPFit). Macroscopic sample fluidity (1/viscosity) was measured at 37°C using a ViscoLab 5000 viscometer.

Results: Each T2 profile contained 3 peaks assigned to distinct mobility domains within the TAG molecule. For each peak, the T2 values (msec) increased linearly with macroscopic fluidity ($R2=0.95$, $p<0.0001$, Peak 1) and cis-double bond number. For peak 1, T2 ranged from 247.6±1.6 (TAG-18:1cis) to 1101.0±1.2 (TAG-22:6all-cis). Notably, TAG-18:2all-trans had a lower T2 (260.9±3.9) compared to its all-cis counterpart (451.4±7.0), $p<0.001$. Mixtures that mimic human adipose tissue yielded T2 values of 367.5±2.0 (more unsaturated) vs. 301.5±8.8 (more saturated), $p<0.001$.

Conclusion: The nanofluidity of TAG oil droplets can be monitored non-invasively using benchtop magnetic resonance. These findings set the stage for correlating in vivo adipose tissue T2 values with insulin sensitivity.

POSTER #16

Metabolic Effects of Diets Containing Ammoniated Beef on Hepatic Lipid Metabolism and Inflammation in Diet-Induced Obese Male Mice

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Diets rich in high-fat, salty processed foods and low in leafy greens or other alkaline foods, tend to have an acidic pH. Such diets may contribute to obesity and metabolic dysregulation, in part, through metabolic acidosis; however, underlying mechanisms are not fully known. Therefore, we hypothesized that metabolic health will be improved by consuming a diet containing pH enhanced beef (ammonium hydroxide), compared to non-pH enhanced beef. Male B6 mice were fed 4 diets for 12 weeks: Low Fat Beef (LFB), LFB + Ammonium (LFBN), High Fat Beef (HFB), HFB + Ammonium (HFBN). Body weight was measured throughout the study, and liver samples were collected at termination for further analyses. Body weights in the HFB and HFBN groups were significantly increased compared to the LFBN group, but not the LFB group. Expression of the cellular energy sensor Ampk was reduced in HFB, compared to LFB groups ($p<0.05$). mRNA levels for the inflammatory marker Tlr4 were upregulated in the HFB group compared to LFB & LFBN ($p<0.05$). There were no significant differences in mRNA levels among markers related to the urea cycle, insulin signaling, or inflammation across dietary groups. Our results indicate that dietary fat, rather than pH/beef ammoniation is a major regulator of hepatic cellular processes at the gene level. Studies are ongoing to determine changes in above markers at the protein level to uncover posttranscriptional/translational regulations by these diets. This research may help us to understand effects of dietary pH, fat content, and proteins in diet-induced obesity and NAFLD.

POSTER #17

Effects of Fish Oil (FO) on Brown Adipose Tissue Metabolism in an Obese Amyloidogenic Female Mouse Model of Alzheimer's Disease

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Alzheimer's disease (AD) is an age-related neurodegenerative disease characterized partly by accumulation of amyloid-beta (Aβ) plaques in the brain. AD affects females more than males. Obesity and its associated metabolic dysfunctions such as impaired glucose intolerance, insulin resistance, and inflammation are key risk factors for AD. Moreover, brown adipose tissue (BAT) dysfunction and reduced thermogenesis are key contributors to obesity. We previously reported that fish oil (FO) reduced serum amyloid β (Aβ) and improved metabolic outcomes in transgenic (TG) amyloidogenic AD mice fed high fat (HF) diets, compared to HF devoid of fish oil. Thus, we hypothesized that FO, may improve metabolic dysfunctions in obese AD mice, partly through activation of BAT thermogenic program. Two-month-old female APPswePS1dE9 TG mice and non-TG wild type (WT) littermates were fed low-fat (LF), or a HF diet with or without FO for 32 weeks. Glucose tolerance tests, body composition measurements and expression of BAT thermogenic genes were conducted. Our results showed that in both genotypes, BAT from HF mice expressed significantly higher levels of thermogenic genes including CIDEA, SIRT3, and PPAR-γ compared to LF group. Additionally, FO supplementation increased mRNA levels of Sirt1 compared to HF in TG mice. Furthermore, inflammatory markers IL-1β and TNF-α were significantly increased in TG mice fed HF compared to LF diets, and supplementation with FO reduced IL-1β compared to HF. Our results demonstrate FO improves thermogenesis and inflammatory markers in AD mice, warranting further research on FO as a therapeutic target in AD subjects with obesity.

POSTER #18 – 2nd Prize Winner for GNO Student Poster

High Fat Diet Induced Metabolic Dysfunctions in Obese DNAJB3 Deficient Female Mice

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Background: Stress responsive heat shock proteins (HSPs) have been implicated in metabolic diseases. We are interested in HSP40, subfamily B, member 3 (DNAJB3), a chaperone protein that is expressed at low levels in human subjects with obesity and type 2 diabetes (T2D). Accordingly, we hypothesized that lack of DNAJB3 will increase body weight, inflammation, glucose intolerance and insulin resistance in diet-induced obese female mice, compared to B6 wild type (WT) littermates fed the same diets.

Methods: DNAJB3 knockout (KO) mice were generated using the CRISPR/Cas 9 approach. Female KO and wild type (WT) mice were fed high fat (HF: 45 kcal% fat) or low fat (LF: 10 kcal% fat) diets for 12 weeks, then tissues including adipose were harvested for analyses of gene expression. Results: Compared to WT, KO mice fed HF diets had a higher body weight and fat mass ($p < 0.0001$) and a slower glucose clearance rate ($p<0.0155$) confirmed. Additionally, mRNA levels for the lipid oxidation markers such as Pparα and Fasn were higher in adipose tissue of LF compared to HF fed groups ($p<0.0013$, $p<0.0001$). Similar results were obtained when comparing the LF KO vs. HF KO ($p=0.0013$). Moreover, glucose transporter Glut4 gene expression was higher in WT compared to KO ($p< 0.02$).

Conclusion: High fat feeding and lack of DNAJB3 in mice increases adiposity and alters glucose homeostasis and fatty acid oxidation. Hence, DNAJB3 may play an important role in energy balance, warranting further research on using this protein as a potential therapeutic target for obesity and T2D.

POSTER #19

miRNA221-Rad18 Regulatory Circuit in Adipose Tissue Could be Targeted for Prevention and Treatment to Improve the Outcomes in Ovarian Cancer.

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Approximately 1.2 billion individuals are overweight globally, and of those, at least 300 million are obese, making obesity an enormous issue in our society. Adipose tissue regulates endocrine and metabolic function in an intricate manner, which may lead to obesity-related disorders. Numerous epidemiological studies have demonstrated a connection between obesity and different varieties of cancers, including those connected to the endocrine system, such as ovarian cancers. Obesity leads to higher incidence and poor prognosis in ovarian cancer. Ovarian cancer (OC) is the deadliest gynecological malignancy, develops asymptomatically, and is typically detected at an advanced stage (stage III–IV) with local or distant metastases. Several genetic and epigenetic factors have been linked to the reprogramming of tumor cells by controlling the pattern of transcriptional and post-transcriptional gene expression. Particularly, the miRNA-mediated regulatory circuit plays a significant role in tumor progression and therapeutic responses. Numerous studies demonstrated that the control of these intricate processes depends heavily on microRNAs (miRNAs, miRs), post-transcriptional modifiers of mRNA stability, and protein translation. miRNAs are dysregulated in obese adipose tissue specifically expression of miRNA221 is less during the adipogenic program suggesting that they act as negative regulators of differentiation in fat cell development. Also, a DNA damage marker Rad18 is overexpressed in ovarian cancer cells as well as in adipose tissue. Rad18 plays a critical role in cellular DNA damage tolerance and repair activity against chemotherapeutics, including platinum drugs. Based on this information, we have hypothesized that miR221 has inverse relation with RAD18 mediated DNA damage tolerance and repair signaling in adipose tissue and could be targeted for intervention to prevent and to treat ovarian cancer and improve outcomes. Collectively, our study identifies a novel epigenetic modulator in OC and offers novel miRNA 221-Rad18 mediated therapeutic intervention for the prevention of OC in obese patients.

POSTER #20 – 3rd Prize Winner for Graduate Student Poster

Maternal Supplementation of Prebiotic Fiber Improves Energy Balance and Protects Offspring Against Diet-induced Obesity

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Background: Maternal obesity increases the risk of metabolic diseases in offspring likely through unhealthy gut microbiota. We hypothesized that reversing maternal gut dysbiosis by feeding prebiotic fiber will improve energy balance, glucose tolerance, and protect offspring against diet-induced obesity.

Methods: Pregnant Sprague Dawley rats were randomized (n=6-7/group) to either Low Fat Diet (LFD), High Fat Diet (HFD) or Prebiotic Fiber Diet (PFD, FiberSym®). Litters were grouped (n=5-27/sex/group) to LFD internal, HFD internal, PFD internal, LFD-HFD foster (HFD pups fostered to LFD mother), HFD-LFD foster, HFD-PFD foster and PFD-HFD foster. Pups from internal groups were nursed by their mothers, whereas, foster groups were nursed by surrogate mothers. Measurements included daily food intake, weekly body weight and composition, and meal or glucose tolerance test.

Results: Dams: Compared to HFD, LFD and PFD dams had 7-10% lower weight and adiposity, and PFD decreased postprandial blood glucose compared to LFD. Offspring: In both sexes, compared to HFD internal, LFD and PFD internal animals had 8-9% lower weight and adipose mass from week 7 to 14 of age. LFD-HFD foster males had 21-35% reduced weight and adipose mass than HFD-LFD fosters from week 9 to 13 of age. Compared to HFD internal females, LFD and PFD females had 11% lower blood glucose.

Conclusion: Maternal consumption of an obesogenic diet increased obesity and glucose intolerance in offspring that could be reversed by a low-fat lactational diet. Importantly, maternal prebiotic fiber supplementation protected offspring against diet-induced obesity.

POSTER #21

10-shogaol Activates Beige Adipocyte-autonomous Thermogenesis

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Obesity-related health consequences, such as type 2 diabetes, stroke, and cancer, are the second leading cause of preventable death in the United States. However, current anti-obesity medications, targeting the brain to decrease appetite, have shown insufficient efficacy and safety concerns. Emerging evidence indicates that thermogenic beige adipocytes, dissipating excess energy as heat in subcutaneous white adipose tissues, enhance insulin sensitivity and glucose metabolism and, therefore, provide new avenues for combating obesity and related chronic diseases. Ginger is known as an anti-obesity spice. However, the underlying mechanisms using proper preclinical models are poorly understood, and there is a lack of understanding of the responsible bioactive components. Here, we identified that a phenol compound from ginger, 10-shogaol, promoted beige fat activation and investigated the thermogenic mechanism by testing the cell-autonomous response of beige adipocytes to 10-shogaol. Gene expression analysis revealed a significant induction of key thermogenic markers, such as Uncoupled Protein 1 and Iodothyronine Deiodinase 2, in murine C3H10T1/2 and primary beige fat cell cultures after 10-shogaol treatment. The 10-shogaol-induced thermogenesis was conserved in human subcutaneous fat cells across ethnicities, ages, and body mass index. Mechanistically, 10-shogaol potentiated cellular cAMP/PKA signaling that composes the feedforward cycle with local thyroid hormone to amplify thermogenesis. Our study provides the first evidence for the thermogenic effect and mechanism of 10-shogaol in beige adipocytes. Given the popularity of ginger in utilization for foods and supplements, these results may

provide insights into the application of ginger and its bioactive components to treat obesity and related chronic disorders.

POSTER #22

Genotype and Sex Differences in Inflammation and Gut Microbiota Composition in Diet-induced Obese mice

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Obesity is a chronic disease that increases risk of other metabolic diseases. Alterations, and remodeling of adipose tissue impacts body metabolism in obesity through chronic low-grade inflammation. Additionally, gut microbiota plays an important role in metabolic diseases, which are characterized by gut dysbiosis, impaired intestinal barrier integrity, and increased systemic bacterial lipopolysaccharide, a major inflammatory mediator. We hypothesized that consumption of high fat (HF) diet negatively impacts gut microbiota composition and induces inflammation in both diet-induced B6 and polygenic (TALLYHO/Jng; TH) mice, compared to low fat (LF) diet-fed mice. To test this hypothesis, we fed 4-weeks-old, B6 and TH mice LF or HF diets for 10 weeks, measured body weights during the study and collected blood and cecal samples at termination. Plasma was used to analyze IL-6 protein level and cecal DNA was isolated for 16SrRNA sequencing of gut microbiota. Both B6 and TH mice were significantly heavier on HF, compared to LF diet. In both males and females, plasma IL-6 was significantly increased in HF-fed TH mice, but not in B6, compared to LF groups. Gut microbiota analyses indicated that alpha diversity tended to be higher in LF, compared to HF ($p=0.11$), but was significantly higher in females compared to males in both B6 and TH ($p<0.05$). Moreover, TH mice had higher alpha diversity, compared to B6 mice ($p<0.01$). In summary, HF diet induced inflammation more in TH genetically obese male mice than B6, possibly by altering gut microbiota composition.

POSTER #23 – 1st Prize Winner for GNO Student Poster

Acceptance, Eating and Purchase Intentions of Sorghum-based Menus Among U.S. College Students

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Sorghum is a gluten-free whole grain, rich in antioxidants and nutrients for humans; with chronic disease reduction potential and hunger alleviation. United States, a world leading sorghum producer; has used sorghum for biofuel and animal feed with limited sorghum human consumption research. Therefore, this study investigated acceptance, eating/purchase intentions of sorghum-based menus among college students. After the university's Hospitality Services developed 24 sorghum-based menus, nine food experts selected 8 menus based on sensory attributes, campus dining replicability, and price. Through TechAnnounce, students (n=83) without food restrictions were recruited. Four sensory evaluations were conducted, with 2 sets osf 4 samples and 15-minute break. Appearance, aroma, texture/mouthfeel, flavor, taste, sweetness, and overall acceptance were evaluated using a 9-point hedonic scale (1=dislike extremely to 9=like extremely). Eating and purchase intentions were obtained using a 5-point scale (1=definitely wouldn't eat to 5=definitely would eat). Descriptive statistics and independent t-tests ($p<.05$) were used for data analysis. Participants were White (32.1%), Hispanic (27.2%), Asian (25.9%), and others (14.8%). Mean age was 20, with 57.3% females. Participants daily servings of grains (Total grains: M±SD=4.52±2.59; Whole grains: M±SD=0.69±1.02, respectively) fell below daily recommendations. Beef-Sorghum had the highest overall acceptance, followed by Sorghum Cookie, Chicken-Sorghum, and Sorghum-Shrimp Grits. Strong associations were found between eating/purchase intentions for the preferred menus (Beef-sorghum; $\rho=0.84$, $p<.01$, Cookie: $\rho=0.72$, $p<.01$; Chicken-Sorghum: $\rho=0.72$, $p<.01$; Grits: $\rho=0.89$, $p<.01$, respectively). Sorghum-based menus were accepted, indicating like moderately to like

extremely. Outcomes will help to develop sorghum-based food and educational programs to promote sorghum consumption and its health benefits.

POSTER #24

Transcriptional and Functional Analyses of Intramuscular, Subcutaneous, and Visceral Adipose Tissue in Overconditioned Beef Cattle

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Intramuscular adipose tissue (IMAT; marbling) deposition is highly desired in beef cattle, but it is often secondary to excessive visceral (VIAT) and subcutaneous (SCAT) adipose tissue (AT) accumulation. We assessed depot-specific characteristics and transcriptome in IMAT, SCAT, and VIAT in overconditioned beef cattle. IMAT and SCAT from the longissimus muscle (9-11th ribs), and VIAT from the greater omentum were collected from four beef animals at harvest. AT samples were RNA-sequenced and assessed for viscoelasticity (rheometer), collagen fibrillogenesis, and adipocyte size. Transcriptome analysis revealed over 4000 DEG between IMAT and SCAT, 3000 DEG between VIAT and IMAT, and 1018 DEG between VIAT and SCAT. Top upregulated genes in SCAT vs. IMAT were associated with increased adipogenesis/lipogenesis (LIPE, LEP, ADIPOQ, PPARG) and extracellular matrix (ECM) remodeling (collagens, MMP14, and TIMP4). PPARG pathway and fatty acid metabolism was activated in SCAT vs. IMAT. Pathways for thermogenesis and oxidative phosphorylation were activated in IMAT vs. SCAT and VIAT. Top VIAT DEG were pro-inflammatory markers (CDHR1, TENM2, and TNFRSF9) suggesting a detrimental role for visceral adiposity. Adipocyte size was increased in SCAT vs. IMAT and VIAT, implying higher lipid accumulation. SCAT had increased collagen fibrillogenesis and was stiffer than IMAT, suggesting a key role for ECM in mechanisms of AT adipogenesis and lipogenesis. Overall, AT location impacts transcriptome, which may translate into functional differences in adipogenesis and ECM remodeling. These data can help on identifying target genes to modulate AT deposition in distinct areas of the body, therefore, improving beef health and meat quality.

POSTER #25 – 1st Prize Winner for Graduate Student Poster

Using Real Fruit and Vegetables (FV) and Supplemental Photos to Understand the Impact of Garden Intervention on Preschool Children's FV Eating Preferences

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Licensed childcare centers in the USA serving more than 13 million 0-5 years old children are an important space for preventing-obesity interventions. Edible gardens in childcare center can improve both physical activity and healthy eating behaviors of children. Children are inspired to eat fresh fruit and vegetables (FV) when they engage in hands-on gardening. Using real FV and supplemental photos, this research examined the impact of gardening on (1) FV knowledge; (2) FV liking; and (3) FV eating preferences among the participating children (3 to 5 years old, N = 239) enrolled in eight different childcare centers of Lubbock, Texas. The childcare facilities were randomly assigned to either an intervention (gardening) group or a no-intervention (no gardening) group. Data were gathered for pre and post intervention. FV knowledge was assessed by showing 12 real FV and asking if the children knew (Yes/No) each of the 12 FV. The children then were asked to name the F/V verbally, and their responses were recorded. A digital version of the picture-based survey created by Carraway-Stage et al. (2014) was used to measure FV liking. The garden intervention of childcare centers had a considerable impact on children's knowledge to identify, and accurate naming both fruits and vegetables. The FV eating preference of children was not significantly affected by the intervention. According to this research, children's learning, particularly their knowledge of FV can be improved by gardening.

POSTER #26 – 2nd Prize Winner for GNO Student Poster

Social Cognitive Theory-based Nutrition Intervention to Improve Healthy Eating and Active Lifestyle among Rural Texas High School Students: A Pilot Study

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Healthy Eating and Active Lifestyle among rural Texas High school students (HEALTH) program was guided by Social Cognitive Theory (SCT). Objectives were to examine the effects of HEALTH intervention on students' knowledge, skills, confidence, dietary intakes, physical activity (PA), stress, and support; and to explore their perspectives, motivations, and barriers to healthy behavior (HB) changes. One out of several recruited schools agreed to participate in the 8-weekly program (pre-post waitlist-control design). Eighteen students (11-control and 7-intervention) consented to participate. Qualtrics surveys were administered to measure personal (cooking skills, nutrition knowledge, self-confidence, perceived stress, and sleep habit), environmental (home food environment and social support), and behavioral (dietary intake and PA) factors using validated questionnaires. Descriptive statistics were used at $p<.05$. Focus group (FG) questions were developed based on SCT. Three FG for intervention group (IG) were held post-intervention. FG were audio recorded, transcribed verbatim, and analyzed using inductive thematic analysis. In IG, food-safety knowledge ($p<.05$) and social support for healthy eating--friends ($p<.05$) improved significantly. Between groups, the IG decreased significantly in diet-soft drink consumption ($p<.05$), and the control group increased significantly in self-confidence in healthy eating ($p<.05$). Five themes were identified from the FG: confidence in knowledge utilization, current routine (dis)satisfaction, responsibilities stress, influence without power, supportive social environment but weak physical environment. Positive HB trends were observed in the IG, but not significant. It is reflective of the FG where they expressed high interest to perform HB but have environmental challenges and do not have power over food choices.

POSTER #27 – 2nd Prize Winner for Graduate Student Poster

Digital Pathology Goes Deep: Accelerating Tumor-Infiltrating Lymphocyte Scoring with AI and Deep Learning

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Tumor-infiltrating lymphocytes (TILs) are known for their biomarker's roles in the prognosis and diagnosis measures of breast cancer. Pathologists and researchers count the number of TIL cells in cancer slides and assign each slide a TILs number or percentage which is used in immunohistology methods. However, this process can be time-consuming and dependent on the individual's expertise. In this presentation, we discuss using artificial intelligence and deep learning methods to score TILs automatically and at a faster pace. The dataset included more than 60 whole cancer slides from the department of surgery and the Breast Center of Excellence at TTUHSC and the cancer slides were digitally scanned with high-resolution quality. The scanned slides were then divided into smaller pieces using the patching method to detect the stroma area of the cancer slides. The stroma area was detected with 98% accuracy by implementing the U-Net model which is a deep-learning method. In the next step, more than 12,000 TIL cells were annotated in the cancer slides. The annotated cells were then used to train a Mask R-CNN model to detect the TILs in cancer slides. Finally, the TILs score was assigned to each cancer slide by dividing the area of the TILs over the stroma area calculated by the U-Net. After training the deep learning models, the two models were combined to create a graphical user interface (GUI) that can be easily used by pathologists and researchers who intend to analyze the TILs in cancer slides.

POSTER #28

Staging of Estrous Cycle in Spontaneously Hypertensive Stroke Prone (SHRSP) Rats

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The Chelikani Lab possesses spontaneous hypertensive stroke prone (SHRSP) rats, which are a natural model for ischemic stroke, hypertension and attention deficit hyperactive disorder (ADHD) because an external intervention is not necessary to induce these ailments. There were plans to breed these rats in Summer 2022; however, attempts were unsuccessful. Our group decided to observe the estrous cycling of the female rats to determine if they were properly cycling. The following data collection was performed with six 11-month-old SHRSP female rats. Blood pressure (BP) readings were taken weekly along with weight. Blood was collected weekly via tail-snip and plasma was processed to analyze estradiol concentration. Vaginal lavages were performed daily for 28 days to determine estrous stage. BP readings indicated all 6 subjects were hypertensive. Weight change was not statistically significant. Estrous staging demonstrated five rats consistently cycled between proestrus and estrus, rarely cycling to metestrus and diestrus. One rat displayed cycling through proestrus, estrus, metestrus and diestrus for 20 days after an 8-day period of cycling between only proestrus and estrus. Plasma samples have yet to be processed. Current data demonstrates there is improper estrous cycling in this population. However, with ovulation occurring during estrus stage and most of the rats cycling only between proestrus and estrus, it is plausible that the improper cycling is not a factor in failed breeding attempts. Future work aims to compare estrous cycling and blood plasma estradiol levels with control group.

POSTER #29

Determining the Prevalence of Diabetic Retinopathy in West Texas

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This retrospective study aims to assess the prevalence of diabetic retinopathy in West Texas and compare it with urban areas to determine the potential risk factors that may contribute to the development of the disease. Obesity raises the risk of developing type 2 diabetes and many studies show a higher burden of diabetes (especially Type 2 diabetes) in rural areas, thus we suspect a high burden of diabetic retinopathy in West Texas. The study will use patient records from a public university hospital, including patients aged 45 to 89 with diabetes, seen from January 1st, 2018 to January 1st, 2023, with pregnant or breastfeeding females being excluded. Descriptive statistics of the sample including standard deviation for normally distributed continuous variables or interquartile range for skewed continuous variables will be used. Percentages will be used for categorical variables. We will employ regression analyses with an $\alpha = 0.05$ for hypothesis testing to determine whether the West Texas population has a greater incidence of diabetic retinopathy compared to urban areas. Our study aims to increase knowledge about public health issues affecting West Texas populations and raise awareness of diabetic retinopathy. We predict that increased incidence rates in West Texas may be due to a lack of awareness of diabetic complications and decreased access to primary care physicians among this population. Our goal is to utilize the results of this study to improve education and awareness of diabetic retinopathy in West Texas.

POSTDOCTORAL FELLOWS

POSTER #30

Malonyl CoA Decarboxylase Regulation Alleviates Hyperglycemia Associated with Obesity

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Objective: Hyperglycemia, insulin resistance, and hyperlipidemia are common complications associated with obesity. Malonyl CoA is highly regulated in fatty acid synthesis, metabolized by fatty acid synthase (FAS), and incorporated into long-chain fatty acids. Additionally, malonyl CoA decarboxylase (MCD) catalyzes the decarboxylation of malonyl CoA to produce acetyl CoA, which stimulates the mitochondrial uptake of free fatty acids for β-oxidation. This relieves the malonyl-CoA-mediated inhibition of carnitine palmitoyl transferase (CPT1), the rate-limiting enzyme in fatty acid oxidation. Additionally, Malonyl CoA has a role in the regulation of food intake through its actions in the central nervous system and signaling satiety. Several studies showed that inhibition of MCD can inhibit fatty acid oxidation through malonyl CoA inhibitory effect for CPT 1. This will shift energy metabolism in addition to the reduction of food intake so could be an approach for treating obesity and associated complications. However, up till now, there are no FDA-approved MCD inhibitors.

Methods: We applied a structure-based drug repurposing approach to identify FDA-approved drug(s) and molecular probes to target MCD. This was coupled with in vitro molecular target validation for the identified molecules. Results: We identified 4 FDA-approved drugs that inhibit MCD with IC50 range between 1.5-15 μM. These lead FDA-approved drugs will be tested in vivo for diet-induced obesity mouse models to decrease fatty acid oxidation, increase glucose oxidation, and improve insulin sensitivity.

Significance and Conclusion: Our study will offer first-in-class MCD inhibitors to alleviate obesity and associated complications.

POSTER #31

miRNA-214-5P, a Dysregulated miRNA in Obesity, Regulates RAD51, a Biomarker for Aggressive Disease and Racial Disparities in Triple-negative Breast Cancer

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Breast cancer (BC) is one of the deadliest cancers in women. Among various subtypes, triple-negative breast cancer (TNBC) is the most aggressive and hard to treat subtype of breast cancer because it is highly metastatic and lacks targeted therapies. The death rate from BC is higher among African American (AA) women than among women of other races and ethnicities. Obesity is one of the risk factors for BC, including TNBC. Incidentally, African American women are more prone to become obese than other ethnicities. This could be one of the reasons for the higher incidences of TNBCs and their aggressive growth in young AA women However, the exact molecular mechanism behind this is not well understood. Our recent findings showed that the DNA repair protein, RAD51, is overexpressed in AA TNBC patients and correlates with a poor prognosis relative to European American (EA) TNBC patients. However, the exact mechanism behind the regulation of RAD51 has not been identified. Our miRNA seq analysis shows a list of downregulated miRNAs in AA TNBC cell lines compared to EA TNBC cell lines. Interestingly, the miRDB-MicroRNA Target Prediction Database predicted that miR-214-5P has the seed sequence to bind and degrade RAD51 mRNA. A separate study has previously reported aberrant expression of miR-214 in obese individuals. Analysis of the TCGA database by UALCAN portal also shows a decreased expression of miR-214-5P in AA TNBC patients compared to EA TNBC patients. Treating the AA TNBC cell lines with miR-214-5P mimic downregulates RAD51 expression in a cell cycle-independent manner and also induces HR-deficiency as measured by Dr-GFP assay. Based on these results, we designed a synergistic lethality-based combination of miR-214-5P and Olaparib in TNBC cells. Data from our preclinical evaluations show miR-214-5P and Olaparib cause increased DNA strand breaks, and synergistic TNBC cell lethality compared to individual treatments. Together, our data indicate that miR-214-5P regulates RAD51 and either of these genes could be biomarkers for aggressive TNBC and racial disparity in BC therapeutic outcomes. Our work also implicates role of obesity, through miR-214, in TNBC severity. However, this arm of regulation in BC needs further investigation.

POSTER #32 – 2nd Prize Winner for Postdoctoral Fellow Poster

Overexpression of microRNA-502-3p Suppressed the GABAergic Synapse Function in Alzheimer's Disease

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Alzheimer's disease (AD) is most common dementia in the aged individuals. Synapse dysfunction is the early event in the brain that initiate AD progression. Studies found the reduced inhibitory GABAergic synapse function in AD subjects. Our global microRNA (miRNA) affymetrix study of synaptosomal fraction identified miR-501-3p/miR-502-3p as potential miRNAs. Data analysis showed the higher expression of miR-502-3p in the AD synapse relative to cognitively healthy synapse. On the other hand, Gamma-Aminobutyric Acid Type A Receptor Subunit Alpha1 (GABRA1) levels were reduced in AD synapse. In silico analysis and luciferase assay confirmed that miR-502-3p binds to multiple sites at the GABRA1 mRNA and suppresses its translation. In vitro studies using mouse primary hippocampal (HT22) neurons unveiled that miR-502-3p agomiRs (overexpression) decreased HT22 cell survival and antagomiRs (suppression) treated cells showed improved cell survival. qRT-PCR, immunoblotting and immunostaining analysis conformed the reduced levels of GABRA1 by miR-502-3p overexpression, while suppression of miR-502-3p increases the GABRA1 protein levels. Further, electrophysiology studies using patch clamp analysis showed reduced GABA receptor functions and impaired chloride ion (Cl-) channel by over expression of miR-502-3p. On the other hand, reduced expression of miR-502-3p showed increased GABA receptor functions and Cl- influx into the cells. Our initial observations confirmed that miR-502-3p modulate GABRA1 receptor functions. Therefore, miR-502-3p could be a therapeutic target to improve the GABAergic synapse function in AD.

POSTER #33 – 1st Prize Winner for Postdoctoral Fellow Poster

Metabolic and Muscle Profiles of Mice Fed Low or High Fat Ammoniated Beef Diets

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Obesity is a metabolic disease that is increasing worldwide. Diets that contain meats that are highly processed and high in fat content may contribute to the development of metabolic diseases. The acidic pH of such diets can lead to metabolic acidosis, often associated with the onset of obesity. Key metabolic pathways and processes such as glucose and fatty acid metabolism, autophagy, and endoplasmic reticulum (ER) stress are also altered by these diets. We hypothesized that the consumption of a pH enhanced beef, could restore muscle and overall metabolic health in diet-induced obese mice. To test this hypothesis, B6 male and female mice, were fed for 13 weeks low-fat beef (LFB) or high-fat (HFB) diets without or with ammoniation (LFBN and HFBN, respectively) for 13 weeks. During the dietary interventions, metabolic phenotypes were measured, and muscle and other tissues were collected for gene (qPCR) and protein (western blotting) expression analyses. HF diets decreased the respiratory exchange ratio (RER) in both male and female mice, and there were sex and diet-dependent effects on muscle glucose/fatty acid metabolism, autophagy, ER stress and inflammation pathways, mostly in female mice. The main metabolic effects in muscle were sex and diet-dependent. Moreover, CHOP and mTOR gene expression were reduced in HFBN-fed females, compared to LFBN females, indicating a possible effect of pH enhancement process with ammonia on muscle metabolism that may alleviate obesity-related inflammation, autophagy, and insulin sensitivity.

Research Staff and Faculty

POSTER #34

Role of Mitohondrial MicroRNAs in Alzheimer's disease

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Mitochondria plays crucial roles at synapses in providing synaptic energy and to maintain healthy synaptic and cognitive functions. Amyloid-beta and phosphorylated tau protein oligomers caused severe mitochondrial defects in Alzheimer's disease (AD), that leads to the lack of synaptic energy and impaired synapse functions in AD. MicroRNAs (miRNAs) present within the mitochondria are involved in multiple mitochondrial activities and mitochondrial functions. Mitochondrial dysfunction is well established in AD; but the roles of mitochondrial miRNAs has not been determined in AD. Current study is focused on the identification of mitochondrial miRNAs in AD and to unveil their roles in disease pathogenesis. Mitochondria and cytosolic fraction were extracted from postmortem AD brains (n=5) and cognitively normal postmortem brains (n=5). Mitochondria purity was characterized by transmission electron microscopy and immunoblot analysis of mitochondrial markers. Further, total RNA was extracted from mitochondria and cytosolic fraction and subjected to miRNAs HiSeq analysis. MiRNAs high throughput analysis showed the deregulation of mitochondrial miRNAs in AD and control samples. We also found the miRNAs localization and differential expression in mitochondrial fraction relative to cytosolic fraction. Further, in silico bioinformatic analysis revealed the critical roles of mitochondrial miRNAs in several mitochondrial function and synaptic pathways in AD. Therefore, our study discovered some novel mitochondrial miRNAs, those could be the potential therapeutic target to retrieve mitochondrial and synaptic dysfunction in AD.

POSTER #35

Insulin Resistance as Monitored by Dynamic Light Scattering of Whole Human Serum: An Ancillary Study of PREMIER

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Introduction: Dynamic light scattering (DLS) is a biophysical technique used to characterize fractionated proteins and nanoparticles. It measures the diffusion coefficient and estimates hydrodynamic diameter based on the Stokes-Einstein equation. Objective: We investigated whether DLS can be applied to unfractionated serum to assess human health.

Hypothesis: The apparent diffusion coefficients derived from DLS measurements of whole human serum are associated with markers of cardiometabolic health.

Methods: This ancillary study of the PREMIER trial had an observational cross-sectional design, n=455. Unmodified fasting serum at baseline was analyzed using a Wyatt DynaPro Plate Reader II instrument. Three apparent diffusion coefficients (fast, medium, slow), representing broad classes of serum proteins and lipoproteins, were resolved using discrete inverse Laplace transform analysis (DynaLS, Alango, Ltd.). Using machine-learning predictor screening and multi-variable regression in JMP Pro, we analyzed the association between each diffusion coefficient and >140 markers of cardiometabolic health.

Results: For each apparent diffusion coefficient, the strongest association was observed with the McAuley Index, a marker of insulin sensitivity. Other independent covariates included total serum protein, plasma fibrinogen and c-peptide. A ROC curve for the fast-diffusing component, with McAuley-IR as the reference condition, revealed AUC=0.801, sensitivity/specificity=83.2%/64.8%.

Conclusion & Significance: Dynamic light scattering detects insulin resistance through changes in serum protein diffusion, likely resulting from alterations in triglyceride-rich lipoproteins. It is a promising and practical method to screen for insulin resistance: no antibodies or reagents required, small sample size, rapid, automated.