BIOGRAPHICAL SKETCH

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NAME: Strieder-Barboza, Clarissa

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil	DVM	12/2009	Veterinary Medicine
Universidad Austral de Chile, Valdivia, Los Lagos, Chile	MS	05/2011	Veterinary Sciences- Animal Health
Michigan State University, East Lansing, Michigan, United States	PHD	08/2018	Comparative Medicine and Integrative Biology - Adipose tissue biology
University of Michigan, Ann Arbor, Michigan, United States	Postdoctoral Fellow	01/2021	Adipose tissue stromal cell biology in obesity and type 2 diabetes

A. Personal Statement

My research program centers on understanding the mechanisms by which adipose tissue dysfunction impacts health and animal production. My work has improved the understanding of the links between dysregulated adipose tissue responses and metabolic disease in large animal, mice and human models, with the major goal of enabling the design of novel strategies to prevent and treat metabolic disorders, such as obesity and type 2 diabetes in humans, and ketosis in cattle. Most recently, my research program extended to understanding the molecular and cellular mechanisms by which adipose tissue deposits and expands within muscle in beef cattle. My training as a veterinarian scientist provided me with strong knowledge in bovine adipocyte tissue biology contributing with novel research in adipose tissue remodeling and adipose progenitor cell biology. My postdoctoral training at University of Michigan Medical School focused on molecular and cellular mechanisms of adipose tissue dysfunction in obesity-associated type 2 diabetes and resulted in 7 peer reviewed publications. My training in biomedical research incorporated novel advanced molecular techniques– including adipose tissue single-nuclei transcriptome analysis, which is the bases of my current research program at TTU. As an Assistant Professor at TTU, I have received NIFA-USDA research awards as a PI for studying adipose tissue biology at the single-cell level, focusing on the understanding of pathways by which distinct subpopulations of adipose progenitor cells regulate local and systemic metabolic and immune responses in the context of periparturient metabolic disease in dairy cows and meat production in beef cattle.

B. Positions, Scientific Appointments and Honors

2006 - 2009	Clinical Research Assistant, Laboratory of Animal Metabolism and Endocrinology, Universidade Federal de Santa Maria, Santa Maria, Brazil
2008 - 2009	Junior Researcher Scholarship, National Council of Technological and Scientific Development (CNPq), Brazil
2010	First place - Graduate Paper Competition, Alltech`s Young Scientist Award, Country category: Chile

2010 - 2011	Research Graduate Assistant, Veterinary Sciences Institute, Universidad Austral de Chile , Valdivia, Chile
2011	Graduated with Distinction, Veterinary Sciences Master Program, Universidad Austral de Chile, Chile
2012 - 2014	Veterinary Instructor / Junior Researcher, College of Veterinary Medicine, Universidad Cooperativa de Colombia, Bucaramanga, Colombia
2013	Visiting Scholar, Department of Large Animal Clinical Science, Michigan State University, East Lansing, MI, USA
2014	Recognition by Intellectual Productivity, Universidad Cooperativa de Colombia, Bucaramanga, Colombia
2015 - 2018	Graduate Assistant, Department of Large Animal Clinical Science, Michigan State University, East Lansing, MI, USA
2016	Third place at PhD Oral Presentation Competition in Dairy Production, American Dairy Science Association, USA
2018	First Place Graduate Student Poster Contest, PhD Division, American Dairy Science Association and Purina Animal Nutrition, USA
2018 – 2021	Postdoctoral Research Fellow, University of Michigan Medical School, Ann Arbor, MI, USA
2020	Minority Postdoctoral Fellow – American Diabetes Association (ADA). Role: PI
2021-	Assistant Professor, Department of Veterinary Sciences, Texas Tech University, TX, USA
2021-	Adjunct Assistant Professor. Department of Nutritional Sciences, College of Human Sciences, Texas Tech University, TX, USA
2021-	Member, Obesity Research Institute, Texas Tech University, TX, USA
2023	Outstanding Research Award– Davis College, Texas Tech University, USA

Complete List of Published Work in My Bibliography:

https://www.ncbi.nlm.nih.gov/myncbi/1RkFfxZ37shkh/bibliography/public/

C. Contribution to Science

1. ***Mechanisms of adipose tissue dysfunction in human obesity-associated type 2 diabetes:*** As a postdoctoral fellow, my research focused on understanding fundamental mechanisms of crosstalk between adipose tissue extracellular matrix (ECM), adipocytes and stromal cells in contributing to adipose tissue dysfunction in human obesity and type 2 diabetes. These studies involved the use of human and mice in vivo models, 3D co-culture systems using ECM and adipocytes in vitro, and analysis of adipose tissue heterogeneity by single cell and single nuclei RNA sequencing in human diabetic tissues. We have made available a preprint version of our work on single-nuclei RNA sequencing of human adipose tissue which's manuscript is under preparation *(Strieder-Barboza, C., Flesher, C., Geletka, L., Delproposto, J., Eichler, T., Akinleye, O., Ky, A., Ehlers, A., O'Rourke, R. and Lumeng, C.N., bioRxiv 2022. Single-nuclei Transcriptome of Human Adipose Tissue Reveals Metabolically Distinct Depot-Specific Adipose Progenitor Subpopulations).* The main goal of this research was to define mechanisms and molecules that underly ECM-adipocyte-stromal cell metabolic crosstalk in obesity with a long-term goal of identifying potential therapeutic molecular targets for modulating adipose tissue function. This is relevant for the field of obesity and human metabolic disease as it can aid on the development of adipose tissue targeted therapies to prevent and/or treat dysfunctional metabolic health, particularly in the context of type 2 diabetes. The manuscripts cited below in which I am the first author were led by me intellectually and experimentally in the laboratory. In 'c", I lead the adipose tissue transcriptome analysis.

a. **Strieder-Barboza C**, Baker NA, Flesher CG, Karmakar M, Neeley CK, Polsinelli D, Dimick JB, Finks JF, Ghaferi AA, Varban OA, Lumeng CN, O'Rourke RW. Advanced glycation end-products regulate extracellular matrix-adipocyte metabolic crosstalk in diabetes. Sci Rep. 2019 Dec 24;9(1):19748. doi: 10.1038/s41598-019-56242-z. PubMed PMID: 31875018; PubMed Central PMCID: PMC6930305.

b. **Strieder-Barboza C**, Baker NA, Flesher CG, Karmakar M, Patel A, Lumeng CN, O'Rourke RW. Depot-specific adipocyte-extracellular matrix metabolic crosstalk in murine obesity. Adipocyte. 2020 Dec;9(1):189-196. doi: 10.1080/21623945.2020.1749500. PubMed PMID: 32272860; PubMed Central PMCID: PMC7153651.

c. Carruthers NJ, **Strieder-Barboza C**, Caruso JA, Flesher CG, Baker NA, Kerk SA, Ky A, Ehlers AP, Varban OA, Lyssiotis CA, Lumeng CN, Stemmer PM, O'Rourke RW. The human type 2 diabetes-specific visceral adipose tissue proteome and transcriptome in obesity. Sci Rep. 2021 Aug 30;11(1):17394. doi: 10.1038/s41598-021-96995-0. PubMed PMID: 34462518; PubMed Central PMCID: PMC8405693.

d. **Strieder-Barboza C,** Flesher CG, Geletka LM, Eichler T, Akinleye O, Ky A, Ehlers AP, Lumeng CN, O'Rourke RW. Lumican modulates adipocyte function in obesity-associated type 2 diabetes. Adipocyte. 2022 Dec;11(1):665-675. doi: 10.1080/21623945.2022.2154112. PubMed PMID: 36457256; PubMed Central PMCID: PMC9728465.

2. ***Defining depot-specific cellular heterogeneity and mechanisms of adipose tissue dysfunction in a bovine model:*** My research on adipose tissue biology in dairy cows started during my PhD studies and have extended into my independent research program at Texas Tech University. Dairy cows, especially around calving period, face a marked shift in energy intake and demand, leading to increased adipose tissue lipolysis and remodeling, and increased risk for metabolic diseases, such as ketosis, similar to gestational diabetes in humans. Recently, we have established models to study mechanisms of adipose tissue remodeling at the extracellular matrix and single nuclei levels using a depot-specific approach and have focused on understanding how ketosis can affect adipose tissue function. Manuscripts cited below include recent publications by my laboratory at TTU, including the first manuscript defining adipose tissue cellular heterogeneity of bovine at the single-cell level. These studies are relevant to dairy science and the general field of adipose tissue biology because they revealed the impact of ketosis on adipose oxylipin profile and on the metabolic crosstalk between immune cells and adipocytes, and defined depot-specific properties of omental and subcutaneous adipose tissue cellularity and extracellular matrix, which are key for the development of nutritional and pharmacological strategies to prevent metabolic disease. My role on the research cited below was of lead principal investigator.

a. Michelotti TC, Kisby BR, Flores LS, Tegeler AP, Fokar M, Crasto C, Menarim BC, Loux SC, **Strieder-Barboza C**. Single-nuclei analysis reveals depot-specific transcriptional heterogeneity and depot-specific cell types in adipose tissue of dairy cows. Front Cell Dev Biol. 2022;10:1025240. doi: 10.3389/fcell.2022.1025240. eCollection 2022. PubMed PMID: 36313560; PubMed Central PMCID: PMC9616121.

b. Diez JFF, Tegeler AP, Flesher CG, Michelotti TC, Ford H, Hoque MN, Bhattarai B, Benitez OJ, Christopher GF, **Strieder-Barboza C**. Extracellular matrix modulates depot-specific adipogenic capacity in adipose tissue of dairy cattle. J Dairy Sci. 2024 Jul 3;. doi: 10.3168/jds.2024-25040. [Epub ahead of print] PubMed PMID: 38969002.

c. Ford HR, Mitchell TM, Scull T, Benitez OJ, **Strieder-Barboza C.** The Effect of Subclinical Ketosis on the Peripheral Blood Mononuclear Cell Inflammatory Response and Its Crosstalk with Depot-Specific Preadipocyte Function in Dairy Cows. Animals (Basel). 2024 Jul 6;14(13). doi: 10.3390/ani14131995. PubMed PMID: 38998107; PubMed Central PMCID: PMC11240650.

d. Sparks BB, Ford H, Michelotti TC, **Strieder-Barboza C**. Adipose tissue oxylipin profile changes with subclinical ketosis and depot in postpartum dairy cows. J Dairy Sci. 2025 Jan;108(1):781-791. doi: 10.3168/jds.2024-25178. Epub 2024 Sep 27. PubMed PMID: 39343228.

3. ***The impact of lipolysis on adipose tissue metabolism****:* As dairy cows approach parturition, the combined reduced feed intake and increased energy demand for lactation trigger metabolic changes systemically and locally at the adipose tissue, including increased lipolysis, insulin resistance, and inflammatory responses. The modulation of these responses in adipose tissue is key for preventing metabolic diseases and impaired productive performance. The manuscripts cited below are part of my PhD dissertation focusing on understanding mechanisms of lipid mobilization in the adipose tissue of dairy cows and defining the role of a novel adipokine, Fetuin-A, on modulating lipolysis and lipogenesis. These studies are relevant to adipose tissue biology and dairy science fields as we revealed a potential modulator of adipocyte lipid mobilization that could be a potential target to modulate exacerbated lipolysis in dairy cows.

a. Contreras GA, **Strieder-Barboza C**, de Souza J, Gandy J, Mavangira V, Lock AL, Sordillo LM. Periparturient lipolysis and oxylipid biosynthesis in bovine adipose tissues. PLoS One. 2017;12(12):e0188621. doi: 10.1371/journal.pone.0188621. eCollection 2017. PubMed PMID: 29206843; PubMed Central PMCID: PMC5716552.
b. **Strieder-Barboza C**, de Souza J, Raphael W, Lock AL, Contreras GA. Fetuin-A: A negative acute-phase protein linked to adipose tissue function in periparturient dairy cows. J Dairy Sci. 2018 Mar;101(3):2602-2616. doi: 10.3168/jds.2017-13644. Epub 2017 Dec 21. PubMed PMID: 29274966.
c. De Koster J, Nelli RK, **Strieder-Barboza C,** de Souza J, Lock AL, Contreras GA. The contribution of hormone sensitive lipase to adipose tissue lipolysis and its regulation by insulin in periparturient dairy cows. Sci Rep. 2018 Sep 6;8(1):13378. doi: 10.1038/s41598-018-31582-4. PubMed PMID: 30190510; PubMed Central PMCID: PMC6127149.
d. **Strieder-Barboza C**, Contreras GA. Fetuin-A modulates lipid mobilization in bovine adipose tissue by enhancing lipogenic activity of adipocytes. J Dairy Sci. 2019 May;102(5):4628-4638. doi: 10.3168/jds.2018-15808. Epub 2019 Mar 1. PubMed PMID: 30827564.

Ongoing projects:

External:

Unraveling molecular and cellular mechanisms underlying intramuscular, subcutaneous, and visceral adipose tissue growth in beef cattle. USDA-NIFA (2023-67015-39336), $650,000, 2023-2026. Role: PI

Unveiling novel mechanisms of immune dysfunction in bovine leukemia virus-infected dairy cows. USDA-NIFA (2024-67016-4208), $300,000, 2024-2026. Role: Co-PI

Uncovering macrophage and endothelial cell functional dynamics and crosstalk in periparturient dairy cattle adipose tissue. USDA-NIFA Cooperative State Research Ed & Extension Service (Postdoctoral Fellowship; 2024-67034-42234), $211,000, 2024-2026. Role: Primary Mentor

Internal:

Addressing adipose tissue cellular heterogeneity as a path to develop cell targeted therapies for women with gestational diabetes. One Health Pilot Grant – Texas Tech University- Texas Tech Health Sciences Center, $100,000, 2023-2024. Role: PI

Completed Research Support

Fetuin-A: A Potential Biomarker of Insulin Resistance in Transition Dairy Cows. Michigan Animal Health Foundation.07/01/15-07/01/16. Role: Co-I

Adipose Tissue Metabolic Biomarkers as Predictors of Lactation Performance in Dairy Cows. Michigan Alliance for Animal Agriculture. 06/01/2018 - 05/31/2019. Role: Co-I

The role of lumican-expressing adipose stromal cells in regulating adipocyte cellular metabolism in human type 2 diabetes. American Diabetes Association (ADA) - Minority Postdoctoral Fellowship. 07/2020 – 07/2022. Role: PI. **This proposal was funded but declined to take a faculty position at Texas Tech University.*

Pathogen-host interaction during the development of liver abscesses; local and systemic immune and metabolic responses during *Fusobacterium necrophorum* challenges. Foundation for Food and Agriculture Research (FFAR; ICASALAWG-0000000057). 09/01/2021 - 8/31/2023. Role: Co-I

Addressing the effects of ketosis on adipose tissue transcriptional diversity and progenitor cells phenotype in dairy cows. USDA-NIFA (2022-67015-36319), $300,000, 2022-2024. Role: PI