Michelle L. (Asp) Law, Ph.D., R.D.

104 Mary Gibbs Jones, One Bear Place #97346, Waco, TX 76798
254-710-6003 | Michelle_L_Law@Baylor.edu

RESEARCH OBJECTIVE

To identify mechanisms and therapeutic strategies for muscle wasting diseases, including cancer-induced cachexia. To understand the complex interplay between muscle wasting pathophysiology and cardiac dysfunction.

EDUCATION

2006 – 2010 **Ph.D., Nutrition**
College of Education & Human Ecology, The Ohio State University, Columbus, Ohio
Dissertation: Therapeutic strategies for the treatment of insulin resistance in various metabolic disease states
Research Mentor: Martha Belury, PhD, RD
Description: The Ohio State University Interdisciplinary PhD Program in Nutrition exposes students to aspects of nutrition sciences from diverse fields including clinical medicine, public health, food science, animal sciences, and biological sciences.

2001 – 2004 **M.S. and Dietetic Internship, Medical Dietetics**
College of Medicine, The Ohio State University, Columbus, Ohio
Thesis: Effect of gamma-cyclodextrin on post-prandial glycemia, insulinemia and colonic hydrogen production in healthy humans
Research Mentor: Steven Hertzler, PhD, RD
Description: The Medical Dietetics Division MS and Dietetic Internship Program prepares students for clinical practice in dietetics. Coursework focuses on all aspects of clinical nutrition including management, ethics, and evidence-based practice guidelines.

1997 – 2001 **B.A., Majors: Dietetics and Chemistry**
Concordia College, Moorhead, Minnesota
Honors: Summa Cum Laude

PROFESSIONAL EXPERIENCE

Aug 2020 – Present **Assistant Professor**
Nutrition Sciences Division, Department of Human Sciences and Design
Robbins College of Health and Human Sciences
Baylor University, Waco, Texas

2018 – 2020 **Adjunct Lecturer**
Nutrition Sciences Division, Department of Family & Consumer Sciences
Baylor University, Waco, Texas
Teacher of Record for nine sections of Nutrition (NUTR 2351), a required course for pre-dietetics and pre-nursing undergraduate students. Enrollment was 25-37 students per section. Developed lectures, projects, homework, class activities, and exams.

2016 – 2017 **Research Scientist**
Department of Pediatrics
Baylor Scott & White Health, Temple, Texas

Facilitated clinical research collaborations among attending physicians, fellows, residents, and allied medical professionals in various specialties within the Department of Pediatrics. Worked with physician investigators in the development of research questions, hypotheses, and study design, and managed collection and analysis of data. Promoted and fostered an environment conducive to research development within the department, and increased visibility of research locally and nationally.

2010 – 2016 **Postdoctoral Fellow**
Department of Integrative Biology and Physiology
University of Minnesota Medical School, Minneapolis, Minnesota
Mentor: Joseph Metzger, PhD

Completed post-doctoral studies in a cardiac physiology laboratory working on the development of gene therapeutic strategies for inherited and acquired cardiomyopathies. Projects focused on correction of calcium mishandling in diastolic dysfunction and Duchenne muscular dystrophy using genetic mouse models and viral gene transfer techniques. Began to develop my independent research agenda by characterizing cardiomyopathy in a mouse model of cancer cachexia.

2006 - 2010 **Graduate Research Associate**
Department of Human Nutrition
The Ohio State University, Columbus, Ohio
Mentor: Martha Belury, RD, PhD

Completed doctoral research in a translational laboratory with a broad focus on understanding mechanisms and therapeutic strategies for dysregulation of glucose and lipid metabolism in metabolic disease. Initiated work to metabolically characterize a pre-clinical model of cancer cachexia and studied the role of insulin sensitization in attenuating the development and progression of muscle and adipose wasting.

2004 – 2006 **Clinical Research Coordinator**
Department of Human Nutrition
The Ohio State University, Columbus, Ohio

Developed and coordinated two clinical research studies. One study was a prospective, observational study examining the relationship between dietary patterns and physical and mental functioning in older adults. One study was a double-masked, placebo-controlled trial to test the effects of dietary oil supplementation on body composition and glycemic control in women with type 2 diabetes.

2002 - 2004 **Graduate Research Associate**
School of Allied Medical Professions
The Ohio State University, Columbus, Ohio
Mentor: Steven Hertzler, RD, PhD

Planned and conducted all aspects of a double-masked, placebo-controlled clinical study to test the glycemic, insulinemic, and breath hydrogen responses to a slowly digested carbohydrate called gamma-cyclodextrin in healthy adults. This study was done as part of an effort to discover novel carbohydrate sources for inclusion in enteral products for patients with diabetes.

AWARDS AND HONORS

BAYLOR UNIVERSITY

Cutting Edge Science Presentation, 6th Cancer Cachexia Conference, 2021
Cutting Edge Science presentations are invited short talks selected from abstracts submitted to the conference. These abstracts present novel and innovative findings from junior investigators that have potential to have high impact in the cachexia field.

PREVIOUS INSTITUTIONS

Presidential Fellowship, The Ohio State University, 2009-2010
The Presidential Fellowship is the most prestigious award giving by the Graduate School. Recipients of this award embody the highest standards of scholarship in the full range of Ohio State's graduate programs.

Myrtle Wolcott Cram Graduate Research Fellowship, College of Education and Human Ecology, The Ohio State University, 2008-2009

Energy and Macronutrient Metabolism Research Interest Group Travel Award, American Society for Nutrition, Experimental Biology Conference, 2008

Mead Johnson/Bristol-Myers Squibb Scholarship, American Dietetic Association, 2002

Karen A. Porcelli Scholarship, Cleveland Dietetic Association, Cleveland, Ohio, 2002

Columbus Dietetic Association Scholarship, Columbus, Ohio, 2002

Mead Johnson/Bristol-Myers Squibb Scholarship, American Dietetic Association, 2000

Faculty Scholarship, Concordia College, Moorhead, Minnesota, 1997-2001

PROFESSIONAL CERTIFICATIONS AND MEMBERSHIPS

Academy of Nutrition and Dietetics, 2020-present
Practice group memberships: Research (RDPG), Nutrition and Dietetic Educators and Preceptors (NDEP)

Commission on Dietetic Registration - Registered Dietitian (ID# 899660), 2004-present

Cancer Cachexia Society, 2020-present

TEACHING

BAYLOR UNIVERSITY

Teacher of Record
NUTR 2351: Nutrition
NUTR 4387: Advanced Nutrition
NUTR 5355: Macronutrients and Metabolism
NUTR 5356: Micronutrients and Phytochemicals
NUTR 5360: Resource Management/Nutrition & Food Systems
NUTR 5V93: Directed Research (Masters)
HSD 4V93: Independent Study

HP 6V70: Directed Research (Doctoral)
HP 6V99: Dissertation Research

NUTR 2351: Nutrition (3 credits)
This course provides students a broad overview to the field of nutrition science. It covers how nutrients are digested, absorbed, and metabolized by the body, how much of the nutrients are needed for optimal health, and how dietary patterns contribute to health and chronic disease risk.

Term	Class size	Response rate	Student Evaluation Mean Score*
Fall 2021	28	93%	5.43
Spring 2022 (asynchronous online)	32	97%	5.14
Fall 2022	35		

NUTR 4387: Advanced Nutrition (3 credits)
This course gives students the tools necessary to understand how metabolism of nutrients impacts health and disease risk. Concepts from physiology, cell/molecular biology, and biochemistry are applied to understand the regulation and interaction of metabolic pathways, utilization of nutrients in the body, and the consequences of nutrient excess and deficiency.

Term	Class size	Response rate	Student Evaluation Mean Score*
Spring 2021	13 (face to face) 3 (asynchronous)**	100%	5.71
Spring 2022	12	100%	5.79

NUTR 4V93: Independent Study (1-3 credits)
This course is for upper-level undergraduate members of my laboratory who have shown consistent commitment to the lab in previous semesters and wish to obtain credit for independent studies in research. Students participate in all aspects of the laboratory and complete an independent project.

Term	Class size
Fall 2022	3 (all at 2 credits)

NUTR 5355: Macronutrients and Metabolism (3 credits)
This course enables students to obtain a detailed understanding of macronutrient structure, function, digestion/absorption/transport, and metabolism by applying concepts from biochemistry, physiology, and molecular/cell biology to the science of nutrition. A strong focus is placed on regulation and integration of metabolic pathways in health and disease. Current literature in the various topic areas is discussed and evaluated.

Term	Class size	Response rate	Student Evaluation Mean Score*
Fall 2020	5	60%	5.28
Fall 2021	8	88%	5.52
Fall 2022	13		

NUTR 5356: Micronutrients and Phytochemicals (3 credits)
This course enables students to obtain a detailed understanding of micronutrient structure, function, digestion/absorption/transport, and metabolism by applying concepts from biochemistry, physiology, and molecular/cell biology to the science of nutrition. A strong focus is placed on regulation and integration of metabolic pathways in health and disease. Current literature in the various topic areas is discussed and evaluated.

Term	Class size	Response rate	Student Evaluation Mean Score*
Spring 2021	3	100%	5.39

NUTR 5360: Resource Management/Nutrition & Food Systems (3 credits)
This course is primarily for graduate students who wish to complete necessary coursework to be eligible to apply for dietetic internships. Students attend and complete all required assignments for the undergraduate course. In addition, students work with me to complete an additional project for graduate credit.

Term	Class size
Spring 2021	1
Spring 2022	1

*Mean of 6 items rated on a Likert scale of 1-6 (1 – strongly disagree, 2 – disagree, 3 – slightly disagree, 4 – slightly agree, 5 – agree, 6 – strongly agree). Items are related to instructor engagement with students, teaching effectiveness, feedback/evaluation, and assignments.
**Asynchronous students not included in the student evaluations

UNIVERSITY OF MN

Instructor (2016)
PT 6310: Physiology for Physical Rehabilitation (Nutrition and Metabolism Unit)
Tutor (2015)
PHSL 5061/PHSL 3061: Principles of Physiology
Laboratory Assistant (2014)
INMD 6814/PHSL 5101: Physiology

MENTORSHIP AND ADVISING

Graduate Student Research Mentorship & Advising

BAYLOR UNIVERSITY

2022-present Linda Salinas, MS Nutrition, *Thesis: Cardiac changes in mice with early-stage cachexia*

2021-present Anna Beaudry, PhD Exercise & Nutrition Sciences, *Dissertation: Studies in pre-clinical cancer-induced cachexia: methods for body & tissue weight analysis, sex differences in cardiac tissue, and effects of obesity on cachexia outcomes*

2021-2022 Alice Chioma Aladume, MS Nutrition, Baylor University, *Non-thesis capstone paper: The application of omega-3 fatty acids in the attenuation of cachexia in pancreatic cancer patients*

2020-2021 Marlissa Frey, MS Nutrition, *Non-thesis capstone paper: The effect of obesity on outcomes of cancer-induced cachexia*

BAYLOR, SCOTT & WHITE HEALTH

2016-2018 Thu Pham, Pediatric Resident, McLane Children's Medical Center, *Project: Nutritional cost of necrotizing enterocolitis in infants admitted to a neonatal intensive care unit*

Graduate Student Committee Membership

BAYLOR UNIVERSITY

Year(s)	Student	Committee	Program
2022	Jacqueline Garcia	Thesis	Army Baylor Nutrition MS
2022	Felicia Dispense	Thesis	Army Baylor Nutrition MS
2022	Jose Seiba Moris	Preliminary Exam	Exercise & Nutrition Sciences PhD
2021-present	Madhur Wyatt	Preliminary Exam, Dissertation	Exercise & Nutrition Sciences PhD
2021	Emily Clark	Thesis	Army Baylor Nutrition MS
2021	Lilly Rivera	Thesis	Army Baylor Nutrition MS
2020	Hannah Peterson	Thesis	Baylor Nutrition MS

Undergraduate Student Research Mentorship

BAYLOR UNIVERSITY

2022-present Lauren Boone

2022-present Kim Phan

2021-present Kayla Nguyen

2020-present Allen Dao, *Honor's Thesis: Characterization of an aged murine model of cancer cachexia*

UNIVERSITY OF MINNESOTA

2016 Zachary Som, *Project: Histological analysis of cardiomyopathy in mdx mice after acute psychosocial stress*

2013-2014 Megan Olander, *Project: Effects of cardiac phospholamban ablation on stress response and fibrosis development in mdx mice*

2010-2014 Jenny Seong, *Honor's thesis: Green fluorescent protein membrane localization via Myr, Gag, and PLCbeta1b: proof of concept study for the design of a calcium buffering system at the plasma membrane*

RESEARCH SUPPORT

BAYLOR UNIVERSITY

Pending

Title: Mechanistic exploration of the "obesity paradox" in a pre-clinical model of cancer cachexia
PI: Michelle Law
Agency: Pfizer
Program: Global Cachexia ASPIRE
Amount requested: $250,000 (total cost)
Date submitted: Dec 2022
Project period: June 1, 2023 – May 31, 2025
Role: PI (10% effort)
Objective: to discover differential mechanisms in cancer cachexia (CC) pathophysiology between male and female lean, metabolically healthy obese (MHO), and metabolically unhealthy obese (MUO) mice to gain insight into conditions in which the "obesity paradox" in cancer cachexia may or may not hold true. In addition, we aim to provide a comprehensive and multidisciplinary characterization of a new preclinical model of obese CC.

Title: Regional Excellence in Cancer Research at Baylor University with Broader Collaborative Emphasis in Molecular Mechanism and Tumor Imaging Studies
PI: Kevin Pinney
Agency: Cancer Prevention & Research Institute of Texas
Program: Texas Regional Excellence in Cancer
Amount requested: $6,000,000 (total cost) (my portion is approximately $550,000)
Date submitted: Sept 2022
Project period: Feb 1, 2023 – Jan 31, 2028 (my project is funded in years 1-3)
Role: Project Director (20% effort)
Objective: Establishment of a Texas Regional Excellence in Cancer (TREC) Program at Baylor University to facilitate significant programmatic and institutional goals that will establish a strong, vibrant, and sustainable foundation in cancer research.

Title: Neuropeptide characterization of limited access sugar drinking in mice
PI: Lara Hwa
Agency: National Institute of Diabetes and Digestive and Kidney Diseases
Program: Katz R01
Amount Requested: $2,185,936 (total cost)
Date Submitted: Sept 2022
Project Period: Jul 1, 2023 – Jun 30, 2028
Role: Consultant (0% effort)
Objective: To characterize the contribution of stress neuropeptides and circuitry in limited access sugar drinking in mice.

Current

Title: Identification of genomic and metabolomic contributors to cardiomyopathy in cancer-induced cachexia
PI: Michelle Law
Agency: Baylor University
Program: ONE URC
Amount: $32,100 (TDC)
Project period: 6/1/2022-5/31/2023
Role: PI
Objective: To gain preliminary data related to the genomic and metabolomic contributors to cardiac dysfunction in cancer cachexia to increase my competitiveness for future applications to extramural funding agencies

Complete

Title: Mechanisms of impaired calcium handling in cancer cachexia-induced cardiac dysfunction
PI: Michelle Law
Agency: Robbins College, Baylor University
Program: Summer Sabbatical
Amount: Summer salary and $1,000 (TDC)
Period: 6/1/2021-7/31/2021
Role: PI
Objective: To gain mechanistic insight into the decreased calcium cycling present in cardiac myocytes from mice with cancer-induced cachexia

Submitted, Not Funded

Title: Identification of genomic and metabolomic contributors to cardiomyopathy in cancer-induced cachexia
PI: Michelle Law
Agency: Baylor University
Program: ONE URC
Amount requested: $34,250 (TDC)
Date submitted: 10/5/2021
Role: PI
Objective: To gain preliminary data related to the genomic and metabolomic contributors to cardiac dysfunction in cancer cachexia to increase my competitiveness for future applications to extramural funding agencies

Title: The impact of faith on participation in cardiac rehabilitation and physical and mental health outcomes in patients with myocardial infarction
PI: Maria Boccia
Agency: John Templeton Foundation
Program: Health, Religion, and Spirituality
Amount requested: $860,000 (total cost)
Date submitted (Letter of Intent): 8/20/2021
Role: Co-Investigator
Objective: To examine the impact of faith and spirituality on the willingness of MI patients to participate in a cardiac rehabilitation program and assess the association between faith/spirituality and physical and mental health outcomes and quality of life.

Title: Mechanisms of impaired cardiac contractility in cancer-induced cachexia
PI: Michelle Law
Mentors: Joseph Metzger, Dwayne Simmons, DeWayne Townsend
Agency: American Heart Association
Program: Career Development Award
Amount requested: $231,000 (total cost)
Date submitted: 2/16/2021
Project period: 3 years
Role: PI
Objective: To discover physiological, molecular, and metabolic contributors to impaired cardiac contractility in cancer cachexia

Title: Binding site elucidation, biological efficacy of targeted therapies, and tumor-associated hypoxia directed toward improved treatment agents for cancer
PI: Kevin Pinney
Agency: Cancer Prevention & Research Institute of Texas
Program: Texas Regional Excellence in Cancer
Amount: $6,000,000 (total cost)
Date submitted: 1/27/2021
Project period: 5 years
Role: Project Director
Objective: Discovery and translational development of highly effective and selective therapeutic agents for the treatment of cancer, along with complementary studies directed towards molecular targets, physiologically relevant binding site interactions, epigenetics, immunology, and accompanying studies related to the biology and metabolomics associated with cancer cachexia. An emphasis will be placed on tumor-associated hypoxia as a target for therapeutic agents and an important driver of cancer biology.

PREVIOUS INSTITUTIONS

Title: Novel calcium buffer for the treatment of diastolic heart failure
PI: Michelle Asp
Agency: National Institutes of Health
Program: NRSA 1F32HL115876
Amount: $163,110 (TDC)
Period: 8/27/2012-8/26/2015
Role: PI
Objective: To genetically engineer a modified parvalbumin protein with optimal calcium/magnesium binding affinities for buffering calcium in human diastolic dysfunction

Title: The role of insulin resistance in the pathogenesis of tumor-induced cachexia
PI: Michelle Asp
Agency: P.E.O.
Program: Scholar Award (Competitive Student Grant Program)
Amount: $15,000 (TDC)
Period: 9/2009-5/2010
Role: PI
Objective: To determine whether insulin resistance is an early event in an animal model of cancer cachexia, and whether correcting insulin resistance decreases the extent of adipose and muscle wasting

Title: The role of insulin resistance in the pathogenesis of tumor-induced cachexia
PI: Michelle Asp
Agency: Department of Human Nutrition, Ohio State University
Program: Russell Klein Award (Competitive Student Grant Program)
Amount $500 (TDC)
Period: 2009
Role: PI
Objective: To determine whether insulin resistance is an early event in an animal model of cancer cachexia, and whether correcting insulin resistance decreases the extent of adipose and muscle wasting

Title: The effect of rosiglitazone on PPARγ regulation of PTEN in colon-26 adenocarcinoma cells
PI: Michelle Asp
Agency: Department of Human Nutrition, Ohio State University
Program: Vivian Research Award (Competitive Student Grant Program)
Amount $2,000 (TDC)
Period: 2007
Role: PI
Objective: To understand the mechanism by which PPARγ agonist rosiglitazone decreases tumor size in mice with colon-26 tumors

SEMINARS AND INVITED LECTURES

BAYLOR UNIVERSITY

Career Panel Discussion. Physiology Post-Doc Seminar Series, University of Minnesota, September 2022

Law Laboratory: Cardiac dysfunction in cancer cachexia. Baylor Science Fellows, Baylor University, February 2022

Calcium handling deficits underlie cardiac dysfunction in cancer cachexia. Nutrition and Exercise Science PhD Seminar Series, Baylor University, January 2022

PREVIOUS INSTITUTIONS

Measuring the cardiac effect of psychosocial stress in mdx mice using a social defeat paradigm. Department of Integrative Biology & Physiology Incubator Chalk Talk, University of Minnesota, 2014

Acute effects of tamoxifen, raloxifene and 4-hydroxytamoxifen on cardiac myocyte function; and Developing a calcium buffering system for diastolic heart failure. Lillehei Heart Institute Trainee Seminar, University of Minnesota, May 2012

Life after Concorida: career path, research opportunities, & some really exciting science Concordia College, Moorhead, MN, January 2012

Effect of PPAR-gamma agonist rosiglitazone on cachexia pathogenesis in tumor-bearing mice. Department of Human Nutrition, The Ohio State University, July 2010

Effects of PPARγ agonist rosiglitazone on cachexia pathogenesis and outcomes in tumor-bearing mice. The Ohio State University & Nationwide Children's Hospital Muscle Research Group Meeting, October 2009

The role of insulin resistance in the pathogenesis of tumor-induced cachexia. Department of Endocrinology Research Group Meeting, The Ohio State University, April 2009

Diabetes and cardiovascular disease: a look at risk factor modification. Dining with Diabetes Conference, The Ohio State University Extension, February 2006

Diabetes and cardiovascular disease: a focus on women. Preventing Type 2 Diabetes and Obesity through Community Partnerships Conference, Columbus, Ohio, December 2005

BIBLIOGRAPHY

*Impact factors were obtained from InCites Journal Citation Reports; *co-first authors; students; #senior & corresponding author; papers with descriptions of scientific contributions have been published since I have been at Baylor University (including my time as Adjunct Lecturer).*

PEER-REVIEWED PUBLICATIONS

22. **Law ML#**. Cancer cachexia: pathophysiology and association with cancer-related pain. *Frontiers in Pain Research* 2022;3:971295. doi: 10.3389/fpain.2022.971295

- *Scientific contribution: This paper reviews cancer cachexia pathophysiology, potential inflammatory mediators between pain and cachexia, and the association between pain and cachexia in clinical literature. Although there is evidence for a link between pain and cachexia severity, almost no work investigates whether improved pain management may positively effect cachexia outcomes. For the first time, to my knowledge, this paper describes how pain may contribute to the worsening of multiple risk factors for cachexia development, calling for research to assess pain management in cachexia treatment.*
- *Role: I identified gaps in the literature, outlined and drafted the manuscript, created figures, and made all revisions.*
- *Affiliation: Baylor University*
- *Journal impact factor: New journal in 2020, no impact factor established*

21. Beaudry AG, **Law ML**. Leucine supplementation in cancer cachexia: mechanisms and a review of the pre-clinical literature. *Nutrients* 2022;14:2824. doi: 10.3390/nu14142824

- *Scientific contribution: This paper reviews the literature surrounding the role of leucine in muscle mass preservation and its role in enhancing muscle protein synthesis, followed by review of pre-clinical literature examining effects of leucine supplementation on cancer cachexia outcomes. It evaluates the body of literature and identifies additional research that must be done to determine efficacy of leucine supplementation for cachexia.*
- *Role: Anna conceived the idea and wrote a draft of this paper in NUTR 5355 (fall 2021). I guided/directed her efforts to significantly revise the manuscript for publication throughout the following semester.*
- *Affiliation: Baylor University*
- *Journal impact factor (2021): 6.7*

20. Wiggs MP, Beaudry AG, **Law ML#**. Cardiac remodeling in cancer-induced cachexia: functional, structural, and metabolic contributors. *Cells* 2022;11:1931. doi: 10.3390/cells11121931

- *Scientific contribution: This paper is a comprehensive review of both clinical and pre-clinical literature identifying and studying the mechanistic contribution of cardiomyopathy in cancer cachexia. We structured the paper into three major sections to focus on functional changes in the heart, and following with contributors to functional changes, namely structural and metabolic aberrations. Importantly, much less is known about the heart in cachexia compared to skeletal muscle. To our knowledge, no previous paper had been published to synthesize, analyze, and identify gaps in existing literature in the form of a comprehensive review, specifically linking structural and metabolic changes to functional deficits in cachectic hearts.*
- *Role: I led all aspects of this project. With input from co-authors, I identified gaps in the literature and constructed an outline. I wrote approximately half of the manuscript, led discussions on creation of figures and tables, created figures and tables, compiled sections, and made revisions to the text.*
- *Affiliation: Baylor University*
- *Journal impact factor (2021): 7.7*

19. **Law ML**, Metzger JM. Cardiac myocyte intrinsic contractility and calcium handling deficits underlie heart organ dysfunction in murine cancer cachexia. *Scientific Reports* 2021;11:23627. doi: 10.1038/s41598-021-02688-z

- *Scientific contribution: This research provides organ- and cellular-level physiological insight into cachexia-induced cardiomyopathy. We distinguished cellular-intrinsic functional deficits from systemic factors that may be contributing to in vivo dysfunction. We identified, for the first time, decreased calcium cycling in individual cardiac myocytes, which can explain contractility and relaxation deficits on a beat-to-beat basis and provides mechanistic insight into cachexia pathophysiology.*
- *Role: I developed the idea for this project, designed and conducted all experiments, and wrote the manuscript.*
- *Affiliation: Baylor University*
- *Journal impact factor (2021): 5.0*

18. **Law ML**, Cohen H, Martin AA, Angulski ABB, Metzger JM. Dysregulation of calcium handling in Duchenne Muscular Dystrophy-associated dilated cardiomyopathy: mechanisms and experimental therapeutic strategies. *Journal of Clinical Medicine* 2020;9:E520. doi: 10.3390/jcm9020520

- *Scientific contribution: This paper is a comprehensive review of published literature examining the mechanisms of calcium dysregulation and its role in the development and progression of cardiomyopathy in muscular dystrophy. Secondarily, the paper addressed strengths and limitations of currently used models of dystrophic cardiomyopathy and experimental therapeutics addressing calcium cycling deficits in these models.*
- *Role: I served as the director of this project. I developed the outline, wrote approximately half of the content, combined and coordinated content, and designed figures and tables.*
- *Affiliation: Baylor University*
- *Journal impact factor (2019): 3.3*

17. Razzoli M*, Lindsay A*, **Law ML***, Chamberlain CM*, Southern WM, Berg M, Osborn J, Engeland WC, Metzger JM, Ervasti JM, Bartolomucci A. Social stress is lethal in the *mdx* model of Duchenne Muscular Dystrophy. *EBioMedicine* 2020;55:102700. doi: 10.1016/j.ebiom.2020.102700

- *Scientific contribution: This paper examined mechanisms of stress-induced cardiomyopathy in the mdx mouse model of Duchenne muscular dystrophy (DMD). Mdx mice exhibited a freezing response after mild stress, and approximately 75% of mice were dead or moribund within 48 hours after social defeat stress. This was associated with severe cardiac muscle damage. Dystrophin repletion rescued this phenotype. Mechanistic investigation revealed a severe and sustained hypotensive and tachycardic response to stress. This study is an important contributor to a mechanistic understanding of DMD cardiomyopathy.*
- *Role: I completed all initial studies showing increased lethality of social defeat, and subsequent cardiac damage. I contributed to manuscript writing and figure preparation.*
- *Affiliation: University of Minnesota*
- *Journal impact factor (2019): 5.7*

16. **Law ML**, Prins KW, Olander ME, Metzger JM. Exacerbation of dystrophic cardiomyopathy by phosholamban deficiency-mediated chronically increased cardiac Ca^{2+} cycling in vivo. *American Journal of Physiology – Heart and Circulatory Physiology* 2018;315:H1544-H1552. doi: 10.1152/ajpheart.00341.2018

- *Scientific contribution: This work examined the effect of increasing cardiac calcium cycling in Duchenne muscular dystrophy (DMD) by knocking out the phospholamban gene in mdx mice. Although cardiac myocyte contractility and calcium handling was improved, in vivo function was unexpectedly worsened. This was attributed to increased susceptibility to membrane damage from deregulated calcium cycling, placing excessive stress on the heart muscle and leading to extensive fibrotic development. This paper is a significant contributor to the DMD literature because several previously published studies examined increased calcium cycling as a therapeutic strategy in DMD skeletal muscle. This study shows calcium-centered therapeutic approaches for DMD cardiomyopathy may place additional stress on the cardiac muscle and lead to worsened pathology in the heart.*
- *Role: I served as the director of this project, designed and conducted most experiments, mentored an undergraduate student on a subset of experiments (Olander ME), and wrote the majority of the manuscript.*

- *Affiliation: University of Minnesota*
- *Journal impact factor (2018): 4.0*

15. **Asp ML**, Sjaastad FV, Siddiqui JK, Davis JP, Metzger JM. Effects of modified parvalbumin EF-hand motifs on cardiac myocyte contractile function. *Biophysical Journal* 2016;110:2094-105. doi: 10.1016/j.bpj.2016.03.037
- *Affiliation: University of Minnesota*
- *Journal impact factor (2016): 3.7*

14. Prins KW, **Asp ML**, Zhang H, Wang W, Metzger JM. Microtubule-mediated misregulation of junctophilin-2 underlies T-tubule disruptions and increased calcium sparks in *mdx* mice. *Journal of the American College of Cardiology Basic to Translational Science* 2016;1:122-30. doi: 10.1016/j.jacbts.2016.02.002
- *Affiliation: University of Minnesota*
- *Journal impact factor: New journal in 2016, no impact factor established*

13. Wang W, **Asp ML**, Guerrero-Serna G, Metzger JM. Differential effects of S100 proteins A2 and A6 on cardiac Ca^{2+} cycling and contractile performance. *Journal of Molecular and Cellular Cardiology* 2014;72C:117-25. doi: 10.1016/j.yjmcc.2014.03.003
- *Affiliation: University of Minnesota*
- *Journal impact factor (2014): 4.7*

12. **Asp ML**, Martindale JJ, Metzger JM. Direct, differential effects of tamoxifen, 4-hydroxytamoxifen, and raloxifene on cardiac myocyte contractility and calcium handling. *PLoS One* 2013;8(10):e78768. doi: 10.1371/journal.pone.0078768
- *Affiliation: University of Minnesota*
- *Journal impact factor (2013): 3.5*

11. Wang W, Barnabei MS, **Asp ML**, Heinis FI, Arden E, Davis J, Braunlin E, Li Q, Davis JP, Potter JD, Metzger JM. Noncanonical EF-hand motif strategically delays Ca^{2+} buffering to enhance cardiac performance. *Nature Medicine* 2013;19:305-12. doi: 10.1038/nm.3079
- *Affiliation: University of Minnesota*
- *Journal impact factor (2013): 28.1*

10. **Asp ML**, Martindale JJ, Heinis FI, Wang W, Metzger JM. Calcium mishandling in diastolic dysfunction: Mechanisms and potential therapies. *Biochimica et Biophysica Acta* 2013;1833:895-900. doi: 10.1016/j.bbamcr.2012.09.007
- *Affiliation: University of Minnesota*
- *Journal impact factor (2013): 5.3*

9. **Asp ML**, Richardson JR, Collene AL, Droll KR, Belury MA. Dietary protein and beef consumption predict for markers of muscle mass and nutrition status in older adults. *Journal of Nutrition Health & Aging* 2012;16:784-90. doi: 10.1007/s12603-012-0064-6
- *Affiliation: The Ohio State University*
- *Journal impact factor (2012): 2.4*

8. **Asp ML**, Tian M, Kliewer KL, Belury MA. Rosiglitazone delayed weight loss and anorexia while attenuating adipose depletion in mice with cancer cachexia. *Cancer Biology & Therapy* 2011;12:957-65. doi: 10.4161/cbt.12.11.18134
- *Affiliation: The Ohio State University*
- *Journal impact factor (2011): 2.6*

7. Tian M, **Asp ML**, Nishuima Y, Belury MA. Evidence for cardiac atrophic remodeling in cancer-induced cachexia in mice. *International Journal of Oncology* 2011;39:1321-6. doi: 10.3892/ijo.2011.1150

- *Affiliation: The Ohio State University*
- *Journal impact factor (2011): 2.4*

6. **Asp ML**, Collene AL, Norris LE, Cole RM, Stout MB, Tang SY, Hsu JC, Belury MA. Time-dependent effects of safflower oil to improve glycemia, inflammation and blood lipids in obese, post-menopausal women with type 2 diabetes: A randomized, double-masked, crossover study. *Clinical Nutrition* 2011;4:443-9. doi: 10.1016/j.clnu.2011.01.001

- *Affiliation: The Ohio State University*
- *Journal impact factor (2011): 3.7*

5. Tian M, Kliewer KL, **Asp ML**, Stout MB, Belury MA. c9t11-Conjugated linoleic acid-rich oil fails to attenuate wasting in colon-26 tumor-induced late-stage cachexia in male CD2F1 mice. *Molecular Nutrition & Food Research* 2011;55:268-77. doi: 10.1002/mnfr.201000176

- *Affiliation: The Ohio State University*
- *Journal impact factor (2011): 4.3*

4. Tian M, Nishijima Y, **Asp ML,** Stout MB, Reiser PJ, Belury MA. Cardiac alterations in cancer-induced cachexia in mice. *International Journal of Oncology* 2010;37:347-53. doi: 10.3892/ijo_00000683

- *Affiliation: The Ohio State University*
- *Journal impact factor (2010): 2.6*

3. **Asp ML**, Tian M, Wendel AA, Belury MA. Evidence for the contribution of insulin resistance to the development of cachexia in tumor-bearing mice. *International Journal of Cancer* 2010;126:756-63. doi: 10.1002/ijc.24784

- *Affiliation: The Ohio State University*
- *Journal impact factor (2010): 4.9*

2. Norris LE, Collene AL, **Asp ML**, Hsu JC, Liu LF, Richardson JR, Li D, Bell D, Osei K, Jackson RD, Belury MA. Comparison of dietary conjugated linoleic acid with safflower oil on body composition in obese postmenopausal women with type 2 diabetes mellitus. *American Journal of Clinical Nutrition* 2009;90:468-76. doi: 10.3945/ajcn.2008.27371

- *Affiliation: The Ohio State University*
- *Journal impact factor (2009): 6.3*

1. **Asp ML**, Hertzler SR, Chow J, Wolf BW. Gamma-cyclodextrin lowers postprandial glycemia and insulinemia without carbohydrate malabsorption in healthy adults. *Journal of the American College of Nutrition* 2006;25:49-55. doi: 10.1080/07315724.2006.10719514

- *Affiliation: The Ohio State University*
- *Journal impact factor (2006): 2.5*

BOOK CHAPTERS

3. Thompson BR, **Law ML**, Metzger JM. Molecular mechanism of sarcomeric cardiomyopathies. In: Garry DJ, Wilson RF, Vlodaver Z (eds). *Congestive Heart Failure and Cardiac Transplantation: Clinical, Pathology, Imaging, and Molecular Profiles*. New York: Springer Publishing, 2017.

2. Belury MA, **Asp ML**, Collene AL, Koster CG, Liu L-F, Purushotham A, Shrode G, Wendel A. Is There a Role for Conjugated Linoleic Acid to Aid in the Prevention of Type 2 Diabetes? In:

Huang YS, Yanagita T, Knapp H (eds). *Dietary Fats and Risk of Chronic Disease*. Champaign, IL:American Oil Chemists Society, 2006:263-73.

1. Hertzler SR, Kim Y, Khan R, **Asp M**, Savaiano D. Intestinal disaccharidase depletions. In: Shils ME, Shike M, Ross AC, Caballero B, Cousins RJ (eds). *Modern Nutrition in Health and Disease*, 10th ed. Philadelphia:Lippincott Williams & Wilkins, 2006:1189-1200.

ABSTRACTS AT NATIONAL/INTERNATIONAL PROFESSIONAL MEETINGS

17. **Law ML**, Metzger JM. Cardiac myocyte intrinsic contractility and calcium handling deficits underlie heart organ dysfunction in murine cancer cachexia. 6th Virtual Cancer Cachexia Conference, August 2021.

- *Scientific contribution: This research distinguishes cellular-intrinsic functional deficits from systemic factors that may be contributing to cachexia-induced cardiomyopathy. Importantly, decreased calcium cycling in individual cardiac myocytes can explain contractility and relaxation deficits on a beat-to-beat basis and may be an important contributor to in vivo cardiac dysfunction.*

16. Beaudry AG, Mills M, **Law ML**. Variability in body and tissue weight measurement reporting in the colon-26 cancer cachexia murine model. 6th Virtual Cancer Cachexia Conference, August 2021.

- *Scientific contribution: This research involved a review of more than 200 papers using the C26 mouse model of cachexia to conduct a comprehensive analysis of different body and tissue weight reporting methods in the literature. Main findings are a lack of consistency in what data is reported and how it is reported, which may lead to differential study findings.*

15. **Law ML**, Metzger JM. Cardiac contractile dysfunction is associated with aberrant myocyte calcium handling in mice with cancer-induced cachexia. 5th Virtual Cancer Cachexia Conference, September 2020.

- *Scientific contribution: This research examined the physiological mechanisms underlying in vivo cardiac dysfunction in mice with cancer-induced cachexia. Ex vivo hearts and isolated cardiac myocytes exhibited severe deficits in contractility and relaxation, and this was associated with impaired calcium cycling. These functional deficits were rescued by β-adrenergic stimulation, which uncovers a fundamental difference from "classical" heart failure.*

14. Pham T, Sunkara M, Mallett LH, Sugianawaty M, Barnard BJ, **Law ML**, Cantey JB. Nutritional cost of necrotizing enterocolitis among preterm infants in the neonatal intensive care unit. North American Society for Pediatric Gastroenterology, Hepatology and Nutrition Conference, Las Vegas, NV, November 2017.

13. Murphy B, Mallett L, **Law M**. Family education program improves diet, family meals and physical activity with interactive demonstrations. Society for Nutrition Education and Behavior Conference, Washington, D.C., July 2017.

12. **Law ML**, Larson K, Rennert M, Barnard BJ, Drigalla J, Beeram MR, Shanley LA. Implementation of a pediatric physician compensation model to improve number of overweight patients with completed lipid panel. Pediatric Academic Societies Meeting, San Francisco, CA, May 2017.

11. **Law ML**, Farris A, McGahey J, Gibson J, McCormick S, Shanley LA. Implementation of a physician compensation model to improve timely admission orders on a hospitalist service, Pediatric Academic Societies Annual Meeting, San Francisco, CA, May 2017.

10. **Asp ML**, Metzger JM. Contractile structure-function of parvalbumin's EF-hand metal ion binding loop in isolated adult cardiac myocytes. *Biophysical Journal* 2014;106:566a.

9. **Asp ML**, Martindale JJ, Metzger JM. Mechanism of acute tamoxifen and 4-hydroxytamoxifen-mediated contractile dysfunction in isolated adult cardiac myocytes. *Biophysical Journal* 2013;104:315a.

8. **Asp ML**, Martindale JJ, Metzger JM. Tamoxifen has acute inhibitory effects on contractility in isolated adult rat cardiac myocytes. *Biophysical Journal* 2012;102(3):354a.

7. **Asp ML**, Tian M, Stout MB, Belury MA. Effects of the insulin sensitizer rosiglitazone on cachexia outcomes in mice with colon-26 tumors. Abstracts of the 5th Cachexia Conference, Barcelona, Spain, December 5-8, 2009. *Journal of Cachexia, Sarcopenia and Muscle* 2010;1(1):43-128.

6. Tian M, **Asp ML**, Stout MB, Nishijima Y, Reiser PJ, Belury MA. Cardiac alterations in cancer-induced cachexia in mice. Abstracts of the 5th Cachexia Conference, Barcelona, Spain, December 5-8, 2009. *Journal of Cachexia, Sarcopenia and Muscle* 2010;1(1):43-128.

5. **Asp ML**, Tian M, Wendel AA, Belury MA. Evidence for the early involvement of insulin resistance in the development of cachexia in mice bearing colon-26 tumors. *FASEB Journal* 2008;22:#1089.5.

4. Tian M, **Asp ML**, Wendel AA, Belury MA. Dysregulation of lipid metabolism in cardiac muscle of mice with cachexia. *FASEB Journal* 2008;22:#147.5.

3. Norris L, Collene A, **Asp M**, Liu L, Hsu D, Li D, Bell D, Osei K, Jackson R, Belury M. Conjugated linoleic acid reduces body weight and body fat in postmenopusal women with type 2 diabetes. *FASEB Journal* 2008;22:#1090.5.

2. Norris L, Collene A, **Asp M**, Liu L, Hsu D, Li D, Bell D, Osei K, Jackson R, Belury M. Comparative effects of dietary oils on markers of insulin sensitivity in postmenopausal women with type 2 diabetes. *FASEB Journal* 2008;22:#1039.6.

1. **Asp ML**, Chow J, Hertzler SR. Effect of gamma-cyclodextrin on postprandial glycemia, insulinemia, and colonic hydrogen production in healthy humans. *FASEB Journal* 2005;19:#69.2.

MEDIA

American Journal of Physiology – Heart and Circulatory Physiology Podcast. Unregulated Ca^{2+} cycling exacerbates DMD cardiomyopathy, https://www.podbean.com/media/share/pb-jyypq-9c924f, 10/16/2018.

UNIVERSITY AND COMMUNITY SERVICE AND LEADERSHIP

BAYLOR UNIVERSITY

Volunteer, Preschool Ministry, Highland Baptist Church, Waco, Texas, 2018-present (quarterly)

Volunteer, Move 2 BU, Baylor University, Waco, Texas, 2020 and 2022

Ad Hoc Reviewer, Journal of Cachexia, Sarcopenia, and Muscle, 2021 (1 manuscript)

Ad Hoc Reviewer, Journal: Experimental Physiology, 2021 (1 manuscript)

Graduate Faculty, Human Sciences and Design, Baylor University, 2020-present

Graduate Faculty, Human Health, Performance & Recreation, Baylor University, 2020-present

Member, Diversity and Inclusion Committee, Human Sciences & Design, Baylor University, 2021

Volunteer, Highland Baptist Church Community Store, Waco, Texas, May 2020

Guest Speaker, Poverty 101 Workshop, Highland Baptist Church, Waco, Texas, 2018

PREVIOUS TO BAYLOR

High School Graduation Mentor, Achieve Minneapolis, Patrick Henry High School, Minneapolis, Minnesota, 2014-2015

Member, Committee on Racial and Economic Justice, First Covenant Church, Minneapolis, Minnesota, 2013-2016

Member, Care Team, First Covenant Church, Minneapolis, Minnesota, 2014-2016

Volunteer, Homeless Shelter, First Covenant Church, Minneapolis, Minnesota, 2014-2016

Mentor for High School Students, Adventures in Leadership, Adventurous Christians Covenant Wilderness Center, Grand Marais, Minnesota, 2013, 2014

Member, Graduate Society for Nutritional Sciences (GSNS), The Ohio State University, Columbus, Ohio, 2006-2010
Quarterly Newsletter Editor, 2009-2010; Secretary, 2008-2009; Journal Club Chair, 2007-2008; National Nutrition Month Chair, 2006-2007.

Member, Registered Dietitian Journal Club, The Ohio State University Medical Center, Columbus, Ohio, 2006-2010

Member, Muscle Research Group, The Ohio State University & Nationwide Children's Hospital, Columbus, Ohio, 2006-2010

Volunteer Dietitian, Vineyard Free Medical Clinic, Columbus, Ohio, 2006-2010

Member, Care Team, Faith Covenant Church, 2002-2005

PROFESSIONAL DEVELOPMENT

TEACHING: Seminars related to pedagogy, understanding and communicating with the students represented in my classroom, subjects that I cover in my courses, incorporating faith and learning

2021

- Panel discussion for new faculty, Sponsor: Institute for Faith and Learning, Baylor University
- Our voices: African American experience, Sponsor: Academy of Teaching and Learning, Baylor University
- Can traditional weight management and a health at every size approach coexist, Sponsor: Dietitian Connection

2020

- Incorporating experiential learning in the classroom, Sponsor: Nutrition and Dietetic Educators and Preceptors
- Why is bariatric surgery so effective, Sponsor: American Physiological Society

RESEARCH: Seminars, conferences, and activities related to my research area, grant and manuscript writing, laboratory and research techniques

2022

- Baylor tenure-track women's writing group
- Cardiac tissue slices: preparation, data acquisition and analysis, Sponsor: American Physiological Society

2021

- Virtual Grant-writing seminar with Peg Atkisson, Sponsor: Baylor University
- One week in person training on extraction and 1H-NMR analysis of metabolites from frozen heart tissue, DeWayne Townsend, University of Minnesota
- Lionheart Microscope Training, Sponsor: BioTek Agilent
- 6th Virtual Cancer Cachexia Conference, Sponsor: Cancer Cachexia Society
- Cachexia and Muscle Journal Club, Sponsor: University of Arkansas

2020

- 5th Virtual Cancer Cachexia Conference, Sponsor: Cancer Cachexia Society
- NIH Virtual Conference on Program Funding and Grants Administration
- Understanding and using national dietary data – What we eat in American NHANES data essentials, Sponsor: Research Dietetic Practice Group
- New reviewer training program, Sponsor: American Journal of Physiology Regulatory, Integrative and Comparative Physiology
- Cachexia and Muscle Virtual Journal Club, Sponsor: University of Arkansas