Anna Thalacker-Mercer

Web Bio

Information

Biography

Biographical Statement

I graduated from the University of Georgia with a B.S. in Biological Science. I did my graduate training at Purdue University where I received a Ph.D. through the Interdepartmental Nutrition Program in the Department of Nutrition Science (formerly Foods and Nutrition). During my graduate research training I developed a strong background in geriatric nutrition, nutritional genomics, protein metabolism, and the mechanisms of aging skeletal muscle. While analyzing and interpreting the influence of dietary intake on the skeletal muscle transcriptome, I recognized that exercise is necessary for successful health and appreciated the need for training in exercise physiology. Additionally, I developed a keen interest in molecular changes occurring in the skeletal muscle with age, particularly inflammatory and stress responses, which may influence age-related skeletal muscle atrophy (i.e. sarcopenia) and metabolic dysfunction leading to increased adiposity and metabolic disease in older adults. The need for additional training and my developed interests led me to the Center for Exercise Medicine at the University of Alabama at Birmingham (UAB) to study the efficacy of exercise as a therapy for health-related disease and muscle re-growth. I applied to the competitive NIH funded T32 Obesity Training Program and the Center for Aging Translational Research Program at UAB where I completed my postdoctoral fellowship. In December of 2010, I was promoted to Assistant Professor in the UAB Department of Cell, Developmental, and Integrative Biology, with affiliations and support through the UAB Center for Exercise Medicine, the Center for Aging, the Nutrition Obesity Research Center, and the NIH-funded Clinical and Translational Science Award, locally named the Center for Clinical and Translational Science at UAB. During my short time as an Assistant Professor at UAB, I continued to study the mechanisms underlying the observed age-related skeletal muscle phenotypes, and began to appreciate sex differences in aging muscle. Observed differences in the aging female muscle transcriptome sparked my interest in metabolomics and led me to develop collaborations to understand the link between amino acid metabolism and insulin sensitivity. In 2012 I was recruited to the Division of Nutritional Sciences at Cornell University.

My research program is built on two complementary areas of focus: (i) Mechanisms underlying skeletal muscle metabolic and inflammatory dysfunction in health and disease primarily linked to aging; and (ii) Mechanisms by which dietary and exercise treatment can improve the phenotype of aging skeletal muscle and metabolic disease. I am particularly interested in understanding the dynamics among amino acids, metabolites, and inflammation in the development of

metabolic disease and sarcopenia.

Teaching

Teaching and Advising Statement

While I take every opportunity to teach and learn from others, I am enthusiastic about formal classroom teaching. I recognize that all students are unique in their learning process and therefore, I incorporate multiple tools to relay course material. Additionally, I am committed to training undergraduate and graduate students and postdoctoral fellows in biomedical science. I believe that hands-on, interactive, goal-oriented research training is the best approach to prepare young investigators for a scientific career. Regular meetings are used to encourage goal development, data interpretation, scientific writing and reading, study design, grantsmanship, and troubleshooting. I strive to keep lines of communication open with my mentees, encouraging them to offer suggestions and new insights to protocols and/or outcomes.

Professional

Current Professional Activities

Chair, Energy and Macronutrient Metabolism, Research Interest Section, American Society for Nutrition

Reviewer: Journals of Gerontology, American Journal of Clinical Nutrition, Journal of Nutrition, Obesity, Nutrition Reviews, Journal of Clinical Endocrinology and Metabolism, Advances in Nutrition, Annals of the New York Academy of Sciences, Journal Frontiers in Exercise Physiology, Journal Frontiers in Skeletal Muscle Physiology

Research

Current Research Activities

Using metabolomics to identify and characterize metabolic disturbances underlying the aging skeletal muscle phenotype and the hypertrophic response to resistance exercise training; Understanding impaired leucine stimulated responses in skeletal muscle health using primary and C2C12 myoblast cell cultures; Investigating the role of PYY in skeletal muscle metabolic health; Understanding sex differences in the aging skeletal muscle transcriptome; Using metabolomics to identify links between amino acids and peripheral insulin sensitivity; Analyzing the synergistic effects of whey protein and resistance exercise on muscle hypertrophy in older adults; Determining skeletal muscle inflammatory and metabolic disturbances in women with polycystic ovary syndrome; Chitosan coated transvaginal mesh and host

responses: Does vaginotomy matter?; Single-Cell Somatic Mitochondrial DNA Heteroplasmy; Identifying changes in the human, aging male skeletal muscle methylome

Extension

Education

Education

Postdoc 2007-2010 - University of Alabama at Birmingham - Advisor, Marcas Bamman

Ph.D. 2007 - Nutrition Sciences, Purdue University, Advisor, Wayne Campbell

B.S. 2000 - Biological Sciences, University of Georgia

Courses

Courses Taught

NS3410 Human Anatomy and Physiology

NS6320 Regulation of Macronutrient Metabolism

Mentor for graduate student NS7030 presentation

Research mentor for undergraduate research

Research mentor for graduate research

Websites

Administration

Administrative Responsibilities

Field of Nutrition Admissions Committee

DNS Small Grants Committee

DNS Teaching and Research Fellow Search Committee

College of Human Ecology, Committee on Academic Status

Faculty advisor, Nutrition Graduate Student Organization

Chair, Energy and Macronutrient Metabolism, Research Interest Section, American Society for Nutrition

Publications

Selected Publications

Peer-reviewed Publications

1. **Thalacker-Mercer AE**, Fleet JC, Craig BA, Carnell NS, Campbell WW.*Inadequate protein intake affects skeletal muscle transcript profiles in older humans.* Am J Clin Nutr 2007 May; 85(5):1344-52.PMCID:PMC2447912
2. **Thalacker-Mercer AE**, Johnson CA, Yarasheski KE, Carnell NS, Campbell WW. *Nutrient ingestion, protein intake, and sex, but not age affect albumin synthesis rate in humans. J Nutr* 2007 July; 137 (7): 1734-40.
3. **Thalacker-Mercer AE,** and Campbell WW. *Dietary protein intake affects albumin fractional synthesis rate equally in younger and older adults.* Nutr Rev. 2008 Feb;66(2):91-5
4. Stull AJ, Iglay HB, Apolzan JW, **Thalacker-Mercer AE**, and Campbell WW. *Liquid and solid meal replacement products differentially affect postprandial appetite and food intake in older humans.* J Am Diet Assoc. 2008 Jul;108(7):1226-30. PMCID:PMC2556245
5. **Thalacker-Mercer AE,** Petrella JK, Bamman MM. *Does habitual dietary intake influence myofiber hypertrophy in response to resistance training? A cluster analysis.* Appl Physiol Nutr Metab. 2009 Aug;34(4):632-9. PMCID:PMC3188961
6. **Thalacker-Mercer AE**, Dell'Italia LJ, Cui X, Cross JM, and Bamman MM. *Differential genomic responses in old vs. young humans despite similar levels of modest muscle damage after resistance loading.* Physiological Genomics. Physiol Genomics;40:141-9. PMCID:PMC2825766
7. **Thalacker-Mercer AE**, Fleet JC, Craig BA, and Campbell WW. *The skeletal muscle transcript profile reflects accommodative responses to inadequate protein intake in younger and older males.* J Nutr Biochem. 2010 Nov;21(11):1076-82. PMCID: PMC2891367
8. Kwak HB, **Thalacker-Mercer AE**, Anderson EJ, Lin CT, Kane DA, Lee NS, Cortright RN, Bamman MM, and Neufer PD. *Simvastatin impairs ADP-stimulated respiration and increases mitochondrial oxidative stress in primary human skeletal myotubes. Free Radic Biol Med.* 2011 Oct 25.
9. Merritt E, **Thalacker-Mercer A**, Cross J, Windham S, Thomas S, Bamman M. *Increased expression of atrogenes and TWEAK family members after severe burn injury in non-burned human skeletal muscle.* JBCR
10. Merritt E, Stec M, **Thalacker-Mercer A**, Windham S, Cross J, Shelley D, Tuggle S, Kosek D, Kim J, and Bamman, M. *Heightened muscle inflammation susceptibility may impair regenerative capacity in aging humans.* J Appl Physiol 115, 937-948,
11. Day K, Waite L, **Thalacker-Mercer A**, West A, Bamman M, Brooks J, Myers R, and Absher D. *Differential DNA methylation with age displays both common and dynamic features across human tissues that are influenced by CpG landscape.* Genome Biol 14, R102
12. **Thalacker-Mercer A**, Stec M, Cui X, Cross J, Windham S, and Bamman M. *Cluster analysis reveals differential transcript profiles associated with resistance training-induced human skeletal muscle hypertrophy.* PhysiolGenomics 45, 499-507
13. **Thalacker-Mercer A**, Ingram K, Guo F, Ilkayeva, O, Newgard C, and Garvey W. *BMI, RQ, diabetes, and gender affect the relationships between amino acids and clamp measures of insulin action in humans.* Diabetes.
14. **Thalacker-Mercer AE** and Drummond MJ. *Protein metabolism in inactive older adults.* New York Academy of Sciences. Ann N Y Acad Sci. 2014 Aug 12.
15. Guoyao Wu, Jessica Fanzo, Dennis D. Miller, Prabhu Pingali, Mark Post, Jean L.

Steiner, and **Anna E. Thalacker-Mercer**. *Production and supply of high-quality food protein for human consumption: sustainability, challenge and innovations.* NYAS Annals Meeting Reports. Ann N Y Acad Sci. 2014 Aug;1321(1):1-19

Book Chapter

Campbell, WW, Carnell, NS, and **Thalacker, AE**. Protein Metabolism and Requirements. *Geriatric Nutrition; The Health Professional's Handbook. 3rd Ed. 2006* p15-22

Krista Casazza, Lynae J. Hanks, **Anna Thalacker-Mercer**. Insulin-like growth factor system in different ethnic groups and relationship with growth and health. *The Handbook of Growth and Growth Monitoring in Health and Disease.*