# Kandy T. Velázquez-Figueroa

## EDUCATION

**University of South Carolina**
Doctor of Philosophy in Exercise Science-Applied Physiology Graduated 2012
Thesis: The influence of quercetin, curcumin, and resistance exercise on anabolic signaling in the skeletal muscle of cachectic mice

**University of Puerto Rico** Graduated 2006
Masters of Science in Medical Physiology
Department of Physiology, Medical Sciences Campus
Thesis: The hedonic, reinforcing, and anxiety related properties of testosterone metabolite androstanediol

**University of Puerto Rico** Graduated 2002
Bachelor of Science, Major Biology
Department of Biology, Mayaguez Campus

## ACADEMIC APPOINTMENTS

**Postdoctoral Fellow** 2013-present
University of South Carolina School of Medicine
Department of Pathology, Microbiology, and Immunology
- Involved in research examining the effects of obesity on cancer development and natural supplements on cancer pain

**Adjunct Faculty** 2015-2017
University of South Carolina, Department of Exercise Science
- Taught Nutrition & Immunology (lecture) (60 student course)

**Instructor of Biology** 2012-2013
University of South Carolina Upstate, Division of Natural Sciences and Engineering
- Taught physiology (lecture) (100 student course)
- Taught physiology and general biology lab

**Adjunct Faculty** 2012
York Technical College, Department of Science
- Taught anatomy and physiology (lecture and lab) (25 student course)

**Graduate Teaching Assistantship** 2010 – 2012
University of South Carolina, Department of Exercise Science
- Taught nutrition and wellness (125+ students)
- Taught stress assessment and management techniques (125+ students)
- Taught lifetime fitness and wellness (125+ students)
- Taught human anatomy and physiology lab I and II (20 students)

**Adjunct Lab Instructor** 2011
Midland Tech College, Department of Science

- Taught human anatomy and physiology Lab I and II (40 students)

## ACADEMIC HONORS & AWARDS

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|---|---|
| Rising Stars in Biomedical, Massachusetts Institute of Technology and Harvard Medical School | 2018 |
| SLOAN Scholarship Mentoring Network Grant | 2018 |
| Pathway to Independence Award, K99/R00, NCCIH, NIH | 2017-2022 |
| Diversity Supplement, NCI-NIH | 2016-2017 |
| ASPIRE I, Track II, University of South Carolina | 2016-2017 |
| South East Alliance for Graduate Education and Professoriate Fellowship (SEAGEP), USC-SOM | 2009-2012 |
| Travel Award-University of South Carolina, Graduate School | 2011 |
| SLOAN Scholarship-University of South Carolina, School of Medicine | 2008 |
| PREP-Program-University of South Carolina, School of Medicine | 2007 |
| RISE-Program-University of Puerto Rico-Medical Sciences Campus | 2005 |
| Travel Award- International Behavioral Neuroscience Society | 2005 |

## ACADEMIC & COMMUNITY SERVICES

**Women's Mentor Network at USC** 2016-2018

- Mentor two undergraduate female students regarding personal and professional growth.

**Peer-Reviewed Journals**

- Jounal of Herbal Medicine 2018
- Carcinogenesis 2015-2018
- Medicine & Science in Sports & Exercise 2016

**University of South Carolina**

- Second Reader Senior Thesis 2014
- Undergraduate Student Day Judge 2012

**University of South Carolina Upstate**

- Global Discovery Travel Award Program 2013
  Organized and chaperoned seven students on a school-sponsored educational trip to Puerto Rico for a one-week period
- Health Professions Club (Faculty Sponsor) 2012

**Harvest Hope Food Bank** 2010

- Volunteer

**Brennan Elementary School** 2009

- Girl's on the Run Coach
  Mentored young females regarding living a healthy lifestyle

**Brain Awarness Week** 2006-2009

- Small group based elementary school activities

**University of Puerto Rico, School of Medicine**

- Academic Senate-Student Representative 2005-2006

## ADVISING EXPERIENCES

**Meredith Carson (Master student, Biomedical Sciences, 2017-present)**

- Project: Effects of sex and diet on colon cancer development
- Responsibilities: Helped with study design, data analysis, as well as interpretation of data.

**Alex Sougiannis (PhDc, Biomedical Sciences, 2016-present)**

- Project: Effects of 5 Fluoracil chemotherapy on colon inflammation. Gut microbiota, and adverse physiological outcomes
- Responsibilities: Helped with study design, data analysis, as well as interpretation of data.

**Jackie Bader (PhDc, Biomedical Sciences, 2014-present)**

- Project: Macrophage depletion using clodronate liposomes decreases tumorigenesis and alters gut microbiota in the AOM/DSS mouse model of colon cancer
- Responsibilities: Helped with study design, animal-handling training, data collection, data analysis, as well as interpretation of data.

**Taryn Cranford (PhD, Biomedical Sciences, 2013-2016)**

- Dissertasion: Influence of High Fat Diet on Macrophage Behavior and Metabolic Processes in Obesity Sensitive and Resistance Mice: Role of Monocyte Chemoattractant Protein 1
- Responsibilities: Helped with study design, animal-handling training, data collection, data analysis, as well as interpretation of data.

**Cara Pritchett (BS, Biology & Spanish, 2013-2014)**

- Senior Thesis: Role of miRNA on Inflammation in the Hepatic Tissue of a High Far Diet Model
- Responsibilities: Second reader for senior thesis. Helped with study design, animal-handling training, data collection, data analysis, as well as interpretation of data.

**Kayla Bingham (South Carolina Governor's School for Sciences & Mathematics, 2009)**

- Summer Project: A small peptide inhibitor of protein kinase C gamma translocation attenuates allodynia and hyperalgesia in a rodent model of neurophatic pain.
- Responsibilities: Helped with study design, animal-handling training, data collection, data analysis, as well as interpretation of data.

**Chip Bowman (BS, Biology & Spanish, 2009)**

- Summer Project: Metabotropic glutamate receptor-5 and protein kinase C-epsilon increase in dorsal root ganglion neurons and spinal glial activation in an adolescent rat model of painful neck injury
- Responsibilities: Helped with data analysis, as well as interpretation of data.

## RESEARCH EXPERIENCE

**Research Interests:**

- The influence of exercise and nutrition on cancer pain and inflammatory chronic diseases

**Obesity, Cancer, and Immunology Laboratory** 2013-Present
Principal Investigator: E. Angela Murphy, Ph.D.
University of South Carolina School of Medicine
Department of Pathology, Microbiology & Immunology

- Involved in research examining the effects of obesity on cancer development
- Investigating the role of microRNA on obesity and cancer progression

- The influence of dietary intake on obesity and cancer

**Integrative Muscle Biology Laboratory** 2009 – 2012
Principal Investigator: James A. Carson, Ph.D.
University of South Carolina
Department of Exercise Science

- Involved in research examining the effects of exercise and nutrition on muscle wasting in a mouse model of cancer
- Investigating the physiological and molecular mechanisms of muscle wasting

**Pain Laboratory** 2006 – 2009
Principal Investigator: Sarah M Sweitzer, Ph.D.
University of South Carolina School of Medicine
Department of Physiology, Pharmacology & Neuroscience

- Involved in research examining the effects of protein kinase C inhibitor and opioid receptors on neuropathic pain

**Neuroendocrinology Laboratory** 2002 – 2006
Principal Investigator: Juan C. Jorge, Ph.D.
University of Puerto Rico, Department of Anatomy

- Involved in research examining the effects of testosterone metabolites on hedonia, reinforcement, and anxiety

## PATENT

Modulation of Delta Opioid Receptor Expression 2010
University of South Carolina, School of Medicine

## PUBLICATIONS & PROFESSIONAL PRESENTATIONS

**Publications:**

**In Preparation**

1. **Velázquez KT**, Enos RT, Bader JE, Sougiannis A, Carson MS, Chatzistamou I, Robinson C, Carson JA, Murphy EA. Prolonged high-fat-diet feeding promotes NAFLD and alters gut microbiota in mice.

**Published**

1. Cranford TL, **Velázquez KT**, Enos RT, Sougiannis AT, Bader JE, Carson MS, Bellone RR, Chatzistamou I, Nagarkatti M, Murphy EA. Effects of high fat diet –induced obesity on mammary tumorigenesis in the PyMT/MMTV murine model. Cancer Biology Therapy. 2018 Nov 2:1-10. Epub ahead of print
2. Fix DK, Hardee JP, Gao S, VanderVeen BN, **Velázquez KT**, Carson JA. The role of gp130 in basal and exercise trained skeletal muscle mitochondrial quality control. J Appl Physiol. 2018. Feb 1
3. Bader JE, Enos RT, **Velázquez KT**, Carson MS, Nagarkatti PS, Chatzistamou I, Davis JM, Robinson C, Murphy EA. Macrophage depletion using clodronate liposomes decreases tumorigenesis and alters gut microbiota in the AOM/DSS mouse model of colon cancer. Am J Physiolo Gastrointest Liver Physiol 2018. Jan 1;314(1):G22-G31

4. Mehrpouya-Bahrami P, Chitrala KN, Ganewatta MS, Tang C, Murphy EA, Enos RT, **Velázquez KT**, McClellan J, Nagarkatti M, Nagarkatti P. Blockade of CB1 cannabinoid receptor alters gut microbiota and attenuates inflammation and diet induced obesity. Sci Rep. 2017 Nov 15(7):15645
5. **Velázquez KT**, Enos RT, Carson MS, Cranford TL, Bader JE, Sougiannis AT, Prichett C, Fan D, Carson JA, Murphy EA. Mir155 deficiency aggravates high-fat-diet-induced adipose tissue fibrosis in male mice. Physiol Rep. 2017. Sep;5(18).
6. Cranford TL, **Velázquez KT**, Enos RT, Bader JE, Carson MS, Chatzistamou I, Nagarkatti M, Murphy EA. Loss of monocyte chemoattractant protein-1 expression delays mammary tumorigenesis and reduces localized inflammation in the C3(1)/SV40Tag triple in triple negative breast cancer murine model. Cancer Biology Therapy. 2017 Feb;18(2):85-93.
7. Enos RT **Velázquez KT**, Carson MS, McClellan JL, Nagarkatti PS, Nagarkatti M, Davis JM, Murphy EA. A low dose of dietary quercetin fails to protect against the development of an obese phenotype in mice. PLoS One. 2016 Dec 13;11(12):e0167979
8. **Velázquez KT**, Enos RT, Carson MS, Cranford TL, Bader J, Chatzistamou I, Singh U, Nagarkatti PS, Nagarkatti M, Davis JM, Carson JA, Murphy EA. Weight loss following diet-induced obesity does not alter colon tumorigenesis in the AOM mouse model. Am J Physiolo Gastrointest Liver Physiol. 2016 Sept 8.
9. Enos RT, **Velázquez KT**, McClellan JL, Cranford TL, Nagarkatti PS, Nagarkatti M, Davis JM, Murphy EA. High-fat diets rich in saturated fat protect against azoxymethane/dextran sulfate sodium-induced colon cancer. Am J Physiolo Gastrointest Liver Physiol. 2016 Jum 1;310(11):G906-19.
10. **Velázquez KT**, Enos RT, McClellan JL, Cranford TL, Chatzistamou I, Singh UP, Nagarkatti M, Nagarkatti PS, Fan D, Murphy EA. MicroRNA-155 deletion promotes tumorigenesis in the azoxymethane-dextran sulfate model of colon cancer. Am J Physiolo Gastrointest Liver Physiol. 2016 Mar 15;310(6):G347-58.
11. Cranford TL, Enos RT, **Velázquez KT**, McClellan JL, Davis JM, Singh UP, Nagarkatti M, Nagarkatti PS, Robinson CM, Murphy EA. Role of MCP-1 on inflammatory processes and metabolic dysfunction following high-fat feedings in the FVB/N strain. Int J Obes (Lond). 2016 May;40(5):844-51.
12. Murphy EA, **Velázquez KT**, Herbert KM. Influence of high-fat diet on gut microbiota: a driving force for chronic disease risk. Curr Opin Clin Nutr Metab Care. 2015 Sep;18(5):515-20.
13. Enos RT, **Velázquez KT**, McClellan JL, Cranford TL, Walla MD, Murphy EA. Lowering the dietary omega-6:omega-3 does not hinder nonalcoholic fatty liver disease development in a murine model. Nutr Res. 2015 May;35(5):449-59.
14. Murphy EA, Enos R, **Velázquez KT**. Influence of exercise on inflammation in cancer: direct effect or innocent bystander? Exerc Sport Sci Rev. 2015 Jul;43(3):134-42.
15. Smith SN, Paige C, **Velázquez KT**, Smith TP, Raja SN, Wilson SP, Sweitzer SM. Injury-specific promoters enhance herpes simplex virus-mediated gene therapy for treating neuropathic pain in rodents. J. Pain. 2015 Mar;16(3):283-90.
16. **Velázquez KT**, Enos RT, Narsale AA, Puppa MJ, Davis JM, Murphy EA, Carson JA. Quercetin supplementation attenuates the progression of cancer cachexia in the $Apc^{Min/+}$ mouse. Journal of Nutrition. 2014 Jun;144(6):868-75.
17. Enos RT, **Velázquez KT**, McClellan, Cranford TL, Walla MD, Murphy EA. Reducing the Dietary Omega-6:Omega-3 Utilizing α-Linolenic Acid; Not a Sufficient Therapy for Attenuating High-Fat-Diet-Induced Obesity Development Nor Related Detrimental Metabolic and Adipose Tissue Inflammatory Outcomes. PLOS One. 2014 Apr:9(4):e94897
18. Enos RT, **Velázquez KT**, Murphy EA. Insight into the impact of dietary saturated fat on tissue-specific cellular processes underlying obesity-related diseases. The Journal of Nutritional Biochemistry. 2014 Jun;25(6):600-12
19. Day ST, Enos RT, McClellan JL, Steiner JL, **Velázquez KT**, Murphy EA. Linking Inflammation to tumorigenesis in a Mouse Model of High-Fat-Diet-Enhance Colon Cancer. Cytokine. 2013 Oct;64(1):454-62.

20. Enos RT, Davis JM, **Velázquez KT**, Day S, McClellan J, Murphy EA. Influence of Saturated Fat on Adiposity, Macrophage Behavior, Inflammation, and Metabolism: Composition Matters. J Lipid Res. 2013 Jan;54(1):152-63.
21. Puppa MJ, White JP, **Velázquez KT**, Baltgalvis KA, Sato S. Baynes JW, Carson JA. The effect of exercise on IL-6-induced cachexia in the Apc (Min/+) mouse. J Cachexia Sarcopenia Muscle. 2012 3(2):117-37 Epub 2011 Nov 30.
22. **Velázquez KT**, Mohammad HK, Sweitzer SM. Protein kinase C in pain: involvement of multiple isoforms. Pharmacol Res. 2007 Jun;55(6):578-89.
23. Rivera-Arce JC, Morales-Crespo L, Vargas-Pinto N, **Velázquez KT,** Jorge JC. Central effects of the anabolic steroid17α-methyltestosterone in female anxiety. Pharmacology, Biochemistry and Behavior. 2006 Jun;84(2):275-81
24. Jorge JC, **Velázquez KT**, Ramos DL, Lorenzini I, Marrero J, Maldonado-Vlaar C. A testosterone metabolite is rewarding to ovariectomized female rats. Behavioral Neurosciences 2005 Oct;119(5):1222-1226.

**Profesional presentations**

1. Herbal products as a therapeutic treatment for cancer symptoms: inflammation, pain & cachexia. Seminar Series in the Department of Exercise Science University of South Carolina. September 15, 2017.
2. Is inflammation the link between colon cancer progression and initiation of cancer pain? Physiological Seminar Series at the University of Florida, Gainesville. February 27, 2018.

## FUNDING

**Funded**

**Active**

Pathway to Independence Award, K99/R00 09/01/17-08/30/22
Project number: K99AT009206-01A1
Tittle: The effects of Ojeok-san on neuro-immune interactions in cancer-induced visceral pain
Funding Agency: National Center For Complementary & Integrative Health, NIH
PI: Kandy T. Velázquez
Award Amount: $963,225

Sloan Scholars Mentor/Mentee Award 10/1/2018-3/1/2019
Title: Using electrophysiological techniques to determine novel analgesic therapies for cancer pain
Funding Agency: Sloan Scholars Mentoring Network
Award Amount: $2,000

**Completed**

Diversity Supplement 08/01/16-02/28/19
Project number:07S1-CA121249
Title: Cachexia in $Apc^{Min/+}$ mice: The role of IL-6
Funding Agency: National Cancer Institute, NIH
PI: Kandy T. Velázquez and James A. Carson (parent grant R01-CA121249)
Award Amount: $206,862

Advance Support for Innovative Research Excellence (ASPIRE) Award 01/27/16-06/30/17

Project number: 18060-16-41770
Tittle: The effects of Ojeok-san on neuro-immune interactions in colon cancer
Funding Agency: Competitive Intramural Funding at University of South Carolina
PI: Kandy T. Velázquez
Award Amount: $5,000

**Not funded**

Irene Diamon Fund/AFAR Postdoctoral Transition Awards in Aging — Submitted May 2017
Title: The role of macrophages on cancer cachexia
Funding Agency: American Federation of Aging (AFAR)
Total Funds Requested: $120,000

Pathway to Independence Award, K99/R00 — Sumitted October 2015
Tittle: The effects of Ojeok-san on microbiota neuro-immune interactions in cancer pain
Funding Agency: National Center For Complementary & Integrative Health, NIH
PI: Kandy T. Velázquez
Proposed Project Period: 07/01/2016-06/30/2021
Total funds requested: $932,624
Impact Score: 39

Ruth L. Kirschstein National Research Service Award, F32 — Submitted April 2014
Title: Effects of quercetin on gut microbiota in obesity-enhanced colon cancer
Funding Agency: National Center For Complementary & Integrative Health, NIH
Proposed Project Period: 12/01/2014-11/30/2017
Total funds requested: 163,994
Impact Score: 52

## WORKSHOPS

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|---|---|
| Pain in Animals Workshop, Creating a Roadmap for Measuring Chronic Pain in Dogs and Cats, NIH | 2017 |
| John Milner Nutrition & Cancer Prevention Research Practicum, National Cancer Institute, NIH | 2017 |
| Gut Check: Exploring Your Microbiome: University of Colorado Boulder | 2014 |
| Pregnancy and Strength Training (CEC/CEU Course) | 2014 |
| Extreme Interval Training (CEC Course) | 2014 |
| ACSM/Exercise is Medicine Professional Credential Workshop | 2014 |
| The 18$^{TH}$ Annual Institute on Teaching and Mentoring (GA) | 2010 |
| Workshop on Basic Confocal Microscopy University of South Carolina | 2009 |
| Professional Skills Training Writing and Reviewing for Scientific Journals (APS) | 2006 |

## PROFESSIONAL CERTIFICATIONS & MEMBERSHIPS

American College of Sport Medicine Certified Health Fitness Specialist
American Heart Association Cardio-Pulmonary Resuscitation
National Strength and Conditioning Association
American College of Sport Medicine
American Physiology Society
American Pain Society
Society For Neuroscience

## LANGUAGES

Fluent in both English and Spanish

## REFERENCES


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