BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.

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NAME Sara Campbell	POSITION TITLE Associate Professor
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EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Bloomsburg University of PA, Bloomsburg, PA	BS	1995-1999	Exercise Science/Biology
Bloomsburg University of PA, Bloomsburg, PA	MS	1999-2001	Exercise Science
Florida State University, Tallahassee, FL	PhD	2001-2007	Exercise Science
Florida State University, Tallahassee, FL	Postdoc	2007-2010	Nutrition/Physiology

A. Personal Statement

I am an exercise physiologist who specializes in the gut microbiota. Humans live in symbiosis with clusters of microbes in various parts of the body ranging from the skin, gut, oral cavity, vagina and other areas exposed to the environment. These bacterial communities are primary constituents of the microbiome which encompasses the complete genetic potential of a bacterial population as well the products of the microbiota (microbial taxa) and host environment. Balance in the gut regulates dietary energy harvest as well as the metabolism of microbial and host derived chemicals. Thus, any perturbations in the microbiota may interrupt intestinal homeostasis. The most common contributor to microbial changes is human behavior, through diet and exercise. Exercise is known to exert a role in energy homeostasis and regulation, and has been shown to manipulate gut bacterial populations. However, little is known about the forces/factors that drive microbial diversity resulting from exercise training. There are several significant scientific questions that remain to be elucidated that our lab investigates including: 1- What is the role of high fat diet and exercise in altering gut microbial populations?; 2- What metabolites do the gut microbes produce in response to dietary manipulation and exercise training?; 3- How do these metabolites influence systemic health?; 4- How does diet and exercise influence the “leaky gut”?; and 5- Does the activity of particular microbes in the gut ecosystem improve intestinal health?

B. Positions and Service

Positions:

2018- present **Associate Professor**, Department of Kinesiology and Health, School of Arts and Sciences, Rutgers University, New Brunswick, New Jersey

2010 – 2018 **Assistant Professor**, Department of Kinesiology and Health, School of Arts and Sciences, Rutgers University, New Brunswick, New Jersey

2007 - 2010 **Postdoctoral Fellow**, Department of Nutrition, Food & Exercise Sciences, College of Human Sciences, Florida State University, Tallahassee, Florida

2005 - 2007	**Adjunct Faculty Member**, Department of Allied Health Education, Southwest Georgia Technical College, Thomasville, Georgia
2001- 2007	**Graduate Assistant**, Department of Nutrition, Food and Exercise Sciences College of Human Sciences, Florida State University, Tallahassee, Florida
2001	**Research Intern**, United States Olympic Committee, United States Olympic Training Center, Lake Placid, New York
1999 - 2001	**Graduate Assistant**, Department of Exercise Science and Athletics, College of Liberal Arts, Bloomsburg University of Pennsylvania, Bloomsburg, Pennsylvania

Professional Service:

- Regional Representative MARC, 2018-2021
- President, Mid-Atlantic ACSM, 2016-2017
- Fellow, American College of Sports Medicine, 2016-present
- Editorial Board Member – Journal of the International Society for Sports Nutrition (2014-present)
- Editorial Board Member – Journal of Clinical Nutrition and Gastroenterology (2014-present)
- Editoral Board Member – Journal of Nutritional Disorders & Therapies (2012-present)
- Editorial Board Member – Journal of Nutrition and Food Sciences (2010 - present)
- Mid-Atlantic 2014 HIIT Session Coordinator and 2 Poster Session Moderator
- Mid-Atlantic ACSM Board Member (Member-at-large) (2013-present)
- Mid-Atlantic ACSM 2013 Regional Poster Session Chair/Moderator
- Mid-Atlantic ACSM Student Bowl Committee (2013-present)
- ACSM National Student Bowl Committee (2011-present)

Service to University, College and Department:

- Advisory Board Member – Center for the Lung Microbiome (Jan 2015-present)
- Aresty Undergraduate Reviewer (2013-present)
- Samsung Faculty Expert – 4H Summer Science Program (video spotlight on our day)
- Rutgers “Ask the Expert” Elementary School Outreach Participant
- Aresty RA Program Mentor (2013-2014)
- Women in STEM Project SUPER Mentor (2013-present)
- Member Rutgers Center for Lipid Research (RCLR) (2012-present)
- 4H Summer Science Day Participant (2012-present)
- SAS Curriculum Committee (2012-present)
- SAS Affirmative Action Committee 2011-2012 (one-year appointment)
- Exercise Science and Sports Studies Curriculum Committee (2012-present)
- Exercise Science and Sports Studies Science Committee (2011-present)

C. Contributions to Science

1. Exercise mediates intestinal inflammation and improves microbial diversity

Intellectual Merit: The major findings of these studies indicate that: (1) high-fat diets altered intestinal morphology particularly of the duodenum; (2) exercise protected duodenal morphology in the presence of a high-fat diet; (3) high-fat diets increased intestinal inflammation in all intestinal segments (duodenum, ileum and colon) and exercise reduced it; (4) exercise manifested a unique microbiome independent of diet; (5) exercise reduced blood levels of IL-6, insulin and ghrelin and increased levels of satiety related hormones. We observed that high fat diets accompanied with sedentary behavior increased the width of duodenal villi. We are the first using IHC to substantiate in situ inflammation and loss of intestinal integrity due to high fat diet and sedentary lifestyle in mice.

1. **Campbell S.C.**, PJ Wisniewski, M. Noji, L McGuiness, MM Häggblom, LB Joseph, SA Lightfoot, LJ Kerkhof. (2016). Exercise protects intestinal morphology and integrity while reducing inflammation in animals fed a high-fat diet. PLoS One*.).* 2016 Mar 8;11(3):e0150502. doi:10.1371/journal.pone.0150502.

2. **Campbell, S.C.**, Wisniewski, P.J. (Jan 2017). Exercise is a novel promoter of intestinal health and microbial diversity. Invited Review. Exercise and Sport Sciences Reviews (IF - 4.259) 45(1); 41-47.

3. Wisniewski, P.J., Joseph, L.B., Composto, G., Gardner, C., Lightfoot, S.A., **Campbell, S.C.** (2017) Exercise Reduces High-Fat Diet Induced Inflammation but Does Not Influence MUC2 Expression or Microbiota Localization. Journal of Histopathology. (IF – 3.1) In review.

2. Bacterial communities in the small intestine respond differently to those in the cecum and colon in mice fed low and high fat diets.

Intellectual merit: We used 16S rRNA gene sequencing to compare microbiota in the small intestine, cecum and colon in mice fed a low or high fat diet. The relative abundance of major phyla in the small intestine, Bacteriodetes, Firmicutes, and Proteobacteria, was similar to that in the cecum and colon; the relative abundance of Verrucomicrobia was significantly reduced in the small intestine compared to the large intestine. Several genera were uniquely detected in the small intestine and included the aerotolerant anaerobe, Lactobacillus spp. A high fat diet was associated with significant weight gain and adiposity and with changes in the bacterial communities throughout the intestine, prominent Gram negative bacteria including genera of the Bacteroidetes and a genus of Proteobacteria significantly changed in the large intestine.

1. Onishi, J., **Campbell, S.C**., Moreau, M., Flashruit, P., Brooks, A., Zhao, X.Y., Häggblom, MM, Storch, J., (2017). Weight gain in the mouse diet induced obesity model is not dependent on shifts in the gut microbiome involving endotoxin-producing Gram negative bacteria. Microbiology. Aug;163(8):1189-1197. doi: 10.1099/mic.0.000496.

3. Functional foods, flaxseed and soy, exert different effects on CVD in postmenopausal women

Cardiovascular disease is the leading cause of mortality and a major contributor to disability of postmenopausal women in the US. The prevalence for CVD drastically increases when women reach the age of menopause, surpassing men, and continues to rise as they age. Recent concerns about the cardio-protective effect of hormone replacement therapy have kept postmenopausal women and their practitioners in search for alternative regimens. We aimed to provide feasible and effective dietary ways for individuals at risk for CVD. Our findings indicate that flaxseed can reverse atherosclerotic lesions that had already formed dose dependently. Further the cardioprotective effects of flaxseed did not extend to soy, which is usually considered an effective treatment for CVD.

1. **Campbell S.C.,** Sadaat R.L., Bakhshalian N., Lerner M.R., Lightfoot S.A., Brackett D., Arjmandi B.H. (2013). Flaxseed reverses atherosclerotic lesion formation and lowers Lipoprotein(a) in ovarian hormone deficiency. *Menopause*, Nov;20(11):1176-83.

2. Arjmandi, B.H., **Campbell, S.C.** (2010). Reply to “Letter to the Editor” Totality of evidence supports hypocholesterolemic effects of soy. Menopause. Sept. 27.

3. **Campbell, S.C.,** Arjmandi, B.H., Khalil, D.A., Payton, M.E. (2010) One year soy protein supplementation does not improve lipid profile in postmenopausal women. Menopause. May-Jun;17(3):587-93.

4. Tuazon, M.A., **Campbell, S.C.**, Klein, D.J., Anthony, T.G., Henderson, G.C. Effects of ovarian hormones and exercise training intensity on hepatic triglyceride and whole-body metabolism. Metabolism. Mar 6. pii: S0026-0495(18)30064-7. doi: 10.1016/j.metabol.2018.02.011. [Epub ahead of print]

D. Research support

In Review

Lennon S., **Campbell, S.C.** Role of Dietary Salt on the Human Microbiota. American Heart Association. Rutgers Subcontract. Amount: $27,320.00. 2018-2020.

Current Funding:

Wisniewski, P.J. (**Campbell, S.C. – faculty mentor**). Effect of exercise on high-fat diet induced endoplasmic reticulum stress – Ref. 535042. Crohn's & Colitis Foundation of America (CCFA). Amount: $2,500.00; duration Nov 2017- Sept 2018.

Campbell, S.C. Microbiota contribution to healthy aging phenotype. Nutrition One Pilot Grant. Amount $20,000, duration July 2017-July 2018.

Campbell, S.C., Vatner S. Microbiota contributions to exercise tolerance. Funding: Department of Kinesiology and Health Chair Grant Initiative. Amount $25,000; duration Sept 2016-Sept 2018.

Previous Funding:

Weisel, C.T. and faculty team (**Campbell, S.C.** collaborating team member). Establishment of a Rutgers Center on the Lung Microbiome (CoLM). Funding agency: Team Science Initiative, Rutgers University. Amount $40,000.00; duration July 2014-July 2015.

Henderson, G.C., **Campbell, S.C.** (collaborating investigator), Uzumcu, M., Goldberg, I. Preclinical testing of exercise approaches in ovarian hormone deficiency. American Diabetes Association (7-13-JF-27-BR), 11/2013 – 10/2014 Amount $70,000.00; duration 2013-2014.

Campbell, S.C. (PI), Haggblom, M.M, Storch, J., Kerkhof, L.J. The Exercise Microbiome. Funding Agency: Rutgers University NIEHS/CEED: Amount: $25,000.00; duration June 2013-June 2014.

Bello, N.T., **Campbell S.C.** (Co-PI) Peripherally-restricted opioid and cannabinoid antagonists actions on obesity. Funding agency: INFH Rutgers University. Amount $20,000; duration August 2012-August 2013.

McKeever, K.H., **Campbell, S.C.** (Co-PI) Chromologic/Department of Defense. Evaluation of OCHYMO Performance in an Equine Hydration Model. $63,603; duration 2011-2012.

Campbell S.A. (PI) Anti-atherogenicity of Flaxseed. Funding Agency: USDA-NRI; amount $125,000; duration 2008-2010.