BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. ***DO NOT EXCEED FIVE PAGES.***

NAME: Malin, Steven Kenneth

eRA COMMONS USER NAME: SKMALIN

POSITION TITLE: Associate Professor of Kinesiology and Health

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
King's College, Wilkes-Barre, PA	B.Sc.	05/2004	Neuroscience
University of Delaware, Newark, DE	M.Sc.	08/2006	Human Nutrition
University of Massachusetts, Amherst, MA	Ph.D.	05/2011	Kinesiology
Cleveland Clinic, Cleveland OH	Postdoctoral	06/2014	Nutrition and Metabolism

A. Personal Statement

Dr. Malin is currently an Associate Professor with dual appointments in the Department of Kinesiology and Health as well as the Division of Endocrinology, Metabolism and Nutrition at Rutgers University. He also holds a faculty membership in the Center for Nutrition, Exercise and Metabolism in the Institute for Food, Nutrition and Health. Dr. Malin is Director of the Applied Metabolism & Physiology Laboratory (AMP-lab) in the School of Arts and Sciences. His working hypothesis is that insulin resistance is the key factor promoting chronic diseases, including metabolic syndrome, type 2 diabetes and cardiovascular disease. He is primarily interested in understanding how exercise interacts with nutrition, pharmacology and bariatric surgery to influence glucose homeostasis and cardio-metabolic health. He conducts measures of energy metabolism, aerobic fitness, cardio-metabolic risk, metabolic insulin sensitivity via the euglycemic clamp and stable isotopes, endothelial function at the level of large conduit arteries and microvasculature, arterial stiffness, body composition, nutritional/appetite responses and endocrine related mechanisms influencing whole-body insulin action. Dr. Malin has the expertise, leadership and motivation to 1) elucidate novel mechanism related to the development of obesity related type 2 diabetes and cardiovascular disease and 2) identify optimal treatment strategies that prevent/delay the onset of metabolic disease.

B. Positions and Honors

Positions and Employment

2011-14 Postdoctoral Research Fellow, Lerner Research Institute, Cleveland Clinic, OH
2014-20 Assistant Professor, University of Virginia, Department of Kinesiology and Division of Endocrinology & Metabolism, Charlottesville, VA
2020- Associate Professor, Rutgers University, Department of Kinesiology and Health; Division of Endocrinology, Metabolism and Nutrition, New Brunswick, NJ

Honors

2010 David N. Camaione Doctoral Scholarship Award, New England Chapter of the American College of Sports Medicine.

2010 Doctoral Student Investigator Award, New England Chapter of the American College of Sports Medicine.
2011 Michael Polluck Clinical Research Award, American College of Sports Medicine
2011 American Kinesiology Association Doctoral Student Award, American Kinesiology Award
2012 Caregiver Celebrations Appreciation Award, Cleveland Clinic
2017 Fellow of the American College of Sports Medicine
2019 Lasting Legacy Honoree, University of Virginia
2020 Lasting Legacy Honoree, University of Virginia
2020 Student Council University of Virginia Teaching Award

C. Contribution to Science

Dr. Malin has directly addressed the interaction of exercise with metformin to better understand how pharmacology modifies exercise-induced health improvements. Despite common recommendations to prescribe metformin along with lifestyle modification, little work has actually been performed to identify if adding metformin to exercise enhances insulin sensitivity and optimizes cardiovascular risk reduction. These publications found that metformin and exercise alone as independent therapies improve metabolic health. However, when metformin was combined with exercise it was found that not only did insulin sensitivity appear blunted, but so did reductions in blood pressure, inflammation and AMPK activity. These publications document this emerging issue of identifying optimal combined therapies of exercise and pharmacology as well as guide primary care providers to treat each patient on an individual level. By providing evidence and simple clinical approaches of exercise+pharmacology, this body of work may change the standards of care for diabetes prevention in adults and provide assistance in relevant medical settings well into the future. I served as the primary investigator or co-investigator in all of these studies.

a. **Malin SK**, Gerber R, Chipkin SR, and Braun, B. Combining metformin with exercise does not produce additive effects on whole body insulin sensitivity in individuals with prediabetes. Diabetes Care; 2012, 35(1) 131-136. PMCID: PMC3774338
b. **Malin SK**, Nightingale J, Choi S, Chipkin SR, and Braun B. Metformin modifies the exercise training effects on risk factors for cardiovascular disease in impaired glucose tolerant adults. Obesity, 2013; 21(1): 93-100. PMCID: PMC3499683
c. **Malin SK**, Braun B. Impact of metformin on exercise-induced metabolic adaptations to lower type 2 diabetes risk. Exerc Sport Sci Rev, 2016; 44(1):4-11. PMCID: 26583801.

Dr. Malin has spent the last several years focusing efforts on identifying the effectiveness of exercise interventions across the glucose tolerance spectrum to better understand personal responsiveness. Most research, however, has not considered the impact exercise has on to different phenotypes of diabetes and how they respond to exercise. This work is clinically relevant as different phenotypes may require novel strategies to combat hyperglycemia. From a basic science perspective, understanding how disease states influence responses to exercise may reveal underlying mechanisms that promote new treatment targets for disease reversal/prevention. Collectively, the work I lead demonstrated that the prediabetes phenotype characterized by impaired fasting glucose plus impaired glucose tolerance have poorer glycemic responses to traditional exercise training and weight loss interventions when compared to the isolated prediabetes phenotypes. Mechanistically, this appeared to be explained by blunted skeletal muscle glucose uptake and fat oxidation, which together contributed to attenuated glucose concentration improvement. These work challenge dogma that normal glucose tolerant people over time develop diabetes in a linear fashion.

a. **Malin SK** and Kirwan JP. Fasting hyperglycemia blunts the reversal of impaired glucose tolerance after exercise training in obese older adults. Diabetes, Obesity, and Metabolism, 2012, 14(9): 835-841. PMCID: PMC3407343
b. **Malin SK**, Haus JM, Solomon TPS, Blaszczak A, and Kirwan JP. Insulin sensitivity and metabolic flexibility after exercise training among different obese insulin resistant phenotypes. American Journal of Physiology: Endocrinology and Metabolism, 2013, 15(305): E1292-E1298. PMC3840211
c. Heiston EM, Eichner NZM, Gilbertson NM, Gaitan JM, Kranz S, Weltman A, **Malin SK**. Two weeks of exercise training intensity on appetite regulation in obese adults with prediabetes. Journal of Applied Physiology, 2019, 126(3):746-754. PMCID: 30629474

Given that some individuals may respond poorly to exercise and pharmacology treatment by having little to no change in metabolic health and/or weight reduction, understanding novel mechanisms by which lifestyle mediates these effects are paramount. Indeed, work Dr. Malin has performed, with Dr. Erdbruegger in recent years highlights the effects of fitness, exercise and nutrition on extracellular vesicles. Interestingly, changes in these extracellular vesicles have directly related to blood pressure, arterial stiffness, and insulin sensitivity as well as glucose tolerance in people with mild hypertension and prediabetes. From this work, it is suggested that endothelial derived extracellular vesicles in particular are key circulating factors driving enhanced cardiometabolic health. However, the mechanisms explaining this relationship in humans remains unclear. As a result, additional studies teasing out the clinical relationship of extracellular vesicles with cardiometabolic health are needed in conjunction with mechanistic underpinnings to optimize patient care.

a. Eichner NZM, Gilbertson NM, Heiston EM, Musante L, La Salvia S, Weltman A, Erdbrugger U, **Malin SK**. Interval Exercise lowers circulating CD105 Extracellular vesicles in prediabetes. *Medicine & Science and Sports & Exercise, 2019.* PMCID: 31609300
b. Eichner NZM, Gilbertson NM, Musante L, LaSalvia S, Weltman A, Erdbrügger U, **Malin SK**. An oral glucose load decreases post-prandial extracellular vesicles in obese adults with and without prediabetes. *Nutrients, 2019*. Mar 8;11(3). pii: E580. PMCID: PMC6470527
c. Eichner NZM, Gilbertson NM, Heiston EM, Gaitan JM, L Musante, S LaSalvia, Weltman A, Erdbruegger U**, Malin SK**. Low Cardiorespiratory Fitness is Associated with Higher extracellular vesicles in Obese Adults. *Physiological Reports, 2018*. 6(10):e13701. PMCID:PMC5974724

Complete List of Published Work in My Bibliography:

https://www.ncbi.nlm.nih.gov/pubmed/?term=Malin%20SK%5BAuthor%5D&cauthor=true&cauthor_uid=31976336

D. Ongoing Research Support

NIH - RO1HL130296 Malin (PI) 01/01/17-12/31/22
The major goal of this study is to determine the effect of metformin on exercise intensity mediated adaptations related to vascular and metabolic insulin resistance in people with metabolic syndrome.
Role: **Principal Investigator**

Clinical & Translational Research Award American Diabetes Association Liu (PI) 01/01/17-12/31/20
The major goal of this study is to examine skeletal muscle microcirculation in patients with type 2 diabetes, with and without peripheral artery disease, before and after exercise training who receive either placebo or GLP-1 agonists.
Role: **Co-Investigator**

UVA – LaunchPad Diabetes Grant Malin (PI) 10/01/15-12/31/20
The major goal of this pilot study is to determine the effect of prediabetes status and exercise on glucose microparticles in relation to endothelial function, arterial health and insulin resistance.
Role: **Principal Investigator**

Diabetes Action Research Award Malin (PI) 01/01/16-12/31/20
The major goal of this pilot study is to determine the effect of diet and exercise on immunometabolism and insulin resistance in patients eligible for undergoing bariatric surgery.
Role: **Principal Investigator**

4-VA Grant Kruti (PI) 10/01/19 – 08/30/20
The major goal of this project is to test the impact of continuous exercise vs. accumulated bouts of exercise across the day on airway inflammation and energy metabolism in young and old adults following high fat feeding.
Role: **Co-Investigator**

American Heart Association Esquivel (PI) 10/01/19 – 07/30/21
Goal is to exam light intensity exercise on physical function, health and well-being in heart failure patients.
Role: Co-Investigator

E. Completed Support

NIH-RO1DK100916 Napolitano (PI) 05/01/14 – 04/30/19
The purpose of this project will be to understand the impact of social media as an obesity treatment option in college-aged individuals.
Role: **Co-Investigator**

4-VA Grant Kruti (PI) 10/01/17 – 07/30/19
The major goal of this project is to test the impact of high fat feeding, with and without exercise, on airway inflammation and energy metabolism in young and old adults.
Role: **Co-Investigator**

UVA – TIC 2 Grant: Cancer Center Malin (PI) 10/01/15-09/30/17
The major goal of this pilot study is to determine the effect of exercise training in combination with reduced nictonine content cigarettes on cancer risk reduction via obesity, metabolism and inflammation.
Role: **Principal Investigator**