



# Nutrition Intervention to Impact Metabolic and Vascular Health



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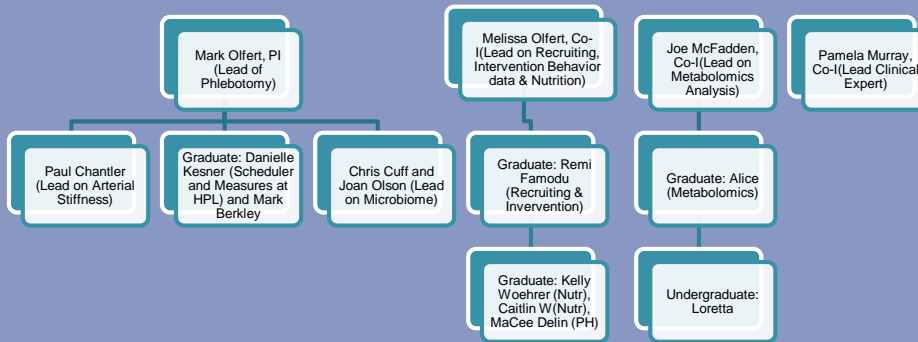
## Public Health Relevance

Obesity remains a worldwide problem due to the risk of exacerbating health conditions and the contributions to healthcare costs, further creating a need for interventions for this disease. Increasing trends are seen among college students, ages 18-25. In addition to obesity, the metabolic syndrome (metS) affects more than 20% of U.S. adults, where it has been reported that at least 27% of college students have one component of metS. However, links between certain biomarkers of poor metabolic health have not been strongly explored which presents an urgent need to better understand as individualized medical treatment is becoming highly popular.

## Impact and Reach

The connection between nutrition and health has long been recognized, but precisely how nutrients interact with human physiology to elicit health or disease is in its infancy. The objective of the current pilot proposal is to investigate the role of diet intervention as it relates to metabolic health in humans, more specifically WVU college-aged individuals who are at risk for metabolic syndrome. With this new era of -omics (i.e genomics, metabolomics, and nutrigenomics), it allows us to measure thousands of biological events and pose questions on the relationship between diet and health at the fundamental level, as well as drill down specific molecular pathways. As a result of this emerging science, nutrition research has shifted from epidemiology and physiology with population-based recommendations, to a molecular and individual level of counseling.

## Multidisciplinary Team



More importantly, the findings in this study will make a great impact on society by identifying metabolic markers of poor health that may be present when an individual is at risk of the metabolic syndrome and other potential co-morbidities. Once a marker is found and measured, we would be able to quantify the extent at which a person is at risk for a disease and personalize a nutrition prescription. Additionally, targeting of college-aged students is an added benefit, as higher education is often the catalyst of where behavior is learned and lifestyle modification can be promoted for a sustainable future.

## Project Description

Although there is much work in mass spectrometry-based metabolomics on expanding the mechanisms mediating insulin resistance and humans, little has been done on early biomarkers of progression of disease and how diet interventions may improve these biomarkers. Therefore we will employ this new modern technology of systems biology to better identify high-risk individuals who are sensitive to specific dietary interventions to develop more effective and individualized treatment and prevention strategies by dietary means for metS.

A total of 36 subjects screened for "at risk" of metS will participate in an 8-week nutritional interventional study. Subjects will be randomized into one of 3 groups (n=12/group; 9); 1) "Fruved" diet; 2) "Fruved+LowCHO"; 3) "Fruved+LowFat". Venous blood samples will be collected pre- and post-nutritional intervention and additionally at weeks 2 and 5 of the intervention, resulting in a total 4 repeated blood samples for metabolomic assessment.

## Timeline

Table 1: Schedule of Project

	2014	2015			
	Dec	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Screening of Subjects	X	X			
Baseline	X	X			
Diet Intervention		X			
Post Data		X			
Metabolic Profiling			X	X	
Data Analysis			X	X	X
Reporting Results					X

