

SUMMARY: FY 2016 RESEARCH PROJECT RECOMMENDATIONS

Status	Researcher	Title	Funding	Funding Requested
Bio-availability/Mechanisms				
Ongoing project	Del Rio, University of Parma, Italy	The Protective Effects of Raspberry Polyphenol Metabolites	Complete year 1	\$10,000
<i>Comments: This proposal continues and completes funding for a current study that will establish baseline bio-availability data. In addition to looking at raspberries and cardiovascular health, it will address neurodegeneration mechanisms.</i>				
Ongoing project	Gill, University of Ulster	Raspberry Consumption and Colonic Health	Complete year 2	\$3,750
<i>Comments: This is a unique opportunity to investigate the impact of a raspberry diet on colonic micro-biota in samples that have been subject to human digestion rather than laboratory simulated digestive processes, and to determine potential protective effects. This research is important because it can demonstrate that the body absorbs important bio-actives and nutrients at a therapeutic level.</i>				
Ongoing project	Zhu, Washington State University	Dietary Raspberry, Gut Microbiota	Complete year 1; fund year 2	Yr 1: \$13,606 Yr 2: \$54,442 Total: \$68,048
<i>Comments: Matching grant funds of \$120,598 over the two-years proposed more than double funds available to support this project. It recognizes the need to study the impact of whole fruit (rather than an extract), and has as its goals: 1) the exploration of the impact of dietary raspberry consumption on gut Microbiota and the onset of irritable bowel disease, and 2) the role of gut Microbiota in mediating the beneficial effects of dietary raspberry, specifically as it pertains to Type I diabetes and other autoimmune diseases.</i>				
Ongoing project	Shay, Oregon State University	Defining the Metabolic Benefits of Raspberries and Raspberry Compounds	Complete year 1; fund year 2	Yr 1: \$18,750 Yr 2: \$75,000 Total: \$93,750
<i>Comments: Proposed project is designed to examine the ability of raspberries and specific raspberry compounds to influence a series of metabolic conditions of interest to the raspberry industry including diabetes, chronic inflammation, obesity, and cardiovascular health. Using a proven mouse model, the study will examine the role of whole fruit, juice,</i>				

seed extract and two key components: ellagic acid and raspberry ketone. Although raspberry ketones have largely been de-bunked as “voodoo science”, there is no real science as to its efficacy. This project could provide an unequivocal answer one way or the other. Year one will confirm metabolic benefits from raspberry consumption, while year 2 will determine the biomechanisms of those benefits. The project will conclude with a communications strategy targeting two key audiences for the NPRC, Experimental Biology and the Academy of Nutrition and Dietetics (AND). The proposal includes matching funds of approximately 2/3 of the funding request.

Diabetes

Ongoing project	Noratto, Washington State University	Protective Effects of Raspberries Against Diabetes Through Modulation of Gut Microbiota	Complete year 1; fund year 2	Yr 1: \$9,839 Yr 2: \$41,928 Total: \$51,767
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Comments: Dr. Noratto’s proposal calls for approximately \$25,000/year of matching funds. The objective of this project is to assess the health benefits of raspberry consumption as it pertains to diabetes, diabetes-induced metabolic disorders, inflammation, and cardiovascular risk factors. The moderation of Metabolic Syndrome through dietary change to improve gut microbiotic health can have a significant impact on overall health by lowering multiple risk factors. Rader Farms and Enfield Farms are cooperators on this project. This is a three-year project.

Ongoing project	Basu, Oklahoma State University	Postprandial Metabolism and Type 2 Diabetes	Complete year 1	\$12,030
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Comments: This clinical study with human patients will address the role of raspberries in the dietary management of Type 2 diabetes and the effects of raspberries to modulate metabolic stresses contributing to vascular dysfunction and cardiovascular disease in diabetic patients.

Ongoing project	Losso, Louisiana State University	Molecular Mechanisms Underlying the Protective Effects of Red Raspberries Against Insulin Resistance	Complete year 1; fund year 2	Yr 1: \$24,742 Yr 2: \$36,930 Total: \$61,672
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Comments: The clinical study will establish the effects of whole red raspberry consumption on insulin sensitivity and inflammation and provide data on how Type 2 diabetes patients respond to red raspberry intervention. The in vitro portion of the project will determine molecular mechanisms protect cells. This is a three-year project.

Ongoing project	Burton-Freeman, Illinois Institute of	Red Raspberries and Insulin Action	Complete year 1; fund	Yr 1: \$19,564 Yr 2: \$78,255
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	Technology		year 2	Total: \$97,819
Comments: <i>Burton-Freeman proposes a clinical study to examine the relationship between red raspberries and oxidative inflammatory stress, and the relationship of these responses to insulin action based on data suggesting the role of red raspberry consumption in reducing risk factors for diabetes. It hypothesizes that red raspberries will restore impaired oxidative stress and inflammatory-mediated insulin signaling in healthy and insulin resistant individuals.</i>				
Cardiovascular Health				
Ongoing project	Kirakoysan, University of Michigan Medical School	Cardioprotective Benefits of Red Raspberries	Complete year 1; fund year 2	Yr 1: 14,359 Yr 2: 57,827 Total: \$72,186
Comments: <i>Kirakoysan's proposal draws its hypothesis from Crozier's work on biomechanisms. Taking a holistic view of health, it addresses the moderation of metabolic syndrome to lessen the public health burden of heart disease by reducing cardiovascular risk factors of including elevated cholesterol and insulin resistance.</i>				
Inflammation				
Ongoing project	Juma, Texas Woman's University	Bone Protective Effects of Whole Red Raspberries in Post-Menopausal Women with Osteopenia	Complete year 1	\$8,269
Comments: <i>The hypothesis of this study is that the daily inclusion of red raspberries will maintain or increase lumbar spinal bone mineral density and bone mineral content in postmenopausal women who are mild to moderately osteopenia. The impact of diet, beyond foods high in calcium, is an emerging area of bone density research. Study results could compliment findings from previous studies on raspberries and arthritic inflammation, bone and joint health.</i>				
New Project	Juma, Texas Woman's University	Effect of Red Raspberry Juice on Range of Motion, Pain Symptoms, and Cartilage/Inflammatory Markers in Individuals with Symptomatic Knee Osteoarthritis	1 year	\$59,563
Comments: <i>Osteo-Arthritis (OA) is generally viewed as a degenerative disorder involving cartilage degradation in aging. In addition to age, a number of other factors have been suggested as risk factors for the development of OA including:</i>				

<i>genetics, obesity, joint hypermobility, and trauma. Given the limitations and side effects of established osteoarthritis medications, there is increased interest in complementary and alternative treatments. One such area that shows promise includes the exploration of bioactive components found in red raspberries, a rich source of polyphenolic compounds including anthocyanins and proanthocyanidins. These phenolic compounds have been shown to be potent inhibitor of the inflammatory process.</i>				
Metabolic Syndrome				
New Project	Du, Washington State University	Browning of White Fat to Prevent Obesity and Metabolic Syndrome: Role of Raspberry Polyphenols	2 year	FY 2016: \$59,633 FY 2017: \$60,745 Total: \$ 120,378
<i>Comments: The hypothesis of this project is that polyphenols and dietary fibers associated with raspberry ingestion increase circulatory polyphenols, which activate AMP-activated protein kinase (AMPK) and promote browning of white fat, eliciting strong hypoglycemic, hypolipidemic, and anti-obesity effects. The project will pursue two specific objectives: 1) Examine the impact of dietary raspberry on the browning of white fat, and 2) Explore the role of AMPK in mediating the beneficial effects of dietary raspberry. A whole fruit approach will be pursued so that data obtained will be directly applicable to the raspberry industry.</i>				
New Project	Neugut/Sardo Molmenti, Columbia University Medical Center	Red Raspberry Exposure for Biological Modulation of Chronic Inflammation, Glucose, and Blood Lipids Among Individuals with Metabolic Syndrome	1 year	\$64,458
<i>Comments: The objective of this study is to evaluate the efficacy of a high and low dose red raspberry slurry compared to placebo in reducing inflammatory mediators, glucose response, and lipid parameters among individuals with metabolic syndrome. Diet is a key contributor to metabolic syndrome risk and specific dietary components may decrease metabolic syndrome risk factors. The anti-inflammatory and metabolic effects of red raspberries may intervene to decrease metabolic syndrome risk factors.</i>				
Cardiovascular Disease				
New Project	Rodriguez-Mateos, University of Dusseldorf	Impact of Raspberry (Poly)phenol Consumption on Vascular Function in Healthy Individuals	1 year	\$48,040

Comments: <i>A randomized, controlled crossover study will be conducted in order to investigate the effects of raspberry (poly)phenols in vascular function in healthy individuals. The findings emanating from the present proposal will contribute to understand the potential cardiovascular health benefits of raspberry (poly)phenols and provide necessary scientific data for future dietary recommendations.</i>				
Cognitive Function/Motor Skills				
New Project	Shukitt-Hale, Tufts University	The Effects of Raspberries on the Interaction Between Inflammation, Psychomotor, and Cognitive Behavior	1 year	\$62,750
Comments: <i>This study will explore the interaction between baseline motor performance and daily raspberry intake required to achieve improvement in motor function. Three hypotheses will be tested: 1) consumption of raspberry will improve and/or preserve motor function; 2) daily consumption of raspberry will preserve the motor function among good motor performers; 3) the degree of improvement in motor performance observed will correspond to a reduction in inflammation biomarkers.</i>				
New Project	Carey, Simmons College	Effects of Red Raspberry Supplementation on High Fat Diet-Associated Alterations in Behavior, Inflammation and Brain Plasticity	1 year	\$35,890
Comments: <i>This project proposes to determine if dietary supplementation with red raspberry (<i>rubus idaeus</i>) can mitigate cognitive dysfunction associated with consumption of a High Fat Diet.</i>				
Post-Harvest				
Ongoing project	Sablani, Washington State University	Ultraviolet Light (UV-C) Treatment for Improving Safety of Red Raspberries	Complete year 2	\$4,440
Summary. <i>This project investigates the efficiency of ultraviolet light to inactivate foodborne pathogens and its effect on berry quality. Many of the commonly used anti-microbial treatments used on other fruits are not transferrable to raspberries due to their fragile nature. While UV-C treatment has proven effective on smooth surfaces, little research has been done on products with complex surfaces like raspberries. Enfield Farms is a cooperator on this project.</i>				