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U.S. Department of Agriculture Accomplishments Report AD-421 U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions			Date (Month, Day, Year) 03/22/2012
1. Accession 0222387	Agency Identification No. 2. SAES 3. LA.B	5. Work Unit/Project No. LAB04048	6. Status Annual Report
7. Title Development of a Caenorhabditis elegans (C. elegans) Model - An Intermediate Step Between Cell Culture Studies and Laboratory Rodent Studies			
12. Investigator Name(s) (Last Name and Initials) Zheng, J. Z.			
20. Termination Date 04/30/2015		40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011	
Outputs: Participation in three international scientific conferences disseminated the research results of resistant starch and other functional food or medications. A database of plant glycoproteins with a potential relationship to Parkinson's Disease was begun, and improvements to a specific data mining skill set for C. elegans studies were made. Patients of at a local children's hospital received education on nutrition and function foods from students involved in the project.			
Outcomes/Impacts: Using Caenorhabditis elegans (C. elegans) as a model organism, the unique properties of 16 dietary plant lectins have been tested. The lectins may be transported to the central nervous system by gastrointestinal absorption. They impacted dopaminergic (DAergic) neurons that are damaged in Parkinson's disease (PD) and altered mobility. Dolichos biflorus agglutinin, Glycine max lectin, and Phaseolus vulgaris erythroagglutinin appear to be transported trans-synaptically to the nervous system and, at variable times post-feeding, co-localized in GFP-DAergic neurons. Some lectins that were not detected to co-localize, in fact, reduced the number of GFP-DAergic neurons, suggesting they were toxic to these neurons; reduced the endogenous GFP-dopamine transporter fluorescent intensity indicating a dopamine transporter protein diminution; or decreased the size of GFP-DAergic neurons. Others increased neuron size. These changes may be dose-dependently inhibited by specific haptenic sugars. This study may provide profound insight into neuronal degenerative diseases and result in clinical applications from an ongoing proprietary drug development program. The mechanism(s) of dietary fiber sources like Prowashonupana barley (Sustagrain), compound ON-206 and Histalea, and plant extracts were examined. These treatments reduced body fat and improved healthy aging by different mechanisms. The effect of PW barley appeared mainly due to β -glucans, mediated via daf-2 or daf-2/daf-16, and may benefit hyperglycemia-impaired lipid metabolism. The ON-206 action is through activation of CPT-1. Histalea reduced intestinal fat deposition in second generation antipsychotics (SGA)-induced obesity via a combination of an H1R agonist and an H3R antagonist. This drug development may be used to prevent SGA-induced adverse effect. Incorporating optimal functional food components into the daily diet and developing these drugs will result in future prevention of obesity and improvements in public health. With the assistance of information technology, three methods of specific data mining were created for this research, speeding up data processing which significantly reduced the labor requirement for analyzing C. elegans data. More methods of automatic data acquisition and analyses, for example, digital counting pumping rate, are being developed.			
Publications: Zheng, J. (2011) Resistant starch is a functional food that reduces intestinal fat deposition and promotes health in Caenorhabditis elegans model. BITs 1st Annual World Congress of Endobolism. Vol.1, Page 24.			
Participants: J. Zheng (PI), W. Wei, C. Gao, R. Martin, F. Enright, M. Keenan, J. Finley, J. King, M. King, Z. Fitzpatrick, and			

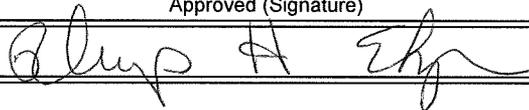
C. Sabliov, LSU AgCenter; J. Ye, F. Greenway, and J. Keller, Pennington Biomedical Research Center-LSU; R. Laine, LSU.

Target Audiences:

Presentations were received by fellow scientific professionals and the public audience (patients with diabetes, obese, coronary cardiovascular diseases, hypertension).

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date
		3-23-12