The HNRCA has an outstanding record of securing research funds to support the work conducted in our 19 labs and 7 core units. In FY2011, funding for research activities reached $23,472,343. Our support comes from several primary sources, including USDA (45%), Federal grants – majority NIH (44%), private grants (10%), restricted contributions (1%), and state and foreign grants (less than 1%).

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MyPlate for Older Adults
MyPlate for Older Adults is a new tool to guide seniors in meeting their daily nutrient, fluid and physical activity needs. Created by Dr. Alice Lichtenstein, Director of the Nutrition, Exercise, Physiology and Sarcopenia Laboratory of the Aging, MyPlate for Older Adults is tailored to the nutritional needs of older adults, with recommendations for both different ages and physical activity levels that work best for older adults. MyPlate for Older Adults is a strategic tool to support healthy aging and its collaboration with other organizations such as the American Society of Nutrition, the American Dietetic Association, and the American Physical Therapy Association will make this tool the basis for future guidelines for older adults.

Strength Training Prevents and Reverses Muscle Loss in Seniors
HNRCA researchers led by Dr. Roger Fielding in the Nutrition, Exercise, Physiology and Sarcopenia Laboratory confirm that middle age adults should lift weights at least twice a week to retain muscle and consume protein to manufacture the lean tissue. The loss of muscle, known as sarcopenia, a term coined by the HNRCA by Dr. Irwin Rosenberg, slows the body's resting metabolic rate, causing weight gain as well as difficulty in performing basic tasks like carrying heavy objects. Weight training that targets specific muscle groups can slow and even reverse the process. Related findings were published in the Journal of the American Medical Directors Association in 2011.

New Research Clusters
Four new Research Clusters were established in 2012 for the purpose of enhancing collaboration within the HNRCA, throughout the University, and eventually, across the nation. The Clusters address Cancer, Cardiovascular Disease, Inflammation, Immunity and Infectious Diseases, and Obesity. The Clusters are advancing their scientific agendas and building multi-lab teams. Their work is leading to new research ideas, plans for pilot studies, cross-disciplinary collaboration, and key milestones.

World Health Day 2012
In collaboration with the World Health Organization (WHO), the Pan American Health Organization, the World Health Organization, and the WHO, MIT AgeLab, the World Health Organization, and the WHO, the HNRCA hosted World Health Day 2012: Population Aging and Urbanization. This event brought together world leaders on aging and urban planning, and included a working group with WHO and FAO to raise awareness regarding the importance of nutrition and physical activity in healthy and active aging around the world. Conference proceedings will be published in late 2012.

Vitamin D Improves Glucose Tolerance in Adults at Risk for Type 2 Diabetes
Adults with lower blood levels of vitamin D are thought to be at increased risk of developing type 2 diabetes. HNRCA researchers in the Bone Metabolism Laboratory, in collaboration with scientists at Tufts Medical Center, conducted a study to examine the effect of 2000 IU of vitamin D per day compared with placebo on insulin sensitivity in adults at high risk for developing type 2 diabetes. Supplementation significantly improved glucose tolerance, mainly by increasing insulin sensitivity. This study suggests a favorable effect of vitamin D on glucose by reducing insulin resistance. Results were published in the American Journal of Clinical Nutrition in 2011.

Focus on Epigenetics
The HNRCA is a world leader in the study of gene-diet interaction. The Center's Nutritional Genomics Laboratory, led by Dr. Jose Ordovas, utilizes both genetic and epidemiologic approaches and controlled dietary intervention studies. In 2012, the HNRCA established a Functional Genomics Core Scientific Service, headed by Dr. Ordovas, to enable more researchers to incorporate this growing area of study into their investigations. Dr. Ordovas was honored by the 2012 Spanish Grand Cross of La Science de l'Alimentation de L'Academie Internationale de la Gastronomia for his pioneering work in the field.

Mother’s Diet of Folate and B Vitamins Protects Offspring from Tumors
Mice born to mothers fed a diet supplemented with B vitamins, including folate, are less likely to develop intestinal tumors, according to research published by Dr. Jose Ordovas, Director of the HNRCA’s Nutritional Genomics Laboratory, and colleagues. Folate and other B vitamins, especially folate, could help control tumor growth. These findings were featured in hundreds of popular media accounts including CNN and the Associated Press. Results were published in the Journal of the American Medical Association in July, 2012.

Restaurant Calorie Counts Misleading
Dr. Lorien Urban, Postdoctoral Associate, and Dr. Susan Roberts, Director of the Energy Metabolism Lab, and author of The 5:2 Diet, published in 2011, reported on research showing that restaurant stated calories have variable accuracy. In particular, “lower in calories” claims were found to contain significantly more than stated. This presents a challenge to dieters who rely on self-reported calories to monitor intake. The findings were featured in a wide range of popular media accounts including CNN and the Associated Press. Results were published in the Journal of the American Medical Association in July, 2012.

HNRCA’S TOP STORIES OF 2011-2012

Lower Glycemic Index Diet Delays Macular Degeneration
Dr. Allen Taylor, Director of the Nutrition and Vision Research Laboratory, and colleagues, found that feeding older mice a lower glycemic index (GI) diet delay the onset of age-related, sight-threatening retinal lesions. Mice given a higher glycemic index diet demonstrated retinal accumulations of debris known as advanced glycation and products (AGEs) in the whole retina, particularly in the cells of the retinal pigment epithelium (RPE). The RPE plays a crucial role in maintaining vision and its training that targets specific muscle groups can slow and even reverse the process. Related findings were published in the Journal of the American Medical Directors Association in 2011.

Fat Hormone Increases Risk for Dementia in Women
An increased presence of the hormone adiponectin can increase the risk for loss of brain function and Alzheimer’s disease. A research team led by Dr. Irwin Rosenberg, Director of the Bone Metabolism Laboratory, and colleagues, analyzed circulating levels of adiponectin in a middle-aged population, compared with insulin and metabolism. Scambler and his team found that older women who had developed dementia also had higher levels of the hormone. Related research was published in the Journal of Clinical Nutrition in 2011.

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HNRCA researchers led by Dr. Roger Fielding in the Nutrition, Exercise, Physiology and Sarcopenia Laboratory confirm that middle age adults should lift weights at least twice a week to retain muscle and consume protein to manufacture the lean tissue. The loss of muscle, known as sarcopenia, a term coined by the HNRCA by Dr. Irwin Rosenberg, slows the body's resting metabolic rate, causing weight gain as well as difficulty in performing basic tasks like carrying heavy objects. Weight training that targets specific muscle groups can slow and even reverse the process. Related findings were published in the Journal of the American Medical Directors Association in 2011.
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**MyPlate for Older Adults**

MyPlate for Older Adults is a new tool to guide seniors in meeting their daily nutrient, fluid and physical activity needs. Created by Dr. Alice Lichtenstein, Director of the Nutrition, Exercise, Physiology and Sarcopenia Laboratory, and colleagues, it offers a personalized, easy-to-read guide to help older adults eat healthy and look for examples of good food choices and guidance in terms of fluid intake and physical activities.

**Strength Training Prevents and Reverses Muscle Loss in Seniors**

HNRCA researchers led by Dr. Roger Fielding in the Nutrition, Exercise, Physiology and Sarcopenia Laboratory confirm that middle age adults should lift weights at least two times per week to retain muscle and prevent sarcopenia. They recommend that all muscle, known as sarcopenia, a term coined by HNRCA/Dr. Irwin Rosenberg, slows the body’s resting metabolic rate, causing weight gain as well as difficulty in performing basic tasks like carrying bags. Weight training that targets specific muscle groups can slow and even reverse the onset of sarcopenia. Findings and results were published in the *Journal of the American Medical Directors Association* in 2011.

**New Research Clusters**

Four new Research Clusters were established in 2012 for the purpose of enhancing collaboration within the HNRCA, throughout the University, and eventually, across the globe. The Clusters address: Cancer, Cardiovascular Disease, Inflammation, Immunity and Infectious Diseases; and Obesity. These Clusters are advancing their scientific agendas and building multi-lab teams. Their work is leading to new research ideas, plans for pilot studies, cross-disciplinary collaboration, and key milestones.

**Lower Glycemic Index Diet Delays Macular Degeneration**

Dr. Allen Taylor, Director of the Nutrition and Vision Research Laboratory, and colleagues, found that feeding older mice a lower glycemic index (GI) diet delays the onset of age-related, sight-threatening retinal lesions. Mice given a higher GI diet demonstrated a five-fold elevation of retinal cell death in the retina, particularly in the cells of the retinal pigment epithelium (RPE). The RPE plays a crucial role in maintaining vision and its training that targets specific muscle groups can slow and even reverse the onset of sarcopenia. Findings and results were published in the *Journal of the American Medical Directors Association* in 2012.

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An increased presence of the hormone adiponectin can increase the risk for loss of brain function and Alzheimer’s disease. A team led by HNRCA researchers Drs. Erin Schafakti, Director of the Lipid Metabolism Laboratory, and colleagues, developed a new tool to examine the effect of 2000 IU of vitamin D per day compared with placebo on insulin sensitivity in adults at high risk for developing type 2 diabetes. Supplementation significantly improved glucose tolerance, mainly by increasing insulin sensitivity. This study suggests a favorable effect of vitamin D on glucose balance. Results were published in the *American Journal of Clinical Nutrition* in 2011.

**World Health Day 2012**

In collaboration with the World Health Organization (WHO), the Pan American Health Organization (PAHO), MIT AgeLab, Harvard Graduate School of Design, and the World Health Day Committee, HNRCA’s Dr. Lorien Urban, Postdoctoral Associate, and Dr. Susan Roberts, Director of the Energy Metabolism Laboratory, authored *The I Diet*, published in 2011, reported on research showing that restaurant stated calories have variable accuracy. In particular, “lower in calories” (less than 500) menu items were found to contain significantly more than stated. This presents a challenge to dieters who rely on self reported calories to monitor intake. The findings were featured on the cover of a popular chain of eating out websites. In 2011, Urban was honored by the 2012 Philadelphia Magazine’s Food & Drink magazine Food & Drink magazine for her pioneering work in the field of nutritional research and clinical practice.

**Focus on Epigenetics**

The HNRCA is a world leader in the study of gene-diet interaction. The Center’s Nutritional Genomics Laboratory, led by Dr. Jose Ordovas, utilizes both genetic and environmental factors to understand the impact of food intake on health. Their research has helped to explain how diet affects health and disease and has contributed to our understanding of the complex interactions between diet and genetics. Their work has been recognized with numerous awards, including the Prix de la Science de l’Alimentation de l’Académie Internationale de la Gastronomie for his pioneering work in the field.

**Vitamin D Improves Glucose Tolerance in Adults at Risk for Type 2 Diabetes**

Adults with lower blood levels of vitamin D are thought to be at increased risk of developing type 2 diabetes. HNRCA researchers in the Bone Metabolism Laboratory, in collaboration with scientists at Tufts Medical Center, conducted a study to examine the effect of 2000 IU of vitamin D per day compared with placebo on insulin secretion in adults at high risk for developing type 2 diabetes. Supplementation significantly improved glucose tolerance, mainly by increasing insulin sensitivity. This study suggests a favorable effect of vitamin D on glucose balance. Results were published in the *American Journal of Clinical Nutrition* in 2011.

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With the USDA’s Agricultural Research Service cooperative agreement funding serving as a solid foundation, the HNRCA has established the identification of new funding sources as a top strategic priority. This is intended to meet the challenge of flat and declining federal research dollars, keep pace with the increasing cost of laboratory support, and to provide the necessary resources for promising new research.

TO OUR SUPPORTERS

Never before has healthy aging been more important. The senior population in America, and globally, is increasing as a percentage of total population each year, and that growth will continue through 2050. As scientists, we know that good nutrition and physical activity can add many healthy years to the average adult life. Our work, from the basic cell science to epidemiological research to animal and human clinical investigation, is impacting the global field.

Healthy & Active Aging
Through Research

ANNUAL REPORT 2012

DIVERSIFYING FUNDING SOURCES

The HNRCA has an outstanding record of securing research funds to support the work conducted in our 19 labs and 7 core units. In FY2011, funding for research activities reached $23,472,343. Our support comes from several primary sources, including USDA (45%), Federal grants—majority NIH (44%), private grants (10%), restricted contributions (1%), and state and foreign grants (less than 1%).

With the USDA’s Agricultural Research Service cooperative agreement funding serving as a solid foundation, the HNRCA has established the identification of new funding sources as a top strategic priority. This is intended to meet the challenge of flat and declining federal research dollars, keep pace with the increasing cost of laboratory support, and to provide the necessary resources for promising new research.

Healthy & Active Aging
Through Research

ANNUAL REPORT 2012

Simin Nikbin Meydani, D.V.M., Ph.D.

Simin Nikbin Meydani

Publications and communications are central to our mission. Sharing our research with fellow researchers, academics, practicing clinicians, dieticians, and the public will help support our mission and lead to healthier citizens. As such, HNRCA scientists collectively averaged more than one high-impact scientific journal publication per business day over the past decade. This prolific publication rate leads to significant coverage in the popular press. In the first half of 2012, our work was featured by the Associated Press, Boston Globe, USA Today, Reuters, ABC News Radio, The Times of London, El Mundo, The Today Show, and The Los Angeles Times, to name but a few.

We are pleased with all we have accomplished and our many contributions to the field of healthy & active aging. This annual report includes some of our most significant study results and news of 2011 and 2012.

Simin Nikbin Meydani

D.V.M., Ph.D.

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TO OUR SUPPORTERS

Never before has healthy aging been more important. The senior population in America, and globally, is increasing as a percentage of total population each year, and that growth will continue through 2050. As scientists, we know that good nutrition and physical activity can add many healthy years to the average adult life. Our work, from the basic cell science to epidemiological research to animal and human clinical investigation, is impacting the global field.

Collaboration is a cornerstone of HNRCA activity both within our labs and within the University. HNRCA scientists conduct an impressive array of University-wide collaboration in teaching, service, and research.

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