



ADVANCING A HEALTHIER WISCONSIN ENDOWMENT



RESEARCH AND EDUCATION PROGRAM Completed Award Summaries

The following includes summaries of progress for AHW
Research and Education Program awards that completed
during the period ending June 30, 2015

FUNDS TO SUPPORT 0.5 FTE PARTNERSHIP DEVELOPMENT AND COMMUNITY ENGAGEMENT



Participants in the Advancing a Healthier Wisconsin Endowment's tenth anniversary event disseminated to and networked with more than 250 community health peers.

Goal

To increase capacity for community-academic partnerships for health improvement in Wisconsin through a faculty director for the Healthier Wisconsin Partnership Program (HWPP).

Background

As HWPP faculty director, Syed Ahmed, MD, MPH, DrPH, FAAFP, leveraged his role as Senior Associate Dean for Community Engagement to promote community engagement throughout the MCW faculty.

Award Summary

Dr. Ahmed and team supported the partnership development process through large-scale skill-building, networking and dissemination events, as well as via many one-to-one mentoring relationships. In addition, Dr. Ahmed provided leadership and community engagement expertise to committees like the MCW Cancer Center Task Force while also conducting original qualitative and quantitative research on community engagement at MCW.

HWPP and Dr. Ahmed provided learning and networking opportunities to more than 1000 members of the MCW faculty and staff, and members of the community, which included leaders and professionals from government, community health care providers and social service agencies. Dr. Ahmed conducted 16 meetings with teams of MCW faculty and staff members applying for HWPP funding for the first time. He also promoted community engagement by presenting to MCW departments and at orientation sessions.

Since this award began in 2010, the number of academic partners on HWPP awards has grown by more than 40 to a total of 170 partners.

As co-chair of the MCW Cancer Center Task Force, Dr. Ahmed assisted in the creation of the Cancer Center Community Engagement Roadmap which will guide the Center in better partnering with the community in the future. He also provided guidance to a new course offered at MCW on the principles of community engagement and community-engaged research. The class was offered in the Fall semesters of 2013 and 2014. In addition to informing MCW's first

Relevance

This project seeks to advance the Medical College of Wisconsin's community engagement mission by generating new knowledge about public health partnerships through science that engages communities in designing and facilitating the research process.

Significance to Science and Health

Through educational opportunities and research, this project will develop and disseminate best practices for partnership development and community engagement.

class on community-engaged research, Dr. Ahmed conducted a qualitative analysis of data submitted in final progress reports by more than 100 HWPP projects. This analysis uncovered 13 lessons learned by community-academic partnerships. These results were shared through two separate events that were attended by 235 individuals. Participants learned about each lesson, heard from community-academic partners with real-world experience of each lesson, and discussed how to apply the lessons in their work.

To further understand community engagement at MCW, Dr. Ahmed launched a survey in July 2014 to measure participation data and other metrics every six months.



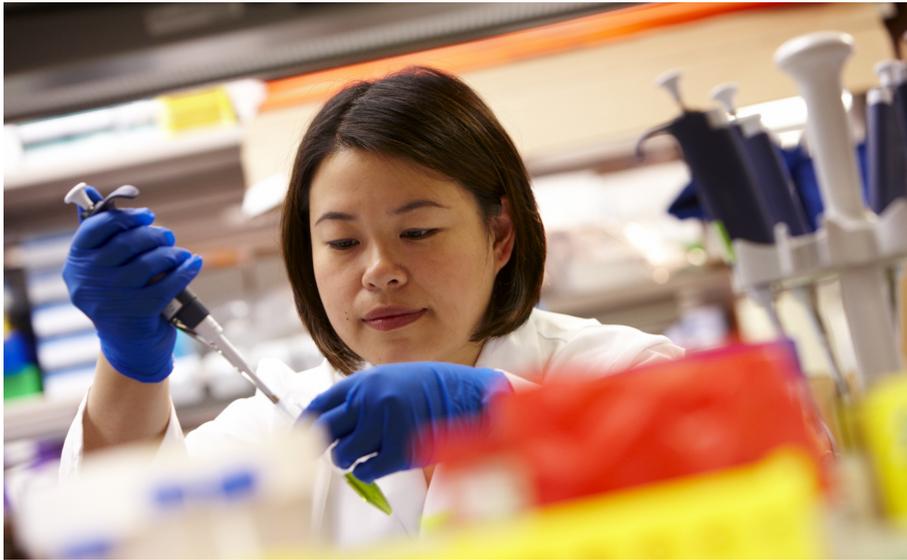
Syed Ahmed, MD, PhD, DrPH, FAAFP
Family and Community Medicine

This award was funded by the Advancing a Healthier Wisconsin endowment of the Medical College of Wisconsin.

PANCREATIC CANCER RESEARCH PROGRAM



RESEARCH AND EDUCATION PROGRAM



Susan Tsai, MD, MHS, Assistant Professor, Surgical Oncology, Medical College of Wisconsin

Goal

To establish an integrated clinical and translational pancreatic cancer research program with the primary objective of developing and completing the first neoadjuvant clinical trial of personalized therapy for patients with localized pancreatic cancer.

Background

To date, therapies for pancreatic cancer have had a minimal impact on the natural history of this disease. As a result, no clinically significant improvements in pancreatic cancer survival rates have been observed over the last 30 years.

Award Summary

The main focus of this project was a new clinical trial for early-stage pancreatic cancer. This state-of-the-art multidisciplinary trial utilizes genetic analysis to personalize the choice of chemotherapy before and after surgery.

The major hurdle for this trial was obtaining enough tissue to test using a safe, minimally invasive technique. A diverse team of

specialists developed the new procedure, which uses ultrasound to guide a needle into the tumor.

The trial enrolled more than 70 patients and was the highest accruing cancer trial at the Medical College of Wisconsin Cancer Center.

To further increase enrollment, project administrators have expanded the trial with a second site at the University of Cincinnati. The trial is anticipated to complete enrollment with 100 patients in 2015.

The Pancreatic Cancer Biorepository (under the direction of Dr. Susan Tsai) is another key piece of the Pancreatic Cancer Research Program. This tissue bank is unique because it acquires blood and tissue specimens (obtained at the time of surgery) at multiple stages of treatment, which allows researchers to assess the disease over time. In addition, the Tumor Donation Program allows patients to donate their tumor at the time of death. This generous donation allows for the acquisition and study of late-stage tumors that are not normally accessible. These combined programs have accrued more than 450 pancreatic cancer specimens.

Relevance

Pancreatic cancer is a highly lethal disease. Its incidence is rising, and the disease is projected to become the second leading cause of cancer death by 2020.

Significance to Science and Health

Recent advancements in pancreatic cancer biology suggest that a single treatment approach for this heterogeneous and biologically complex cancer is not ideal.

In the future, the most effective treatments may be determined by the molecular determinants of each individual patient and his or her tumor.

To share the program's findings, members of the Pancreatic Cancer Program have published a number of manuscripts in academic journals and delivered multiple presentations at local, national and international conferences and scientific meetings.



Douglas Evans, MD, Surgery

This award was funded by the Advancing a Healthier Wisconsin endowment of the Medical College of Wisconsin.

EDUCATING STUDENTS IN HEALTH DELIVERY AND HEALTH SYSTEMS



MEDICAL SCHOOL

Goal

To develop a new course for the Medical College of Wisconsin medical student pathway program that prepares students for leadership roles in health systems, health policy, community health and advocacy for patients.

Background

Medical schools traditionally teach the structure and function of the human body and how diseases disrupt this balance, but they do not include much instruction on the structure of our health system and how flaws in the delivery of health care can have negative consequences for entire populations.

While there are physicians who devote energy to health system policy, the lack of training in this area and the steep learning curve for physicians who graduate from their medical training with little more than a rudimentary education about how the U.S. health system functions hampers the ability to design new systems and advocate for changes in the current system.

Providing an education program that prepares students to become active participants in the health policy arena once they finish medical school and residency will provide a resource for Wisconsin policy makers that they have not had in prior years. Also, by virtue of developing this curriculum, MCW will be viewed as one of the leaders in this emerging area of medical student education.

Award Summary

This project has established the Health Systems Management Policy Pathway as one of eight choices for students. Based on the success of the curriculum developed under the support of AHW, this Pathway was made available to first and second year medical students beginning August 2015.

The Pathway program at MCW allows students to concentrate their studies in a specific area where they wish to gain substantial expertise. In addition to didactic training, Pathway students construct an individualized learning plan for out-of-classroom educational experiences.

Additionally, the curriculum developed under this award will be included in a national description of how medical schools are educating students about the science of healthcare delivery. This manuscript is being co-written by the MCW faculty members participating in this project along with faculty members from the Mayo Medical School, Geisel School of Medicine at Dartmouth University, University of Wisconsin School of Medicine and Public Health, Vanderbilt University.

Overall, this pathway successfully demonstrated that students, even in the earliest stages of their medical school training, have the sophistication to understand how the U.S. medical system functions and identify areas for improvement.

Relevance

The lack of training in health system policy and the steep learning curve for physicians who graduate from their medical training with little education about how the U.S. health system function hampers the ability to design new systems and advocate for changes in the current system.

Significance to Science and Health

Providing education on the structure and function of our health system and how flaws in the delivery of health care can have negative consequences for entire populations will ensure physicians are better prepared to provide leadership for health policy change.



William J. Hueston, MD

Senior Associate Dean for Academic Affairs and Professor of Family and Community Medicine

This award was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

EARLY DETECTION OF MILD COGNITIVE IMPAIRMENT



MEDICAL SCHOOL

Goal

To establish and support new expertise in brain imaging research focused on identifying changes in brain activity that are an early warning sign that the patient is at risk of developing Mild Cognitive Impairment.

Background

Mild Cognitive Impairment (MCI) is a condition marked by more severe difficulties with memory, problem-solving and decision-making than are found in normal aging. Patients who develop MCI are also at a greater risk of progressing into the Alzheimer's disease (AD) population.

This project seeks to discover a biological marker, visible in a brain scan, which could be used to identify at-risk populations for studies of new treatments to delay the on-set of MCI and AD.

Identifying this population early will improve research and development efforts seeking new treatments, and may define a period of time for intervening in the progression of these conditions.

Alzheimer's disease is a common illness with more than 100,000 cases in Wisconsin. Improvements in patient care in these cases would also positively impact the more than 175,000 AD and dementia caregivers residing in the state.

Award Summary

The project resulted in the recruitment of a new imaging faculty member at MCW, Kevin Koch, which will further the goals of the Center for Imaging Research to image and detect disease earlier.

Substantial gains were made in the field of "quantitative susceptibility mapping (QSM)" MRI, which reduces MRI image distortions and increases contrast.

MRI that uses QSM is also effectively used with patients who have difficulty remaining perfectly still during a scan.

This advanced technology was applied to patients suffering from sports concussions and brain cancer.

The improvements in MRI that were accomplished during the term of this project may enable new and improved approaches in assessing brain tumors, concussions, Alzheimer's disease, and other neurological disorders that impact Wisconsin residents.

Relevance

MRI is a powerful diagnostic tool for physicians, but application in many settings is restricted by resolution limits and/or the presence of orthopedic implants. The advances from this project positively impact these areas.

Significance to Science and Health

The advances made are important since the number of joint replacements is rapidly increasing and there is great demand for MRI approaches that circumvent image distortion by the implants. Further, high-strength MRI will allow for more detailed images of cancer and brain injury, which will improve treatment.



Kevin Koch, PhD

Associate Professor
Departments of Biophysics and
Radiology

This award was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

MASTER OF PUBLIC HEALTH DISTANCE LEARNING PROGRAM



Goal

To prepare and develop a competent, professional, and diverse public health workforce through community-academic partnerships in education, research, and service to enhance the health of the public.

Background

MCW's Master of Public Health (MPH) Program began a process to reinvent itself in order to better serve the public health workforce.

The MPH Program had a twenty-year history serving the needs of physicians seeking to become certified in Occupational Medicine. But leaders saw the need to evolve the program to meet Wisconsin's population health challenges.

To support the MPH Program's transformation, the Advancing a Healthier Wisconsin Endowment invested more than \$2.2 million through the Research and Education Program. This investment helped the MPH Program's leaders create a curriculum focused on public health practice and community health improvement.

Award Summary

The MPH Program went through a complete redesign. The concentration for the program became Public and Community Health and the program became available to anyone seeking quality training in the field of public health.

During the course of the project, 20 new faculty members, both full time and adjunct, were recruited into the MPH Program.

The MPH Program has developed 18 new courses and conducted extensive revisions of an additional three courses to support the new

curriculum for the Public and Community Health concentration. To date, 71 individuals have graduated from the MPH program since the introduction of the revised concentration.

In 2009, the MPH Program developed and offered a Graduate Certificate in Public Health, consisting of a 15-credit program in core public health training. To date, there have been 40 individuals who have completed the certificate program with many of them continuing on to enroll in the MPH program.

In 2010, the program was re-accredited by the Council on Education for Public Health (CEPH) and was awarded the maximum seven years of accreditation.

The program continues to develop a strong curriculum with a focus on population health and is ideally suited for individuals working in governmental public health, hospital and health care, community-based organizations, and employee wellness programs.

Relevance

The audience for this degree has expanded to include non-physician health professionals who work in local public health and community agencies, which should increase the diversity of the public health workforce.

Significance to Science and Health

Distance learning continues to increase the variety of students enrolling in the program, which will lead to improved skills and career development for the state's public health workforce.



John Meurer, MD, MBA

Professor and Director, Institute for Health and Society

This award was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

DEVELOPMENT OF A VOXEL-WISE DATABASE OF PHYSICAL PARAMETERS FOR NEUROIMAGING



MEDICAL SCHOOL

Goal

To develop a fast magnetic resonance imaging (MRI) methodology that can be used for the classification of healthy and/or diseased tissue.

Background

Magnetic resonance imaging (MRI) is a profoundly flexible tool for imaging body tissues that is aided by contrast differences within tissues that, when imaged sequentially and merged together, can be used to inform both researchers and clinicians about the tissue changes resulting from injury or disease.

However, obtaining multi-contrast images is time consuming, subject to image artifacts, compromised by patient movements between imaging runs, and difficult to do on some patient populations (e.g., the elderly, young children).

The ability to rapidly collect multi-contrast images with reduced artifacts would circumvent these problems would improve early detection of disease and enhance their treatment.

The research performed in this work was directed toward basic research in neurosciences, but additional applications have become clear.

Award Summary

This award led to the development of technology for the faster acquisition of MRI neuroimaging data.

The simultaneous acquisition of several two-dimensional brain slice images by MRI is revolutionizing the field of neuroimaging, and the work funded in this project has kept MCW

at the competitive forefront of this field.

The fast-imaging technology developed in this study requires a highly uniform magnetic field in the region being imaged, which was achieved in an unconventional way by attaining a uniform magnetic field through the process of "shimming" the magnetic field with 3D printed plastic components. A patent application was submitted for this application.

The imaging technologies developed in this study have proven to be instrumental in other new neuroimaging studies, such as the sports-related concussion study, "Project Head to Head Two", and the Epilepsy Connectome Project.

Such technologies are also included in multiple projects under review that include applications for pediatric imaging and neurocognitive decline.

Further, additional projects seek to acquire high-resolution imaging data in elderly patients suffering from neurocognitive decline, patients who have been diagnosed with concussion, and a collaborative grant application with researchers at the University of Wisconsin to tailor the imaging technology to address challenges associated with patient motion in neuroimaging exams of children under the age of seven.

Relevance

Previous use of multi-contrast MRI was problematic on several fronts, but this AHW award resulted in technologies that will be instrumental in imaging studies for numerous diseases.

Significance to Science and Health

The fast-imaging technologies developed in this project have been directly applied to new neuroimaging initiatives in sports-related concussion, epilepsy, and normal and pathologic aging. The findings from these new studies will impact the way that neurological diseases are diagnosed and monitored in the future.



Andrew Nencka, PhD

Assistant Professor of Biophysics

This award was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

FMRI IN PERIPHERAL NERVE INJURY



MEDICAL SCHOOL

Goal

To determine the role of brain reorganization in sensory and motor recovery following peripheral nerve injury and repair.

Background

The incidence of peripheral nerve injuries is high in Wisconsin due to the prevalence of manufacturing occupations, the large number of motor accidents, and increased potential for limb injury during seasonal outdoor activities and machinery used.

The aggregate healthcare cost associated with surgical repair and rehabilitation of nerve injury patients is high. There have been no significant new treatment approaches developed in the last 25 years and outcomes have stagnated in that same time period.

About 50% of all peripheral nerve injury patients have not returned to work within two years following the injury.

With this project, the research team sought to develop new treatment approaches to optimize the rehabilitation time course and improve patient outcomes. Although the work at this stage is primarily basic science in focus, the team hopes to transition the work to the clinical setting in the coming years.

Award Summary

The central finding of this project is that there are significant reorganizational changes in the brain after peripheral nerve injury and repair.

Key discoveries during the course of this award include showing that, in both humans and animals, the brain never returns to its pre-injury state after nerve repair. This demonstrated that the brain is permanently altered after injury.

The team also tracked reorganization longitudinally in time using functional magnetic resonance imaging (fMRI) and found specific changes associated with different brain regions along the recovery timeline. These changes may be interpreted as biomarkers for recovery.

Finally, the team tested pharmacological methods to enhance beneficial brain changes after nerve repair. It is hoped that the work will lead to new treatment avenues for peripheral nerve injuries.

Relevance

The incidence of peripheral nerve injuries is high in Wisconsin and the aggregate healthcare cost associated with surgical repair and rehabilitation of nerve injury patients is costly. Advances in treatment will be beneficial to the citizens of Wisconsin.

Significance to Science and Health

There has been a lack of research into brain changes after peripheral nerve injury. The research team's efforts to understand the key points in the rehabilitation process and the specific time-points or brain regions that are targets for intervention is novel, and the work has clinical potential to improve treatment of nerve injuries.

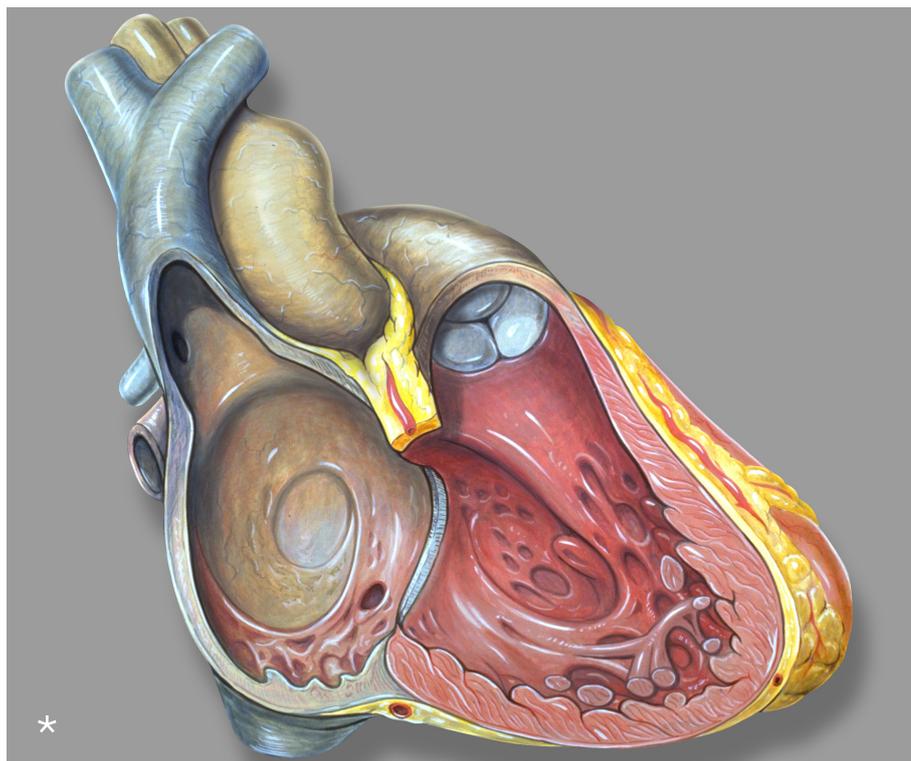


Christopher Pawela, PhD

Assistant Professor of Anesthesiology
Assistant Professor of Biophysics

This award was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

THROMBIN RECEPTOR INVOLVEMENT IN DIABETIC CARDIOMYOPATHY



Goal

To study how a receptor protein influences heart tissue damage associated with diabetes.

Background

Rates of obesity, hypertension, and hypercholesterolemia are on the rise in Wisconsin and these cardiovascular risks are affecting Wisconsin residents at a younger age. More understanding is needed to better protect against the rise of these diabetes and heart disease risk factors.

Award Summary

This project focused on the role of a receptor protein, the thrombin receptor, in heart problems associated with diabetes.

The Strande lab worked on understanding how this receptor contributes to the deterioration of heart function and heart failure. The receptor is believed to contribute by increasing cardiac fibrosis, a condition in which the heart muscle stiffens, which can progress to heart failure.

Stiffened cardiac tissue is observed in patients with heart failure, especially in diabetic patients.

While the researchers did not find that diabetes, induced in an experiment, led to overactive thrombin receptors, they did discover that reducing the activity level of the thrombin receptor protects the heart against injury and subsequent development of cardiac fibrosis. Reducing the receptor activity also protected the heart's ability to pump after experiencing an injury.

Throughout the project, the scientists shared these results, publishing manuscripts in academic journals, such as Stem Cell Research and Journal of Cardiovascular Pharmacology and also presenting at scientific meetings like the American Heart Association's Basic Cardiovascular Science Sessions.

To further apply the findings from their studies, the investigators will look into whether protection from reducing thrombin receptor activity can be preserved in rodent models of diabetes. This would be an important finding because diabetes has a reputation for interfering with other potentially helpful therapies. By understanding the complex interaction between diabetes and the function of the thrombin receptor, the scientists will be able

Relevance

Heart disease is the number one cause of death in Wisconsin, accounting for more than 16,000 deaths annually, or 35 percent of all deaths in the state.

The considerable disability and mortality of heart disease puts emotional and financial stress on individuals and their families.

Significance to Science and Health

This project proposed to study heart disease in a manner that will allow the bench science work to translate into improved clinical practice.

The findings may ultimately improve the health of Wisconsin residents suffering from diabetes and cardiovascular disease by delaying or preventing damage to the heart leading to heart failure.

to translate their bench science work into improved clinical practice, and they may ultimately improve the health of the many Wisconsin residents suffering from diabetes and cardiovascular disease.



Jennifer Strande, MD, PhD, Medicine (Cardiology)

This award was funded by the Advancing a Healthier Wisconsin endowment of the Medical College of Wisconsin.

*Image by Patrick Lynch. Available under a Creative Commons 2.5 Generic license at http://commons.wikimedia.org/wiki/File:Heart_right_anatamy.jpg

MOLECULAR CARCINOGENESIS AND CHEMOPREVENTION PROGRAM



MEDICAL SCHOOL

Goal

To identify chemicals, drugs, or food supplements that can prevent the development of cancer, and then evaluate the efficacy of these agents for cancer prevention in high-risk human populations.

Background

The chemoprevention research program and activities, including the recruitment of top chemoprevention faculty to MCW and the distribution of seed grants to cancer researchers, directly supports the Cancer Center's mission to reduce the cancer burden throughout Southeastern Wisconsin through research into the causes, prevention, early detection and treatment of cancer.

Award Summary

The MCW Cancer Center (MCWCC) have made several important discoveries that resulted from AHW's investment in this program area. Several novel chemopreventive agents have been evaluated for their impact on a variety of cancers including, esophagus, colon, oral, laryngeal, and renal cancer.

In several instances, chemopreventive agents have reduced the occurrence of cancer in animal models by at least 50%.

Although all of these agents work somewhat differently, most of them reduce the growth rate of premalignant cells, reduce inflammation, and inhibit the growth of new blood vessels that feed developing tumors. Some of them cause cells to have a lesser tendency to invade and metastasize to other organ sites.

Studies have also identified potential new biomarkers that might prove to be useful for both the prevention and treatment of cancer. For example, program members have identified a

number of cancer genes that are frequently mutated in lung cancer and colon cancer. These findings may lead to new approaches for cancer prevention and treatment.

Human clinical trials of chemopreventive agents are underway. For example, investigators participated in a trial that confirmed the preventive ability of a black raspberry gel. The gel was applied to sores in the mouth that were at an increased risk of developing into cancerous tissue. The treatment caused the lesions to regress by approximately 70 percent, and generated positive changes in genes that protect against cancer development.

Currently, human clinical trials of black raspberries are being initiated in patients with ulcerative colitis, a precancerous lesion that can lead to colon cancer, and in patients who have been treated for cancers of the esophagus and pancreas.

Similar results have been reported for strawberries and blueberries. Thus, the routine use of berries might be expected to reduce certain parameters of inflammation in obese individuals and, perhaps, in the Wisconsin population as a whole that could have a favorable impact on cancer incidence.

Researchers with the Cancer Chemoprevention Research Program continue to make progress in identifying chemicals, drugs, or food supplements that can prevent the development of cancer, and evaluating the efficacy of these agents for cancer prevention .

In August 2015, the MCW Cancer Center integrated the work of the *Molecular Carcinogenesis and Chemoprevention Program* into the work of the AHW funded *Cancer Center Biology and Population Sciences* awards.

Relevance

Several novel chemopreventive agents have been evaluated for their impact on a variety of cancers including, esophagus, colon, oral, laryngeal, and renal cancer. In several instances, chemopreventive agents have reduced the occurrence of cancer in animal models by at least 50%.

Significance to Science and Health

Researchers with the Cancer Chemoprevention Research Program made significant progress in identifying chemicals, drugs, or food supplements that can prevent the development of cancer, and evaluated the efficacy of these agents for cancer prevention .



Ming You, MD, PhD

Senior Associate Dean and Director,
Medical College of Wisconsin
Cancer Center

This award was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.