

Foundation Update Fall 2005

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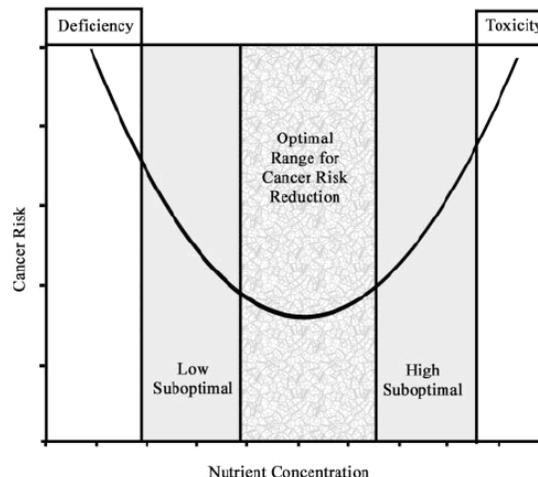
Headline News

Message from Murphy scientists: More dietary supplements are not always better.

When it comes to taking dietary supplements to reduce your cancer risk, too much of a good thing may not be a good thing. That's the conclusion of new research by Murphy Foundation scientists showing supplementation with the trace mineral selenium can reduce DNA damage within the prostate – the same type of genetic injury caused by oxidative stress that has been linked to prostate cancer. But too little selenium or too much selenium can lead to undesirably high levels of DNA damage within the prostate. The cancer preventive effect of selenium – an essential nutrient found in a variety of foods – is currently being tested in more than 32,000 men in the National Cancer Institute-sponsored SELECT study, the largest prostate cancer prevention trial ever conducted. Results of the new research further support the notion that a man can reduce his prostate cancer risk by consuming the right amount of selenium. Just what *is* the right amount of selenium has baffled scientists studying the cancer-fighting nutrient, leading the researchers to study what dose minimizes the amount of DNA damage within the prostate.

Murphy Foundation scientists took a unique approach to the problem by studying the effects of selenium in elderly beagle dogs, physiologically equivalent to 65 year-old men. "We wanted to see the effect of selenium on prostate cells in an appropriate context – in an aging prostate gland, not in a petri dish," said David J. Waters, Director of the Gerald P Murphy Cancer Foundation. It was logical to choose dogs because the influence of aging on prostate cancer development is strikingly similar in dogs and men, the only two species in which prostate cancer occurs naturally.

Dogs were fed different levels of selenium in order to mimic the broad range of selenium intake of men in the United States. “When we looked at the relationship between selenium intake and how much DNA damage accumulated in the prostate, we discovered an intriguing U-shaped curve – the degree of DNA damage was most severe at the lowest and highest selenium intake. Clearly, more was not always better,” said Dr. Waters who led the research team. “The dogs are leading us in a whole new direction in our thinking about the best way to use selenium to prevent prostate cancer,” said David G. Bostwick, MD, world-renowned prostate cancer pathologist and co-investigator on the project.



The research, which is joint research with Purdue University, was published in the July 2005 issue of the journal *Carcinogenesis*. The U-shaped curve predicts that not all men will ultimately benefit from increasing their selenium intake. This warns that men should not indiscriminately take dietary selenium supplements. Instead, men looking to reduce their prostate cancer risk should tailor their selenium intake to move their selenium level into the optimum range.

Pills, pills, pills: Why do men take dietary supplements? “The most distinguishing characteristic between man and the lower animals is the desire to take pills,” said Mark Twain. More than half of the U.S. adult population uses dietary supplements. In 1996 alone, consumers spent more than \$6.5 billion on dietary supplements. Many of them contain vitamins and minerals that people already get in sufficient quantities in their regular diet. Murphy Foundation scientists are now teaming up with investigators from Purdue University’s Center on Aging and the Life Course to find out just why older adults take dietary supplements. “We want to understand the motivational factors and biological consequences of using selenium supplements,” said Inna Savikhin, RN, project supervisor. Men who are 45-80 years old and currently supplementing their diet with the trace mineral selenium undergo a detailed interview and submit their own toenail clippings for selenium analysis. Revealing just how people make the decision to take dietary supplements and determining whether this indeed represents a health promoting behavior is a concrete example of the Foundation’s commitment to generating new knowledge about how lifestyle can impact health.

Updates

Pet dogs are leading new cancer treatments toward human clinical trials. The Murphy Foundation is exploring the vast, untapped potential of pet dogs to advance medical progress to benefit people stricken with cancer. The Foundation’s PATH to Progress® Comparative Oncology Research Program is enrolling pet dogs with naturally-occurring cancers into state-of-the-art clinical trials to test new life-saving cancer treatments. Murphy scientists treating pet dogs with life-threatening metastatic prostate and liver cancers have documented impressive results with a new cancer therapy called macrobeads. This fascinating new approach to treating cancer employs encapsulated mouse tumor cells that are surgically implanted in the patient where they can exert direct antitumor effects or enhance immune response. The results from pet dogs were instrumental in gaining FDA approval to begin the first human clinical trial testing macrobeads in March 2005. “Our experience with the macrobeads strongly supports the notion that PATH to Progress® is indeed just that – a new way of moving forward cancer treatments so that they can benefit people,” said Dr. Waters.

Research collaboration with the Van Andel Research Institute yields new insights into metastasis -- the most deadly aspect of cancer. Studying the complex process called metastasis – the escape of malignant cells from the tumor and the subsequent colonization of distant organs – is critical to finding better methods to diagnose and treat life-threatening cancers. The work investigates the role of a specific cell surface protein called c-met, which is turned on in many tumor cells that have spread. The research has led to an improved understanding of what activates c-met and moves closer to developing a targeted cancer detection method that exploits the presence of c-met on the most sinister cancer cells. The team’s most recent findings, which describe the role of c-met in human and canine prostate cancer cells, appeared in the November 2004 issue of *Cancer Research*. “Our ultimate goal is to translate this knowledge into a targeted imaging agent that will allow doctors to more accurately see whether tumor cells have spread, even before they are detectable using radiographs or CT scan,” said Rick Hay, MD, PhD, Senior Scientific Investigator at the Van Andel Research Institute located in Grand Rapids, MI. Murphy Foundation scientists are keeping their eye on a prize – and that prize is the clinical application of medical knowledge. This means placing the utmost priority on doing research that truly benefits people.

Murphy Foundation turns spotlight on cancer prevention, appointing Shuren Shen, PhD as Director of the Foundation’s 2 Steps Ahead™ Cancer Prevention Research Program. Dr. Shen’s work in cancer prevention research reaches all the way from laboratory cell culture studies, to dog studies, to human clinical trials. “It is difficult to understand why the idea of cancer prevention has been so slow to take hold among members of the oncology research community,” said Dr. Shen. “We really need to redefine our priorities so we can make meaningful progress in preventing this horrible disease.” This sentiment has been echoed by other prominent scientists in a cover story published in *Fortune* magazine (March 2004), entitled “Why We are Losing the War on Cancer”. Cancer is a chronic disease that should be prevented, not just treated. By launching the 2 Steps Ahead™ program, the Murphy Foundation signifies its commitment to be a strong advocate for cancer prevention research and education. With its focus on promoting health through research that accelerates the useful application of new knowledge – from mechanistic studies in the laboratory to the development of practical tests that people can use to measure their cancer risk – clearly the Murphy Foundation is becoming a major player in the redefined war on cancer.

Shorts

Aging and cancer: Murphy Foundation promotes international research activities. The Murphy Foundation participated in an international meeting “Aging and Cancer at the Crossroads” in Geneva, Switzerland in October 2004. Dr. Waters was chosen as 1 of 20 speakers from around the world who came together to explore the complex relationship between aging and cancer. The meeting featured experts from the field of aging research, including the noted British biologist Dr. Thomas Kirkwood, who provided a keen evolutionary perspective on how we might better understand the link between aging and cancer. The Murphy Foundation also organized and co-sponsored a symposium “Aging and Cancer” at the 7th International Conference of Anticancer Research held in Corfu, Greece in October 2004. By participating in these scientific conferences, the Foundation is shaping the dialogue concerning the research priorities that will significantly advance the field of aging research.

Murphy Foundation develops strong collaborations with top research scientists worldwide. In January 2005, the Foundation’s new research findings were presented to scientists at the Oklahoma Medical Research Foundation (OMRF) in Oklahoma City, OK. Dr. Robert Floyd of the OMRF

is world-renowned for his work on oxidative stress, aging, and cancer. In June 2005, Dr Waters was invited to the School of Medicine at the University of Modena, Italy where he delivered a talk entitled “The Public Health Significance of Selenium and Cancer Prevention”. Dr. Waters was the invited guest of Drs. A. Vivoli and M. Vinceti, two distinguished researchers in the field of trace minerals and human health risks.

Kudos

Dr. Waters recognized for teaching excellence by Purdue University’s Center on Aging and the Life Course. Dr. Waters is the first recipient of the Center’s Excellence in Teaching Award for his commitment to interdisciplinary learning. “He has the unusual ability to translate some of the most complex issues in biology into terms that students from a wide range of disciplines can understand”, said Michael Steinhour, a PhD candidate in sociology. In further recognition of his significant contributions to science education, Dr Waters, who is a Professor of Comparative Oncology at Purdue University, was chosen as one of 3 senior faculty to participate in the 2005 Teachers for Tomorrow program. This offers him the opportunity to share innovative ideas about interdisciplinary education with junior faculty who aspire to become exceptional teachers. Through Dr. Waters’ efforts, the Foundation is investing in the future -“stocking the pond” with the next generation of talented scientists who will become tomorrow’s “big fishes” in the field of cancer and aging research.

New Digs!

The Murphy Foundation has a new address within the Purdue Research Park. The Foundation now enjoys an expanded facility that better reflects our big vision and includes additional specialized laboratory space to conduct cell culture and cell imaging studies that measures DNA damage. The Purdue Research Park, located adjacent to the Purdue University campus in West Lafayette, IN, has the highest concentration of high tech businesses within the state of Indiana and has been a magnet for new business development. In 2004, the Purdue Research Park earned the honor of the country’s most outstanding research park from the Association of University Research Parks. Murphy Foundation scientists feel right at home surrounded by the innovative talents of the 70 technology firms within the research park.

Thanks to the support of 70 Gallery Club members, representing 6 countries worldwide, the dramatic Gallery entrance to our headquarters offers a visual history from Dr. Murphy’s pioneering research to our latest ventures-- a testimony to the broad reach of our cutting-edge research. Be sure to visit our website at www.gpmcf.org to catch a glimpse of our Gallery. Better still, come for a visit! We are eager to be your host for a “meet and greet” to give you a first hand look at our scientific progress in action.

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For information on making tax-deductible donations to the Foundation, please visit www.gpmcf.org or email us at murphyfoundation@gpmcf.org.

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