

Research sheds light on how selenium fights cancer, improves health

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WEST LAFAYETTE, Ind. - Personalizing nutrition for disease prevention is one of the major challenges facing scientists and health professionals. Emerging data on the relationship between the intake of selenium, which is an essential trace mineral, and human health suggests that more selenium is not necessarily better.

A study conducted by scientists at the [Gerald P. Murphy Cancer Foundation](#) sheds new light on the anticancer action of selenium in the aging process, which aligns with U-shaped thinking. This thinking suggests being in the middle range of selenium intake is better than being too high or too low. The study has been published in the peer-reviewed scientific journal BioFactors and featured by UroToday.

The Gerald P. Murphy Cancer Foundation is a not-for-profit research institute focused on cancer and aging. It is based at the [Purdue Research Park](#) of West Lafayette.

Investigators used controlled laboratory experiments to show that selenium can trigger the elimination of prostate cells that have the most genetic damage. The results of these laboratory studies rested upon the researchers' ability to develop a model system in which the level of genetic damage could be controlled in both human and canine cells. Emily C. Chiang, Ph.D., research associate at the Murphy Cancer Foundation and the lead author of the research, said the work introduces an important perspective on the anticancer action of selenium that is independent of its role as an antioxidant.

"By documenting the ability of selenium to sweep away DNA-damaged cells, a process we have termed 'homeostatic housecleaning,' the new study builds upon previous observations that the anticancer benefit of selenium supplementation in humans and animals cannot be explained solely by the ability of this nutrient to shield tissues from oxidative stress," Chiang said.

David J. Waters, Ph.D., DVM, director of the Murphy Cancer Foundation's Center for Exceptional Longevity Studies, wrote the commentary "Your Selenium Intake, Your Prostate, and 'U,'" which was published on UroToday.com as a featured "Beyond the Abstract." The commentary describes the research in the context of U-shaped thinking about selenium and healthy aging, in particular reducing a man's risk of getting prostate cancer. "When it comes to identifying the optimal selenium dose for prostate cancer risk reduction, it is unlikely that more selenium will always be better," he wrote. "Landing in the trough of the U, achieving mid-range selenium status, is more desirable than being too low or too high."

This middle-of-the-road-is-better stance is bolstered by the extensive review of the scientific literature by professor Margaret Rayman of the University of Surrey, U.K., who concluded in the journal The Lancet: "The crucial factor that needs to be emphasized with regard to the health effects of selenium is the inextricable U-shaped link with status; whereas additional selenium intake may benefit people with low status, those with adequate-to-high status might be affected adversely and should not take selenium supplements."

"The possibility that the trough of the curve is precisely where the homeostatic housecleaning effect of selenium is maximized offers a new, working explanation for why more selenium is not always better," Waters said. "We believe selenium is instrumental in optimizing how the body responds to cellular damage, which can translate into improved health and disease resistance."

As the researchers work to hammer out the specific links between selenium and prostate cancer, men are looking to optimize their selenium intake for disease prevention.

Measuring selenium status and then adjusting selenium levels to mid-range status offers men a practical and informed approach, rather than blindly taking selenium supplements and risking the downside of oversupplementation, Waters said. Harnessing this U-shaped thinking, health professionals at the Murphy Cancer Foundation are utilizing SeleniumHealth™ - a commercially available toenail test developed by the Murphy Foundation in collaboration with Bostwick Laboratories LLC - to assist men who are motivated to target their selenium intake to achieve optimal health.

Waters points to the test as a simple, straightforward method that eliminates the guesswork about a person's selenium level. He said a toenail clipping provides a reliable picture of how much selenium people have been getting from their diet and supplements over the previous three months. He added that women's health also could be impacted by selenium.

"Most experts agree that the evidence for an association between selenium and cancer risk in women is not as strong as it is for prostate cancer. But a growing body of evidence suggests that measuring and adjusting the intake of selenium to optimal levels so that it is not too low or too high can benefit women's health in several other ways," said Waters, who serves as associate director of Purdue's Center on Aging and the Life Course. "Women with lower selenium levels have been reported to be at increased risk for cardiovascular disease and cognitive decline. Women with selenium in mid-range status may enjoy improved hip bone density, whereas selenium levels exceeding the mid-range were associated with a six-fold increased risk of type II diabetes in a nationwide study of U.S. women."

Information on scientific reports linking selenium, women's health and U-shaped thinking can be found at <http://www.seleniumhealthtest.com>.

About the Gerald P. Murphy Cancer Foundation

The [Gerald P. Murphy Cancer Foundation](#) seeks to identify important genetic and life-style determinants of cancer resistance and to better understand the complex relationship between aging and cancer. The research is conducted jointly by the Murphy Cancer Foundation and Purdue University. The Murphy Foundation is a 501(c)(3) not-for-profit research institute.

About Purdue Research Park

The [Purdue Research Park](#), with four locations across Indiana, has the largest university-affiliated business incubation complex in the country. The park network is home to about 240 companies that employ about 4,500 people and are located in West Lafayette, Indianapolis, Merrillville and New Albany.

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