Beyond prevention: Sulforaphane may find possible use for cancer therapy

January 12 2015

Research in the Linus Pauling Institute has found that sulforaphane, found in foods such as broccoli, may be able to play a role in cancer therapy. Credit: US Department of Agriculture

New research has identified one of the key cancer-fighting mechanisms for sulforaphane, and suggests that this much-studied phytochemical may be able to move beyond cancer prevention and toward therapeutic use for advanced prostate cancer.

Scientists said that pharmacologic doses in the form of supplements would be needed for actual therapies, beyond the amount of sulforaphane that would ordinarily be obtained from dietary sources such as broccoli. Research also needs to verify the safety of this compound when used at such high levels.

But a growing understanding of how sulforaphane functions and is able to selectively kill cancer cells indicate it may have value in treating metasticized cancer, and could work alongside existing approaches.

The new findings on the unique abilities of sulforaphane were recently published in the journal *Oncogenesis*, by researchers from Oregon State University and the Texas A&M Health Science Center. The work was supported by the National Institutes of Health.

"There's significant evidence of the value of cruciferous vegetables in cancer prevention," said Emily Ho, professor and director of the Moore Family Center for Whole Grain Foods, Nutrition and Preventive Health in the OSU College of Public Health and Human Sciences, and lead author on this research.

"However, this study is one of the first times we've shown how sulforaphane can affect a histone methylation and alter gene expression in metasticized prostate cancer cells," said Ho, who is also a principal investigator in OSU's Linus Pauling Institute. "It begins a process that can help to re-express tumor suppressors, leading to the selective death of cancer cells and slowing disease progression."

The evidence now shows that sulforaphane should have therapeutic value against some forms of cancer, Ho said, including late-stage, metasticized disease. Its multiple impacts on metabolic processes might also make it a valuable adjunct to existing therapies, helping them to work better.

No clinical trials have yet been done to test the value of sulforaphane in cancer therapy, although a trial is under way using sulforaphane supplements in men with high risk for prostate cancer. Results from that may help demonstrate the safety of higher-dosage supplements and set the stage for therapeutic trials, Ho said.

Dozens of studies have examined the health value of cruciferous vegetables such as broccoli, cauliflower, and cabbages, and many of them ultimately focused on the role of sulforaphane, one compound found in these foods. Broccoli sprouts contain some of the highest dietary levels of the sulforaphane precursor.

The new study identified a particular enzyme in prostate cancer cells, SUV39H1, that is affected by exposure to sulforaphane. Aside from potential dietary approaches, the researchers said that this establishes SUV39H1 as a new therapeutic target, in general, for advanced cancer.

Prostate cancer is one of the most commonly diagnosed cancers in the United States, and existing therapies include surgical removal of the prostate, radiation therapy, hormones or other approaches. Although often slow growing, prostate cancer can be much more aggressive if it metasticizes to other areas of the body, at which point survival rates decrease dramatically. In the U.S. it's the fifth leading cause of cancer death.

In laboratory studies, sulforaphane has shown toxicity to a number of human cancer cell lines, including prostate, breast, ovarian, colon and pancreatic cancer, and in animal studies it decreased metastases of prostate cancer.

Provided by Oregon State University