

# Mysteries of How Functional Foods Fight Cancer Revealed

Researchers at the University of Illinois at Chicago have uncovered the biochemical mechanism by which functional foods fight cancer. Considering nearly 180 people every hour are diagnosed with cancer in the United States, and the American Cancer Society estimates that there will be over 1.3 million new cases of cancer in 2005 alone, that's important news.

According to researchers, one method of preventing cancer may be to eat certain foods rich in cancer-preventing compounds such as sulforaphane in broccoli and resveratrol in wine. Such compounds signal the body to boost the production of proteins capable of preventing DNA damage.

## **How does the signal work?**

Two key proteins are involved in triggering the defense against cancer when disease-preventing foods are consumed: Keap1 and Nrf2.

Keap1, the sensor protein:

- Detects the presence of dietary compounds like sulforaphane when they link with its cysteine residues, one of the amino acids that compose proteins.
- Binds to Nrf2, the messenger that turns on the genes for the protective proteins, preventing DNA damage.

And while earlier studies in mice suggested that natural cancer-fighting compounds worked by cutting the tie between Keap1 and Nrf2 -- freeing Nrf2 to take action -- researchers found that, in humans, the link between the two proteins is not broken.

Most importantly, however, is the modification of cysteines in Keap1.

One cysteine in particular was among the most likely to be altered in the interaction with cancer-preventing compounds. Consequently, researchers are proposing that the alteration of this one amino acid in Keap1 is the crucial step that triggers higher levels of the messenger Nrf2 and, as a result, heightened production of the protective proteins.

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