GEORGESON BOTANICAL GARDEN

UNIVERSITY OF ALASKA FAIRBANKS

**University of Alaska Fairbanks**
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# Of Cabbages and Cancer

by Pat Holloway

In September, bits and pieces of frozen cabbage and broccoli from the Georgeson Botanical Garden arrived at the Brassica Chemoprotection Laboratory, Johns Hopkins University, Maryland. They are part of an experiment to study cancer-fighting chemicals in plants.

Two years ago, a team of scientists at Johns Hopkins, led by molecular pharmacologist Dr. Paul Talalay, revealed a potent chemical found in broccoli, cabbage, brussels sprouts and other vegetables that appears to protect animal and human cells against cancer. This chemical, sulphoraphane (sul-for-a-fane), belongs to a class of chemicals called isothiocyanates (eye-so-thigh-o-sigh-an-eights). These chemicals cause cells to speed up production of special enzymes called Phase II enzymes. These enzymes detoxify harmful carcinogenic chemicals so the body can eliminate them.

The Johns Hopkins team injected rats with either a low dose or high dose of a synthetic version of sulphoraphane. This treatment was followed by an injection of dimethyl benzanthracene (DMBA) (die-methil-benz-an-thra-seen), a potent carcenogenic chemical that causes breast cancer tumors. A second set of rats was injected only with DMBA. Sixty-eight percent of the DMBA-treated rats developed breast cancer. Only 35 percent of the rats receiving the low dose of sulphoraphane and 26 percent of the rats receiving the high dose developed cancer. Sulphoraphane not only reduced the incidence of cancer but delayed the onset of the tumors and reduced their number and size.

In 1994, Dr. Talalay's research was expanded with the opening of the Brassica Chemoprotection Laboratory, the world's first lab dedicated solely to the study and development of natural cancer-fighting substances found in edible plants. One member of Talalay's team is research scientist, Dr. Jed W. Fahey, who is studying the amount of sulphoraphane found in various members of the Brassicaceae family. He is also exploring possible environmental factors such as daylength, temperature and UV radiation that might influence sulphoraphane production in plants.

Early studies revealed that one variety of broccoli, 'Saga' contained significant amounts of sulphoraphane. Dr. Fahey heard about Alaska's giant 'O-S Cross' cabbages and was interested in learning if this variety contained greater quantities of sulphoraphane than other varieties grown at lower latitudes. The GBG grows several giant cabbages each year, mostly to satisfy the curiosity of the thousands of visitors from around the world who visit the garden. Coincidentally, we grew several varieties of broccoli and cabbage that Dr. Fahey also was growing in Maryland. We collected leaf and core samples of eight cabbage varieties and florets from six broccoli varieties and sent them to Maryland for analysis. Our "fee" for these services was simply that Dr. Fahey share his findings with us. The results (drum roll, please) were that the giant cabbage, as well as every other cabbage and broccoli sample we sent were extremely low in sulphoraphane! In fact Dr. Fahey said they were the lowest recordings of any samples they tested both from Alaska and Maryland. Despite not having one more thing to brag about, this information is interesting for Alaska gardeners. Maybe our short growing season, cool temperatures and/or fast growth rates prevented the production of sulphoraphane. We don't know. However, what it means for Alaska gardeners is, grow and eat twice as much green cole crops!

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