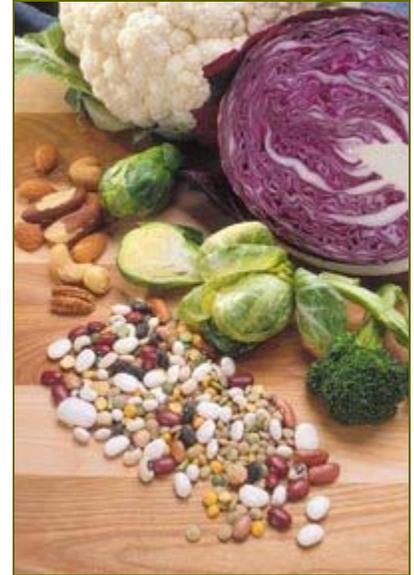


# Cruciferous Vegetables

## Overview

- The cruciferae include the various members of the species *Brassica oleracea*.
- Examples of some cruciferous vegetables include: broccoli, cabbage, cauliflower, kale, and Brussels sprouts. Other examples include: oriental cabbage, arugula, radish, daikon, wassabi, and various mustards.
- A striking and characteristic chemical property of cruciferous plants is their high concentration of **glucosinolates**. Glucosinolates and their isothiocyanate hydrolysis (breakdown) products are well-known protectors against the development of cancer.
- This suggests that greater intakes of these vegetables may help **lower the risk** of several types of cancer.



## Activation in Humans

When food is prepared or chewed, or in response to plant injury by predators, the enzyme **myrosinase**, which accompanies the glucosinolates is released. This enzyme is responsible for **hydrolyzing glucosinolates to isothiocyanates**. In the absence of myrosinase (such as when food is cooked and myrosinase is heat inactivated), humans have the ability to efficiently convert glucosinolates to isothiocyanates through the action of microflora in the GI tract.

## Recent Findings

- A study links a 51% risk reduction for bladder cancer in those consuming more than 5 servings of cruciferous vegetables a week.
- Prostate cancer was reduced 41% in those consuming 3 or more servings of cruciferous vegetables a week.
- Other cancers that are reduced with higher intake of cruciferous vegetables are breast cancer and Non-Hodgkin's lymphoma.

### **Cruciferous vegetables:**

Detoxify by upregulating detoxification enzymes  
Prevent oxidative cell and DNA damage  
Are chemoprotective against numerous types of cancer

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