

# Sulforaphane – Why Your Cells Need Cruciferous Vegetables

Sulforaphane is a miraculous compound that enhances brain function, promotes healthy fat distribution, and greatly reduces the risk of cancer, brain diseases, diabetes, and cardiovascular disease. It is like a health insurance policy for your cells. And guess what? It's all natural. Sounds like another supplement sales pitch, right? That's what I thought when I first heard about it, but then I dug through the research.

In a scientific article published by Dr. Thomas W. Kensler and his colleagues, sulforaphane is described as one of...

*...the most potent naturally occurring inducers of Nrf2 signaling."*

Nrf2 is a cytoprotective (cell-protecting) pathway that protects your cells from oxidative stress and removes toxins from the body. This means that nrf2 plays a key role in preventing and reversing common health issues like:

- Heart disease
- Diabetes
- Cancer
- Alzheimer's disease, Parkinson's disease, traumatic brain injury and other brain diseases
- Multiple sclerosis
- ALS
- Autism and other behavioral disorders
- Chronic pain
- Rheumatoid arthritis
- Asthma

The best part is that you won't have to climb to the top of a

mountain or scavenge the Amazon jungle and sit through a 6-hour ceremony to reap the benefits of nrf2. All you need to do is eat cruciferous vegetables like broccoli, Brussels sprouts, cauliflower, and cabbage. Sulforaphane will be yours.

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## **Where Does Sulforaphane Come From?**

Technically, sulforaphane does not naturally occur in cruciferous vegetables. A healthy, mature broccoli plant, for example, will contain no sulforaphane. However, as soon as the plant is damaged an enzyme called myrosinase is released that reacts with glucoraphanin, a compound that is sulforaphane's precursor.

This process is not a gift from nature to ensure human health, it is actually the plant's defense mechanism. Sulforaphane is designed to be toxic to the plant's predators. In fact, it can be toxic to humans in large quantities. For example, when we ingest the majority of our calories from raw cruciferous vegetables, we can impair our thyroid function.

However, in small quantities, sulforaphane creates a hormetic effect. A hormetic effect is what happens when we gain beneficial effects from something that would be toxic or lethal in higher doses. For example, daily cold exposure triggers brown fat production. This is a healthier version of fat that increases our energy and heat production. This means that cold exposure has a hormetic effect on our bodies, but if we are exposed to frigid temperatures for too long, we will begin to accumulate frostbite instead of brown fat.

Although you won't get frostbite from eating too many cruciferous vegetables, very high intakes of these vegetables have been found to cause hypothyroidism. This is because compounds in cruciferous vegetables called glucosinolates can be broken down into goitrins in the body. These goitrins

interfere with the production of thyroid hormones causing hypothyroidism. However, if you maintain an adequate iodine intake, you will need to eat a lot more cruciferous vegetables to experience adverse effects. Fortunately, you won't have to eat a tremendous amount of cruciferous vegetables. The benefits of sulforaphane can be experienced by eating just 3 to 5 servings per week. In fact, doing this may prevent cancer.

## **Cancer Prevention? Yeah, That Too**

If you dig through the literature on sulforaphane, you will find an abundance of studies on cancer. Sulforaphane has been found to prevent the formation of breast, prostate, colon, skin, lung, stomach, and bladder cancer. One study found that a diet of three to five servings per week of cruciferous vegetables is sufficient to decrease the risk of cancer development by 30% to 40%. It was also found that consuming one portion of cruciferous vegetables per week is associated with a significantly reduced risk of oral cavity and pharynx, esophageal, colorectal, breast, and kidney cancer.

These profound effects are not only due to sulforaphane's cell protecting properties. Sulforaphane also has the capacity to be selectively toxic to malignant cells, while simultaneously enhancing the detoxification of aflatoxins and airborne toxins like smoke. It also has been shown to have potent effects on the brain.

## **Brain Transformation**

Sulforaphane is essential for brain health, especially in healing damaged brains. In cases of traumatic brain injury and Alzheimer's disease, sulforaphane has been found to improve memory and learning abilities. Scientists think that this may be associated with its ability to promote neurogenesis and reduce the aluminum load in the brain.

Autism is also positively affected by sulforaphane. In one study, autistic children that supplemented with sulforaphane showed an improvement in social interaction, abnormal behavior, and verbal communication.

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## **Fat Loss & Gut Health**

Studies have found that sulforaphane triggers the creation of brown fat in mice. Brown fat is a healthier form of fat storage that actually increases energy consumption.

Sulforaphane also improved the gut flora of mice compared to other mice that were fed the same diet without sulforaphane. This may mean that sulforaphane can change our body composition by promoting brown fat storage and a healthy gut flora while staving off unhealthy, inflammatory white fat.

**Related: *Gluten, Candida, Leaky Gut Syndrome, and Autoimmune Diseases***

## **And There's More**

Studies have also found that sulforaphane aids in the reversal of fatty liver disease, preventing lung damage from inhaled toxins, reducing hypertension, and improving mood.

Okay. That's it.

I am sure there is more, but that is enough of the science for today. Let's get practical.

## **How to Get More Sulforaphane**

Simply eating cruciferous vegetables is not enough to guarantee that you are getting sulforaphane in your diet. Many

different environmental factors can cause glucoraphanin to not be converted into sulforaphane. And glucoraphanin is useless to the body.

One environmental factor that reduces the production of sulforaphane is heat. Studies have found that exposing cruciferous vegetables to temperatures higher than 158 degrees Fahrenheit deactivated the myrosinase enzyme leading to a sharp decrease in sulforaphane production. This suggests that cooking your cruciferous vegetables will rob you of the benefits of sulforaphane. But before you make a raw kale salad or have some raw broccoli to get your daily dose of sulforaphane, it is important to note that myrosinase activity decreases as the cruciferous vegetable matures. Luckily, there is a much easier and tastier way to increase the amount of sulforaphane in your meals.

## **The Best Source of Sulforaphane**

Even if you eat raw broccoli or cauliflower, you are still getting 10 to 100 times less sulforaphane than when you eat 3-day-old broccoli sprouts. In fact, one ounce of broccoli sprouts can convert to as much sulforaphane as one-and-a-half pounds of mature broccoli. This is mainly because myrosinase activity is increased in young sprouts compared to adult plants. This increase in enzyme activity helps ensure that the vulnerable sprout can protect itself into adulthood.

The increased activity of the myrosinase enzyme in broccoli sprouts also helps you to convert the glucoraphanins from other vegetables in your meal to sulforaphane. You can reap these benefits with every salad by garnishing it with broccoli sprouts. Dr. Rhonda Patrick suggests adding around 2.5 ounces of broccoli sprouts to your daily smoothies, salad, or snack.

# Supplementing with Broccoli Sprouts

Buying a broccoli sprout supplement may seem like the best option, but don't let the tempting price of \$10 a month fool you. This will cost you 20x more than buying broccoli sprouts in the store, and supplements can't even guarantee that the myrosinase enzyme will be present or active.

When you buy fresh broccoli sprouts you can at least guarantee that you are getting sulforaphane in your diet. Store bought broccoli sprouts will cost you about \$1 per ounce or you can easily grow them at home for the cost of around 9 cents per ounce.

**Related: *You Need Sulforaphane – How and Why to Grow Broccoli Sprouts***

## Conclusion

Sulforaphane is a compound that comes with a list of beneficial effects that gets longer as we continue to study it. You can reap the benefits of sulforaphane by eating around 5 servings of raw or minimally cooked cruciferous vegetables a week. However, the simplest and most effective way to consume sulforaphane is by eating broccoli sprouts.

Just one ounce of broccoli sprouts converts to as much sulforaphane as one-and-a-half pounds of mature broccoli. A reliable source of broccoli sprouts is your local organic food store, but this added expense can easily break your grocery budget. The cheapest way to supplement your diet with broccoli sprouts is by growing them at home. After 5-7 days you can have up to a half pound of sprouts for 10x less than the cost of broccoli sprouts in the store.

### Related Reading:

- *Detox Cheap and Easy Without Fasting – Recipes Included*

- *Foods, Vitamins, and Herbs That Kill Cancer*
- *Holistic Guide to Healing the Endocrine System and Balancing Our Hormones*
- *The Difference Between Heirlooms, Hybrids, and GMOs*

## Sources:

- *Keap1-Nrf2 Signaling: A Target for Cancer Prevention by Sulforaphane* – NCBI
- *Sulforaphane treatment of autism spectrum disorder (ASD)* – NCBI
- *Sulforaphane, a Dietary Component of Broccoli/Broccoli Sprouts, Inhibits Breast Cancer Stem Cells* – NCBI
- *Dietary Sulforaphane in Cancer Chemoprevention: The Role of Epigenetic Regulation and HDAC Inhibition* – NCBI
- *Frugal Chemoprevention: Targeting Nrf2 with Foods Rich in Sulforaphane* – NCBI
- *Oxidative Stress and Neurodegenerative Diseases: A Review of Upstream and Downstream Antioxidant Therapeutic Options* – NCBI
- *Sulforaphane, a phytochemical in broccoli sprouts, ameliorates obesity* – Science Daily
- *Sulforaphane improves cognitive function administered following traumatic brain injury* – Science Direct
- *Neuroprotective Effects of Sulforaphane on Cholinergic Neurons in Mice with Alzheimer's Disease-Like Lesions* – NCBI
- *Broccoli sprouts: an exceptionally rich source of inducers of enzymes that protect against chemical carcinogens.* – NCBI
- *Heating decreases epithiospecifier protein activity and increases sulforaphane formation in broccoli.* – NCBI
- *Refrigerating* – Sprout People
- *Potential health benefits of sulforaphane: A review of the experimental, clinical and epidemiological evidences and underlying mechanisms* – Academic Journals
- *Broccoli sprouts: an exceptionally rich source of*

*inducers of enzymes that protect against chemical carcinogens.* – NCBI

- *Myrosinase activity and total glucosinolate content of cruciferous vegetables, and some properties of cabbage myrosinase in Taiwan* – Journal of the Science and Food Agriculture
- *Brown Fat in Humans: Turning up the Heat on Obesity – Diabetes*
- *Sulforaphane Bioavailability from Glucoraphanin-Rich Broccoli: Control by Active Endogenous Myrosinase* – NCBI
- *Cruciferous Vegetables* – Oregon State University