

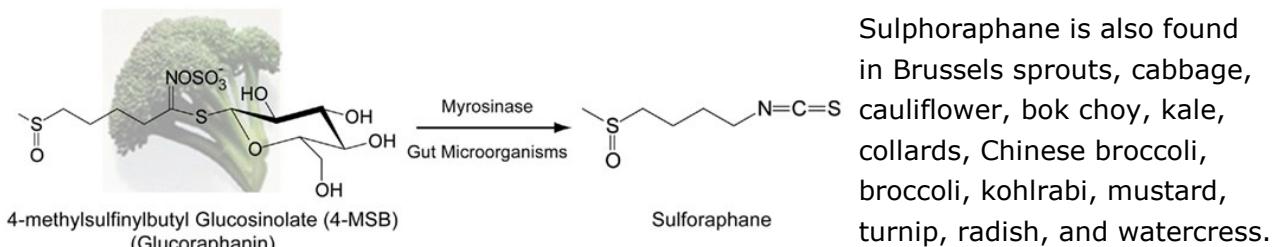
# Sulforaphane in the Treatment of Autism



A recent study has been published that has shown significant benefits of **sulforaphane** in some core symptoms of Autism Spectrum Disorder (ASD). This is an encouraging initial study.

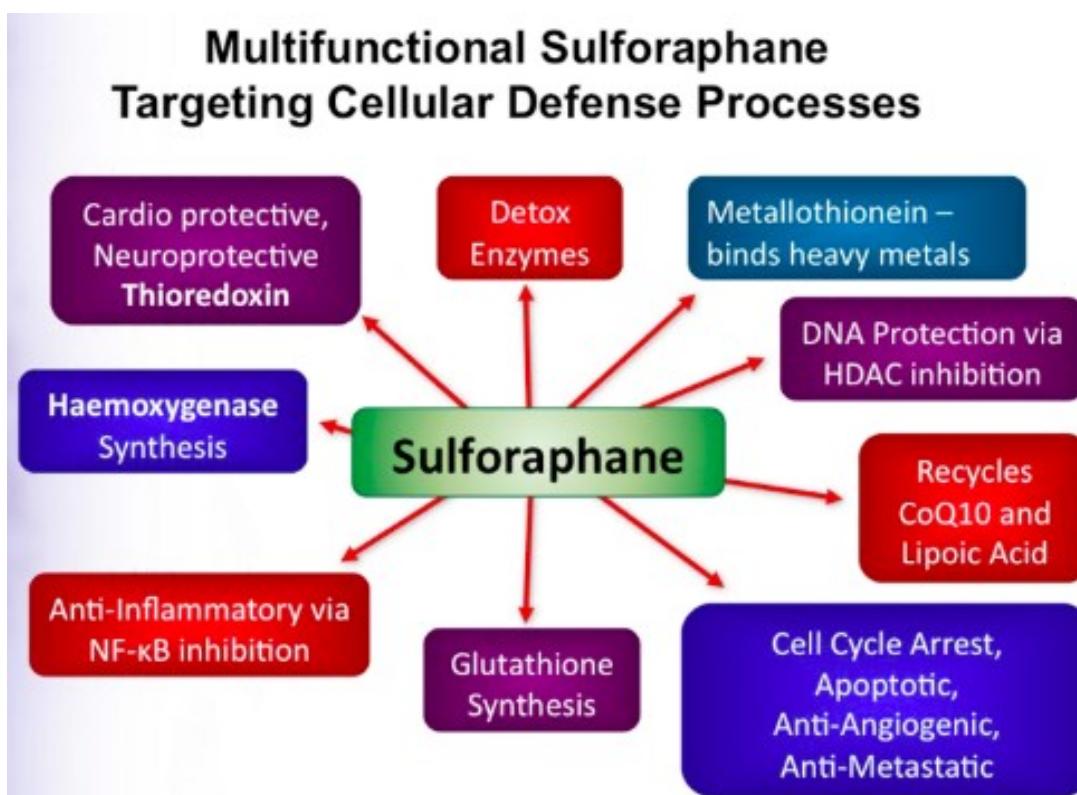
## What is Sulforaphane?

Sulforaphane is isolated from a group of phytochemicals called glucosinolates of which glucoraphanin, contained in **broccoli sprouts**, is converted to sulforaphane by the action of the enzyme myrosinase.



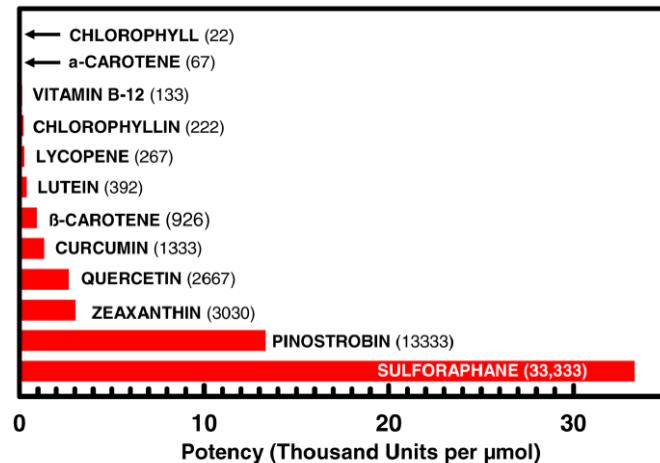
### Sulforaphane acts as a long lasting antioxidant that detoxifies free radicals in the body.

Sulforaphane has reportedly many benefits, including enhancing cellular defences, as an anti-inflammatory and activating hundreds of cytoprotective genes. Sulforaphane has attracted recent attention for its antioxidant properties, which may persist for hours after ingestion. Research into sulforaphane indicates potential for treatment of neurodegenerative disorders and cancer.



## Mechanism of Action of Sulforaphane?

The therapeutic potential of sulforaphane is based on its potent activity in up-regulating genes that control mechanisms whereby cells protect themselves against oxidative stress, inflammation, DNA-damage, and radiation. Basically, sulforaphane up-regulates the cells ability to protect itself, reducing the risk of developing malignancies and other chronic condi-

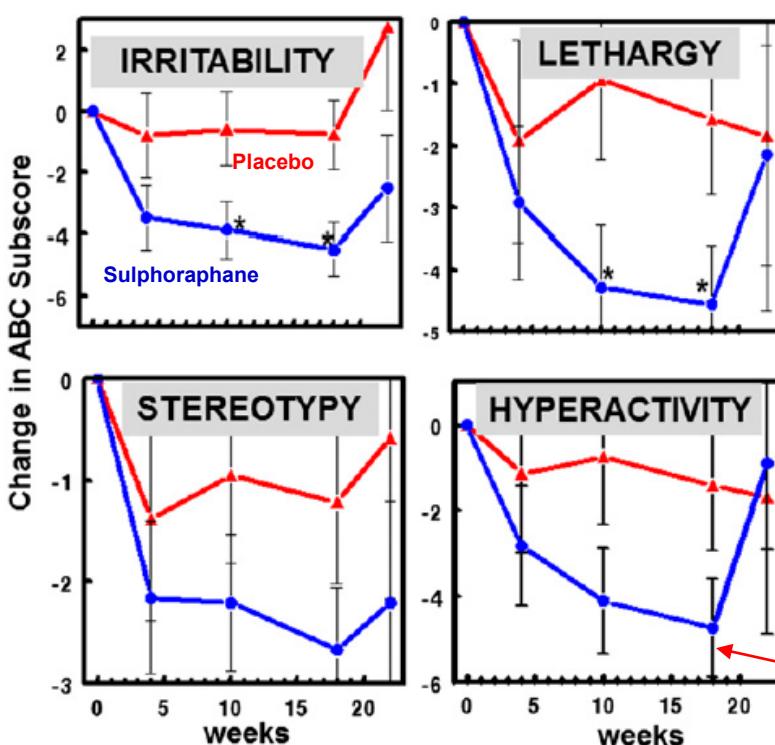


Comparative effect of sulforaphane in increasing levels of the phase II liver detoxification enzyme, quinone reductase in mammalian cells.

As an example, the diagram to the left shows how potent sulforaphane can be in up regulating phase II liver detoxification genes compared to other compounds. Sulforaphane enhances cellular defences primarily by activating transcription factor, Nrf2, which up-regulates genes coding for more than 200 cytoprotective enzymes and other compounds. These genes include those that code for the synthesis of glutathione and the detoxification enzymes. In addition sulforaphane activates the gene which codes for metallothionein, essential for detoxifying heavy metals, including mercury.

## So what about this study of sulforaphane in ASD individuals?

This placebo-controlled, double-blind, randomized trial, of young men (aged 13–27) with moderate to severe ASD, received sulforaphane derived from broccoli sprout extracts or placebo. The effects on behaviour of daily oral doses of sulforaphane (50–150  $\mu\text{mol}$ ) for 18 weeks, followed by 4 weeks without treatment, was assessed by three widely accepted behavioural measures completed by parents/caregivers and physicians.



After 18 weeks, participants receiving placebo experienced minimal change (<3.3%), whereas **those receiving sulforaphane showed substantial improvement of behaviour (34%)**. A significantly greater number of participants receiving sulforaphane had **improvement in social interaction, abnormal behaviour, and verbal communication**. Upon discontinuation of sulforaphane, total scores on all scales rose toward pre-treatment levels.

18 week period, sulforaphane discontinued

Sulforaphane as used in the trial is available through my clinic.

### Study details:

**Sulforaphane treatment of autism spectrum disorder (ASD).** Kanwaljit Singh, Susan L. Connors, et al. [www.pnas.org/cgi/doi/10.1073/pnas.1416940111](http://www.pnas.org/cgi/doi/10.1073/pnas.1416940111)