NAC
N-Acetyl-L-Cysteine

(Hypoallergenic)

Item # 71370
Available in bottles of 120 tablets

The Possible Benefits of N-Acetyl-L-Cysteine, a Dietary Supplement

- An important antioxidant that protects against oxidative stress
- Provides a stable form of L-cysteine, and is a precursor to glutathione

Description

N-Acetyl-L-Cysteine (NAC) is a premier antioxidant, antitoxin, and immune support nutrient. NAC is a derivative of the amino acid L-cysteine, and is a dietary precursor to reduced glutathione. Glutathione, cysteine, and NAC are sulfhydryl (-SH) substances, which play crucial roles in the natural antioxidant defenses of the body's cells, tissues, and organs. Antioxidant activity is important to homeostasis and to normal metabolism overall. NAC has superior bioavailability compared to glutathione and cysteine.

As potent antioxidant free radical scavengers, the natural -SH substances can readily donate electrons, which makes them able to combine with, and thereby neutralize, a great variety of potentially toxic reactive substances. These -SH substances can also help protect against radiation damage, which is largely mediated by free radical formation. They are important physiological antitoxins, and are valuable for optimal immune function.

The major -SH substance used by our cells is glutathione. It can exist either in the electron-rich antioxidant form known as reduced glutathione (GSH), or in the electron-poor form known as oxidized glutathione (GSSG). The ratio between these two forms largely determines the sulfhydryl balance of each cell. As a general rule, an excess of GSH over GSSG makes for better cellular health, whereas a shortage of GSH is linked to a falloff in cell function and eventually the death of the cell. Healthy cells are continually reconverting GSSG to the reduced GSH form in order to maintain a favorable balance of antioxidant properties.

In the body, the ratio of reduced cysteine over the oxidized form (cystine) also is a factor in determining sulfhydryl balance. This -SH balance largely determines the structure of our proteins, and their structure in turn determines their biological activity. The antioxidant sulfhydryl groups in proteins can become converted to disulfide groups, which then function as "cross-braces" in the body of the protein molecule:

R-SH + R-SH ←→ R-S-S-R
2 sulfhydryl molecules — 1 disulfide group
Reduced (antioxidant) — Oxidized (cross-linked)

As these bonds are formed and broken, the shape of the molecule will change. The body's enzymes, receptors, and other proteins are large molecules that have active sites, specific zones on the molecule at which chemical reactions are favored. For this active site to be effective it must have a very specific 3-dimensional shape. This shape is determined to a large extent by a pattern of conversion of the sulfhydryl groups in the larger molecule to disulfide bonds. Enzymes in particular often have sulfhydryl or disulfide groups at or near their active sites. These bonds are particularly sensitive to the oxidation-reduction state of their surrounding environment, and converting one set to the other by oxidation or reduction can affect an enzyme's catalytic activity.

The influence of -SH balance on life processes goes beyond effects on enzymes and other proteins. In addition to being essential for homeostasis and optimal metabolism, favorable -SH status is essential for the formation of new cells, and for cells to differentiate, grow, mature, and function. For example, by affecting cell membrane enzymes, -SH balance can facilitate or impair functions as diverse as the release of neurotransmitters or hormones, the contraction of muscle, and neutralization of certain toxins.

Favorable sulfhydryl balance is important for aiding neutralization of toxins, such as cigarette smoke, and heavy metals such as mercury, cadmium, and lead. The body has a sophisticated system of enzymes, the P-450 system, that is mainly responsible for

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detoxifying a plethora of foreign chemicals, including various pharmaceuticals, to which many of us are exposed on a routine basis. Such chemicals are called xenobiotics, substances foreign to the body. The P-450 system is involved in the metabolism of many compounds: the aromatic hydrocarbons (dry cleaning solvents, some pesticides and herbicides, PCB's, dioxins, CFC's); the benzopyrenes and other barbecued food constituents that are potentially dangerous; and cholesterol, estrogens, and other water-insoluble circulating hormones. The P-450 enzymes require -SH substances as essential cofactors as well as for their own protection against damage from xenobiotics.

As a precursor to GSH, NAC is an excellent biochemical resource for aiding detoxification of xenobiotics. Mercury has the capability to enter the circulation from dental amalgam fillings, and mercury toxicity has been linked to a number of conditions of ill health. Under optimal physiological conditions, mercury is cleared from the body as a complex with glutathione or cysteine. Dietary supplementation with NAC helps to buffer mercury entering the circulation from dental amalgams, or lead or cadmium from environment sources.

Reduced glutathione has long been recognized to play an essential role in immunity function, especially via its antioxidant/reducing power. Favorable GSH status is important for the T and B lymphocyte cells to respond to stimulation and to proliferate as part of the normal immune response. The other major class of circulating immune cells, the phagocytes (macrophages, monocytes, neutrophils), which have the job of killing pathogenic viruses, bacteria, and fungi, rely on optimal GSH status to carry out these functions. By converting the disulfide bonds of lung mucus into sulfhydryl bonds, NAC helps naturally lower mucus viscosity, so that the lungs may be cleared more easily. GSH levels in the various organs can decline with age, and NAC may contribute to the amelioration of GSH deficiencies related to aging.

NAC is the dietary supplement of choice for supporting the body's stores of glutathione, cysteine, and other sulfhydryl antioxidants. Oral supplementation with glutathione appears not to be the best means for repleting the body's glutathione levels, since it is largely broken down by intestinal enzymes and comparatively little is absorbed intact. Even though cells rely on internal glutathione for normal functioning, GSH itself is unable to cross cell membranes. NAC, on the other hand, appears to be an excellent dietary starting substance for building up reduced glutathione. It acts as a readily available source of L-cysteine in the body, which can freely cross enter the cells to act as a source of GSH.

NAC is a premier nutritional supplement for the amelioration of deficiencies of glutathione, cysteine, or other constituents of the body's antioxidant defenses. NAC is well tolerated and well absorbed, resists enzymatic breakdown, and has been proven to raise internal GSH and cysteine levels when given by mouth. NAC is also more stable than its non-acetylated relative L-cysteine, which has a tendency to "auto-oxidize" (break down spontaneously). NAC is therefore superior as a dietary -SH source. Our NAC is in tablet form to insure potency.

Each tablet contains:	N-Acetyl-L-Cysteine	500 mg
Other ingredients:	Dicalcium phosphate, cellulose, magnesium stearate, silicon dioxide, stearic acid.	
Suggested Use:	As a dietary supplement, 1 tablet one to three times per day, or as directed by a healthcare practitioner.	

Selected References

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