

Are you ready for the flu and cold season?

NAC: The Best Flu and Cold Remedy Yet? By Jack Challem

It turns out that a little known dietary supplement may be your best defense against symptoms of the flu and common cold. The supplement, N-acetylcysteine (NAC), is a form of the amino acid cysteine and a component of protein. It's also one of the most potent immune boosters around.

Never heard of it? Virtually every hospital emergency room in the country stocks it as an antidote for acetaminophen (Tylenol®) poisoning. Overdoses of acetaminophen, a common analgesic drug, deplete your liver's supply of glutathione, a powerful antioxidant, leading to liver failure. Large supplemental doses of NAC restore liver glutathione levels and help the organ break down acetaminophen.

NAC has also been used since the 1960s as a "mucolytic" agent-that is, to break down lung-clogging mucous in chronic bronchitis and other respiratory disorders. Rich in what chemists call "free sulfhydryl groups," NAC breaks down the disulfide bonds of mucous-in essence, thinning it out.

NAC Reduces Flu Symptoms

NAC has several key functions in the body. It is a precursor to glutathione, the principal antioxidant made in the body, meaning that NAC raises glutathione levels. Like other sulfur-containing nutrients, NAC is a powerful antioxidant. It also helps the liver break down hazardous compounds-that is, after all, part of the liver's job.

Unlike pure cysteine, which can be neurotoxic in high doses, NAC is completely safe. The "acetyl" part of the name comes from the fact that its cysteine is acetylated. That means it is bonded to a molecules called an "acetyl group." similar to the molecules that make up acetic acid, or vinegar. Acetylation increases absorption, stability, and safety.

Researchers have for years studied NAC as a natural cancer-preventive compound. Glutathione levels are typically lower than normal in people with cancer and other serious diseases. Given NAC's ability to boost glutathione levels and to clear congested lungs, one of these researchers decided to test NAC on elderly men and women susceptible to flus and "flu-like" symptoms.

Silvio De Flora, M.D., of the Institute of Hygiene and Preventive Medicine at the University of Genoa, Italy, enrolled 262 subjects in a randomized, double-blind study to test the benefits of NAC. The subjects were given either two placebos or two 600 mg NAC tablets daily for six months overlapping the wintertime flu season. All of the participants kept a daily log of their health and symptoms, and some were tested for flu antibodies.

While NAC did not prevent infection with flu germs, its effect was "striking," according to De Flora. Of the people with laboratory-confirmed flus who were taking NAC, only 25 percent developed symptoms. In contrast, 79 percent of the men and women taking placebos developed clear-cut flu symptoms, according to De Flora's article in the *European Respiratory Journal*. In other words, NAC supplements reduced the likelihood of having flu symptoms by more than two-thirds.

Not everyone who gets sick during the winter, however, actually has the flu. So De Flora and his colleagues looked at more general flu-like symptoms, including fever, headache, achiness, nasal discharge, cough, and sore throat. Again, the differences between people taking NAC and placebos was unmistakable. Month to month, over the flu and cold season, people taking NAC had anywhere from one-third to one-half the flu-like symptoms of those taking placebos.

"An additional criterion for evaluating the severity of influenza-like episodes was the length of time in bed which, irrespective of the age of patients, was remarkably shorter in NAC-treated subjects," noted De Flora. "In fact, in the 10 subjects suffering from influenza-like episodes who were not bedridden, nine were under NAC treatment.

Overall, subjects taking NAC weathered their flu-like symptoms with greater ease. Most of the people taking NAC had mild flu-like symptoms, in contrast, a larger percentage of people suffered moderate and severe symptoms.

All of the subjects also underwent period immune function tests, in which antigens (noninfectious bacterial compounds) were applied to the skin. In healthy people, these antigens trigger a noticeable immune response, but the study's elderly subjects responded sluggishly when De Flora began his study. Retested after one, three, and six months, immune responsiveness—the ability to respond to an infection—improved steadily among people taking NAC, but not among those taking placebos.

In concluding remarks, De Flora noted that NAC was not virus-specific and could provide "broad-spectrum protection" to ease or eliminate symptoms of infection, particularly in elderly and other people at risk for contracting the flu.

Increases Life Expectancy in AIDS

Further evidence of NAC's immune-enhancing properties comes from a study of patients infected with the human immunodeficiency virus (HIV), one of the most deadly viruses. Geneticists Lenora Herzenberg, Ph.D., Leonard Herzenberg, Ph.D., and their colleagues at Stanford University, determined that patients with HIV infections and acquired immune-deficiency syndrome (AIDS) had low levels of glutathione, and that declining of glutathione levels were a better indication of life expectancy than were a decrease in CD4 immune cells. CD4 T cells are the immune cells targeted and destroyed by HIV.

The Hertenberg's followed 204 AIDS patients for three years. Those with normal glutathione levels in their CD4 cells generally outlived those with low glutathione levels.

The Herzenberg's gave the AIDS patients either very large doses of NAC-3,200-8,000 mg-or a placebo daily for six weeks. Patients taking NAC had increased blood levels of glutathione.

After this phase of the study, The Herzenberg's offered NAC to all of the patients, and a majority took it for six months. Those who chose to take NAC supplements were "roughly twice as likely to survive for 2 years as the subjects who did not take NAC," explained Leonard Herzenberg.

Several years ago, researchers at the Gaslini Institute, Genoa, Italy, investigated how NAC enhances the immune response. Giovanni A. Rossi, M.D., and his colleagues studied NAC's effect on two types of immune cells, alveolar macrophages and polymorphonuclear leukocytes, obtained from human subjects. The macrophages were incubated by *Staphylococcus aureus*, a type of bacteria that causes strep throat and "flesh-eating bacteria" infections.

When Rossi added NAC to some of the cell cultures, the bacteria-killing properties of the macrophages and leukocytes increased significantly. Normally, these cells react so strongly to infections that many are killed in the process. With NAC, however, the enhanced germ-killing effect of macrophages and leukocytes did not result in greater self-destruction of these immune cells.

May Help Prevent Cancer

NAC has also shown promise as a "chemopreventive," or cancer-preventing, compound. Most cancers are caused by damage to deoxyribonucleic acid (DNA), which contains the genetic instructions for cell growth. Cancer-causing compounds attach to DNA via chemicals called "adducts." NAC decreases adduct numbers, according to an animal study published in *Cancer Research*.

Cancer cells also produce their own free radicals, which mutate DNA and signal other cancer cells to keep growing. A study, by Kaikobad Irani, Ph.D., found that antioxidants, particularly NAC, block these cell-growth signals and might inhibit the activity of some types of cancers. In the *Journal of Cellular Biochemistry*, the University of Genoa's De Flora wrote that NAC "appears to possess all four requirements necessary for a cancer chemopreventive agent to be used in humans: low cost; practicality of use (oral administration); efficacy, as documented by experimental data; and tolerability and very low toxicity, well established in 30 years of clinical use."

NAC may also be of value in preserving muscle tissue in cancer patients, as well as people over overexercise. Wolf Dröge, Ph.D., an immunologist at the German Cancer Research Center, Heidelberg, found that reasonably fit men had a "significant decrease" in muscle mass and an increase in body fat after eight weeks weightlifting. However, when the subjects took 600 mg of NAC three times weekly, their loss of body mass was almost completely prevented.

In sum, NAC is a power immune booster that can protect you against flu symptoms other infections and maybe even lower your risk of cancer. Furthermore, NAC supplements are extraordinarily safe, and recommended doses generally range from 500-1,200 mg daily. Because NAC contains sulfur, capsules have a strong smell. However, they generally do not cause stomach upset or bad breath.

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