N-Acetyl Cysteine (NAC)

En Español (Spanish Version)

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Principal Proposed Uses
• Angina Pectoris (in Combination With Conventional Treatment); Chronic Bronchitis; Preventing Influenza

Other Proposed Uses
• Chemical Dependency (Cocaine); Chemotherapy Support; Chronic Blepharitis; Colon Cancer Prevention; Female Infertility Caused by Polycystic Ovary Syndrome; HIV Support; Liver Failure; Pathological Gambling (Gambling Addiction); Protection Against Kidney Damage Caused by Contrast Agents; Schizophrenia; Sjogren’s Syndrome

N-acetyl cysteine (NAC) is a specially modified form of the dietary amino acid cysteine. When taken orally, NAC is thought to help the body make the important antioxidant enzyme glutathione. It has shown promise for a number of conditions, especially chronic bronchitis.

Sources
There is no daily requirement for NAC, and it is not found in food.

Therapeutic Dosages
Optimal levels of NAC have not been determined. The amount used in studies has varied from 250 to 1,500 mg daily.

It has been suggested that NAC may increase excretion of trace minerals; some evidence, however, suggests that this effect is too minimal to make a real difference. Prudence suggests that individuals taking NAC for an extended period of time should also consider taking a standard multivitamin/multimineral supplement.

Therapeutic Uses
Significant but not entirely consistent evidence suggests that regular use of NAC is helpful for individuals with chronic bronchitis (a condition commonly associated with smoking and emphysema) in reducing frequency of acute flare-ups of the condition.

Regular use of NAC may help prevent influenza, possibly by stimulating immunity.

One substantial study found evidence that NAC may augment the effectiveness of clomiphene, a drug used for
female infertility, in women with polycystic ovary syndrome. Another study found NAC far less effective for this purpose than the drug metformin; however, it still could have provided some benefit.

Mixed evidence suggests that NAC may also enhance the effectiveness of the drug nitroglycerin used for the treatment of angina. However, severe headaches can develop as a side effect.

Note: Do not attempt to self-treat angina, acute respiratory distress syndrome, or acetaminophen poisoning! Medical supervision is absolutely essential because of the very real risk of death in these conditions.

NAC may be helpful in a life-threatening condition called acute respiratory distress syndrome. Very high dosages of NAC are used in hospitals as a conventional treatment for acetaminophen poisoning.

According to some, but not all studies, NAC may be helpful for preventing complications that occur during cardiac surgery.

Some research has also suggested that NAC may be helpful for Sjogren’s syndrome (a disease that causes dry eyes, among other symptoms), chronic blepharitis (ongoing infections of the eyelid), severe liver disease, and reducing the side effects of the cancer chemotherapy drug ifosfamide. Other evidence hints that NAC might help offset the carcinogenic effects of smoking and reduce colon cancer risk. Weak evidence hints that NAC might reduce some side effects (specifically, cardiac toxicity and hair loss) caused by the cancer chemotherapy drug doxorubicin.

NAC has been proposed as supportive therapy for HIV. Despite some intriguing results, overall the evidence is inconsistent at best.

Several studies have suggested that NAC may be beneficial as an aid to treating various mental health disorders including schizophrenia, cocaine-dependence, and even pathological gambling.

In order to get more information from certain types of x-rays, radiologists often administer substances called contrast agents. Unfortunately, contrast agents can damage the kidney. It has been suggested that NAC can help protect the kidney from such damage; however, the most recent and best-designed study failed to find benefit.

One double-blind trial failed to find NAC helpful for head and neck or lung cancer. Studies have also failed to find NAC helpful for treating viral hepatitis, preeclampsia, or enhancing sports performance.

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**What Is the Scientific Evidence for N-Acetyl Cysteine?**

**Chronic Bronchitis**

Individuals who have smoked cigarettes for many years eventually develop deterioration in their lungs leading to various symptoms, including chronic production of thick mucus. This so-called chronic bronchitis (closely related to chronic obstructive pulmonary disease) tends to flare up periodically into severe acute attacks possibly requiring hospitalization.

Regular use of NAC may diminish the number of these attacks. A review and meta-analysis selected 8 double-blind, placebo-controlled trials of NAC for chronic bronchitis. The results of these studies, involving a total of about 1,400 individuals, suggest that NAC taken daily at a dose of 400 mg to 1,200 mg can reduce the number of acute attacks of severe bronchitis. However, the largest and best of these studies, a 3-year, double-blind, placebo-controlled trial of 523 people, failed to find that use of NAC at a dose of 600 mg daily reduced exacerbations or delayed the typical progressive worsening of lung function.

It is not clear how NAC works (if it does); the old concept that it acts by thinning mucus may not be correct.
Influenza

In a double-blind, placebo-controlled study of 262 seniors, regular use of NAC at dose of 600 mg twice daily helped prevent the development of influenza-like illnesses. Over the 6-month study period, only 25% of participants taking NAC developed flu-like symptoms, as compared to 79% in the placebo group, a statistically significant difference.

Interestingly, blood tests suggested that NAC did not prevent influenza infection—about as many people showed antibodies indicating influenza infection in the NAC group as in the placebo group. Rather, the supplement seemed to reduce the rate at which influenza infection became severe enough to cause noticeable symptoms. Tests of immune function hinted that NAC functioned by increasing the strength of the immune response.

Angina Pectoris

Angina pectoris is a squeezing feeling in the chest caused by inadequate blood supply to the heart. It can be a precursor of heart attacks. People with angina often use the drug nitroglycerin to relieve symptoms. One 4-month, double-blind, placebo-controlled study of 200 people with heart disease found that the combination of nitroglycerin and NAC significantly reduced the incidence of heart attacks and other severe heart problems. NAC alone and nitroglycerin alone were not as effective. The only problem was that the combination of nitroglycerin and NAC caused severe headaches in many participants. This effect has been seen in other studies as well.

NAC may also help in cases of nitroglycerin tolerance, a condition in which the drug becomes less effective over time. In a small double-blind study of 32 people with angina, tolerance developed in 15 of 16 individuals who took nitroglycerin only, but in just 5 of 16 individuals who took nitroglycerin plus 2 g of NAC daily. Other studies have found no benefit.

Female Infertility

In a double-blind, placebo-controlled study of 150 women suffering from infertility who had not responded to treatment with the fertility drug clomiphene, use of NAC at 1,200 mg daily significantly augmented the effectiveness of clomiphene. Treatment was begun on day 3 of the menstrual cycle and continued for 5 days. About 20% of women in the NAC plus clomiphene group became pregnant, as compared to 0% in the placebo plus clomiphene group.

Acute Respiratory Distress Syndrome

A double-blind, placebo-controlled clinical trial compared the effectiveness of NAC, Procysteine (a synthetic cysteine building-block drug), and placebo in 46 people with acute respiratory distress syndrome. This catastrophic lung condition can occur when an unconscious person inhales a small amount of his or her own vomit. Both NAC and Procysteine reduced the severity of the condition in some people (as compared with placebo). However, overall it did not reduce the number of deaths.

Colon Cancer Prevention

A preliminary double-blind, placebo-controlled study of NAC enrolled 62 individuals, each of whom had had a polyp removed from the colon. The abnormal growth of polyps is closely associated with the development of colon cancer. In this study, the potential anticancer benefits of NAC treatment were evaluated by taking a biopsy of the rectum. Individuals taking NAC at 800 mg daily for 12 weeks showed more normal cells in the biopsied tissue as compared to those in the placebo group.

Safety Issues
NAC appears to be a very safe supplement when taken alone, although one study in rats suggests that 60 to 100 times the normal dose can cause liver injury. 45

As mentioned above, the combination of nitroglycerin and NAC can cause severe headaches. Safety in young children, women who are pregnant or nursing, and individuals with severe liver or kidney disease has not been established.

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**Interactions You Should Know About**

If you are taking nitroglycerin, NAC may cause severe headaches.

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**References [+]**


13. Hogan JC, Lewis MJ, Henderson AH. Chronic administration of N-acetylcysteine fails to prevent nitrate...


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