



NAC (N-ACETYL-CYSTEINE)

Summary

NAC is a supplement used by people with HIV/AIDS (PHAs) usually as part of an antioxidant regimen. NAC is usually taken two or three times daily and is available in capsule and tablet forms in some health food stores. NAC is also available by prescription in liquid form from pharmacies.

What is NAC?

NAC is a supplement used by PHAs. NAC stands for N-acetyl-cysteine and is similar to the amino acid cysteine. Taking NAC helps to increase levels of the protective compound glutathione (GSH) in the body.

How does NAC work?

Before explaining how NAC works, we first need to give you some background information about GSH.

GSH is a compound that the body makes using various nutrients including the amino acid cysteine. GSH is the body's chief protector from the damage caused by toxic substances. Results from a number of studies suggest that in HIV/AIDS the demand by the body for GSH exceeds the supply. Less-than-normal levels of GSH may result in impaired performance by cells of the immune system and perhaps increased sensitivity to the toxic effects of some drugs. When there is not enough cysteine available to make GSH, the body tears down muscles, which are rich in protein, to find the nutrients needed to make GSH. NAC works by acting as a source of cysteine and stimulating the production of GSH.

Why do PHAs use NAC?

1. Antioxidant

In the late 1980s, researchers found that PHAs were likely to have higher-than-normal levels of highly active compounds called “free radicals.” These compounds damage cells in much the same way that rust damages a car. Some PHAs take NAC as part of an antioxidant regimen to help counter the damaging effects of high levels of free radicals.

2. Antiviral

In laboratory experiments with cells and viruses, very high concentrations of NAC appear to reduce production of HIV. However, to achieve this concentration in the blood of people, large doses of NAC — 5 grams every six hours — would have to be taken. In one short clinical trial, Norwegian researchers gave HIV positive subjects two antioxidants: high-dose NAC (as listed previously) and vitamin C — 3 grams every six hours. These two antioxidants resulted in a modest decrease in viral load (less than one log). Unfortunately, taking large doses of antioxidants every six hours is not practical for most PHAs over the long term. Moreover, such high doses of NAC are likely to cause nausea, vomiting and possibly diarrhea. Now that highly



active antiretroviral therapy (HAART) is available in high-income countries, few PHAs would consider intensive NAC therapy a suitable and practical option for lowering levels of HIV in their blood.

3. To maintain GSH, protein and muscle mass

HIV positive people — whether or not they are taking HAART — can experience a loss of critical sulfur-containing amino acids such as cysteine and methionine. Supplements of NAC may be able to replace lost cysteine, help maintain protein levels and possibly reduce muscle wasting. Together, all of these potential benefits may explain why one American study found that supplements of NAC — an average of 4 grams daily — prolonged survival for up to three years in the time before HAART was widely available.

4. To protect the liver and kidneys from the toxicity of Tylenol (acetaminophen) and other drugs

In some people, the pain reliever Tylenol (acetaminophen) can be toxic to the liver and kidneys even when used within normal doses. Use of NAC may help to reduce this problem. PHAs who also have hepatitis sometimes use NAC, which may help protect their liver from the ongoing damage that results from hepatitis.

Drug interactions

If you are taking antibiotics, NAC should not be taken, as it will weaken their beneficial effects.

Side effects

At high doses, NAC may cause the following symptoms in some people:

- nausea
- abdominal discomfort
- vomiting
- diarrhea

In lab experiments with cells, high concentrations of NAC can weaken some activities of the immune system. There have been no studies of this in people.

Dosage

The best dose of NAC for PHAs is not clear, but reviewing the data from clinical trials in PHAs may be useful. In the previously mentioned American study, use of about 4 grams per day of NAC was associated with improved survival. However, anecdotal reports suggest that taking such large doses of NAC for prolonged periods could cause abdominal discomfort, nausea, vomiting and diarrhea.

According to results from two recent German studies, a dose of 3 grams every other day is effective at increasing GSH levels and does not appear to cause toxicity.

Taking NAC with meals may reduce nausea. The manufacturer of the liquid form of NAC suggests that when it is taken in high doses it can be mixed with cola drinks or fruit juice to reduce the risk of nausea.

Availability

In drug stores, NAC is available in liquid form with a prescription and sold under the brand name Mucomyst. Health food stores may sell NAC in capsule form. An effervescent tablet formulation of NAC has recently become available in some of those stores.

Credits

Author: Sean R. Hosein

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Design: Renata Lipovitch

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Contact CATIE

by telephone
1.800.263.1638
416.203.7122

by fax
416.203.8284

by e-mail
info@catie.ca

on the Web
<http://www.catie.ca>

by mail
505-555 Richmond Street West
Box 1104
Toronto, Ontario
M5V 3B1
Canada



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