

CITICOLINE

Promotes Brain Metabolism



- Is a Major Constituent of the Gray Matter of the Brain
- Promotes Brain Metabolism by Enhancing Acetylcholine Production
- Helps Restore the Phospholipid Content to Brain Cell Membranes
- Aids in the Regulation of Neuronal Membrane Excitability
- Indirectly Modulates the Control of Blood Flow in the Brain

levels of neurotransmitters. These effects reflect not just the impact of CDP Choline upon the synthesis of acetylcholine, dopamine and noradrenaline, but also its indirect impact upon membrane health and transport through the improved production of phosphatidylcholine and phosphatidylserine (PS).

It might seem that the obvious way to increase phosphatidylcholine levels in the brain would be to supplement with phosphatidylcholine itself. However, the obvious is not always the best. Phosphatidylcholine is a good supplement, but it may not be absorbed as fully as is CDP Choline.

Both the cytidine and the choline fractions of CDP Choline are active. Cytidine is capable of penetrating the Blood Brain Barrier (BBB), and has been shown to improve the synthesis of several of the phospholipids, e.g. phosphatidylcholine, phosphatidylethanolamine and phosphatidylserine. Choline is a substrate for phospholipid synthesis.

Usage

As a supplement for healthy individuals, 250 mg of **Jarrow FORMULAS® Citicoline** per day is sufficient. The effective range of dosages for other purposes begins at approximately 500 mg per day, clinical trials typically having employed 500 to 2,000 mg per day.

References

Alvarez XA, et al. *Methods Find Exp Clin Pharmacol* 1997 Apr;19(3): 201-10.

Aranowski J., Strong R., Grotta JC. Citicoline for treatment of experimental focal ischemia: histologic and behavioral outcome. *Neurol Res* 1996 Dec;18(6):570-4.

Babb SM, Appelmans KE, Renshaw PF, Wurtman RJ, Cohen BM. Differential effect of CDP Choline on brain cytosolic choline levels in younger and older subjects as measured by proton magnetic resonance spectroscopy. *Psychopharmacology (Berl)* 1996 Sep; 127(2):88-94.

Hickenbottom SL, Grotta J. Neuroprotective therapy. *Semin Neurol* 1998; 18(4):485-92.

Porciatti V, Schiavi C, Benedetti P, Baldi A, Campos EC. Cytidine-5'-diphosphocholine improves visual acuity, contrast sensitivity and visually-evoked potentials of amblyopic subjects. *Curr Eye Res* 1998 Feb;17(2):141-8.

Schabitz WR, Weber J, Takano K, Sandage BW, Locke KW, Fisher M. The effects of prolonged treatment with citicoline in temporary experimental focal ischemia. *J Neurol Sci* 1996 Jun;138(1 2):21-5.

Secades JJ, Frontera G. CDP-Choline: pharmacological and clinical review. *Methods Find Exp Clin Pharmacol* 1995 Oct;17 Suppl B:2-54.

Spiers PA, Myers D, Hochanadel GS, Lieberman HR, Wurtman RJ. Citicoline improves verbal memory in aging. *Arch Neurol* 1996 May;53(5):441-8. Published erratum appears in *Arch Neurol* 1996 Oct;53(10):964.

Supplement Facts

Serving Size 1 Capsule		
	Amount Per Capsule	% DV
Citicoline (from stabilized cytidine 5'diphosphocholine)	250 mg	*
* Daily Value not established.		

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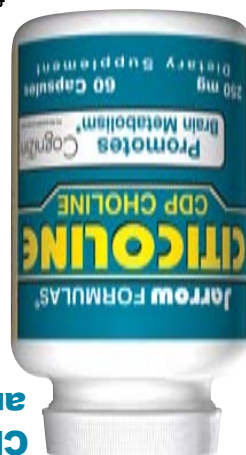
Researcher have theorized that CDP Choline may be effective in helping brain cells prevent the buildup of different toxins, as well as enhancing neuronal functions and promoting the production of proper

Why Use CDP Choline?

CDP Choline is a molecule that consists of cytidine and choline joined together. It is almost completely absorbed and equally bioavailable whether given orally or by injection. Once CDP Choline is ingested, it is broken down into its component parts, and these readily cross into the brain and central nervous system. Both components are incorporated into the phospholipid fraction of the membrane and various neurotransmitters and in the production of acetylcholine, although they influence other brain mechanisms as well.

CDP Choline: Clinically Proven

Phospholipids are the principal components of all cell membranes. These membranes might be envisioned as internal and external walls which are permeable, yet relatively solid and stable in comparison with their more fluid core. Within this semifluid core float proteins which act as switching and control mechanisms for cellular processes. The membrane consists of a single layer of cholesterol with a layer of phospholipids, and their attached polyunsaturated fatty acids. These supply the building blocks for prostaglandins, immune components, regulatory signals and other physiological important processes. Some phospholipids, primarily the inositols are especially active in cell signal regulation. The choline are preferentially involved in the functioning of various neurotransmitters and in the production of acetylcholine, although they influence other brain mechanisms as well.



Choline for Learning and Memory

The compound has been tested extensively in clinical trials in the areas of memory, verbal memory, recognition, recall, and cognitive abilities. These are all areas in which membrane permeability, choline and other neurotransmitters are known to be important. Cholinergic compounds and the brain neurons which make use of them play especially significant roles in learning and memory. Typical of journal titles regarding studies of this compound are "Citicoline Improves Verbal Memory in Aging," and "Citicoline Improves Memory Performance in Elderly Subjects". In these tests, this special nutrient improved many forms of recall at intakes as low as 300 mg/day. Even higher dosages (2,000 mg/day) improved both immediate and delayed logical memory. Recent studies have indicated improved visual acuity as well.

Although the causes of mental decline and degenerative brain disorders are diverse, a few basic changes are common to most forms of deterioration which affect the brain. Reduced synthesis of necessary neurotransmitters, decreased circulation and diminished cellular efficiency are the enemies of sound memory and mental clarity. Somewhat surprisingly, phospholipids can influence all of these areas responsible for brain health. CDP Choline is a very effective supplement to influence the production of important phospholipids.

Other factors involved in mental decline reflect undesirable general changes within the body. For instance, the body's ability to produce the basic energy unit which powers metabolism, *adenosine triphosphate* (ATP), declines over time. Similarly, the brain's capacity to metabolize glucose for energy goes down with age.

Moreover, even the ability of the blood to carry and release oxygen is subject to decline. First, the basic building blocks for important neurochemicals, especially acetylcholine, are less available and less efficiently used by the aging brain. One reason is that the same deterioration of the vascular system which is involved in heart disease can affect the ability of the blood supply to the brain.

First, the basic building blocks for important neurochemicals, especially acetylcholine, are less available and less efficiently used by the aging brain. This support is important because neurological function declines with age and reflects multiple factors. Many of these are nutritional in nature.

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Nutrition for the Brain