# Citicoline

Citicoline is the name for cytidine 5'-diphosphocholine (CDP-choline) and is a naturally occurring compound taking part in the synthesis of phosphatidylcholine. These compounds make up the lipid layers of cell membranes, which have a high turnover and therefore require constant synthesis. Citicoline is a donor in the synthesis of acetylcholine and phospholipids.

### **Possible Uses**

Traumatic brain injury, stroke, vascular dementia, Parkinson's disease, brain aging, and glaucoma.

### **Functions in the Body**

Stabilizes cell membranes and reduces free radicals, activates the cholinergic system, increases dopamine synthesis, and inhibits dopamine uptake.

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### In stroke:

- · Stabilizes cell membranes.
- · Increases synthesis of proteins, acetylcholine, and neutoransmitters (dopamine).
- · Prevents glutamate release and excitotoxicity.
- Decreases the release of caspase and decreases free radicals.

# **Human Trials of Citicoline**

Study Design	Outcomes	Ref.	
Dementia			
A systematic review of 46 articles.	Citicoline inhibited the progression of the disease and improved daily functioning. The review also reported positive impact of citicoline use on learning and cognitive functions in healthy people.	[1]	
Memory			
24 elderly patients with memory deficits without dementia. 3 groups: 500 mg, 1,000 mg, or combination with nimodipine, compared to placebo.	Citicoline at doses of 300–1,000 mg/d improved memory free recall, but not recognition. Compared to placebo, improvements in word recall, immediate object recall, and delayed object recall. Secondary improvements were decrease in systolic blood pressure and changes in lymphocyte count.	[2]	
100 healthy men and women between 50 and 85 years with age-associated memory impairment were given citicoline (500 mg/d) or placebo, for 12 weeks.	Compared to placebo, those in the citicoline group showed statistically significant improvements from baseline in episodic and composite memory (secondary outcome).	[3]	
Attention			
60 healthy women aged 40–60 years received 250 mg citicoline, 500 mg citicoline, or a placebo, for 28 days.	Both doses demonstrated fewer omission and commission errors compared to placebo after 28 days.	[4]	

The first company in the industry to have invested in an ISO 17025–accredited laboratory to test for identity, potency, oxidation, disintegration, purity, and more.





Study Design	Outcomes	Ref.		
Acute Ischemic Stroke				
10 randomized controlled trials investigated if citicoline, compared to placebo, had favourable outcomes within a 14-day-period post ischemic stroke.	Citicoline was associated with a trending higher independence. If citicoline was taken within 24 hours, and without standard therapy of recombinant tissue plasminogen activator, citicoline demonstrated benefit with OR 1.27.	[5]		
Systematic review of 12 human trials.	Compared to placebo, citicoline demonstrated a statistically significant improvement in functional outcomes $(p=0.01)$ (no significant change in neurological, domestic, or cognitive outcomes).	[6]		
Parkinson's Disease				
Systematic review of 7 studies (2 crossover, 3 RCT, and 2 open label).	The review found that patients with PD taking citicoline had significant improvements in rigidity, akinesia, tremor, handwriting, and speech. Citicoline also allowed effective reduction of levodopa by 50%.	[7]		
Glaucoma				
54 patients with primary open-angle glaucoma were given 250 mg citicoline or placebo for 3 months, with a 1-month washout period.	The average retinal nerve fibre layer (RNLF) thickness was higher in the citicoline group; however, it regressed after the 1-month washout, and there were no changes with manucular ganglion-inner plexiform layer (mGCIPL). The effects on RNLF in the short-term may have impacts in slowing the progression of the disease.	[8]		
Review	Citicoline conferred beneficial effects in several ophthalmological neurodegenerative diseases such as open-angle glaucoma, anterior ischemic optic neuropathy, and diabetic neuropathy.	[9]		
Review	Citicoline at 500–1,000 mg/d in permanence or in cycles can improve cognitive performance as well as being a valuable addition to treat open-angle glaucoma.	[10]		

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### Each vegetable capsule contains:

Citicoline (Cytidine 5'-diphosphocholine)	250 mg
Providing:	
Choline	52.5 mg
Choline (from choline bitartrate)	. 14 mg

Nonmedicinal ingredients: Microcrystalline cellulose, vegetable magnesium stearate, and silicon dioxide in a non-GMO vegetable capsule composed of vegetable carbohydrate gum and purified water.

**Directions of use: Adults 19 years and older:** Take 2 capsules once or twice daily or as directed by your health-care practitioner.

Cautions and warnings: Consult a health-care practitioner prior to use if you are taking medications that contain L-DOPA, meclofenoxate, or other cholinergic nootropic drugs. Consult a health-care practitioner prior to use if you are suffering from hypertonia of the parasympathetic nervous system.

**Contraindications:** Do not take if you are pregnant or breast-feeding.

Known adverse reactions: Occasional restlessness and excitability, digestive intolerance, and headache have been known to occur.

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