SUMMARY OF PRODUCT CHARACTERSTICS MEMCOLIN TABLETS

1. Product Name:

Memcolin 500 (Citicoline Tablets 500mg)

2. Composition:

Each film coated tablet contains:

Citicoline Sodium

Eq. to Citicoline 500 mg

Excipients q.s.

Colour : Titanium Dioxide BP

3. Indication:

Citicoline is a brain chemical that occurs naturally in the body. As a medicine, it is taken by mouth as a supplement or given by IV or as a shot.

Citicoline is used for Alzheimer's disease and other types of dementia, head trauma, cerebrovascular disease such as stroke, age-related memory loss, Parkinson's disease, attention deficit-hyperactive disorder (ADHD), and glaucoma.

Citicoline was originally developed in Japan for stroke. It was later introduced as a prescription drug in many European countries. In these countries it is now frequently prescribed for thinking problems related to circulation problems in the brain. In the US, citicoline is marketed as a dietary supplement.

Citicoline seems to increase a brain chemical called phosphatidylcholine. This brain chemical is important for brain function. Citicoline might also decrease brain tissue damage when the brain is injured.

- Age-related memory problems. Taking citicoline seems to help memory loss in people aged 50 to 85 years.

- Long-term blood circulation problems in the brain (cerebrovascular diseases). There is some evidence that taking citicoline by mouth or injecting citicoline into the vein or muscle might improve memory and behavior in patients with long-term cerebrovascular diseases, such as stroke.

- Stroke recovery. Stroke patients who take citicoline by mouth within 24 hours of having the kind of stroke that is caused by a clot (ischemic stroke) are more likely than other ischemic stroke patients to have a complete recovery within 3 months. Stroke patients who receive intravenous (IV) citicoline within 12 hours of having an ischemic stroke and daily thereafter for 7 days also have improved recovery.

- Alzheimer's disease and other types of dementia. Some evidence suggests that taking citicoline by mouth might improve learning, memory and information processing (cognitive function) in people with mild to moderate Alzheimer's disease.

- Lazy eye (amblyopia). Early research suggests that giving citicoline as a shot for 15 days might improve vision in people with a lazy eye.

- Bipolar disorder. Early research suggests that taking citicoline does not improve depression or manic symptoms in people with bipolar disorder and cocaine addiction.

- Cocaine addiction. Early research suggests that taking citicoline might reduce cocaine usein people with bipolar disorder and cocaine addiction.

- Glaucoma. Developing evidence suggests that citicoline might improve vision in some people with glaucoma.
- Vision loss due to blockage of the optic nerve (ischemic optic neuropathy). Early research suggests that taking a specific citicoline product (Cebrolux-Tubilux) for 60 days mightimprove vision in people with ischemic optic neuropathy.
- Memory. Early research suggests that taking citicoline might improve memory, learning, and speaking ability in people with brain injury due to trauma. Other research suggests that citicoline might improve some aspects of memory in elderly people.
- Muscle strength. Early research suggests that injecting citicoline intravenously (by IV) might improve muscle strength in people recovering from a type of stroke called a cerebral hemorrhage that was not caused by trauma.
- Parkinson's disease. Some research shows that giving citicoline as a shot along with usual treatment might improve some of the symptoms of Parkinson's disease, but not shaking (tremor).
- Recovery after surgery. Early research suggests that taking citicoline 24 hours beforesurgery and for 4 days after surgery might reduce symptoms of delirium after surgery in elderly people.
- Vascular dementia. Taking citicoline does not seem to improve symptoms in people with vascular dementia.
- Attention deficit-hyperactive disorder (ADHD).
- Head trauma.
- Other conditions.

Posology and method of administration :

Route of administration: Oral

For decline in thinking skills due to age: 1000-2000 mg of citicoline per day. For ongoing disease of the blood vessels that serve the brain (chronic cerebrovascular disease) : 600 mg of citicoline per day.

For immediate treatment of stroke due to a clot (ischemic stroke): 500-2000 mg of citicoline per day starting within 24 hours of stroke.

Dosage :

Head injury

Adult: 200-600 mg daily in divided doses.

Cerebrovascular disorders

Adult: 200-600 mg daily in divided doses.

Parkinsonism

Adult: 200-600 mg daily in divided doses.

OOD (before/after) :

May be taken with or without food. (Take with or between meals.)

Contraindications :

Citicoline treatment will not alter the acute effects of smoke marijuana.

Special Precautions & Warnings :

Pregnancy and breast-feeding : There is not enough reliable information about the safety of taking citicoline if you are pregnant or breast-feeding. Stay on the safe side and avoid use.

Interaction with other medicinal products and other forms of Interactions

No clinically significant drug interactions have been reported during the course of clinical studies.

- May potentiate oral anticoagulant action.
- May elevate serum digoxin concentration.

- Potentially Fatal : Increases plasma concentrations of terfenadine or astemizole. Increases the risk of ventricular arrhythmias in patients with preexisting cardiac diseases.

-Studies have shown that bioavailability is decreased by approximately 30% when Citicoline 500 is administered with drugs which neutralise gastric pH or inhibit acid secretions. Therefore, such drugs as antacids of the mineral type and H blockers such as ranitidine,which can 2 cause an increase in gastric pH, should be taken 2 to 3 hours after Citicoline 500 administration.

- The bioavailability increases if the product is administered during meals.

Food Interaction:

Food may interfere with absorption though not clinically significant.

Effects on Ability to Drive and Use Machines:

None

Undesirable effects

Citicoline is POSSIBLY SAFE when taken by mouth short-term (up to 90 days). The safety of long-term use is not known. Most people who take citicoline don't experience problematic side effects. But some people can have side effects such as trouble sleeping (insomnia), headache, diarrhoea, low or high blood pressure, nausea, blurred vision, chest pains, and others.

Overdose and special antidotes

None

Pharmacological Properties :

Citicoline, also known as cytidine diphosphate-choline (CDP-Choline) and cytidine 5'

- diphosphocholine is a psychostimulant/nootropic. It is an intermediate in the generation of phosphatidylcholine from choline.

Studies suggest that CDP-choline supplements increase dopamine receptor densities, and suggest that CDP-choline supplementation can ameliorate memory impairment caused by environmental conditions. Preliminary research at Harvard found that citicoline supplements help improve focus and mental energy and may possibly be useful in the treatment ofattention deficit disorder.

It is an ingredient in some energy drinks such as "5-Hour Energy" and is available as an over the counter nutritional supplement.

Pharmacodynamic Properties

Mechanism of Action :

Neuroprotective effects

The neuroprotective effects exhibited by citicoline may be due to its preservation of cardiolipin and sphingomyelin, preservation ofarachidonic acid content of phosphatidylcholine and phosphatidylethanolamine, partial restoration of

phosphatidylcholine levels, and stimulation of glutathione synthesis and glutathione reductase activity. Citicoline's effects may also be explained by the reduction of phospholipase A2 activity. Citicoline increases phosphatidylcholine synthesis.

The mechanism for this may be :

By converting 1, 2-diacylglycerol into phosphatidylcholine.

Stimulating the synthesis of SAMe, which aids in membrane stabilization and reduces levels of arachidonic acid. This is especially important after an ischemia, when arachidonic acid levels are elevated.

SUMMARY OF PRODUCT CHARACTERISTICS
MEMCOLIN 500
(CITICOLINE TABLETS 500mg)

Neuronal membrane

The brain prefers to use choline to synthesize acetylcholine. This limits the amount of choline available to synthesize phosphatidylcholine. When the availability of choline is low or the need for acetylcholine increases, phospholipids containing choline can be catabolized from neuronal membranes. These phospholipids include sphingomyelin and phosphatidylcholine. Supplementation with citicoline can increase the amount of choline available for acetylcholine synthesis and aid in rebuilding membrane phospholipid stores after depletion. Citicoline decreases phospholipase stimulation. This can lower levels of hydroxyl radicals produced after anischemia and prevent cardiolipin from being catabolized by phospholipase A2. It can also work to restore cardiolipin levels in the inner mitochondrial membrane.

Cell signalling

Citicoline enhances cellular communication by increasing the availability of neurotransmitters, including acetylcholine, norepinephrine, and dopamine.

Blood flow

Citicoline increases glucose metabolism in the brain and cerebral blood flow.

Inflammation and stress

Citicoline reduces oxidative stress. It also prevents excessive inflammatory response in the brain by inhibiting the release of free fatty acids and decreasing bloodbrain barrierbreakdown.

Glutamate transport

Citicoline lowers increased glutamate concentrations and raises decreased ATP concentrations induced by ischemia. Citicoline also increases glutamate uptake by increasing expression of EAAT2, a glutamate transporter, in vitro in rat astrocytes. It is suggested that the neuroprotective effects of citicoline after a stroke are due in part to citicoline's ability to decrease levels of glutamate in the brain.

Pharmacokinetic Properties

Citicoline is water-soluble, with more than 90% oral bioavailability. Plasma levels peak one hour after oral ingestion, and a majority of the citicoline is excreted as CO2 in respiration, and again 24 hours after ingestion, where the remaining citicoline is excreted through urine. Citicoline increases blood flow and O_2 consumption in the brain. It is also involved in the biosynthesis of lecithin.

Special precautions for storage:

Store below 30°C, protect from light and moisture.

Keep all medicines out of reach of children.

Nature and contents of container:

Alu-Alu Blister Pack of 1 X 10’s Tablets, packed in a carton with pack insert.

SUMMARY OF PRODUCT CHARACTERISTICS
MEMCOLIN 500
(CITICOLINE TABLETS 500mg)

Manufactured By:
Baroque PHARMACEUTICALS PVT. LTD.
192/2 & 3, 190/1 & 202/9, Sokhada-388620,
Tal-Khambhat, Dist.-Anand, Gujarat State, India.

Manufactured For:
Omnicals Pharma (Pvt.) Ltd.
Andheri (W), Mumbai-400053, India.