Decline in brain function is undoubtedly the factor that most disturbs people when they think of aging. The brain is the seat of personal identity and that which makes us uniquely human. It must be carefully protected from decline, whether due to disease or aging. While a healthy and supportive body is a prerequisite to the brain's optimal function, and every nutrient in this Directory may, therefore, help the brain, there are certain nutrients and drugs which have been found to be especially beneficial for brain health and the prevention or partial reversal of the effects of brain aging. In this section, we consider those which are nonprescription and available from the Life Extension Foundation.

Aging and Brain Function

Aging precipitates a progressive decline in overall cognitive function. It causes us to lose our ability to store and retrieve from short-term memory and to learn new information. Many neurological diseases are directly related to aging. Cognitive function is impacted via several well-defined age-related mechanisms, including:

- Metabolic disorders such as low thyroid, anemia, and cortisol overload
- Depression caused by methylation deficit and other changes in neuronal metabolism

The Life Extension Foundation has evaluated thousands of published studies showing that brain aging can be controlled, at least in part. Some of these studies demonstrate a preventive effect, whereas others show a benefit in reversing the cognitive impairment caused by normal aging or by a specific disease of aging, such as stroke.

An Overlooked Factor

A 30-year study of male twins showed that elevated blood pressure in mid-life predisposed men to accelerated brain aging and an increase in stroke later in life (Stroke 1999; 30:529-36). Men with even mildly elevated blood pressure 25 years before showed smaller brain volumes and more strokes compared to their twin brothers who did not have the elevation in blood pressure.

Improving Mental Function

Age-associated mental impairment can range in severity from forgetfulness to senility to dementia. Whatever its form or cause, it need not be accepted as a consequence of growing older. Behavioral modifications, such as increased physical and mental activity and a healthy diet, can improve mental function both directly and indirectly by enhancing overall health. Memory can also be improved by using aids such as lists and routines, and by making connections to existing knowledge. Age-associated mental impairment can be treated safely and effectively with memory-enhancing nutrients that increase available acetylcholine, brain cell energy boosters, hormones, vitamins that become deficient, and antioxidants.
Cognitex

The COGNITEX multi-ingredient formula provides potent nutrients used as drugs in Europe to treat senile dementia in the elderly. Published studies indicate these ingredients may also protect healthy people against many deleterious effects that occur in the aging brain.

The brain has a voracious appetite for choline. There are two main reasons for the brain’s huge need for this nutrient. First of all, choline is required for synthesis of the key neurotransmitter, acetylcholine. Second, choline is used for the building and maintenance of brain cell membranes. In Alzheimer’s disease, the levels of acetylcholine are abnormally low and it is the cholinergic neurons that show the most degeneration as Alzheimer’s disease progresses.

Glycerophosphorylcholine, vinpocetine, and phosphatidylserine are sold as drugs in Europe and Japan to correct cognitive impairment inflicted by degenerative brain disease. COGNITEX provides these potent brain-boosting nutrients that function via a variety of mechanisms to correct the molecular devastation that aging inflicts on brain cells, along with nutrients that have been shown to enhance memory and learning.

6 capsules of COGNITEX provide
Glycerophosphorylcholine.............600 mg
Choline Dihydrogen Citrate...........1500 mg
Choline Bitartrate....................1200 mg
Phosphatidylserine (PS).............100 mg
Vinpocetine..........................15 mg
Pantothenic acid.....................500 mg
RNA/DNA.............................425 mg
Pregnenolone.........................50 mg

Other ingredients: rice bran oil, gelatin, glycerin, soy lecithin, silicon dioxide, rosemary extract.

Dosage and use
- Six capsules daily are suggested.
- Eight capsules daily are recommended for those suffering from brain aging decline.
- This product need not be taken with meals.

Member
one bottle..............Retail $140.00 $30.00
four bottles.........Retail $152.00 $28.50 each
twelve bottles.....Retail $384.00 $24.00 each

Cognitex with Pregnenolone (1999 formula) 303

75 capsules

1 capsule contains
Choline (as choline bitartrate, Dihydrogen citrate, and CDP choline)........198 mg
Phosphatidylserine..................25 mg
Phosphatidylcholine (from soy)....35 mg
L-Serine..................................100 mg
Pantothenic Acid.....................170 mg
RNA/DNA.................................85 mg
Pregnenolone.......................10 mg
Vinpocetine...........................3 mg
Other ingredients: magnesium stearate, ethylcellulose, gelatin and water.
50 mg CDP choline per capsule.

Dosage and use
- Five capsules daily are suggested.
- Eight to ten capsules daily are recommended for those suffering from brain aging decline.
- This product need not be taken with meals.

The year 1999 version of COGNITEX does not contain glycerophosphorylcholine, but it does contain the less expensive CDP-choline. For some people, CDP-choline may work better.

ORDER ONLINE AT: www.LifeExtension.com
than the more expensive forms of choline, but the published literature indicates that glyceryl phosphorylcholine is the superior form.

**Caution**
- Those with prostate or estrogen-receptor positive breast cancer should use Cognitex without pregnenolone.
- If you suffer from the bipolar (manic-depressive) depressive disorder, consult your doctor before using Cognitex.

**Cognitex without Pregnenolone (1999 formula) 021**

75 capsules

1 capsule contains:
Choline as bitartrate, Dihydrogen citrate, and CDP Choline ..........198 mg
Phosphatidylserine ..........25 mg
Phosphatidylcholine (from soy) ....35 mg
L-Serine ..........100 mg
Pantothenic Acid ..........170 mg
RNA/DNA ..........85 mg
Vinpocetine ..........3 mg
Other ingredients: magnesium stearate, ethylcellulose, gelatin and water. 50 mg CDP choline per capsule.

**Dosage and use**
- Five capsules daily are suggested.
- Eight to ten capsules daily are recommended for those suffering from brain aging decline.
- This product need not be taken with meals.

**CDP Choline Caps 390**

250 mg • 60 capsules

CDP-choline stands for cytidine-5-diphosphocholine. This unique form of choline readily passes through the blood-brain barrier (BBB) directly into the brain tissue. Once past the BBB, CDP-choline activates the synthesis of critical components in cell membranes, and enhances cerebral energy metabolism.

1 capsule contains
250 mg of pure pharmaceutical grade CDP-choline (cytidine-5-diphosphocholine). Other ingredients: rice flour, magnesium stearate, silica, gelatin and water. Elemental choline 51.25 per capsule.

**Dosage and use**
- One capsule daily is suggested for healthy people over age 40.
- Those with neural impairment should take two capsules daily under the care of a physician. Significant improvement does not occur within 30 days, four capsules daily should be taken. After symptoms improve to an acceptable degree, this can be reduced to a maintenance dose of one capsule daily.
- In treating cases of acute head trauma, many European doctors are immediately prescribing 1000 mg a day.

**Choline**

Choline and pantothenic acid are substances needed by the brain to produce acetylcholine, a major brain/motor neuron neurotransmitter that facilitates the transmission of impulses between neurons.

Choline chloride and phosphatidylcholine are two forms of choline that have been the subject of most of the research, some of which has shown that high doses of choline are an effective way of achieving optimal acetylcholine levels. Lower levels of acetylcholine are associated with memory loss and learning difficulties that occur in aging brains. In one experiment, university students improved test scores after taking supplemental choline.

**Choline Bitartrate Powder (41% choline) 142**

300 grams

1 teaspoon contains:
3.1 grams of choline bitartrate supplying
1.46 gm of pure choline.

**Dosage and use**
- One to three grams of choline daily are suggested, mixed with juice or other beverage.
- Choline is most effectively utilized when taken in divided doses after meals.
- 100 mg of pantothenic acid (vitamin B5) and sufficient vitamin C should be taken to facilitate the conversion of choline to acetylcholine.

**Caution**
Large doses of choline bitartrate may cause diarrhea.

**Member**

one bottle ....... Retail $36.00 $27.00
four bottles ...... Retail $134.00 $25.13 each
eight bottles ...... Retail $256.00 $24.00 each
twelve bottles .... Retail $336.00 $21.00 each

**Choline Bitartrate Powder**

**Member**

one bottle ...... Retail $17.75 $13.31
four bottles ...... Retail $64.00 $12.00 each

**CDP Choline Caps**

**Member**

one bottle ...... Retail $36.00 $27.00
four bottles ...... Retail $136.00 $25.50 each
Lecithin

Lecithin contains all the phosphatides found naturally in cell membranes. The same lecithin product was used in research performed by Ronald Mervis, M.D., at Ohio State University, in which laboratory animals fed lecithin were found to have less deterioration of neuronal dendrites than controls. In addition to its value for memory and mental function, studies suggest that lecithin alters the membranes of cells in a manner that inhibits the entry of viruses. Lecithin works by increasing the cell membrane ratio of phosphatidylcholine/phosphatidylethanolamine to cholesterol, increasing the fluidity of the cell membrane, making it harder for viruses to penetrate. Lecithin's ability to reduce cholesterol in cell membranes may also prevent cholesterol-induced atherosclerosis.

Lecithin Granules 020

16 oz (461 gm)

1 heaping tablespoon (10 grams) contains
Calories ........................................... 70
Fat calories .................................... 48
Total fat ........................................ 5 g
Saturated fat .................................. 1.2 g
Monounsaturated fat ....................... 0.5 g
Polyunsaturated fat ......................... 3.3 g
Cholesterol .................................... 0 g
Total carbohydrates ....................... 0.8 g
Sugar ........................................... 0.4 g
95% phosphatides including:
Phosphatidylcholine ....................... 2600 mg
Phosphatidylethanolamine ............. 2000 mg
Phosphatidylinositol ..................... 1400 mg

Dosage and use
- One heaping tablespoon daily is suggested.
- Lecithin can be consumed alone, sprinkled on cereal or mixed in fruit juices, sauces, soups, salads, etc.
- This product contains vitamin B5 (pantothenic acid) to facilitate the conversion of choline to acetylcholine.
- The BHA helps preserve the fatty substances in lecithin and makes refrigeration unnecessary at the normal rate of consumption.

DMAE / Ginkgo

DMAE

DMAE is a memory enhancing substance common to a number of drugs that are known to stabilize cell membranes. Cell membrane degradation has been proposed as one of the prime mechanisms of aging. DMAE is a precursor to choline and acetylcholine. However, DMAE has been shown to cross the blood-brain barrier faster than choline. It is the choline inside cells that is converted to phosphatidylcholine, used in the building and repair of cell membranes, especially in the brain.

In Europe, the drug Centrophonoxine, which combines DMAE with a synergistic chemical called p-chlorophenoxyacetate, is prescribed to boost cognitive function in the aged. It is likely that all the benefits of Centrophonoxine may be obtained more inexpensively from DMAE.

DMAE Capsules 257

150 mg • 200 capsules

1 capsule contains
150 mg of DMAE bitartrate. Other ingredients: rice flour, magnesium stearate, gelatin and water.

Dosage and use
- One capsule, one to four times daily, or as suggested by a healthcare professional.
- This product may be more effective if not taken with meals.
DMAE Powder
(37% DMAE) 022

100 grams

1/4 level teaspoon contains
1 gram of dimethylaminoethanol (DMAE) bitartrate supplying 370 mg DMAE.

Dosage and use
- 1/8 -1/4 teaspoon daily is suggested, depending on stimulation tolerance.
- This product may be more effective if not taken with meals.

Member
one bottle ..... Retail $24.00 $18.00
four bottles ..... Retail $80.00 $15.00 each

Ginkgo

For nearly 2800 years the Chinese have used extracts from the ginkgo biloba tree to treat a variety of conditions.

Studies published in medical journals show that ginkgo can improve mental function in people of all ages. Some European physicians have stated ginkgo is more effective than high doses of Hydergine in treating senile dementia.

Ginkgo may
- Correct age-related organic brain impairment
- Increase alertness and mental responsiveness in healthy people
- Improve cerebral and peripheral circulation
- Protect small blood vessels against spasm and loss of tone
- Prevent capillary fragility and leakage into surrounding tissue
- Inhibit blood pooling and clot formation by blocking platelet-activating factor
- Inhibit atherosclerosis and treat diabetic vascular disease
- Reduce tissue damage caused by low blood flow
- Help auditory difficulties including vertigo, tinnitus and deafness
- Protect against age-related visual disorders such as cataracts and dry macular degeneration
- Improve the outcome of stroke
- Inhibit radiation-induced brain edema

Not only does this new ginkgo extract provide more of the active constituents, but it is virtually devoid of a toxic (ginkgolic acid) part of the ginkgo leaf.

This Japanese pharmaceutical grade biochemical extract in Super Ginkgo Extract 28/7 has been concentrated and dual standardized to ensure the highest quality, consistency and biological activity.

1 capsule contains
Ginkgo biloba leaf powder extract .... 120 mg standarded to supply:
Ginkgo flavone glycosides (28%) .... 33.6 mg
Terpene lactones (7%) .............. 8.4 mg

Other ingredients: rice flour, magnesium stearate, gelatin and water.

Dosage and use
- Take one capsule a day.
- For more intensive use, take one capsule twice daily or as directed by a healthcare professional.
- Use with caution if taking antiocoagulants.
- Not for use by pregnant or lactating women.

Member
one bottle ..... Retail $29.00 $21.75
four bottles ..... Retail $106.00 $19.88 each

DMAE-Ginkgo Caps 197

100 capsules

DMAE-Ginkgo Capsules provide both of these valuable brain nutrients plus additional cofactors, in one capsule.

1 capsule contains
Ginkgo biloba leaf powder extract .... 60 mg

Standing Behind our Products

All of our products are the finest pharmaceutical grade nutrients you can buy. The Life Extension Foundation requires that strict quality control and assay procedures be followed in order to provide you with the highest quality of pure ingredients available. We take seriously our obligation to help our members prevent and treat today's diseases.
standardized to supply:
- Ginkgo flavone glycosides (24%)...14.4 mg
- Terpene lactones (6%)........................3.6 mg
- Dimethylaminoethanol
- Bitartrate (DMAE)................100 mg
- Pantothenic acid (vitamin B5)...80 mg
- Inositol..................................25 mg
- Thiamin (B1- from thiamin HCL)...10 mg
- Riboflavin (vitamin B2).........10 mg
- Nicotinamide (vitamin B3)........10 mg
Other ingredients: rice flour, magnesium stearate, gelatin and water.

**Dosage and use**
- One to two capsules daily are suggested for healthy people.
- Four capsules daily are recommended for those with neural impairment.
- This product need not be taken at meals.

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<th>Quantity</th>
<th>Member Price</th>
<th>Retail Price</th>
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<tr>
<td>eight bottles</td>
<td>$220.00</td>
<td>$20.63 each</td>
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**PC-Ginkgo Caps**

100 softgels

Phosphatidylcholine, a major structural component of brain cells, is important for intelligence and memory enhancement. Ginkgo functions via many mechanisms to improve memory and protect against degenerative diseases of aging. This capsule combines these two widely documented brain boosting nutrients into one capsule. Also included, are medium chain triglycerides (MCT) - saturated fatty acids that do not induce cholesterol formation, are burned as fuel, and have shown significant health benefits.

**1 softgel contains**
- Vitamin E.............................10 IU
- Vitamin C..................................2 mg
- Ginkgo biloba leaf powder extract...60 mg

**Dosage and use**
- Two softgels daily are suggested for healthy people, preferably early in the day.
- Four softgels daily are recommended for those with neural impairment.
- This product is most effectively utilized when taken with meals.

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<th>Quantity</th>
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<td>four bottles</td>
<td>$128.00</td>
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**Methylcobalamin**

Methylcobalamin is the form of vitamin B12 active in the central nervous system. The liver may not convert cyanocobalamin, the common supplemental form of vitamin B12, into adequate amounts of methylcobalamin the body may need to correct neural damage or decline. Methylcobalamin has been shown to protect against glutamate-induced excitotoxic neuronal damage. Animal studies show high doses of methylcobalamin are effective in neuronal regeneration and there is no toxicity at the doses used. Since methylcobalamin may be changed from this special brain form by processing in the liver, sublingual absorption is advised to bypass the liver during first pass through the blood stream. Sublingual methylcobalamin is now being offered in a new vanilla flavor with reduced prices.

**Methylcobalamin Lozenges**

1 mg • 60 sublingual lozenges

**1 lozenge contains**
- 1 mg of pure methylcobalamin (vitamin B12).

Other ingredients: sorbitol, mannitol, cellulose, vanilla flavor, magnesium stearate, croscarmellose sodium and silica.

**Dosage and use**
- One lozenge daily is suggested for healthy people.
- Place lozenge under tongue and allow to dissolve.

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**Additional Resources**

We are continually updating our website to provide you with the most current research available. Visit us at [www.LifeExtension.com](http://www.LifeExtension.com) to learn more about our latest disease prevention and treatment protocols. For more important health information visit our website. For the latest news, click on "What's Hot." Click on "What's New" for more health news.

ORDER ONLINE AT: [www.LifeExtension.com](http://www.LifeExtension.com)
**Methylcobalamin Lozenges** 537

5 mg • 60 sublingual lozenges

1 lozenge contains 5 mg of pure methylcobalamin (vitamin B12).

Other ingredients: sorbitol, mannitol, cellulose, vanilla flavor, magnesium stearate, croscarmellose sodium and silica.

**Dosage and use**
- One or more lozenges daily are suggested for those with brain health problems.
- Place lozenge under tongue and allow to dissolve.

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<td>four bottles</td>
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<td>$64.64 $12.12 each</td>
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**RNA Powder** 143

100 grams

1 level teaspoon contains 2.7 grams of pure RNA (ribonucleic acid).

**Dosage and use**
- 1/4 - 3/4 teaspoon daily is suggested.

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<tbody>
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<td>ten bottles</td>
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**Acetyl-L-Carnitine** 449

500 mg • 100 capsules

The acetylated ester of the amino acid acetyl-L-carnitine (ALC) plays a critical role in maintaining youthful cellular energy metabolism and blood flow. Two major factors involved with brain aging are: diminished brain cell metabolism and reduced cerebral circulation. ALC easily crosses the blood-brain barrier and its potential role in protecting neurological function is clear.

Studies show that ALC may prevent the neural impairment that normally occurs in oxygen deprivation and researchers have suggested that ALC should be given to children who suffer from oxygen deprivation in the womb. In published reports, short-term administration of ALC reversed ammonia-induced brain cell abnormalities and normalized brain cell energy metabolism in mice. The researchers suggested that the protective effect of acetyl-L-carnitine may maintain the energy-producing capabilities (mitochondrial respiration) of the central nervous system and emphasized its value for people with diseases that elevate ammonia levels in the blood, such as cirrhosis of the liver.

About 95% of cellular energy occurs in the mitochondria and diseases of aging are increasingly being referred to as "mitochondria disorders." Acetyl-L-carnitine is the biologically active amino acid involved in the transport of fatty acids into the cell's mitochondria for the purpose of producing energy.

Acetyl-L-carnitine is sold as an expensive drug in Europe to treat heart and neurological disease. It can increase muscle mass and convert body fat into energy. Acetyl-L-carnitine has been shown to protect brain cells against aging-related degeneration and improve mood, memory and cognition. People use acetyl-L-carnitine to maintain their immune competence and reduce the formation of the aging pigment lipofuscin.
The most important effect of acetyl-L-carnitine, however, is to maintain the function of the cell's energy powerhouse, the mitochondria. Published research continues to substantiate the multi-faceted benefits of this critical amino acid supplement.

1 capsule contains
500 mg of pure acetyl-L-carnitine.
Other ingredients: water, gelatin.

Dosage and use
- Acetyl-L-carnitine may have a stimulating effect, therefore, it may be unwise to take it in the evening.
- Two to four capsules daily are recommended for most people.
- Acetyl-L-carnitine is most effectively utilized when taken on an empty stomach with water or juice, in divided dosages 30-45 minutes before breakfast and lunch.
- If you are using it for Alzheimer's or another serious disorder take one capsule on an empty stomach (30-45 minutes before meals or two to three hours after meals) every four hours unless your physician has recommended otherwise.

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<th>Member one bottle...</th>
<th>Retail $56.00 $42.00</th>
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<tbody>
<tr>
<td>four bottles...</td>
<td>Retail $186.64 $35.00 each</td>
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**Huperzine A** 524

60 capsules

The NutraPharm brand of Huperzine A (standardized extract from Chinese club moss) is an all natural herbal supplement that has been clinically shown to enhance memory, focus and concentration.

It is beneficial for people who need to be sharp and perform at peak mental alertness. It may also be used for mental overload, and to help people center themselves and function at optimum capacity. Emerging research also indicates that Huperzine A holds tremendous promise for improving the quality of life for people with a wide range of memory impairments, including Alzheimer's disease.

Studies have shown that this pure alkaloid helps prevent the breakdown of acetylcholine, an important neurotransmitter affecting memory and concentration. This product is standardized for maximum efficacy, and its patented delivery system increases absorption.

Vitamin E is added to help reduce the impact of age related memory loss.

1 capsule contains
Huperzine A..................50 mcg
Vitamin E.....................100 IU
(from d-alpha tocopheryl acetate)
Other ingredients: maltodextrin, silica and magnesium stearate.

Dosage and use
- Adults may take one capsule in the morning and one capsule in the evening during periods only when peak mental performance is required.
- Do not take more than four doses in any week and do not use Huperzine A on a chronic basis unless a physician treating an Alzheimer’s patient is first informed.

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<th>Member one bottle...</th>
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<tr>
<td>four bottles...</td>
<td>Retail $150.00 $28.13 each</td>
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**NADH** 477

5 mg • 30 tablets

NADH (reduced B-nicotinamide adenine dinucleotide) is a coenzyme molecule formed from vitamin B3, found in all living cells and essential for their development and energy production.

1 tablet contains
NADH (reduced B-nicotinamide adenine dinucleotide)........................5 mg
Other ingredients: D-mannitol, sodium bicarbonate, sodium ascorbate, microcrystalline cellulose, magnesium stearate and enteric coating.

**Wholesale Pricing**

Foundation members receive pharmaceutical-grade products at the lowest prices in the world. LEF offers volume discounts on many multiple purchases for even more savings.
Phosphatidylserine Caps 368

100 mg • 100 capsules

In 1988, the Foundation published an article about studies in Europe showing phosphatidylserine could slow and reverse the rate of brain cell aging in laboratory animals. Phosphatidylserine restored mental function in older animals to levels exceeding those found in some younger animals. Although studies in humans with Alzheimer’s disease were less dramatic, they still produced significant improvements in cognitive function. In patients with mild dementia, significant cognitive and behavioral enhancing effects were observed. In one study with mildly demented elderly patients, the improvement in neural function continued 30 days after discontinuing phosphatidylserine (PS) therapy. This suggests that relatively low doses or cyclical dosing of PS therapy over an extended period of time in healthy people may produce sustained anti-aging results.

Brain tissues are especially rich in PS, but aging causes a decline in the PS content of cells throughout the body. Research has shown that in addition to improving neural function, PS enhances energy metabolism in all cells. In the brain, PS helps maintain cell membrane integrity and youthful synaptic plasticity, protecting brain cells against the functional deterioration that occurs as a result of aging.

1 capsule (100 mg) contains
A soy extract supplying:
Phosphatidylserine (PS) ........ 100 mg
Phosphatidic acid (3-sn) ......... 4 mg
Phosphatidylcholine (PC) ........ 1 mg
Other ingredients: rice flour, silica, gelatin and water.

Dosage and use
- One capsule daily is suggested for healthy people.
- Two to four capsules daily are recommended for those with neural dysfunction.

Vinpocetine 427

5 mg • 100 tablets

Vinpocetine is derived from vincamine, the major indole alkaloid of the periwinkle plant. Vinpocetine has been used for many years in Europe to enhance memory and mental function by increasing neuronal firing rate. No toxic effects have been seen from vinpocetine use at levels far above therapeutic dosages.

When taken orally, vinpocetine can
- Improve blood supply to the brain
- Increase oxygen and glucose use by the brain
- Improve brain tolerance to hypoxic excitotoxicity
- Increase vasodilation response to hypoxia
- Increase ATP levels in the brain
- Reduce abnormal coagulation of blood
- Raise brain levels of the neurotransmitter serotonin

1 tablet contains
5 mg of vinpocetine.
Other ingredients: dicalcium phosphate, cellulose, stearic acid, magnesium stearate.

Dosage and use
- Two tablets, three times daily for one month are suggested to achieve brain benefits.
- Thereafter, one tablet, three times daily.
- Tablets need not be taken at meals.

Caution
Side effects from oral use are mild, only experienced by a small number of people, and disappear after the drug has been taken for awhile. A brief drop in blood pressure or faster heart rate may occur in some people. Vinpocetine has not been found to interact with other drugs. In a one year toxicity study, no ill effects were seen. All toxicity, mutagenicity and teratogenicity studies of vinpocetine have proved negative.

Vinpocetine

368

427

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