

MD+ InControl

Mind control is a good thing if you're doing the controlling – InControl will give you more control over your own mind.



InControl is formulated to influence several pathways in the brain to improve concentration, focus, memory and cognition, and to decrease anxiety and its associated physical effects such as rapid heart beat, sweating, nervousness, shakiness, etc.

InControl™ is designed to enhance and support normal brain function and decrease the adverse psychological and physical effects of stress. It contains more than 60 ingredients including:

- Fat-soluble **vitamin E** fights free radical damage in the body's fattiest organ--the brain.
- Antioxidant **coenzyme Q10** and its analog **idebenone** increase brain activity.
- Flavonoids combat free radical damage and may improve cognitive function.
- **Phosphatidylserine** assists brain function and helps the brain process energy.
- **Phosphatidylcholine** is necessary for nerve growth and function.

- **Acetyl-L-carnitine** and **alpha lipoic acid** help neurons maintain optimal energy levels and rejuvenate aging brains.
- **Huperzine A** improves memory, cognitive and behavioral function.
- **Vinpocetine** improves blood circulation to the brain.
- **Ginkgo biloba** improves cognitive performance.
- **Benfotiamine, L-carnosine** and **alpha lipoic acid** decrease glycation, provide protection against nervous system degeneration and improve brain function.
- **Vinpocetine** is a plant-derived compound that enhances blood circulation to the brain, thus boosting oxygen and glucose delivery to brain cells.
- **Choline** is a precursor to the cell-membrane component **phosphatidylcholine** (low levels are common in dementia patients) and to the neurotransmitter acetylcholine.
- **Pantothenic acid** (vitamin B5) is a vital cofactor for choline metabolism.
- **DMAE** (dimethylaminoethanol) enhances mood and alertness.
- **DHA** (docosahexaenoic acid) is an **omega-3 fatty acid** that is vital to the formation of cell membranes and that is helpful in age-related cognitive decline.
- **L-carnosine** inhibits brain degeneration and provides immune and anti-aging effects
- **Bacopa monnieri** improves learning and memory.
- And dozens of others that significantly improve brain function and performance.

Details on the Ingredients in InControl

Neurotransmitter Precursors and Modulators

Several ingredients in InControl optimize the levels of various neurotransmitters in the brain resulting in increased mental functioning and improved mood.

These ingredients include **5-HTP (5-Hydroxytryptophan), L-tyrosine, L-phenylalanine, velvet bean extract (containing L-dopa), L-pyroglutamic acid, alpha-glycerolphosphorylcholine, choline, CDP choline, phosphatidylserine, GABA, glutamine, huperzine A, and DMAE**, all affect neurotransmitters, both major and minor, in the central nervous system, including serotonin, dopamine, norepinephrine and acetylcholine.

Stress and Anxiety Relievers

Several ingredients in InControl are meant to relieve stress and anxiety and some of their adverse cardiovascular and neuromuscular effect, and subsequently to improve performance.

These ingredients include, **chamomile extract, hops extract, passion flower extract, skullcap herb extract , lemon balm extract, codonopsis extract, GLA and vanillin**.

To get the required effects the mix of these ingredients are in specific proportions to themselves and to other ingredients in InControl. The result is that while they relieve stress, they do not make you tired or drowsy but rather increase focus, concentration and mental control.

For example, **lemon balm extract** (melissa officinalis) has been shown to have a relaxing effect and also result in significant improvements in cognitive scores in patients with mild-to-moderate Alzheimer's disease.

Lemon Balm is a natural herb that that has been used to relieve feelings of anxiety, stress, nervous agitation and gastrointestinal discomfort. This traditional herbal medicine is considered a mild sedative that is used to help improve sleep and has also been reported to increase attention and mental cognition.

Researches have recently performed clinical studies to determine the effectiveness of Lemon Balm on memory, cognitive thinking and attention enhancement. In one placebo controlled study involving young participants, lemon balm dosages over a period of 6 weeks were found to improve the accuracy of attention and improve working memory factors.

In a subsequent clinical trial, researchers concluded that supplementation with lemon balm can improve cognitive performance, specifically memory performance. In both studies, patients reported an enhanced mood and rated themselves as being more calm.

A double blind, placebo controlled clinical trial directly investigated the effects of lemon balm on laboratory-induced psychological stress. The results showed that a single dose of lemon balm improved negative mood effects associated with stress. Moreover, patients reported

increased calmness and significant improvements in the speed of mathematical processing with no reduction in accuracy.

Gamma linolenic acid (GLA) is important for health and has suppressive effects on both acute and chronic inflammation, and effects on decreasing the response to anxiety and stress. It also works synergistically with some of the essential fatty acids to decrease inflammation and stress responses.

Acetyl-L-Carnitine

Acetyl-L-carnitine (ALC) has been extensively studied and found to have significant cognitive and anti-aging effects. It can be effective in improving memory, mood and response to stress:

ALC is a cognitive enhancer and neuroprotective agent that protects against a wide range of age-related degenerative changes in the brain and nervous system. ALC is an ester of carnitine that modulates cellular concentrations of free coenzyme A and acetyl-coenzyme A, two compounds integrally involved in numerous cellular functions, including the transfer of fatty acids across mitochondrial membranes for energy production.

ALC is found in various concentrations in the brain and its levels are significantly reduced with aging. Several studies suggest that acetyl-L-carnitine delays onset of age-related cognitive decline and improves overall cognitive function in the elderly.

ALC protects against brain degeneration, helps with energy production in mitochondria of cells, and removes toxins from the mitochondria.

Its effects on brain cells include:

- Increasing neural energy production
- Protecting neurons from toxins
- Maintaining neuron receptors
- Increasing availability of the neurotransmitter acetylcholine

ALC also has the ability to cross into the brain where it acts as a potent antioxidant, preventing the deterioration of brain cells that normally occurs with age. Because of this protective effect, ALC may be beneficial in the prevention and treatment of free-radical induced diseases, such as Alzheimer's and Parkinson's disease.

Several clinical trials suggest that acetyl-L-carnitine improves overall mental functioning and mood.

In one study, acetyl-L-carnitine was given to elderly people with mild cognitive impairment. After 45 days, significant improvements in cognitive function (especially memory) were observed.

Another large trial of acetyl-L-carnitine for mild cognitive impairment in the elderly found that supplementation significantly improved memory, mood, and responses to stress. The favorable effects persisted at least 30 days after treatment was discontinued.

Acetyl-L-carnitine also has effects on alleviating depression. Studies have shown that acetyl-L-carnitine supplementation is effective at relieving depression in elderly people, particularly those showing more serious clinical symptoms.

ALC also significantly reduces damaged fats, such as lipofuscin, in the brains of aged rats. In addition to accumulating in the aging brain, lipofuscin also accumulates in the skin as aging spots, those brownish pigmented blemishes that accumulate in the backs of hands of many people over fifty. The reduction of these deposits following consumption of ALC may be evidence of a slowing in the aging process in the brain.

Alpha-Lipoic Acid

ALA is a natural substance that has potent antioxidant and anti-inflammatory properties that can recycle other antioxidants such as vitamin C, vitamin E and glutathione. It also is important for optimizing energy metabolism and thus provides an important impetus for the maintenance and repair of the central nervous system.

It has been shown to inhibit cross-linking among proteins, a process that contributes to the aging process in the body. Alpha-lipoic acid activates a collagen-regulating factor known as AP-1 that turns on enzymes that digest glycation-damaged collagen.

It also improves vascular function and helps the repair process in damaged tissues. As well, it helps neutralize and remove various toxic metals, including mercury, from the body.

All of these properties allow ALA to exert beneficial effects on the brain and neuromuscular, immune and cardiovascular systems.

Alpha-Lipoic Acid (ALA) is an excellent antioxidant agent in neurodegenerative diseases due to the fact that it can interrupt free radical damage at several points. It has been shown to elevate antioxidants in various brain regions and improves memory. Further, ALA supports healthy blood glucose levels and insulin activity.

A combination of ALA and ALC has been found to rejuvenate elderly rats and could have a similar effect in ageing humans. These two nutritional supplements act on the mitochondria. Studies show that over time, damage to mitochondria could be significantly implicated in the ageing process.

Phosphatidylserine

Phosphatidylserine will:

- Maintain neuron membranes.

- Increase number of receptors and promote dendritic branching.
- Stimulate release of neurotransmitters.
- Encourage the regrowth of damaged nerve networks.

All of these functions improve memory and cognition, and help prevent degeneration of brain structure and function.

Phosphatidylserine (PS), the most abundant phospholipid in the brain, is essential to cell membrane structure and function, and effects nerve cell metabolism and the release of neurotransmitters. It plays critical roles in alleviating the effects of stress, especially on an adrenal/cortisol level, and maintaining both the structure and functionality brain cells.

It has been studied for beneficial effects in protecting the hippocampus (memory) sector of the brain, retarding loss of neural connections and age-related memory function. Low levels of phosphatidylserine in the brain are associated with impaired mental function and depression in the elderly.

Supplementation with PS consistently benefits memory, learning, concentration, word choice, and other measurable cognition parameters, as well as mood and the capacity to cope with stress. Numerous studies have documented phosphatidylserine's ability to improve memory, learning, concentration, word recall, and mood in middle-aged and elderly subjects with dementia or age-related cognitive decline.

Extensive double-blind trials and other clinical testing have established that PS consistently benefits memory, learning, concentration, word choice, and other measurable cognition parameters, as well as mood and the capacity to cope with stress.

PS and choline improve acetylcholine (ACh) levels. ACh and the cholinergic neurons which secrete ACh are important for memory and cognition.

L-Carnosine

L-carnosine, a dipeptide made up of the amino acids alanine and histidine (histidyl-alanine) is present at relatively high levels in muscle, heart, and brain tissue. Carnosine levels, however, decline with age.

It was added to InControl because of its antioxidant and anti-inflammatory properties, its beneficial effects on healing and the immune system, and its anti-aging potential.

Carnosine, (along with alpha lipoic acid and benfotiamine) also provides protection against glycation (protein carbonylation), a destructive protein/sugar reaction that occurs in the body and which contributes to aging through a number of mechanisms including the breakdown of connective tissue and interfering with central nervous system function.

Carnosine reacts with and removes the carbonyl groups in glycated proteins. Moreover, carnosine suppresses the multiple pathways that lead to protein carbonylation. Several studies show that carnosine prevents protein cross-linking and AGE formation. In particular,

carnosine inhibits the cross-linking of amyloid beta, which forms the senile plaques characteristic of Alzheimer's disease.

in animal studies carnosine has been shown to extend the life span of senescence-accelerated mice by 20% on average compared to mice that were not fed the supplement, and doubled the number of mice who lived to old age. The researchers of this study concluded that, in addition to extending the lives of the mice, carnosine significantly improved their appearance, physiological health, behavior, and brain biochemistry.

Benfotiamine

Benfotiamine, a compound derived from thiamine, is fat soluble and therefore considerably more available to the body than thiamine. One of its beneficial effects is in decreasing glycation. As such, it works along with L-carnosine and alpha lipoic acid in decreasing glycation and the adverse effects that glycation has on brain function.

A recent study found that benfotiamine increases transketolase activity in cell cultures by 300%. By comparison, when thiamine was added to cell cultures, transketolase activity increased only 20%. This activation of transketolase by benfotiamine was sufficient to block three of the four major metabolic pathways leading to blood vessel damage.

Additionally, benfotiamine blocked activation of the pro-inflammatory transcription factor NF- κ B. This suggests yet another beneficial attribute of benfotiamine. The study research team, based at the Albert Einstein College of Medicine of Yeshiva University in New York, further demonstrated that benfotiamine prevents damage to blood vessel cells cultured under hyperglycemic conditions in “test tubes” in the laboratory. Similarly, benfotiamine completely prevented retinal damage in live laboratory animals.

“The data indicate that treatment of diabetic patients with benfotiamine or other lipid-soluble thiamine derivatives might prevent or delay the development of diabetic complications,” concluded the authors.

A study on human subjects in Hungary found that six weeks of benfotiamine treatment resulted in significant improvements in diabetic polyneuropathy in 93% of cases. Polyneuropathy is a painful condition that results when diabetes damages nerves in the extremities. The research team found benfotiamine therapy to be both safe and effective.

Working along the same lines, a Bulgarian research team enrolled 45 diabetic patients in a three-month observational study to determine the efficacy of benfotiamine for the treatment of diabetic polyneuropathy. One group was given benfotiamine while the control patients received conventional B-vitamin supplements.

The benfotiamine-supplemented patients experienced statistically significant relief of their pain symptoms, while patients taking vitamin supplements experienced no such improvement. Researchers noted that their results “underscore the importance of benfotiamine tablets as an indispensable element in the therapeutic regimen of patients with painful diabetic polyneuropathy.”

Essential Fatty Acids

Fish oils contain two essential fatty acids, **EPA** and **DHA** that are well known for their anti-inflammatory activity. Furthermore, DHA is required for normal brain function in adults. Decreases in brain DHA content are associated with age-related cognitive decline, dementia, and Alzheimer's disease.

Docosahexaenoic acid (DHA) is an omega-3 fatty acid that is essential for proper growth and functional development of the brain in infants, and DHA is also required for maintenance of normal brain function in adults. Adequate levels of DHA in the diet improves learning ability, whereas deficiencies of DHA are associated with deficits in learning. Also, in adults, decreases in DHA in the brain are associated with cognitive decline during aging.

A deficiency in EFAs or too little omega 3 fatty acids can lead to decreased mental health, depression and even aggressive tendencies.

EFAs have been shown to assist in treating depression and other mental health conditions. Low levels of omega-3 EFAs are common in depression. In one 2002 study, researchers found that treatment with 1 g/d of EPA improved outcomes in patients with persistent depression. Another study found that EPA may prove an effective add-on treatment in schizophrenia.

There is even some evidence that the decrease in omega 3 consumption may be responsible for increasing homicide rates.

Part of omega-3's effectiveness in treating brain disorders and the reason why lack of omega 3's results in some mental aberrations may be linked to its role in neurotransmission and brain development. DHA in particular is crucial for proper brain function, and pregnant women are advised to consume adequate levels for fetal brain development.

A recent paper published in 2005 concluded:

There is no doubt that cerebral lipids, and EFA-derived LC-PUFAs in particular, have significant direct and indirect actions on cerebral function. Not only does the lipid composition of neural membranes affect the function of their embedded proteins, but also many LC-PUFAs are converted to neurally active substances. There is good evidence that psychiatric illness is associated with depletion of EFAs and, crucially, that supplementation can result in clinical amelioration. As well as challenging traditional views of aetiology and therapeutics in psychiatry, the clinical trial data may herald a simple, safe and effective adjunct to our standard treatments for many disabling conditions.

InControl contains pharmaceutical grade fish oil with higher levels of EPA and DHA. It's important to include these longer carbon chain omega 3s as the formation of EPA and DHA from ALA is limited. As well, while fish is one method of getting these oils, most sources recommend that fish consumption be limited to two to three servings weekly because so many fish, unlike fish oil capsules, are tainted with mercury and other contaminants.

One benefit of omega-3 fatty acids is that they are very safe to consume. However, most sources recommend that fish consumption be limited to two to three servings weekly because so many fish are tainted with mercury and other contaminants. Fish oil capsules don't present this same risk.

Alpha linolenic acid is transformed into eicosapentaenoic acid (EPA) and later into docosahexaenoic acid (DHA). The series three prostaglandins are formed from EPA. As well, EPA reduces the production of the bad prostaglandins from arachidonic acid.

Coenzyme Q10

Coenzyme Q10 is an antioxidant cofactor that has been shown to protect the brain. In addition to being a potent free radical scavenger, CoQ10 has proven to be effective in a wide variety of age-related conditions.

Coenzyme Q10, a powerful anti-oxidant biochemical known also as "ubiquinone" and most commonly as CoQ10. This substance is the energy producing unit of our body cells. Every process in our bodies requires CoQ10.

Idebenone, an analog of Coenzyme Q10, supplies all of the same benefits as CoQ10 plus some distinct advantages. Though very similar in chemical make-up to CoQ10, its longer chain organic structure gives it extra powerful anti-oxidant properties making it a more effective "free radical quencher" resulting in less cell and tissue damage.

Idebenone offers three very distinct advantages over CoQ10:

1. Studies show that Idebenone enhances brain structure and function
2. Its superior anti-oxidant properties protect body organs more efficiently
3. Offers protection against excitatory amino acid neurotoxicity from ingestion of these ingredients through the diet (Examples: MSG, artificial sweeteners, canned soups and meats, spices, etc.)

Huperzine A

Huperzine A, from the Chinese medicinal herb *Huperzia serrata*, has been found to improve cognitive function in elderly people with memory disorders. It acts as an acetylcholinesterase inhibitor (a class of drugs that inhibit the enzyme that breaks down acetylcholine) used to treat Alzheimer's Disease), possibly more effectively than tacrine (a drug used to treat Alzheimer's Disease). Supplementation results in improvements in memory, cognitive function, and behavioral factors in 58% of Alzheimer's patients with no significant side effects.

This club moss extract may also benefit older individuals with dementia. A study was conducted with fifty-six patients suffering from multi-infarct dementia (multiple small strokes) and one hundred patients with senile memory disorders. Most patients had an improvement

in memory. Huperzine was even mentioned in the Journal of the American Medical Association as a possible herbal therapy for Alzheimer's disease.

These findings suggest that Huperzine not only protects from the effects of Alzheimer's and senile memory deficits, but also provides a unique and exciting supplement for supporting memory in the healthy aging human as well.

Bacopa monnieri

Bacopa monnieri may improve higher order cognitive processes such as learning and memory.

Clinical studies show that **bacosides** can improve intellectual and cognitive functions, reduce stress-induced anxiety, increase concentration, promote memory and protect synaptic function of nerves.

Animal studies have found the Ayurvedic herb bacopa has constituents that enhance several aspects of mental function and learning ability. A controlled study found that a syrup containing an extract of dried bacopa herb given to children improved several measures of mental performance.

Ginkgo Biloba

Ginkgo biloba's effect on memory and cognition has been studied fairly extensively. Several studies have found ginkgo supplementation to be a safe and effective treatment for age related cognitive decline.

Ginkgo biloba extract is a time-honored remedy for improving memory and cognition and is an approved treatment for dementia in Germany. It has been shown to promote awareness, alertness and cognition by increasing cerebral blood flow and by providing antioxidant protection to neural networks.

Overall ginkgo seems to be effective at improving memory, concentration, fatigue, anxiety, and depression. It also has antioxidant properties, is neuroprotective and protective against hypoxia (insufficient oxygen).

The **combination ginkgo biloba and ginseng** can promote fast, accurate thinking, improve short and long-term memory retention and reduce mental fatigue. In a 14-week, double-blind, placebo-controlled, trial the cognitive effects of the herbal combination was studied in 256 healthy volunteers between the ages of 38 and 66 years. The volunteers performed a battery of tests using the Computerized Cognitive Assessment System, a validated testing method accepted by the FDA and used to assess the effect of cognitive enhancing products.

The study showed the group of volunteers receiving the active herbal combination had statistically significant improvements in cognitive function compared to the control group receiving placebo. The combination product was well tolerated by study volunteers.

While previous research has documented the effects of ginkgo biloba on memory in older people, this study clearly shows that this specific formulation of standardized Ginkgo biloba and Ginseng extracts enhanced mental performance in a younger healthy population.

DMAE (see below) and ginkgo biloba act to reduce age pigment formations such as lipofuscin and amyloid.

Vinpocetine

- Increases cerebral blood flow
- Increases transport and uptake of glucose
- Increases availability of the neurotransmitter acetylcholine

Vinpocetine, derived from the herb lesser periwinkle (*Vinca minor*), has been shown to result in memory enhancement, increased cognitive performance, improved cerebral circulation and higher mental acuity and awareness.

The demonstrated safety, absence of serious adverse effects, and the improvement of cognitive function even in healthy individuals suggest a clinical application of vinpocetine in the early phases of mild cognitive impairment.

Experiments with vinpocetine indicate that it can dilate blood vessels, enhance circulation in the brain, improve oxygen utilization, stepping up brain cell ATP production, make red blood cells more pliable, and inhibit aggregation of platelets. Vinpocetine also has been shown to have antioxidant properties.

Reactive oxygen species (ROS) are believed to play a crucial role in the neuronal damage occurring in ischemic injury (stroke) and neurodegenerative disorders. Researchers at the Center for Neurosciences in Portugal performed animal studies to examine the antioxidant effects of vinpocetine to prevent the formation of ROS and lipid peroxidation in brain synaptosomes. They found that vinpocetine significantly decreased oxidative stress and inhibited ROS formation up to 83%. The researchers concluded that the antioxidant effects of vinpocetine contributed to reducing neuronal damage in pathological situations.

Several peer-reviewed, double-blind studies looked at cognitive performance of normal subjects, seeing how vinpocetine would improve their cognitive performance. The researchers found a significant improvement with vinpocetine.

In a double blind clinical trial, vinpocetine was shown to offer significant improvement in elderly patients with chronic cerebral dysfunction. Patients on vinpocetine scored consistently better in all cognitive evaluations. No serious side effects were reported.

In another study twelve healthy female volunteers received pre-treatments with vinpocetine or placebo for two days according to a randomized, double-blind crossover design. On the third day of treatment and one hour following morning dosage, subjects completed a battery of

psychological tests. Memory was significantly improved following treatment with vinpocetine when compared to placebo.

Choline and Phosphatidylcholine

Choline - Involved as a precursor in the synthesis and release of acetylcholine. Some preliminary reports, mostly in mice models of Alzheimer's, suggest that choline supplementation significantly improves cognitive function.

Choline is well known to promote neurologic development in neonates, and has been shown in a pilot study to improve verbal and visual memory in critically ill patients requiring parenteral nutrition.

Lecithin is known as **phosphatidylcholine**, although lecithin is also a term loosely applied to describe a combination of phosphatidylcholine with other phospholipids. Phosphatidylcholine levels in brain cell membranes decline with age, perhaps contributing to memory loss.

Phosphatidylcholine and Homocysteine

A report in the July 2005 issue of the American Journal of Clinical Nutrition, indicates that a high daily dose of choline, supplemented as phosphatidylcholine, lowers fasting as well as postmethionine-loading plasma homocysteine concentrations in healthy men with mildly elevated homocysteine concentrations. If high homocysteine concentrations indeed cause cardiovascular disease, choline intake may reduce cardiovascular disease risk in humans.

phosphatidylcholine could be of help to those with high homocysteine levels.

Phosphatidylcholine is abundant in nerve cell membranes, and is required for nerve growth and function. The Choline fraction promotes production and function of the neurotransmitter acetylcholine, and has been shown to promote memory processes.

CDP Choline

CDP-choline (cytidine-5'-diphosphocholine also known as citicoline) is a naturally occurring molecule found in most life forms, and is a chemical intermediate in the biosynthesis of phosphatidylcholine and acetylcholine.

It has several effects

- Maintain neuron membrane
- Increase availability of acetylcholine
- Facilitate activity in dopaminergic systems

Produced endogenously, CDP-choline serves as a choline donor in the metabolic pathways for biosynthesis of acetylcholine and neuronal membrane phospholipids, chiefly

phosphatidylcholine. The principal components of CDP-choline, choline and cytidine, are readily absorbed in the GI tract and easily cross the blood-brain barrier. Exogenous CDP-choline, as the sodium salt, has been researched in animal experiments and human clinical trials that provide evidence of its cholinergic and neuroprotective actions.

shows promise of clinical efficacy in elderly patients with cognitive deficits, inefficient memory, and early-stage Alzheimer's disease.

CDP-choline improved the declining memories of the older rats compared with control rats of the same age that received no CDP-choline.

The authors of a meta-analysis of the literature on human clinical trials with CDP-choline analyzed 13 randomized, double-blind, placebo-controlled trials that involved elderly patients suffering from cerebrovascular disorders, senile dementia (including Alzheimer's disease), or normal or abnormal cognitive impairment associated with aging. They concluded that there were modest but significant beneficial effects of CDP-choline on memory function and behavior in these patients.

Citicoline (CDP-choline; cytidine 5'-diphosphocholine), a form of the essential nutrient choline, shows promise of clinical efficacy in elderly patients with cognitive deficits, inefficient memory, and early-stage Alzheimer's disease.

Amino Acids

L-Phenylalanine and **L-Tyrosine** are the major nutritional precursors for norepinephrine, a neurotransmitter which is also involved in primitive memory formation and learning. Both Norepinephrine and dopamine, another neurotransmitter, must be present for neural-dendrite growth to proceed for new learning to occur.

L-tyrosine is also a precursor for thyroid hormone. That along with its effects on neurotransmitter levels results in some beneficial effects on energy metabolism and mental functioning.

GABA (Gamma-aminobutyric Acid), a nonprotein free form amino acid which acts as an inhibitory neurotransmitter within the brain, protects against over-excitation of the neural thoroughfares, while **L-Glutamine** (GAM) acts as an excitatory agent stimulating neural receptor sites and enabling deep processing of information to take place, critical for long term memory enhancement.

Taurine is considered a potent antioxidant and cytoprotective agent that may be useful for combating the adverse effects of physical and psychological stress, and aging.

DMAE

DMAE (dimethylaminoethanol) has been used to elevate mood, improve memory and learning, increase intelligence and physical energy, and extends the life span of laboratory animals.

In a recent study the authors concluded that DMAE induces a psychophysiological state of better feeling of wellbeing on both levels of analysis mood and electrical pattern of brain activity in subjects suffering from borderline emotional disturbance.

DMAE is a free-radical chain transfer agent believed to specifically slow down the formation of lipofuscin age pigment within the neural network of the central nervous system, as well as slow the formation of other possible contaminants such as the other well known age pigments: ceroid (which accumulates in the liver) and amyloid (which is known to attack the CNS of Alzheimer's victims).

Lipofuscin age pigment forms especially rapidly in the dopamine-dependent tracts of the brain leading to dysfunction in these areas and affects memory, cognition, sexuality, locomotion, mood, tissue growth and repair.

Encephalitis lethargica or sleeping sickness, Parkinson's Disease and Catatonia in Schizophrenia are known to be correlated with low Dopamine populations within the brain. Interestingly, Dopamine populations also decline with age as lipofuscin increases. Thus lipofuscin appears to both directly and indirectly inhibit Dopamine production and transmission. Dopamine also falls prey to autoxidation, producing free radicals and hydrogen peroxide which damage dopaminergic nerve receptors.

S-Adenosyl-L-methionine (S-AMe)

Methyl donors are important for the methylation reaction, which adds a methyl group (one carbon atom and three hydrogen atoms), on proteins, enzymes, chemicals, DNA, and amino acids like homocysteine. Methylation is important for maintaining many functions in the body including genetic expression, and neurological and musculoskeletal function.

Usually this methylation process occurs through a compound called S-adenosyl-L-methionine (S-AMe). However, S-AMe, because of its volatility and incompatibility, can't be incorporated into a multi-ingredient formula such as InControl so the alternative is to include ingredients that have been shown to increase endogenous production and at the same time reduce the increased levels of homocysteine that can follow.

S-AMe, is synthesized from the amino acid methionine and its level in the body is increased by dietary methyl donors such as **folic acid, B12** (especially the **methylcobalamin** that is used as the preferred form of B12 in InControl rather than the synthetic cyanocobalamin, the usual form of B12 found in most other supplements), and **vitamin B6**. These nutrients are also needed to reduce homocysteine levels and decrease cardiovascular disease.

Various clinical trials and animal studies suggest that SAME may be effective, among other things, in reducing inflammation. It's also felt to have significant direct and indirect (by increasing glutathione synthesis) antioxidant effects.

SAME is prescribed by some doctors in Europe as therapy for depression, chronic fatigue syndrome, arthritis, and fibromyalgia.

Studies have shown that SAME influences the formation of brain chemicals and helping the preservation of glutathione, an important antioxidant. Furthermore, SAME is involved in the formation of myelin, the white sheath that surrounds nerve cells.

The influence of SAME on depression has been tested in numerous studies. A study published in 1994 compared oral SAME with oral desipramine (a pharmaceutical antidepressant). At the end of the four-week trial, 62 percent of the patients treated with SAME and 50 percent of the patients treated with desipramine had significantly improved.

Eleutherococcus Senticosus

Eleutherococcus Senticosus (Siberian Ginseng) is related to American ginseng and Panax ginseng and has beneficial effects on memory and concentration.

Chemicals in eleuthero appear to produce moderate reductions in blood sugar and blood cholesterol levels and modest improvements in memory and concentration.

Perhaps the single most important property of adaptogenic plants, which include **eleutherococcus**, **rhodiola** and **schizandra** is their proven ability to combat stress in all forms. Eleutherococcus, the most potent of the adaptogenic plants, increases the body's resistance to a variety of stressors. Experiments have conclusively demonstrated that eleutherococcus changes the course of the primary physiological indicators of stress by reducing the activation of the adrenal cortex.

Schizandra has shown anti-depressant and immune system effects.

Rhodiola rosea

Rhodiola rosea has been categorized as an adaptogen due to its observed ability to increase resistance to a variety of chemical, biological, psychological and physical stressors. It has significant effects on dampening the adverse hormonal effects of stress, including cortisol, insulin and thyroid, and in enhancing adaptation to stress. It also has potent antioxidant, anti-inflammatory, hepatoprotective and cardiovascular effects. As well, it has been shown to be useful in decreasing stress induced fatigue and increasing endurance.

Gotu Kola and Guarana

Both gotu kola and guarana have a beneficial effect on memory and cognition, and decrease fatigue. And both have been used as effective energy tonics and for mental acuity and long-term memory.

Gotu kola contains several glycosides that have anti-inflammatory and anti-anxiety effects. It's been traditionally used to enhance, memory and alertness.

In a 1997 study, guarana was found to decrease fatigue and increase memory with single doses as well as with chronic doses. A recent study found that the use of guarana improved cognitive performance in human volunteers. A study published in 2005 found that guarana has antidepressant effects.

Antioxidants: The neuroprotectors.

The antioxidants in InControl include **vitamins C and E, zinc, coenzyme Q10, idebenone, L-carnosine, alpha lipoic acid, taurine**, and polyphenols and other ingredients from various extracts including **grape seed, green tea, and ginkgo biloba extracts**.

Antioxidants scavenge free radicals, or unstable ions, that result from oxidation, and therefore tend to protect the tissues from damage by these ions. Though lipid oxidation is a natural process in the aging brain, some researchers have found that people with AD have lower defences against oxidation than the rest of us. Namely, AD sufferers seem to have lower levels of the antioxidants Vitamins E and C in their cerebrospinal fluid than do healthy elderly people.

The oxidation of lipids is one of the biochemical processes driving Alzheimer's Disease, although its exact significance is not yet clear. In the brain, this process leads to neuronal cell death and thus the loss of memory and cognitive skills. In the rest of the body, oxidation contributes to the general wear and tear that could contribute to the eventual development of cancers and cardiovascular disease.

Since antioxidant use on the whole has been found to be safe and effective as a cardiovascular protector, it is probably safe to assume that these beneficial effects apply to the mind as well. Therefore, despite the fact that information regarding antioxidant benefits in dementia is just emerging, any vitamin or nutrient that is good for the heart is likely to be good for the mind as well.

Studies have shown that antioxidants, while uniquely different from one another, have a synergistic effect when used together. By combining these various lipid-and water soluble nutrients, InControl offers multiple levels of synergistic protection.

For example:

- Alpha lipoic acid is synergistic with vitamins C and E, and they work together as a team to produce an antioxidant effect that is far greater than any one individual antioxidant.
- Vitamin E and selenium interact to provide strong protection against oxidative damage to the liver.
- Selenium interacts with glutathione (GSH), which is a vital component in the production of glutathione peroxidase, an enzyme which is essential for life.
- Both vitamin C and coenzyme Q10 interact with vitamin E to regenerate its antioxidant form.
- Vitamin E and coenzyme Q10 taken together are believed to have an interactive effect wherein CoQ10 has a sparing effect on vitamin E, and vitamin E plays a key role in determining tissue retention of exogenous CoQ10.

Vitamin C is an antioxidant that reduces free radical damage in the body. Several studies with elderly subjects indicate that individuals who ingest higher amounts of vitamin C have better cognitive function and memory performance, which suggests that vitamin C may protect against cognitive decline.

Vitamin E is another antioxidant nutrient that reportedly protects against subsequent development of dementia and poor cognitive functioning, probably due to its protection against free radical damage to the blood vessel system in the brain.

Low vitamin E levels are consistently associated with an increased risk and occurrence of neurological diseases, including Alzheimer's and Parkinson's. The amount of vitamin E in the blood is associated with memory performance.

As well, vitamin E supplementation has been shown to be effective in slowing age-related cognitive decline. A study of patients with moderately advanced Alzheimer's disease indicated that vitamin E may slow functional decline.

Vitamin E supplementation, for example, has been shown to result in memory improvement in mildly demented patients in a well-designed trial.

Also studies suggest that polyphenols and other antioxidant constituents found in **grapeseed, green tea, ginkgo biloba**, and other extracts may protect against inflammation and cognitive disorders.

The B Vitamins

The B vitamins have multiple functions and effects and are essential for proper functioning of the brain and nervous system. Deficiencies of any of the B vitamins can result in a variety of debilitating diseases.

However, frank deficiency of any of the B vitamins is not common except under specific circumstances. However, marginal deficiencies are common because of the ways foods are grown and processed, and some of our poor eating habits.

As well, the use of some of the B vitamins even if no deficiency is present, can result in beneficial effects.

Niacin and Nicotinamide – vitamin B3 Supplementation with vitamin B3 results in improvement of sensory register and short-term memory, and long-term memory.

Vitamin B6 (pyridoxine). Vitamin B6 deficiency is common among people over age 65. A study of healthy men, aged 70 to 79 years, showed that supplementation with pyridoxine for 3 months improved memory performance, especially long-term memory.

Pantothenic acid (as **calcium pantothenate** in InControl) is considered a stress vitamin and is involved in adrenal function and in the formation of certain neurotransmitters.

Vitamin B12. Supplementation with vitamin B12 may improve cognitive function in elderly people who have been diagnosed with a B12 deficiency.

Cognitive impairment is an important manifestation of vitamin B12 deficiency. Cognitive decline due to low levels of vitamin B12 is a greater problem in elderly individuals since cobalamin deficiency increases with advancing age.

Supplementation with vitamin B12 showed improvements in cognitive function even in people without obvious signs of B12 deficiency.

Vitamin B12 in the methylcobalamin form is used in InControl as it is the biologically active form of B12, whereas cyanocobalamin, the one used in most nutritional supplements, is the synthetic, and much cheaper form. The body has to change the cyanocobalamin into methylcobalamin. This process may be compromised in some people so using the metabolically active form is more efficient and improves bioavailability and function. In fact several studies have shown the advantages of methylcobalamin over cyanocobalamin.

For example, a preliminary study investigated the effects of methyl- and cyanocobalamin on circadian rhythms, well-being, alertness, and concentration in healthy subjects. Six women (mean age 35 years) and 14 men (mean age 37 years) were randomly assigned to treatment for 14 days with either cyano- or methylcobalamin and found that levels of B12 increased linearly with the methylcobalamin but not with cyanocobalamin, and that only methylcobalamin had a positive psychotropic alerting effect with significantly reduced sleep time, improved sleep quality, concentration, and feeling refreshed.

New findings suggests that some people with depression might have problems metabolizing the B vitamin **folate** - supporting the idea that supplements could help ward off the condition, researchers say.

Investigators in Norway found that depression occurred more commonly in people who had high levels of the amino acid homocysteine in their blood, and in those who carried a form of a gene that encodes a protein involved in processing folate.

Folate and vitamins B6 and B12 are needed for proper brain function. Insufficiencies of these nutrients may result in forgetfulness, memory loss, confusion, depression, dementia, and mood and sensory changes. One study stated that age-related impairment of cognitive function is likely related to vitamin deficiencies, and is "preventable or reversible with improved vitamins, especially vitamin B6, vitamin B12, and folate."

Deficiencies in the B vitamins B12, B6, folate, and thiamine (B1) have long been recognized as contributors to cognitive decline.

Patients with these deficiencies often respond favorably to vitamin replacement, showing improved short-term memory and language abilities. Furthermore, it is now thought that people with even slightly lower levels of these vitamins go on to develop Alzheimer's more often than people with normal levels.

Many dementia sufferers, however, are subclinically or mildly deficient in either B12 or folate, and can derive a cognitive benefit from replacement. It seems that a certain subset of patients with a subclinical deficiency in these nutrients derive particular benefit.

Nilsson and colleagues in Sweden recently found that patients with elevated blood homocysteine levels showed a greater improvement in cognitive function on B12 and folate supplements than did patients with normal homocysteine levels. Elevated homocysteine, which can be measured in the blood, is thought to represent a cardiovascular risk. It seems that measuring a person's homocysteine level may be a way of predicting how their memory might respond to B12 or folate supplements.

All in all, researchers seem to agree that a healthy diet high in the B vitamins and folate is at least protective against cognitive decline.

Minerals and Trace Elements

As we age, we also tend to become less efficient at absorbing some essential minerals such as zinc, and magnesium from our diets, and we may end up with relative deficiencies of these nutrients. Deficiencies in these metals can cause oxidative damage in our brains by preventing some key protective enzymes from operating to their fullest extent, thereby resulting in damage and cell loss.

Ginkgo Biloba and zinc monomethionine are powerful antioxidants which help keep dopamine from being oxidized into hydrogen peroxide and hydroxyl radicals which damage dopamine receptors.

Besides the adaptogens (see above), there are many other ingredients in InControl that improve well being. For example in a study involving 80 young, healthy males, the use of **calcium, magnesium** and **zinc** was associated with reduced anxiety and perceived stress, and an improved feeling of well-being.

Magnesium, besides complementing the effects of calcium it also has important effects on its own. Low levels of magnesium promote inflammation and impact on the body's ability to handle stress. These functions are useful in alleviating the release of pro-inflammatory cytokines, and decreasing both insulin resistance and inappropriate cortisol secretion.

Potassium helps correct marginal potassium deficiency. In many women, and in some men, fatigue may also be due to a relatively low, or low normal, serum potassium. This is understandable in light of the monthly potassium loss most women have secondary to their premenstrual water retention and subsequent diuresis (water loss), and the blood loss associated with menstruation.

As well, dieting increases potassium loss since fluid weight is lost initially and dietary potassium intake usually decreases when less food is eaten.

Whatever the reason, loss of potassium can lead to fatigue and lethargy, which can decrease well being.

Chromium enhances insulin sensitivity and decreases insulin resistance. As such, it can be used as an aid to treat various conditions associated with insulin resistance including the metabolic syndrome, diabetes, glycation and cardiovascular disease.

Although most diets just barely provide the RDA for chromium, for many it's not enough to make up for daily losses, especially if they exercise. But not any kind of chromium is OK. For example the most commonly used form of chromium, chromium picolinate, has potential adverse effects associated with its use. The polynicotinate form of chromium used in InControl is a readily absorbable and biologically active form of chromium that enhances insulin sensitivity, without side effects.

Manganese deficiency has been traced to abnormalities in brain function. Laboratory studies have demonstrated that Manganese superoxide dimutase, an antioxidant enzyme containing manganese, protects brain cells from the type of damage seen in stroke and Alzheimer's disease.

Other Ingredients

Bioperine®, an extract of black pepper fruit, has been shown to promote efficient nutrient absorption and thus enhance the bioavailability of the ingredients in InControl.

Supplement Quality and Purity Is Important

InControl consists of over 60 ingredients in the Generally Recognized As Safe (GRAS) list by the US government.

The nutritional and botanical ingredients used in InControl are of the highest quality and are intended to impact multiple pathways that lead to specific mental and physical benefits. These benefits include improved memory and cognition, increased focus and concentration, and improved mental health.

InControl has been manufactured for safety in a fully temperature-controlled 100,000 square-foot USA FDA-inspected facility that ensures purity and accuracy of materials through inspection and evaluation at every step of production and packaging. Product purity is verified through independent 3rd party analysis, and InControl is specially produced to meet or exceed United States Pharmacopeia (USP) standards.

InControl does not contain any IOC/USADA/WADA/IAAF/NCAA/NFL/NHL/MLB banned substances.

InControl Nutrition Panel

Supplement Facts:		Serving Size: 6 Tablets			
		Servings Per Container: 15			
	Amount Per Serving	% Daily Value			
			Amount Per Serving		
			% Daily Value		
Vitamin C (as Ascorbic Acid)	100 mg	167%	Bioperine	5 mg	*
Vitamin E (as dl-Alpha Tocopheryl Acetate)	100 IU	333%	InControl Proprietary Complex 8,500 mg		
Vitamin B1 (as Thiamine and Benfotiamine)	10 mg	667%	5-HTP (5-Hydroxytryptophan), Alpha-Glycerolphosphocholine,		
Vitamin B2 (as Riboflavin)	10 mg	490%	Alpha Lipoic Acid, Acetyl L-Carnitine HCl, Bacopa Monniera Leaf Extract,		
Vitamin B3 (as Niacinamide and Niacin)	110 mg	550%	Calcium Phosphate, Chamomile Extract, CDP Choline, Cellulose,		
Vitamin B6 (as Pyridoxine HCl)	10 mg	500%	Choline Bitartrate, Codonopsis Extract, Coenzyme Q-10, DMAE Bitartrate,		
Vitamin B12 (as Methylcobalamin)	100 mcg	1667%	Eleutherococcus Senticosus (Root), Ginkgo Biloba Extract, GABA,		
Folic Acid	400 mcg	100%	Gotu Kola, Grape Seed Extract, Green Tea Extract, Guarana Extract,		
Biotin	100 mcg	33%	Hops Extract, Huperzine A, Idebenone, L-Carnosine, L-Glutamine,		
d-Calcium Pantothenate	100 mg	1,000%	L-Phenylalanine, L-Pyroglutamic Acid, L-Tyrosine,		
Magnesium (as Magnesium Oxide)	150 mg	37.5%	Lecithin (Phosphatidylcholine), Lemon Balm Extract, Velvet Bean Extract,		
Zinc (as Zinc Monomethionine)	10 mg	67%	Omega 3 Fish Oil (DHA, EPA), Passion Flower Extract, Phosphatidylserine,		
Potassium (as Potassium Chloride)	99 mg	3%	Rhodiola Rosea Extract, Sage Extract, Schizandra, Skullcap Herb Extract		
Manganese (as Manganese Citrate)	2 mg	100%	Taurine, Vanillin, Vinpocetine.		
Chromium	25 mcg	21%			
Other Ingredients: Stearic Acid, Magnesium Stearate, Croscarmellose Sodium, Silicon Dioxide, Hypromellose					
*Daily Value Not Established					

References

1. A scientific review: the role of chromium in insulin resistance. *Diabetes Educ* 2004; Suppl:2-14.
2. Abidov M, Crendal F, Grachev S, Seifulla R, Ziegenfuss T. Effect of extracts from *Rhodiola rosea* and *Rhodiola crenulata* (Crassulaceae) roots on ATP content in mitochondria of skeletal muscles. *Bull Exp Biol Med*. 2003; 136(6):585-7.
3. Abidov M, Grachev S, Seifulla RD, Ziegenfuss TN. Extract of *Rhodiola rosea* radix reduces the level of C-reactive protein and creatinine kinase in the blood. *Bull Exp Biol Med*. 2004; 138(1):63-4.
4. Aguilaniu H, Gustafsson L, Rigoulet M, Nystrom T. Asymmetric inheritance of oxidatively damaged proteins during cytokinesis. *Science*. 2003 Mar 14;299(5613):1751-3. Epub 2003 Feb 27.
5. Allain H, Raoul P, Lieury A, et al. Effects of two doses of ginkgo biloba extract (EGb 761) on the dual-coding test in elderly subjects. *Clin Ther* 1993;15(3):549-58.
6. Alpert JE, Fava M. Nutrition and depression: the role of folate. *Nutr Rev*. 1997; 55:145–149.
7. Alzheimers Association, General Statistics and Demographics, www.alz.org/hc/overview/stats.htm.
8. Amaducci L and the SMID Group. Phosphatidylserine in the treatment of Alzheimers disease: results of a multicenter study. *Psychopharmacol. Bulletin*, 1988, 24: 130-4.
9. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. Washington, DC: American Psychiatric Association, 1994, 684.
10. Asano K, Takahashi T, Miyashita M, et al. Effect of *Eleutherococcus senticosus* extract on human working capacity. *Planta Medica* 1986;37:175–77.
11. Ashani Y, Peggins JO III, Doctor BP. Mechanism of inhibition of cholinesterases by huperzine A. *Biochem Biophys Res Commun*. 1992; 184:719–726.
12. Avena R, Arora S, Carmody BJ, Cosby K, Sidawy AN. Thiamine (vitamin B1) protects against glucose- and insulin- mediated proliferation of human infragenicular arterial smooth muscle cells. *Ann Vasc Surg*. 2000 Jan;14(1):37-43.
13. Balestreri R, Fontana L, Astengo F. A double-blind placebo controlled evaluation of the safety and efficacy of vinpocetine in the treatment of patients with chronic vascular senile cerebral dysfunction. *J Am Geriatr Soc* 1987;35:425-30.

14. Barham JB, Edens MB, Fonteh AN, Johnson MM, Easter L, Chilton FH. Addition of eicosapentaenoic acid to gamma-linolenic acid-supplemented diets prevents serum arachidonic acid accumulation in humans. *J Nutr.* 2000; 130(8):1925-31.
15. Barthelemy C, Garreau B, Leddet I, et al. Behavioral and biological effects of oral magnesium, vitamin B6 and combined magnesium–vitamin B6 administration in autistic children. *Magnes Bull.* 1981; 2:150–153.
16. Bell, K.M., Potkin, S.G., Carreon, D., and L. Plon. S-adenosylmethionine blood levels in major depression: changes with drug treatment. *Acta. Neurol.Scand. Suppl;*154:15-8, 1994.
17. Bereczki D, Fekete I. A systematic review of vinpocetine therapy in acute ischaemic stroke. *Eur J Clin Pharmacol.* 1999; 55:349–352.
18. Berlett BS, Stadtman ER. Protein oxidation in aging, disease and oxidative stress. *J Biol Chem.* 1997 Aug 15;272(33):20313-6.
19. Bidri M, Choay P. Taurine: a particular aminoacid with multiple functions. *Ann Pharm Fr.* 2003 Nov;61(6):385-91.
20. Bierkamper GG, Goldberg AM. Release of acetylcholine from the vascular perfused rat phrenic nerve hemidiaphragm. *Brain Res* 1980; 202: 234-37
21. Blokland A, Honig W, Brouns F, et al. Cognition-enhancing properties of subchronic phosphatidylserine (PS) treatment in middle-aged rats: comparison of bovine cortex PS with egg PS and soybean PS. *Nutrition* 1999;15:778-83.
22. Blusztajn JK, Wurtman RJ. Choline and cholinergic neurons. *Science* 1983; 221: 614-20
23. Bodis-Wollner, E. Chung, M.F. Ghilardi, et al, *J Neural Transm Park Dis Diment Sci* 1991; 3: 63-72.
24. Boldyrev A, Johnson P. Carnosine and related compounds: antioxidant dipeptides. In: P. Johnson and A. Boldyrev, Editors, *Oxidative Stress at Molecular, Cellular and Organ Levels*, Res. Signpost 2002; 101-114.
25. Boldyrev AA, Gallant SC, Sukhich GT. Carnosine, the protective, anti-aging peptide. *Biosci Rep.* 1999 Dec; 19(6):581-7.
26. Bolla KI, Lindgren KN, Bonaccorsy C, Bleecker ML. Memory complaints in older adults: Fact or fiction? *Arch Neurol* 1991;48:61-4.
27. Bonavita E. Study of the efficacy and tolerability of L-acetylcarnitine therapy in the senile brain. *Int J Clin Pharmacol Ther Toxicol* 1986;24(9):511-6.

28. Bonoczk P, Gulyas B, Adam-Vizi V, Nemes A, Karpati E, Kiss B, Kapas M, Szantay C, Koncz I, Zelles T, Vas A. Role of sodium channel inhibition in neuroprotection: effect of vinpocetine. *Brain Res Bull.* 2000 Oct;53(3):245-54.
29. Botez MI. Folate deficiency and neurological disorders in adults. *Med Hypotheses.* 1976; 2:135–140.
30. Bottiglieri, T., Hyland, K., and E.H. Reynolds. The clinical potential of S-adenosylmethionine in brain mapping, cerebrovascular hemodynamics, and immune factors. *Ann. N.Y. Acad. Sci.* 17;777:399-403, 1994.
31. Brambilla F, Maggioni M, Panerai AE, et al. Beta-endorphin concentration in peripheral blood mononuclear cells of elderly depressed patients—effects of phosphatidylserine therapy. *Neuropsychobiology.* 1996; 34:18–21.
32. Brattstrom LE, Hultberg BL, Hardebo JE. Folic acid responsive postmenopausal homocysteinemia. *Metabolism.* 1985; 34:1073–1077.
33. Brautigam MRH, Blommaert FA, Verleye G, et al. Treatment of age-related memory complaints with Ginkgo biloba extract: a randomized double-blind placebo-controlled study. *Phytomedicine* 1998;5:425-34.
34. Brayne C, Gill C, Paykel ES, et al. Cognitive decline in an elderly population—a two wave study of change. *Psychological Study of Medicine* 1995;25:673-83.
35. Brownson C, Hipkiss AR. Carnosine reacts with a glycated protein. *Free Radic Biol Med.* 2000 May 15;28(10):1564-70.
36. Buchman AL, Sohel M, Brown M, Jenden DJ, Ahn C, Roch M, Brawley TL. Verbal and visual memory improve after choline supplementation in long-term total parenteral nutrition: A pilot study. *Journal of Parenteral & Enteral Nutrition* Vol 25(1) (pp 30-35), 2001.
37. Calvaresi E, Bryan J. B vitamins, cognition, and aging: A review. *Journals of Gerontology Series B-Psychological Sciences & Social Sciences* Vol 56(6) (pp P327-P339), 2001.
38. Cameron NE, Gibson TM, Nangle MR, Cotter MA. Inhibitors of advanced glycation end product formation and neurovascular dysfunction in experimental diabetes. *Ann N Y Acad Sci.* 2005 Jun;1043:784-92.
39. Campos AR, Barros AI, Albuquerque FA, M Leal LK, Rao VS. Acute effects of guarana (*Paullinia cupana* Mart.) on mouse behaviour in forced swimming and open field tests. *Phytother Res.* 2005 Aug 16;19(5):441-443 [Epub ahead of print]
40. Carlini EA. Plants and the central nervous system. *Pharmacol Biochem Behav.* 2003 Jun;75(3):501-12. Review.

41. Caro AA, Cederbaum AI. Antioxidant properties of S-adenosyl-L-methionine in Fe(2+)-initiated oxidations. *Free Radic Biol Med.* 2004 May 15;36(10):1303-16.
42. Carroll D, Ring C, Suter M, Willemsen G. The effects of an oral multivitamin combination with calcium, magnesium, and zinc on psychological well-being in healthy young male volunteers: a double-blind placebo-controlled trial. *Psychopharmacology (Berl)* 2000; 150(2):220-5.
43. Castilho JC, Perry JC, Andreatini R, Vital MA. Phosphatidylserine: an antidepressive or a cognitive enhancer? *Prog Neuropsychopharmacol Biol Psychiatry* 2004 Jul;28(4):731-8.
44. Ceda GP, Ceresini G, Denti L, Marzani G, Piovani E, Banchini A, Tarditi E, Valenti G. alpha-Glycerylphosphorylcholine administration increases the GH responses to GHRH of young and elderly subjects. *Horm Metab Res.* 1992 Mar;24(3):119-21.
45. Cenacchi, B, Bertoldin T, Farina C, Fiori M.G., Crepaldi G. Cognitive decline in the elderly: a double-blind, placebo-controlled multicenter study on efficacy of phosphatidylserine administration. *Aging (Clin. Exp. Res.)*, 1993, 5: 123-33.
46. Cheng DH, Ren H, Tang XC. Huperzine A, a novel promising acetylcholinesterase inhibitor. *Neuroreport* 1996; 8:97–101.
47. Cheng DH, Tang XC. Comparative studies of huperzine A, E2020, and tacrine on behavior and cholinesterase activities. *Pharmacol Biochem Behav.* 1998; 60:377–386.
48. Chez MG, Buchanan CP, Aimonovitch MC, et al. Double-blind, placebo-controlled study of L-carnosine supplementation in children with autistic spectrum disorders. *J Child Neurol* 2002 Nov;17(11):833-7.
49. Chowdhuri DK, Parmar D, Kakkar P, Shukla R, Seth PK, Srimal RC. Antistress effects of bacosides of *Bacopa monnieri*: modulation of Hsp70 expression, superoxide dismutase and cytochrome P450 activity in rat brain. *Phytother Res.* 2002 Nov;16(7):639-45.
50. Cicero AF, Derosa G, Brillante R, Bernardi R, Nascetti S, Gaddi A. Effects of Siberian ginseng (*Eleutherococcus senticosus maxim.*) on elderly quality of life: a randomized clinical trial. *Archives of Gerontology and Geriatrics Supplement.* 2004;(9):69-73.
51. Cipolli C, Chiari G. [Effects of L-acetylcarnitine on mental deterioration in the aged: initial results.] *Clin Ter* 1990;132(6 Suppl):479-510 [in Italian].
52. Cohen KL, Gorecki GA, Silverstein SB, et al. Effect of pyridoxine (vitamin B6) on diabetic patients with peripheral neuropathy. *J Am Podiatry Assoc.* 1984; 74:394–397.
53. Cohen RA, Kucera LS, Herrmann EC. Antiviral activity of melissa officinalis (lemon balm) extract. *Proc. Soc. Exptl. Biol. Mod.*, 117, 431-434, 1964.

54. Conant R, Schauss AG. Therapeutic applications of citicoline for stroke and cognitive dysfunction in the elderly: a review of the literature. *Altern Med Rev*. 2004 Mar;9(1):17-31.
55. Coppen A, Swade C, Jones SA, et al. Depression and tetrahydrobiopterin: the folate connection. *J Affect Disord*. 1989; 16:103–107.
56. Cozzi R, Ricordy R, Bartolini F, Ramadori L, Perticone P and de Salvia R (1995). Taurine and ellagic acid: two differently-acting natural antioxidants. *Environmental and Molecular Mutagenesis* 26, 248-254.
57. Craik FIM, Salthouse TA. *Handbook of Aging and Cognition*. Hillsdale, NJ: Erlbaum, 1992.
58. Crellin R, Bottiglieri T, Reynolds EH. Folates and psychiatric disorders. *Clinical potential*. *Drugs*. 1993; 45:623–636.
59. Crook TH III, Adderly BD. *The Memory Cure: The Safe, Scientifically Proven Breakthrough That Can Slow, Halt, Or Even Reverse Age-Related Memory Loss*. New York, NY: Pocket Books; 1998:71, 72.
60. Crook, T.H., Petrie W, Wells C, Massari, D.C. Effects of phosphatidylserine in Alzheimers disease. *Psychopharmacol. Bulletin*, 1992. 28: 61-6.
61. Crook, T.H., Tinklenburg, J, Yesavage J, Petrie W, Nunzie M.G., and Massari, D.C. Effects of phosphatidylserine in age-associated memory impairment. *Neurol*, 1991. 41: 644-9.
62. Curti D, F. Dagani, M.R. Galmozzi, et al, *Mech Ageing Dev* 1989; 47: 39-45.
63. Darbinyan V, Kteyan A, Panossian A, Gabrielian E, Wikman G, Wagner H. Rhodiola rosea in stress induced fatigue--a double blind cross-over study of a standardized extract SHR-5 with a repeated low-dose regimen on the mental performance of healthy physicians during night duty. *Phytomedicine*. 2000; 7(5):365-71.
64. Dasgupta A, Wu S, Actor J, Olsen M, Wells A, Datta P. Effect of Asian and Siberian ginseng on serum digoxin measurement by five digoxin immunoassays. Significant variation in digoxin-like immunoreactivity among commercial ginsengs. *American Journal of Clinical Pathology*. 2003;119(2):298-303.
65. Davis KL, Berger PA. Pharmacological investigations of the cholinergic imbalance hypotheses of movement disorders and psychosis. *Biol Psychiatry*. 1978; 13:23–49.
66. Davydov M, Krikorian AD. *Eleutherococcus senticosus* (Rupr. & Maxim.) Maxim. (Araliaceae) as an adaptogen: a closer look. *Journal of Ethnopharmacology*. 2000;72(3):345-393.

67. De Bock K, Eijnde BO, Ramaekers M, Hespel P. Acute Rhodiola rosea intake can improve endurance exercise performance. *Int J Sport Nutr Exerc Metab.* 2004; 14(3):298-307.
68. Dean MD, W., Morgenthaler, J. 1991 *Smart Drugs and Nutrients: How to Improve Your Memory and Increase Your Intelligence Using the Latest Discoveries in Neuroscience.* California: B&J Publications.
69. Dean, W, Morgenthaler J, Fowkes S. 1993 *Phosphatidylserine Smart Drugs II, The Next Generation,* Health Freedom Publications. Menlo Park, CA. pp. 75-80.
70. Deijen JB, van der Beek EJ, Orlebeke JF, et al. Vitamin B-6 supplementation in elderly men: effects on mood, memory, performance and mental effort. *Psychopharmacology (Berl)* 1992;109(4):489-96.
71. DeLuca P, Rossetti RG, Alavian C, Karim P, Zurier RB. Effects of gammalinolenic acid on interleukin-1 beta and tumor necrosis factor-alpha secretion by stimulated human peripheral blood monocytes: studies in vitro and in vivo. *J Investig Med.* 1999; 47(5):246-50.
72. Delwaide, P.J., Gyselynk-Mambourg A.M., Hurlet A. and Ylieff M. Double-blind randomized controlled study of phosphatidylserine in demented patients. *Acta Neurol. Scand,* 1986. 73:136-40.
73. De Souza MC, Walker AF, Robinson PA, Bolland K. A synergistic effect of a daily supplement for 1 month of 200 mg magnesium plus 50 mg vitamin B6 for the relief of anxiety-related premenstrual symptoms: a randomized, double-blind, crossover study. *J Womens Health Gend Based Med.* 2000 Mar; 9(2):131-9.
74. Di Perri R, Coppola G, Ambrosio LA, Grasso A, Puca FM, Rizzo M. A multicentre trial to evaluate the efficacy and tolerability of alpha-glycerolphosphorylcholine versus cytosine diphosphocholine in patients with vascular dementia. *J Int Med Res.* 1991 Jul-Aug;19(4):330-41.
75. Dietrich HA, Lindmar R, Loffelholz K. The role of choline in the release of acetylcholine in isolated hearts. *Arch Pharmacol* 1978; 301: 207-15
76. Dimpfel W, Pischel I, Lehnfeld R. Effects of lozenge containing lavender oil, extracts from hops, lemon balm and oat on electrical brain activity of volunteers. *Eur J Med Res.* 2004 Sep 29;9(9):423-31.
77. Dimpfel W, Wedekind W, Keplinger I. Efficacy of dimethylaminoethanol (DMAE) containing vitamin-mineral drug combination on EEG patterns in the presence of different emotional states. *Eur J Med Res.* 2003 May 30;8(5):183-91.
78. Dolezal V, Tucek S. *J Neurochem* 1981; 36: 1323-1330.
79. Dori D, Casale G, Solerte SB, et al. Chrono-neuroendocrinological aspects of physiological aging and senile dementia. *Chronobiologia* 1994;21(1-2):121-6.

80. Dreon DM, Peroutkal SJ. Medical Utility of APOE Allele Determination in Assessing the Need for Antioxidant Therapy. *Med Hypotheses*. Vol 56 (pp357-359), 2001.
81. Eastley R, Wilcock GK, Bucks RS. Vitamin B12 deficiency in dementia and cognitive impairment: the effects of treatment on neuropsychological function. *Int J Geriatr Psychiatry*. 2000 Mar;15(3):226-33.
82. Eisenberg J, Asnis GM, van Praag HM, Vela RM. Effect of tyrosine on attention deficit disorder with hyperactivity. *J Clin Psychiatry*. 1988 May;49(5):193-5.
83. Emsley R, Myburgh C, Oosthuizen P, van Rensburg SJ. Randomized, placebo-controlled study of ethyl-eicosapentaenoic acid as supplemental treatment in schizophrenia. *Am J Psychiatry*. 2002 Sep;159(9):1596-8.
84. Engel, R.R., Satzger W, Gunther W, Kathmann N, Bove D, Gerkes, Munch U and Hippus H. Double-blind cross-over study of phosphatidylserine vs. placebo in subjects with early cognitive deterioration of the Alzheimer type. *Eur. Neuropsychopharmacol*, 1992. 2: 149-55.
85. Ernst E. The Risk-Benefit Profile of Commonly Used Herbal Therapies: Ginkgo, St. John's Wort, Ginseng, Echinacea, Saw Palmetto, and Kava. *Annals of Internal Medicine*. Vol 136(1) (pp 42-53), 2002.
86. Eschbach LF, Webster MJ, Boyd JC, McArthur PD, Evetovich TK. The effect of Siberian ginseng (*Eleutherococcus senticosus*) on substrate utilization and performance. *International Journal of Sports Nutrition and Exercise Metabolism*. 2000;10(4):444-451.
87. Espinola EB, Dias RF, Mattei R, Carlini EA. Pharmacological activity of Guarana (*Paullinia cupana* Mart.) in laboratory animals. *J Ethnopharmacol*. 1997 Feb;55(3):223-9.
88. Farnsworth NR, Kinghorn AD, Soejarto D, Waller DP. Siberian ginseng (*Eleutherococcus senticosus*): Current status as an adaptogen. *Econ Med Plant Res* 1985;156-215.
89. Ferraro L, Tanganelli S, Marani L, Bianchi C, Beani L, Siniscalchi A. Evidence for an in vivo and in vitro modulation of endogenous cortical GABA release by alpha-glycerylphosphorylcholine. *Neurochem Res*. 1996 May;21(5):547-52.
90. Ferris SH, Kluger A. Commentary on age-associated memory impairment, age-related cognitive decline and mild cognitive impairment. *Aging Neuropsychol Cogn* 1996;3:148-53.
91. Filaretov AA, Bogdanova TS, Mitiushov MI, et al. Effect of adaptogens on the activity of the pituitary-adrenocortical system in rats. *Biull Eksp Biol Med* 1986;101:573-574.

92. Fioravanti M, Yanagi M. Cytidinediphosphocholine (CDP choline) for cognitive and behavioural disturbances associated with chronic cerebral disorders in the elderly (Cochrane Review). In: The Cochrane Library, Issue 3, 2004. John Wiley & Sons, Chichester, UK.
93. Fiore L, Rampello L. *Acta Neurol* 1989; 11: 346-350.
94. Fischhof PK, Moslinger-Gehmayr R, Herrmann WM, et al. Therapeutic efficacy of vincamine in dementia. *Neuropsychobiology* 1996;34:29-35.
95. Funfgeld, E.W., Baggen, M, Nedwidek, P, et al. Double-blind study with phosphatidylserine (PS) in Parkinsonian patients with senile dementia of Alzheimers type (SDAT). *Progr. Clin. Biol. Res*, 1989. 317: 1235-46.
96. Furse RK, Rossetti RG, Seiler CM, Zurier RB. Oral administration of gammalinolenic acid, an unsaturated fatty acid with anti-inflammatory properties, modulates interleukin-1beta production by human monocytes. *J Clin Immunol*. 2002; 22(2):83-91.
97. Furushiro M, Suzuki S, Shishido Y, et al. Effects of oral administration of soybean lecithin transphosphatidylated phosphatidylserine on impaired learning of passive avoidance in mice. *Jpn J Pharmacol* 1997;75:447-50.
98. Gaby AR. Don't believe everything you read. *CounterPoint*. *Townsend Letter for Doctors Patients* 1997;July:125-6 [editorial].
99. Gadoth N, Figlin E, Chetrit A, Sela BA, Seligsohn U. The neurology of cobalamin deficiency in an elderly population in Israel. *J Neurol*. 2005 Aug 24; [Epub ahead of print]
100. Gallant S, Kukley M, Stvolinsky S, Bulygina E, Boldyrev A. Effect of carnosine on rats under experimental brain ischemic. *Tohoku J Exp Med*. 2000 Jun;191(2):85-99.
101. Garzya G, Corallo D, Fiore A, et al. Evaluation of the effects of L-acetylcarnitine on senile patients suffering from depression. *Drugs Exp Clin Res* 1990;16(2):101-6.
102. Gedeon Richter product literature, Cavinton.
103. Gelenberg AJ, Gibson CJ. Tyrosine for the treatment of depression. *Nutr Health*. 1984;3(3):163-73.
104. Genazzani E. [A controlled clinical study on the efficacy of L-acetylcarnitine in the treatment of mild to moderate mental deterioration in the aged. Conclusions.] *Clin Ter* 1990;132(6 Suppl):511-2.
105. Gille JJ, Pasman P, van Berkel CG, Joenje H. Effect of antioxidants on hyperoxia-induced chromosomal breakage in Chinese hamster ovary cells: protection by carnosine. *Mutagenesis*. 1991 Jul;6(4):313-8.

106. Gillis RC, Daley BJ, Enderson BL, Karlstad MD. Eicosapentaenoic acid and gamma-linolenic acid induce apoptosis in HL-60 cells. *J Surg Res.* 2002; 107(1):145-53.
107. Gindin J, Novikov M, Kedar D, et al. The effect of plant phosphatidylserine on age-associated memory impairment and mood in the functioning elderly. Rehovot, Israel: Geriatric Institute for Education and Research, and Department of Geriatrics, Kaplan Hospital, 1995.
108. Godfrey P, Crellin R, Toone BK, Flynn TG, Carney MW, Laundry M, Chanarin I, Bottiglieri T, Reynolds EH. Enhancement of recovery from psychiatric illness by methylfolate. *Br J Psychiatry.* 1992 Jul;161:126-7.
109. Golotin VG, Gonenko VA, Zimina VV, et al. Effect of ionol and eleutherococcus on changes of the hypophyseal-adrenal system in rats under extreme conditions. *Vopr Med Khim* 1989;35:35-37.
110. Gräbel E. The influence of Ginkgo biloba extract (EGb 761) on mental performance: A double-blind study under computerized measurement conditions in patients with cerebral insufficiency. *Fortschr Med* 1992;110:73-6.
111. Gueck T, Seidel A, Baumann D, Meister A, Fuhrmann H. Alterations of mast cell mediator production and release by gamma-linolenic and docosahexaenoic acid. *Vet Dermatol.* 2004; 15(5):309-14.
112. Hallahan B, Garland MR. Essential fatty acids and mental health. *Br J Psychiatry.* 2005 Apr;186:275-7. Fan YY, Chapkin RS. Importance of dietary gamma-linolenic acid in human health and nutrition. *Journal of Nutrition* 1998; 128: 1411-14.
113. Hammes HP, Du X, Edelstein D, et al. Benfotiamine blocks three major pathways of hyperglycemic damage and prevents experimental diabetic retinopathy. *Nat Med.* 2003 Mar;9(3):294-9. Epub 2003 Feb 18.
114. Hänninen T. Age-associated memory impairment: A neuropsychological and epidemiological study. *Neurologian klinikan julkaisusarja* 1996;39 [abstract].
115. Hardy ML, Coulter I, Morton SC, et al. S-adenosyl-L-methionine for treatment of depression, osteoarthritis, and liver disease. *Evid Rep Technol Assess (Summ).* 2003 Aug;(64):1-3.
116. Harris CM, Dysken MW, Fovall P, Davis JM. Effect of lecithin on memory in normal adults. *Am J Psychiatry.* 1983 Aug;140(8):1010-2.
117. Hershowitz M, et al. Long-term treatment of dementia Alzheimer type with phosphatidylserine: effect on cognitive functioning and performance in daily life. In, Bazan NG, et al (eds.) *Phospholipids in the Nervous System: Biochemical and Molecular Pathology*, 1989. Padua, Italy: Liviana Press.

118. Heseke H, Kubler W, Pudiel V, Westenhoffer J. Psychological disorders as early symptoms of a mild-to-moderate vitamin deficiency. *Ann N Y Acad Sci.* 1992 Sep 30; 669:352-7.
119. Hibbeln JR, Nieminen LR, Lands WE. Increasing homicide rates and linoleic acid consumption among five Western countries, 1961-2000. *Lipids.* 2004 Dec;39(12):1207-13.
120. Hindmarch I, Fuchs HH, Erzigkeit H. Efficacy and tolerance of vinpocetine in ambulant patients suffering from mild to moderate organic psychosyndromes. *Int Clin Psychopharmacol* 1991;6:31-43.
121. Hipkiss AR, Brownson C. A possible new role for the anti-ageing peptide carnosine. *Cell Mol Life Sci.* 2000 May;57(5):747-53.
122. Hirsch MJ, Growdon JH, Wurtman RJ. Relations between dietary choline or lecithin intake, serum choline levels, and various metabolic indices. *Metabolism.* 1978; 27:953–960.
123. Iaremii IN, Grigor'eva NF. [Hepatoprotective properties of liquid extract of *Rhodiola rosea*] *Eksp Klin Farmakol.* 2002; 65(6):57-9.
124. Imperato A, M.T. Ramacci, L. Angelucci, et al, *Neurosci Lett* 1989; 107: 251-255.)
125. Israel L, Dell'Accio E, Martin G, Hugonot R. Ginkgo biloba extract and memory training programs-comparative assessment on elderly outpatients. *Psychologie Médicale* 1987;19:1431-9.
126. Itil TM, Eralp E, Ahmed I, Kunitz A, Itil KZ. The pharmacological effects of ginkgo biloba, a plant extract, on the brain of dementia patients in comparison with tacrine. *Psychopharmacol Bull* 1998;34(3):391-7
127. Jarvis MJ. Does caffeine enhance absolute levels of cognitive performance? *Psychopharmacology (Berl)* 1993;110(1-2):45-52.
128. Johnson MM, Swan DD, Surette ME et al. Dietary supplementation with gamma-linolenic acid alters fatty acid content and eicosanoid production in healthy humans. *Journal of Nutrition* 1997; 127: 143544.
129. Johnson S. Gradual Micronutrient Accumulation and Depletion in Alzheimer's Disease. *Med Hypotheses.* Vol 56 (pp 595-597), 2001.
130. Jones W, Li X, Qu ZC, et al. Uptake, recycling, and antioxidant actions of alpha-lipoic acid in endothelial cells. *Free Radic Biol Med* 2002;33:83-93. Bast A, Haenen GR. Lipoic acid: a multifunctional antioxidant. *Biofactors.* 2003;17(1-4):207-13.

131. Jorissen BL, Brouns F, Van Boxtel MPJ, et al. The influence of soy-derived phosphatidylserine on cognition in age-associated memory impairment. *Nutr Neurosci* 2001;4:121-34.
132. Joseph JA, Shukitt-Hale B, Denisova NA, et al. Long-term dietary strawberry, spinach, or vitamin E supplementation retards the onset of age-related neuronal signal-transduction and cognitive behavioral deficits. *J Neurosci* 1998;18(19):8047-55.
133. Kang KS, Yun JW, Lee YS. Protective effect of L-carnosine against 12-O-tetradecanoylphorbol-13-acetate- or hydrogen peroxide-induced apoptosis on v-myc transformed rat liver epithelial cells. *Cancer Lett.* 2002 Apr 8;178(1):53- 62.
134. Kelly GS. *Rhodiola rosea*: a possible plant adaptogen. *Altern Med Rev.* 2001; 6(3):293-302. *Rhodiola rosea*. Monograph. *Altern Med Rev.* 2002; 7(5):421-3.
135. Kennedy DO, Haskell CF, Wesnes KA, Scholey AB. Improved cognitive performance in human volunteers following administration of guarana (*Paullinia cupana*) extract: comparison and interaction with *Panax ginseng*. *Pharmacol Biochem Behav.* 2004 Nov;79(3):401-11.
136. Kennedy DO, Scholey AB, Tildesley NT, Perry EK, Wesnes KA. Modulation of mood and cognitive performance following acute administration of *Melissa officinalis* (lemon balm). *Pharmacol Biochem Behav.* 2002 Jul;72(4):953-64.
137. Kennedy DO, Wake G, Savelev S, Tildesley NT, Perry EK, Wesnes KA, Scholey AB. Modulation of mood and cognitive performance following acute administration of single doses of *Melissa officinalis* (Lemon balm) with human CNS nicotinic and muscarinic receptor-binding properties. *Neuropsychopharmacology.* 2003 Oct;28(10):1871-81.
138. Kidd PM. Don't believe everything you read. . .a sequel. *Point. Townsend Letter for Doctors Patients* 1997;July:122-4 [editorial].
139. Kidd, P., 1995. Phosphatidylserine (PS), A Remarkable Brain Cell Nutrient. Lucas Meyer, Inc, Decator, Il.
140. Kleefstra N, Bilo HJ, Bakker SJ, Houweling ST. Chromium and insulin resistance. *Ned Tijdschr Geneesk.* 2004 Jan 31;148(5):217-20.
141. Kleijnen J, Ter Riet G, Knipschild P. Vitamin B6 in the treatment of premenstrual syndrome—a review . *Br J Obstet Gynaecol.* 1990; 97:847–852.
142. Kopf SR, Buchholzer ML, Hilgert M, Loeffelholz K, Klein J. Glucose plus choline improve passive avoidance behaviour and increase hippocampal acetylcholine release in mice. *Neuroscience Vol 103(2)* (pp 365-371), 2001.
143. La Rue A. *Aging and Neuropsychological Assessment.* New York: Plenum, 1992.

144. Ladd SL, Sommer SA, LaBerge S, Toscano W. Effect of phosphatidylcholine on explicit memory. *Clin Neuropharmacol*. 1993 Dec;16(6):540-9.
145. Leathwood PD, Schlosser B. Phosphatidylcholine, choline and cholinergic function. *Int J Vitam Nutr Res Suppl*. 1986; 29:49–67.
146. Lelord G, Callaway E, Muh JP. Clinical and biological effects of high doses of vitamin B6 and magnesium on autistic children. *Acta Vitaminol Enzymol*. 1982; 4:27–44.
147. Levy R. Aging-associated cognitive decline. *Int Psychogeriatr* 1994;6:63-8 [review].
148. Lezak M. *Neuropsychological Assessment*, 3rd ed. New York: Oxford, 1995.
149. Lin RY, Reis ED, Dore AT, et al. Lowering of dietary advanced glycation endproducts (AGE) reduces neointimal formation after arterial injury in genetically hypercholesterolemic mice. *Atherosclerosis*. 2002 Aug;163(2):303-11.
150. Linden DC, Newton MW, Grinnell AD, Jenden DJ. Rapid decline in acetylcholine release and content of rat extensor digitorum longus muscle after denervation. *Exp Neurol* 1983; 81: 613-26
151. Lindenbaum J, Heaton EB, Savage DG, et al. Neuropsychiatric disorders caused by cobalamin deficiency in the absence of anemia or macrocytosis. *N Engl J Med* 1988;318:1720-8.
152. Lishmanov IB, Trifonova ZV, Tsibin AN, Maslova LV, Dement'eva LA. Plasma beta-endorphin and stress hormones in stress and adaptation. *Biull Eksp Biol Med* 1987; 103(4):422-4.
153. Lopez CM, Govoni S, Battaini F, Bergamaschi S, Longoni A, Giaroni C, Trabucchi M. Effect of a new cognition enhancer, alpha-glycerolphosphorylcholine, on scopolamine-induced amnesia and brain acetylcholine. *Pharmacol Biochem Behav*. 1991 Aug;39(4):835-40.
154. Lourenco R, Camilo ME. Taurine: a conditionally essential amino acid in humans? An overview in health and disease. *Nutr Hosp*. 2002 Nov-Dec;17(6):262-70.
155. Louwman MW, van Dusseldorp M, van de Vijver FJ, Thomas CM, Schneede J, Ueland PM, Refsum H, van Staveren WA. Signs of impaired cognitive function in adolescents with marginal cobalamin status. *Am J Clin Nutr*. 2000 Sep; 72(3):762-9.
156. Lucchi L, Pascale A, Battaini F, Govoni S, Trabucchi M. Cognition stimulating drugs modulate protein kinase C activity in cerebral cortex and hippocampus of adult rats. *Life Sci*. 1993;53(24):1821-32.
157. Maccari F, Arseni P, Chiodi, et al, *Exp Geront* 1990; 25: 127-134.) In numerous animal studies ALC has been shown to have the remarkable ability of

improving not only cognitive changes, but also morphological (structural) and neurochemical changes. ALC has varied effects on cholinergic activity.

158. Madigan SM, Tracey F, McNulty H, et al. Riboflavin and vitamin B-6 intakes and status and biochemical response to riboflavin supplementation in free-living elderly people. *Am J Clin Nutr* 1998;68(2):389-95.
159. Maggioni, M, Picotti, G.B., Bondiolotti, G.P., Panerai, A, Cenacchi, T, Nobile, P, and Brambilla, F. Effects of phosphatidylserine therapy in geriatric patients with depressive disorders. *Acta Psychiatr. Scand.* 1990. 81 (3): 265-70.
160. Maier JA, Malpuech-Brugere C, Zimowska W, Rayssiguier Y, Mazur A. Low magnesium promotes endothelial cell dysfunction: implications for atherosclerosis, inflammation and thrombosis. *Biochim Biophys Acta.* 2004; 24;1689(1):13-21.
161. Maimeskulova LA, Maslov LN. The anti-arrhythmia action of an extract of *Rhodiola rosea* and of n-tyrosol in models of experimental arrhythmias. *Eksp Klin Farmakol* 1998;61:37-40.
162. Maire JC, Wurtman RJ. Effects of electrical stimulation and choline availability on release and contents of acetylcholine and choline in superfused slices from rat striatum. *J Physiol Paris* 1985; 80: 189-95
163. Manconi E, Binaghi F, Pitzus F. A double-blind clinical trial of vinpocetine in the treatment of cerebral insufficiency of vascular and degenerative origin. *Curr Ther Res Clin Exp* 1986;30:702-709.
164. Martin DC, Francis J, Protetch J, Huff FJ. Time dependency of cognitive recovery with cobalamin replacement: report of a pilot study. *J Am Geriatr Soc* 1992;40(2):168-72.
165. Masaki KH, Losonczy KG, Izmirlian G, et al. Association of vitamin E and C supplement use with cognitive function and dementia in elderly men. *Neurology* 2000;54:1265-72.
166. Mayer G, Kroger M, Meier-Ewert K. Effects of vitamin B12 on performance and circadian rhythm in normal subjects. *Neuropsychopharmacology* 1996; 15(5):456-64.
167. McDaniel MA, Maier SF, Einstein GO. Brain-specific" nutrients: a memory cure? *Nutrition.* 2003 Nov-Dec;19(11-12):957-75.
168. McDowell I. Alzheimer's Disease: Insights From Epidemiology. *Aging.* Vol 13 (pp 143-162), 2001.
169. Miyamoto M, Murphy TH, Schnaar RL, Coyle JT. Antioxidants protect against glutamate-induced cytotoxicity in a neuronal cell line. *J Pharmacol Exp Ther* 1989 Sep;250(3):1132-40.

170. Miyazaki M. The effect of a cerebral vasodilator, vinpocetine, on cerebral vascular resistance evaluated by the Doppler ultrasonic technique in patients with cerebrovascular diseases. *Angiology*. 1995; 46:53–58.
171. Monteleone P, Beinat L, Tanzillo C, et al. Effects of phosphatidylserine on the neuroendocrine response to physical stress in humans. *Neuroendocrinology* 1990;52:243-248.
172. Monteleone P, Maj M, Beinat L, et al. Blunting by chronic phosphatidylserine administration of the stress-induced activation of the hypothalamo-pituitary-adrenal axis in healthy men. *Eur J Clin Pharmacol* 1992; 42:385-388.
173. Monteleone, P, Maj, M, Beinat, L, Natale, M, and Kemali, D. Blunting by chronic phosphatidylserine administration of the stress-induced activation of the hypothalamo-pituitary-adrenal axis in healthy men. *Eur. J. Clin. Pharmacol* ,1992. 41: 385-8.
174. Munch G, Mayer S, Michaelis J, et al. Influence of advanced glycation end-products and AGE-inhibitors on nucle- ation-dependent polymerization of beta-amyloid peptide. *Biochim Biophys Acta*. 1997 Feb 27;1360(1):17-29.
175. Myers BL, Badia P. Changes in circadian rhythms and sleep quality with aging: mechanisms and interventions. *Neurosci Biobehav Rev* 1995;19(4):553-71. Published erratum appears in *Neurosci Biobehav Rev* 1996;20(2):I-IV.
176. Nagai K, Suda T, Kawasaki K, Mathuura S. Action of carnosine and beta-alanine on wound healing. *Surgery*. 1986; 100(5):815-21.
177. Nagai K, Suda T. Immunoregulative effects of carnosine and beta-alanine. *J. Physiol. Soc Jap* 1986; 48:564-571.
178. Nagai K, Suda T. Immunoregulative effects of carnosine and beta-alanine. *J. Physiol. Soc Jap* 1986; 48:564-571. Boldyrev A, Johnson P. Carnosine and related compounds: antioxidant dipeptides. In: P. Johnson and A. Boldyrev, Editors, *Oxidative Stress at Molecular, Cellular and Organ Levels*, Res. Signpost 2002; 101-114.
179. Nathan PJ, Clarke J, Lloyd J, et al. The acute effects of an extract of *Bacopa monniera* (Brahmi) on cognitive function in healthy normal subjects. *Hum Psychopharmacol* 2001;16:345-51.
180. Neri DF, Wiegmann D, Stanny RR, et al. The effects of tyrosine on cognitive performance during extended wakefulness. *Avit Space Environ Med*. 1995; 66:313–319.
181. Nilsson K, Gustafson L, Hultberg B. Improvement of cognitive functions after cobalamin/folate supplementation in elderly patients with dementia and elevated plasma homocysteine. *International Journal of Geriatric Psychiatry* Vol 16(6) (pp 609-614), 2001.

182. Nussbaum, PD, ed. Handbook of Neuropsychology and Aging. New York: Plenum, 1997.
183. Olson DA, Masaki KH, White LR, et al. Association of vitamin E and C supplement use with cognitive function and dementia in elderly men. *Neurology*. Vol 55(6) (pp 901-902), 2000.
184. Packer L, Tritschler HJ, Wessel K. Neuroprotection by the metabolic antioxidant alpha-lipoic acid. *Free Radic Biol Med*. 1997;22(1-2):359-78.
185. Packer L, Witt EH, Tritschler HJ. Alpha-lipoic acid as a biological antioxidant. *Free Radic Biol Med*. 1995;19:227-250.
186. Palmieri, G, Palmieri, R, Inzoli, M.R., et al. Double-blind controlled trial of phosphatidylserine in patients with senile mental deterioration. *Clin. Trials J.*, 1987. 24: 73-83.
187. Paradies G, Ruggiero FM, Petrosillo G, Gadaleta MN, Quagliariello E. Effect of aging and acetyl-L-carnitine on the activity of cytochrome oxidase and adenine nucleotide translocase in rat heart mitochondria. *FEBS Lett*. 1994 Aug 22;350(2-3):213-5.
188. Passeri M, Iannuccelli M, Ciotti G, et al. Mental impairment in aging: selection of patients, methods of evaluation and therapeutic possibilities of acetyl-L-carnitine. *Int J Clin Pharmacol Res* 1988;8(5):367-76.
189. Patacchioli FR, F. Amenta, M.T. Ramacci, et al, *J Neurosci Res* 1989; 23: 462-466.
190. Peet M et al. "A dose ranging study of the effects of ethyl-eicosapentaenoate in patients with ongoing depression despite apparently adequate treatment with standard drugs." *Arch Gen Psychiatry*, 59:913-9, 2002.
191. Pennypacker LC, Allen RH, Kelly JP, et al. High prevalence of cobalamin deficiency in elderly outpatients. *J Am Geriatr Soc*. 1992; 40:1197–1204.
192. Perrig WJ, Perrig P, Stahelin HB. The relation between antioxidants and memory performance in the old and very old. *J Am Geriatr Soc* 1997;45(6):718-24.
193. Peruzza M, DeJacobis M. A double-blind placebo controlled evaluation of the efficacy and safety of vinpocetine in the treatment of patients with chronic vascular or degenerative senile cerebral dysfunction. *Adv Ther* 1986;3:201-9.
194. Podda M, Grundmann-Kollmann M. Low molecular weight antioxidants and their role in skin ageing. *Clin Exp Dermatol*. 2001 Oct;26(7):578-82.
195. Podda M, Tritschler HJ, Ulrich H, et al. Alpha-lipoic acid supplementation prevents symptoms of vitamin E deficiency. *Biochem Biophys Res Commun*. 1994;204:98-104.

196. Pogorelyi VE, Makarova LM. [Rhodiola rosea extract for prophylaxis of ischemic cerebral circulation disorder] *Eksp Klin Farmakol*. 2002; 65(4):19-22.
197. Price DL, Rhett PM, Thorpe SR, Baynes JW. Chelating activity of advanced glycation end-product inhibitors. *J Biol Chem*. 2001 Dec 28;276(52):48967-72. Epub 2001 Oct 24.
198. Procter A. Enhancement of recovery from psychiatric illness by methylfolate. *Br J Psychiatry*. 1991 Aug;159:271-2.
199. Puca FM, Genco S, Specchio LM, et al. Clinical pharmacodynamics of acetyl-L-carnitine in patients with Parkinsons disease. *Int J Clin Pharmacol Res* 1990;10(1-2):139-43.)
200. Rai GS, Shovlin C, Wesnes KA. A double-blind, placebo-controlled study of Ginkgo biloba extract ('tanakan') in elderly patients with mild to moderate memory impairment. *Curr Med Res Opin* 1991;12(6):350-5.
201. Ramacci MT, De Rossi M, Lucreziotti MR, Mione MC, Amenta F. Effect of long-term treatment with acetyl-L-carnitine on structural changes of aging rat brain. *Drugs Exp Clin Res* 1988;14(9):593-601.)
202. Ransmayr, G, Plorer, S, Gerstenbrand, F, and Bauer, G. Double-blind placebo-controlled trial of phosphatidylserine in elderly patients with arteriosclerotic encephalopathy. *Clin. Trials J.*, 1987. 24: 62-72.
203. Raves ML, Harel M, Pang YP, Silman I, Kozikowski AP, Sussman JL. Structure of acetylcholinesterase complexed with the nootropic alkaloid, (-)-huperzine A. *Nat Struct Biol* 1997 Jan;4(1):57-63.)
204. Rayssiguier Y, Mazur A. R [Magnesium and inflammation:lessons from animal models.] *Clin Calcium*. 2005;15(2):245-248.
205. Re' O. 2-Dimethylaminoethanol (deanol): a brief review of its clinical efficacy and postulated mechanism of action. *Curr Ther Res Clin Exp*. 1974;16(11):1238-42.
206. Rediess S, Caine ED. Aging, cognition, and DSM-IV. *Aging Neuropsychol Cogn* 1996;3:105-17.
207. Reimherr FW, Wender PH, Wood DR, Ward M. An open trial of L-tyrosine in the treatment of attention deficit disorder, residual type. *Am J Psychiatry*. 1987 Aug;144(8):1071-3.
208. Rodriguez-Martin JL. Qizilbash N. Lopez-Arrieta JM. Thiamine for Alzheimer's disease (Cochrane Review). *Cochrane Database Syst Rev*. 2:CD001498, 2001.
209. Roodenrys S, Booth D, Bulzomi S, et al. Chronic effects of Brahmi (*Bacopa monnieri*) on human memory. *Neuropsychopharmacology*. 2002;27:279-81.

210. Rosadini, G, Sannita ,W.G., Nobili, F, and Cenacchi, T. Phosphatidylserine: quantitative EEG effects in healthy volunteers. *Neuropsychobiol*, 1991. 24: 42-8.
211. Rubin EH, Storandt M, Miller JP, et al. A prospective study of cognitive function and onset of dementia in cognitively healthy elders. *Arch Neurol* 1998;55(3):395-401.
212. Russell RW. Continuing the search for cholinergic factors in cognitive dysfunction. *Life Sci*. 1996; 58:1965–1970.
213. Sairam K, Dorababu M, Goel RK, Bhattacharya SK. Antidepressant activity of standardized extract of *Bacopa monniera* in experimental models of depression in rats. *Phytomedicine*. 2002 Apr;9(3):207-11.
214. Sakai M, Yamatoya H, Kudo S. Pharmacological effects of phosphatidylserine enzymatically synthesized from soybean lecithin on brain functions in rodents. *J Nutr Sci Vitaminol (Tokyo)* 1996;42:47-54.
215. Salvioli G, Neri M. L-acetylcarnitine treatment of mental decline in the elderly. *Drugs Exp Clin Res* 1994;20(4):169-76.
216. Santos MS, Duarte AI, Moreira PI, Oliveira CR Synaptosomal response to oxidative stress: effect of vinpocetine. *Free Radic Res* 2000 Jan;32(1):57-66
217. Sapolsky RM, L.C. Krey, and B.S. McEwen, *J Neurosci* 1985; 5: 1222-1227.
218. Schaffer S, Azuma J, Takahashi K, Mozaffari M. Why is taurine cytoprotective? *Adv Exp Med Biol*. 2003;526:307-21.
219. Seelig MS. Consequences of magnesium deficiency on the enhancement of stress reactions; preventive and therapeutic implications (a review). *J Am Coll Nutr*. 1994; 13(5):429-46.
220. Seidman MD, Khan MJ, Bai U, et al. Biologic activity of mitochondrial metabolites on aging and age-related hearing loss. *Am J Otol*. 2000; 21:161–167.
221. Sergio W. Use of DMAE (2-dimethylaminoethanol) in the induction of lucid dreams. *Med Hypothesis*. 1988; 26:255–257.
222. Sershen H, L.G. Harsing, M. Banay-Schwartz, et al, *J Neurosci Res* 1991; 30: 555-559.
223. Sharma R, Chaturvedi C, Tewari PV. Efficacy of *Bacopa monniera* in revitalizing intellectual functions in children. *J Res Edu Ind Med* 1987:1:12.
224. Singh HK, Dhawan BN. Effect of *Bacopa monniera* Linn. (brahmi) extract on avoidance responses in rat. *J Ethnopharmacol* 1982;5:205-14.

225. Singh HK, Dhawan BN. Neuropsychopharmacological effects of the Ayurvedic nootropic *Bacopa monniera* Linn. (Brahmi). *Indian J Pharmacol* 1997;29:S359-S365.
226. Singh HK, Rastogi RP, Srimal RC, Dhawan BN. Effect of bacosides A and B on avoidance responses in rats. *Phytother Res* 1988;2:70-5.
227. Smith GE, Petersen RC, Parisi JE, et al. Definition, course, and outcome of mild cognitive impairment. *Aging Neuropsychol Cogn* 1996;3:141-7.
228. Solfrizzi V, Panza F, Torres F, et al. High monounsaturated fatty acids intake protects against age-related cognitive decline. *Neurology* 1999;52(8):1563-9.
229. Song C, Li X, Leonard BE, Horrobin DF. Effects of dietary n-3 or n-6 fatty acids on interleukin-1beta-induced anxiety, stress, and inflammatory responses in rats. *J Lipid Res*. 2003; 44(10):1984-91.
230. Spreen O, Strauss E. *A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary*. New York: Oxford, 1991.
231. Stadtman ER, Levine RL. Protein oxidation. *Ann NY Acad Sci*. 2000; 899:191-208.
232. Stadtman ER. Protein oxidation and aging. *Science*. 1992 Aug 28; 257(5074):1220-4.
233. Stough C, Lloyd J, Clarke J, et al. The chronic effects of an extract of *Bacopa monniera* (Brahmi) on cognitive function in healthy human subjects. *Psychopharmacology* 2001;156:481-4.
234. Stracke H, Hammes HP, Werkmann D, et al. Efficacy of benfotiamine versus thiamine on function and glycation products of peripheral nerves in diabetic rats. *Exp Clin Endocrinol Diabetes*. 2001;109(6):330-6.
235. Stracke H, Lindemann A, Federlin K. A benfotiamine-vitamin B combination in treatment of diabetic polyneuropathy. *Exp Clin Endocrinol Diabetes*. 1996;104(4):311-6.
236. Stuerenburg HJ, Kunze K. Concentrations of free carnosine (a putative membrane-protective antioxidant) in human muscle biopsies and rat muscles. *Arch Geront Geriatr*. 1999; 29:107-113.
237. Stvolinsky SL, Dobrota D. Anti-ischemic activity of carnosine. *Biochemistry (Mosc)* 2000; 65(7):849-55. Hardy ML, Coulter I, Morton SC, et al. S-adenosyl-L-methionine for treatment of depression, osteoarthritis, and liver disease. *Evid Rep Technol Assess (Summ)*. 2003 Aug;(64):1-3.
238. Stvolinsky SL, Dobrota D. Anti-ischemic activity of carnosine. *Biochemistry (Mosc)* 2000; 65(7):849-55.

239. Subhan Z, Hindmarch I. Psychopharmacological effects of vinpocetine in normal healthy volunteers. *Eur J Clin Pharmacol*. 1985;28(5):567-71.
240. Sugiyama S, Takasawa M, Hayakawa M, Ozawa T. Changes in skeletal muscle, heart and liver mitochondrial electron transport activities in rats and dogs of various ages. *Biochem Mol Biol Int*. 1993 Aug;30(5):937-44.
241. Sun QQ, Xu SS, Pan JL, Guo HM, Cao WQ. Huperzine-A capsules enhance memory and learning performance in 34 pairs of matched adolescent students. *Zhongguo Yao Li Xue Bao*. 1999 Jul;20(7):601-3.
242. Taglialetela G, L. Angelucci, M.T. Ramacci, et al, *Brain Res Dev Brain Res* 1991; 59: 221-230
243. Tang AM, Graham NM, Saah AJ. Effects of micronutrient intake on survival in human immunodeficiency virus type 1 infection. *Am JEpidemiol*. 1996; 143:1244–1256.
244. Tang XC, Han YF, Chen XP, et al. Effects of huperzine A on learning and the retrieval process of discrimination performance in rats. *Zhongguo Yao Li Xue Bao*. 1986; 7:507–11.
245. Tate G, Mandell BF, Laposata M, Ohliger D, Baker DG, Schumacher HR, Zurier RB. Suppression of acute and chronic inflammation by dietary gamma linolenic acid. *J Rheumatol*. 1989; 16(6):729-34.
246. Teather LA, Wurtman RJ. Dietary CDP-choline supplementation prevents memory impairment caused by impoverished environmental conditions in rats. *Learn Mem* 2005 (online preprint).
247. Teather LA, Wurtman RJ. Dietary cytidine (5')-diphosphocholine supplementation protects against development of memory deficits in aging rats. *Prog Neuropsychopharmacol Biol Psychiatry* 2003;27:711-7.
248. Thal LJ, Salmon DP, Lasker B, et al. The safety and lack of efficacy of vinpocetine in Alzheimer's disease. *J Am Geriatr Soc* 1989;37:515-20.
249. Tolonen M, Schrijver J, Westermarck T, et al. Vitamin B6 status of Finnish elderly. Comparison with Dutch younger adults and elderly. The effect of supplementation. *Int J Vitam Res* 1988;58(1):73-7.
250. Van Dongen M, van Rossum E, Kessels AGH, et al. The efficacy of ginkgo for elderly people with dementia and age-associated memory impairment: New results of a randomized clinical trial. *J Am Geriatr Soc* 2000;48:1183-94.
251. van Goor L, Woiski MD, Lagaay AM, Meinders AE, Tak PP. Review: cobalamin deficiency and mental impairment in elderly people. *Age Ageing*. 1995 Nov;24(6):536-42.

252. Venkatraman MS, Chittiboyina A, Meingassner J, Ho CI, Varani J, Ellis CN, Avery MA, Pershadsingh HA, Kurtz TW, Benson SC. Alpha-Lipoic acid-based PPARgamma agonists for treating inflammatory skin diseases. *Arch Dermatol Res*. 2004 Aug;296(3):97-104.
253. Villardita C, Grioli S, Salmeri G, et al. Multicentre clinical trial of brain phosphatidylserine in elderly patients with intellectual deterioration. *Clin Trials J* 1987;24:84-93.
254. Vincent JB. The potential value and toxicity of chromium picolinate as a nutritional supplement, weight loss agent and muscle development agent. *Sports Med*. 2003;33(3):213-30.
255. Vlassara H, Palace MR. Glycoxidation: the menace of diabetes and aging. *Mt Sinai J Med*. 2003 Sep;70(4):232-41. Matsuoka H, et al. Advanced glycation end products are associated with impaired vascular reactivity in non-diabetic subjects. *Circulation*, 2001.104 (17): 1763 Suppl. S.
256. Wang AM, Ma C, Xie ZH, et al. Use of carnosine as a natural anti-senescence drug for human beings. *Biochemistry (Mosc)* 2000; 65(7):869-71.
257. Wang HX, Wahlin A, Basun H, et al. Vitamin B(12) and Folate in Relation to the Development of Alzheimer's Disease. *Neurology*. Vol 56 (pp 1188-1194), 2001.
258. Wang Z, Ren G, Zhao Y, et al. A double-blind study of huperzine A and piracetam in patients with age-associated memory impairment and dementia. In: Kanba S, Richelson E, eds. *Herbal Medicines for Nonpsychiatric Diseases*. Tokyo: Seiwa Shoten Publishers, 1999, 39-50.
259. Watkins PB, Zimmerman HJ, Knapp MJ. Hepatotoxic effects of tacrine administration in patients with Alzheimers disease. *JAMA* 1994 Apr 6; 271:992-8
260. Wesnes K, Simmons D, Rook M. A double-blind, placebo-controlled trial of Tanakan in the treatment of idiopathic impairment in the elderly. *Human Psychopharmacol* 1987;2:159-69.
261. Wesnes KA, Faleni RA, Hefting NR, Hoogsteen G, Houben JJ, Jenkins E, Jonkman JH, Leonard J, Petrini O, van Lier JJ. The cognitive, subjective, and physical effects of a ginkgo biloba/panax ginseng combination in healthy volunteers with neurasthenic complaints. *Psychopharmacol Bull*. 1997;33(4):677-83.
262. Whyte EM, Mulsant BH, Butters MA, Qayyum M, Towers A, Sweet RA, Klunk W, Wisniewski S, DeKosky ST. Cognitive and behavioral correlates of low vitamin B12 levels in elderly patients with progressive dementia. *Am J Geriatr Psychiatry*. 2002 May-Jun;10(3):321-7.
263. Winther K, Randlov C, Rein E, Mehlsen J. Effects of Ginkgo biloba extract on cognitive function and blood pressure in elderly subjects. *Curr Ther Res* 1998;59:881-8.

264. Wurtman RJ, Growdon JH. Dietary enhancement of CNS neurotransmitters. *Hosp Pract.* 1978; 13:71–77.
265. Wurtman RJ, Hefti F, Melamed E. Precursor control of neurotransmitter synthesis. *Pharmacol Rev* 1981; 32(4): 315-25.
266. Wurtman RJ. Effects of dietary amino acids, carbohydrates and choline neurotransmitter synthesis. *Mt. Sinai J Med* 1988; 55(1): 75-86.
267. Xiong ZQ, Tang XC. Effect of huperzine A, a novel acetylcholinesterase inhibitor, on radial maze performance in rats. *Pharmacol Biochem Behav.* 1995; 51:415–419.
268. Xu SS, Cai ZY, Qu ZW, et al. Huperzine-A in capsules and tablets for treating patients with Alzheimer disease [abstract]. *Zhongguo Yao Li Xue Bao.* 1999; 20:486–490.
269. Xu SS; Gao ZX; Weng Z; Du ZM; Xu WA; Yang JS; Zhang ML; Tong ZH; Fang YS; Chai XS; et al, Efficacy of tablet huperzine-A on memory, cognition, and behavior in Alzheimers disease. *Chung Kuo Yao Li, Hsueh Pao*16:391-5, 1995.)
270. Youngjohn JR, Larrabee GJ, Crook TH. Discriminating age-associated memory impairment and Alzheimer's disease. *Psychol Assess* 1992;4:54-9.
271. Yuneva MO, Bulygina ER, Gallant SC, et al. Effect of carnosine on age-induced changes in senescence-accelerated mice. *J Anti-Aging Med.* 1999;2(4):337-42.
272. Zakharchenko MV, Temnov AV, Kondrashova MN. Effect of carnosine on self-organization of mitochondrial assemblies in rat liver homogenate. *Biochemistry (Mosc).* 2003; 68(9):1002-5.
273. Zeisel SH, Da Costa KA, Franklin PD, et al. Choline, an essential nutrient for humans. *FASEB J.* 1991; 5:2093–2098.
274. Zeisel SH. Dietary influences on neurotransmission. *Adv Pediatr.* 1986; 33:23–47.
275. Zhang Z, Liu J, Shang X, Yang J, Chu J, Wang Z, Yao Z, Ma H, Li Q, Wang Y. [The effect of Rhodiola capsules on oxygen consumption of myocardium and coronary artery blood flow in dogs] *Zhongguo Zhong Yao Za Zhi.* 1998; 23(2):104-6.
276. Zhi QX, Yi FH, XI CT. Huperzine A ameliorates the spatial working memory impairments induced by AF64A. *Neuroreport.* 1995; 6:2221–2224.
277. Zhu XD, Tang XC. Facilitatory effects of huperzine A and B on learning and memory of spatial discrimination in mice. *Yao Xue Xue Bao.* 1987; 22:812–817.