



# Nutritional Brain Actives

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Literature Education Series On Dietary Supplements

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The Brain and nervous system are our means of getting input from the outside world, and also our way of sending messages through our bodies and creating output. These messages affect functions like coordination, learning, memory, emotion, and thought.

Our brain is a command post. It is the size of a large grapefruit and weighs about 3 pounds, approximately 2% of our body's weight. However, despite its small size and weight, it makes up 97% of the entire central nervous system, uses 20% of our body's total energy supply, 20% of our body's oxygen intake, and 20% of the heart's output of blood. The brain also has a big appetite for vitamins, minerals, amino acids, and other food isolates.

## **Nutritional Brain Actives**

Most people, in their day to day lives, do not feed their brains the right stuff, and therefore are not maximizing on their potential intelligence, memory, overall mental performance, and vitality. Recent studies suggest that mental processes are changeable and improveable, and that we may be able to slow the brains natural aging process. All we have to do is bath our brains with the right nutrients that we will call *Nutritional Brain Actives (NBAs)*.

## **How the Brain Works**

In order to understand how NBAs work, we have to review a little bit about how the brain and nervous system works. The brain is composed of about 100 billion nerve cells, called neurons. These basic units

of the nervous system consist of a cell body, an axon, which is a major branching fiber, and dendrites, which are smaller branching fibers.

Neurons make up pathways of communications by almost touching each other. I say almost touching because there is a gap of about one millionth of an inch between them called a synapse. Neurons talk to each other with electrical impulses that travel down the wiring system (axons and dendrites) up to the synapse. In order to cross the synapse, the electrical signal is converted to a chemical signal. This chemical signal is called a neurotransmitter. It is because of these neurotransmitters that neurons are able to work in concert with each other, allowing us to experience feelings, understand things, and remember information. Neurotransmitters are manufactured entirely out of NBAs.

## **Key Neurotransmitters**

Some of the more important neurotransmitters are acetylcholine, norepinephrine, dopamine, serotonin, and GABA (gamma-aminobutyric acid).

Acetylcholine is the most abundant neurotransmitter in the body. It is heavily involved in muscle activity and general household functions of the body. In the brain however, it is the key neurotransmitter involved in memory, long-term planning, mental focus, concentration, in deficiency states-forgetfulness, and learning. It is also involved with primitive drives and emotions. It is manufactured out of the NBAs Choline and DMAE, with the help of vitamin and mineral co-factors (C, B-1, B-5, B-6, Zinc and Calcium).

Norepinephrine works in many areas including metabolism, the hormonal systems, appetite, and the body's fight, flight and fright mechanisms. In the brain it is involved in learning, memory, and in deficiency situations, depression. It is manufactured out of the amino acids L-phenylalanine and L-tyrosine, with the help of vitamin and mineral co-factors (C, B-3, B-6, and Copper).

Some of the areas that dopamine operates in are the muscles, immune health, metabolism, and sex drive. It is also manufactured from the amino acids L-phenylalanine and L-tyrosine. Low levels of dopamine are associated with depression and Parkinson's Disease.

Serotonin's claim to fame is in initiating sleep as a precursor to melatonin, which regulates the body's clock. However, it is active in many other body functions including fighting depression. Serotonin is manufactured out of the amino acid L-tryptophan.

As an inhibitory neurotransmitter, GABA is the body's Valium. It's key roles are played in relaxation, sedation and sleep. This natural substance may be purchased in vitamin shops as an NBA.

### **The Blood-Brain-Barrier**

As the command center of the body, the brain protects itself with an extremely efficient defense system called the blood-brain-barrier. It is a well designed fortress that tries to reject the poisons we take into our bodies daily, while allowing friendly NBAs to pass in.

Research confirms that by overfeeding, so to speak, the brain with NBAs relative to other food nutrients, the blood-brain-barrier can be oversaturated. This will allow more NBAs to enter the brain and be available to produce more neurotransmitters thereby creating a greater potential for brain performance.

### **Vitamin Supplements**

NBAs do not operate in a vacuum during the process of synthesizing neurotransmitters. It is critical that the brain be bathed in vitamins and minerals to ensure results. The brain uses a wide range of the basics, some of which are mentioned above, as manufacturing co-factors. It is for this reason that I recommend a basic foundation program to act as your brain's insurance program for efficiency.

Make sure that your nutritional starter program (NSP) includes a B-Complex in the range of 50-100 mg, and at least 1000 mg of Vitamin C. Since these are water soluble, easily lost vitamins, be sure to choose a timed release product. And, since true timed release tablets are very difficult to be manufactured reliably, choose only those products that guarantee their releasability with a clear label statement.

When choosing minerals, look for products that are manufactured with modern, more effective delivery systems. While adding a few pennies to the cost, minerals can be pre-bound to carriers like aspartates, citrates, orotates, threonates, and other assorted chelates, which will effect superior cell penetration.

As a cautionary measure, remember that vitamins,

minerals, and NBA supplements that are old or improperly stored, can go bad. One notable author recommends purchasing antioxidants, for example, only from reputable manufacturers who have been in national distribution for at least 10 years. While this may seem a little harsh, only purchasing supplements which are labeled with an expiration date is probably a good practice.

### **Natural Brain Aging**

We are born with a fixed number of brain cells. Brain cells never reproduce. Perhaps this is why nature established the blood-brain-barrier, to dam up the onslaught of garbage we subject ourselves to, thus allowing us to coast in with some modicum of cognitive powers (mental processing ability).

Over time, brain cells are naturally subject to damage, and accumulate cellular waste caused by molecular sharks called free radicals. These evil creeps destroy cell membranes (walls) and then the internal workings of the cell, including DNA, causing aging, and in many cases premature brain aging. What this means to us is cell malfunction, memory loss, personality changes, senility, Alzheimer's disease, Parkinson's disease, stroke, and even cancer.

Luckily we have at our disposal a full army of cellular heroes called antioxidants. Antioxidants neutralize free radicals that damage neural tissues, as well as all other tissues, thereby slowing the destruction of aging. Unfortunately antioxidants in foods come with a caloric price. For example, one of the most valuable antioxidants know is Vitamin E. Vitamin E, like many NBAs, is present mostly in foods high in fat, and the amounts one would have to consume for optimum protection, would preclude me, as a health professional, from recommending them.

Fortunately great supplements are available today. The amount of antioxidants, and NBAs, that one may need depend on age (the older the more), diet, alcohol and drug use, stress, and familial history. Examples of nature's antioxidant heroes available in vitamin stores are: E, C, Mixed Carotenoids, Selenium, Vegge Concentrates, Citrus Concentrates, Mushroom Concentrates, Alpha-Lipoic Acid, Glutathione, CoEnzyme, Q-10, SOD, Pycnogenol, N-Acetyl Cysteine, and Green Tea Extract. Shop for supplements only in places where you are comfortable with the knowledge of the people available to help you and answer your questions. Nutritional supplementation has become very complicated; you should have someone help you sort things out.

### **NBA Heavy Hitters**

NBAs may not turn a bonehead into a genius, but they may give you an extra edge. They may fight mental fatigue, increase your memory, keep you focused, enhance cognitive skills, and fight

depression. NBAs, in concert with a sound diet and exercise, will bring your mental performance to new levels. The following nutrients represent neuroscience's cutting edge.

**Phosphatidyl Choline (PC):** Our brains manufacture acetylcholine mostly out of the NBA, choline. Without adequate amounts of it, neurons are unable to transmit messages across synapses. The most important form of dietary choline is phosphatidyl choline because of the ease with which it passes through the blood-brain-barrier. Unfortunately the best sources of dietary PC are such foods as egg yolks, liver, cheese, seed oils, and peanuts, which I can not consider health foods because of their fat and/or cholesterol content.

The reasonable way to boost blood choline and brain choline levels is through supplementation with the NBA PC. However all PC products are not the same. Some PC capsules are nothing more than inexpensive lecithin, re-labeled. The problem with these is that they contain competitive impurities. While not harmful, they are considered impurities because they can get in the way and tie up valuable choline receptor sites on the blood-brain-barrier.

When shopping for phosphatidyl choline, look for a purity statement on the label. While some manufacturers choose not to disclose this information on their labels, others do. The range of purity commercially available on the market is 12% (lecithin) to 75%.

Recommended dosage: 1-28 capsules (depending on % purity) upon arising. I do not really intend for anyone to take 28 capsules of anything; I only wish to demonstrate the futility of working with a low potency product.

**Ginkgo Biloba:** The Ginkgo tree is considered a living fossil. It has survived for 200 million years, and is considered among the oldest living things on earth. The Ginkgo leaf has been the focus of international interest due to its profound effect on the brain. In fact, in Germany Ginkgo extracts have been recognized and licensed as pharmaceuticals, by their FDA equivalent (Commission E), for its cerebral benefits. Given its long history of safe use, and extensive clinical experience in Europe over the last 20 years, this plant derived **NBA** is now widely used in this country.

What makes Ginkgo a NBA is its rich complex of phyto-nutrients, which include bioflavonoids, flavones and organic acids. The high quality Ginkgo products are standardized to a level of 24% Flavonglycosides. The current focus of intensive pharmacological and clinical research is on the fraction called terpene lactones, which includes the

Ginkgolides (A, B, and C), and bilobalide. The reality is that in order to be considered for licensing by Commission E as a medicinal plant pharmaceutical, the product must be further calibrated to these ingredients. That is to say, that a product that meets the highest standards, and is a replica of product used in nearly 250 studies, should state on its label what percentage of Ginkgolide A, Ginkgolide B, Ginkgolide C, and total bilobalides it contains.

What do these 250 studies tell us? They tell us that Ginkgo has demonstrated a positive effect in increasing blood flow in various circulatory disorders. That Ginkgo increases blood flow and hence oxygenation in the brain. Ginkgo has shown short-term memory improvement, and can aid in concentration difficulties, absentmindedness, confusion, lack of energy, depression, anxiety, dizziness, tinnitus (ringing in the ears), and headaches. Ginkgo also acts as an antioxidant, especially in the brain.

Recommended dosage: 100 mg (of the real stuff) twice daily.

**Phosphatidyl Serine (PS):** As a rising NBA star, PS has only been available on the open market for a fairly short period, although intensively studied since the 1970's. PS, like phosphatidyl choline, is a phospholipid, but functions completely differently. PS is a component of brain cell membranes. It acts like soap, keeping fatty substances soluble and regulating fluidity. This, in turn, seems to enhance synaptic communication. Research also suggests that PS increases glucose (fuel) metabolism in the brain, as well as increasing the number of available neurotransmitter receptor sites.

The results of well controlled published studies, many of which involved people suffering from mental decline (like early Alzheimer's), showed improvements in brain functions after PS therapy, such as: learning and remembering names of persons after introduction, recognizing individuals one has seen previously, recall of the location of frequently misplaced objects, remembering numeric information like phone numbers, ability to maintain concentration, and improvement in scores on standard neuropsychological tests.

In healthy adults, PS may help maintain or improve brain functions such as short-term memory and learning. PS can enhance one's state of arousal, and may have a positive effect on depression. All in all, as an NBA, PS may be an important piece in the puzzle of preventing and treating age-associated memory impairment.

Recommended dosage: 100-200 mg twice daily.

**DMAE:** Dimethylaminoethanol (DMAE), a NBA normally present in the brain in small amounts, has a fascinating history. It was once known as the prescription drug Deaner or Deanol, and used to treat hyperactive children. In the early 1980's the FDA asked the manufacturer to perform a whole new set of studies to prove its effectiveness. Even in the 80's this meant an expenditure of millions of dollars. DMAE is actually a natural substance, and not eligible for a patent. This meant that the manufacture would be spending money with no chance to maintain proprietary rights. This coupled with the fact that the drug Ritalin was dominating the hyperactive market, Recommended dosage: Initially start with low doses of about 200 mg and gradually build up to 500-1000 mg daily.

**Acetyl L-Carnitine (ALC):** As the name suggests, ALC is a derivative of carnitine the amino acid whose major role lies in fatty acid transport in the cell's powerhouse, especially in muscle. However, it is the 'acetyl' group that makes ALC what carnitine is not, namely an energy carrier, metabolic facilitator, membrane protectant, and a NBA.

As a membrane protectant (antioxidant properties) and a promoter of acetylcholine activity in the brain (acetyl donor), ALC can improve longevity, learning ability and memory. In an Italian study released in 1991, Alzheimer's patients given daily doses of 2000 mg of ALC showed improvement in attention span, long-term memory and verbal ability. While longer, larger, and more studies are needed, ALC could be the most promising NBA discovered for use by normal healthy people to slow the effects of aging on the brain.

Recommended dosage: 500 mg daily before breakfast.

### **In Conclusion**

NBAs, although it would be nice, are not overnight miracles. If you decide to try any or all of the one's I have mentioned, commit to at least a 90 day trial. The results, while generally significant in most people, are subtle. And, like any medicinal entity, the people who function the worse, are usually those people who are likely to improve the most and the fastest.

resulted in the company walking away.

Today DMAE is considered a premier NBA. It occurs naturally in seafoods like anchovies and sardines, and may be why seafood is called "brain food." It easily crosses the blood-brain-barrier and accelerates the brain's synthesis of acetylcholine. It has been shown to increase concentration, improve mood, improve memory and sleep patterns. People using DMAE report that they require less sleep and that they are capable of thinking more clearly. It has a mild stimulating effect, but unlike stimulant drugs or caffeine, there is no 'buzz', let down, or depression associated with its use.



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