

Neurogenesis: Natural Options To Stimulate Brain Recovery And Regrowth

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Anti-aging, especially brain and cognitive function, has become a focus of both the public and scientific community in the quest to find the fountain of youth in the natural health field. All you have to do is walk into a bookstore and look at the health section and find that at least one third of the books are about “improving your memory” or “healthy brain aging.” Every week there are a number research bulletins released showing that some natural substance, extract or food has “promising” effects on memory or brain health. With the aging baby boomer population aging, there is an increased fear of a looming dementia epidemic. Experts predict that the rates of Alzheimer’s dementia will increase exponentially over the next few decades.

Alzheimer’s disease is not the only motivating factor for the increased focus on cognitive health. The terms neuroplasticity and neurogenesis have caught the eye of many different people from medical professionals to athletes to top executives. The terms refer to the ability of the brain to recovery from damage, regrow neuronal connections, and even function at a higher level. Many online websites (such as www.luminosity.com) and private companies have created programs to take advantage of the brain’s incredible ability to grow and adapt at almost any age. While this is intriguing for top executives, it is even more exciting for people that have sustained some degree of damage to their brains. The mechanism of neuroplasticity and neurogenesis is being applied to accident victims, concussed athletes and those with neurodegenerative diseases. The concepts are very promising and more research is now finding that natural substances have powerful properties to not stop damaging processes in the brain but to also promote recovery.

The remainder of this article will highlight a number of natural health interventions that have shown promising evidence in promoting healthy brain function and even stimulating regrowth. A key molecule that will be highlighted is called brain-derived neurotrophic factor (BDNF). This “neuro-hormone” is essential to the structure of nerve cells and it stimulates neuroplasticity and neurogenesis.

Caloric restriction

One of the most powerful ways to improve cognitive functioning is through caloric restriction and promoting ketone production. Caloric restriction (by 30%) has multiple mechanisms are responsible for the observed beneficial effects. Studies have show its can improve memory, increase levels of BDNF, reduce inflammation and oxidative damage and enhance mitochondrial function (Witte *et al* 2009). It also improves the function of insulin and promotes the production of ketones, which the

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brain can use as an efficient fuel source. The ability to regulate insulin supports one of the latest theories that suggests Alzheimer's disease is actually a type of diabetes of the brain (de la Monte and Wands 2008). The wide range of effects of caloric restriction and ketone production makes it one of the most powerful brain building interventions.

Stress levels

Most people know that stress has a negative impact of your health and can increase blood pressure however stress has a much broader and more damaging impact than once thought. The negative effects of stress are mediated through the action of a hormone called cortisol. Chronically high stress levels elevate cortisol, which now has been found to have a negative impact on memory. High cortisol decreases the production of the BDNF in the hippocampus, which is the area of the brain that stores our memories (Lupien *et al* 2005). This highlights how important it is to find good coping mechanisms and stress relieving techniques such as meditation and yoga to minimize this negative effect in our brains.

Physical exercise

It seems slightly counter intuitive that physical exercise can have such a powerful effect on cognitive function but studies have demonstrated that that only 20 minutes of aerobic exercise a day increased the size of the hippocampus (when in normal aging it shrinks in size) and improved memory and cognition (Erickson *et al* 2011, Lautenschlager *et al.* 2008). The latest research shows that exercise training promotes the production of BDNF. Furthermore, there is emerging evidence that exercise has been shown to increase mitochondrial (energy producing organs) formation in the brain. It is clear that modest strength and aerobic training for a short time daily over a period of at least a year can benefit both your memory and cardiovascular health.

DHA

It is well known that omega 3 fatty acids have a beneficial effect on inflammation and brain health. This was confirmed by the Framingham heart study when they found those people with the highest intake of DHA, which is a specific fraction in omega 3 fatty acids found in nerve cells, had a decreased risk of developing dementia. Other studies have confirmed the opposite was also true where low DHA levels were characteristic of Alzheimer's disease patients and those experiencing age associated cognitive impairment. One of the most exciting mechanisms of DHA is the ability to increase BDNF and therefore promote the growth of nerve cells. One promising animal study that highlights the neurogenic potential of DHA found that it counteracted learning disability after a traumatic brain injury. Interestingly, a diet

high in saturated fat and refined sugar decreased nerve growth and promoted oxidative damage (Wu *et al*, 2003 and 2004).

Proline-rich polypeptides (colostrinin)

Proline-rich polypeptides (PRP) are compounds found in bovine colostrum (the first milk after giving birth) with promising effects for treating cognitive decline. Bovine colostrum is traditionally used to help stimulate the immune system and promote healing of the digestive tract. Preliminary results from animal studies have shown that supplementation may reduce inflammation (by decreasing NF-kappaB), decrease the toxicity B- amyloid proteins, and stimulate nerve growth (Janusz and Zabłocka 2010). In 2 human trials that were conducted, memory scores improved after 15 weeks (Leszek *et al* 2002). The results are promising but more research is needed to confirm the findings. They do highlight that a substance that influences the immune system potentially can have a powerful effect on nerve growth and protection.

Acetyl L-Carnitine (ALCAR)

ALCAR is a well-known nutrient with a wide range of well documented beneficial effects. Recently, Dr Oz has made it popular for weight loss but the effects are much more powerful when ALCAR is used to prevent damage to nerves, blood vessels and brain cells. It is important to note that ALCAR is more beneficial for nerve health than L-carnitine since it has better absorption into the brain and it can also act as precursor to the neurotransmitter acetylcholine. Multiple studies have found that supplementation with ALCAR improved cognitive function and short-term memory and slowed decline. One of the mechanisms these effects are achieved is by protecting the mitochondria and stimulating nerve growth factor (Wollen 2010).

Pyrroloquinoline Quinone (PQQ)

PQQ is a recently discovered compound that is part of the B-Vitamin family with potent antioxidant and nerve growth effects. It works as an antioxidant within mitochondria protecting it from oxidative damage. There are a number of animal trials that have shown exciting effects on nerve regeneration and growth (Zhang *et al* 2011). A study conducted in Japan in elderly patients found that there was an improvement in memory after 12 weeks when PQQ and Coenzyme Q10 were supplemented together. They also found a 40x higher level of BDNF and that the antioxidant effect of PQQ was 30 times more effective than Vitamins C or E (Nakano *et al*. 2007).

There are many natural substances that have promising effects on reversing cognitive decline and regenerating nerve tissue. The above discussion highlights the options with the most promising and best supporting evidence. As more research is conducted we can continue to build on the intervention options that are available for patients experiencing memory loss and cognitive decline and recovering from brain injuries.

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