

# Food For Thought

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As students prepare for mid-terms, they often ask me the ultimate question: what food will make me smarter? Although I sometimes ponder the reason for such an inquiry, (does it mean they're not prepared for the upcoming exam?), I admit that sometimes I wish there was a food that would make *me* smarter. Unfortunately, there is no magic food that will raise anyone's intelligence. The brain is a complex organ and it needs nutrients to flourish. Although, it may not be what my students want to hear I do tell them what is good for the body is also good for the mind. If they take care of their body, then their brains will also benefit.

It has long been established that a lack of nutrients can have a devastating effect on the brain and brain function. To prevent any deficiency, the diet should be filled with a variety of foods. This also means that foods should be consumed in moderation. More recently, there have been many studies on different foods (nutrients) and their effect on cognitive function. It is suggested that neurodegenerative disease (e.g., Alzheimer's) that comes with age may be the result of free radical damage and the body's inability to protect itself against oxidative stress (from the free radicals) and inflammation. The brain, like the rest of the body, is in a constant battle with free radicals that can damage the brain cells which eventually leads to impaired brain function. As we get older, we are more likely to forget things like appointments, birthdays, people's name, conversations, etc. This is all a part of age-related cognitive decline. High levels of free radicals may be responsible for the age-related cognitive decline. Antioxidants (so named because they are the anti of oxidative stress) are promoted to reduce the oxidative damage of the free radicals. Researchers have shown that certain compounds found in specific foods appear to improve cognitive function and prevent the neuro-degeneration in individuals. So, before this author forgets, the focus of this paper is to discuss the foods that may improve cognitive function and prevent age-related cognitive decline.

## **Green tea**

You have most likely heard about this beverage. It has received a lot of press lately because of its cancer fighting antioxidant properties. However, current research also supports the concept that the more green tea consumed, the lower the incident of cognitive impairment—especially the impairment related to aging. One study by Kuriyama and cohorts compared the cognitive function of subjects who consumed green tea (in various amounts), black or oolong tea, or coffee. Subjects who consumed the highest amount of green tea showed the best cognitive function. The most potent antioxidant in green tea is Epigallocatechin Gallate (EGCG). EGCG is more abundant in green tea compared to other types of tea or coffee. There have been many studies on the positive effect of EGCG in prevention of cancer, diabetes, and heart disease. It is conceivable that EGCG is also responsible for a reduction of cognitive impairment. So does this mean it is time to run down to the nearest grocery store to trade in your Lipton for green tea in a bag? Not exactly. True green tea does not come in a bag.

True green tea, or *Matcha*, comes in a powder. Matcha is the result of stone-grinding the dried Gyokuru leaves. Thus, drinking green tea means that you are actually drinking the whole leaf (in powder form that has been mixed with water). The bagged green tea that you find in your local grocery store is a diluted form of Matcha. The bagged green tea contains only a tiny fraction of EGCG compared to Matcha. Now you ask, where do I find Matcha? Matcha can be purchased through various sites online and in tea shops, like Teavana. However, be aware that there are companies out there that sell low-quality green tea and may even add artificial green color and sell it as Matcha. If you are not sure, do the *smart* thing and ask before you buy.

### **Spinach**

Actually, any dark leafy green will do (i.e., Swiss chard, collard green, mustard green). Spinach is probably the most recognizable plant of this variety. What is so special about this type of plant is that it is rich in folate. Dark leafy greens are not the only folate rich foods, citrus fruits and beans are also good sources of folate. A study by Ramos et al., reported that individuals with low folate status exhibit more cognitive impairment and dementia. In a separate study, Morris and cohorts examined the cognitive functions (as measured by response speed, sustained attention, visual spatial skills, associative learning and memory) of individuals 60 years and older. They report that individuals with adequate vitamin B12 levels and high folate levels scored the highest on the cognitive function test. However, individuals with low vitamin B12 levels combined with high folate levels scored poorly. Vitamin B12 is an essential nutrient found in meats, fish, eggs and animal products that most Americans consume more than enough of. However, as you age, your ability to absorb vitamin B12 declines. Many seniors will opt to get their “B12 shot” from their doctor to prevent this deficiency. Thus, the attention falls back on folate. As Morris reports, cognitive function is best when the individual consumes a diet rich in folate while maintaining adequate vitamin B12 status. However, it would not be wise to simply supplement the diet with a folate pill without knowing your B12 status.

### **Blueberries**

Now, who can resist these tempting, juicy berries? Do not let their size deceive you in how powerful they are. Animal studies have shown that when old rats were given blueberry or strawberry extract for two months, the animals demonstrated a reversal of age-related cognitive function. In an older human brain, the loss of synapses and atrophy of the dendritic branching in neurons lead to memory loss and decreased cognitive function. Blueberries added to the diets of the test animal showed significant improvement in the dendritic branching and synapses. In other words, the blueberries promoted the rejuvenation of brain circuitry in the rat to look like the brain of a much younger rat. The amount of blueberries fed to the animals is equivalent to half of a cup of blueberries a day. Although the studies have not been conducted on human subjects (it is difficult to find subjects who is willing to have their brain examined under a microscope without the risk of permanent damage), it is well established that individuals who maintain a diet high in fruits and vegetables exhibit fewer neurodegenerative diseases. At this point, a half a cup of blueberries a day is an easy one to swallow.

## Salmon

Salmon is a low fat, high-quality protein that is rich in omega-3 fatty acids. Other cold water fish like herring, tuna, and mackerel also contain a high amount of omega-3 fatty acids. Wild salmon is a better choice since it has lower levels of mercury than other deep sea fish. Farm raised salmon has raised some concerns since levels of dioxin and polychlorinated byphenols (PCBs) have been detected. These toxins have been associated with cancer and birth defects. Omega-3 can also be found in other marine life such as algae (e.g., seaweed or kelp, also known as nori to sushi patrons). Omega-3 fatty acid is an essential nutrient which means that we need it in our body because our body cannot produce it. Therefore, we must receive it from the foods we eat. The body takes the consumed omega-3 fatty acid and converts it to docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). The nutrient of most interest in regards to brain function is DHA. DHA appears to be important for cognitive function, especially brain memory and brain performance. DHA plays an important role in normal brain development and in the formation of cellular membranes of nerve cells. It has already been shown that infants deficient in omega-3, or specifically, DHA, suffer from developmental problems. Not surprisingly, breast milk is a good, natural source of DHA for infants. (DHA is now fortified in some brands of infant formula.) In a study of children with attention deficit-hyperactivity disorder (ADHD), it was shown that their level of DHA and EPA were low. In addition, boys with low levels of omega-3 fatty acid demonstrated more learning and behavioral problems compared to those with normal levels. Contrarily, boys who ate fish at least once a week tested higher on an intelligence test than those who ate less. This was still true when the researchers held other factors (e.g., parents' education level, socioeconomic status) constant. Another study shows that adequate intake of omega-3 fatty acid for 3 months resulted in significant improvement in standard tests like reading, spelling and even behavior in children (fewer tantrums, better sleep, and better concentration). The researchers are suggesting that a diet rich in omega-3 fatty acids is a reasonable recommendation and may contribute to positive cognitive function. Research conducted on the elderly has been positive. DHA appears to reverse age-related cognitive decline. The recommended intake of omega-3 fatty acids translate to eating 2-3 servings of cold-water fish per week.

As I sit down to my meal of spinach salad, topped with blueberries and salmon, and a nice cup of Matcha tea, I can appreciate the fact that this meal is full of antioxidants and may also be improving my cognitive functions. (Since I am getting older, I welcome any opportunity to maintain or perhaps increase my mental acuity.) So next time you sit down to your meal, *think* about what you are going to eat and make *smart* choices.

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