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Positive effect of fruits on brain function

Neetu Gouda and Dr. Preeti Dave

Abstract

The potential of fruits as prophylactic and therapeutic agent versus diseases has known from the very beginning and the positive effects are now more acknowledged. Like other organs brain is a vital part of our body, and even though the brain is an amazingly complex and sophisticated part of the body, it is still just an organ and with ages, memory and cognitive changes occur. To keep the memory sharp and brain function active; fruits are very important as these are rich in variety of nutrients such as antioxidant, essential fatty acids, vitamin and minerals. Fruits can also helps in offset the natural processes of aging, and could also protect from illnesses like dementia, Alzheimer's disease and depression. Here are the foods, which helps in proper brain functioning and improving memory. Widely and frequently consumed fruits and nuts like walnut, almond, berries, grapes and apple helps in proper brain function. Consumption of fruits having special characteristic properties to protect brain against oxidative damage. As, it has no side effects, cheap as compared to the medicines and provide variety to diet.

Keywords: Brain, Fruits, Memory, Alzheimer's disease

Introduction

Brain is the vital organ of the body. The cerebrum is the largest part of the brain and controls the physical and mental activities. Thinking and learning take place in the cerebrum. Memory is the process in which information is encoded, stored and retrieved. There are two different types of memory, short term memory; this is the type of memory store for only a few minutes and long term memory; it helps to remember information for longer periods. But memory and brain functions are affected by many factors like lack of sleep, poor dietary habits, stress, lack of regular exercise and smoking can all contribute to worsened cognitive performance and brain health.

Even though the brain is an amazingly complex and sophisticated part of the body, it is still just an organ and with ages, memory and cognitive changes occur. Parts of the brain linked to learning, memory, planning and other cognitive functions may shrink as you get older. In addition, decreased blood flow to the brain because of narrowing of the arteries, free radical damage to cells and increased inflammation in the brain may occur, all of which affects cognitive functioning. Brain can be kept healthy, by eating foods that nourish it. Brain function boosting foods can have a real and lasting impact when it comes to keeping thinking skills sharp and memory intact. Food can and does have profound effects on the brain growth and functions. As it has said, "Just like other organs in the body, the brain is acutely sensitive to what we eat or drink." There are foods which can offset the natural processes of aging, and could also protect from illnesses like dementia, Alzheimer's disease and depression. Here are the foods, which helps in proper brain functioning and improving memory.

WALNUTS (*Juglans regia*)

Walnuts are easily distinguished as the nut that looks like the brain, and have always been thought of as a 'brain food'. Like other nuts, fruits and vegetables, walnuts are packed with a wide range of vitamins, minerals and phytochemicals beneficial to health. One of the few plant sources of omega-3 fatty acids – walnuts contain significant amounts of omega-3 fats, in the form of alpha-linolenic acid (ALA). Walnuts reduced microbial activity in the hippocampus. In addition to having healthy fats, walnuts also contain other bioactive compounds shown to influence brain function, including vitamin E, melatonin and fiber. They also include the antioxidant polyphenols such as ellagic acid that act synergistically with ALA to increase dietary antioxidant absorption and uptake. It has been studied that, ALA are anti-inflammatory and anti-coagulant in nature. Whereas eicosanoid precursors that are produced from LA (omega-6) tend to be pro-inflammatory and pro-coagulant (Farooqui, 2007) [2]. Wu (2004) [12] revealed that dietary omega-3 fatty acids normalize brain-derived neurotrophic factor (BDNF) levels, reduce oxidative damage, and counteract learning disability after traumatic brain injury in rats.

Rats were fed a regular diet or an experimental diet supplemented with omega-3 fatty acids, for 4 weeks before a mild fluid percussion injury (FPI) was performed. FPI increased oxidative stress, and impaired learning ability in the Morris water maze. This type of lesion also reduced levels of brain-derived neurotrophic factor (BDNF), synapsin I, and cAMP responsive element-binding protein (CREB). It is known that BDNF facilitates synaptic transmission and learning ability by modulating synapsin I and CREB. Supplementation of omega-3 fatty acids in the diet counteracted all of the studied effects of FPI, that is, normalized levels of BDNF and associated synapsin I and CREB, reduced oxidative damage, and counteracted learning disability. The reduction of oxidative stress indicates a benevolent effect of this diet on mechanisms that maintain neuronal function and plasticity.

Almonds

Almonds sharpen your memory because they are rich source of Omega 3 fatty acids and vitamin E. Omega 3 fatty acids fats themselves are more significant for brain health. Vitamin E is an important antioxidant that primarily protects cells from damage associated with oxidative stress caused by free radicals. The brain is highly susceptible to oxidative stress, which increases during ageing and is considered a major contributor to neuro-degeneration. High plasma vitamin E levels were repeatedly associated with better cognitive performance. Due to its antioxidant properties, the ability of vitamin E to prevent or delay cognitive decline has been tested in clinical trials in both ageing population and Alzheimer's disease (AD) patients (Giorgio La Fata, 2014) [3]. The authors investigated the association between serum antioxidant (vitamins E, C, A, carotenoids, selenium) levels and poor memory performance in an elderly, multiethnic sample of the United States. The sample consisted of 4,809 non-Hispanic White, non-Hispanic Black, and Mexican-American elderly who visited the Mobile Examination Center during the Third National Health and Nutrition Examination Survey, a national cross-sectional survey conducted from 1988 to 1994. Memory is assessed using delayed recall (six points from a story and three words) with poor memory being defined as a combined score less than 4. Decreasing serum levels of vitamin E per unit of cholesterol were consistently associated with increasing levels of poor memory after adjustment for age, education, income, vascular risk factors, and other trace elements and minerals. Serum levels of vitamins A and C, beta-carotene, and selenium were not associated with poor memory performance in this study (Perkins *et al.*, 1999) [9].

Berries

Blueberries, strawberries, black currants and boysenberries are full of antioxidants that pack a wallop when it comes to protecting the brain. Cyanidin (a proanthocyanin) contents are generally proportional to color intensity and reach values up to 2–4 g/kg fresh weight in blackcurrants or blackberries.

a) BLUEBERRY: Blueberries' antioxidant power could reduce the stress of oxidation in the brain—which makes them strong allies in the fight against Alzheimer's. Blueberries contain a kind of flavonoid called “anthocyanin.” Anthocyanin is known to work in critical areas of the brain. A study found that blueberries could reverse age related declines in neuronal signal transduction as well as cognitive and motor deficits and short-term blueberry supplementation was found to

increase hippocampal plasticity (Lau *et al.* 2005) [4]. Intake of blueberries inhibited cognitive and motor impairments induced by kainic acid challenge, as evidenced by the suppression of expression of IL-1b, TNF α , and nuclear factor-kB in the hippocampus (Shukitt, 2008) [10]. It has showed that intake of blueberries led to activation of cyclic AMP-response element-binding protein (CREB) and up regulation of brain-derived neurotrophic factor (Williams 2008) [11].

- b) STRAWBERRY: Strawberries contain anthocyanins, too as well as another brain-boosting nutrient called “quercetin.” Strawberries control inflammation in the brain and maintain memory. It was found that strawberries played a role in helping to reverse age-related degeneration of the brain (Bickford *et al.* 2000) [1].
- c) BLACK CURRANTS: Black currants are high in vitamin C and in gamma-linoleic acid. Gama-linoleic acid is a rare fatty acid that is difficult to find in foods—but a bowl of black currants can give a healthy dose. Concentrated black currant is an effective monoamine oxidase inhibitor that acts as a natural anti-depressant.
- d) Boysenberries: Nutritionists have found that the darker the boysenberries, the more potent is the anthocyanin, compounds tend to be. Polyphenols in boysenberries have been found in studies to protect the aging brain from damage (Lau *et al.* 2005) [4].

Grapes (*Vitis vinifera*)

Grape juice also has an uncanny ability to increase the production of dopamine in the brain. Dopamine functions as a neurotransmitter. And that's not all—grapes contain another important chemical called 'resveratrol'. Grape juice is full of nutrients, including valuable antioxidants that could reverse the sensitivity of certain receptors in the brain and, in so doing, enhance its overall cognitive function. Resveratrol could help reduce the level of plaque that builds up within the brain. This plaque can be responsible for disrupting memory and bringing on Alzheimer's (Marambaud *et al.* 2005) [6]. In a study, 23 healthy overweight older individuals that successfully completed 26 weeks of resveratrol intake (200 mg/d) were pair wise matched to 23 participants that received placebo (total n 46, 18 females, 50–75 yrs). Before and after the intervention/control period, subjects underwent memory tasks and neuro imaging to assess volume, micro structure, and functional connectivity of the hippocampus, a key region implicated in memory functions. A significant effect was found of resveratrol, on retention of words over 30 min compared with placebo (Veronica Witte, 2014).

Apples (*Malus domestica*)

Apples contain Quercetin named flavonoid, which are powerful antioxidants. A study has been done showing that apples could have dementia-fighting qualities. The study looked at fruits as a source of vitamin C, a known factor in the reduction of Alzheimer's (Martin *et al.* 2003) [7]. Apple phenolics—the kind of antioxidants found in fresh apples—could protect nerve cells from damage by preventing neurotoxicity caused by oxidative stress (Lee *et al.* 2003) [5]. Eating apples and drinking apple juice can be beneficial when it comes to improving brain health and diminishing symptoms of Alzheimer's disease. In conjunction with a balanced diet, apple and apple juice consumption may protect against oxidative brain damage that can lead to memory loss. The brain health benefits were found when animals consumed the

equivalent of 2-3 cups of apple juice or 2-4 whole apples per day. A clinical trial showed that drinking apple juice significantly improved mood and behavior among a group of patients diagnosed with moderate-to-severe Alzheimer's disease (Apple Products Research & Education Council, 2010).

Conclusion

Brain can be kept healthy and active by eating foods that nourish it. Brain-boosting foods can have a real and lasting impact when it comes to keeping thinking skills sharp and memory intact. The brain constitutes about two per cent of the body weight but requires about 20 per cent of a person's total calorie intake to function properly. With ages, memory and cognitive changes occur. Parts of the brain linked to learning, memory, planning and other cognitive functions may shrink as you get older. Memory supplements are no substitute for enhancing memory and brain function. To ensure and enhance maximum mental skills and memory it's necessary for a person to have this memory boosting foods intake as suggested here instead of medicines. Consumption of fruits having special characteristic properties to protect brain against oxidative damage. As, it has no side effects, cheap as compared to the medicines and provide variety to diet. Apart from the memory enhancing capacity of these foods, it also could protect from illnesses like dementia, Alzheimer's disease and depression.

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