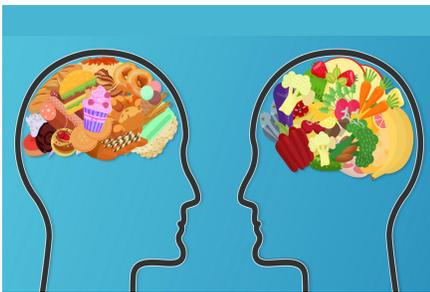


Maximizing neurofeedback's benefit by improving your diet

The doctor of the future will no longer treat the human frame with drugs, but rather will cure and prevent disease with nutrition. – Thomas Edison

When something is burned for energy it produces waste products. If we use coal in a fireplace or to create electricity the waste includes poisons such as arsenic, cadmium, chromium, lead, mercury, and uranium, to name a few (1). The main waste products of 'clean' fuels like natural gas are carbon dioxide and water (2). How about the foods we eat? What are their effects such as from being metabolized? And what are the ramifications for health including that of the brain?

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The brain never rests, even while we are sleeping. It needs a constant supply of good 'clean' energy. Foods rich in vitamins, minerals, and antioxidants nourish the brain and the rest of our bodies, and can protect it from oxidative stress – what are called free radicals that do damage to other cells such as fats and proteins. Add in time and free radicals cause an increasing amount of damage as we age, with two of the biggest diseases that result being cancer and atherosclerosis (3). Diets high in refined sugar foster inflammation and oxidative stress. And oxidation is believed to be a major factor contributing to all inflammatory diseases (e.g. lupus, heart disease,

stroke, high blood pressure, preeclampsia, Alzheimer's, Parkinson's, muscular dystrophy, and many others). The brain is especially sensitive to oxidation because it uses so much of the daily calories, plus of all the fat that is part of brain cells (4). Animal products (e.g. red meat, poultry, dairy, eggs) can also be harmful to the brain by causing inflammation (5). Food intolerances (e.g. gluten) can trigger inflammation (6). How do you know if your brain is inflamed? You can not feel it like you can a damaged joint. Symptoms of brain inflammation can include depression, anxiety, irritability, anger, and memory loss. And if you feel that your thinking is slow and fuzzy that too may be due to inflammation (6), in that inflammation impedes the ability of brain cells to fire and so thinking slows down.

Diets rich in anti-oxidants may help protect against stroke, high blood pressure, COPD, and various other diseases that can impact the brain, as well as reduce clinical depression (7). Use of probiotic foods (such as yogurt or kefir with 'live' cultures) can see levels of anxiety and stress in people decrease. There also has been studies looking at the Mediterranean diet, traditional Japanese diet, and the 'standard American diet,' and depression is 25-35% lower in the first two, due to their being high in fruits, veggies, unprocessed grains, and fish, and having only a little meat or dairy (5). Those who eat a lot of fast food are 51% more likely to be depressed. Eating too much fast food is also linked to anxiety. Refined carbs in fast food can cause fluctuations in your blood sugar, and this may lead to panic attacks, insomnia, and other symptoms of anxiety. (8)

Other foods can have beneficial effects on the brain. These include omega 3 fatty acids (e.g. from salmon, flax seed, walnuts). Omega 3's and DHA in particular may increase a brain chemical called BDNF which helps grow new brain cells, protect the cells from dying, and increases the number and strength of connections between brain cells – which is how memory and learning occur.

There is also research that junk food diets reduce cognitive ability and impair the hippocampus (the key region of the brain involved with memory) after only 3 weeks eating such foods. Such an impact is regardless of insulin resistance or obesity (4). One study looked at 5,500 5th graders in a national longitudinal survey by the Dept. of Education. Kids who ate fast food three or more times a week had lower standardized test scores in reading and math. By how much? It would have been equal to a child scoring a 90 vs. a 73 on a 1-100 scale. This finding controlled for the variables of: parents' income, age, education, occupational status, and number of hours employed, whether or not they attended parent-teacher conferences, if there was 'food security' issues in the family, and how

many hours the kid spent in before or after-school care. Race, gender, age, the number of books they owned, interest in the subject matter tested, other food behaviors, obesity, school attendance, geographical region and urbanicity were also controlled for. None of these factors changed the link between a fast food diet and low academic performance (9).

Sugary beverages like sodas, sports drinks, energy drinks, and fruit juice can also cause harm to brain function. Excess sugar consumption obviously raises the risk of diabetes that can then lead to problems like strokes. Brain inflammation and memory impairment may also result, and this is especially true if high fructose corn syrup is consumed vs. just regular sugar in such drinks. Foods that have a high glycemic load and glycemic index (those that cause spikes in blood sugar) can impair memory function possibly due to inflammation of the hippocampus. Research done in Australia found that only five days of a diet of sugary drinks, cakes and cookies caused increased inflammation in the hippocampus (10).

Aspartame (NutraSweet, the artificial sweetener) can cause problems, such as increased risk of stroke and dementia, along with higher rates of depression. Decreased memory performance and oxidative stress may also occur with aspartame consumption. Fish high in mercury (e.g. tuna, swordfish) can also cause damage. Mercury concentrates in the brain and damages it (and also hits the liver and kidneys;11). Vegetable oils (e.g. corn, canola, sunflower, soybean) are loaded with omega-6 fatty acids, which compete with healthy omega 3's and in the process promote inflammation. And these oils are found in almost all processed (pre-packaged) food.

Then there are excitotoxins, which are chemicals that have no nutritional value but add taste. They are found in almost all processed foods. Aspartame and MSG are the two most common excitotoxins (and others include cysteine, aspartic acid, natural flavorings, spices, textured protein, hydrolyzed vegetable protein, caseinate, and soy protein extract to name some). The downside of them chemically is that excitotoxins over stimulate the brain cells and cause them to fire out of control and then burn out. Dead brain cells stay dead. Excitotoxins also make more free radicals and so damage additional cells. Excitotoxins are also thought to cause migraines, seizures, neurological disorders, impaired brain function, cancer, and heart disease. Still other problems they may cause include learning disabilities in kids, dementia, Huntington's, Parkinson's, and Alzheimer's (13). Fetuses, infants and young kids are even more prone to the damage they can cause at a rate up to four times higher than more mature brains (12,13).

What's the bottom line? Diet and nutrition make a difference to how well your brain can work. A simple example is too much caffeine during the day which then impairs sleep at night, which subsequently leaves a person tired and groggy the next day. Drink too much alcohol, end up with a hangover the next day, same thing. Sugar, saturated fat, excitotoxins, animal based foods that are inflammatory, they lead to the same end result: impaired brain function on a short term basis. And long term, poor choice of foods is potentially setting the stage for diseases and disabilities. If you want neurofeedback to be as successful as possible then you need to improve your diet (14). We have come to accept the standard American diet as healthy but the rate of disease such as heart attacks, strokes, and cancer in this country is far greater than that of others who eat better than we do. If you want to invest in neurofeedback to assist you to a more functional state, give yourself an edge by improving what you eat. One way to learn more about nutrition & its impact on brain health is to look at the videos at <https://nutritionfacts.org/topics/brain-health/>.

1. "Coal combustion wastes" <http://www.groundtruthtrekking.org/Issues/AlaskaCoal/Coal-Ash-Combustion-Wastes.html>10/31/2014
2. "Natural gas & the environment" <http://naturalgas.org/environment/naturalgas/>
3. "Free radicals, antioxidants, and functional foods: impact on human health" *Pharmacognosy Review*, July-Dec. 2010, 4(8), 118-126, V. Lobo et al
4. "Brain foods: the effects of nutrients on brain function" *Nat. Rev Neuroscience*, July 2008, 9(7), 568-578, F. Gómez-Pinilla
5. "Nutritional psychiatry: your brain on food" *Harvard Health Publishing*, 11/16/2015, Eva Selhub, MD
6. "Is your brain on fire? Symptoms of brain inflammation" <https://functionalhealthminute.com/2017/06/is-your-brain-on-fire-symptoms-of-brain-inflammation/>
7. "Inflammation" www.nutritionfacts.org
8. "12 Weird Effects Fast Food Has on Your Brain" *Reader's Digest*, 3/1/2018, Lauren Fisher
9. "Food for thought: can kids eat their way to better grades?" *Greatschools.org.*, Carol Lloyd, 10/28/2016
10. "Five ways junk food changes your brain" *MIT University*, Sept. 9, 2016.
11. "The 7 worst foods for your brain" <https://www.healthline.com/nutrition/worst-foods-for-your-brain>
12. "Excitotoxins: the FDA-approved way to damage your brain" <https://www.honeycolony.com/article/excitotoxins-fda-approved-damage-brain/> Karla Lant, 6/22/2015
13. "Food additive excitotoxins and degenerative brain disorders" <http://www.jpands.org/hacienda/article27.html> Russell Blaylock, MD
14. "Brain benefits: nutrition and neurofeedback" <http://barbaramendeznutrition.com/archives/brain-nutrition-neurofeedback/> Catherine Boyer, LCSW, 5/25/2010