The importance of nutrition in the treatment of epilepsy and seizure disorders is something that can easily elude people when they are facing the lifestyle changes and medical rigors involved in the disorder. However, rediscovering the impact of basic healthy eating and living can do wonders for both seizure rate and general well-being. Not only can epileptic seizures cause vitamin and mineral imbalances but anti-epileptic medications can affect the levels of these nutrients. Research has shown that anti-epileptic drugs (AEDs) can alter the levels of vitamins B1, B2, B6, B12, C, D, E, beta-carotene, biotin and folic acid. In time, these deficiencies may even cause behavioural disturbances.

Recently, I have realized that I knew a lot about my medication and about the effects of seizures on my brain but I did not know very much about the effect of various vitamins, minerals and herbs. Curious, given these are basic, natural substances that most of us have been aware of since childhood. The following is designed to explain the function of some vitamins and minerals as well as their possible effect on seizures and some dietary sources of each nutrient.

This information was developed by Beth Tait

**Vitamin B Complex**

* Aids in nervous system functioning, important for metabolism, production of neurotransmitters, etc.
* Vitamin B6 has been used to complement treatment of seizures in small children and infants;
* dietary sources: leafy greens, peanuts, meat, eggs, whole wheat.

**Vitamin E**

* Antioxidant preventing oxidation of fats into free radicals, works with Vitamin C to provide antioxidant protection to organs, muscle and nerve maintenance;
* some research indicates that vitamin E increases seizure threshold in uncontrolled cases when AEDs were NOT discontinued;
* dietary sources: wheat germ, brussel sprouts, leafy greens, vegetable oils and eggs.

**Calcium**

* Used in brain for electrical transmission;
* deficiencies lead to jitteriness, excitability, insomnia: decreased seizure threshold - dietary sources: milk products, dark leafy greens, salmon, sardines.

**Magnesium**

* Aids in absorption of calcium, increases energy levels and emotional state, regulates neuromuscular excitability;
* helps prevent depression, dizziness, muscle twitching and premenstrual syndrome;
* low levels of magnesium predispose seizures in someone with seizures;
* surveys indicate that 80% of Canadians get less than the recommended daily intake of this mineral;
* dietary sources: avocado, wheat germ, nuts, bran and spinach.

**Manganese**

* enables body to utilize vitamin C, B, biotin and chlorine, role in glucose metabolism and enzyme activation;
* scientific studies show that low levels are related to an increase in seizure rate;

dietary sources: nuts and grains, spinach, beets, brussel sprouts and kelp.

**Zinc**

* important for immune function and strength, phosphorus and protein metabolism, carbohydrate digestion, nervous system functioning;
* deficiencies in zinc can lead to increases in seizure activity;
* dietary sources: meat, yogurt, cereal, nuts, chickpeas, beans, oatmeal.

**GABA**

* functions in the central nervous system as a neurotransmitter, inhibits neural excitability (thereby increasing seizure threshold), decreases anxiety;
* vitamin B6, manganese, taurine and lysine increase the synthesis of GABA and therefore increase levels in brain;
* dietary sources: protein (meat, fish, nuts, etc.).

**Taurine**

* amino acid that helps stabilize the excitability of membranes;
* studies show that it improves seizure frequency, especially in partials seizures;
* not recommended as a standard medical treatment but rather complementary treatment;
* requires Vitamin B6 to be metabolized;
* dietary sources: eggs, fish, meat and milk but not in vegetable proteins.

 A healthy and safe way to get the daily-recommended dose of most of these nutrients is simply by taking a multivitamin everyday. However, some experts recommend magnesium supplements (as most people do not get enough even with a multivitamin, especially people with epilepsy or seizure disorders) and taking cod liver or salmon oil capsules. Fish oils contain omega 3 fatty acids with are used in abundance by the brain but are often not ingested enough on a daily basis. These oils improve general brain functioning and have specifically good effects on memory and mood, both of which can be compromised by AEDs.

**Nutritional Concerns**

 Although medical doctors may be skeptical, many people with or seizure disorders believe that their seizure occurrences have a great deal to do with their diet. Not only alcoholic beverages and other abusive substances affect seizures but what we eat and do not eat seems to as well. There are two diets recommended in certain cases of epilepsy or seizure disorders by medical doctors. Other than those, we are on our own. In my view and from my experience, the high fibre, low fat, low sugar, moderate-protein diet widely accepted at present should be helpful for people with epilepsy or seizure disorders. High fibre acts as a control on fluctuations of blood sugar. Preventing glucose highs and lows is important if not critical for people with seizures.

 In addition, recent and ongoing research in the brain sciences reveals the roles of certain brain chemicals and nutrients, particularly protein. Changes in the neurophysiological conditions in the body are also moderated by a nourishing balanced regular diet.

**Non-Sugar Sweeteners**

 Substituting non-sugar sweeteners for refined sugar is not panacea that it was once believed to be! Saccharin, the original and formerly most popular, was taken off the market for a time because it has been suspected of being a possible carcinogen. Today it is back, particularly visible as Sweet ‘n’ Low but it carries a warning on every packet that it is implicated as a cause of cancer.

While saccharin declined in popularity, aspartame became the non-sugar of choice. Marketed under the names Equal and NutraSweet, some researchers believe this substance may cause brain damage in laboratory animals. For those affected by seizures, any substance that may alter brain functions should be avoided.

**Coffee and Teas**

 Coffee and teas play a role in the rise and fall of blood sugar. Caffeine works in the body as a nervous system stimulant that affects the adrenal cortex. Once adrenalin has been released, it activates the liver to secrete glycogen, its stored blood sugar. The rise in blood sugar accounts for the lift coffee and tea give the body, it is the drop later, when the blood sugar is acted upon and brought below normal by the released insulin, which is dangerous for people with seizures. Researchers report that caffeine is a proconvulsant, affecting the amygdala deep in the brain, an area implicated in complex partial seizures. In laboratory animals, the neurotoxic effects of caffeine are obvious at high doses and a tendency for more severe seizures was noted. Although this is only animal testing, its results should be enough to motivate a person with epilepsy or seizure disorders to “kick the caffeine” habit.

 Caffeine comes disguised in many medications. Antihistamines, oral decongestants may use caffeine to overcome the drowsiness that is caused by the medication. Most diet soft drinks contain caffeine as a sugar substitute. An additional reason for avoiding caffeine and sugar is the tendency for some people with seizures to suffer bouts of depression. The fast lift and drop that these substances produce can increase the tendency to depression, which may turn suicidal under certain circumstances. It is not wise to feed this possibility with fast acting stimulants.

A Word About Breakfast

**The No-No breakfast:**

Coffee, sweet roll and orange juice. This low-fibre, high sugar (both refined and fructose) plus caffeine combination provides a fast lift and a precipitous drop later, increasing the tendency later to fatigue, depression and the possibility of seizure.

The Right Stuff:

A whole piece of fruit - half a grapefruit (unless taking tegratol), whole oranges, melon, whole grain cereal, with skim milk, no sugar, eggs (only 2 or 3 a week as they are high in fats and cholesterol), whole wheat toast or muffin, corn-oil margarine or no-oil spread, decaffeinated coffee or tea, or herb tea. If your seizures occur early in the morning, try a whole-grain snack at bedtime. It may help keep blood sugar levels more even through the night.

Experiment within these guidelines for what is right for you, what makes you feel energized and alert. There is no absolute diet for all people.

Diet can relieve certain physiological conditions that seem to make fertile ground for seizures to occur. Some of these are: menstruation, premenstruation, constipation, excessive intake of water, dehydration and obesity.

**Did You Know?**

* High fibre helps control fluctuations of blood sugar; for people with epilepsy or seizure disorders, preventing glucose highs and lows is important.
* Protein is important in the metabolism of certain brain chemicals and hormones.

**Vitamins & Minerals**

 There is no evidence that epilepsy or seizure disorders are caused by a deficiency of vitamins, minerals or diet, though there are rare inherited conditions that respond to vitamin or dietary manipulation; some that have been found to have an effect are calcium, magnesium and Vitamin B6. Some anticonvulsants may cause deficiencies of vitamin K, folic acid, vitamin D, calcium, magnesium and manganese.

**Calcium**

 Is important for brain functioning; low levels may lead to seizures. Magnesium interacts with and allows the body to absorb calcium.

**Vitamin B6**

 Deficiency in vitamin B6 can lead to seizures, especially in infants.

Smoking

 Smoking has little effect on epilepsy or seizure disorders - but there are exceptions, which can cause seizures. Some people are affected by tar or nicotine. Those who are prone to blackouts or fainting may be more nicotine-sensitive. Loss of consciousness or motor control during a seizure could lead to a fire.

**Sugar**

 High blood sugar (as in diabetes) or low blood sugar (hypoglycaemia) can lead to seizures. Sugar intake in epilepsy or seizure disorders is not critical but one should keep blood sugar levels steady and moderate. For people with seizures, low consumption of sugar is recommended to prevent glucose highs and lows. Blood sugar may dictate a hypoglycaemic diet - emphasizes meat, fish, nuts, fruit and vegetables; eliminates starches (potatoes, pasta, sugar). If seizures occur in the early morning hours, may try a whole-grain snack at bedtime: a piece of whole-wheat toast or a bran muffin; it may help keep blood sugar levels more even through the night.

**Fibre & Protein**

 Foods with higher fibre content are absorbed slower, keeping glucose levels more even; if consuming sweets, eat as part of a meal along with proteins, fats and fibres (if having a sweet snack by itself, exercising after will help burn it off).

**Beverages**

 Coffee, Tea, Iced Tea, cola; drink in moderation. Caffeine has a stimulating effect. There is a possibility of fluid intoxication (see water intoxication). Alcohol, caffeine and sugar all produce a fast lift and drop, which can exacerbate the tendency to depression.

**Caffeine**

 Caffeine can influence seizure control in animals. There is no conclusive evidence it affects humans but the possibility remains. As a nervous system stimulant, it also increases blood sugar level.

Insulin is released and blood sugar levels drop below normal, fluctuations above and below normal are dangerous for people with seizures. Caffeine constricts cranial blood vessels and restricts blood supply to the brain. Caffeine may be present in antihistamines, oral decongestants and diet drinks.

**Water Intoxication**

 Excessive water intake can cause temporary swelling of the brain and lead to seizures.

**Alcohol**

 Alcohol consumption is not recommended. People with generalized seizures need to be careful about drinking alcohol. Seizures resistant to medication can be aggravated by small quantities. Excessive drinking by anyone may provoke seizures, which more often occur during the withdrawal period. Intoxicated persons may forget to take seizure medication. Alcohol can affect the rate at which certain medications are absorbed by the body (ex. phenytoin is eliminated more rapidly). Side effects of medication may be compounded with alcohol. Alcohol may also affect the healing nature of sleep.

**The New Food Pyramid**

**Key Recommendations**

1. Consume a sufficient amount of fruits and vegetables while staying within energy needs. Two cups of fruit and 2½ cups of vegetables per day are recommended for a reference 2,000-calorie intake, with higher or lower amounts depending on the calorie level.
2. Choose a variety of fruits and vegetables each day. In particular, select from all five vegetable subgroups (dark green, orange, legumes, starchy vegetables, and other vegetables) several times a week.
3. Consume 3 or more ounce-equivalents of whole-grain products per day, with the rest of the recommended grains coming from enriched or whole-grain products. In general, at least half the grains should come from whole grains.
4. Consume 3 cups per day of fat-free or low-fat milk or equivalent milk products.

Key Recommendations for Specific Population Groups

1. *Children and adolescents.* Consume whole-grain products often; at least half the grains should be whole grains. Children 2 to 8 years should consume 2 cups per day of fat-free or low-fat milk or equivalent milk products. Children 9 years of age and older should consume 3 cups per day of fat-free or low-fat milk or equivalent milk products.

Dark green vegetables 3 cups/week Orange vegetables 2 cups/week Legumes (dry beans) 3 cups/week Starchy vegetables 3 cups/week Other vegetables 6 ½ cups/week

**Sources of vitamin A (carotenoids)**

1. Bright orange vegetables like carrots, sweet potatoes, and pumpkin
2. Tomatoes and tomato products, red sweet pepper
3. Leafy greens such as spinach, collards, turnip greens, kale, beet and mustard greens, green leaf lettuce, and romaine
4. Orange fruits like mango, cantaloupe, apricots, and red or pink grapefruit

**Sources of vitamin C**

1. Citrus fruits and juices, kiwi fruit, strawberries, guava, papaya, and cantaloupe
2. Broccoli, peppers, tomatoes, cabbage (especially Chinese cabbage), brussel sprouts, and potatoes
3. Leafy greens such as romaine, turnip greens, and spinach

**Sources of folate**

1. Cooked dry beans and peas
2. Oranges and orange juice
3. Deep green leaves like spinach and mustard greens

**Sources of potassium**

1. Baked white or sweet potatoes, cooked greens (such as spinach), winter (orange) squash
2. Bananas, plantains, many dried fruits, oranges and orange juice, cantaloupe, and honeydew melons
3. Cooked dry beans
4. Soybeans (green and mature)
5. Tomato products (sauce, paste, puree)
6. Beet greens