Optimizing Nutrition for Fibromyalgia

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Many patients with fibromyalgia are looking for information about how diet may affect symptoms. There is limited, but informative, data currently in existence which supports specific dietary strategies. This article outlines these strategies, including specific cooking and planning ideas for those with fibromyalgia.

It is important to remember that the term "diet" just means 'what you eat.' It has been erroneously linked to following a certain eating pattern in order to lose weight, which, after achievement of weight loss, the eating pattern is then abandoned. In this article, the term 'diet' is being used to represent how you should eat going forward, as a permanent lifestyle change.

When a person is improving his/her diet, it is important to look at optimizing the intake of necessary nutrients while minimizing exposure to negative dietary components, such as food additives. Unfortunately, this sometimes requires cooking. The profound fatigue that accompanies the other symptoms of fibromyalgia can severely limit a person's ability to cook. It has been our experience that making the dietary improvements outlined below can result in reduced fatigue and an increased ability to cook after about a week. However, it is extremely important to either (a) have someone initially help you with the cooking, or (b) eat healthy foods which do not need preparation (we will give some examples of these later in the article). It is very common for fibromyalgia patients to rely on processed foods since these don't require any preparation; however, these foods contain many food additives which should be avoided to help lessen symptoms.

In prior research, we have observed that a class of food additives called excitotoxins may be contributing to fibromyalgia and irritable bowel syndrome (IBS) symptoms.[1] We recruited subjects with fibromyalgia and irritable bowel syndrome and put them on a one month diet which restricted consumption of excitotoxins. Eighty-four percent of subjects improved on the diet, evidenced by >30% of their symptoms remitting. On average, subjects had 11 symptoms remit after one month on the diet; and eight subjects had complete remission of all symptoms. Subjects who improved were eligible to proceed onto a randomized, double-blind, placebo-controlled, crossover challenge where they received monosodium glutamate (MSG) over three days one week and placebo over three days the next week (or vice versa). Challenge with MSG caused a significant return of symptoms as compared to placebo.

As implicated above, MSG is a member of this class of food additives called excitotoxins (as is the artificial sweetener aspartame), but other additives also contain free forms of aspartate, L-cysteine, and glutamate which can cause dysfunction in neurotransmission when consumed in high enough amounts.[2] In the diet, glutamate, aspartate, and L-cysteine are all amino acids which are part of the building blocks of all proteins (like meat); however, these can also be added to food alone, in their "free" form, to enhance the flavor of food. It is this free form that appears to be problematic for some people with fibromyalgia.

Inside the body, glutamate has multiple functions, including being used as: a building block for proteins, a substrate for alpha-ketoglutarate (which feeds into the Kreb's cycle to produce energy in the body), a substrate for an important antioxidant called glutathione, and very importantly as an excitatory neurotransmitter in the body. Glutamate is actually the most ubiquitous neurotransmitter in the human body, and as such, it has the ability to profoundly impact nervous system function. The term "excitotoxin" comes from the fact that glutamate and aspartate can 'excite' neurons (their normal job), but in high enough amounts, they can also over-excite these neurons to the point they die (thus they can act as 'toxins').[3] The dietary strategies outlined below are meant to prevent this over-excitation of neurons and to help promote normal glutamate neurotransmission in the nervous system.

How Do I Avoid These Food Additives?

The best way to start avoiding free glutamate (and other excitotoxins) is to limit your exposure to food additives. The only way to do this is to start reading labels, with a focus on the ingredient list. The ingredient list should be short with ingredients that you could add to a food if you were making it. There are certain terms that the food industry uses to hide ingredients (which helps protect trade secrets). So for example, food with terms like 'natural flavor' and 'spices' should be avoided because these terms do not actually tell you what was put in the food. Other additives will be noticeable due to the fact that they reference a protein being altered (which frees the amino acids). Examples of these are terms like 'autolyzed,' 'hydrolyzed,' or 'textured' protein.

Refer to Appendix 1 for a complete list of additives to avoid. Note that artificial food coloring may react synergistically with excitotoxins,[4] so they are included on the list as well. Almost every food item you purchase can be substituted by a very similar food product which is low in food additives. A great example of this is chips, where a simple tortilla chip has three ingredients (corn, oil and salt), whereas some of the most popular flavored tortilla chips have as many as 11 excitotoxins on the ingredient list.

In addition to foods with additives, there are a few foods which are naturally higher in free glutamate and thus must also be avoided. The top offenders are soy sauce (and tamari), fish sauces, Bragg's amino acids, and aged hard cheeses like parmesan and romano. Tomatoes contain free glutamate which is low enough in amount that most people do not react to them; however, be careful to limit tomato sauce consumption, which can cause symptoms when consumed over multiple days.

Adequate protein is needed in the diet to supply all the essential amino acids, which our body cannot produce, as well as to provide some important vitamins and minerals. Meat and other animal products are excellent sources of complete protein in addition to supplying high amounts of vitamins B3 (niacin) and B12 and high amounts of the minerals iron and zinc. It is important to note that soy-based, processed vegetarian foods are laden with food additives and thus are not a good substitute for protein in vegetarian diets. Additionally, protein powders use hydrolyzed protein (which releases amino acids including high amounts of glutamate, aspartate, and L-cysteine in their free form) and can cause symptoms in patients who are sensitive to these additives. The only safe protein powder we have found is hemp protein powder, which can be found in a non-hydrolyzed version. Hemp protein is not only high in protein but also supplies fiber, zinc, iron and magnesium (the latter three being extremely important for optimal brain health). It can be combined with milk, yogurt, and frozen berries for a simple-to-prepare, healthy meal or snack. If possible, try to consume eggs, Greek yogurt (which is high in protein and safe for those who also have lactose intolerance), fatty fish like salmon, lean cuts of grass-fed meat, or free-range chicken.

A large amount of advertising dollars goes towards making people believe that they should replace sugar with artificial sweeteners. As mentioned earlier, aspartame acts as an excitotoxin itself, and other artificial sweeteners have been linked to other negative health outcomes. Furthermore, artificial sweeteners are hundreds of times sweeter than sugar, which causes a person to crave more sweetness rather than to reduce sugar cravings (which is counterproductive to reducing sugar intake). Commonly, when our study subjects first remove artificial sweeteners from their diet, they report strong cravings (to the point of labeling it an "addiction"), and they find that they initially have to use more sugar (for example, in their morning coffee) to equal the sweetness of the artificial sweetener.

Note that over a week, these cravings will reduce, and you will able to slowly reduce the amount of sugar to a more normal amount (such as one teaspoon in a cup of coffee). The total amount of sugar in your diet will also decrease dramatically just by cutting out processed food. Furthermore, for people who chew gum regularly, it is important to note that gum found in a normal grocery store contains multiple artificial sweeteners in addition to artificial coloring/flavoring. We recommend looking online or going to a health food store to find safe chewing gum.

What <u>To</u> Eat

Diet can not only help optimize neurotransmission through avoiding food additives, but also through eating a balanced diet including the consumption of important nutrients such as vitamins C, E, D, as well as omega-3 fatty acids, magnesium, and zinc. The benefits of each of these dietary aspects will be reviewed below.

To protect against oxidative stress, it is important to consume adequate quantities of the dietary antioxidants, vitamins C and E. Vitamin C is a water soluble

vitamin which has the ability to travel throughout the brain in watery fluids like cerebrospinal fluid. It has been shown to be protective against glutamate-induced neurodegeneration in cell culture,[5] as has vitamin E.[6] Vitamin E is a fat soluble vitamin which acts as an antioxidant in fatty tissues like cell membranes. Both vitamin C and E contribute important antioxidant protection for the brain. Vitamin C is found in the highest amounts in sweet bell peppers, citrus fruits, and even in greens like spinach. Because it is water soluble, it can be lost during cooking, so it is best to consume these foods raw. As mentioned earlier, lack of cooking means less prep time, which is beneficial for those first couple weeks of dietary change when fatigue may limit the ability to cook. Vitamin E is found mostly in nuts, seeds, olives, and their corresponding oils. Appendix 2 lists a sample recipe for lemon garlic dressing, which is high in both vitamins C and E. A simple spinach salad with lemon garlic dressing is very high in these antioxidants.

Vitamin D and omega-3 fatty acids also may be important for supporting normal neuronal function in the brain. Vitamin D has been shown to attenuate glutamate toxicity in cell culture models.[7] Similarly, omega-3 fatty acids have been shown to prevent excitotoxic damage to neurons in a model of stroke.[8] Vitamin D is known as the sunshine vitamin since our bodies are able to produce this fat soluble vitamin if we receive adequate sunshine during late Spring to early Fall, if we are at a low enough latitude, and if we have light skin and aren't wearing sunscreen, etc. Unfortunately, many people do not get enough vitamin D. Those with darker skin, the elderly, people who are overweight/obese, and anyone living at more northern latitudes are at higher risk of vitamin D deficiency.

The best way to ensure adequate consumption of omega-3 fatty acids and vitamin D in your diet is to eat fatty fish like salmon on a regular basis. Unfortunately, due to high cost and low availability is some areas, this is not always easy to do. A supplement that can be used in lieu of eating fish is cod liver oil. The best cod liver oil is that which has had all mercury removed and has been reformulated to be higher in vitamin D (such as Arctic-D cod liver oil from Nordic Naturals). It comes with added lemon or orange flavor, and can be added to yogurt or smoothies without adding a fishy taste. Other sources of omega-3 fatty acids in the diet include walnuts (and walnut oil), canola oil, ground flaxseed meal (and flaxseed oil), and eggs high in omega-3 fatty acids (made by changing what the chicken eats). Note that grass-fed animals have a better fatty acid profile (including greater omega-3s) and should be preferentially eaten; and that conversely, farm-raised fish have a worse fatty acid profile (lower in omega-3s) and should be avoided.

Magnesium is probably the most important mineral to consume in order to prevent excitotoxicity. It plays an important role in blocking the NMDA glutamate receptor to prevent excess excitation of neurons.[9] It also has a myriad of other health benefits, including an important role in muscle relaxation, helping with cellular energy production and preventing high blood pressure.[10] National data from 2001-2006 estimated that approximately 50% of US adults failed to meet the Estimated Average Requirement (EAR), which is a level of intake where half the population would be meeting their daily needs.[11] Therefore, consumption of foods high in magnesium should be of highest priority.

Some good sources of magnesium include seeds (pumpkin, sesame and sunflower), greens like spinach and Swiss chard, beans (navy, pinto, lima and kidney), grains (barley, buckwheat and brown rice), and nuts (cashews and almonds). To get enough magnesium every day, many "good sources" of magnesium must be eaten, since many foods only contain small amounts of what a person needs each day. One food is never enough. Processing significantly reduces magnesium, so fewer processed foods must be consumed to optimize intake. For example, molasses contains a good amount of magnesium, but processed white sugar contains none. Bulgur is a good source of magnesium, whereas processed white flour is a poor source.

Putting It All Together

Now that we have presented the individual changes that would maximize nutrition and minimize exposure to food additives, you may be wondering what this looks like if you put it all together. The best example of a healthy diet that incorporates the above concepts is the Mediterranean diet. In the Mediterranean area, it is common to see consumption of Greek yogurt (also used in cooking), whole grains (bulgur rather than processed wheat), and high amounts of citrus. Lemon is commonly used in cooking, and parsley is frequently consumed, which are very high in vitamin C. Beans are consumed daily; fish is consumed once a week or more; and meat comes from grass-fed animals as opposed to animals fed grain in a feed lot. Nuts and seeds are commonly used in their cooking, in

addition to olives/olive oil. Copious amounts of garlic are also used daily which has a myriad of health benefits. Foods tend to be made from scratch rather than using processed foods, and there is a focus on fresh produce.

Here are some examples of how you can incorporate these foods into your diet. For breakfast, lemon cod liver oil can be added to additive-free Greek yogurt (plain or vanilla), then berries can be added, with muesli sprinkled on top. The yogurt completely hides the cod liver oil and will not taste like fish, but rather just like lemon. This meal is high in protein from the Greek yogurt and low in sugar. It contains probiotics which are important for a healthy gastrointestinal system; it is high in antioxidants from the berries; and the muesli provides whole grains and nuts/seeds as a source of B vitamins and vitamin E, respectively.

For lunch, a salad can be made using copious greens (spinach, romaine, etc.), with cucumber, baby tomatoes, and chicken from the night before. A little feta cheese can also be sprinkled on top. A lemon garlic dressing can be made using a ¼ cup each of lemon juice and oil (olive or walnut), a ½ teaspoon of salt, a ¼ teaspoon of pepper and 1-2 crushed garlic cloves. The crushed garlic serves as an emulsifier and mixes the lemon juice and oil when shaken. This can also be used to marinate chicken in addition to being used as a salad dressing.

For dinner, grilled wild salmon can be made with a rub of one teaspoon each of rosemary, thyme, oregano, basil, salt, and sugar. This can be served with steamed green beans and brown basmati rice with black beans, seasoned with salt and pepper. A sweet fruit can be used as dessert (e.g. watermelon). Snacks can include things like nuts or trail mix, carrots dipped in hummus (see recipe on page 9), apples dipped in natural peanut butter, or roasted garbanzo beans with a little salt.

In summary, it is possible to improve your health by optimizing nutrients in your diet, while also avoiding food additives. A focus on fresh unprocessed food is essential. Eating 'real' food can remove additives from the diet while simultaneously adding important nutrients. In the beginning it may be easiest to focus on simple fresh food like fruits, vegetables, yogurt, nuts, etc. which do not need to be cooked. After the first week, simple recipes can be used, and then expanded upon as symptoms lessen.

Appendix 1

List of food additives to avoid. Note: not all of these are excitotoxins. Some are being included due to other negative health effects or due to potentially interacting synergistically with excitotoxins.

* Acesulfame-K (Sunett, Sweet One)
* Artificial colors (all)
* Artificial sweeteners (all)
* Aspartame (Equal, NutraSweet, Canderel)
* Autolyzed yeast (or autolyzed yeast extract)
* Barley malt extract
* Bouillon
* Broth
* Calcium caseinate
* Carrageenan
* 'Flavoring'
* Gelatin
* Hydrolyzed corn, wheat, or soy protein (or flour)
* L-cysteine
* Malt extract
* Malt flavoring
* Modified food starch (any type like corn etc.)
* Monopotassium glutamate
* Monosodium glutamate (MSG)
* 'Natural flavor'
* Nutritional yeast
* Plant protein extract
* Saccharin (Sweet'N Low)
* 'Seasoning'
* Smoke flavoring
* Sodium benzoate
* Sodium caseinate
* Sodium guanylate
* Sodium inosinate
* Soy protein concentrate
* Soy protein isolate
* 'Spices' (this term can hide other ingredients)
* Stock
* Sucralose (Splenda)
* Textured protein
* Whey protein concentrate
* Whey protein isolate
* Yeast extract

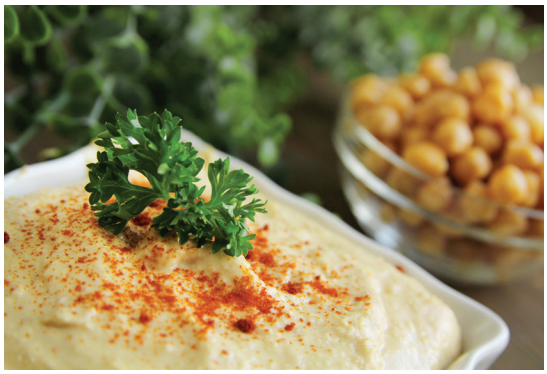
Appendix 2

Berry Smoothie

1 cup milk
¼ cup Greek yogurt
½ cup frozen blueberries etc.
1 heaping tablespoon of hemp protein powder
1 teaspoon lemon cod liver oil

Lemon Garlic Dressing

¼ cup lemon juice (read labels to find one without additives, or juice one lemon)
¼ cup of olive, walnut, or canola oil
1-2 cloves of garlic crushed (crushing is very important as it helps blend the liquids)
½ tsp salt
¼ tsp pepper
1 tsp sugar



Hummus

1 can of garbanzo beans (reserve half the liquid and add to food processor)
3 T organic lemon juice or juice of one lemon
3 T tahini (ground sesame seeds)
1-2 garlic cloves
1 tsp cumin
1 tsp salt
Olive oil (added to food processor to improve consistency as needed)
Blend all ingredients together in a food processor.

Roasted Garbanzo Beans

Drain a can of garbanzo beans and then spread onto a cookie sheet. Sprinkle with salt and broil for approximately five minutes. Watch them carefully and remove from oven when skins crack. Use as a snack in place of less nutritious foods like chips, crackers, and pretzels.

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"Ooo, I just felt the good cholesterol kick the bad cholesterol."

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