

# Nutritional Guidelines for Optimal Brain Metabolism

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## NUTRITION GUIDELINES™ –Ketoflex 12/3

Nutrition is an important contributor to a lifestyle that optimizes cognition and well-being. What and when you eat, and don't eat, how well you sleep, move and handle stress, experience joy, are all intricately connected and function together with this program. There are patients who have implemented only the basics of these guidelines and seen reversals of their cognitive decline, while there are others who have needed strict adherence to induce and sustain cognitive improvement.

Ketoflex 12/3 is based on a "ketogenic" lifestyle. That is, creating ketosis, a fat-burning state that produces ketones. Ketones are the preferred fuel, over glucose, for the brain as they are more efficient (absorbed faster) and clean (produce fewer free radicals or oxidative damage). Most critical is the observation that the brain demonstrates a decrease in glucose utilization in the Alzheimer's disease regions for decades before cognitive decline is noted. This deficit is often caused by insulin resistance, which also leads to a difficulty shifting from one fuel source to another. In the midst of this deficit, the brain can still utilize ketones to compensate for this shortfall in fuel. Our goal of "metabolic flexibility" allows for a seamless transition from one fuel source to the other.

Ketosis is safe and natural. Babies are naturally in ketosis much of the time (human breast milk is high in medium chain triglycerides (MCT), which support ketosis) as are metabolically flexible adults during sleep, fasting, and exercise. Ketones have been used as fuel throughout much of human history. Only in modern times have people eaten three highly refined meals a day, plus snacks, while becoming increasingly sedentary. In many non-Westernized parts of the world, people still live a ketogenic lifestyle. They are active throughout the day, often performing physically demanding labor. They eat much less often, partaking of traditionally prepared whole food with periods of fasting both daily, and intermittently, imposed with seasonal food supplies.

Ketones are produced by fasting 12/3 (see below), minimizing refined carbohydrates, proteins, increasing good fats and exercising. The program is also "flexitarian" in that, although it is a primarily plant-based diet, it does allow limited, clean sources of animal products. The pace at which these changes are adopted depends on your readiness and willingness. They can be implemented slowly over weeks, months, or all at once. Those making the transition quickly have the opportunity to promote healing more rapidly, but must be aware of the possible, usually mild and transitory, side effects that can result. Dehydration (and the subsequent mineral loss) is behind most of the transitional side effects, often dubbed the "keto-flu." It's especially important while transitioning, and for the entirety of your adoption of these guidelines, to stay hydrated and to supplement with sea salt\* to replenish lost minerals. Here's a helpful [resource](#) with a comprehensive list of possible side effects and tips on how to avoid them.

*\*When choosing a non-iodized salt, be sure to get enough iodine through your diet from sources like fish and sea vegetables.*

### A. FASTING

Fasting is incorporated into the Ketoflex 12/3 program daily as it allows for optimizing many critical metabolic functions by controlling when you eat. Fasting helps induce ketogenesis, the fat-burning state that produces ketones. Fasting allows autophagy ("self-eating") to occur, which is a process that removes damaged proteins and thereby contributes to detoxification. Detoxification is

critical to all of us in our modern world with the cumulative burden of toxicity, but especially urgent to those suffering from neurotoxicity.

**1) Fast for at least 12 hours between the end of dinner and the beginning of breakfast.**

ApoE4 carriers may want to work towards extending the fast to 16 hours. Coffee or tea drinkers may freely enjoy a cup or two of organic black coffee or tea (with a limited amount of stevia, if desired) while still essentially fasting. Both coffee and tea are high in antioxidants and associated with longevity. Caffeine drinkers experience increased cognitive clarity, energy, and mood. It is best to break the fast, when hungry, with water (not cold) with some lemon, ginger, green tea and/or other detoxifying drink.

**2) Fast for at least 3 hours prior to going to bed.** As the day winds down, the body needs less food for energy and should be entering a fat-burning state. This fat-burning state will facilitate your body's detoxification and repair. Sleep provides an opportunity to add hours to a total fasting time and helps to mimic our ancestral circadian (daily) rhythms by fasting with the setting of the sun and eating with the height of the sun.

**3) Note that fasting is especially difficult to initiate, particularly for those with insulin resistance.** Insulin resistance creates a state in which your body is less able to use the sugar you are providing it, and this can create carbohydrate craving. There are several methods that have been shown to help with hunger, carbohydrate cravings, and ultimately to increase insulin sensitivity. MCT, such as coconut or MCT oil, are saturated oils that are rapidly absorbed and especially useful for overcoming glycotoxicity (sugar toxicity and insulin resistance). It is best to increase the amount from one teaspoon or less to one tablespoon gradually (once to three times per day) to avoid side effects. Another way to mitigate hunger is with healthy fats, such as a handful of nuts or seeds, avocado slices, or non-starchy vegetables. When you become insulin sensitive and familiar with the sensation of being in ketosis, you do not experience the urgency of hunger. Exercise can be helpful in increasing insulin sensitivity, making fasting easier over time.

## B. MINIMIZE SIMPLE CARBOHYDRATES

Simple carbohydrates, such as sugar and processed foods, stimulate the production of insulin and can create insulin resistance. Insulin resistance impairs the brain's ability to use glucose as an energy source, and the associated high glucose leads to inflammation. Increasing the use of fats as a source of fuel for the brain, which the brain uses more efficiently, while decreasing insulin resistance, is a critical component of the nutrition guidelines. Decreasing insulin resistance is achieved by avoiding simple carbohydrates, sugar, and processed foods while increasing nutrient and fiber-rich foods, such as those found in plants.

It is key to minimize simple carbohydrates (sugar, candy, cookies, muffins, cakes, all bread, pasta, white potatoes, grains, soft drinks—both regular and diet (artificial sweeteners disrupt the gut microbiome)—fruit juices, alcohol, processed foods, and anything with high fructose corn syrup). It's OK to eat sweet potatoes and other colored potatoes in limited amounts. As you limit your intake of simple carbohydrates, you will lose your desire for sweet-tasting food. Organic stevia, in a relatively pure form, may be used as a sweetener in small amounts. (SweetLeaf is one recommended brand.)

Carbohydrates can be categorized as simple (sugars or carbohydrates that break down easily into sugars), complex (starch or carbohydrates that do not break down as easily) and fibers (plant material that does not break down in the human gut). A "resistant starch" is a complex starch that behaves more like a fiber. Resistant starches resist digestion (by humans, but not by some

bacteria in your colon), and thus do not contribute as significantly to your blood glucose. Many plants, roots and tubers contain various ratios of these resistant starches and fibers. Some potatoes, other root vegetables, rice, and legumes can be converted from a complex into a resistant starch by cooking, then cooling. (Reheating is debated; some claim that the resistance of the starch is compromised, especially if heated to over 130 degrees.)

## C. EAT WHOLE FOOD, MOSTLY PLANT-BASED

1) **VEGETABLES: The majority of your diet should be comprised of non-starchy vegetables with some limited starchy vegetables.** The chart below outlines some of your key options to guide your choices. Vegetables in green should be enjoyed freely. Vegetables in yellow and red should be limited and monitored for their potential to negatively affect glycemic markers.

Choose colorful, deeply pigmented, seasonal, local, non-GMO and organic to the extent possible. The Environmental Working Group's [Dirty Dozen](#), [Clean Fifteen](#) list can help to guide organic selection priority.

Vegetables	Cruciferous Vegetables	Herbs/Spices	Resistant Starches
Artichokes	Arugula	Basil	Beans/Lentils**
Asparagus	Bok choy	Bay leaves	Cassava
Beets*	Broccoli	Chives	Celery root
Beet greens	Broccolini	Cilantro	Green banana
Carrots*	Brussels sprouts	Cinnamon	Green mango
Celery	Cabbage	Coriander	Green papaya
Cucumber	Cauliflower	Cumin	Green plantain
Chickory	Collard greens	Dill seed/weed	Jicama
Eggplant	Dandelion greens	Ginger	Millet***
Endive	Horseradish	Lavender	Parsnip
Escarole	Kale	Marjoram	Potato starch
Fennel	Kohlrabi	Mint	Rice***
Garlic	Maca	Oregano	Rutabaga
Green Beans	Mustard greens	Parsley	Sorghum***
Hearts of Palm	Raddichio	Rosemary	Sweet potato
Jicama	Radish	Saffron	Taro root

Vegetables	Cruciferous Vegetables	Herbs/Spices	Resistant Starches
Leeks	Rapini	Sage	Turnip
Lettuces	Swiss chard	Tarragon	Yam
Mushrooms	Wasabi	Thyme	Yucca Root
Okra	Watercress	Turmeric	
Onions			
Peas			
Peppers			
Purslane			
Scallions			
Sea vegetables			
Snap peas			
Snow peas			
Spinach Squash*			
Zucchini			

\*Consuming raw or lightly cooked reduces glycemic impact.

\*\*Pressure-cook to reduce lectins. Lectins are "sticky proteins" that cause holes in our gut leading to "leaky gut".

\*\*\*These are allowable grains due to their low lectin content and beneficial resistant starch.

Plants are the cornerstone of this program for a multitude of reasons. When plants are grown in healthy soil, a synergy of thousands of compounds occurs that creates remarkable phytonutrients, some of which we have yet to understand. These "whole foods" cannot be replaced with supplements. In addition, we now understand that the brain and gut are intricately, and bi-directionally, connected. The health of the brain begins with the health of the gut, and gut health begins by promoting a beneficial microbiome. Beneficial bacteria, given an opportunity to feast on these healthy plants, thrive and heal the gut, among many beneficial effects.

**Leafy green vegetables\*** are found in the vegetable, cruciferous, and herb/spice columns. They are at the top of the nutrient density chart for optimal health, and contribute to brain health with many of these nutrients: Vitamins K, C, A and carotenoids such as lutein, beta-carotene and zeaxanthin, which have all shown evidence for contributing to cognition and preventing its decline. Vitamin B9 (folate, which comes from the term "foliage"), when combined with B12 and B6, reduces homocysteine, a metabolite that is measured on the protocol. Evidence has revealed that an elevated homocysteine corresponds with progressive atrophy of the hippocampus, a critical structure for memory.

Colored vegetables impart their value as antioxidants based on their pigments: carotenoids are yellow and orange, flavonoids are red, blue, purple, black and cream, and chlorophyll are green. The deeper and more widespread the pigment throughout the vegetable (or fruit), the more nutrients are typically present.

*\*A warning to those on Coumadin (Warfarin): Your physician should approve and monitor any change in intake of vitamin K-rich foods, like leafy green and other vegetables (and some fruits). Coumadin works as a blood thinner by interfering with vitamin K, and sudden increases may change the effectiveness of the drug!*

**Cruciferous vegetables\*** are some of the most powerful and nutrient dense vegetables. It is the sulfur component of cruciferous vegetables that gives some bitter taste, but is responsible for many of the health merits. Sulfur is required for the synthesis of glutathione (the “master antioxidant” for detoxification in the liver) and the production of several amino acids that provide the structural component of many tissues and hormones, including insulin. The alliums (onions, shallots, garlic, leeks) and the brassicas (cabbage, broccoli, cauliflower, Brussels sprouts, bok choy) aid in detoxification, protect from oxidative damage, and improve glucose metabolism. When cruciferous vegetables are chopped, juiced and chewed, their unique sulfur compounds are converted and released. They are best consumed blanched, lightly steamed, sautéed at medium heat to preserve crunch, or added to soups and stews.

*\*Raw cruciferous vegetables are known to inhibit iodine uptake. The thyroid gland preferentially binds iodine for its function. As iodine deficiency is thought to play a role in thyroid disease, these vegetables should be at least minimally cooked.*

**Mushrooms**, often considered vegetables, are actually important and unique edible fungi that have been prized throughout the ages and cultures for their medicinal and flavor qualities. Not only do they contain sulfur, but they are also rich in Vitamin B and beta-D-glucan. Beta-D-glucan is important to the innate immune system (the ancient part of our immune systems, which functions as a first responder), which is thought to play a role in the reversal of cognitive decline. Immune-enhancing effects are present in nearly all mushrooms including white button, cremini, portobello, shitake, reishi, chanterelle, oyster and many others. Mushrooms are heat-stable and therefore, still nutritious while adding flavor when cooked with garlic, onions and vegetables.

**Herbs and spices**, which contain antiviral and antimicrobial properties, are an integral part of cooking with whole foods. Most contain more disease-fighting antioxidants than fruits and vegetables. It’s best to source fresh and organic herbs and spices as they have the most nutritional value.

**Fiber and resistant starches** are naturally present in a diet high in vegetables. Fiber and resistant starch are the components of the plants that are digested by the beneficial bacteria. Their by-products provide us with SCFA (short-chain fatty acids) and ketones that are excellent fuels, products that contribute to the integrity of the gut lining, the regulation of the immune system, and thus to brain health. They help us feel full and regulate bowel function.

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*Everyone, but especially those healing from insulin resistance or working to switch from a carbohydrate-based diet to a fat-based diet, may need to proceed cautiously with resistant starches, legumes, and quinoa, since these may spike glucose levels. You may not be able to include any of these at the onset, or move toward a limited amount as you achieve insulin sensitivity. It may be necessary to check for glucose levels to assess how you respond to a given amount of these foods, such as not to negate your earned gains.*

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*Note: if you are ramping up your intake of vegetables, your microbiome will be changing; therefore, do so gradually as your system may need to adjust its production of enzymes to handle the change. Also, see under Gut Health for concerns about food allergies or intolerances.*

## 2) FRUITS:

**The best fruits are wild berries, lemons, limes, tomatoes, olives and avocados.** As whole fruits (not juices) are high in nutrient density and fiber, they can be used as a dessert at the end of a meal containing dietary fat. Organic, wild berries, in reasonable portions,\* should be prioritized as their polyphenolic compounds have been shown to have a therapeutic role in both preventing and remediating cognitive decline. Ancestrally, fruits were consumed at the end of summer to fatten for the winter. Avoid or limit tropical fruits (except for green bananas, mangoes, papaya and plantains in limited amounts as resistant starch) because of their increased glycemic indices. Avocados are an extraordinary standout in that they are high in nutrients, fiber, and beneficial fats. They will not induce glucose spikes, and can help you achieve a ketotic state. They can easily be added to every meal and needn't be organic due to their thicker skin.

*\*Due to the potential for glycemic spikes.*

**A note about alcohol.** Epidemiological studies suggest that a glass of wine per day may be both cardio and neuro-protective. However, in terms of cognitive health, existing evidence is insufficient to suggest that those who currently abstain should begin to drink alcohol. It is important to emphasize that all alcohol is a neurotoxin. Focused research has shown that ApoE4 carriers do poorly with any amount of alcohol. If you choose to indulge occasionally, limit yourself to a few ounces of dry red wine with or following a meal to blunt the glycemic effect. For anyone with a history of alcohol abuse, it is best to abstain completely.

## 3) NUTS and SEEDS:

**Nuts and seeds are powerhouses of nutrition.** They have been found to be both cardio and neuro-protective and contain an excellent fat, protein, vitamin, mineral and fiber content. Nuts and seeds should be fresh, organic, raw, ([soaked and sprouted](#) when possible, as these methods will reduce lectins, phytates and enzyme inhibitors, all of which will impair digestion and nutrient absorption). It is best to dehydrate or roast at low temperatures, 170-220 degrees F (77-104 degrees C), with the type of nut or seed dictating the timing. When oven roasting, periodically turn the nuts and seeds to ensure even cooking. You can experiment with tossing your raw nuts and seeds with various spices, such as paprika, cumin, curry and sea salt prior to roasting to create a healthful and flavorful artisanal snack or meal accompaniment.

When you can't prepare your own nuts and seeds, buying dry roasted (with no added oils) is the next best option. All nuts and seeds have varying ratios of the different types of fats: monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), and saturated fat acids (SFA). PUFAs are particularly susceptible to oxidation and rancidity when exposed to higher commercial roasting temperatures, leading, in turn, to inflammation. Nuts that are roasted with added, unhealthy oils (for example, seed oils; see below) are not recommended. Storing larger quantities of nuts and seeds in the freezer and smaller quantities in the refrigerator helps preserve freshness.

Walnuts, macadamia nuts, pistachios, pecans, almonds, hazelnuts, brazil nuts, pine nuts, cacao (used as nibs or powder) and seeds of pumpkin, sunflower, sesame, black sesame, flax, hemp,

quinoa and chia are all excellent options.

- Walnuts have been especially associated with brain health because of their high omega-3 fatty acid content, but should be consumed raw since PUFAs oxidize easily.
- Flax seeds, also high in omega-3 fatty acids, must be eaten raw and either freshly ground or soaked overnight.
- Macadamias have the highest MUFA content and a low carbohydrate, protein, and lectin (plant toxin) content.
- Pecans also are excellent for their high healthy fat to carbohydrate and protein ratio.
- Cacao nuts (as cacao nibs, powder or butter), especially raw, are another star in brain health for their healthy fat, nutrient density, metabolic enhancing effect, and flavonols. They have nearly 4x the antioxidant impact of dark chocolate. Dark chocolate (86% or higher) is also excellent.

Try not to consume more than a couple of handfuls or ounces of nuts and a few tablespoons of seeds, unless weight maintenance or gain is desired. It is important to make sure that any nut or seed does not have a rancid or moldy smell. Avoid peanuts (especially peanut butter), which are legumes, and are associated with mold contamination and the resulting inflammation.

#### 4) LEGUMES:

**Legumes** are helpful for vegetarians and vegans for their protein, mineral and fiber content. Furthermore, since their fiber content is higher than most grains, they do not contribute as much to insulin resistance. Legumes, however, can be problematic because they contain lectins, phytates, and enzyme inhibitors, which contribute to inflammation and impair digestion/nutrient absorption. The lectins and phytates can be mitigated by soaking dry beans overnight (including a four-inch strip of kombu, a seaweed that helps to make the beans more digestible, less gas-producing, and increases the absorption of the nutrients). Following the overnight soaking, the beans can be boiled, according to instructions for whichever type of beans you have soaked. Pressure cooking can also be used.

#### 5) FATS: **There are four main types of fat:**

- Monounsaturated fatty acids (MUFA): e.g. avocados, olives, nuts and seeds
- Polyunsaturated fatty acids (PUFA; include omega-3 and omega-6): e.g. nuts, seeds, seed oils, algae and fish
- Saturated fatty acids (SFA): e.g. animal fats and coconuts
- Trans fats: synthetic hydrogenated fats ,e.g. "partially hydrogenated oils" as seen on the ingredient list of food packages

Trans fats are the only clear-cut demons here. The other fats, under the right circumstances (depending on processing methods, heat extraction, sourcing, presence of low-carbohydrate, high-fiber intake and a good omega 6:3 ratio), can be a substantial, even majority portion (calorically) of your diet leading to a healthy cardiovascular profile. It may be helpful to adjust to your fat intake by increasing slowly. The use of digestive enzymes may also be helpful.

#### **Examples of good fats:**



- Extra Virgin Olive Oil (high polyphenol, with a known harvest date, cold pressed, stored in a dark bottle)
- Avocados and avocado oil
- Coconut and coconut oil\* (preferably organic, cold-pressed, unrefined, without chemical processing)
- MCT Oil\*
- Red Palm Oil\* (virgin, unrefined, certified sustainable)
- Walnut oil
- Macadamia oil
- Nuts
- Seeds
- Sesame oil
- Perilla oil
- Algae oil
- Cod liver oil
- Butter\* (grass-fed, clarified, goat, sheep, or A2 cows)
- Ghee\*
- Cacao Butter\*
- Egg yolk\* (pastured, organic)

*\*SFA has been shown to elevate LDL particle number (LDL-P) and ApoB, especially in ApoE4 carriers. This leads to a paradox: on the one hand, MCT oil and coconut oil (both saturated fats) can help to induce ketosis, which is supportive of cognitive function; on the other hand, the resulting increase in LDL-P **may** be associated with cardiovascular disease. Therefore, one resolution to this paradox is to use MCT oil and coconut oil transiently, to produce ketosis and improve cognition. When this has been achieved, a switch to primarily MUFAs and PUFAs (EVOO, avocados, olives, nuts and seeds) to achieve a continuation of mild ketosis while tracking LDL-P, ApoB, or sdLDL and oxidized LDL may offer continued neuroprotection while concurrently protecting the cardiovascular system. It may be noted that healthy fats in the context of the ketogenic lifestyle often results in a lowering of triglycerides, a rise in functional "good" HDL, and a shift in LDL to the larger, more fluffy particle type, all of which are known to be cardioprotective.*

When making dietary fat choices, consider prioritizing fresh, high polyphenol, extra virgin olive oil\* (EVOO). Polyphenols are phytochemicals, compounds found abundantly in natural plant food sources, that have antioxidant properties that protect the cells from free radical damage. Polyphenols are believed to be a key component of EVOO that contributes to it's cardio and neuroprotective properties. Growing evidence suggests that EVOO may play a therapeutic role for reducing neuroinflammation and upregulating autophagy to help with beta-amyloid clearance. Always buy EVOO with a known harvest date; either printed on the bottle or guaranteed by the distributor. EVOO should only be used as a finishing oil (served at room temperature). It is wonderful to pair with low glycemic vinegars or citrus to make a salad dressing. It can also be seasoned with fresh herbs and spices to create a topping or dip for your vegetables. Although it is not recommended to cook with EVOO, if you choose to do so, keep temperatures low to prevent oxidation.

*\*[Amphora Nueva](#) is a good source. They regularly import the highest polyphenol count and freshest harvest from all over the world. Call directly (925) 310-4681 to ensure that you're getting both.*

- Avoid all seed, grain, and bean oils (polyunsaturated, omega-6, heat-extracted and GMO refined oils) such as soy, corn, canola, peanut, sunflower, safflower, cottonseed, and palm kernel.

- For cooking oils, choose oils with high “smoking” points, that do not produce smoke at higher temperatures. Good choices are avocado oil, coconut oil, butter, ghee, or animal fat.
- Avoid all trans fats processed foods such as crackers, cookies, cakes, chips, microwave popcorn, frozen dinners, pizza, creamers, margarine, cool whip, and all fast food. (Food manufacturers can claim 0 trans fats on the label even though they may include up to 0.5 grams/serving.)

## 6) PROTEIN:

**Use animal protein as a condiment, not a main course.** We need protein for essential body functions, but it’s important to realize that the average American eats too much. It’s important to limit your protein consumption to 0.8 to 1 gram of protein per kilogram of lean body weight per day\*. The actual protein needs for each person are highly individualized. Those with underlying illness (especially suboptimal gastrointestinal (GI) function) may temporarily need to stay near the maximum recommended level while they heal. As health is optimized, protein requirements will be reduced. To prevent muscle loss while reducing protein, it’s vital to incorporate strength training into your lifestyle. Look for opportunities to add weight-bearing movement into your day. Much of your protein needs can come from plants. Two cups of spinach nearly equals the equivalent of 2 pastured eggs, but plant protein is often incomplete and less bio-available. Vegetarians and vegans can achieve adequate protein in vegetables, nuts, seeds, tempeh, and beans, but should consider potential deficiencies in omega-3, vitamin B-12, vitamin D and choline.

*\*Determine your lean body weight using this [calculator](#). Choose an average of the three results, then use this [tool](#) to convert to kilograms. Use [CRON-O-meter](#) to determine the amount of protein in a given food.*

There are justified debates over the issues of the consumption of animal protein. However, for the purpose of reversal of cognitive decline, the use of omega-3 fatty acid, especially DHA, is critical. DHA is one of the most important fats for the brain since synapses (neuronal connections) need DHA for their structure. In other words, DHA helps promote new brain cell growth and protects existing brain cells. An excellent source of DHA is cold-water fatty fish. Fish should be wild-caught, high omega-3, and low in mercury. It’s helpful to remember the “SMASH” (salmon, mackerel\*, anchovies, sardines\*\*, and herring) acronym when choosing fish. Salmon has high omega-3 and low contamination. Best sources are wild-caught Alaskan and sockeye. High-mercury fish are typically those with long lives and large mouths, such as tuna, swordfish, and shark, and should be avoided. In general, fish that are smaller and lower on the food chain are the safest. Carefully source your shellfish, crustaceans, and mollusks. Most are wild-caught, with the exception of shrimp. Avoid farmed shrimp. There are sites such as the Monterey Bay Aquarium Seafood Watch, Marine Stewardship Council, Natural Resources Defense Council, and labels such as Fishwise and Seafood Safe, to guide you in your choices of less toxic and sustainably harvested fish.

*\*Atka & North Atlantic caught mackerel from the US & Canada are low in mercury. King & Spanish Mackerel should be avoided as they are high in mercury.*

*\*\*Sardines should be sourced from the Pacific Ocean.*

When using animal protein\*, it is important to use organic, pastured, high omega-3 sources, which means that the animals have not been subject to CAFOs (concentrated animal feeding operations) with the inherent inflammation/toxicity of antibiotics, growth hormones, stress, feed and living conditions unnatural to those animals. Given that virtually all poultry and livestock are raised in CAFOs, sourcing healthy protein from animals is a challenge. However, for many it is a challenge worth pursuing, especially when it comes to finding eggs from 100% pastured hens.

Eggs are one of the best sources for choline, a micronutrient, critical to the brain in that it stimulates the production of acetylcholine, a neurotransmitter responsible for synaptic connections (i.e. memory).

*\*"American Grassfed" is a label that denotes pasture-raised. [ButcherBox](#) is one resource for organic 100% pastured animal products).*

## 7) MACRONUTRIENT RATIOS:

### **All foods fall into categories called macronutrients: fats, carbohydrates, and proteins.**

Now that we've described some healthful options available to you on this program, you need to be able to put them together in combinations that will promote healing. [CRON-O-Meter](#)\* is a free online resource that allows you to see the macronutrient (and micronutrient) value of your foods. It can also serve as an online food diary that can help you track and tweak your food intake to reach ketosis by showing you a pie chart of your macronutrient values in real time as they change throughout the day. In general, if you want to create a ketogenic state, you need to reduce your carbohydrates and proteins while increasing your good fats. Within that framework, you can still get enormous amounts of non-starchy vegetables (10+ cups a day) and still achieve ketosis as you are combining diet with other strategies (fasting and exercise) to achieve this goal. You're not using a ketogenic "diet", as much as you'll be practicing a ketogenic lifestyle, more reminiscent of healthful, non-Westernized people. As you heal, your protein needs will reduce even further per the guidelines. In contrast to protein and carbohydrate, healthy fat is the one macronutrient that you should enjoy freely. An avocado a day has been shown to reduce LDL particle numbers. Several tablespoons of olive oil can easily be enjoyed with each meal. Olives, nuts and seeds are wonderful accompaniments to salads.

*\*CRON-O-meter often reports food portions in grams, as opposed to ounces or more traditional units of measurement. A digital scale is very helpful when trying to make that conversion.*

To help you visualize what the macronutrient ratios look like for various meals, you can see a few samples below. The first picture shows a sample meal for breaking your fast, typically after noon, but it can be earlier if you are still working on healing from glycototoxicity.



- Four to five cups of organic, non-starchy, preferably seasonal and local vegetables

- Some limited starchy vegetables, sweet potato wedges for beta-carotene, that have been cooked, then cooled to enhance resistant starch
- Pastured eggs that are naturally high in Omega-3s. Notice the yolks are very lightly cooked to preserve the choline, but may be cooked more firmly depending on your preference
- Fermented vegetables
- High polyphenol extra virgin olive oil as a dip for vegetables
- Moderate use of sea salt and other fresh herbs and spices
- Bone broth

Here's an example for the evening (or second) meal that would typically be eaten at least 3-4 hours before bedtime:



- Five or more cups of organic, non-starchy, preferably local and seasonal vegetables, lightly cooked or raw
- Small serving of wild caught Alaskan sockeye salmon
- Liberal use of healthy fats such as avocado, olives, nuts, seeds & high polyphenol extra virgin olive oil
- Liberal use of seasonings including sea salt, infused vinegars, fresh herbs and spices

Here's an example of a brain healthy treat. You can make unlimited variations on this crunchy, sweet dessert by swapping out the coconut kefir for an A2 dairy yogurt or flavoring with lime zest, a squeeze of fresh key lime and cinnamon instead of wild berries. A square of dark chocolate (86% or higher cocoa) is another satisfying and healthful treat best enjoyed after a meal to blunt the glycemic response.





- Coconut milk kefir (unsweetened)
- Wild blueberries
- English walnuts
- Sliced Almonds
- Cocoa nibs
- Coconut flakes (unsweetened)
- Sprinkle of stevia

#### D. GUT HEALTH

Gut health is the foundation of any health program, but is especially critical to brain health. The brain and the gut are intricately and bi-directionally connected. If there are underlying issues with gut health, such as “leaky gut”, SIBO (small intestinal bacterial overgrowth), or H. pylori, you may need additional interventions to aid in the optimization of your nutritional program.

**1) Avoid grains and dairy, to the extent possible, as these have been demonstrated to be inflammatory.** Grains such as wheat, barley, rye, oats, corn, and soy contain lectins, phytates, and enzyme inhibitors. Lectins (which include gluten) are plant toxins that are “sticky proteins” that create holes in the gut lining (“leaky gut”). The holes in the gut lining allow particles to enter that are seen as foreign, cause inflammation, and can be a set-up for food/allergy intolerances. If the cause of the inflammation is not eliminated, chronic issues may ensue such as autoimmune disease and neurological disease. Pressure cooking does not remove lectins in grains that have gluten such as wheat, rye, barley, and oats.. Note that even gluten-free products and flours contain not only lectins, but are also highly processed and high in glycemic load..

Dairy products are inflammatory for several reasons. Dairy in the U.S. comes from a type of cow (A1) that produces an inflammatory lectin-like protein, while A2 cows, sheep and goats do not. For those with gluten intolerance, dairy cross-reacts and mimics gluten.

- Any food allergy/intolerances should be revealed either by testing or elimination. After testing or elimination, any candidate food allergen can be reintroduced, and its effect on your symptoms evaluated (unless there is a severe allergy). Food allergies can be severe and life-threatening, and usually occur closer to the time of ingestion.

Food intolerances are usually timed further from ingestion, are less severe and often limited to GI symptoms such as gas, bloating, constipation and/or diarrhea, but can include rashes, arthritis, headaches, fatigue, mood swings irritability and “brain fog”.

- Common food allergies/intolerances besides gluten and dairy are eggs, peanuts, tree nuts, shellfish, soy, nightshades (such as eggplant, tomatoes, hot and sweet peppers, and potatoes), and multiple ingredients/chemicals used in processed foods.
- Other sources of inflammation to gut lining or cause of imbalances are drugs such as antibiotics, anti-inflammatories, PPI (proton pump inhibitors), other medications, GMO foods (which are exposed to glyphophate), alcohol, soft drinks, and, of course, stress.
- If you decide to consider a re-exposure to a food intolerance, wait until you have eliminated that food for 3 weeks to 3 months and determined that your gut has healed, either by blood or stool testing, or a retrial attempt. Keeping a journal of your efforts can be helpful.

**2) Incorporate prebiotics and probiotics to help to optimize your microbiome, the bacterial population in your gut.** Prioritize real food, over supplemental prebiotics and probiotics. Supplementation provides an important short term fix, while your food changes will create more durable benefits. To reiterate, the brain and the gut are intricately, and bi-directionally, connected. The health of the brain begins with the health of the gut, and gut health begins by promoting a beneficial microbiome.

Prebiotics are foods that are non-digestible by humans, but are digested in the colon by the beneficial bacteria to support their growth, and their by-products support the health of the intestinal lining. Prebiotic foods include the resistant starches and fibrous plants, roots, and tubers. Examples are listed above. Organic psyllium seed husks, acacia fiber, potato, plantain, and green banana starch, inulin, and FOS are examples of supplements that may be helpful. Gradual increases in these prebiotic foods can help mitigate the potential GI side effects.

Probiotic foods contain beneficial bacteria, which convert carbohydrates into lactic acid (i.e., fermentation) and compete with pathogenic bacteria. Probiotic foods include fermented foods such as sauerkraut, kimchi, kombucha, tempeh, miso, and unpasteurized fruits and vegetables pickled in brine. Yogurt or kefir from coconut without added sugar is another option. Proceed cautiously with dairy yogurt or kefir, and only if dairy intolerance is not a problem. Look for unsweetened, full- fat options, made exclusively from grass-fed A2 cows, sheep or goats, although these can be hard to find. Goat milk, which is widely available, is always A2. Strictly avoid dairy from A1 cows.

**3) Bone broth can also be useful in healing a “leaky gut.”** The bones should come from pastured, organic animals. The bone broth regimen utilizes the collagen of bone to seal the “leaky gut.” There are regimens for multiple gut/neurological and autoimmune diseases that address their reversal primarily through the healing of the gut. Bone broth can be added daily, plain or as a base for soups, stews, and other foods. [Kettle and Fire](#) bone broth is one source for organic 100% pastured bone broth.

## E. COOKING METHODS

The goal is for the food to taste good, while minimizing the loss of nutrients and the production of AGEs (advanced glycation end products). AGEs are glycotoxins created by a reaction between sugars and proteins or lipids. High levels create oxidative stress, inflammation, and many of the pathologies we see with diabetes and other chronic diseases.

Moist heat, shorter cooking times, lower temperatures, using acidic ingredients such as lemon, lime, and vinegar, and food choices (uncooked plants have no AGEs, uncooked animals do have AGEs) are all methods that reduce AGEs. Grilling, searing, roasting, broiling, and frying will produce AGEs. Avoid non-stick and aluminum cookware due to possible toxicity and metal accumulation. Ceramic and steel cookware are safe choices.

## F. IMPLEMENTATION

To learn about your response to your fasting, food, exercise, and sleep, it can be useful to check your glucose and ketones with your present regimen and for the period of time that you transition to a fat-based metabolism.

A Dual Glucose/Ketone Meter can provide you with real time data that can help guide your food choices. It's a small portable device that allows you to check your glucose and ketones, on disposable strips, by using a prick of blood (obtained by a lancet) from your finger. The Precision Xtra meter, which is widely available, is one example of a dual- purpose meter.

[Tracking Glucose](#) gives you information about how your body responds to a given amount of food, especially carbohydrates. A postprandial (after meal) glucose check should be done one and two hours following a meal. It is valuable to see how you respond to your transition period of reducing carbohydrates or the addition of carbohydrates such as resistant starches. Here's a useful [resource](#) with detailed instructions on how to use glucose measurements to aid in your recovery and track your progress.

[Tracking Ketones](#) through beta-hydroxybutyrate (BHB), the most abundant ketone found in the blood, is the most accurate and reliable means of measuring levels, especially during the transition to ketosis. (Urine ketosticks and ketone breathalyzers are not recommended for this purpose since they lack specificity and accuracy at very low levels.) Some patients have found that achieving ketosis is very helpful for both healing from glycototoxicity and addressing reduced cerebral glucose utilization. They report cognitive clarity, increased energy, and a stable, calm mood, but this strategy may not be necessary for every patient. Here's a helpful [guide](#) with instructions on how ketone testing can be useful.

**Once you've made the transition to a fat-based metabolism, this type of testing will no longer be necessary on a regular basis as you will have learned through your testing what it feels like to be in mild ketosis.**

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*These guidelines should be approved by your doctor, especially if you have an underlying condition such as diabetes or other hormonal condition, cardiovascular disease or hypercholesterolemia, cancer, or you are malnourished, underweight or suffering from an eating disorder. You may also consider that diabetics and those with cardiovascular disease or hypercholesterolemia have shown remarkable benefits from a ketogenic lifestyle, but have to monitor their symptoms and biomarkers carefully as their dosage/need for medications will be affected. Cancer patients have also been shown to benefit from a ketogenic lifestyle as cancer cells require glucose for their metabolism, therefore cancer cell growth may be inhibited.*

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