

Nutrition: Anxiety, Depression and Cognitive Disorders - Part 3

Dietary fat and cholesterol are also important for brain health. The human brain is made up of at least 60 percent fat. It's definitely the fattiest organ in the body. It's mostly saturated fat and cholesterol. Inadequate intake of fat may affect brain health, and for that reason, a low-fat diet may not provide adequate fat for optimal brain function. Appropriate cholesterol levels are also important for normal brain function. Cholesterol is a component of the myelin sheath, which is the insulation around the neurons in the brain, and some studies have shown that both inadequate or very low levels of cholesterol and very high levels of cholesterol can cause neurological impairments.

I think a mixed fat intake, which is what you'd get from just eating a healthy, nutrient-dense diet, is optimal for brain health. Monounsaturated fats increase the production of acetylcholine, a very important neurotransmitter, and increase blood flow to the brain. Choline from cholesterol-rich foods like eggs and liver improves memory and protects against cognitive decline. Medium-chain triglyceride and beta-hydroxybutyrate, which are found in coconut oil and butter, can improve cognitive function in older adults with memory disorders like Alzheimer's. A balance of essential omega-3 and omega-6 fats, which we talked about before, is also crucial for brain function. A large portion of the fat in the brain is DHA, which is the long-chain omega-3 fat, and DHA in particular has been shown to help brain function and improve conditions like depression, bipolar disorder, and ADHD. Vegetarians have been shown to have 30 percent lower EPA and DHA levels, whereas vegans have 50 to 60 percent lower EPA and DHA levels.

OK, moving on to carbohydrates, a contentious issue, pretty controversial. Some clinicians and researchers and prominent authors have recommended very-low-carb or ketogenic diets for mental health, whereas others suggest that we need a minimum amount of carbohydrate to promote good cognitive function and balanced mood. In my experience, carbohydrate intake should be personalized to a patient's health, physical activity, and their own individual response to higher and lower carbohydrate intakes. Just to give you some guidelines or general ideas, athletes, breastfeeding women, and children, in my experience, often require higher levels of carbohydrate for optimal mental health. Elderly, sedentary, insulin-resistant, hypoglycemic or hyperglycemic patients, or patients that are dealing with pre-existing cognitive or neurological issues like Alzheimer's or dementia or Parkinson's may do better with a lower carbohydrate intake or even a ketogenic diet. A switch to a low-carb diet often causes initial cognitive deficits as the body adjusts to using fat for fuel and conserving glucose, but most patients, especially if they fit into the groups that will benefit from low carb, should stick with it for at least a little while to see if that switchover happens, and in many cases, they'll start to feel better.

Long-term low-carb diets, though, especially for athletes and people who need more carbohydrate, can actually exacerbate mood or cognitive dysfunction. Very often I've seen women, in particular, come to my practice and they are dealing with insomnia and depression or anxiety,

decreased stress tolerance, decreased performance if they're working out. I look at their diet history, and they have maybe six months prior switched to a Paleo diet, and without really intending to, they switched to a low-carb Paleo approach. When I have them start adding some carbohydrates back in, they typically do much better.

All right, let's talk about some micronutrients now that we've talked about macronutrients. There are several to consider when it comes to depression: B12, folate, B6, zinc, copper, vitamin D, magnesium, calcium, and iron.

B12 deficiency is associated with Alzheimer's, dementia, cognitive decline, memory loss, depression, anxiety, bipolar disorders, and psychosis. It plays a very important role in mental health, as you can see. The typical lab reference range for B12, the lower end, I believe, is too low. A lot of research suggests that deficiency symptoms can begin as low as 450 picograms per milliliter. B12 malabsorption can be caused by numerous problems: gut dysbiosis, leaky gut, inflammation, pernicious anemia, which is an autoimmune condition, alcohol intake, medications, hypochlorhydria, which is low stomach acid, celiac disease, inflammatory bowel disease, particularly Crohn's, which involves often inflammation of the terminal ileum, which B12 is absorbed, so B12 deficiency is not uncommon even in people who are eating meat. That's important to keep in mind. However, vegetarians and vegans are at much higher risk of B12 deficiency. Early studies suggested that this was more common than in omnivores, but not dramatically so, but newer studies that use more sensitive methods of detecting B12 deficiency have found that 68 percent of vegetarians and 83 percent of vegans are deficient in B12, so that's very important to be aware of if you have patients that are vegetarian or vegan.

Folate deficiency decreases serotonin synthesis. It decreases SAM, S-adenosylmethionine, which is the major methyl donor in the body. It increases inflammatory homocysteine. There are numerous studies showing an increased incidence of folate deficiency in patients with depression. There's a high incidence of folate deficiency in patients with epilepsy, psychiatric conditions, and in the elderly population with psychiatric conditions. There may be a link between folate and homocysteine levels and aging, dementia, and Alzheimer's disease.

Next is B6, an important B vitamin that's required to make serotonin, which is a crucial neurotransmitter that regulates mood and mental health. B6 deficiency is less common in the diet, but there are a number of health conditions that can affect B6 levels, so it's still something good to look at if anxiety and mental health or depression is an issue in your patients. Symptoms of B6 deficiency include poor stress control, nervousness, anxiety, and mood swings.

Let's talk a little bit about zinc and copper. The ideal ratio of serum copper to zinc is between 0.7 and 1, so you want to have either a little less copper than zinc or the same amount. Copper and zinc both function as neurotransmitters in the brain. Excess of copper and deficiency of zinc can cause hyperactivity, ADD and ADHD, behavioral disorders, depression, autism, panic disorders, and even paranoid schizophrenia. Vegetarians can often have high copper intake and low zinc intake. Vegetarian diets reduce zinc absorption by 35 percent, so even if their zinc intake on paper is

adequate, their zinc absorption may not be, and they may actually be suffering from physiological zinc deficiency.

Another thing that's really important to keep in mind about zinc and copper levels is that copper is an acute phase reactant, so it's something that would be elevated in an inflammatory response, and it's actually a marker for inflammation. Oxidative stress and inflammation can reduce zinc levels and increase copper levels, so when you see a high copper-to-zinc ratio, a lot of practitioners will go in and supplement with high doses of zinc. In some cases, that may be appropriate, but in other cases, that's not the right thing to do, and what you need to do is address the inflammation, and that's what's going to bring down that ratio.

Let's talk a little bit about vitamin D, a very important vitamin-like hormone that activates genes that release neurotransmitters like dopamine and serotonin. Vitamin D receptors are located in regions of the brain linked with depression. Vitamin D deficiency is associated with depression and other mood affective disorders, and in some studies, vitamin D supplementation has been shown to be more effective than light therapy in treating seasonal depression. Vitamin D deficiency is also associated with schizophrenia.

Magnesium is next. It's the nutrient that is most commonly deficient in the modern diet due to soil depletion and removal from drinking water. Magnesium has been used traditionally for anxiety, depression, irritability, restlessness, headaches, etc. It guards against excess excitatory neurotransmitter levels and suppresses the stimulation of cortisol by the HPA axis. It acts at the blood-brain barrier to prevent the entrance of stress hormones into the brain. Animal studies have shown that sufficient magnesium protects against anxiety and depression after a traumatic brain injury. Magnesium wasting is increased by stress and excess caffeine consumption. That's a combination that's pretty common in the industrialized world. And too much calcium can interfere with magnesium absorption.

Iron is another important nutrient. Like most nutrients, too much is just as much of a problem as too little. Iron overload accelerates mitochondrial decay, and impaired mitochondrial function is a major source of cognitive and mood problems. Iron is a pro-oxidant that is a catalyst for oxidative damage, and if iron builds up in the brain, it can be a cause of cognitive and neurological problems. It increases oxidative stress in brain cells and causes neurodegeneration, and treating iron overload if it's present and avoiding iron supplementation is important for long-term brain health.

On the other hand, iron deficiency is a significant problem. It affects 2 billion people worldwide. It's less of a problem in the developed world than it is in the developing world, but it's still a major issue, particularly in menstruating females. Iron is crucial for oxygen delivery, and the two nutrients that the brain needs the most are glucose and oxygen. If you have iron deficiency, that's going to lead to compromised oxygen delivery to the brain, which means that the brain won't function well, and that can lead to mood and cognitive disorders.