Food and Mood: Eating Plants to Fight the Blues

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Depression and related mental health conditions are on the rise in the United States. In 2020, almost 1 in 10 American adults had experienced depression in the last 12 months; even more adolescents and young adults, 1 in 5, had also experienced depression.[1] For many people, depression makes accomplishing even simple tasks much harder. It can contribute to chronic diseases or exacerbate existing health problems. Luckily, evidence suggests that a healthy diet can improve mood and quality of life. The diets with the most benefits to mental health are those that are rich in fruits and vegetables, include nuts and seeds, and minimize or avoid inflammatory foods like processed meats and trans fats.[2] When researchers analyzed 16 studies (including data from almost 46,000 participants), they found that depressive symptoms were significantly reduced by diet changes.[3] Plant foods rich in complex carbohydrates, fiber, probiotics, and antioxidants have also been shown to reduce depressive symptoms.[4]

Mechanisms of Action

Oxidation and Inflammation. By reducing inflammation and recalibrating neurotransmitters (chemicals that the brain uses to communicate), a healthy diet can help reduce depression.[5] A whole food, plant-based diet does a great job of this because of its focus on vegetables and fruit and avoidance of animal products.

Plant foods are high in antioxidants and phytochemicals; these help to repair damage and decrease inflammation in brain cells. In addition, plant foods can help restore balance to neurotransmitters. An example is an enzyme called monoamine oxidase (MAO). MAO breaks down serotonin, dopamine, and norepinephrine—neurotransmitters that help control mood. Too much MAO leads to low levels of these neurotransmitters, which can lead to depression.[6] The antioxidant quercetin, which is found only in plant foods, slows down the activity of MAO. Quercetin works much like a natural antidepressant by increasing the amount of serotonin, dopamine, and norepinephrine in the brain.[7] Foods high in quercetin include apples, kale, berries, grapes, onion, and green tea.

Arachidonic acid is a building block for inflammation found mostly in meat, and reducing it may be protective. This type of fat serves as a precursor to inflammatory chemicals in our bodies. By eating foods high in arachidonic acid, such as chicken, eggs, and other animal products, we set off a cascade of chemical reactions that lead to general inflammation, or an overreactive immune response.[8] When inflammation reaches the brain, subsequent feelings of anxiety, stress, hopelessness, and depression arise.[9] Vegetarians have been found to have fewer inflammatory markers in their blood than omnivores.[10] Individuals who avoid foods high in arachidonic acid tend to report a happier, more positive mood.[11] Eliminating inflammatory animal foods from the diet and focusing on plant-based foods high in anti-inflammatory nutrients ensures not only physical health, but mental health as well.

Omega-3 Fatty Acids. A common nutritional approach to treating depression is with omega-3 fatty acid supplements or eating fatty fish, because omega-3 fats are known to reduce inflammation.[12] However, research is inconclusive on whether omega-3 supplementation can help treat symptoms of depression.[13] While fatty fish can be a source of this nutrient, eating fish comes with the risk of also consuming mercury and other dangerous contaminants found in our oceans.[14] A well-planned vegan diet can reduce inflammation and provides plenty of alpha-linolenic acid (ALA), a type of omega-3 fatty acid. The body is able to convert ALA into eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), the same type of omega-3 found in fish, so there is no need to consume seafood. Plant-based sources of ALA include walnuts, flaxseed, chia seeds, and leafy green vegetables.

Tryptophan and Serotonin. Serotonin is an important neurotransmitter that regulates memory and feelings of happiness. The brain makes it from tryptophan, which is an essential amino acid found in food. Plant-based sources of tryptophan include leafy greens, sunflower seeds, watercress, soybeans, pumpkin seeds, mushrooms, broccoli, and peas.

While meats such as turkey also contain the amino acid, the body can have a difficult time converting it to serotonin. Competition from other amino acids prevents tryptophan from entering the brain, resulting in low serotonin production. A high-protein meal, thus, leads to more amino acids in the bloodstream and more competition for tryptophan to enter the brain.

Scientists have found that meals rich in carbohydrates promote an increase in insulin production, allowing muscle cells to absorb competing amino acids. This makes it easier for tryptophan to cross the blood-brain barrier, increasing serotonin levels in the brain.[15] This may explain the association between depression and carbohydrate cravings. A diet high in protein and animal foods can limit serotonin production. A healthy way to ensure the brain receives enough tryptophan is to eat foods like legumes, which have protein and plenty of complex carbohydrates. Great plant-based sources of tryptophan include leafy greens, sunflower seeds, watercress, soybeans, pumpkin seeds, mushrooms, broccoli, and peas.

Gut Microbiota. A fast-growing area of research is how gut health influences other parts of the human body, especially mental health. The gut microbiota is made up of trillions of bacterial cells living in the human intestine. Diet has a big effect on the gut microbiota, and serotonin is an important way that the gut influences our mood. In fact, only about 10% of serotonin is produced in the brain; the other 90% of serotonin is produced in the intestine.[16] Low-quality diets harm the gut microbiota and have been shown to increase risk for depression. On the other hand, diets that focus on plant foods reduce risk of depression.[17] Fiber and polyphenols, which are both plentiful in vegan diets, encourage growth of beneficial gut bacteria. Gut bacteria use fiber to produce short-chain fatty acids; these act as a source of energy, support immune system health, and improve the health of the intestine.[18] Studies show that the more fiber a person eats, the less likely they are to suffer from depression.[19] It's important to note that animal products do not contain fiber; fiber is found only in plant foods.

BMI and Depression. Researchers have found a link between obesity and depression. In fact, obesity can lead to depression, but depression can also lead to obesity.[20] Because of its low calorie and high nutrient content, a plant-based diet is very effective not simply for weight loss, but also weight maintenance, and may benefit those suffering from body image-related depression and mood conditions.[21]

Cost of Depression

Depression can take a serious toll on emotional well-being, health care costs, and workplace productivity. The economic burden of depression in the United States is rising, totaling $326 billion in 2018. Of this, $114.3 billion was direct costs incurred by individuals, while $20.4 billion was pharmacy expenditures. Depression causes the loss of an estimated 200 million workdays each year. This significantly impacts productivity and costs employers resources.[22,23]

Many of depression's pharmacological expenses come from antidepressants, drugs that are meant to alleviate the symptoms of major depressive disorder and similar conditions. These medications often require a patient to be on them long-term, leading the costs to add up over a lifetime.

Some of these expenses could be reduced by encouraging preventive, plant-based eating patterns in the workplace. Researchers looked at the impact of diet on emotional well-being and productivity at 10 U.S. insurance company corporate sites. They found that a plant-based dietary intervention significantly reduced feelings of depression, anxiety, and fatigue. The intervention group who followed a vegan diet also reported significant gains in emotional well-being and in daily functioning. Eating plant-based improved their physical and mental health compared with the control group.[24] These findings suggest that changes in dietary habits can improve quality of life, increase productivity, and decrease health care costs.

Conclusion

Our mood and mental health significantly affect our ability to focus and to maintain healthy relationships. A plant-based diet that is rich in fiber, antioxidants, and polyphenols from fruits, vegetables, and other whole plant foods can serve as an inexpensive, natural, and noninvasive therapeutic means to support mental health.

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