



Diet's Role in Parkinson's Disease



Parkinson's disease (PD) is a progressive neurodegenerative disorder that causes unintended or uncontrollable movements. It's the second-most common neurodegenerative disease after Alzheimer's.

The hallmark of PD is the accumulation of abnormal alpha-synuclein neural proteins in the brain that damage dopamine-producing cells. Dopamine is a neurotransmitter essential in movement control. The loss of dopamine causes the distinctive motor symptoms characteristic of PD.

Although PD symptoms can vary greatly from one person to the next, common motor symptoms include slowness of movement, stiffness, decreased flexibility, tremors, and problems with balance and coordination. Patients with PD also frequently experience nonmotor symptoms, such as mood changes, cognitive impairments, sleep disturbances, constipation, and difficulties with speech and swallowing.

Role of Diet

There are several avenues through which diet may affect the course of PD, including the following:

- **Antioxidant and Anti inflammatory effects:** PD is associated with oxidative stress and inflammation, which contribute to the degeneration of dopamine-producing cells. It's thought that a diet high in antioxidants and anti-inflammatory foods may help protect against this damage to neural cells, slowing disease progression.
- **Alteration of the gut microbiome:** As noted above, PD is characterized by the accumulation of abnormal alpha-synuclein neural proteins in the brain. Some evidence suggests that these proteins may originate in the gut (as a result of gut dysbiosis) and then migrate to the brain via the vagus nerve. Thus, resolving dysbiosis in the gut could, in theory, impact the course of PD. In addition, certain gut microbiota are capable of producing or metabolizing dopamine, so alterations to the gut microbiome also could impact dopamine levels in the brain, influencing motor symptoms of PD via this avenue. Epidemiologic research shows that a diet high in dairy, meat,

refined pastries, and fried food is linked to an increased risk of developing the disease, whereas a diet high in fresh fruits and vegetables, whole grains, legumes, nuts, and seeds is associated with a lower risk.

Impact of Nutrients

Coenzyme Q10, Vitamin D, and Other Antioxidants:

Coenzyme Q10 is a powerful antioxidant, and supplementation with this nutrient can help staving off damage to dopamine-producing cells in PD. Animal studies and early human trials supported its benefits for PD. One study showed Coenzyme Q10 was safe and well tolerated at dosages of up to 1200mg/d. Less disability developed in subjects assigned to coenzyme Q10 than in those assigned to a placebo, and the benefit was greatest in subjects receiving the highest dosage. Another nutrient receiving attention in PD is vitamin D. Several studies have shown that low serum levels of this vitamin are linked with PD progression. Vitamin D deficiency significantly affected both motor and cognitive symptoms. A 2022 longitudinal study of 682 participants also found that intake of dietary sources of vitamin E and vitamin C are linked to a slower progression of Parkinsonian signs.

Probiotics: Multiple studies have observed that the gut microbiota of healthy adults differs from the gut microbiota of people with PD. There is also increasing awareness that the gut microbiome appears to play a significant role in the pathology of PD.

Multiple human trials have found that probiotic supplementation can help relieve constipation in PD (constipation is a very common symptom of the disease and underscores the involvement of the gut in the disease pathology). Moreover, several studies in animal models of PD suggest that probiotics stave off the loss of dopamine-producing neurons and also reduce motor impairments. In addition, one small randomized, double-blinded, placebo-controlled human trial found that a multi-strain probiotic administered over the course of 12 weeks resulted in improved motor function in patients with PD. A 2023 meta-analysis found that probiotics can significantly improve motor symptoms as well as gastrointestinal, anxiety, and depressive symptoms in people with PD.

Vitamin B complex: B vitamin levels are appeared to be inversely correlated with PD via the regulation of homocysteine levels. Available data suggested that higher dietary intake of vitamin B6 was associated with a decreased risk of PD. Vitamin B12 deficiency in humans is also known to contribute to a variety of neurological conditions and low vitamin B12 levels have been described in patients with idiopathic PD. A recent study showed that low levels of vitamin B12 result in worse motor symptoms for patients early on in PD progression. Vitamin B3, also called niacin, has shown an ability to preserve nerve cells by boosting energy-producing centers to stop the death of nerve cells that occurs in PD.