

## Lifestyle & Culture

# Exploring nutraceuticals as potential treatment for Parkinson's disease



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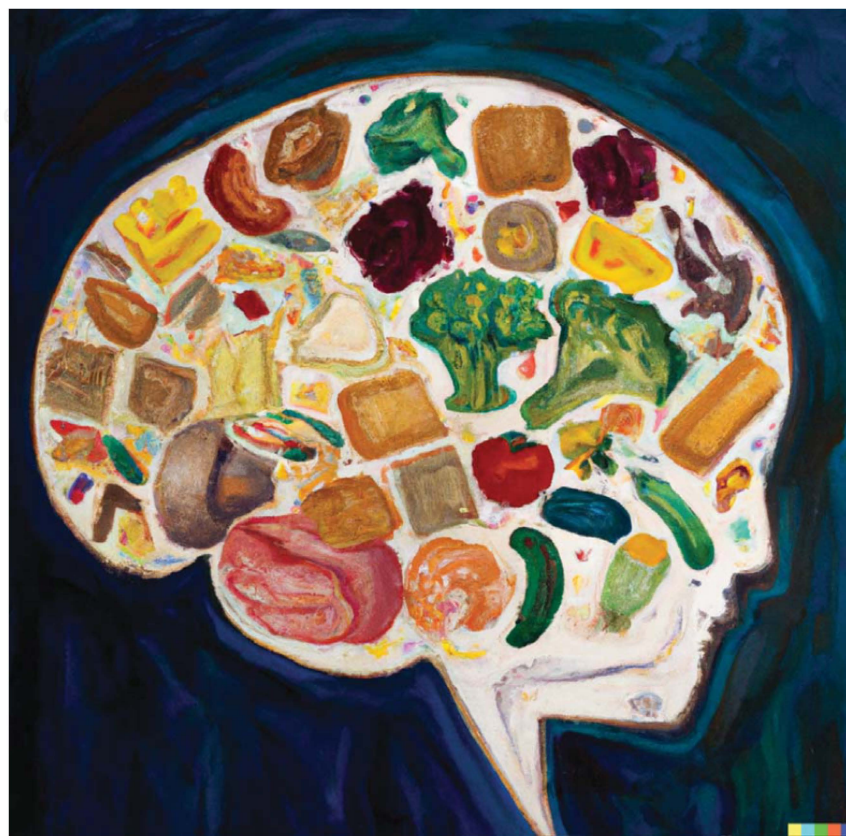
In recent years, the exploration of alternative approaches to managing chronic diseases has gained significant momentum. One area of particular interest is the role of nutraceuticals in improving the symptoms and progression of Parkinson's disease (PD). Nutraceuticals, a fusion of "nutrition" and "pharmaceuticals" encompass a diverse range of natural compounds, including vitamins, minerals, herbs and other dietary supplements. As we delve into the potential benefits of nutraceuticals for Parkinson's disease, we uncover a world of promising possibilities that could enhance the quality of life for millions of people.

### Parkinson's disease

Parkinson's disease is a heterogeneous progressive neurodegenerative disorder that affects the central nervous system. It is characterised by a range of motor symptoms, including tremors, bradykinesia, rigidity and postural instability. The disease results from the loss of dopamine-producing neurons in a specific brain region called the substantia nigra. As a result, dopamine levels decrease, leading to disruptions in the brain's ability to control movement and coordination. In addition to dopamine depletion, Parkinson's disease is linked to cholinergic neuron degeneration in the pedunculopontine nucleus, which may account for the typical symptoms of postural instability, dysphagia and sleep disturbance in these patients. While the exact cause of Parkinson's remains unknown, both genetic and environmental factors are believed to play a role in its development.

### Etiology of Parkinson's disease

The etiology of Parkinson's disease is multifactorial and complex, with both genetic and environmental factors playing significant roles. While the exact cause remains unclear, researchers have identified specific genetic mutations associated with familial cases of Parkinson's disease. Mutations in genes such as SNCA, LRRK2 and Parkin have been linked to an increased risk of developing the condition. Additionally, environmental factors, such as exposure to pesticides, heavy metals and certain toxins, have been implicated in the develop-



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ment of Parkinson's disease. These factors, in combination with age-related changes in the brain, contribute to the progressive degeneration of dopamine-producing neurons in the substantia nigra.

### Mechanisms in which nutraceuticals work

Nutraceuticals are substances having natural sources that have been clinically shown to be useful in the management of a certain disease. Nutraceuticals demonstrate diverse mechanisms of action, encompassing free radical scavenging and reactive oxygen species (ROS) neutralisation, reduction of inflammation, chelation of iron, support for mitochondrial homeostasis, prevention of apoptosis and modulation of cell signalling pathways. These multifaceted properties position nutraceuticals as promising candidates for potential therapeutic interventions across a range of health conditions.

### Antioxidant protection

Oxidative stress plays a significant role in Parkinson's disease progression. Uncontrolled oxidative stress impedes cellular energy metabolism, which has an impact on brain functions.

Nutraceuticals rich in antioxidants, such as vitamins C and E, coenzyme Q10 and polyphenols, help neutralize harmful free radicals and reduce oxidative damage. These compounds exhibit neuroprotective properties, potentially slowing down the degeneration of dopamine-producing neurons. A few antioxidants that have been investigated in clinical studies include desferrioxamine, melatonin, pioglitazone, vitamin E, creatine and coenzyme Q10. Due to the stagnant rate of neurodegeneration, the lack of biomarkers for the premotor stage of Parkinson's disease, and the inability of the current drugs to cross the blood-brain barrier, clinical research may be difficult.

### Anti-inflammatory effects

Neuroinflammation plays a significant role in the advancement of Parkinson's disease. Nutraceuticals, such as omega-3 fatty acids, curcumin and green tea extract, exhibit remarkable anti-inflammatory attributes, effectively regulating immune responses and diminishing neuroinflammatory processes. By curbing inflammation, these compounds hold the potential to alleviate symptoms and potentially slow the

progression of the disease.

### Mitochondrial support

The dysfunction of mitochondria has been implicated in the pathogenesis and advancement of Parkinson's disease. Within the realm of potential therapeutic options, nutraceuticals, such as coenzyme Q10, alpha-lipoic acid and acetyl-L-carnitine, have garnered attention due to their pivotal role in nurturing mitochondrial well-being and facilitating optimal energy production within cellular structures. Their ability to potentially mitigate oxidative stress and bolster cellular resilience not only offers potential symptom relief but also presents an avenue for exploring neuroprotective effects.

### Neuroprotective effects

Several nutraceuticals exhibit neuroprotective effects, aiding in the preservation of neuronal health. Resveratrol, found in red grapes and berries, exhibits potential neuroprotective properties, as does green tea extract and ashwagandha. In addition, studies have shown that activating AMPK might encourage autophagy, a cellular process that aids in the removal of damaged proteins and organelles, which may further support

neuroprotection in PD. A possible therapy strategy for PD may involve targeting AMPK, according to new research. For instance, AMPK-activating medications, like metformin and resveratrol, have demonstrated encouraging outcomes in preclinical research and human clinical trials. The nutraceuticals targeting AMPK pathways in Parkinson's disease include Luteolin, EGCG, Quercetin, Genistein, Caffeic acid, Magnolol and Resveratrol. These compounds may help protect against neuronal damage, delay disease progression and enhance the overall resilience of the brain.

### Treatment and Prevention of Parkinson's Disease

At present, Parkinson's disease lacks a definitive cure, but the scientific community is actively exploring promising treatment avenues that may potentially slow down or halt its progression. Recent breakthroughs in understanding the genetic mechanisms responsible for neuronal degeneration have opened up new possibilities for intervention. Research efforts are dedicated to identifying therapies that could delay or prevent the advancement of the condition, bringing hope to those affected by this complex neurodegenerative disorder. The utilization of dopamine replacement therapy in Parkinson's disease is linked to drug-induced dyskinesia and reduced effectiveness over extended usage. Consequently, the development of novel medications with improved efficacy and safety profiles is of utmost importance. Nutraceuticals are now emerging as a comparatively safer and cost-effective therapeutic option for age-related conditions, including Parkinson's disease, as supported by the scientific community and nutrition experts.

### Conclusion

Although nutraceuticals may have benefits for Parkinson's disease, it's crucial to remember that they shouldn't be taken in place of traditional medical care. Consultation by a healthcare professional should be taken before beginning any new supplements or altering your treatment regimen if you have Parkinson's disease.

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