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BRAIN CHEMISTRY: L-DOPA AND PARKINSON'S DISEASE TREATMENT

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Dihydroxyphenylalanine (DOPA) is a biogenic substance formed in the body from tyrosine; it is a precursor of dopamine. L-Dopa (levodopa) is a synthetic levorotatory isomer of dioxyphenylalanine, which is used as a medicine. The effect of levodopa on Parkinson's disease is the following: dopamine-producing neurons are destroyed, therefore, against the background of a progressive lack of dopamine, L-dopa makes up for its deficiency in the body. Since dopamine is not able to cross the blood-brain barrier, levodopa is used for this, which is its precursor and, when it enters the body, undergoes decarboxylation, as a result of which dopamine is formed.

Parkinson's disease is a serious neurodegenerative and neurological disorder that most often develops in people aged over 60. Parkinson's symptoms are muscle rigidity, tremor, and hypokinesia. The first time of using of L-dopa for the treatment of parkinsonism was carried out in 1960–1961. Then the biochemist Oleh Hornykiewicz discovered a sharp decrease in dopamine in patients with parkinsonism, and turned to the neurologist Walter Birkmayer with a proposal to conduct clinical experiments using levodopa, which were successful.

The principle of action of L-dopa is to replenish the lack of dopamine, and not to treat the damaged part of the brain, so this drug is not durable and does not help in the later stages of the disease. At the beginning of the development of the disease, with not very pronounced symptoms, levodopa helps a person to live fully. However, with further treatment, it is necessary to increase the dose to the maximum, but due to the fact that L-dopa has many negative side effects the medicament has to be gradually canceled. Also, in order to eliminate the side effects of L-dopa, it is used with other medicaments, so it is practically not used in its pure form. After the discontinuation of taking the medicine, the symptoms of parkinsonism return and intensify due to an increase in degenerated neurons.

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