

Genetic risk factor identified for Parkinson's disease

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An international team of doctors and human geneticists has identified a new genetic risk factor for Parkinson's disease. The institutions involved in the study were the Institute of Human Genetics of Helmholtz Zentrum Munchen and Technische Universitat Munchen, the Neurological Clinic of Ludwig-Maximilians-Universitat Munich and the Mitochondrial Research Group of Newcastle University, Newcastle upon Tyne, UK.

"Our study reveals the interaction of genetic and environmental factors such as dietary habits in the pathogenesis of Parkinson's disease," explained Dr. Matthias Elstner of the Neurological Clinic of LMU and Helmholtz Zentrum München, lead author of the study. In addition, this genome-wide expression and association study confirms that vitamin B6 status and metabolism significantly influence both disease risk and therapy response ([Annals of Neurology](#), January, 2010).

Scientists of the two Munich universities and Helmholtz Zentrum München investigated neurons in the [brain](#) to determine which genes modify their activity in Parkinson's disease. Among other findings, the research group detected increased activity of the pyridoxal kinase gene. In a subsequent international cooperation project, the researchers compared this gene in over 1,200 Parkinson patients with the genetic data of more than 2,800 healthy test subjects. In doing so, they discovered a [gene variant](#) which increases the risk for Parkinson's disease and which may lead to a modified quantity or activity of the enzyme pyridoxal kinase (PDXK) in the brain. In combination with genetic association analysis, the innovative method used here - single cell

expression profiling of dopaminergic neurons - opens up new possibilities for analyzing genetic risk factors.

PDXK converts Vitamin B6 from food sources into its physiologically active form, which is the prerequisite for the production of the [neurotransmitter dopamine](#). Parkinson's disease is linked to the accelerated aging and dying off of [neurons](#) that produce dopamine. The decreased synthesis of this neurotransmitter explains most of the disease symptoms: The gradual progression of the neurological disease is accompanied by muscle rigor and tremor and a slowing of movement (bradykinesia). Besides the constraints on daily life caused by these symptoms, the postural instability of the body can lead to dangerous falls. Moreover, in the course of the disease sensory symptoms like paresthesia, vegetative disorders (e.g. bladder dysfunction) and depression as well as other psychological changes can occur.

"Our study elucidates how genetic and environmental factors such as dietary habits interact in the pathogenesis of Parkinson's disease," explained Dr. Matthias Elstner of the Neurological Clinic of LMU and Helmholtz Zentrum München, who is lead author of the study. Dr. Holger Prokisch, head of the research team studying mitochondrial diseases at Helmholtz Zentrum München and TU München, added: "Although this variant is responsible for only a slight contribution to the overall risk for Parkinson's disease, our findings could aid in developing individualized therapies. "

Provided by Helmholtz Zentrum München

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