# PARK genes

PARK genes are genes associated with the hereditary form of Parkinson's disease.

## The relationship of PARK genes to the development of Parkinson's disease

**Parkinson's disease (PD)** is a chronic neurological disease, the pathological-anatomical basis of which is the formation of intracellular inclusions containing **alpha-synuclein** and the premature death of pigmented neurons in the *pars compacta substantia nigra*. This causes a lack of the neurotransmitter dopamine in the striatum, and thus an insufficiency of stimulation of the dopaminergic receptors **D1** and **D2**. The direct consequence of this deficit is the dysfunction of the motor circuits of the basal ganglia. These connections play an essential role in the regulation of free motor skills, deciding on the selection of appropriate and inhibition of inappropriate movement patterns and synergisms.

The cause of PD is still unknown. We distinguish between **genetically conditioned** and **sporadic** forms of the disease.

It is assumed that most cases are the result of a combination of a certain genetic predisposition and long-term exposure to toxins from the environment, or certain products of metabolism. Scientific research has led to the identification of several monogenic forms of the disorder and many genetic risk factors that increase the risk of developing PD. The hereditary form collectively accounts for 20% of PD cases before the age of 40 and 2% of patients after the age of 50.

PD, which is genetically influenced, has several types with regard to the **age of onset**:

- **juvenile** (age of onset ≤ 21 years)
- **EOPD** (*early onset PD* –age of onset under 30 years)
- **Early onset** PD (age of onset ≤ 50 years)
- **Classic form**.

### Forms of PARK genes

Several PARK genes are currently known, the most important of which are listed in the table:

Tab. 1: Summary of Hereditary Parkinson's Disease Genes

| Symbol | Locus | Illness | Heridity | Gene |
|---|---|---|---|---|
| PARK1 | 4q21-22 | EOPD | AD | *SNCA* |
| PARK2 | 6q25.2-q27 | EOPD | AR | *Parkin* |
| PARK3 | 2p13 | classic PD | AD | Unknown |
| PARK4 | 4q21-q23 | EOPD | AD | *SNCA* |
| PARK5 | 4p13 | classic PD | AD | *UCHL1* |
| PARK6 | 1p35-p36 | EOPD | AR | *PINK1* |
| PARK7 | 1p36 | EOPD | AR | *DJ-1* |
| PARK8 | 12q12 | classic PD | AD | *LRRK2* |
| PARK9 | 1p36 | Kufor-Rakeb syndrome | AR | *ATP13A2* |

🔎 *For more information see the /Details page .*

## Links

### Related Articles

- Parkinson's disease
- Basal ganglia
- Dopamine
- Antiparkinson Drugs

### References

KOLLAR, Katarina et al.. *Genetics of Parkinson's Disease (online)* [online]. ©2007. [cit. 2020-04-16]. <https://www.neurologiepropraxi.cz/pdfs/neu/2007/06/08.pdf>.