

# PARKINSON DISEASE

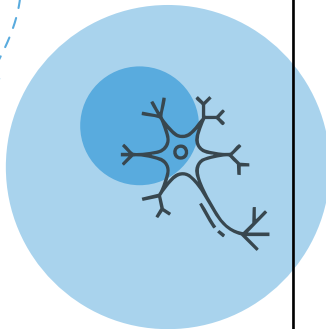
Parkinson's disease is a **chronic and progressive neurodegenerative condition** that primarily affects the brain regions responsible for the selection and execution of movements.



It is characterized by the **degeneration of neurons in the substantia nigra**, a structure located in the midbrain.

The loss of these neurons leads to a **significant reduction in dopamine**, a crucial neurotransmitter for motor control.

As a result, the **neural signals** required to coordinate body movements **are disrupted**, leading to the various motor symptoms of Parkinson disease.



## WHAT CAUSES NEURONS TO DEGENERATE?

### ROLE OF ALPHA-SYNUCLEIN

Alpha-synuclein is a **protein that is naturally present in the human brain**. It plays a critical role in regulating communication between neurons.

In Parkinson's disease, this protein takes on an abnormal shape and accumulates in neurons in the form of clumps, known as **Lewy bodies**.

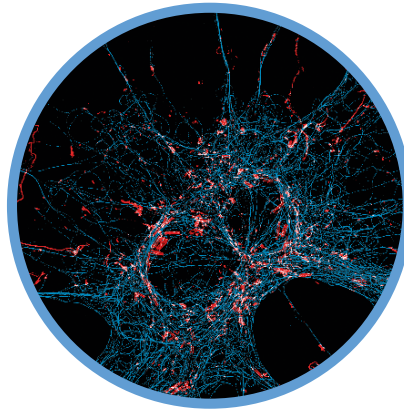


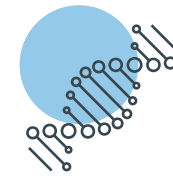
Image: Human cell containing accumulations of alpha-synuclein (in red); these small spheres build up along the cellular skeleton (in blue), leading to progressive degeneration over time. © Abid Oueslati 2023

These deposits interfere with the proper functioning of nerve cells, particularly those that produce dopamine, thereby triggering motor symptoms.

Alpha-synuclein clusters may also be present elsewhere in the nervous system, contributing to non-motor symptoms. The presence of Lewy bodies does not automatically lead to dementia. Their impact on the progression of the disease differs from person to person.



## RISK FACTORS



In most cases, Parkinson's disease occurs without an identifiable cause. However, **genetic variants have been found in approximately 20% of individuals with the disease**. Advancing age remains the most significant risk factor, and men appear to be slightly more affected than women.

Head trauma, and exposure to pesticides, chlorinated solvents, or certain heavy metals have also been associated with an increased risk. On the other hand, caffeine consumption and regular physical activity may have protective effects.

## SIGNS AND SYMPTOMS

Parkinson's disease includes both **motor and non-motor symptoms that progress differently from one person to another**.

Motor signs include resting tremor, bradykinesia (slowness of movement), muscle rigidity and postural instability. These symptoms can affect various parts of the body, such as the hands, fingers, tongue, jaw or feet, and lead to difficulties with movement, balance and coordination.

By the time motor symptoms appear, **over 50% of dopamine-producing neurons in the substantia nigra have already been lost**. These signs often begin on one side of the body and intensify over time, potentially leading to a loss of autonomy.

Non-motor symptoms can appear years before motor signs and can serve as early indicators of the disease. They include REM sleep behavior disorder, anxiety, depression, constipation and a reduced sense of smell. Such symptoms have a significant impact on various bodily functions and greatly contribute to the decline in quality of life.

## CARDINAL MOTOR SYMPTOMS



- Slowness of movement
- Muscle rigidity
- Postural instability
- Resting tremor

## OTHER MOTOR SYMPTOMS

- Gait disturbances
- Hypomimia (Masked face)
- Speech and swallowing changes

## NON-MOTOR SYMPTOMS

- Anxiety and depression
  - Apathy
- Cognitive impairment
  - Constipation
  - Fatigue
  - Hallucinations
- Excessive sweating
  - Loss of smell
  - Pain
- Seborrhic dermatitis
  - Sexual and bladder dysfunction
- Sleep-related disorders
  - Vision changes



\* This list is not exhaustive. Other symptoms may occur, and not all will necessarily appear in every person.

# OVERVIEW

- **Parkinson's disease is a chronic and progressive neurodegenerative disease.**
- It is characterized by both motor and non-motor symptoms.
- There is currently no cure.
- Medication and surgery can help manage symptoms.
- Dopaminergic medication remains the gold standard therapy. It improves motor function by replacing missing dopamine.
- The effectiveness of these treatments may decrease over time.
- Lifestyle changes, such as a balanced diet, physical activity, and supportive therapies can help better manage symptoms and enhance quality of life.

## KEY FACTS

**Parkinson's is the fastest growing neurodegenerative condition in the world.**

20 yo  90 yo

**Parkinson disease is typically diagnosed in the early to mid-60s, with incidence increasing with age.**

10 to 20 % of people

**develop early-onset Parkinson's before age 50.**

Parkinson Québec informs and raises awareness about Parkinson disease, supports the community and promotes scientific research in collaboration with its regional partners.

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<https://parkinsonquebec.ca>



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