



January's Topic: Parkinson's Disease

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Parkinson's Disease^{1,2}

Parkinson's disease (PD) is a progressive disorder of the nervous system that often affects the coordination of movement.

PD affects 1 in 100 people over age 60. In the United States, 60,000 new cases will be diagnosed this year alone.

Today, it is estimated that 1 million people in the United States and more than 5 million people worldwide are living with Parkinson's disease.

The exact cause of PD is unknown, but research points to a combination of genetic and environmental factors, with different Parkinson's patients falling somewhere in between these two causes. Scientists believe that in the majority of cases, genetic and environmental factors interact to cause PD.

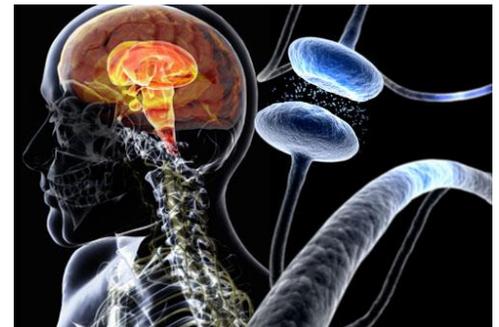


Photo: <https://www.webmd.com/parkinsons-disease/ss/slideshow-parkinsons-overview>

Parkinson's and the Brain^{1,3}

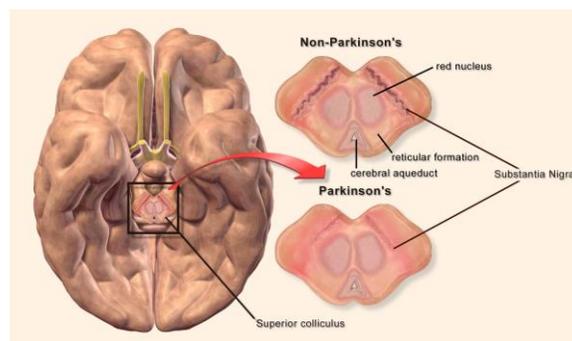


Photo: <http://www.merckmanuals.com/home/brain-brain-spinal-cord-and-nerve-disorders/movement-disorders/parkinson-disease-pd>

PD predominately affects the dopamine-producing nerve cells of the brain, in a specific area called the **substantia nigra**.

Dopamine: a chemical messenger responsible for transmitting signals within the brain that allows for coordination of movement.

Loss of dopamine causes these nerve cells to fire without normal control, leading to the inability to direct or control movement.

Other changes noted include the presence of **Lewy bodies**, which are clumps of specific substances within brain cells that are microscopic markers of PD.

Although many substances are found within Lewy bodies, scientists believe an important one is the natural and widespread protein called **alpha-synuclein**. It's found in all Lewy bodies as a clumped form that cannot be broken down.

Parkinson's Disease Facts^{1,2}

- ☞ PD was discovered by British surgeon Dr. James Parkinson in 1817.
- ☞ The single biggest risk factor for PD is advancing age.
- ☞ Men have a somewhat higher risk than women.
- ☞ Head injury and pesticide exposure have been associated with higher risk
- ☞ There is no objective test to make a definitive diagnosis. A doctor takes a careful medical history and performs a neurological exam, looking for 2 or more cardinal signs of PD.
- ☞ There is no cure for PD, but medications can help control symptoms.
- ☞ PD is not fatal, but as symptoms worsen they can cause incidents that result in death.

Symptoms of Parkinson's Disease¹

PD symptoms are classified into two categories: related to movement (motor) or unrelated to movement (non-motor). Each person with PD will experience symptoms.

Since PD is a progressive disease, some people may only experience symptoms on one side of the body for many years, but eventually these symptoms will also affect the other side.

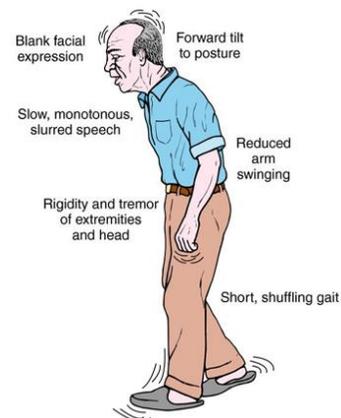


Photo: <http://physiorehab.in/parkinsons-disease/>

Motor Symptoms	Non-Motor Symptoms
<ul style="list-style-type: none"> ▪ Bradykinesia (<i>slowness of movement, abnormal stiffness or decrease in facial expression</i>) ▪ Tremor ▪ Rigidity ▪ Postural instability (<i>trouble with balance and falls</i>) ▪ Micrographia (<i>small, untidy handwriting</i>) ▪ Shuffling gait ▪ Freezing (<i>appearance of stuck in one place</i>) ▪ Depressed or mad look on face ▪ Soft speech ▪ Short, rapid steps during walking ▪ Drizzling ▪ Dystonia (<i>sustained or repetitive twisting or tightening of muscles</i>) 	<ul style="list-style-type: none"> ▪ Cognitive changes ▪ Constipation ▪ Early satiety ▪ Excessive sweating ▪ Fatigue ▪ Hallucinations/delusions ▪ Lightheadedness upon standing ▪ Loss of taste or smell ▪ Depression, anxiety, apathy, irritability ▪ Pain ▪ Sexual dysfunction ▪ Insomnia, restless legs ▪ Weight loss ▪ Vision problems ▪ Urinary incontinence

Diagnosis of Parkinson's Disease^{1,2}

There is no "one way" test to diagnose PD. Your doctor may perform blood work and imaging tests to rule out other disorders and causes.

Two out of these 4 symptoms must be present over a period of time for PD diagnosis.

1. Tremor
2. Bradykinesia or slowness of movement
3. Stiffness or rigidity of arms, legs, or trunk
4. Trouble with balance and possible falls

Making an accurate diagnosis is difficult but essential.

Treatment for Parkinson's Disease

Drug Class	Medications	How it Works	Role in PD	Comments
Levodopa	Carbidopa/Levodopa (Sinemet [®] , Sinemet CR [®] , Duopa [®] , Parcopa [®]) Carbidopa/Levodopa / Entacapone (Stalevo [®])	Levodopa is a natural chemical that passes into the brain and is converted to dopamine. Carbidopa protects levodopa from premature conversion to dopamine outside of the brain, which allows for greater effectiveness and lessens side effects.	Most effective drug for PD symptoms	<ul style="list-style-type: none"> ▪ Most common side effects are nausea and lightheadedness ▪ After a year, with disease progression the benefit may become less stable, displaying a "wearing off" effect. ▪ Should NOT be taken with a high protein meal as it can affect absorption of the drug. Take at least 1 hour before or 2 hours after a protein-rich meal. ▪ May see involuntary movements after taking high doses; therefore, dosage adjustment may be necessary.
Dopamine Agonists	Pramipexole (Mirapex [®] , Mirapex ER [®]) Ropinirole (Requip [®] , Requip XL [®]) Rotigotine transdermal system (Neupro [®]) Apomorphine (Apokyn [®])	Dopamine agonists don't change into dopamine; instead, they mimic dopamine effects in the brain.	<p>Can be used first-line in younger patients (under age 50)</p> <p>Can be used in combination with carbidopa/levodopa</p>	<ul style="list-style-type: none"> ▪ Has a longer duration of action than levodopa, and can be helpful in reducing the intensity of levodopa's "wearing off" reaction or enhance levodopa's effects. ▪ Side effects similar to carbidopa-levodopa but also include hallucinations, sleepiness, and compulsive behaviors (uncontrolled eating, shopping, gambling, and sexual urges).
MAO-B Inhibitors	Selegiline (Eldepryl [®] , Zelapar [®]) Rasagiline (Azilect [®])	Monoamine Oxidase Type-B (MAO-B) is an enzyme that naturally breaks down several chemicals in the brain, including dopamine. MAO-B inhibitors block the effects of MAO-b, allowing more dopamine to be used by the brain.	<p>Can be used first-line for modest symptom control</p> <p>Can be used in combination with levodopa to reduce "off" time</p>	<ul style="list-style-type: none"> ▪ Shown to delay need for levodopa when prescribed in PD's earliest stages. ▪ At later PD stages, can boost the effects of levodopa. ▪ May aggravate hallucinations and involuntary movement when combined with levodopa. ▪ Insomnia is more common with selegiline; should be taken before 1pm. ▪ Many potential drug interactions with antidepressants, pain medications, and cough medications. ▪ Avoid certain foods, like aged cheeses and wines, due to raising blood pressure.
COMT Inhibitors	Entacapone (Comtan [®])	COMT is an enzyme that inactivates levodopa before it is transported in the bloodstream to the brain. COMT inhibitors block this enzyme.	Used in combination with carbidopa/levodopa.	<ul style="list-style-type: none"> ▪ Extends the clinical benefit of levodopa, reducing "off" time and lengthening "on" time. ▪ May intensify levodopa side effects. ▪ Entacapone can cause orange urine.

Sources:

1. Parkinson's Foundation. (2017, December 04). Retrieved December 04, 2017, from <http://www.parkinson.org/>
2. The Michael J. Fox Foundation for Parkinson's Research. (n.d.). Retrieved December 04, 2017, from <https://www.michaeljfox.org/>
3. Parkinson's disease. (2015, July 07). Retrieved December 04, 2017, from <https://www.mayoclinic.org/diseases-conditions/parkinsons-disease/symptoms-causes/syc-20376055>



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- Develop a personalized medication plan
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- Medication check-ups
- Medication therapy management