

Treating Parkinson's Understanding Medications



Parkinson's is a very individualized disease and each person who lives with it requires a unique treatment plan. Although researchers are attempting to develop treatments that will slow down or reverse the disease, no such therapy has yet been approved by the United States Food and Drug Administration (FDA). The goal of treatment is to reduce symptoms with as few side effects as possible. The following are the primary medications indicated for PD, but do not include those used for specific non-motor symptoms. It is important to note that medications work best when they are taken on a regular schedule, and when combined with exercise, good nutrition and adequate sleep.

Class/Type and Medications	How It Works	What To Know	Potential Side Effects
Levodopa Carbidopa/Levodopa enteral suspension (Duopa™) Carbidopa/Levodopa orally disintegrating tablet (Parcopa®) Carbidopa/Levodopa extended-release capsules (Rytary®) Carbidopa/Levodopa (Sinemet®) Carbidopa/Levodopa controlled release (Sinemet CR®) Carbidopa/Levodopa/Entacapone (Stalevo®)	Levodopa is the gold standard medication for Parkinson's with the broadest antiparkinsonian effects of any treatment. In the brain, neurons typically convert levodopa to dopamine. Levodopa works by replacing the dopamine lost in Parkinson's. It is combined with carbidopa to prevent nausea and ensure levodopa is not metabolized before it enters the brain.	Carbidopa/Levodopa is the most potent and effective medication for PD. Most formulations of levodopa are taken as a pill, but more recent formulations are extended release. By contrast, Duopa is a gel formulation of the drug that is delivered directly to the small intestine through a tube that is placed during a relatively minor surgery. Parcopa and Rytary are helpful for people who experience wearing-off of drug benefit between doses. People with Parkinson's should be aware of which preparation they are taking, as there are many different pill sizes, colors, dose strengths and manufacturers. The decision about when to begin using carbidopa/levodopa is different for every person. Because of debate over a possible toxic effect, some people have been reluctant to begin medication; however, studies have shown no evidence of toxicity. Most neurologists agree that delaying treatment may lower quality of life and may put a person at risk for falling.	Early in the PD course, side effects include low blood pressure, nausea, dry mouth and dizziness. As PD advances, motor side effects such as dystonia and dyskinesia may develop. Confusion and hallucinations are side effects in advanced PD, but less prevalent than hallucinations caused by dopamine agonists. For Stalevo, side effects may include diarrhea, dyskinesia, abdominal pain and harmless discoloration of urine, saliva and/or sweat. The FDA is investigating Stalevo and a possible increased risk of prostate cancer. Healthcare professionals should follow current guidelines for prostate cancer screening. People with PD should not stop taking medication unless directed to do so by their doctor. Duopa treatment may cause irritation in the site of the insertion to the gut. Pump related complications (often minor) are not uncommon.
Dopamine Agonists Apomorphine (Apokyn®) Bromocriptine (Parlodel®) Pramipexole (Mirapex®) Pramipexole dihydrochloride extended-release (Mirapex ER®) Ropinirole (Requip®) Ropinirole extended-release tablets (Requip® XL™) Rotigotine transdermal system (Neupro®)	Dopamine agonists are drugs that stimulate the parts of the human brain that are influenced by dopamine. In effect, the brain is tricked into thinking it is receiving the dopamine it needs.	In general, this class of medications is not as effective in relieving symptoms of Parkinson's as carbidopa/levodopa. The exception is apomorphine, an injectable dopamine agonist that works rapidly, lasts only 30 minutes or so, and may provoke dyskinesias. Doctors often prescribe agonists as an initial therapy in individuals with Parkinson's, or as a complement to levodopa in people who develop symptom fluctuations. Dopamine agonists should be started in low doses, with a gradual increase in dosage to prevent side effects. Apomorphine requires training in its administration, and is used as a "rescue" therapy for people who experience sudden spells of wearing-off immobility. The rotigotine patch can be advantageous for individuals seeking a long acting medication, as well as those who are undergoing surgery, and cannot swallow.	Mild, common side effects include nausea and lightheadedness due to low blood pressure. More serious side effects can include hallucinations, sedation (including sudden sleepiness, called sleep attacks) and in some people impulse control disorders (impulsive shopping, gambling, hypersexuality and binge eating). Dopamine agonists may also cause dyskinesias, but are less likely than levodopa/carbidopa to do so. Apomorphine may cause severe nausea, and so people using this agent must take an anti-nausea agent. Some clinicians believe that people with PD can develop a withdrawal syndrome when dopamine agonists are stopped, so a gradual decrease in dosage (rather than stopping the medication immediately) may be advised.

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Class/Type and Medications	How It Works	What To Know	Potential Side Effects
COMT Inhibitors (Catechol-O-Methyl Transferase) Entacapone (Comtan®) Tolcapone (Tasmar®)	COMT inhibitors are the newest class of PD medications. These agents have no direct effect on PD symptoms, but instead are used to prolong the effect of levodopa by blocking its metabolism.	COMT inhibitors are used primarily to help with wearing-off, a circumstance in which the effect of levodopa becomes short-lived. Entacapone, in addition to being a COMT inhibitor, is also one of the main ingredients in Stalevo, listed under the first class of medications above.	Side effects include abdominal pain, back pain, constipation, nausea, diarrhea and blood in urine. People who take Tasmar must have regular liver function blood tests. In addition to enhancing the positive effects of levodopa, COMT inhibitors may intensify levodopa side effects including hallucinations and dyskinesia.
MAO-B Inhibitors Rasagiline (Azilect®) Selegiline or deprenyl (Eldepryl®) Selegiline HCl orally disintegrating tablet (Zelapar®)	MAO-B inhibitors block an enzyme in the brain that breaks down levodopa.	These drugs have a modest effect in suppressing the symptoms of Parkinson's. They are used as alternatives to levodopa in the earliest stage of PD, and are approved for use in moderate and advanced PD to boost the effects of levodopa or dopamine agonists. Both rasagiline and selegiline have been studied for possible neuroprotection — i.e., whether the drugs can slow down PD progression. In the case of rasagiline, an FDA advisory committee has concluded that more studies are required before the medication can be approved for this indication.	Depending upon the medication, possible side effects include agitation, dizziness, nausea, headache, rhinitis, back pain, stomatitis, dyspepsia, postural hypotension and indigestion. MAO-B inhibitors may aggravate dopaminergic side effects including dyskinesia and hallucinations. Insomnia is more common with selegiline; therefore it should be taken no later than 1:00 PM.
Anticholinergics Benztropine mesylate (Cogentin®) Procyclidine (not currently available in the US) Trihexyphenidyl (Artane®)	Anticholinergics do not act directly on the dopaminergic system. Instead, they decrease the activity of acetylcholine, a neurotransmitter that regulates movement and memory.	Anticholinergics are the oldest medications for Parkinson's but they are no longer widely used because of the availability of many other more effective agents. The drugs are used for people with early onset PD who experience mainly tremor. Anticholinergics may ease dystonia that is associated with wearing-off or peak-dose effects.	Potential adverse effects include blurred vision, dry mouth, constipation and urinary retention. Many people with PD taking anticholinergics complain of "fogginess" and memory problems. Since older individuals are susceptible, these agents should be avoided in individuals over the age of 70.
Others Amantadine Droxidopa (Nothera™) Rivastigmine tartrate (Exelon®)	Amantadine promotes the release of dopamine from nerve terminals, blocks its re-uptake and inhibits a glutamate receptor in the brain. It may decrease the activity of acetylcholine, which regulates movement and memory. Droxidopa is a synthetic precursor of norepinephrine, which works to increase blood pressure. Rivastigmine tartrate inhibits enzymes that break down acetylcholine.	In the early stages of PD, amantadine is a mild agent that can be used to help tremor. Droxidopa is available for the treatment of neurogenic orthostatic hypotension, a form of low blood pressure affecting people with PD. In later stages of PD, amantadine has also been found useful in reducing dyskinesias that may occur with levodopa or dopamine agonists. Rivastigmine tartrate is the only medication approved by the FDA for the treatment of dementia in PD. It should be started in low doses, which may be increased.	Amantadine is well-tolerated, but its potential side effects include dry mouth, constipation, urinary retention, ankle swelling and a mottled skin rash. In later stages of PD, amantadine may aggravate hallucinations. Droxidopa carries a black box warning indicating that its use carries an increased risk of supine hypertension, which is when one's blood pressure does not drop as it is supposed to when lying down and, as a result, can lead to stroke. Rivastigmine tartrate side effects include diarrhea, dizziness, weakness, drowsiness, trouble sleeping, headache, increased sweating, loss of appetite, nausea, upset stomach and weight loss.
A full description of each medication is beyond the scope of this fact sheet, but can be found on PDF's website at www.pdf.org/meds_treatments . (As of April 10, 2015)			

If you have or believe you have Parkinson's disease, then promptly consult a physician and follow your physician's advice.
 This publication is not a substitute for a physician's diagnosis of Parkinson's disease or for a physician's prescription of drugs, treatment or operations for Parkinson's disease.

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