
Most people impacted by Parkinson's are familiar with dopamine…or the lack thereof. But for those who may be unfamiliar, dopamine is a neurotransmitter and hormone made in your brain. It plays a significant role in many of our body's functions including (but not limited to) movement, mood, motivation, decision making, and more. For reasons we don't fully understand, people with Parkinson disease slowly lose the ability to produce dopamine. And, when enough of those dopamine-producing cells have died or become impaired (typically around the 80% mark) symptoms of Parkinson's develop. The solution may seem clear – just take dopamine. Unfortunately, dopamine cannot be given directly as it is unable to enter the brain/cross the blood-brain barrier. This is where levodopa or L-Dopa (as it is also known) comes into play.

Developed in the late-60s Levodopa is considered one of the most important breakthroughs in the history of medicine. Levodopa is widely considered the "gold standard" or "first-line" and most effective medication for treating Parkinson disease. It is an organic compound that is absorbed into the blood (via the small intestine), passes into the brain, and is then converted into dopamine. Levodopa is almost always combined with either carbidopa or benserazide; both of which help prevent the breakdown of levodopa in the bloodstream so more can get into the brain and changed into dopamine. Both also may also lessen some of the side effects that can accompany Levodopa (more on that in a little bit). Levodopa/carbidopa may also be combined with entacapone, a COMT inhibitor (more on those on page 14). In Canada, Levodopa is available in tablet, capsule, intestinal gel, and solution forms (more on the latter two in our Fall issue).

Levodopa (and it's / carbidopa or / benserazide companions) can be prescribed on their own, or with other medications such as dopamine agonists, MAO-B inhibitors, etc to enhance effectiveness and/or address a variety of PD symptoms.

## How Does it Work? Is it Working?

The main action of levodopa is as a dopamine replacement agent. Levodopa doesn't slow down or cure Parkinson disease, but it can help control symptoms that make it hard to move. It is best at treating motor symptoms in Parkinson's like bradykinesia (slow movement), and rigidity/stiffness, and can also be beneficial for some when it comes to tremor. Levodopa will not "erase" these symptoms, rather allow for less stiffness or rigidity and a person may report it feels a little easier to move.

These medications are usually started at smaller doses and are slowly increased. This is done to help prevent possible side effects, though that isn't always the case. It does take the brain and body some time to adapt to the medications, so it is not uncommon for your medication schedule to increase slowly over a couple weeks. Sometimes a newly diagnosed person doesn't feel the effect, in fact most people report "I don't notice much difference." However, a true evaluation of the medication's effect can be observed and understood by a health care professional doing a neurological exam. A comparison from before you started taking medication to being on medications does provide the examiner with evidence of the effect. If you have had Parkinson's for a while, you have likely experienced fluctuations and may be able to feel/notice when you are ON vs OFF, or the difference when medication adjustments are made.

As Parkinson's progresses overtime it can feel like the levodopa is not "working". Rest assured; the levodopa is working, it is just that over time, people with Parkinson's will need to take more levodopa. This is due to the progression of the disease rather than medication's effects diminishing.

| | |
|---|---|
| **Levodopa/Carbidopa**<br>» Tablet<br>o Sinemet<br>o Levocarb | This medication is taken orally, is available in different strengths, and comes in both immediate- and controlled-release (CR). The difference is that the CR pills have a coating on them which prevents them from breaking down quickly. Because of the coating, these pills should not be broken or crushed. It is important to note that due to the coating, the CR version is not as easily absorbed in the gut; making the medication effect sometimes harder to distinguish and/or inconsistent.<br><br>It is important to know that there are often numbers imprinted on the tablet(s) - this number is related to the manufacturer, NOT the dose or strength of the medication. |
| » Intestinal gel<br>o Duodopa | This medication is delivered via a surgical pump system directly into the small intestine. |
| » Solution<br>o Vyalev | Foslevodopa/Caribdopa is a soluble formula of levodopa/carbidopa. This medication is delivered subcutaneously (under the skin) via a non-surgical pump system. |
| **Levodopa/Benserazide**<br>» Capsule<br>o Prolopa | This medication is taken orally and comes in different strengths. It is important to note that with the capsule formulation, the medication cannot be broken or chewed. It is NOT recommended to open the capsule and consume only the contents. |
| **Levodopa/Carbidopa with Entacapone**<br>» Tablet<br>o Stalevo | This combination medication contains dopamine replacement and a COMT inhibitor in one tablet. It comes in different strengths, shapes, and sizes (depending on the dose). This medication is coated and should NOT be broken in half. |

## Side Effects

A side effect is an unwanted response to a medication when it is taken in normal doses. Side effects can be mild or severe, temporary or permanent. As with any other medication, there is the potential for side effects. A reminder that side effects will vary from person to person. The some of the side effects of levodopa (and its varying combinations) include (but are not limited to):

- Nausea and/or vomiting
  - This is often lessened when levodopa is taken combined with carbidopa or benserazide
- Dizziness/lightheadedness
- Loss of appetite
- Confusion (typically in older individuals)
- May cause saliva, urine, or sweat to turn a dark color
- Dyskinesia (involuntary, erratic movements) may occur - Major risk factors for developing dyskinesia include higher levodopa doses, younger age at diagnosis and longer course of disease.

If you experience nausea with levodopa, taking your pills with food can sometimes help to reduce feelings of nausea. Sometimes the nausea will go away once your body gets used to taking the medication. For some (but not all) people, protein seems to interfere with the way levodopa works. The protein may affect how well the drug is absorbed by the body. If this is true for you, you may benefit from taking your medication 30 minutes before a meal that contains protein.

Levodopa (and its varying combinations) remains the most effective medication for treatment of the motor symptoms of Parkinson disease. If you have any questions or concerns, never hesitate to ask your doctor or pharmacists about your medication.