

ABRIDGED PARKINSON'S GLOSSARY

A guide for the terms you may hear and wonder “What is that?”

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World Parkinson Coalition
www.WorldPDCoalition.org

Akinesia: Literally, means loss of movement also described as lack (or marked slowness) of voluntary movements. It is usually interchangeably with bradykinesia (see below).

Anticholinergics: A type of medication that interferes with the action of acetylcholine (see above) in order to try and restore the balance between dopamine and acetylcholine. They are not recommended for use in the elderly because they cause confusion.

Basal ganglia: Clusters of neurons that include the caudate nucleus, putamen, globus pallidus and substantia nigra which are located deep in the brain and play an important role in movement. Cell death in the substantia nigra contributes to Parkinsonian signs.

Biomarker: An early indicator that a person may have a disease, such as Parkinson's. A biomarker, if present, could indicate that the person has a disease before symptoms of that disease appear. There is a search for biomarkers for PD. Biomarkers could be a chemical, clinical, physiologic or imaging finding.

Blood brain barrier: The separating membrane between the blood and the brain; a tight physical barrier that normally keeps immune cells, chemicals and drugs out of the brain.

Bradykinesia: Literally, means slowness of movement. It is commonly used synonymously with akinesia and hypokinesia. Bradykinesia is a clinical hallmark of Parkinsonism.

Carbidopa: A drug given with levodopa. Carbidopa blocks the enzyme dopa decarboxylase, thereby preventing levodopa from being metabolized to dopamine. Because carbidopa does not penetrate the blood brain barrier(see above), it only blocks levodopa metabolism in the peripheral tissues and not in the brain, thereby reducing side effects but increasing the effectiveness of levodopa.

Carer/Care Partner: A name used to describe anyone who provides help or support of any kind to a relative or friend.

Chronic: (opposite: acute) Chronic diseases are of long duration. Chronic diseases are typically of subtle onset and slow worsening over time. The term does not imply anything about the severity of a disease.

Cognition: Mental processes including attention, remembering, producing and understanding language, solving problems and making decisions.

Cognitive: Relating to mental activity such as thinking, reasoning, making judgments and remembering.

Complementary Therapies: These are non-medical treatments, which many people use in addition to conventional medical treatments, such as Alexander Technique (see above), aromatherapy, music and art therapies, reflexology, osteopathy.

Controlled Release Drugs: These are special preparations of drugs that release the drug into the body slowly and steadily rather than all at once. They keep the amount of the drug in the blood stream at a steadier level than the 'ordinary' version of the same drug.

Dementia: A decline in cognitive function due to damage or disease in the brain beyond what might be expected from normal aging. Areas particularly affected include memory, attention, judgment, language, planning and problem solving.

Depression: A state of low mood. Some consider it a dysfunction, while others see it as an adaptive defense mechanism.

Dopa decarboxylase inhibitors (DDI): Drugs (such as carbidopa and benserazide) that inhibit the metabolism of levodopa to form dopamine. By inhibiting dopa decarboxylase only in the peripheral organs (not CNS), levodopa concentration is increased and more can enter the brain. These drugs are particularly useful in Parkinson's when used with levodopa.

Dopamine: A small chemical molecule that is one of the brain's neurotransmitters. It is found particularly in cells within the substantia nigra. These cells project to the striatum in the basal ganglia. Deficiency of dopamine causes symptoms of Parkinsonism.

Dopamine agonist: A compound that activates dopamine receptors, other than dopamine. Examples include, bromocriptine mesylate (Parlodel), pramipexole (Mirapex), ropinirole hydrochloride (Requip), apomorphine (Apokyn), rotigotine (Neupro patch) and lisuride. These act like dopamine, but are not actually dopamine. They can be used in both the early and late stages of Parkinson's disease. They are the second most powerful type of anti-Parkinson medication after levodopa. They can cause side effects such as sleepiness, sleep attacks, ankle swelling, hallucinations and impulse control problems, more commonly than levodopa does.

Dysarthria: Impaired speech function.

Dyskinesia: Abnormal involuntary movements; hyperkinesia.

Dysphagia: Difficulty in swallowing.

Glutamate: An amino acid and the main excitatory neurotransmitter in the human brain. The major input to the striatum is from the cerebral cortex. These corticostriatal neurons use glutamate as their neurotransmitter.

Gut microbiome: the complex community of microorganisms that live in the digestive tracts of humans and other animals.

Growth factors: Naturally occurring substances (usually proteins) that help maintain the health of neurons and encourage cell growth, proliferation and differentiation. Some growth factors are being looked at to try to promote the survival of the neural cells that are degenerating in Parkinson's.

- Glial cell line derived nerve growth factor (GDNF): Thought to promote the health of dopamine neurons.
- Brain-derived nerve growth factor (BDNF): Also supports dopamine neurons.

Idiopathic: Arising from an unknown cause.

Impulse control disorder (ICD): A set of psychiatric disorders characterized by an inability to control one's actions, in particular those that might bring harm to oneself or others. Common ICDs in patients receiving dopamine agonists are pathologic gambling, compulsive eating, compulsive shopping and hypersexuality.

Interdisciplinary care: multiple healthcare professionals collaborating to provide care with a common perspective, often involving joint consultations.

Leucine rich repeat kinase 2 (LRRK2): A protein created by the LRRK2 gene which when mutated can lead to Parkinson's. Several different disease causing LRRK2 gene variants have been found in Parkinson's patients, but there may also be variants within the general population that do not necessarily cause disease.

Levodopa (L-DOPA): A chemical that is the precursor to dopamine. It can pass through the blood-brain barrier (whereas dopamine cannot). Once it has entered the central nervous system, L-dopa is converted into dopamine by aromatic L-amino acid decarboxylase (DOPA decarboxylase/DDC). L-DOPA is also converted into dopamine within the peripheral nervous system, but this is usually blocked by employing peripherally-active dopa decarboxylase inhibitors.

Lewy bodies: A pathologic hallmark of Parkinson's disease and dementia with Lewy bodies. First described by Frederic Lewy, Lewy bodies are seen microscopically as inclusions in neurons in several brain regions, including the substantia nigra and locus ceruleus. One protein seen is alpha-synuclein in an aggregated form. Aggregates of this protein in axons are called Lewy neurites.

MAO (monoamine oxidase): A family of enzymes with two subtypes: MAO-A and MAO-B. These catalyze the oxidation of amine molecules (replacing the amine group with an oxygen molecule.)

- MAO B inhibitors: These drugs (e.g. selegiline, rasagiline) inhibit the breakdown of dopamine via MAO-B enzyme and do not cause the "cheese effect" of hypertension.

Motor skills: The degree of control or coordination provided by brain control of the skeletal muscles.

Motor symptoms: Symptoms that involve movement, coordination, physical tasks or mobility. These include, among others: resting tremor, bradykinesia, rigidity, postural instability, freezing, micrographia, mask-like expression, unwanted accelerations, stooped posture, dystonia, impaired motor dexterity and coordination, speech problems, difficulty swallowing, muscle cramping, and drooling of saliva. (*Also see: non-motor symptoms*)

Multidisciplinary care: care given by multiple healthcare professionals each approaching the patient from their professional perspective, often involves separate, individual consultations.

Neurological conditions: disorders caused by damage or malfunctioning of the brain or nervous system.

Neurologist: A doctor who specializes in the diagnosis, care and treatment of disorders of the brain or nervous system.

Neuroprotection: Mechanisms within the nervous system that would protect neurons from dying due to a degenerative disease or from other types of injury.

Neuroprotective: serving to protect neurons from injury or degeneration, could possibly have an effect that may result in salvage, recovery or regeneration of the nervous system, its cells, structure and function.

Neurotransmitter: A chemical messenger in the nervous system that permits communication between two neuronal cells, normally across a synapse. The neurotransmitter is released from the nerve terminals on the axons. Examples of neurotransmitters include dopamine, acetylcholine, adrenaline, noradrenaline, serotonin, glutamate, and GABA.

Non-motor symptoms: Symptoms that do not involve movement, coordination, physical tasks or mobility, including loss of sense of smell, constipation, sleep disorders or disturbances, mood disorders, orthostatic

hypotension, bladder problems, sexual problems, excessive saliva, weight loss or gain, vision and dental problems, fatigue, depression, fear and anxiety, skin problems, and cognitive issues. (*See motor symptoms*)

Occupational Therapist: Occupational therapists are concerned with assessing a person's home or work situation and then devising ways to make them more manageable and less hazardous. They can also advise on aids and equipment and leisure activities.

On and Off: The clinical states of PD while being treated with levodopa, which commonly causes clinical fluctuations after a few years of treatment. The "on" state is when the PD symptoms and signs are reduced by levodopa. The "off" state is when the benefit has been reduced or lost. The most common type of "off" is wearing-off, due to the levodopa's benefit not lasting more than 4 hours after a dose. Sudden and unpredictable "off" states can also occur, but are less common. "Off" states usually will respond to another dose of levodopa. Clinical fluctuations are considered a complication of levodopa therapy.

Orthostatic hypotension: A drop in blood pressure when a person is standing. It can be a complication of medications, but can sometimes be due to Parkinsonism itself.

Parkinson-plus syndromes: A group of neurodegenerative diseases featuring the classical features of Parkinsonism (rigidity, akinesia/ bradykinesia, postural instability and less commonly tremor) with additional features that distinguish them from typical Parkinson's disease.

Parkinson-plus syndromes include multiple system atrophy (MSA), progressive supranuclear palsy (PSP), and corticobasal degeneration (CBD).

Parkinsonism: A group of neurological diseases whose features include slowness and paucity of spontaneous movement (bradykinesia), rest tremors, rigidity of the muscles, loss of postural reflexes, flexed posture and freezing of gait.

Parkinsonian gait: With bradykinesia, gait is slow, short paced and with a tendency to shuffle, associated with decreased arm swing. Freezing of gait can also occur in Parkinsonism.

Physical therapist: Physical therapists use physical means such as exercise and manipulation to help prevent or reduce stiffness in joints and restore muscle strength. They can also advise on aids and equipment to help with movement problems.

Placebo: A simulated or inert form of treatment without known proven benefit on a symptom or a disease. A pill serving as a placebo is colloquially called a "sugar pill." When placebos provide benefit, it is called a placebo effect. Placebos are employed in controlled clinical trials along with the active drug being tested. The difference in responses between the two drugs is considered the true effect of the active drug. Surgical trials can also utilize a placebo arm in which sham or simulated surgery is performed in the control group. The mechanism of how placebos provide benefit may be associated with release of dopamine in the brain.

Receptor: A protein structure typically embedded in the cell membrane with which neurotransmitters and drugs interact.

REM (rapid eye movement) sleep behavior disorder (RBD): A sleep disorder that involves movement and abnormal behavior during the sleep phase with rapid eye movements - the stage of sleep in which dreaming occurs. In normal sleep, muscles are paralyzed during dreaming, except for the eye movements. In RBD, muscles are not paralyzed so that the dreamer acts out his or her dreams. RBD is common in people with Parkinson's disease or MSA.

Restless leg syndrome (RLS): A neurological disorder characterized by unpleasant sensations in the legs, like the feeling of ants crawling underneath the skin. These sensations usually occur in the late evening and during sleep. Walking around relieves the sensation, hence the term "restless legs." RLS interferes with sleep and is common in people with PD. Medications, such as dopamine agonists, levodopa and opioids, can be effective treatments.

Rigidity: A special type of muscle stiffness, which is one of the main symptoms of Parkinson's disease. The muscles tend to pull against each other instead of working smoothly together.

Shuffling gait: Refers to short, slow steps, with feet close to the ground or dragging along the ground. This gait is often seen in people with advanced Parkinson's disease.

Speech language pathologist (SLP): SLP's treat problems associated with speech and swallowing. They can also advise on communication aids, which may sometimes be helpful.

Stem cells: Biological cells found in all multicellular organisms, that can divide (through mitosis) and differentiate into diverse specialized cell types and can self-renew to produce more stem cells. They are a potential line of treatment in Parkinson's, either by directly replacing the old nigrostriatal neuronal cells or by creating growth factor releasing cells. Problems have arisen due to the inability to stop growth, which may cause tumor growth.

Substantia nigra: (Latin for black substance). A brain structure located in the midbrain that plays an important role in reward, addiction, and movement. Parts of the substantia nigra appear darker than neighboring areas due to high levels of neuromelanin in dopaminergic neurons. The substantia nigra is the site of the brain's major collection of dopamine neurons, which project their axons to the striatum, the so-called nigrostriatal pathway. These neurons slowly die in PD. The substantia nigra is part of the basal ganglia; the other parts of the basal ganglia include the striatum (caudate nucleus, putamen, and nucleus accumbens), globus pallidus, and subthalamic nucleus. The substantia nigra is made up of two parts: the pars compacta and the pars reticulata.

Subthalamic nucleus (STN): A small lens-shaped nucleus involved in movement control. As suggested by its name, the subthalamic nucleus is located below the thalamus. It is part of the basal ganglia. It receives input from the cerebral cortex and from the globus pallidus interna. It sends its output mainly to the globus pallidus externa and interna. It is a component of the "indirect pathway" within the basal ganglia. It is "overactive" in PD due to loss of inhibitory incoming fibers. It is a common target in deep brain stimulation for PD.

T.R.A.P.: Acronym for four primary Parkinson's disease symptoms:

- Tremor: Shaking of limb (usually hands) while they are at rest.
- Rigidity: Muscle stiffness and resistance to movement.
- Akinesia/bradykinesia: Slow movement or difficulty initiating voluntary body movements; Slowed ability to start and continue movements.
- Postural instability: Loss of postural stability can cause falls and produce a feeling of unsteadiness.

Tremor: Involuntary shaking, trembling or quivering movements of the muscles. In Parkinson's disease it is characteristically a resting tremor, which lessens with movement and is aggravated by stress. It can occur in any part of the body, although it often begins in one hand or arm. Although it is one of the main symptoms of Parkinson's disease, not everyone will have a tremor.