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AN OVERVIEW ON PARKINSON'S DISEASE - A NEURODEGENERATIVE DISORDER

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Abstract

Parkinson's disease (PD) is a common neurodegenerative disease typified by a movement disorder consisting of bradykinesia, rest tremor, rigidity, and postural instability. However, these do not alter disease course and do not treat the non-dopamine-dependent features of PD such as freezing of gait, cognitive impairment, and other non-motor features of the disorder, which often have the greatest impact on quality of life. As understanding of PD pathogenesis grows, novel therapeutic avenues are emerging. In this latter regard, there has been much interest in drug repurposing (the use of established drugs for a new indication), with many drugs being reported to affect PD-relevant intracellular processes. In this review, we provide an overview of the novel therapeutic approaches that are close to, or are already in, clinical trials.

Introduction

Parkinson's disease (PD) is a common neurodegenerative disease characterised by a movement disorder consisting of bradykinesia, rest tremor, and rigidity, along with postural instability, a range of other more-subtle motor features, and many non-motor feature. Parkinson's disease is a condition where a part of your brain deteriorates, causing more severe symptoms over time. While this condition is best known for how it affects muscle control, balance and movement, it can also cause a wide range of other effects on your senses, thinking ability, mental health and more. Parkinson's disease is very common overall, ranking second among age-related degenerative brain diseases. It's also the most common motor (movement-related) brain disease. Experts estimate that it affects at least 1% of people over age 60 worldwide.

Two types of symptoms are well known for parkinson's diseases,

- Motor- Related symptoms
- Non-motor related symptoms

Levodopa, the precursor of dopamine, was first developed for the treatment of PD in the 1960s and continues to be the most-effective therapeutic agent for PD in 2020. Other dopaminergic drugs have since been used ,but they are less tolerated and less effective.

An expanding number of drugs are being considered for their ability to influence the pathogenic processes of PD, include novel agents and technologies,

such as active and passive immunisation and RNA interference techniques to limit the propagation, and synthesis, of α-synuclein.

What causes this condition?

The causes of the parkinson's diseases genetic. When parkinson's diseases isn't genetic ,Experts classify it as a "idiopathic"(diseases of it's own). Many conditions look like Parkinson's disease but are instead parkinsonism (which refers to Parkinson's disease-like conditions) from a specific cause like some psychiatric medications. Parkinson's diseases is caused by a loss of nerve cell in the part of the brain called **the substantia nigra.**

How does this condition affect my body?

Parkinson's disease causes a specific area of your brain, the basal ganglia, to deteriorate. As this area deteriorates, you lose the abilities those areas once controlled. Researchers have uncovered that Parkinson's disease causes a major shift in your brain chemistry. Under normal circumstances, your brain uses chemicals known as neurotransmitters to control how your brain cells (neurons) communicate with each other. When you have Parkinson's disease, you don't have enough dopamine, one of the most important neurotransmitters.

When your brain sends activation signals that tell your muscles to move, it fine-tunes your movements using cells that require dopamine. That's why lack of dopamine causes the slowed movements and tremors symptoms of Parkinson's disease. As Parkinson's disease progresses, the symptoms expand and intensify. Later stages of the disease often affect how your brain functions, causing dementia-like symptoms and depression.

Diagnosis

Presently, the diagnosis of Parkinson's is primarily based on the common symptoms outlined above. There is no X-ray or blood test that can confirm the disease. However, noninvasive diagnostic imaging, such as positron emission tomography (PET) can support a doctor's diagnosis. Conventional methods for diagnosis include.

- The presence of two of the three primary symptoms
- The absence of other neurological signs upon examination
- No history of other possible causes of parkinsonism, such as the use of tranquilizer medications, head trauma or strokeResponsiveness to Parkinson's medications, such as levodopa

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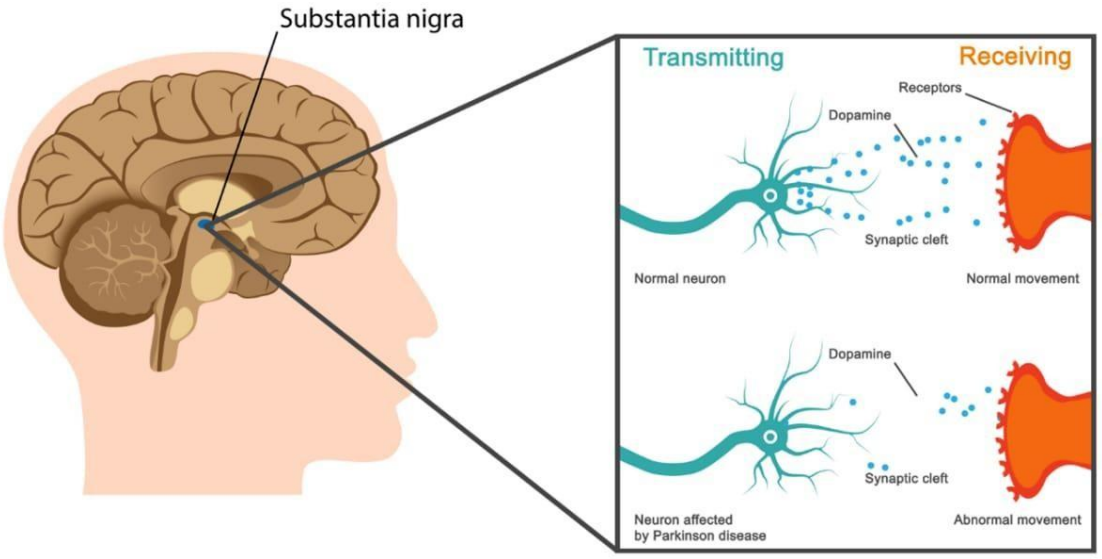


Common Drugs for Parkinson's Disease

Levodopa and carbidopa (Duopa, Rytary,Sinemet). Levodopa (also called L-dopa) is the most commonly prescribed medicine for Parkinson's. It's also the best at controlling the symptoms of the condition, particularly slow movements and stiff, rigid body parts.

Levodopa works when your brain cells change it into dopamine. That's a chemical the brain uses to send signals that help you move your body. People with Parkinson's don't have enough dopamine in their brains to control their movements.

SINEMET :

Sinemet is a mix of levodopa and another drug called carbidopa. Carbidopa makes the levodopa work better, so you can take less of it. That prevents many common side effects of levodopa, such as nausea, vomiting, and irregular heart rhythms.

Sinemet has the fewest short-term side effects, compared with other Parkinson's medications. But it does raise your odds for some long-term problems, such as involuntary movements. An inhalable powder form of levodopa (INBRIJA) and the tablet istradefylline (Nourianz) have been approved for those experiencing OFF periods, OFF periods can happen when Parkinson's symptoms return during periods between scheduled doses of levodopa/carbidopa.

People who take levodopa for 3-5 years may eventually have restlessness, confusion, or unusual movements within a few hours of taking the medicine. Changes in the amount or timing of your dose will usually prevent these side effects.

AMANTADINE :

Amantadine (**Gocovri,** Osmolex ER, Symmetrel) may help people with mild Parkinson's disease**.**It works by raising the amount of dopamine that your brain cells can use, which helps you have fewer Parkinson's symptoms. Recent studies have found that amantadine may help ease the involuntary movements that can happen with levodopa therapy. But it may cause side effects, such as confusion and memory problems.

Dopamine agonists

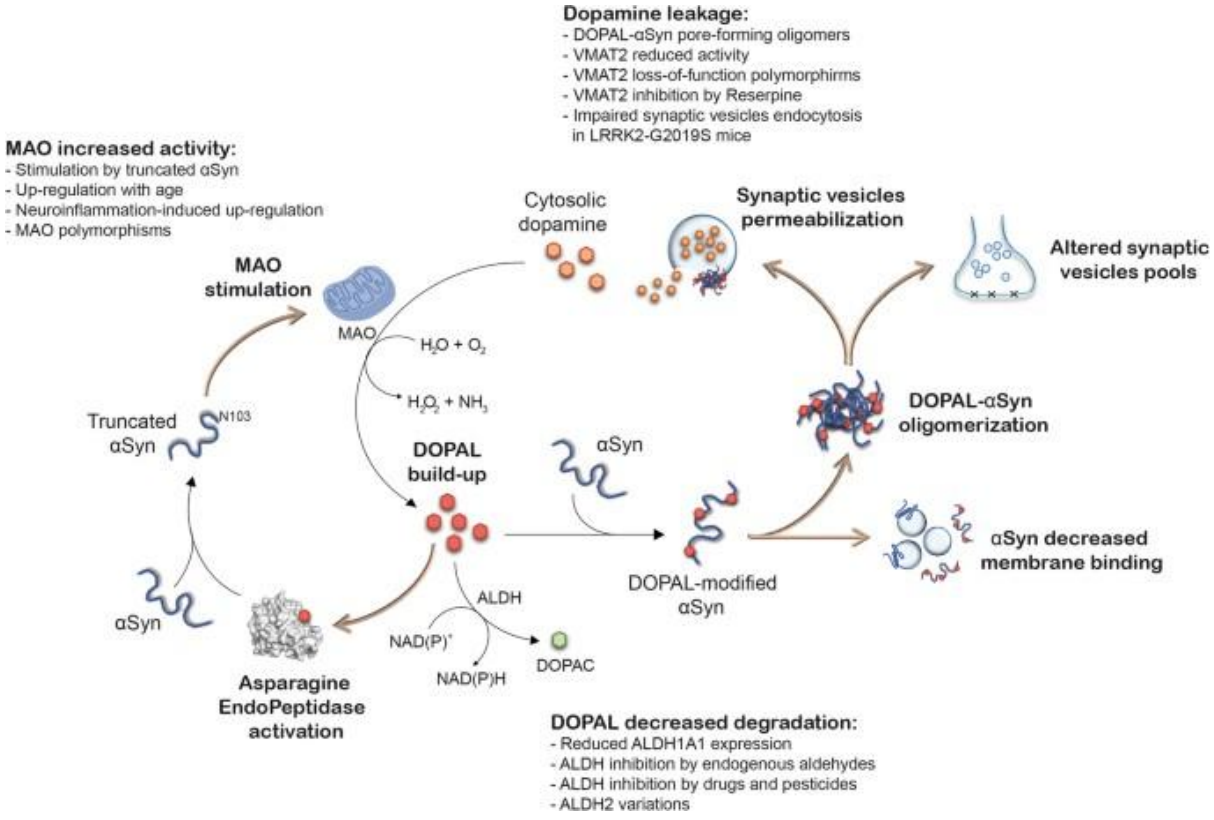
Dopamine agonists act as a substitute for dopamine in the brain and have a similar but milder effect compared with levodopa. They can often be given less frequently than levodopa.They're often taken as a tablet, but are also available as a skin patch (rotigotine).Sometimes dopamine agonists are taken at the same time as levodopa, as this allows lower doses of levodopa to be used. Possible side effects of dopamine agonists include:

- feeling and being sick
- tiredness and sleepiness
- dizziness

Dopamine agonists can also cause hallucinations and increased confusion, so they need to be used with caution, particularly in elderly patients, who are more susceptible.

If you're prescribed a course of dopamine agonists, the initial dose is usually very small to prevent feeling sick and other side effects.The dosage is gradually increased over a few weeks. If feeling sick becomes a problem, your GP may prescribe anti-sickness medication.A potentially serious, but uncommon, complication of dopamine agonist therapy is sudden onset of sleep.This generally happens as the dose is being increased and tends to settle once the dose is stable.People are usually advised to avoid driving while the dose is being increased in case this complication occurs.

Impaired dopamine metabolism in Parkinson's diseases pathogenesis – Molecular Neurodegeneration



COMT Inhibitors

Entacapone and tolcapone are medications that are used to treat fluctuations in response to levodopa. COMT is an enzyme that metabolizes levodopa in the bloodstream. By blocking COMT, more levodopa can penetrate the brain and, in doing so, increase the effectiveness of treatment. Tolcapone is indicated only for patients whose symptoms are not adequately controlled by other medications, because of potentially serious toxic effects on the liver. Patients taking tolcapone must have their blood drawn periodically to monitor liver function.

CLINICAL TRIALS

Much progress has been made in the treatment of Parkinson's disease as the result of clinical trials, where new treatments and treatment combinations are compared with standard ones.

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Surgery

Most people with Parkinson's disease are treated with medication, cases.

This surgery is also available in specialist neuroscience centres around the UK, but it's not suitable for everyone.

If surgery is being considered, your specialist will discuss the possible risks and benefits with you.

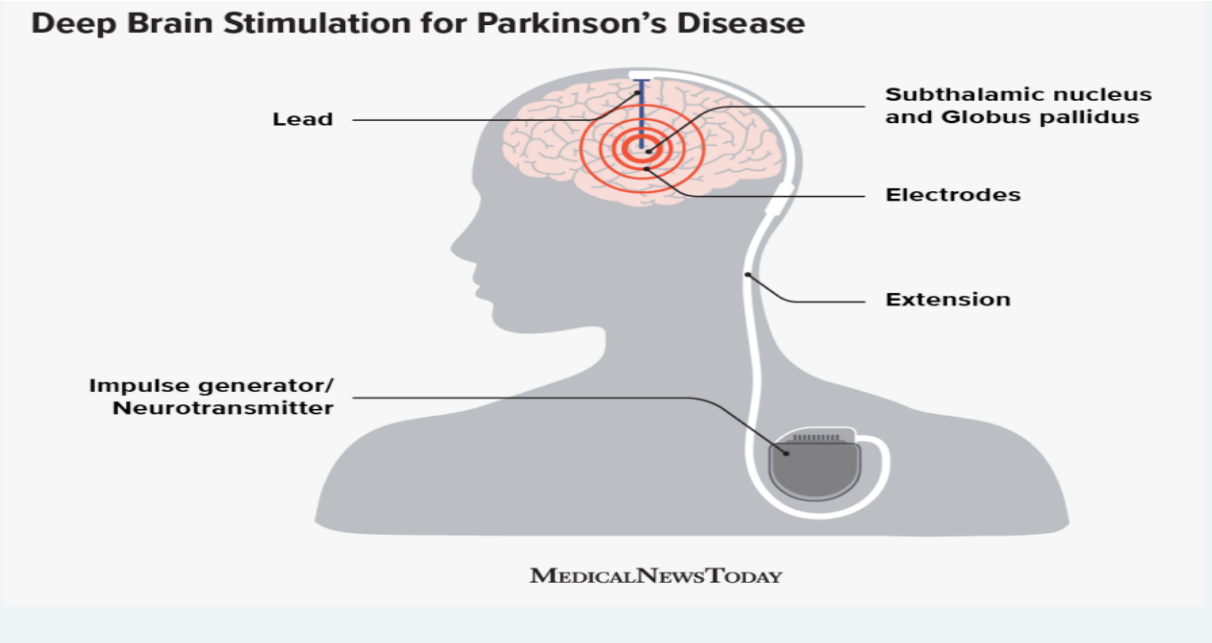
Deep brain stimulation

Deep brain stimulation involves surgically implanting a pulse generator similar to a heart pacemaker into your chest wall.

This is connected to 1 or 2 fine wires placed under the skin, and is inserted precisely into specific areas in your brain.

A tiny electric current is produced by the pulse generator, which runs through the wire and stimulates the part of your brain affected by Parkinson's disease.

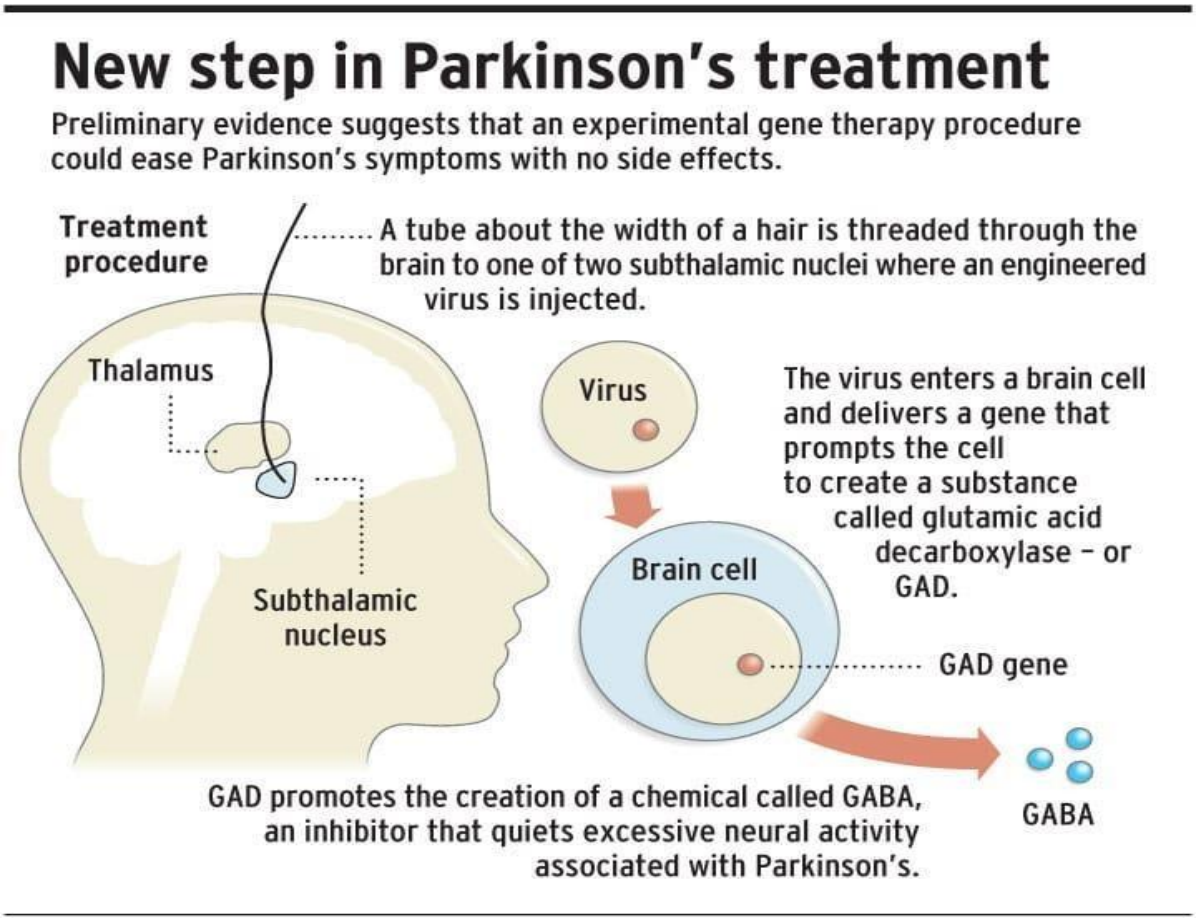
Although surgery does not cure Parkinson's disease, it can ease the symptoms for some people.



Experimental treatments

Researchers are exploring other possible treatments that could help with Parkinson's disease. While these aren't widely available, they do offer hope to people with this condition. Some of the experimental treatment approaches include:

- Stem cell transplants. These add new dopamine-using neurons into your brain to take over for damaged ones.
- Neuron-repair treatments. These treatments try to repair damaged neurons and encourage new neurons to form.
- **Gene therapies and gene-targeted treatments**. These treatments target specific mutations that cause Parkinson's disease. Some also boost the effectiveness of levodopa or other treatments.



Motor-related symptoms

Motor symptoms — which means movement-related symptoms — of Parkinson's disease include the following:

- Slowed movements (bradykinesia). A Parkinson's disease diagnosis requires that you have this symptom. People who have this describe it as muscle weakness, but it happens because of muscle control problems, and there's no actual loss of strength.
- Tremor while muscles are at rest. This is a rhythmic shaking of muscles even when you're not using them and happens in about 80% of Parkinson's disease cases. Resting tremors are different from essential tremors, which don't usually happen when muscles are at rest.
- Rigidity or stiffness. Lead-pipe rigidity and cogwheel stiffness are common symptoms of Parkinson's disease. Lead-pipe rigidity is a constant, unchanging stiffness when moving a body part. Cogwheel stiffness happens when you combine tremor and lead-pipe rigidity. It gets its name because of the jerky, stop-and-go appearance of the movements (think of it as the second hand on a mechanical clock).

Additional motor symptoms can include:

- Blinking less often than usual. This is also a symptom of reduced control of facial muscles.
- Cramped or small handwriting. Known as micrographia, this happens because of muscle control problems.
- Drooling. Another symptom that happens because of loss of facial muscle control.
- Mask-like facial expression. Known as hypomimia, this means facial expressions change very little or not at all.

Non-motor symptoms

Several symptoms are possible that aren't connected to movement and muscle control. In years past, experts believed non-motor symptoms were risk factors for this disease when seen before motor symptoms. However, there's a growing amount of evidence that these symptoms can appear in the earliest stages of the disease. That means these symptoms might be warning signs that start years or even decades before motor symptoms.

Non-motor symptoms (with the potential early warning symptoms in bold) include:

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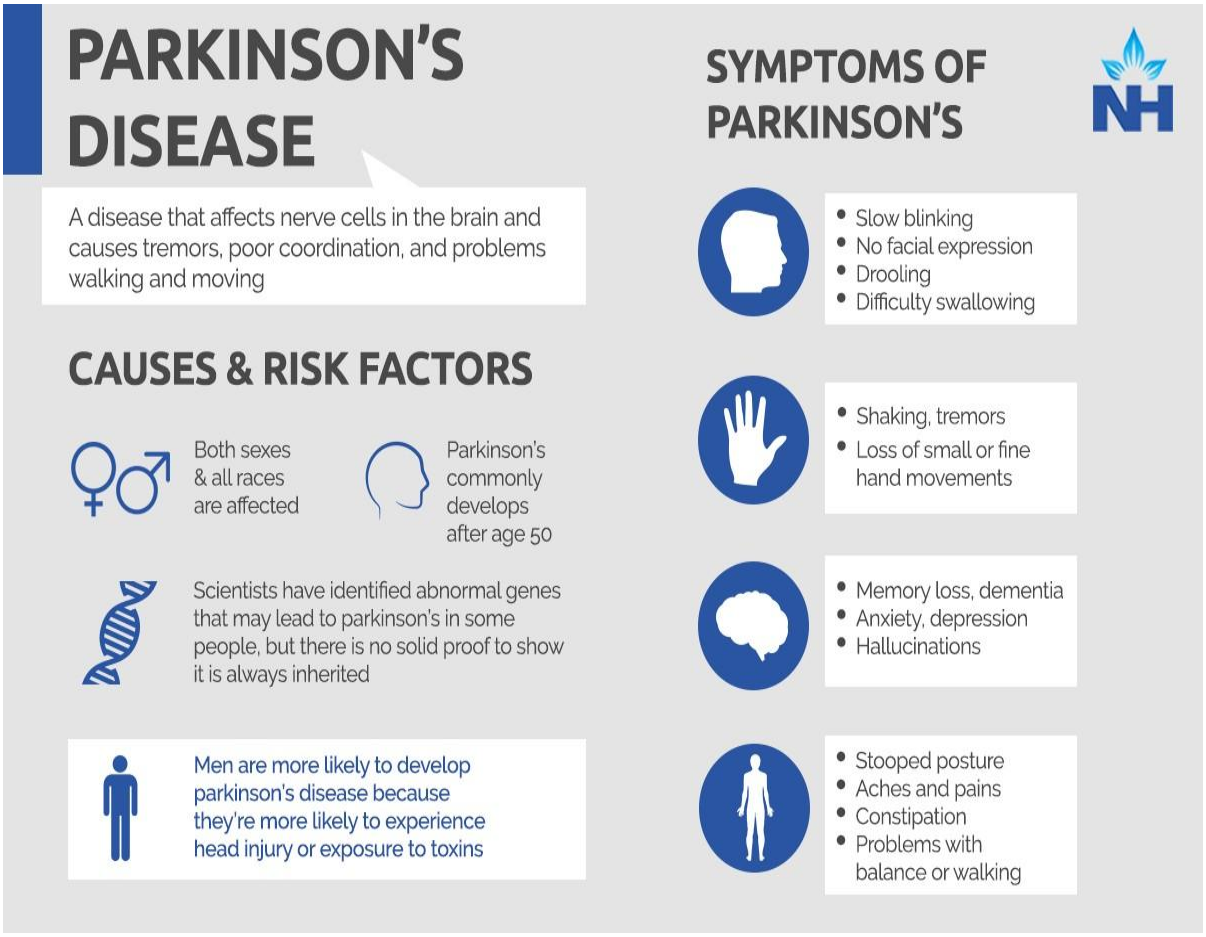
- **Autonomic nervous system symptoms.** These include orthostatic hypotension (low blood pressure when standing up), constipation and gastrointestinal problems, urinary incontinence and sexual dysfunctions.
- **Depression.**
- **Loss of sense of smell (anosmia)**.
- **Sleep problems** such as periodic limb movement disorder (PLMD), rapid eye movement (REM) behavior disorder and restless legs syndrome.
- **Trouble thinking and focusing** (Parkinson's-related dementia).



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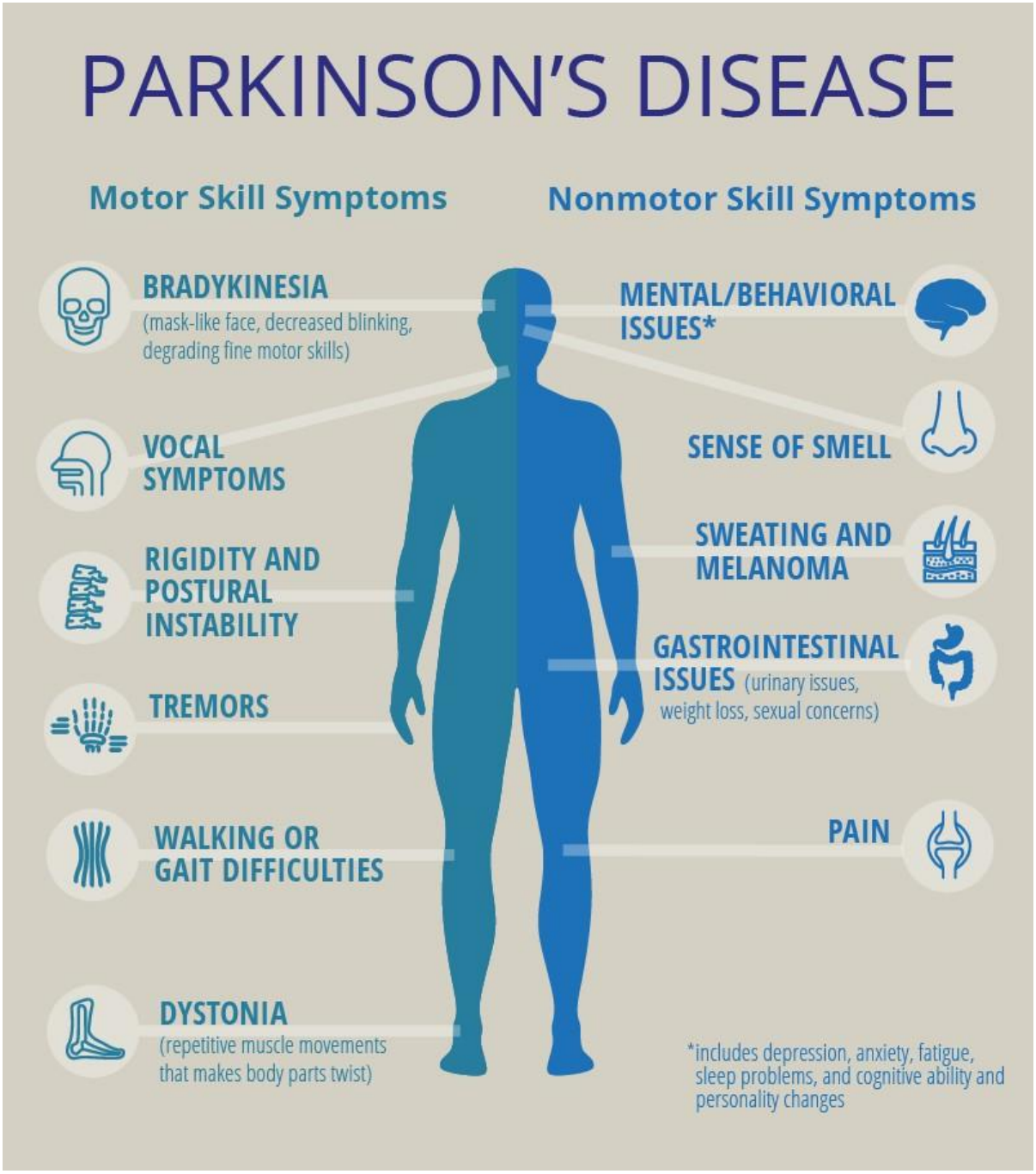

What's the outlook for Parkinson's disease?

Parkinson's disease isn't fatal, but the symptoms and effects are often contributing factors to death. The average life expectancy for Parkinson's disease in 1967 was a little under 10 years. Since then, the average life expectancy has increased by about 55%, rising to more than 14.5 years. That, combined with the fact that Parkinson's diagnosis is much more likely after age 60, means this condition

doesn't often affect your life expectancy by more than a few years (depending on the life expectancy in your country).

Conclusion

A wide variety of experimental treatment approaches for PD have progressed towards the clinic over recent years. Many previous putative treatments have fallen by the wayside when taken to clinical trials, despite being backed up by promising pre-clinical results, emphasising the need for robust trial design. A greater understanding of the pathogenic mechanisms and anatomical basis for PD symptoms has opened up avenues for new treatment modalities, and it now seems probable that the management of PD will evolve significantly over the coming years.

REFERENCES

1. Williams-Gray CH, Worth PF. Parkinson's disease. Medicine.

2. Cotzias GC, van Woert MH, Schiffer LM: Aromatic amino acids and modification of parkinsonism.

3. Henderson EJ, Lord SR, Brodie MA, et al.: Rivastigmine for gait stability in patients with Parkinson's disease

4. Hickey P, Stacy M: Deep Brain Stimulation: A Paradigm Shifting Approach to treat Parkinson's Disease.

5. Hickey P, Stacy M: Deep Brain Stimulation: A Paradigm Shifting Approach to treat Parkinson's Disease.

6. Betarbet R, Sherer TB, MacKenzie G, Garcia-Osuna M, Panov AV, Greenamyre JT. Chronic systemic pesticide exposure reproduces features of Parkinson's disease.