



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

Pharmacists Clinic

Faculty of Pharmaceutical Sciences



The In's and Out's of PD Medications

Parkinson Society of BC Webinar

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UBC Pharmacists Clinic
Faculty of Pharmaceutical Sciences

Discussion Overview

1. Review of Parkinson's Disease (PD)
 - Symptoms
 - Pathophysiology
 - Parkinsonism
2. Medications in PD
 - Medications for symptom management
3. Life-style choices

1. Review of Parkinson's Disease (PD)

Epidemiology of Parkinson's Disease (PD)

- **Second** most common neurodegenerative disorder
- 1% of population over 65 years of age
- Average age of diagnosis is 60
- 20% diagnosed under age of 50

Quiz

The main sign and symptom of PD is:

- a) Tremors
- b) Rigidity
- c) Bradykinesia (slow movement)
- d) Asymmetrical onset
- e) All of the above

Quiz

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Cardinal Symptoms

Chronic neurodegenerative disease characterized by:

- Tremors (initially unilateral)
- Rigidity
- Bradykinesia
- Asymmetrical onset



Other Symptoms

- Changes in smell
- Cognitive decline
- Mood disorders
- Sleep disturbances
- Fatigue
- Hallucinations



Quiz

What causes Parkinson's disease?

- a) Loss of dopamine
- b) Loss of serotonin
- c) Loss of endorphins
- d) Loss of epinephrine

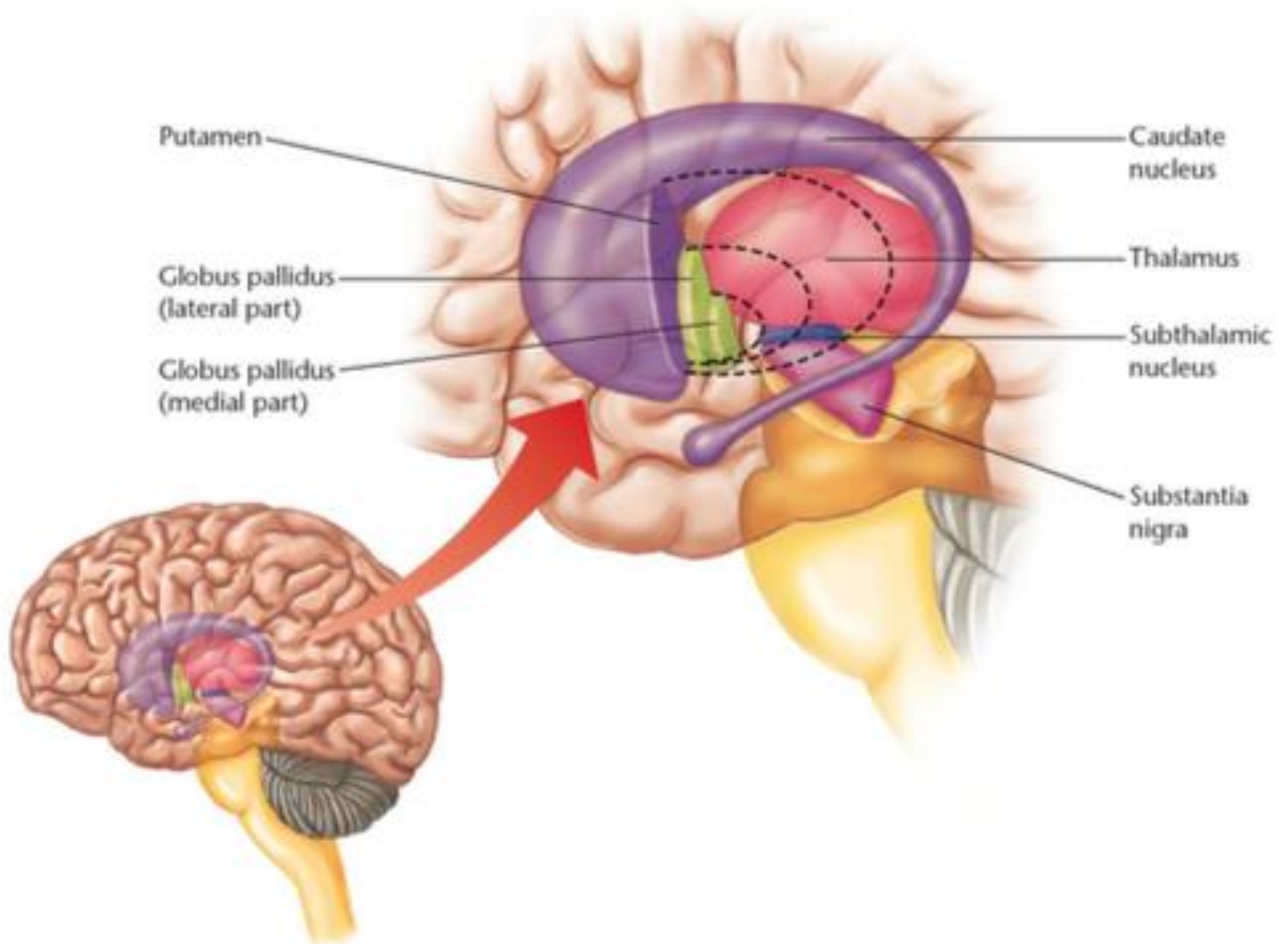
Quiz

What causes Parkinson's disease?

- a) Loss of dopamine
- b) Loss of serotonin
- c) Loss of endorphins
- d) Loss of norepinephrine

PD and Dopamine

- Dopamine is a neurotransmitter (chemical) produced by the brain, and one of its function is to control movement.
- Produced by specialized cells in the brain called *substantia nigra*
- In PD, cells begin to die and stop producing dopamine
- At least 50% of dopamine cells are lost by the time symptoms of PD appear

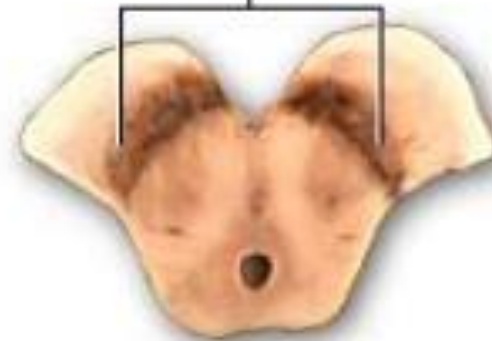




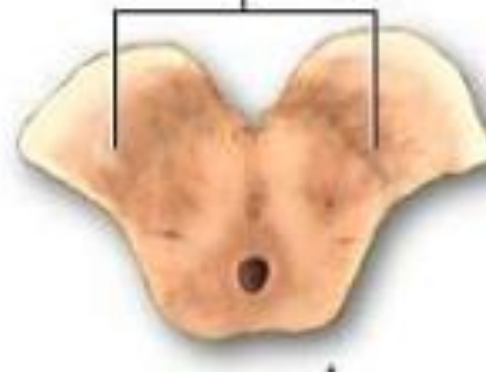
Cut section
of the midbrain
where a portion
of the substantia
nigra is visible



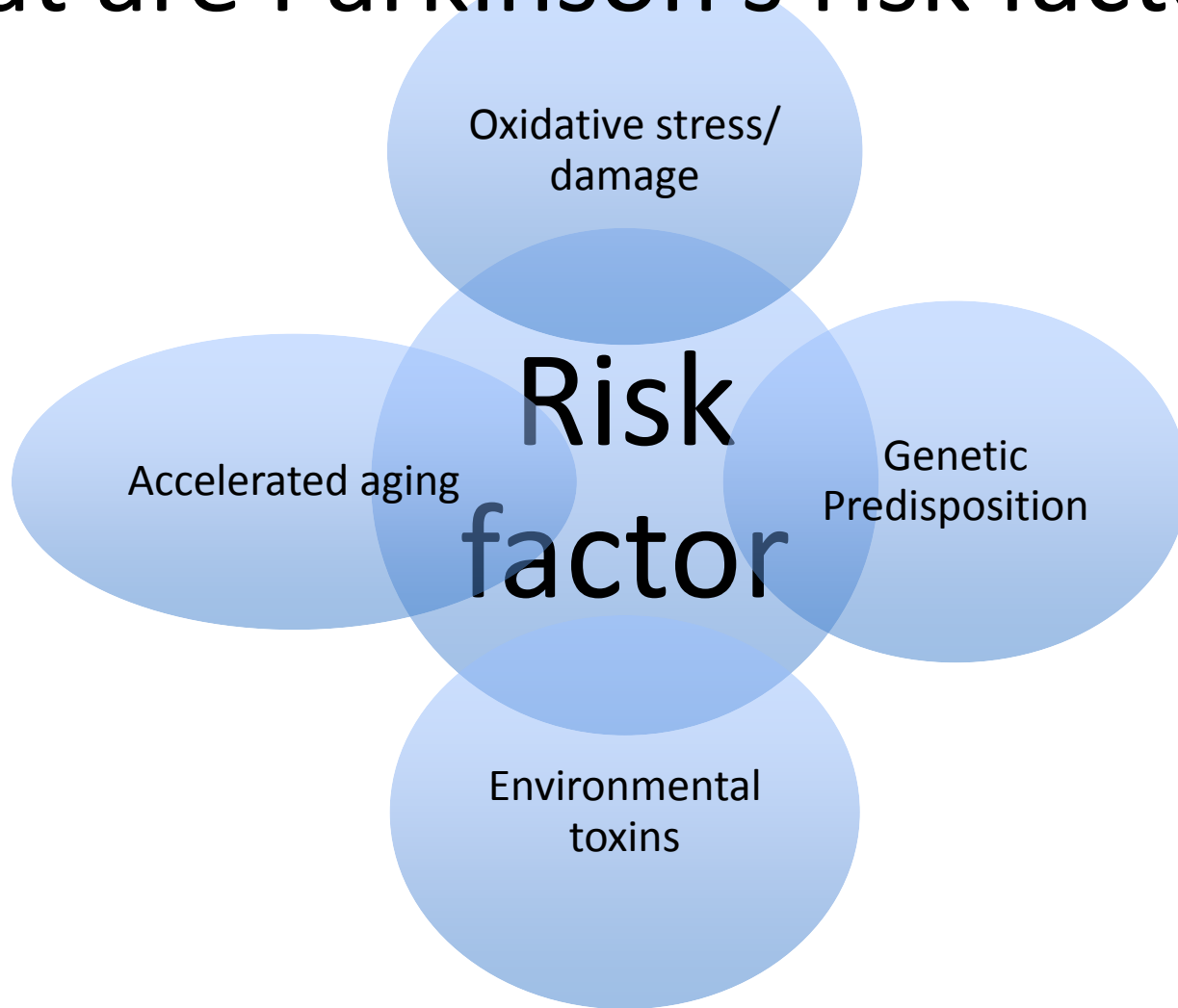
Substantia nigra

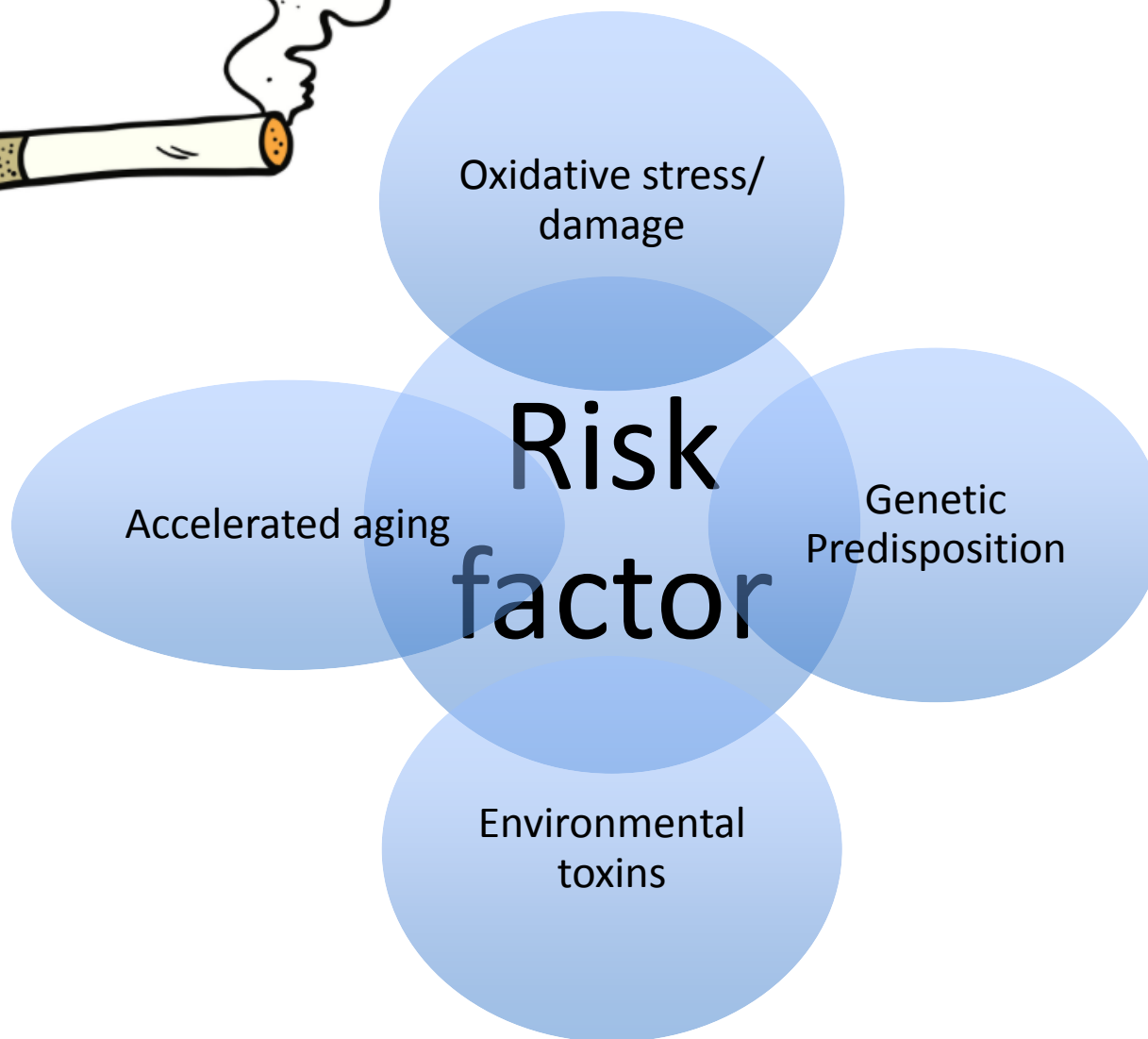


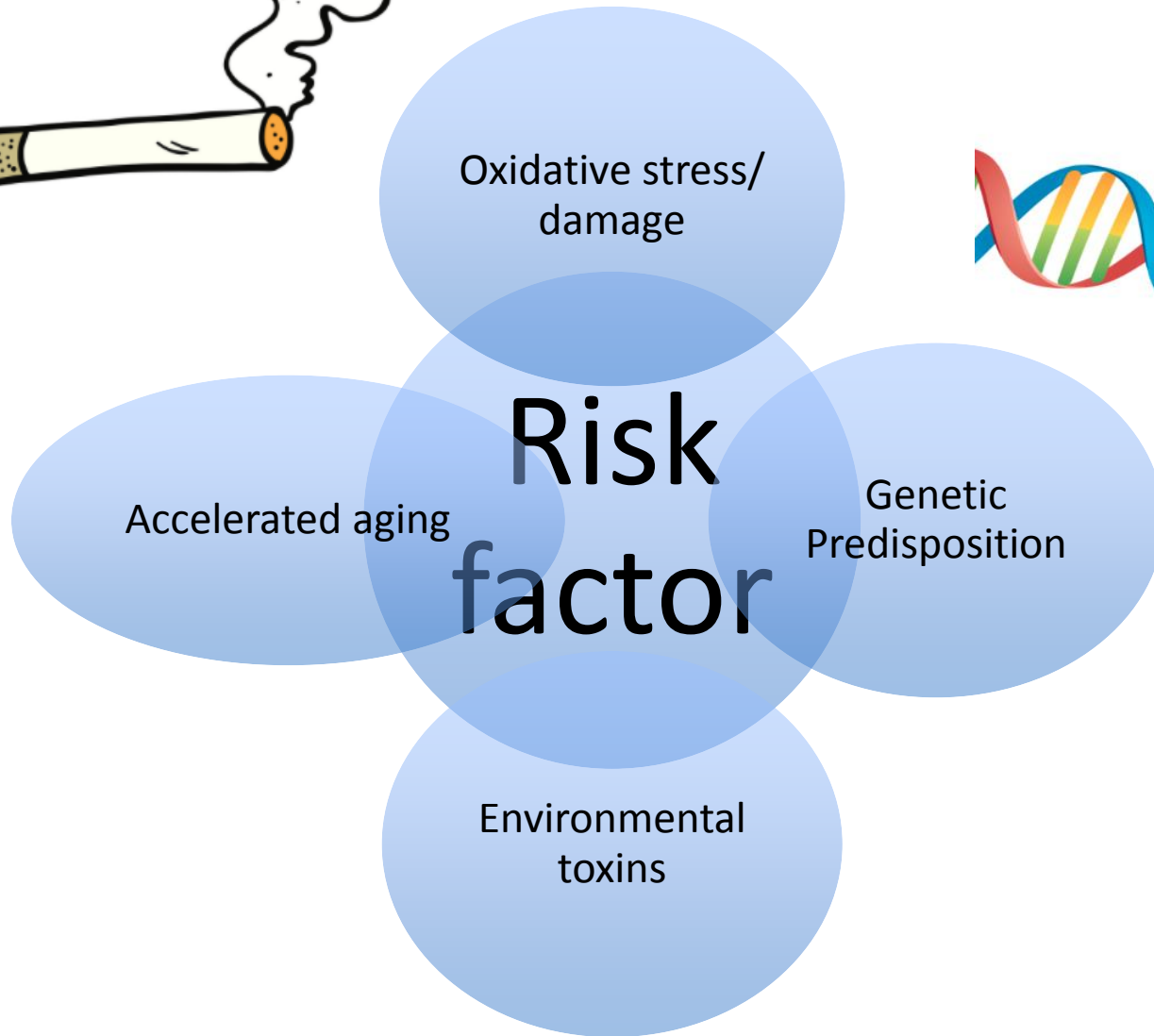
Diminished substantia
nigra as seen in
Parkinson's disease



What are Parkinson's risk factors?









Oxidative stress/
damage

Accelerated aging

PD risk
factors

Genetic
Predisposition

Environmental
toxins

Quiz

What is the difference between Parkinson and parkinsonism?

Parkinsonism

- Most common causes are drug-induced
- Symptoms are very similar to PD, but when offending agent is stopped, the symptoms disappear
- Parkinson-like symptoms can be induced by some medications such as:
 - Antipsychotics: risperidone and haloperidol
 - Antiemetics: metoclopramide, prochlorperazine
 - Reserpine, alpha-methyldopa
 - Mood stabilizer: lithium, valproic acid

2. Medications

Medications for PD

Medications can manage the symptoms

But

No known medications to stop or slow the progression of Parkinson's.

Quiz

Which medication is the gold standard medication for Parkinson's disease?

- a) Rasagiline (Azilect)
- b) Pramipexole (Mirapex)
- c) Levodopa/carbidopa (Sinemet)
- d) Amantadine

Quiz

Which medication is the gold standard medication for Parkinson's disease?

- a) Rasagiline (Azilect)
- b) Pramipexole (Mirapex)
- c) Levodopa/carbidopa (Sinemet)
- d) Amantadine

Medications

Levodopa/Carbidopa

Dopamine agonist

MAOI (Rasagiline/Selegiline)

Amantadine (Symmetrel)

Others (anticholinergics,
entacapone)

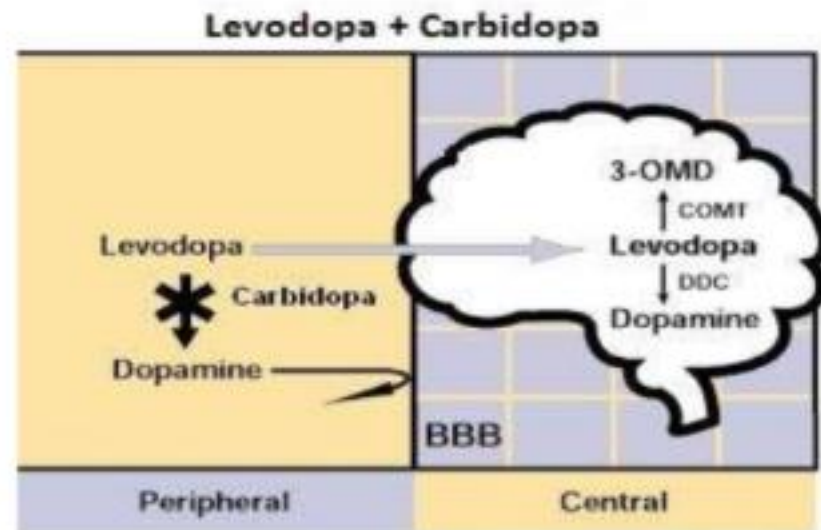
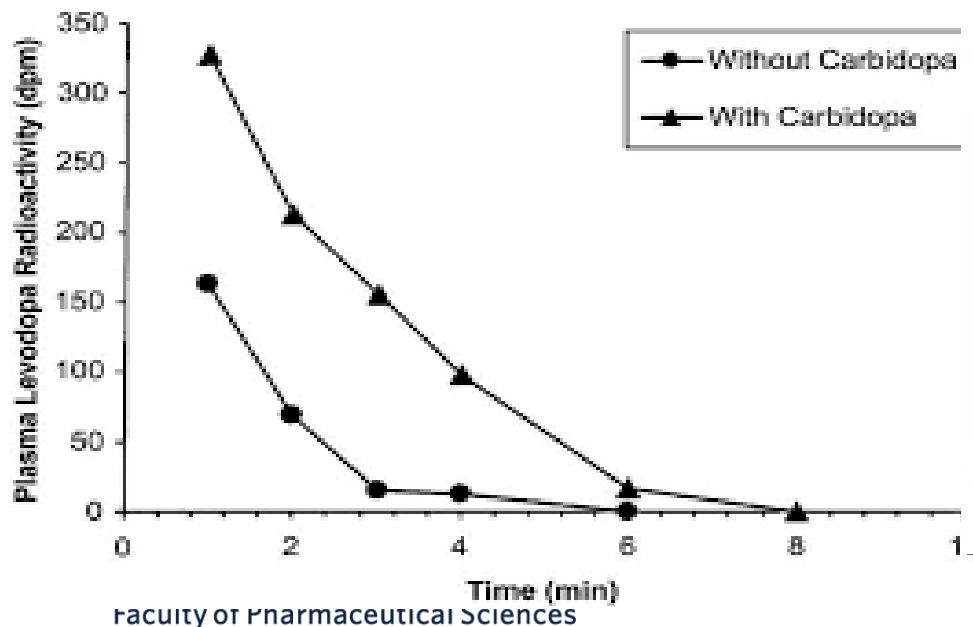
Levodopa

- Gold standard medication for PD
- Most potent for treatment of motor symptoms
- Converted to dopamine in brain and stored in nerve cells to increase dopamine
- Most commonly used in combination with carbidopa to prolong effect
- Available as Sinemet



Carbidopa and Benserazide

- Carbidopa and Benserazide work by preventing the breakdown of levodopa into dopamine
- Leads to increase the concentration of levodopa into the brain.

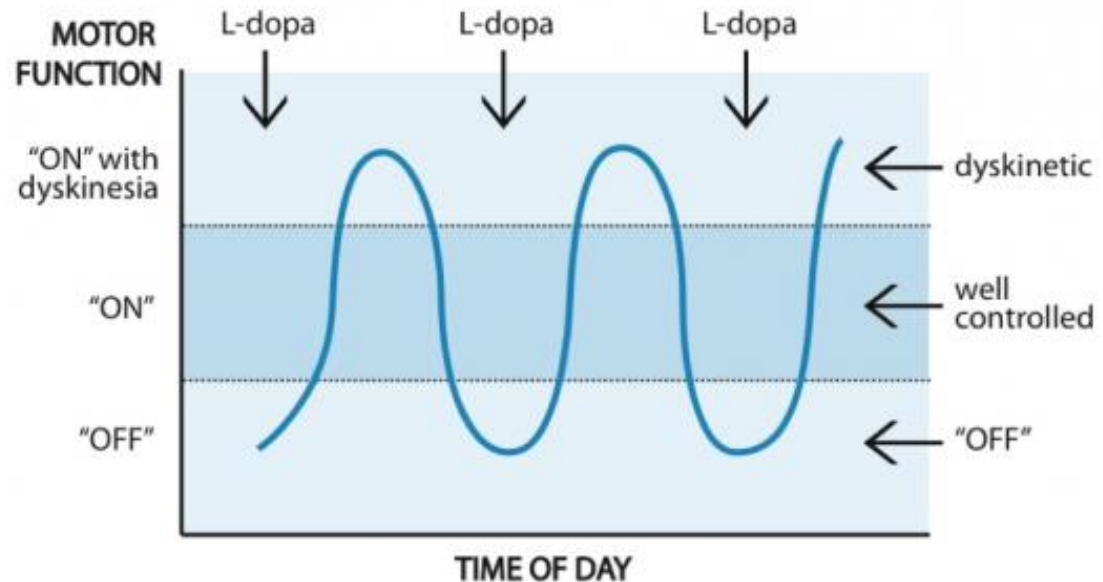


Side Effects of Levodopa

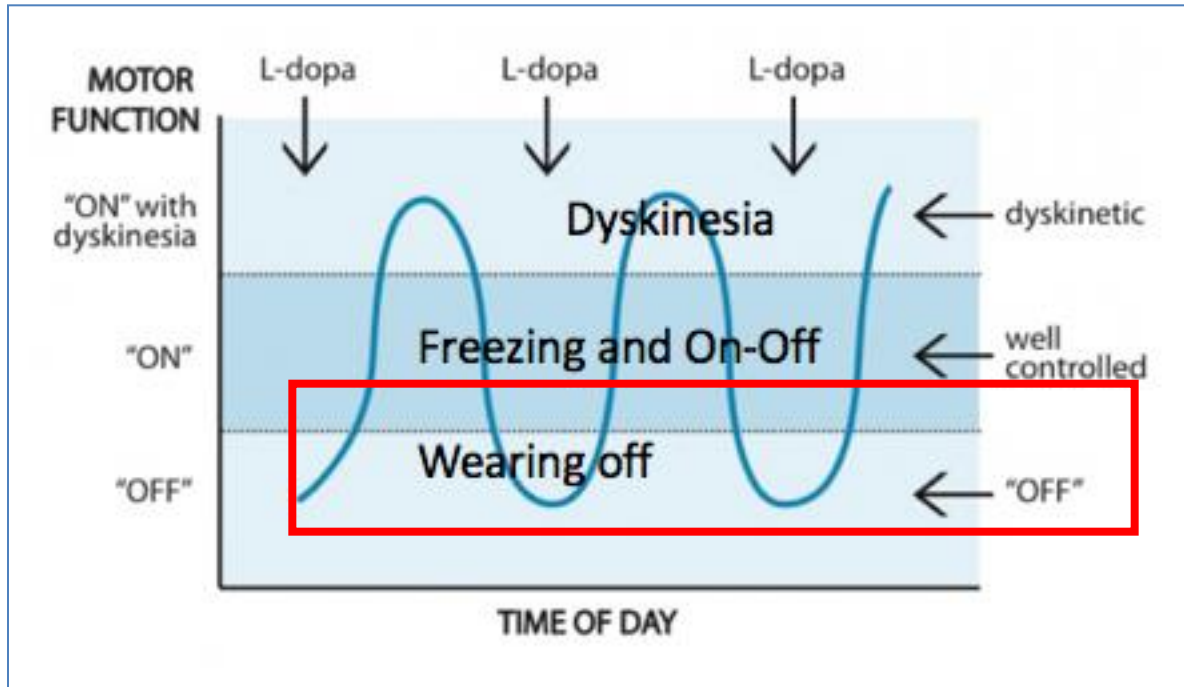
- Nausea
- Light-headedness, low blood pressure
- Fatigue/ sleepiness
- Confusion
- Hallucination
- Dyskinesia (involuntary movements which occur later in therapy)
- Motor fluctuations

Motor Fluctuations

- Wearing-off effect
- Dyskinesia (involuntary movement)
- On-Off motor fluctuations (occur randomly)
- Freezing

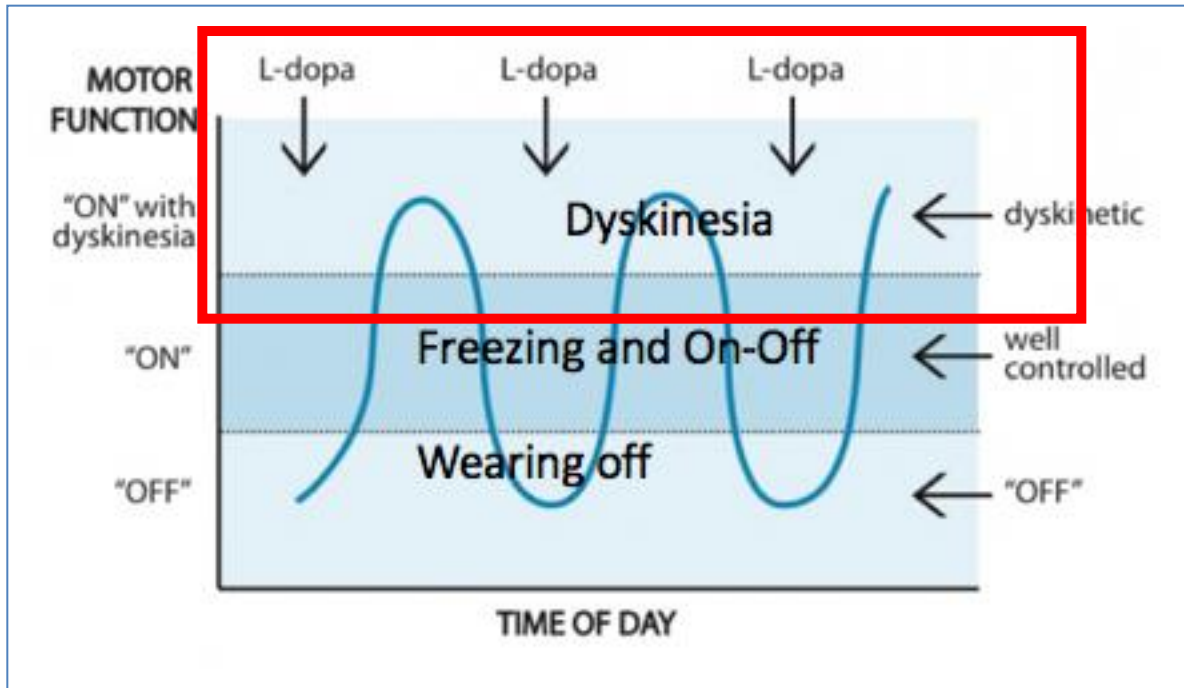


Wearing Off



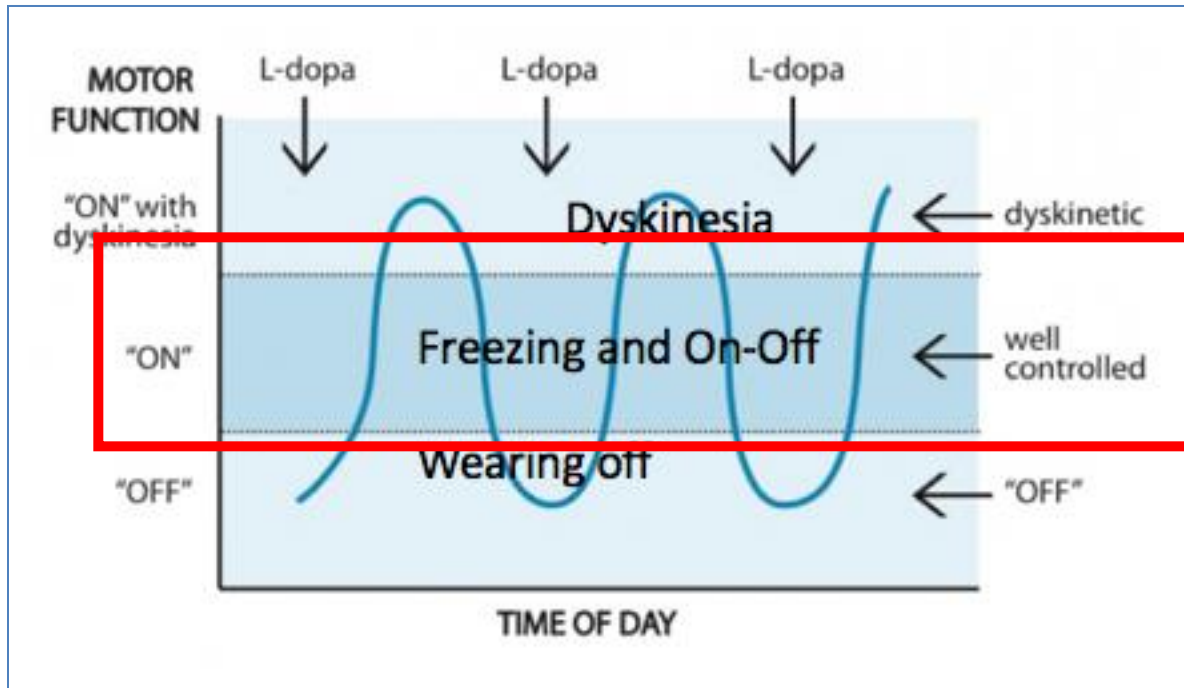
- Symptoms worsen prior to the next dose.
- Management of wearing off:
 - Assessment of protein intake and timing of levodopa
 - Change dosing interval for more frequent doses.
 - Formulation change to levodopa CR formulation

Dyskinesia



- Involuntary, uncontrollable movement.
- Associated with changing in concentration of levodopa in the body and the brain

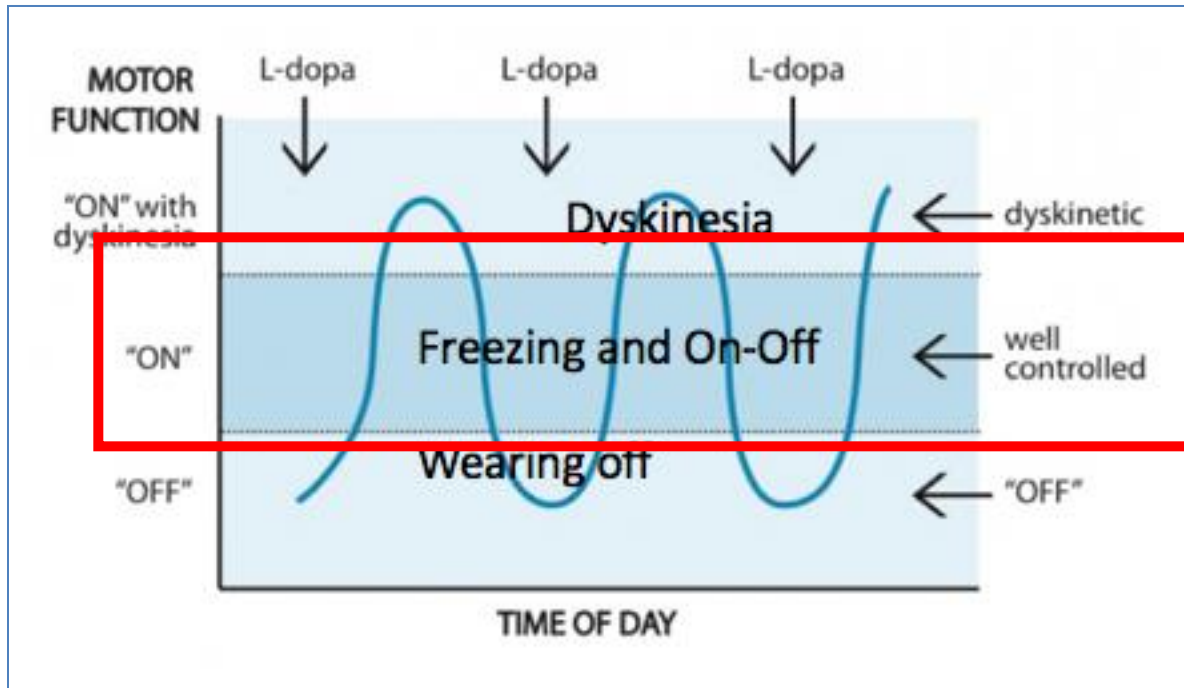
On-Off



On-Off

- Abrupt and random loss of benefit
- May last hours or minutes

Freezing



- Freezing
 - Sudden stopping while walking or when trying to initiate walking.
 - Management: unresponsive to drugs (weight shift method, sound and vision cues, physio and occupational therapy)

Dopamine Agonists

Ropinirole (Requip), Pramipexole (Mirapex), Rotigotine (Neupro)

- Mimics effect of dopamine causing a similar brain response
- Role in Therapy:
 - Early PD: Can be used as initial monotherapy
 - Advanced PD: Can be used as adjunct to levodopa when experiencing motor fluctuations such as wearing off or on-off, or dyskinesia.
- Second most potent for control of motor symptoms

Side Effects of Dopamine Agonists

- **Sleepiness** (sudden onset of sleep)
- Nausea
- Hallucinations
- Weight gain
- Impulsive, uncontrolled behaviours (eg. compulsive gambling)
- Low blood pressure

Other Medications used in PD

Medication	Role in PD	How they work
Amantadine	Early PD: Can be used alone to manage tremors Advanced PD: Can help manage dyskinesia when used with levodopa	Promotes release of dopamine from nerve terminals, increasing dopamine levels
Rasagiline and Selegiline	Early PD: monotherapy for management of symptoms Advanced PD: may help reduce off-time when used with levodopa	Prevent the breakdown of dopamine in the brain
Entacapone	Advanced PD: As adjunct to levodopa in patients with motor complications	Prevent breakdown of levodopa, which help increase the amount of levodopa available to the brain

3. Life-style choices

Lifestyle Choices

- Improvements in activities of daily living, gait, walking speed, decreased falls and reduced bradykinesia



Lifestyle Choices

- Staying **active** and having a regular **exercise** routine
- Beneficial to maintain flexibility and strength
- Slows symptoms that further limit mobility and functional activity – eg. swimming



4. The Pharmacist Clinic



Pharmacists Clinic Overview

- Canada's first university-affiliated, licensed, pharmacist-led patient care clinic
- Access to clinical pharmacists
- Opened November 2013
- Comprehensive medication management services
- Goals:
 1. The highest possible level of care to patients
 2. Learning opportunities for health professionals and students
 3. Research opportunities for the healthcare community

Pharmacists Clinic Services

Every visit includes:

1. Comprehensive medication management including natural health and non-prescription products.
2. Patient education.
 - Disease, medication, device teaching
3. List of high quality recommendations for the family doctor.
4. Follow-up with patient to implement and monitor plan.

Pharmacists Clinic Services

- The services are provided free
- Appointments are usually 30-60 minutes (or more if needed)
- No physician referral needed
- Monday – Friday 9:00am – 4:30pm

Questions?

Clinic information

Email: pharmacists.clinic@ubc.ca

Website: clinic.pharmacy.ubc.ca

Reception/appointment: 604-827-2584



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