

# PARKINSON'S MEDICATION

# History

1940 – 50's Neurosurgeons operated on basal ganglia. Improved symptoms. 12% mortality

1960's: Researchers identified low levels of dopamine caused Parkinson's leading to development of Levodopa.

1968: Levodopa pills available for use.

1970: Bromocriptine & MAO-B inhibitor deprenyl

1980's: Pergolide, selegiline

1980/90's: Deep brain surgery refined.

1990's: Genetic defects implicated in Parkinson's discovered.

1997: Pramipexole & Ropinirole

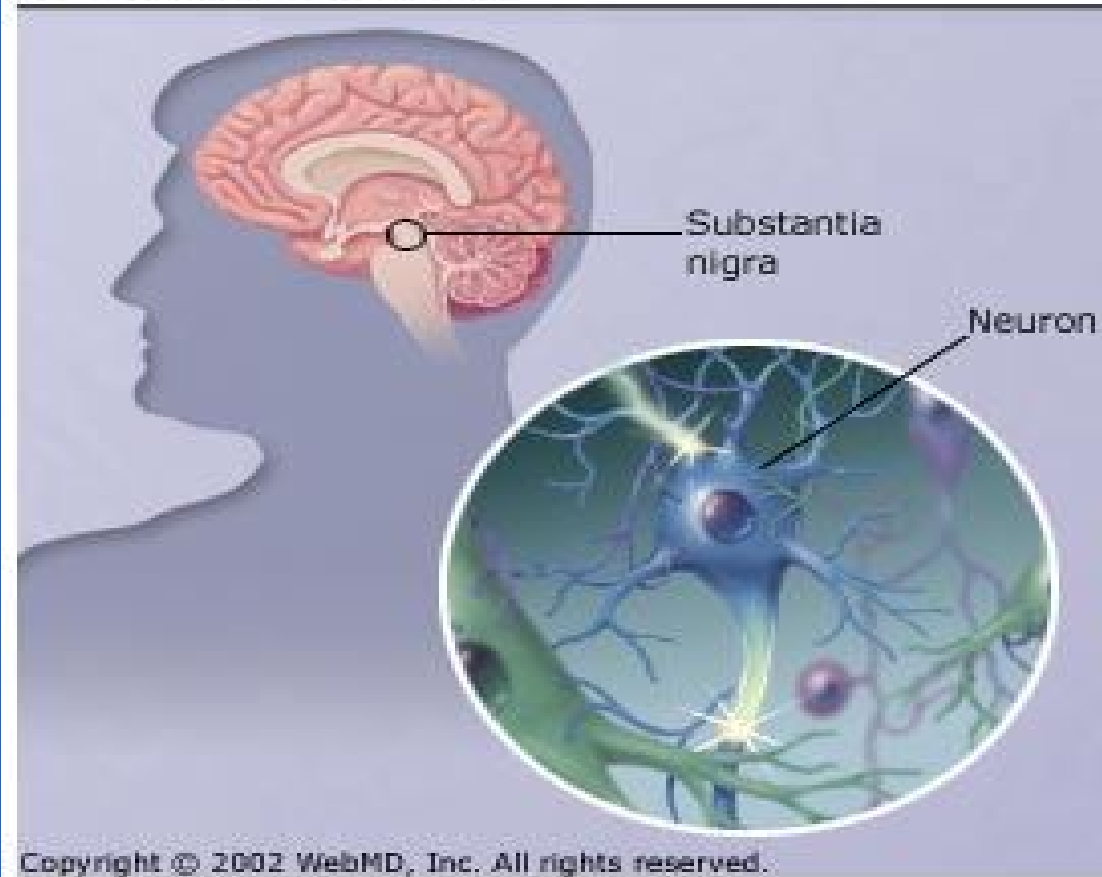
1998: Tolcapone & Entacapone

2000 >: Stem cell biology suggested new therapies would come soon...as yet not emerged.

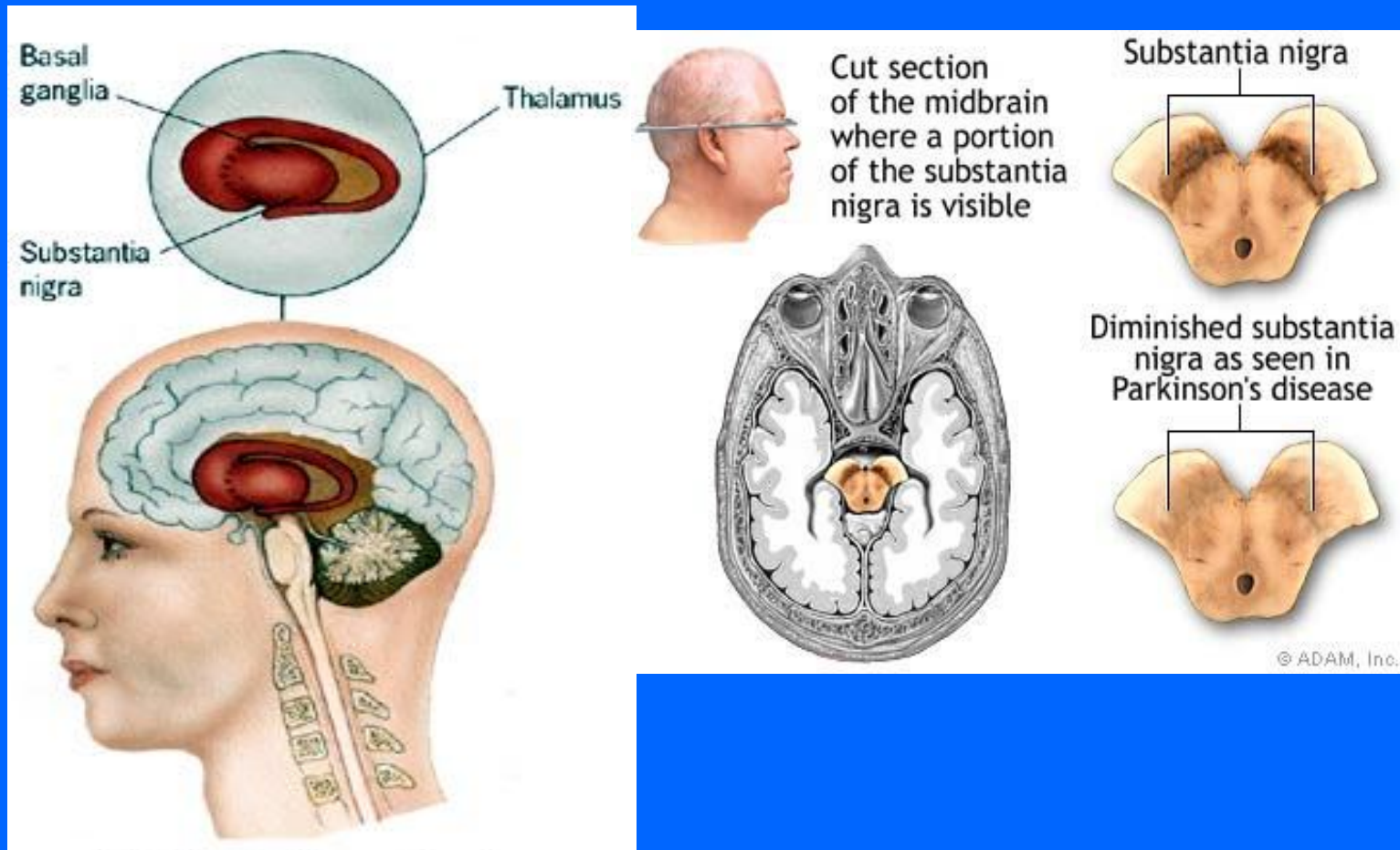
2006: MAO-B inhibitor Rasagiline. Not SMC approved in Scotland

2007: Rotigotine patch

## Parkinson's Disease



# Substantia nigra

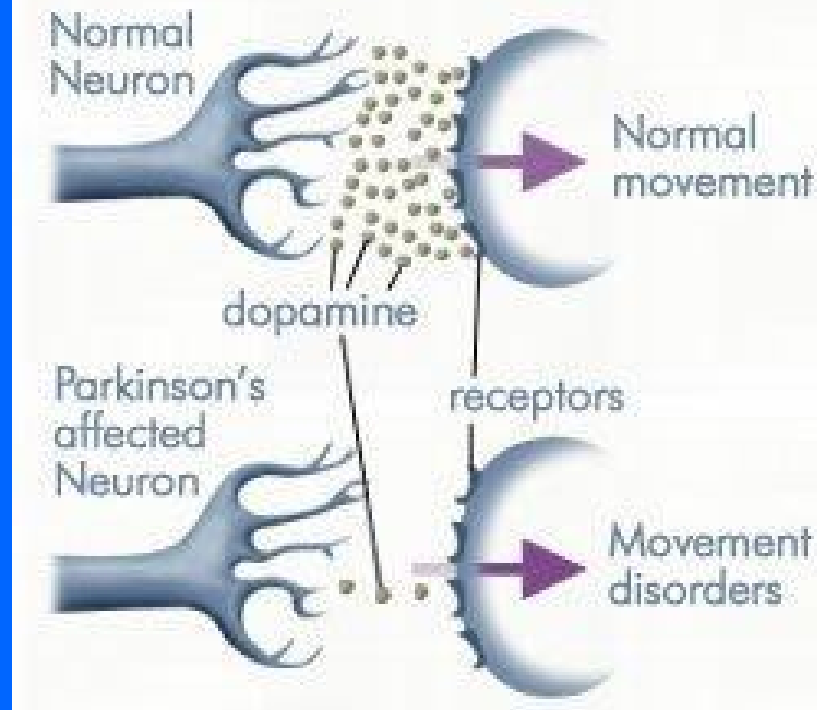


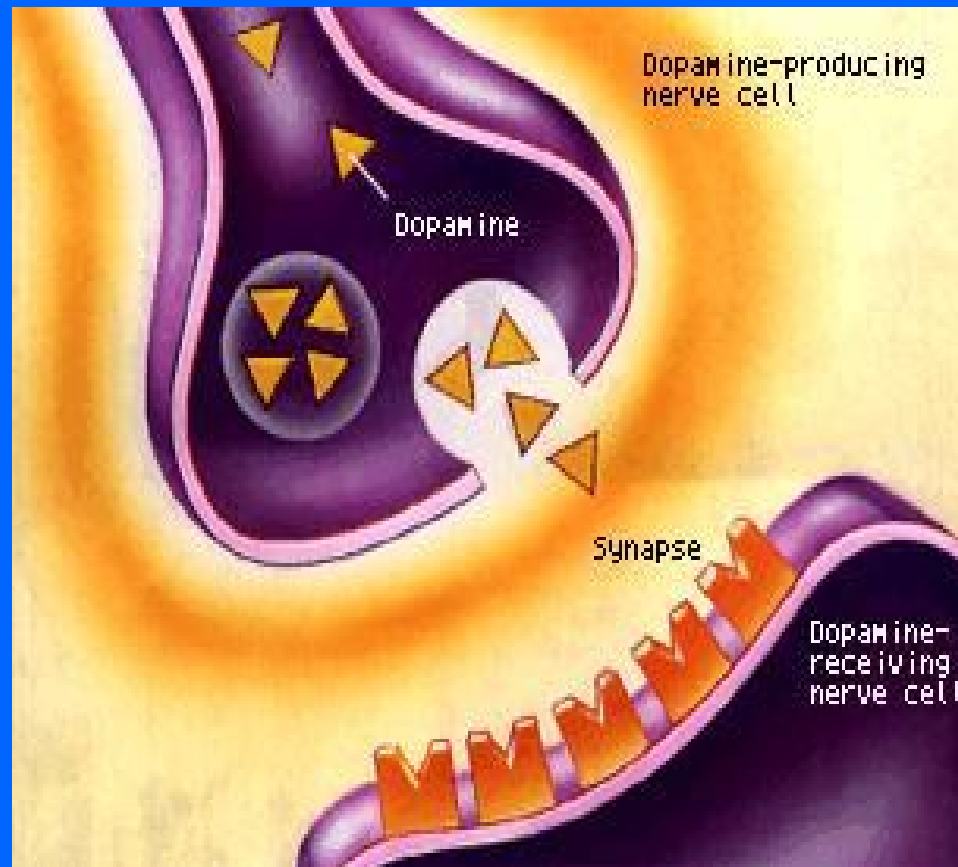
# What is Parkinson's disease?



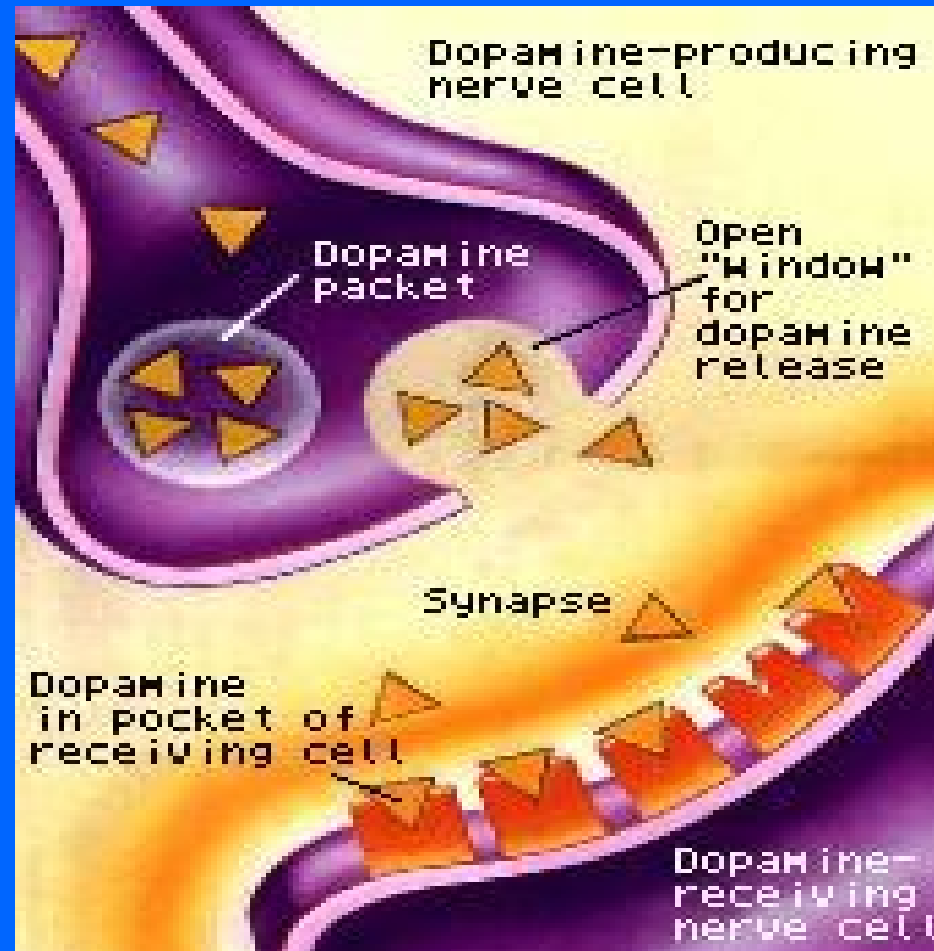
# The problem with Parkinson's

Dopamine levels in a normal and a Parkinson's affected neuron.



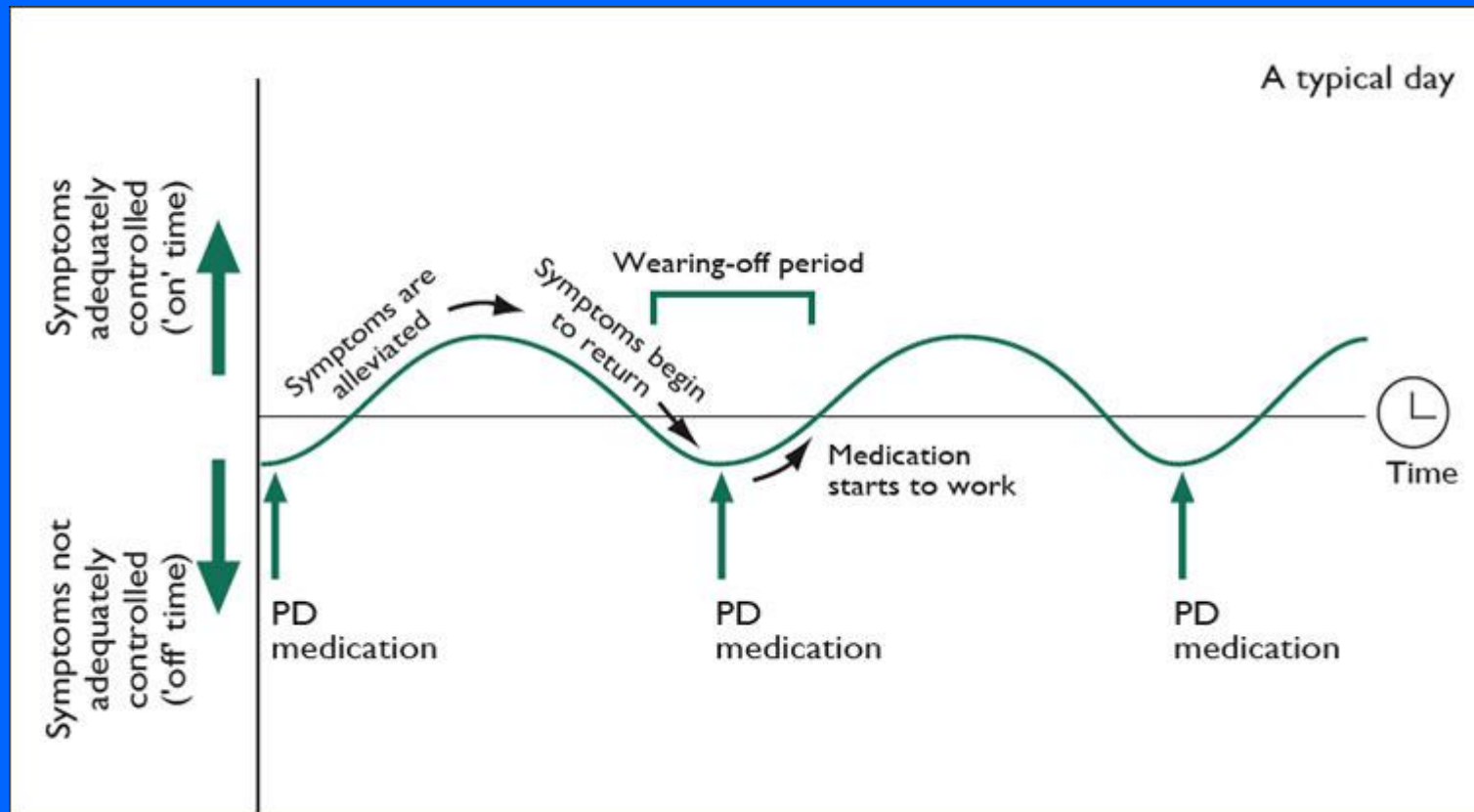


# SYNAPSE

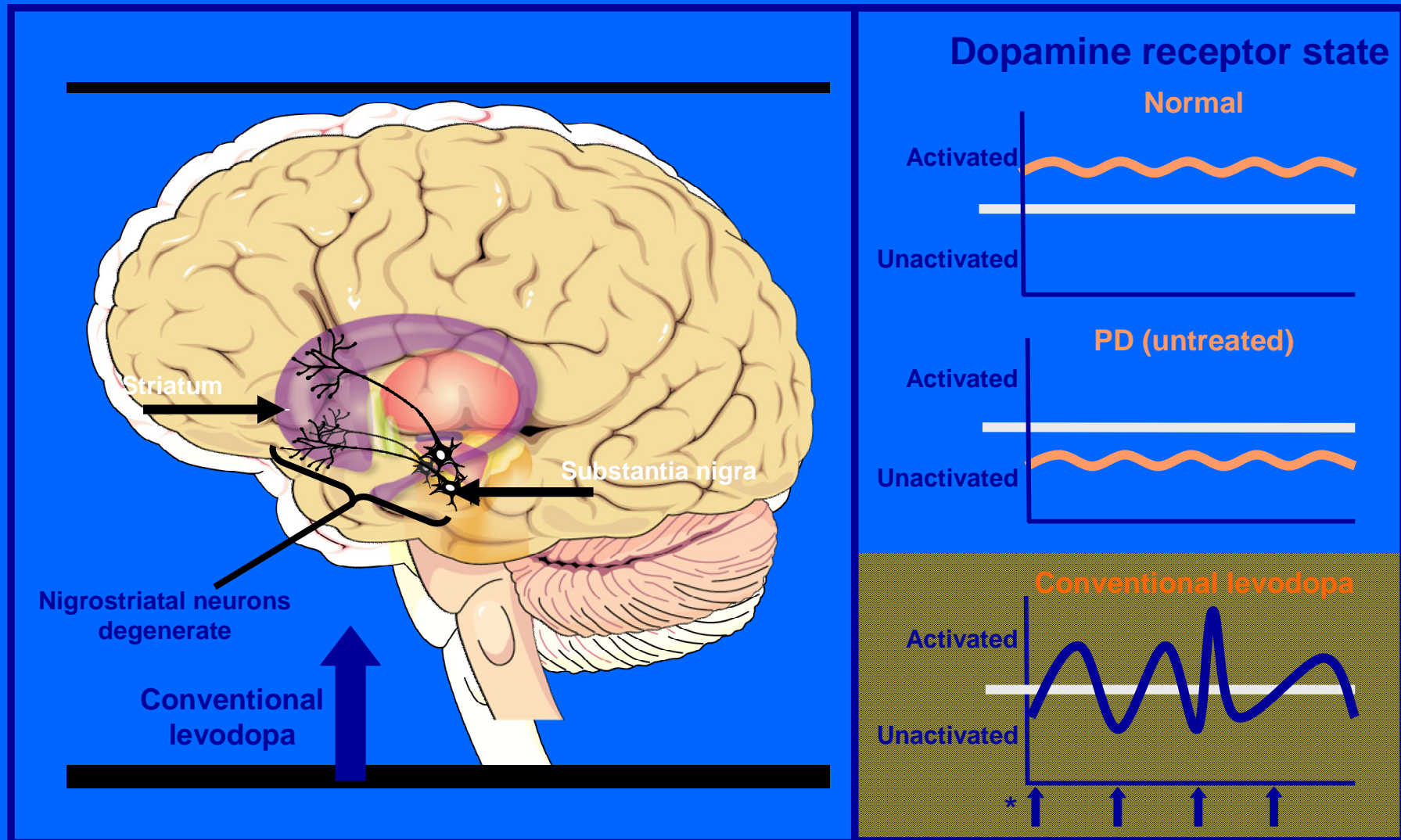




# Peaks & Troughs



# Wearing-off is thought to result from degeneration of nigrostriatal neurons and sub-therapeutic delivery of Levodopa



\*Levodopa dose; PD=Parkinson's disease

# DRUG CHOICE



- PREFERENCE OF CONSULTANT
- PRESCRIBED TO SUIT EACH INDIVIDUAL
- AGE
- COGNITIVE STATE

# DRUG CHOICE



DOPAMINE AGONISTS V

L-DOPA

## DRUG MANAGEMENT

AIMS TO RESTORE BALANCE BETWEEN NEUROTRANSMITTERS

**DOPAMINERGIC:** Levodopa  
Co-Careldopa (Sinemet),  
Co-Beneldopa (Madopar)

### **DOPAMINE AGONISTS:**

Ropinirole,  
Pramipexole  
Rotigotine patch  
Apomorphine injection / infusion

### **CATECHOL-O-METHYL TRANSFERASE (COMT) INHIBITORS:**

Entacapone

### **MONOAMINE OXIDASE B INHIBITORS:**

Selegiline  
Rasagaline

**Antimuscarinic:** Orphenadrine, Procyclidine (Rarely used)

# LEVODOPA + DECARBOXYLASE INHIBITOR

Prescribed since 1960's

Still "Gold standard" drug for Parkinson's

Most effective for:

Stiffness – rigidity

Slowness - bradykinesia

# MADOPAR (co-beneldopa)

Benserazide hcl (1 part) / Levo-dopa (4 parts)

eg

$$12.5 / 50 = 62.5$$

$$25 / 100 = 125$$

$$50 / 200 = 250$$

- Capsules
- Dispersible
- CR : 125 (70% bio-availability)

# SINEMET (Co- Careldopa)

Carbidopa / Levodopa

eg:  $12.5 / 50 = 62.5$

$10 / 100 = 110$

$25 / 100 = 125$  (PLUS)

$25 / 250 = 275$

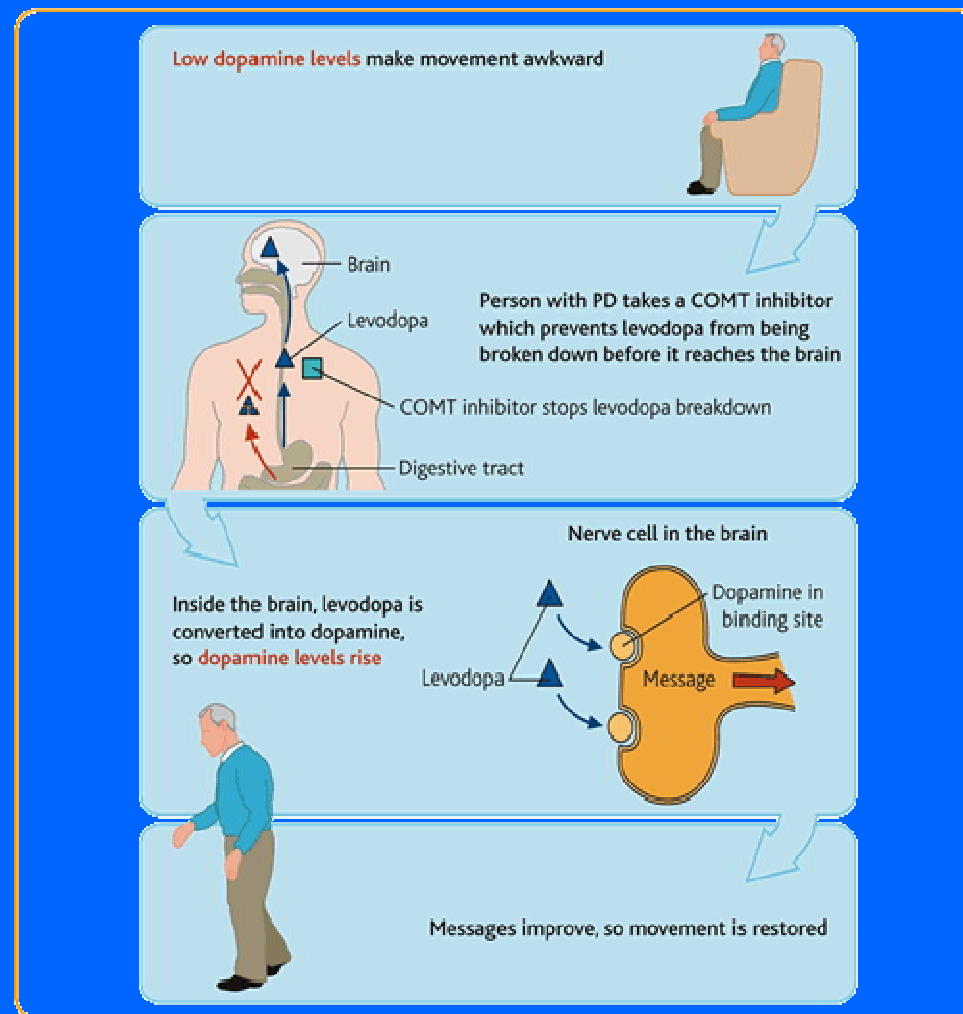
Tablets

Half SINEMET CR  
SINEMET CR



# Entacapone / STALEVO (combination Sinemet & Entacapone)

## How COMT inhibitors work



# DOPAMINE AGONIST'S

## Non Ergot

Ropinirole (3-24mg)

Pramipexole (max  
3.3mg base).

Rotigotine

Apomorphine  
– (s/c only)

- Nausea
- Drowsiness
- Leg oedema
- Abdominal pain
- Hypotension
- ADJUNCT:
- Hallucinations
- Confusion
- Dyskinesia

# ROPINIROLE

Max 24mg daily



# MIRAPEXIN (Pramipexole)

IMMEDIATE RELEASE

MAX DAILY:

3.3MG(BASE)

4.5 MG (SALT)

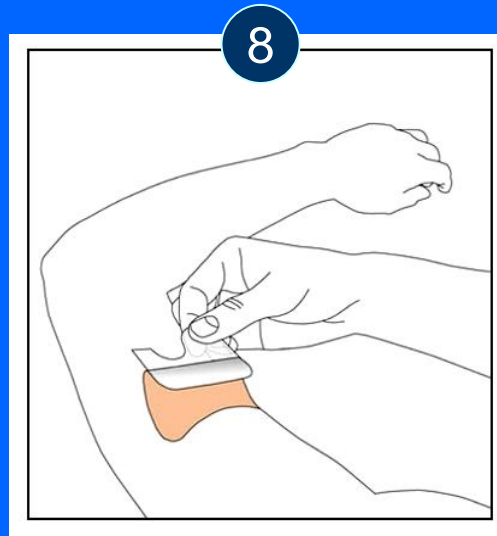
PROLONGED RELEASE



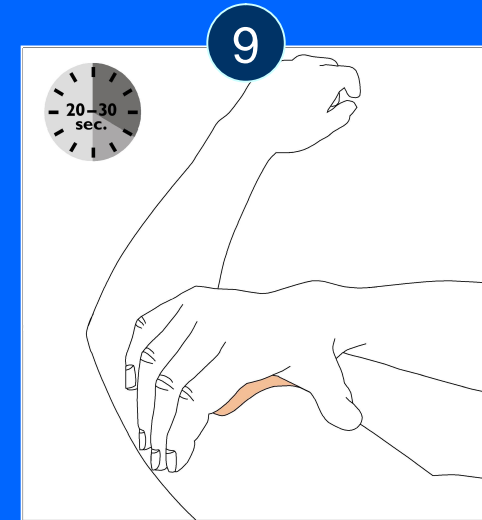
# How to apply Neupro<sup>®</sup> (III)



- n Apply the sticky surface of the patch to the skin
- n Press the sticky side of the patch firmly into place



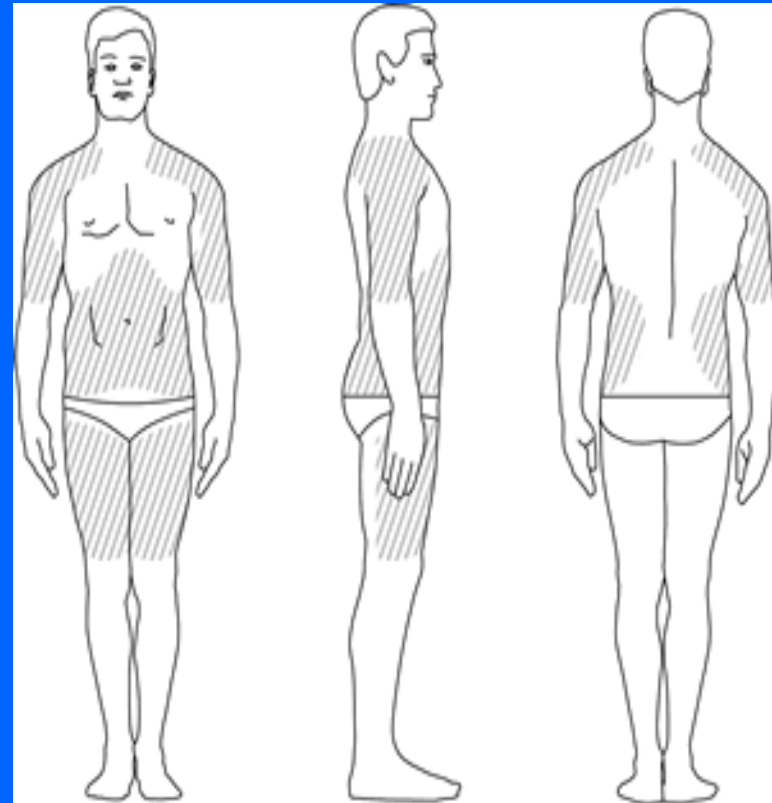
- n Remove the other side of the protective liner using the exposed tab on the liner

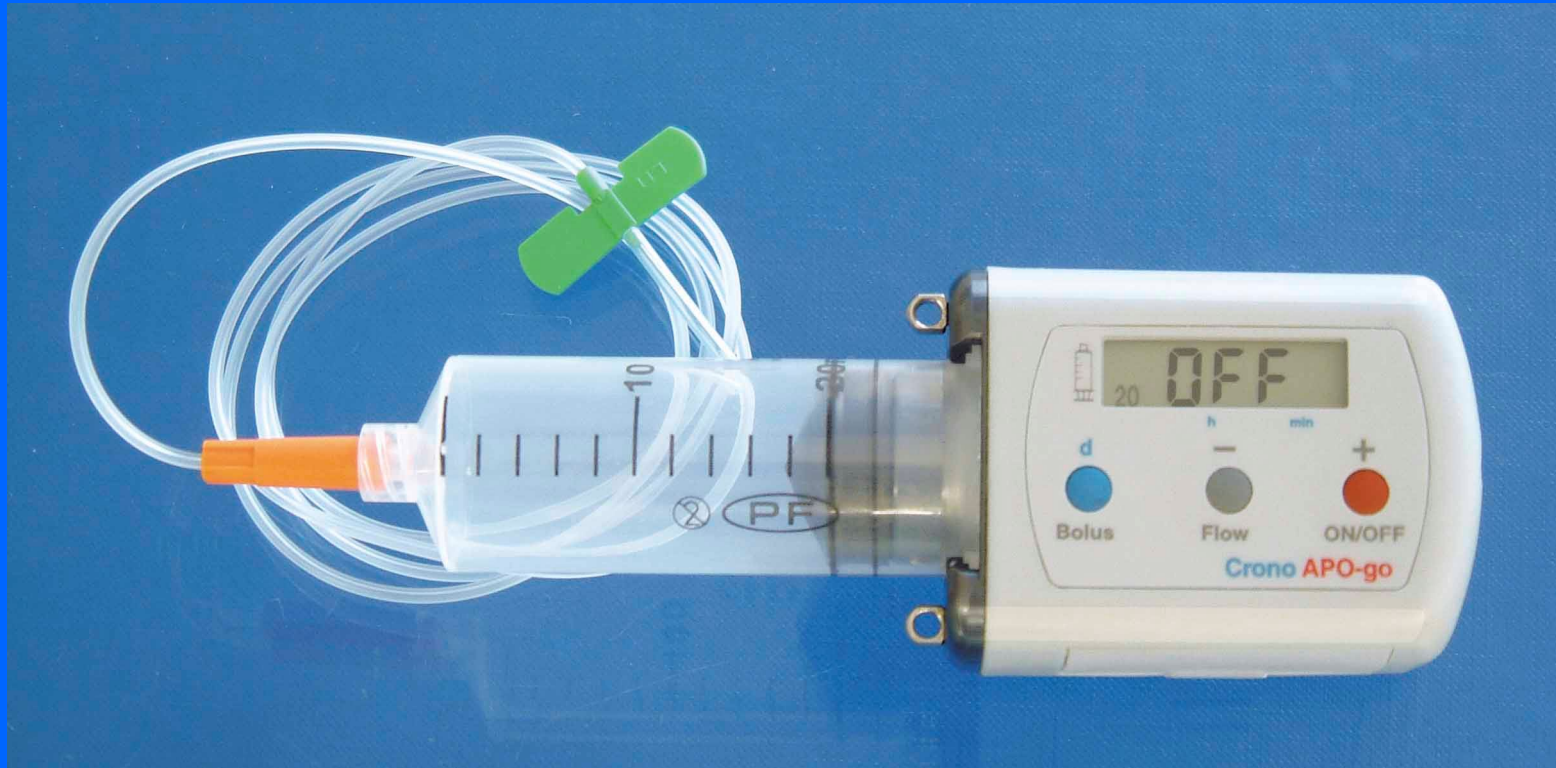


- n Press down the patch firmly with the palm of the hand for about 20–30 seconds

# Rotigotine application

- When using your patches, follow the instructions in the leaflet provided with your patches carefully.
- One patch:
- should be applied daily at about the same time each day.
- patch should be applied to clean, dry, hairless, healthy skin on the lower back, abdomen, hip, shoulder, upper arm or thighs.
- It is important the sticky side of the patch is not touched.
- **The patch should be pressed down firmly with the palm of the hand for about one minute to make sure it stays in place.**
- Do not apply it to skin that is red, irritated or damaged.
- Don't apply lotions, creams or powders to the skin before applying the patch, as they will prevent it sticking properly.
- When changing the patch, the old patch should be removed and disposed of safely; the new patch should be applied to a different area of the skin.
- It is recommended that the site of application is rotated and that the same site is not used within 14 days of the last application.

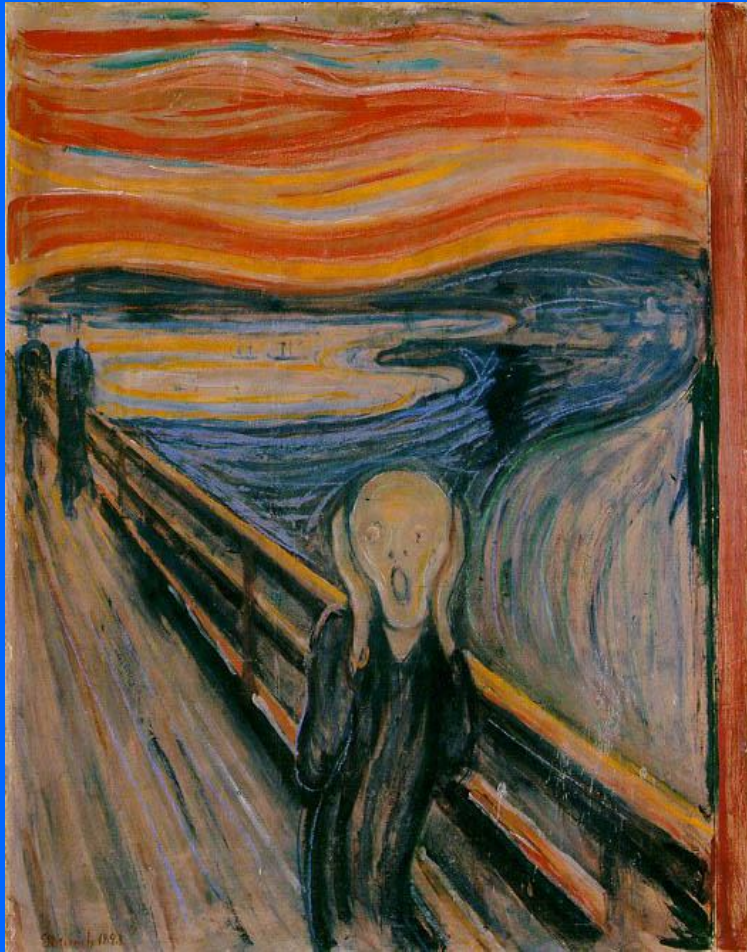




APO-go Pump, with syringe and line

# IMPULSE CONTROL DISORDER

## Counsel patients



**GAMBLING**

**COMPULSIVE  
BEHAVIOUR**

**HYPERSEXUALITY**



# MAO-B inhibitors

## Monamine oxidase type B

Make better use of your dopamine by blocking the enzyme called monamine oxidase type B, which breaks down dopamine in brain.

**RASAGALINE** (Azilect) Not SMC approved.

**1mg daily**

**SELEGILINE** / Eldepryl: 5/10mg tab

» Max 10mg

# GLUTAMATE ANTAGONIST

Not clear exactly how it works

## AMANTADINE

100 - 400mg tablets

Available in liquid form

Used to treat dyskinesia

# Avoid the following drugs

## ANTI-EMETICS:

metoclopramide  
prochlorperazine.

## ANTI-PSYCHOTICS:

fluphenazine  
trifluorophenazine  
haloperidol  
chlorpromazine  
flupentixol  
Zuclopenthixol

# ANTI-CHOLINERGICS

Block acetylcholine which helps send messages from nerves to muscles.

Trihexyphenidyl (Benzhexol)

Orphenadrine (Disipal)

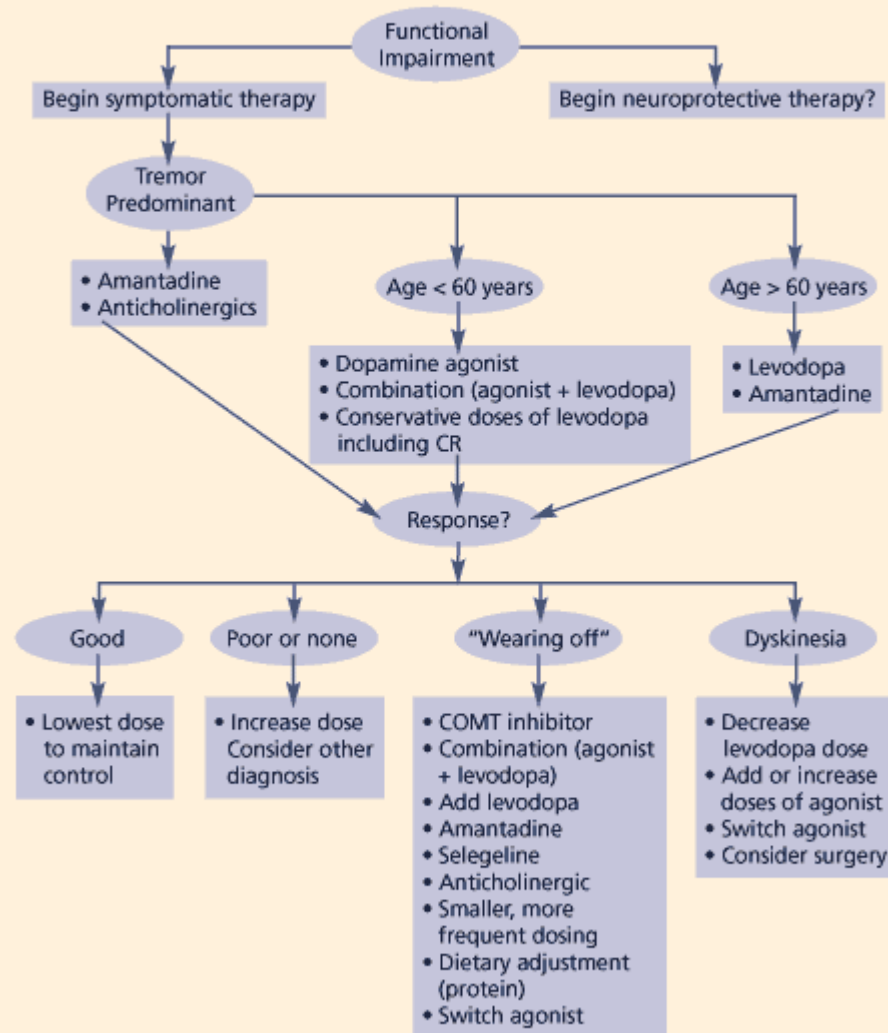
Should not be stopped suddenly unless necessary

# In hospital



Figure

## Therapeutic Algorithm for the Management of Parkinson's Disease



Source: Adapted from Waters CH (1999).

QUESTION TIME

# QUESTIONS (at)

“Timing of medication; how to deal with taking it late ?”

“Why do my co-beneldopa capsules sometimes fail to work entirely, or take a very long time before they have any effect and then only for a very short time ?”



# QUESTIONS (as)

Effect of mealtimes and  
drug dosage  
(especially protein)



# QUESTIONS (ad)

What exactly are the benefits of exercise?

Does it actually affect movement and medication or is it intended to combat depression ?

# Does it affect movement

- Regular exercise helps maintenance of your abilities
- Strengthens muscles.
- Increases mobility in joints.
- Builds up your general fitness and health.



# And medication

- Exercise releases endorphins the "feel good" hormones.
- Boosts energy levels.
- Helps combat constipation which can interfere with the absorption and effectiveness of medication



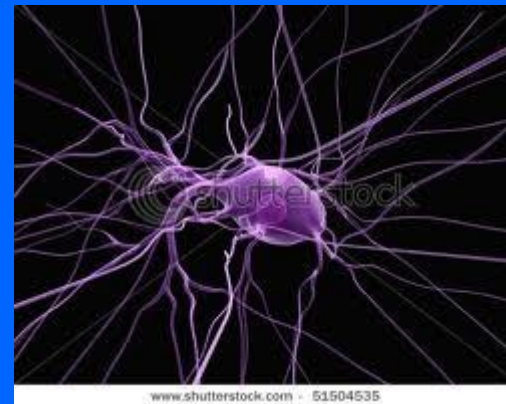
# Or is it intended to combat depression?

- Exercise Improves mood.
- Alleviates stress
- Improves sleep quality
- Increases mental focus
- Increases self esteem



# Research on PD and exercise

- Exercise studies of animal models of PD seems to improve the function of nerve cells and the potential of increased survival of nerve cells within the affected area of the brain.



# Research projects on PwP

- Argentinian Tango ↑ balance
- Wii fit
- Weight training-
- Tai chi
- Flexibility classes

Recent studies have shown improvements to Strength  
balance, coordination, flexibility



# QUESTIONS (at)



We now have the option of patches for delivering our medication. Could you outline the pro's & cons ?

Please discuss the Pro's & cons of Rotigotine patches, physical problems, side effects etc and is there an easier alternative ?



# QUESTIONS (all)

“Non motor side effects such as confusion and impulse control.”

“A second possible area of discussion – are we anywhere near understanding why some people cannot tolerate, or cannot tolerate higher dosage, drugs which others find very helpful in conjunction with levodopa.”