



# Cognitive Changes in Parkinson's Disease (PD)

Pamela E May-Weeks, PhD, ABPP  
Clinical Neuropsychologist, Associate Professor  
Dept. of Neurological Sciences, UNMC





I have no financial disclosures.

Presentation is for informational purposes only, **not** for diagnosis or treatment





*What is Cognition?*



# What is Cognition?

- Mental speed
- Attention
- Learning
- Memory (recall and recognition)
- Language (e.g., naming, fluency, writing, repetition, comprehension)
- Visuospatial skills (e.g., perception of space, assembly, navigation)
- Executive functions (e.g., planning, organizing, set-shifting, problem-solving, inhibition)
- General intellect

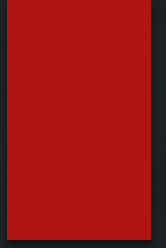
# What Affects Cognition?

- Age
- Psychiatric symptoms
- Sleep, fatigue
- Nutritional status, vitamin deficiencies
- Pain
- Vision, hearing
- Infections
- Thyroid functions
- Blood sugar levels
- Medication side effects

*...among other factors*



# *PD Basics*

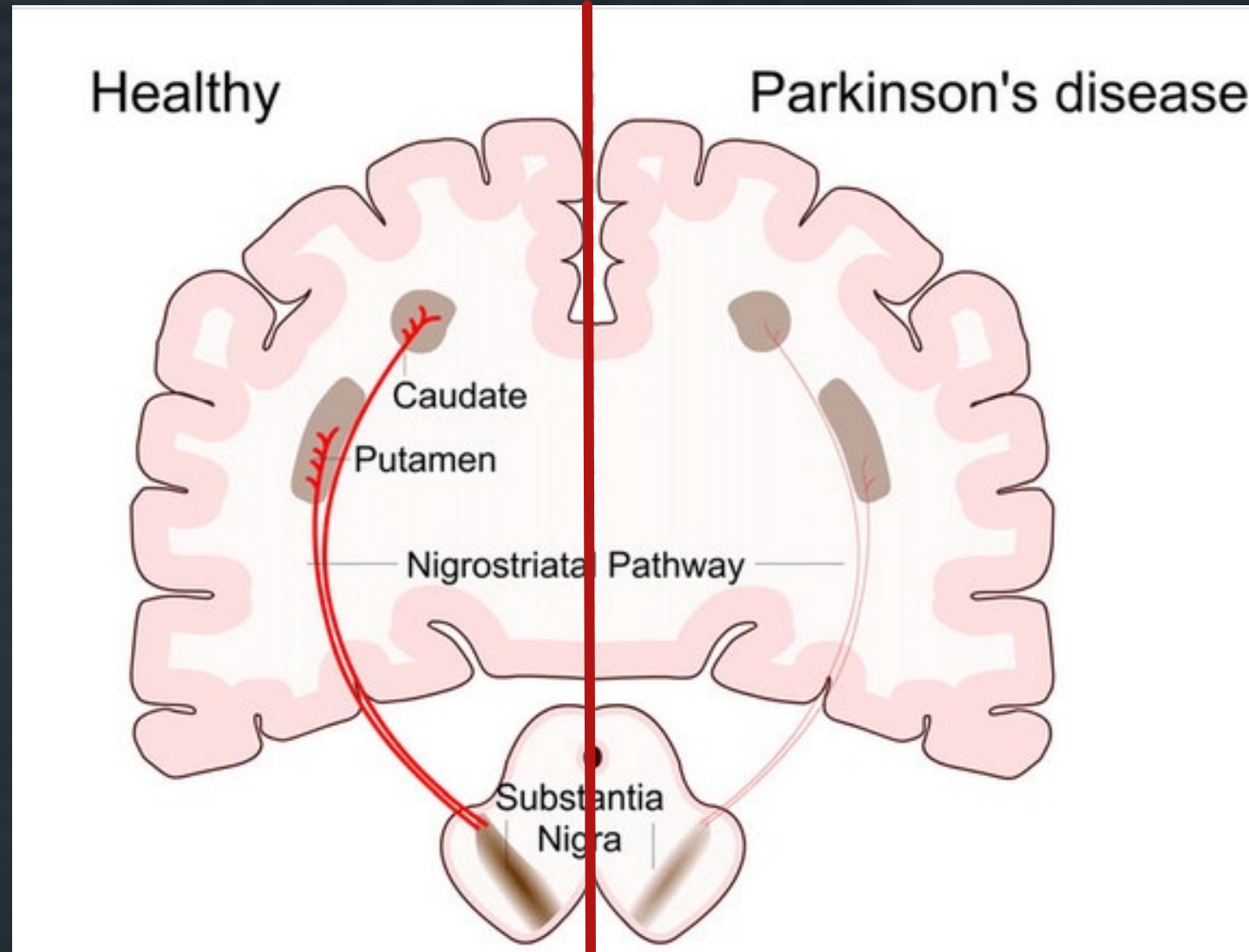




# PD Basics

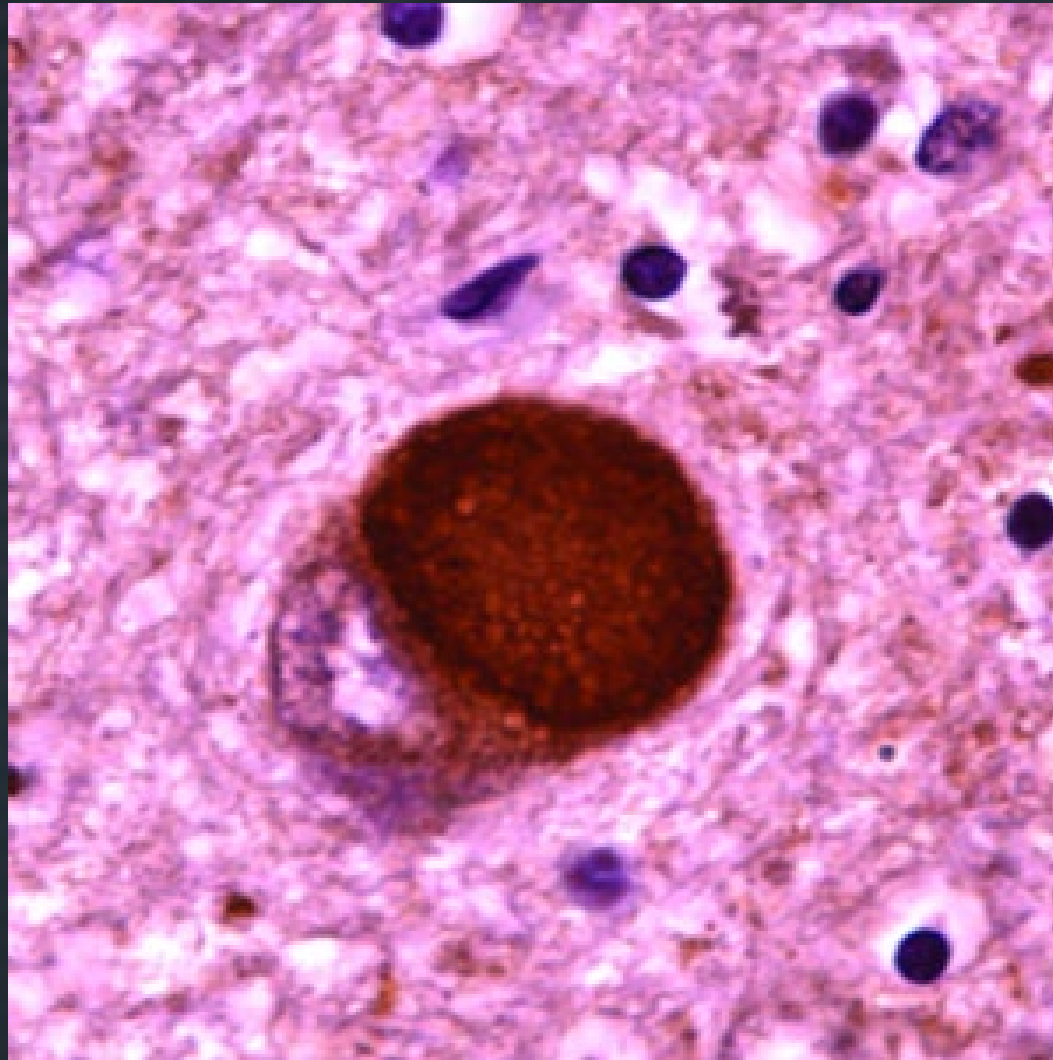
- 2<sup>nd</sup> most common age-related neurodegenerative disorder after Alzheimer's disease
- Prevalence: 100-200 per 100,000 adults over age 40 in North America and Europe. Nearly 1 million people have PD in U.S.
- Incidence increases rapidly after age 60
- Mean age at diagnosis is 70.5 years old
- Men are more likely to have PD than women

# PD Basics

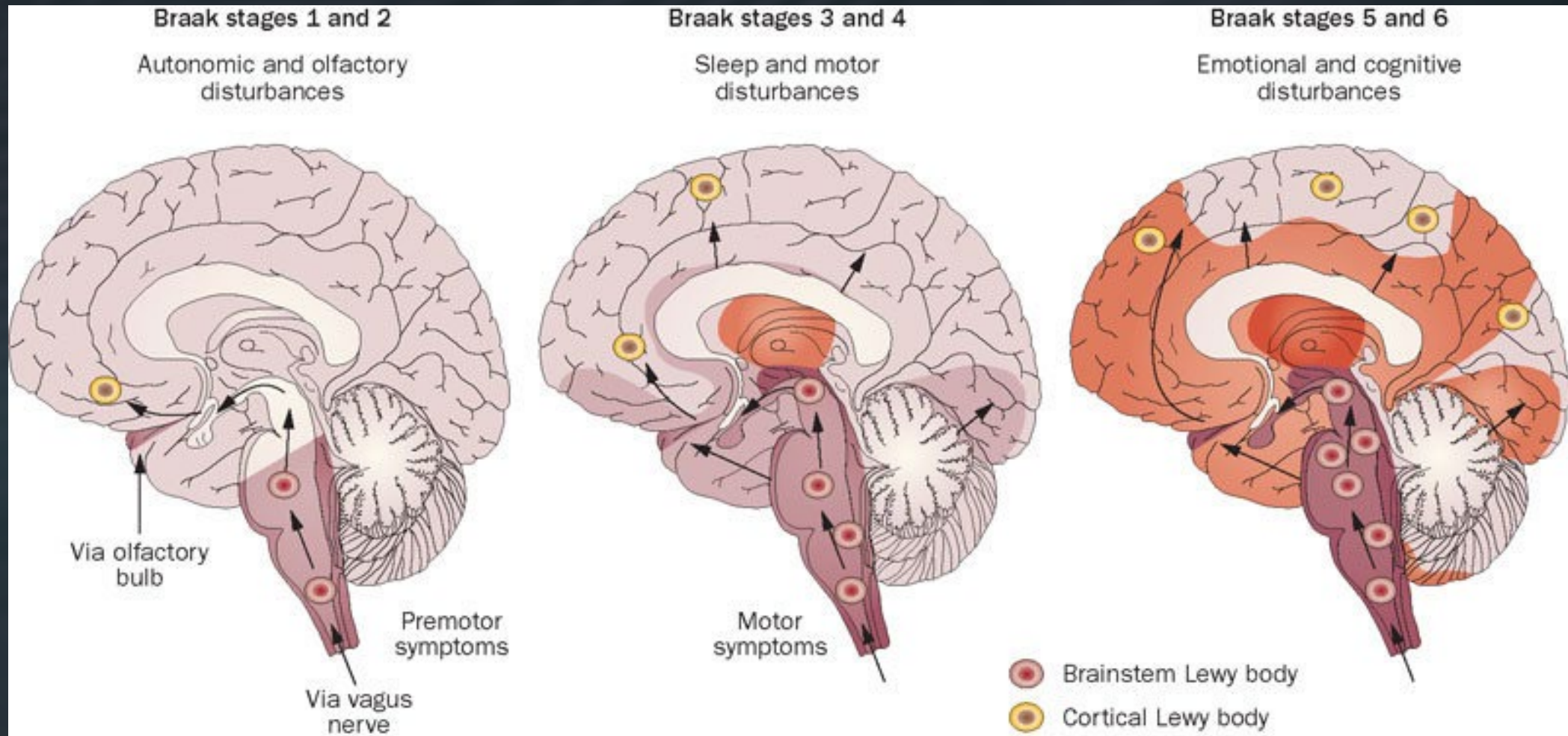




# PD Basics



# PD Basics



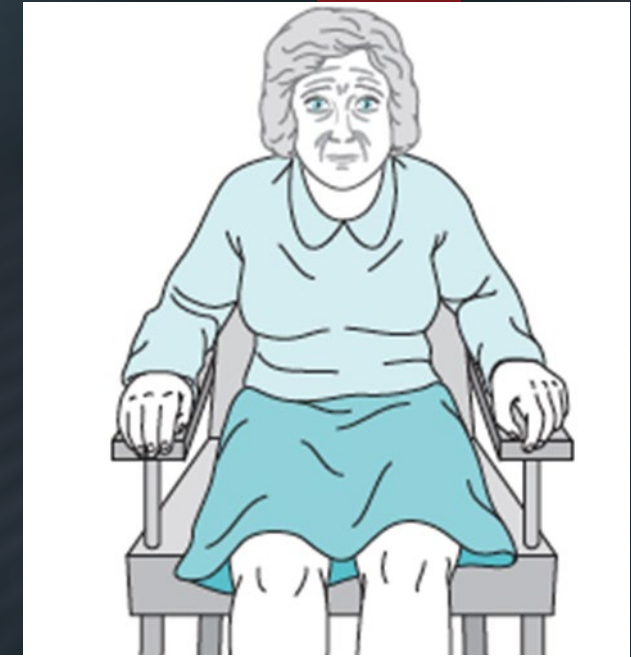
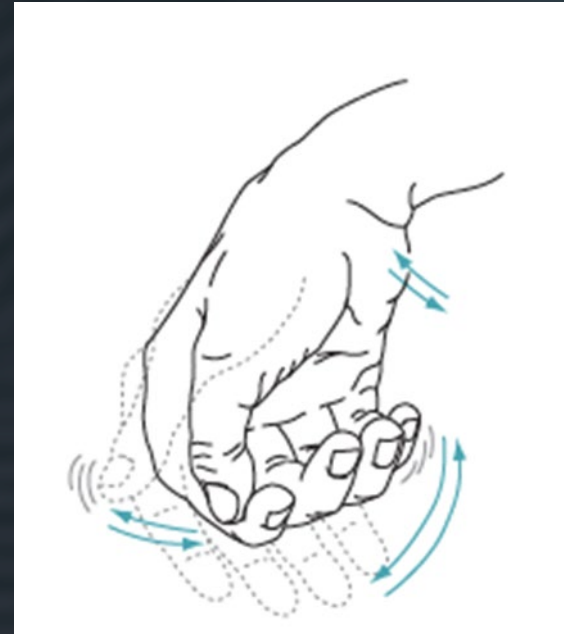


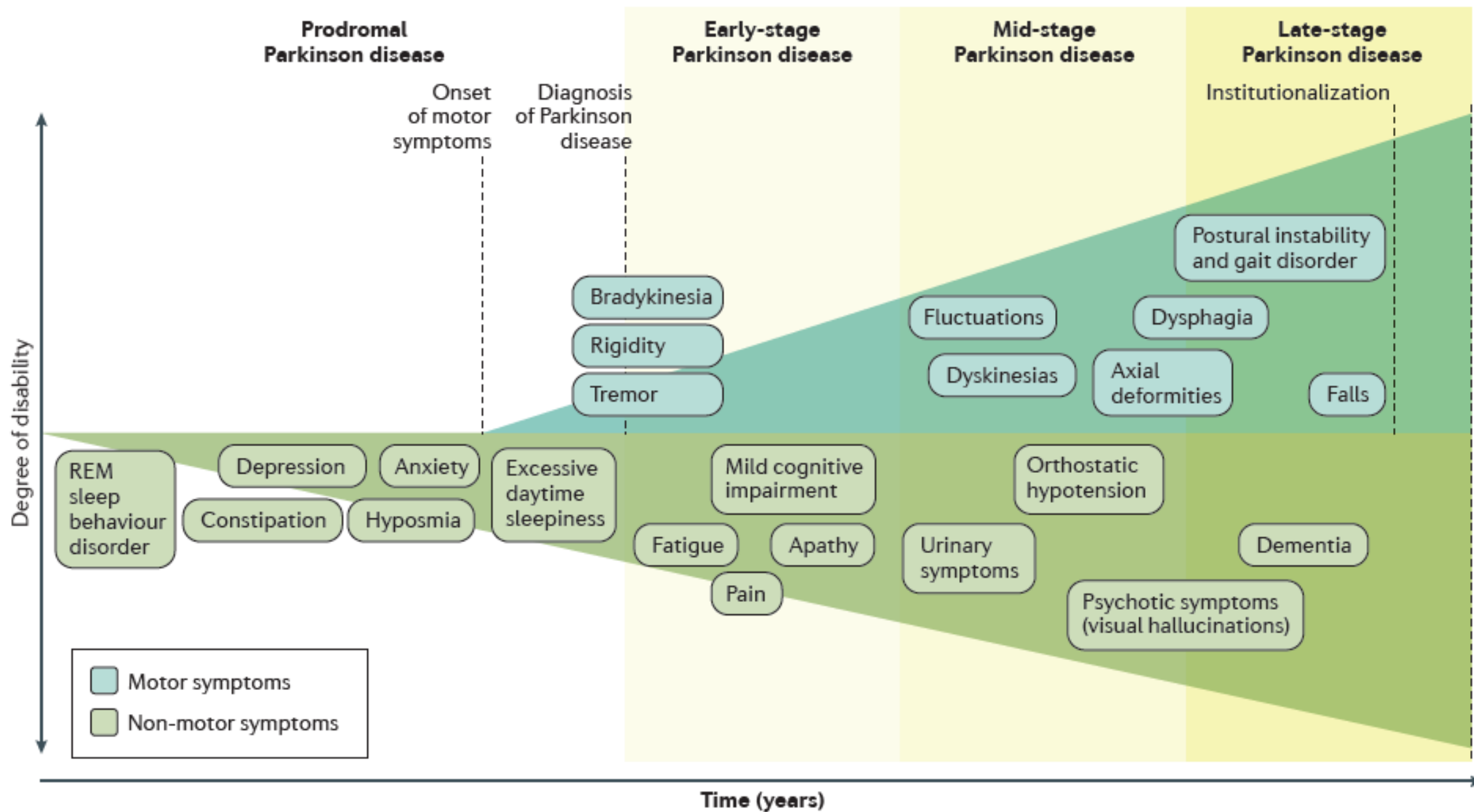
# PD Basics:

## *Motor Features*

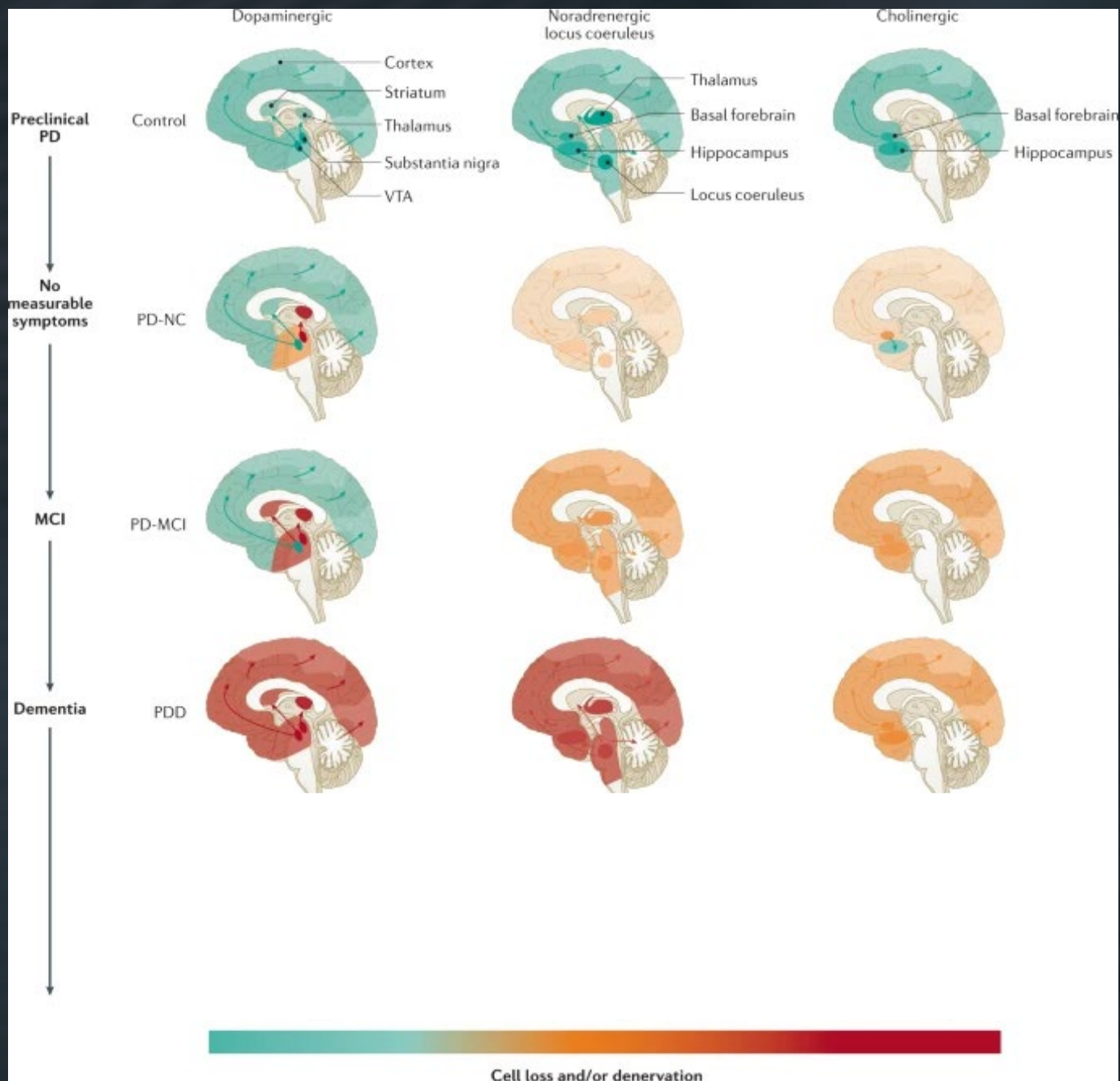
Four cardinal symptoms (TRAP):

- Tremor (resting)
- Rigidity
- Akinesia/bradykinesia
- Postural instability

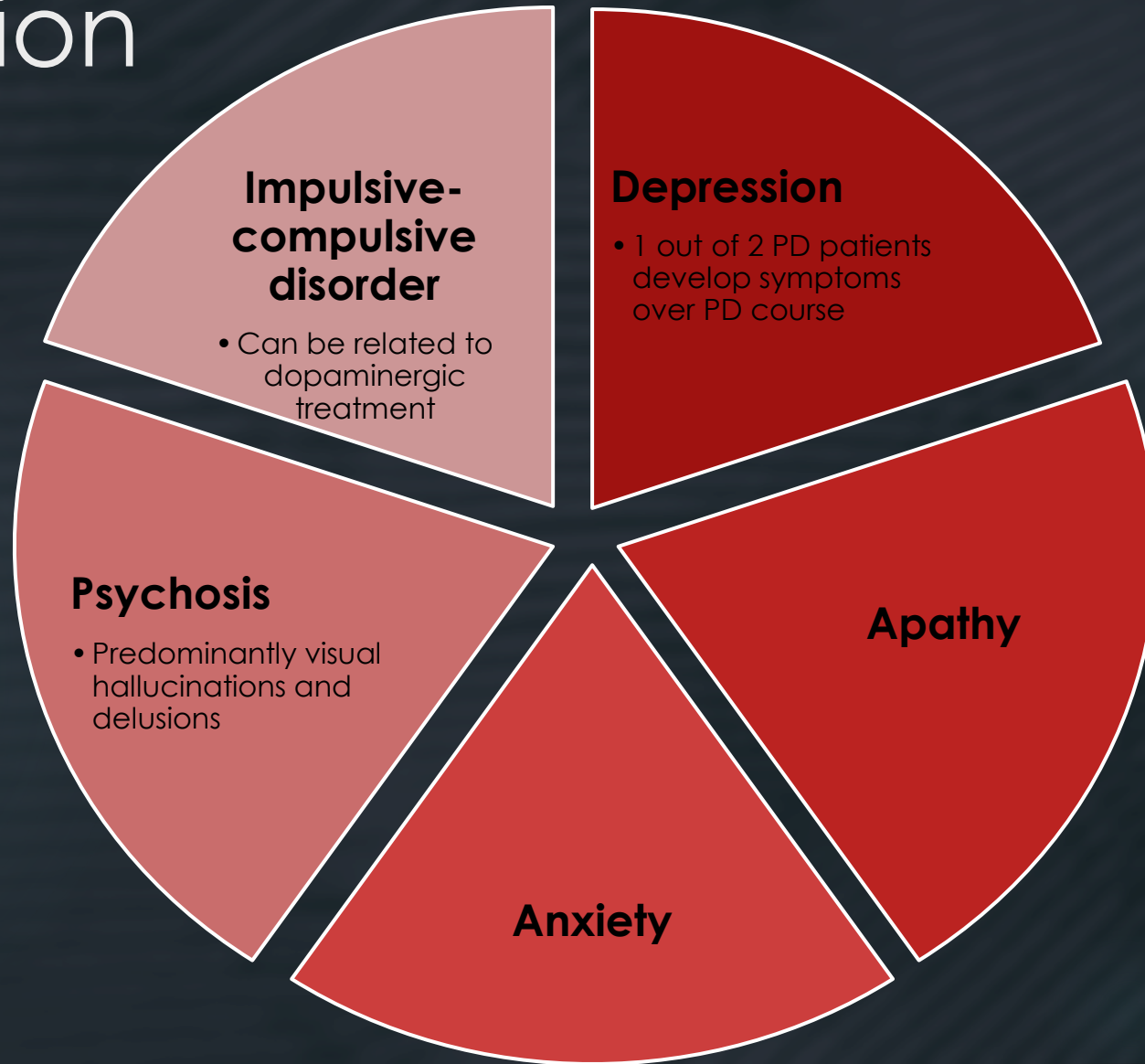








# PD as a *Neuropsychiatric* Presentation





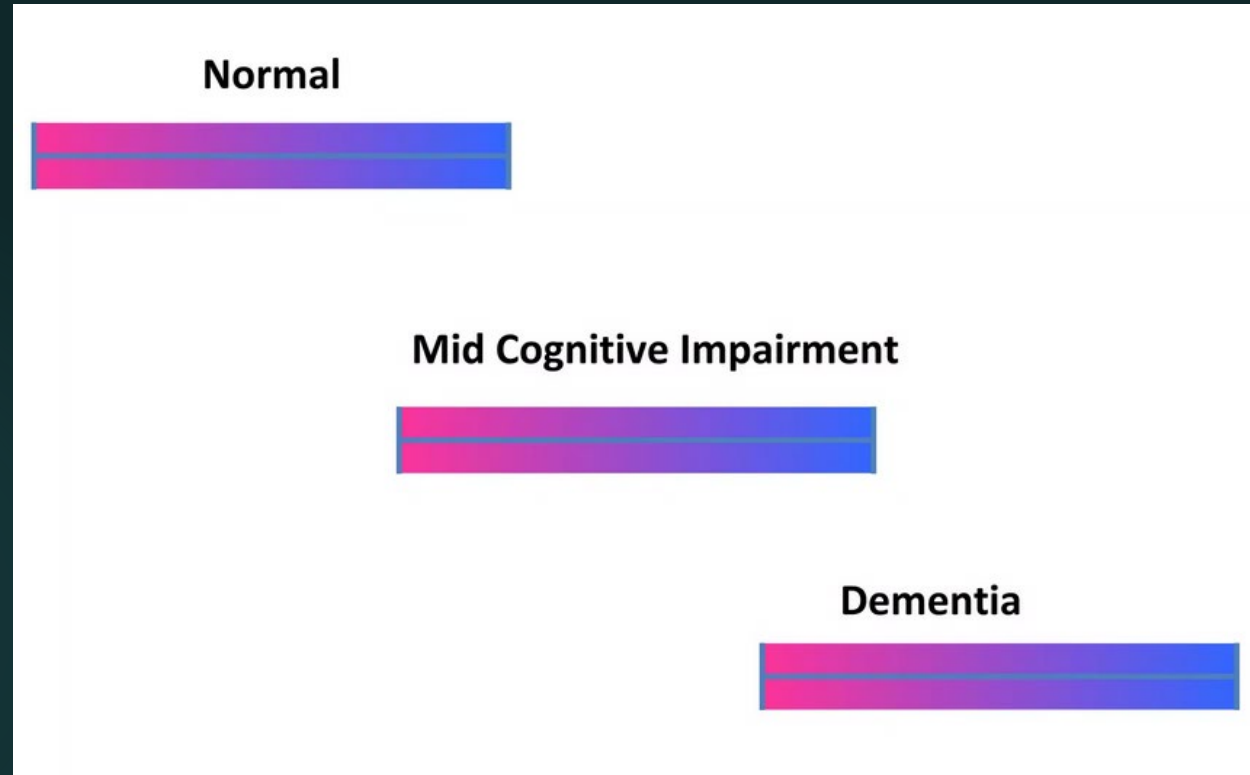


# *Cognitive Trajectories*

# Classification Continuum

## Mild Cognitive Impairment:

- 1) Modest decline from a previous level of cognitive performance
- 2) The cognitive deficits do not significantly interfere with independence in everyday activities



## Dementia:

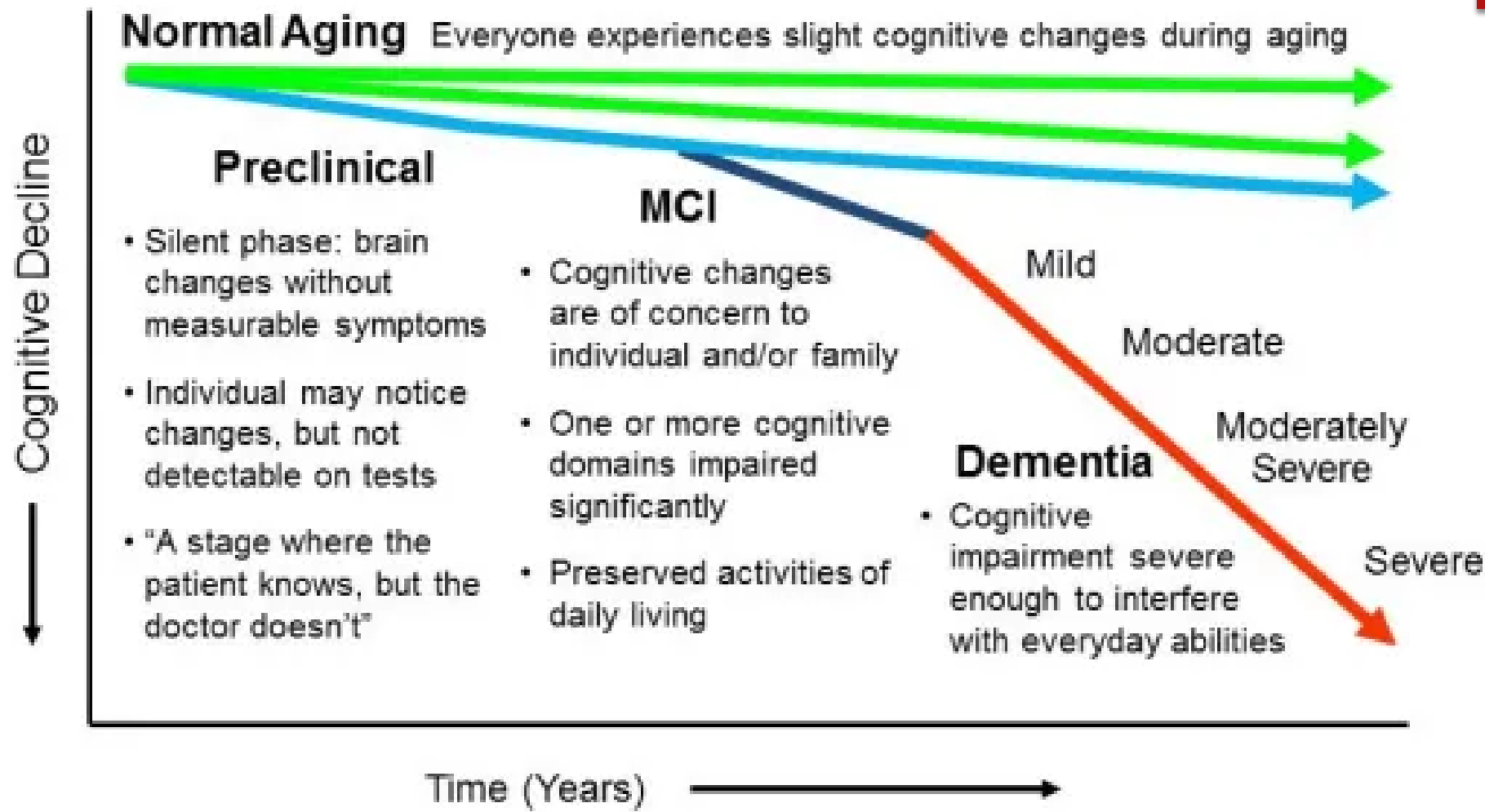
- 1) Significant cognitive decline from a previous level of cognitive functioning
- 2) The cognitive deficits interfere with independence in everyday activities
- 3) A behavioral symptom(s) may be apparent (apathy, depressed or anxious mood, hallucinations, delusions)



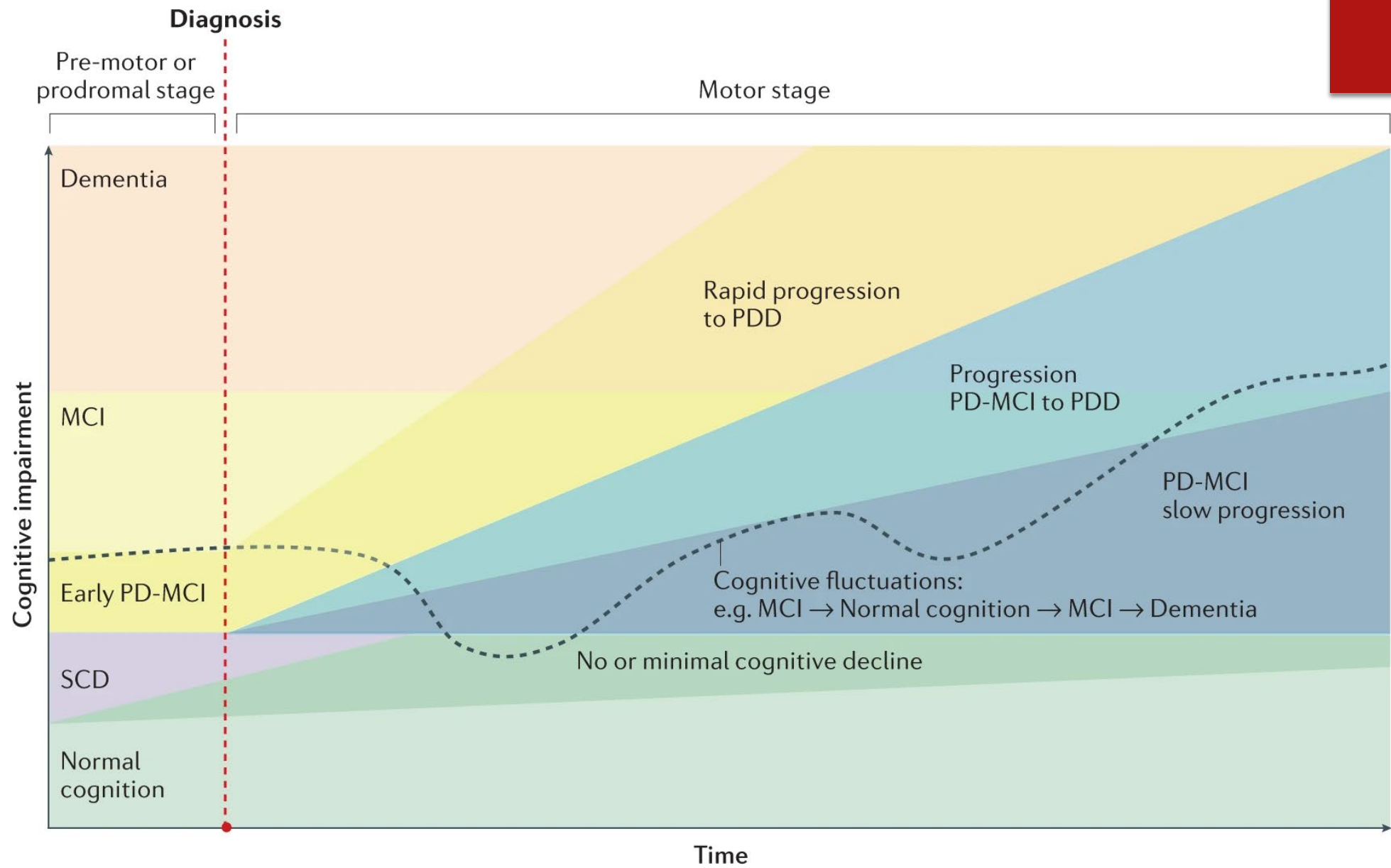
# TYPES OF DEMENTIA

Dementia is an umbrella term for loss of memory and other thinking abilities severe enough to interfere with daily life.

- Alzheimer's 60-80% of cases
- Vascular 15-25% of cases
- Lewy body 5-10% of cases
- Frontotemporal 5-6% of cases
- Other, including Huntington's For PD, 3-4% of cases
- \* **Mixed dementia:** Dementia from more than one cause







# Prodromal PD

Phase during which signs, symptoms, genotype, or biomarker findings suggest presence of early neurodegeneration, but the patient does not fully exhibit motor features for PD diagnosis

3 prodromal clinical markers associated with highest likelihood of future PD are:

- REM sleep behavior disorder (RBD)
- Olfactory loss
- Reduced dopamine transporter (DAT) binding



Cognitive weaknesses have been associated with all of these



# Cognitive Changes

*Early in PD course, subtle changes in:*

- Retrieval memory and planning, organizing, and other executive functions

*With mild cognitive impairment, difficulties may arise in:*

- Attention: sustaining attention, shifting attention, completing multi-step processes
- Executive functions, including inhibition and regulation
- Mental speed (increased time to register, retrieve, and respond to information)
- Language (word-finding)
- Retrieval of recent memories (yet benefiting from cues, reminders)
- Visual perception

*With dementia, additional difficulties may arise in:*

- Comprehension
- Naming
- Memory (benefiting less from cueing, reminders)

# Recognizing Emotions

More difficult for people with PD to identify others' emotions

- Particular difficulties with identifying or making sense of negative emotions, such as anger, disgust, fear, and sadness, of others' facial expressions and voices

People with PD may have difficulties identifying their own emotions

- Otherwise known as “alexithymia”
- Independent of depression
- People with PD and cognitive decline may not be aware that they are depressed



# General Risk Factors Associated with Developing PD Dementia

## **Demographic factors:**

- Older age
- Male sex
- Later age of PD onset

## **Potentially modifiable factors:**

- Depression
- Head injuries
- Tobacco use
- Hypertension

## **Disease variables:**

- Olfactory dysfunction
- Visual hallucinations
- REM sleep behavior disorder (RBD)
- Non-tremor/akinetic rigid predominant PD
- ApoE4
- Longer duration of PD symptoms
- Mild Cognitive Impairment

# General Risk Factors Associated with Developing PD Dementia

Proportion of people with PD and dementia is about 30%

People with PD have a six-fold increased risk of developing dementia versus people without PD



# Protective Factors Against Developing PD Dementia

Years of education / higher education

And likely, exercise, diet, sleep, limiting substance use, and managing other chronic illnesses adequately

# Cognitive Features of Dementias

Dementia of Alzheimer's type (AD): Key impairment is memory, followed by language and orientation

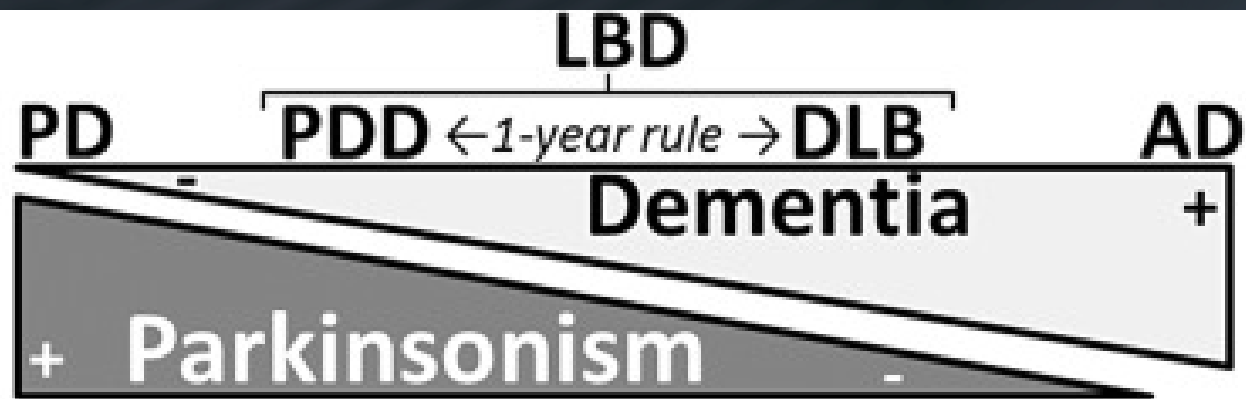
Dementia with Lewy bodies (DLB): Key impairments in attention, executive functions, visuospatial abilities, and episodic memory, with some language involvement

- People with DLB tend to decline more rapidly than people with AD in the visuospatial domain


Parkinson's disease dementia (PDD): Key impairment in executive function. Also tend to have reduced attention, slowed processing speed, and alterations in visuospatial functioning

- People with PDD tend to decline at a slower rate on language measures than people with DLB or AD





	PD	PDD	DLB	AD
<b>Cognitive deficits</b>	Rare and mild	Late	Early and typical	
- Dementia	None	Late	Typical	
- Memory and attention	None	Variable	Prominent	
- Hallucinations and delirium	Rare	Typical	Occasional	
- Delusions	Occasional	Typical		
- REM sleep disorder	Occasional	Typical	Rare	
- Depression	Common			
<b>Parkinsonism</b>	First manifestation		Late or none	Rare
- Rigidity	Typical		Rare	
- Bradykinesia	Typical		Rare	
- Gait and postural disturbances	Typical		Rare	
- Tremor	Typical	Variable	Rare	



# *Neurocognitive Diagnosis*



# What to Do?

- Talk to your doctor. Can be helpful to bring a loved one to this visit to discuss their observations
- Cognitive screen in office
- Comprehensive neuropsychological evaluation

# What is a Neuropsychological Evaluation?



Record review and test selection based on history / referral question



Interview



Gather additional information from collaterals, outside medical records



Cognitive and psychological testing / scoring



Written report



Feedback to patient of results, diagnosis, and recommendations



# *Recommendations*



# Modifications to Complex Tasks

- Work accommodations
- Driving evaluation by occupational therapist
- Medication management
- Financial oversight
- Communication habits
- Discuss surrogate decision maker



# Cognitive Compensatory Strategies

- Develop a routine and good habits, to make procedures “muscle memory”
- Use calendars, reminders on smartphone, and other visual and auditory cues for memory and planning
- Inform others when providing information too quickly or when something needs to be repeated. Ask others to write information down.
- Reduce distractions when possible (e.g., turn off the television or radio while you’re having a conversation)
- Avoid shifting back and forth between tasks
- Divide tasks into individual steps that are easier to complete
- Keep rooms well-lit to reduce issues with visual misperception

# Stay Engaged!

- Exercise to the extent it is safe
- Stimulate the mind with novel, cognitive activities (attend a lecture, read a book, learn a new hobby)
- Be social. Stay connected to friends and family



# Healthy Habits

- Diet (e.g., Mediterranean diet, adequate fluid intake)
- Sleep
- Avoiding toxins to the brain

# Medications

- Consideration of whether there are any offending medications that might contribute
- Optimizing “on” time, reducing “off” time
- Treating providers may offer medications for people with memory impairment



# Online Resources

- <https://www.parkinson.org>
- <https://www.michaeljfox.org>
- <https://davisphinneyfoundation.org/>
- <https://www.nia.nih.gov/health/brain-health/>
- <https://www.apdaparkinson.org>

Thank you for your  
attention

