50TH ANNIVERSARY
Parkinson Society British Columbia

Non-Motor Symptoms in Parkinson's Disease

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  - Royalty payments from University of Rochester

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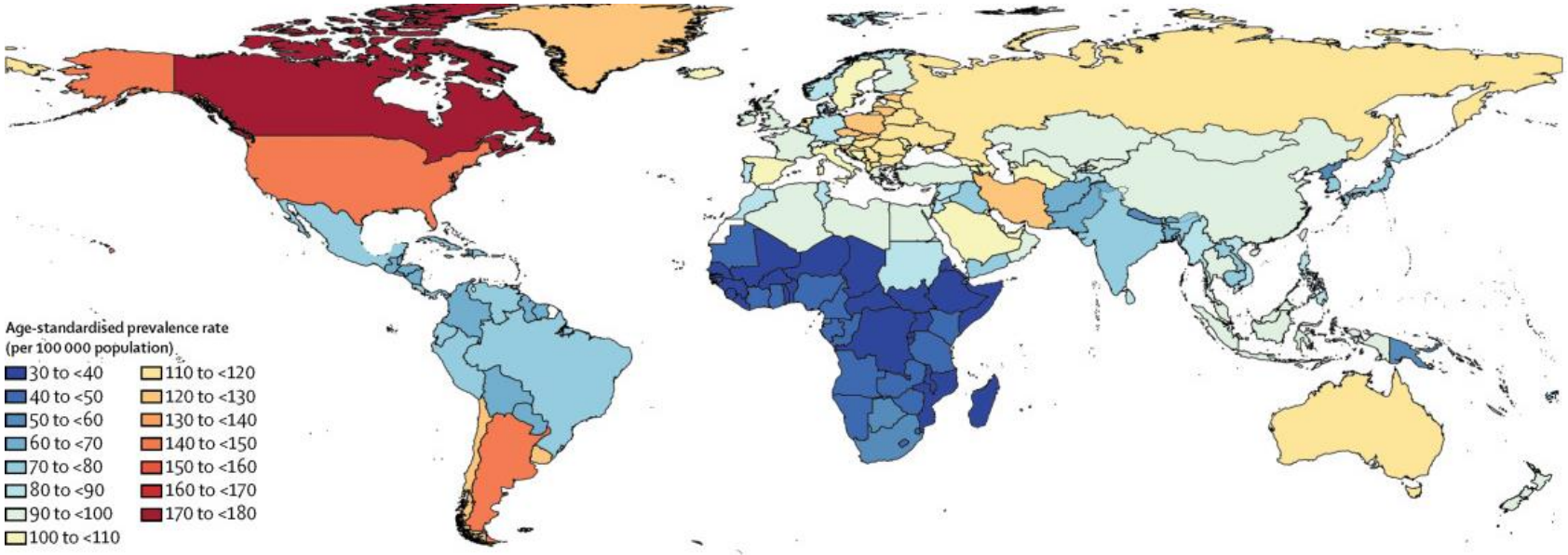
Parkinson's Disease

- 2nd most common neurodegenerative disease after Alzheimer's disease
- Estimated prevalence ~100,000 cases in Canada; 930,000 cases in US; 10M worldwide
- Incidence ~6,000 new cases per year in Canada; 60,000 in US; 600,000 worldwide



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GBD 2016 PDC, Lancet Neurology, 2018
PDF and MJFF: Lewin Report, 2019

Impact of Parkinson's Disease

- Affects the patient, family, community
  - More than half of people with PD rely on others for help
  - More than 75% of these individuals rely on family or friends
- Affects people in productive years
  - Typical age of onset 55-65
- The economic burden of PD is high
  - Average cost to the health care system is $25,000/year
  - $2.54B direct medical costs
  - Does not include non-medical costs: missed work, lost wages, family impact

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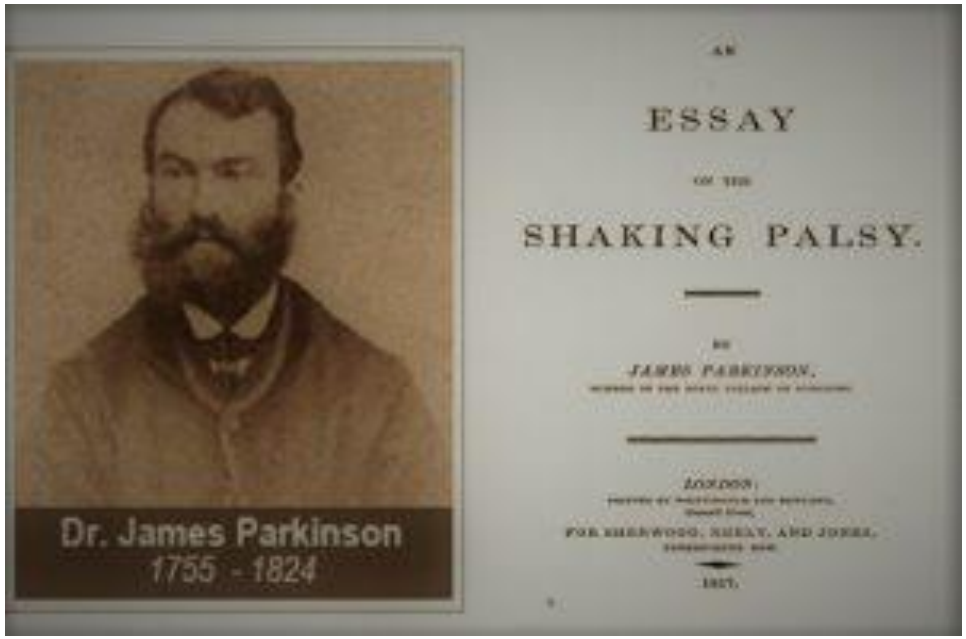
In The Beginning

- Tremor
- Rigidity
- Bradykinesia
- Gait and balance problems



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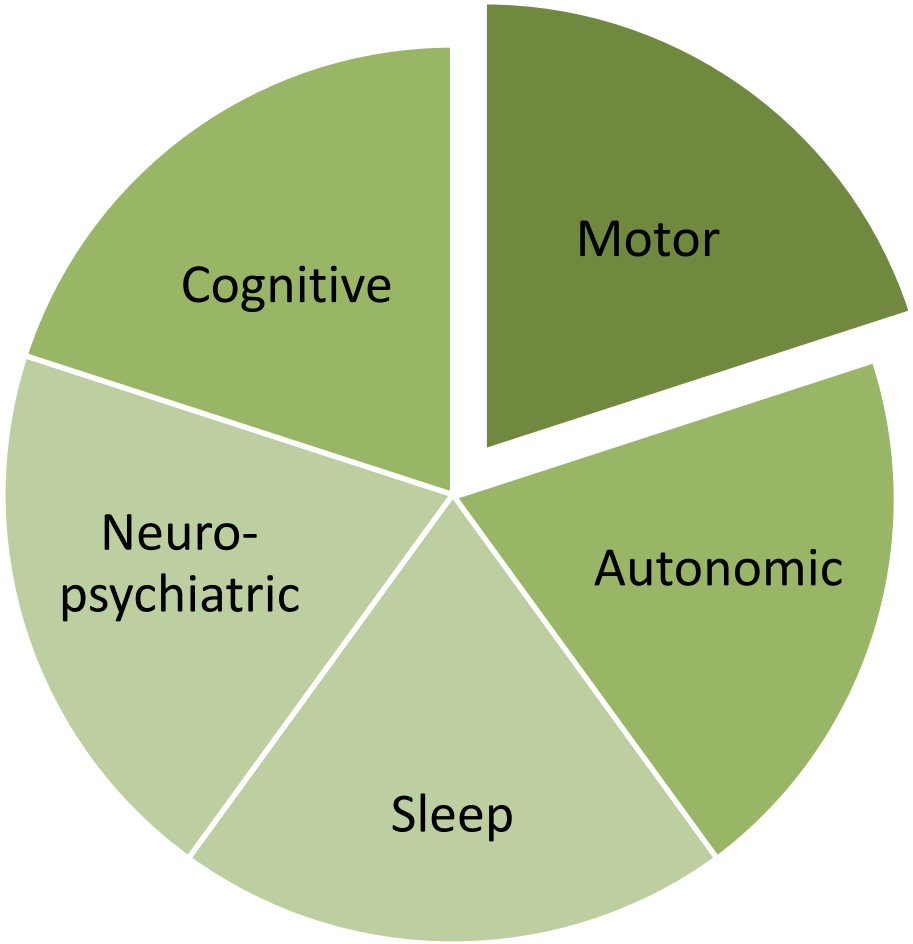
Growing Recognition of Non-Motor Features



Symptom	% of PD patients
Olfactory dysfunction	90%
Dementia	78%
Depression	40-50%
Autonomic dysfunction	80%
Orthostatic hypotension	50%
GI symptoms	50-95%
Urogenital dysfunction	57-83%
Pain	40-50%
Sleep disorders	66%
Fatigue	50%

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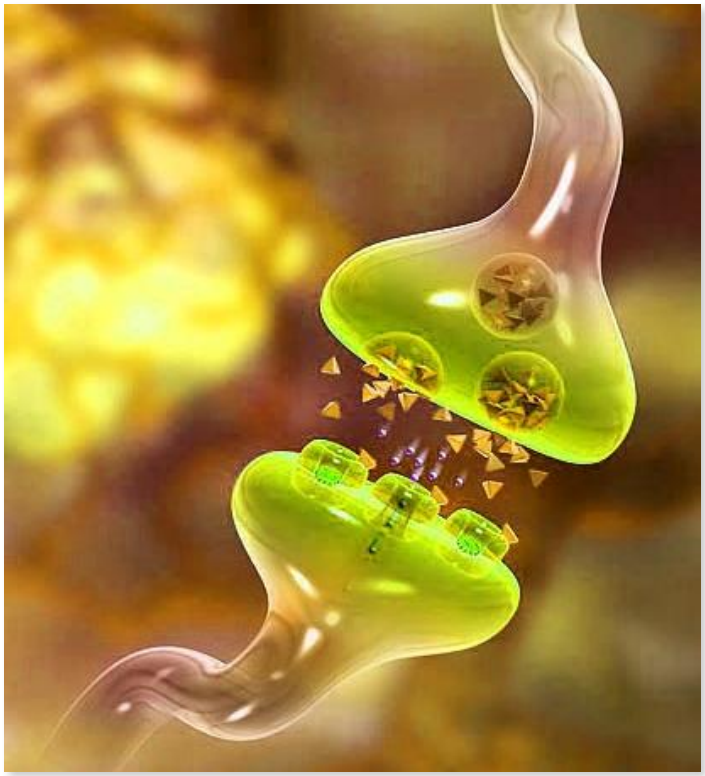
Chaudjuri et al, Lancet Neur 2006

Reichmann et al, Exp Opin Pharmacother, 2009

From Neurons to Behavior



Neurons

- Workhorses of the brain
- Communicate using neurotransmitters like dopamine

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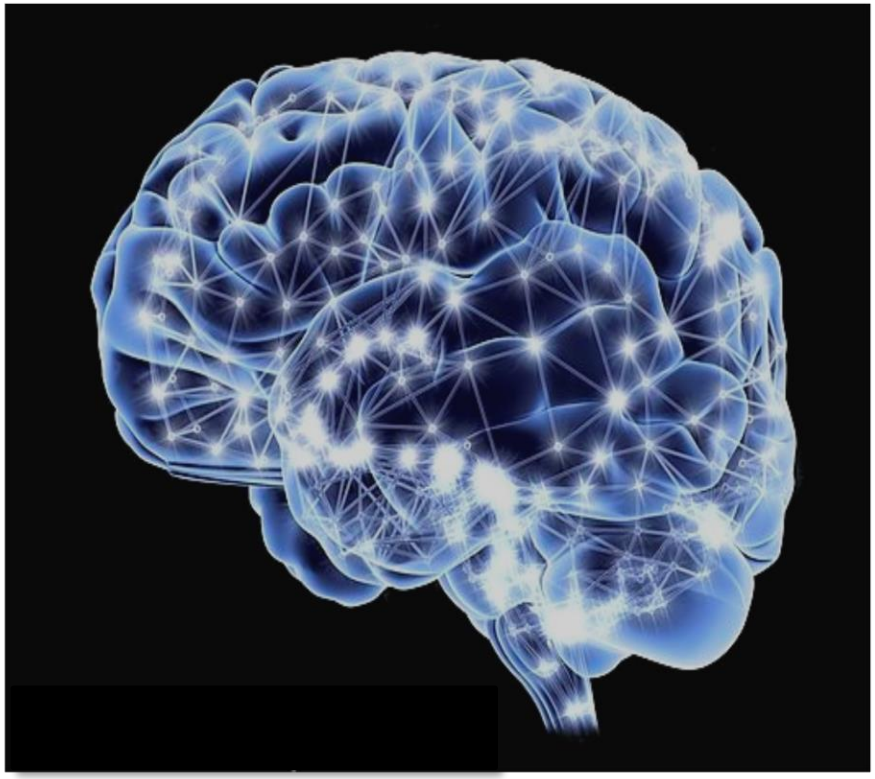
From Neurons to Behavior



Neurons

- Connected in large networks
- Networks operate in different parts of the brain

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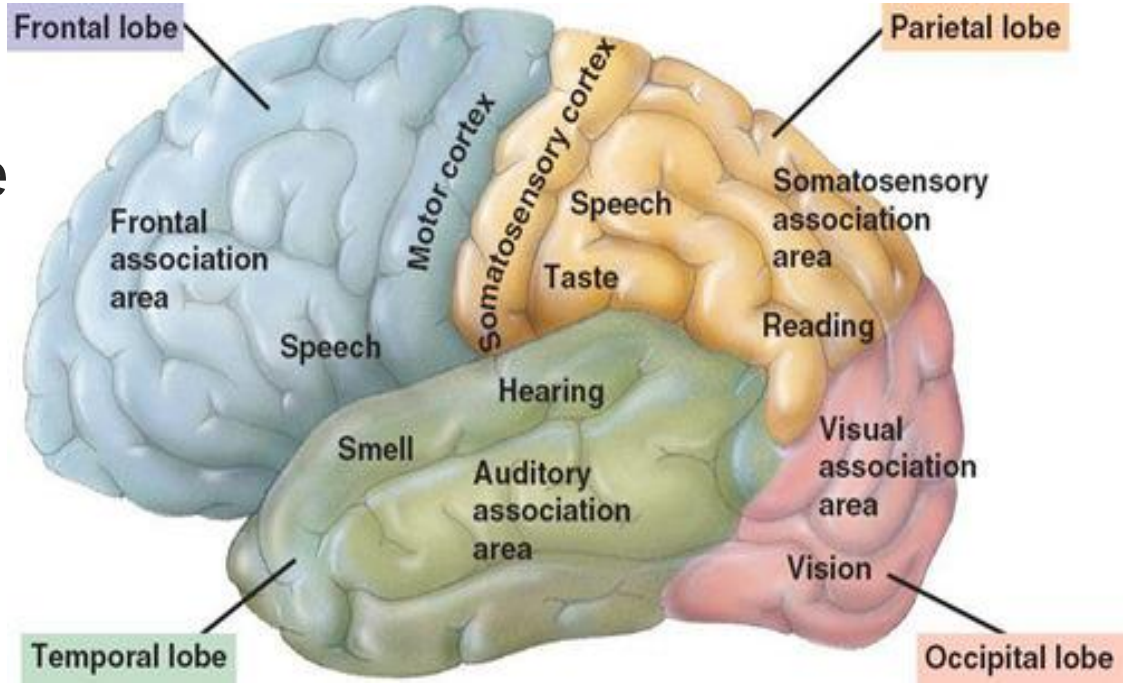
From Neurons to Behavior

- Different parts of the brain are responsible for different behaviors



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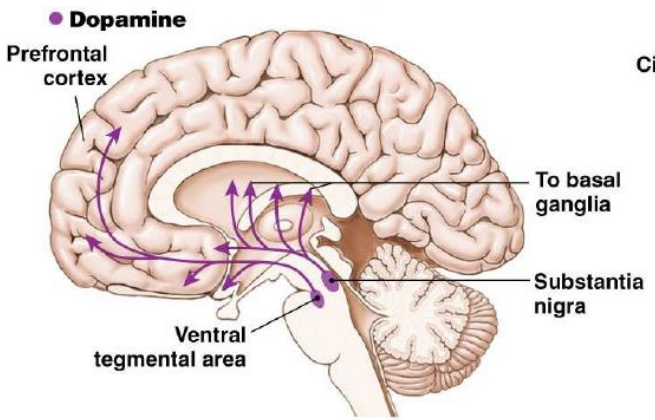
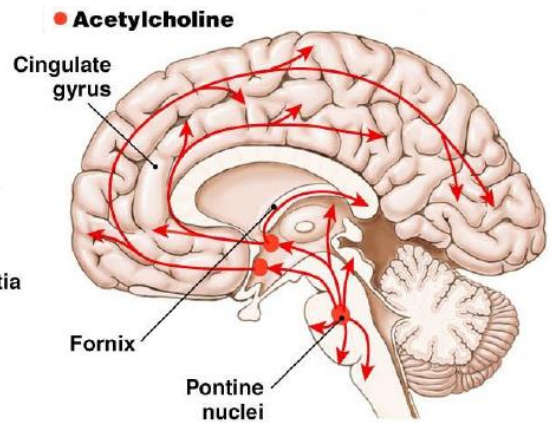
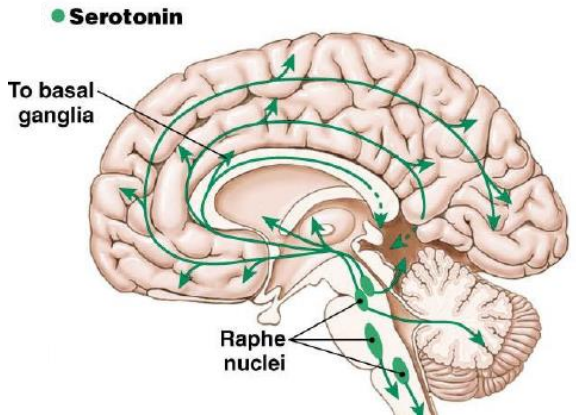
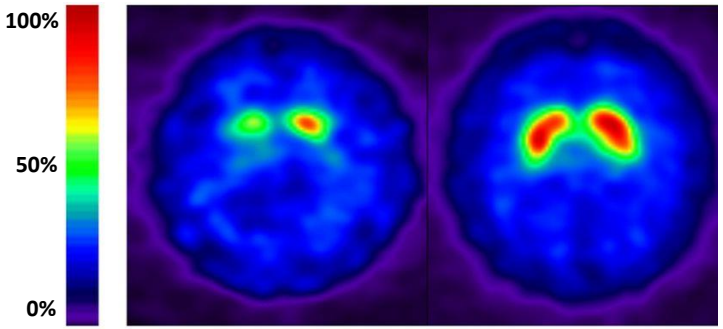
What Causes Non-Motor Symptoms?

- Cells that produce dopamine and other neurotransmitters die off
- Many areas of the brain are affected

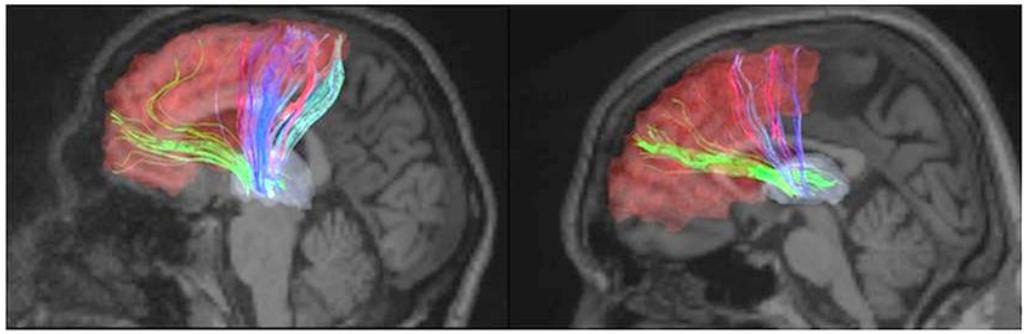








PD Control



PD Control

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Son & Park, Scientific Reports 2016

Pre-Motor Symptoms of Parkinson's Disease

- Increasingly recognized pre-clinical phase
- Can occur years to decades before motor symptoms
- Characterized by:
  - Loss of sense of smell
  - REM behavior disorder
  - Excessive sleepiness
  - Mood disorders
  - Constipation

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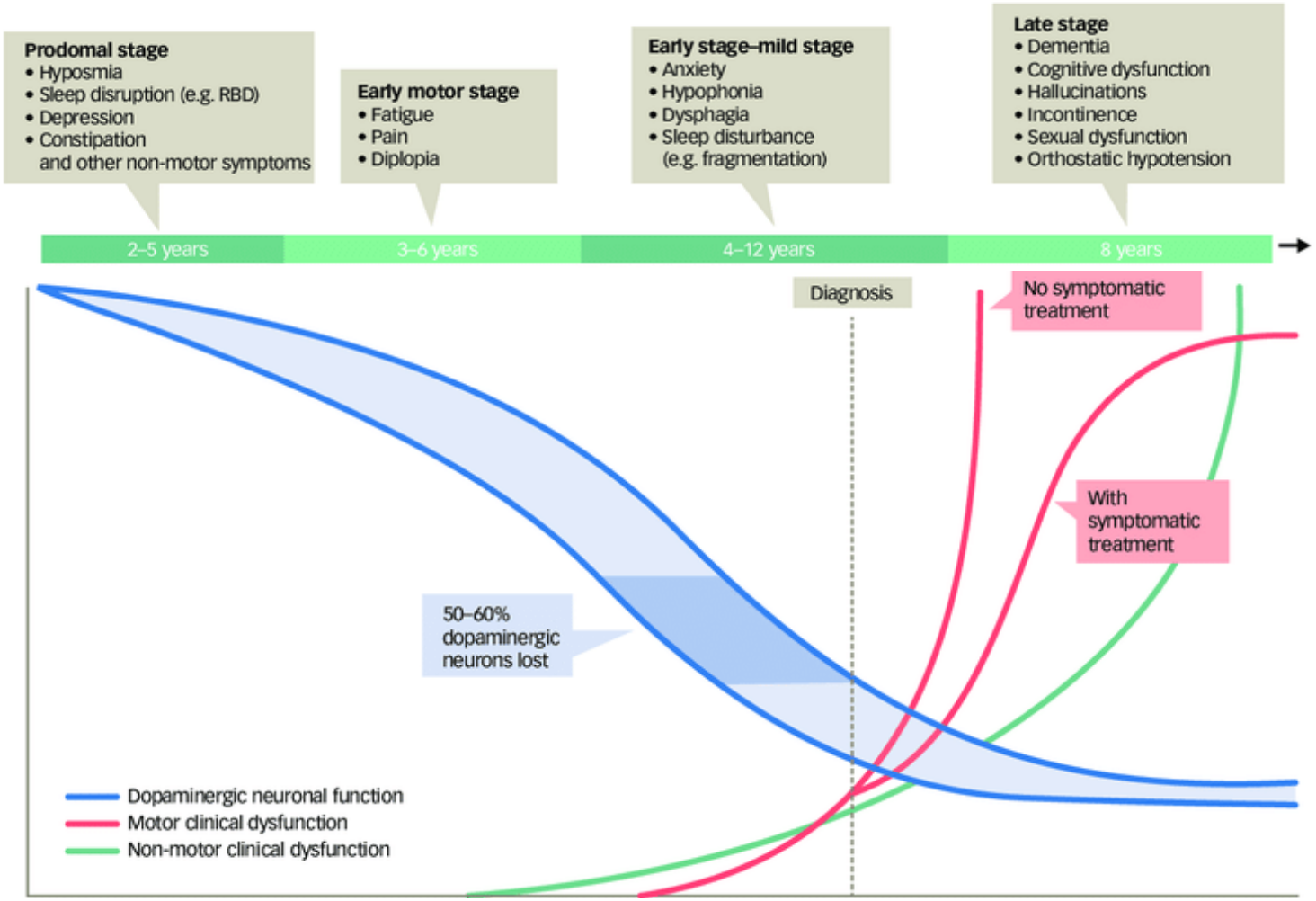
Evolution of Non-Motor Symptoms



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Chaudhuri & Titova, Eur. Neuro. Rev. 2019

Impact of Non-Motor Symptoms

- Very common; affecting majority of patients (>90%)
- Typically less predominant in early disease, but increase with disease duration
- Non-motor symptoms have a great impact on quality of life
- Negatively impact sense of well-being
- Source of significant caregiver burden
- May impact relationships and finances (ICD)
- Greatest risk factors for assisted living are dementia or neuropsychiatric features

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Autonomic Symptoms

- Can occur early in the disease-not always related to severity
- Bladder problems
  - Urinary urgency; frequency; nocturia; and incontinence
  - Significant predictor of quality of life
- Problems with swallowing (Dysphagia)
  - >90% patients report dysphagia at some point in the disease
  - Significant cause of concern for caregivers
- Excessive sweating, especially of hands and feet
  - Associated with poor sleep and embarrassment
- Orthostatic hypotension (blood pressure changes)
  - Can be reported as transient giddiness, visual disturbance, or nausea
  - Loss of consciousness is rare, but increases risk of falls

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Goldstein et al, Ann Intern Med, 2000

Sleep Disturbances

- Sleep disturbance occurs frequently in PD (>60%)
- Restless Legs Syndrome (RLS)
  - Prevalence ranges from 8-20% of PD patients
- REM Behavior Disorder (RBD)
  - Acting out during REM sleep
  - Risk of injury to self or bed partner
- Excessive daytime sleepiness
  - Affects 15-50% of people with PD
- Insomnia
  - Prevalence 20-88%
  - Many factors may contribute including RLS, circadian rhythm alterations, motor fluctuations, medication side effects, pain, rigidity

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Olson et al, Brain, 2000

Caap-Ahlgren & Dehlin, Arch Gerontol Geriat, 2001

Neuropsychiatric Symptoms- Depression

- Very common in PD (up to 50%)
- Depression
  - Feelings of sadness lasting at least 2 weeks
    - Changes in sleep or appetite
    - Decreased concentration or attention
    - Increased fatigue
    - Feeling “slowed down” or restless
    - Feeling worthless or guilty
    - Suicide ideas or a wish for death
  - More predictive of distress than motor disability
  - More frequent in males and those with prior episodes or family history

Neuropsychiatric Symptoms- Depression (cont)

- Cause may be multi factorial
  - Psychological factors
    - Coping with chronic illness, isolation, early retirement, restriction of activities
  - Biological
    - Neurochemical: dopamine, serotonin, norepinephrine
- Challenges
  - Some people may not report mood changes.
  - Some people have difficulty recognizing changes in mood state
  - Hard to distinguish depression symptoms from motor symptoms

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Neuropsychiatric Symptoms- Anxiety

- Anxiety
  - Feelings of tension or worry lasting 6 months
    - These feelings are bothersome and feel out of control
    - Decreased concentration or attention
    - Feeling overwhelmed
    - Concentration problems
    - Irritability
    - Poor sleep
  - Can be experienced as
    - Generalized anxiety
    - Anxiety attacks
    - Obsessive-compulsive disorder
    - Social avoidance

Neuropsychiatric Symptoms- Anxiety (cont)

- Cause may be multi factorial
  - Psychological factors
    - Coping with chronic illness, isolation, early retirement, restriction of activities
  - Biological
    - Neurochemical: serotonin, norepinephrine, dopamine
- Challenges
  - Worry about symptoms may not be true anxiety
  - Legitimate concerns about physical risks (falls)
  - Motor symptoms may be mistaken for anxiety

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Neuropsychiatric Symptoms- Impulse Control

- Impulse Control Disorders
  - Difficulty controlling impulses
  - Hypersexuality
  - Binge eating
  - Compulsive behaviors: Shopping/gambling
  - Acting without thinking
- Most commonly seen during treatment with specific drugs
- May be similar in presentation to OCD or addictive behavior
- Upsetting to patients and families
- May lead to damage to relationship and/or finances

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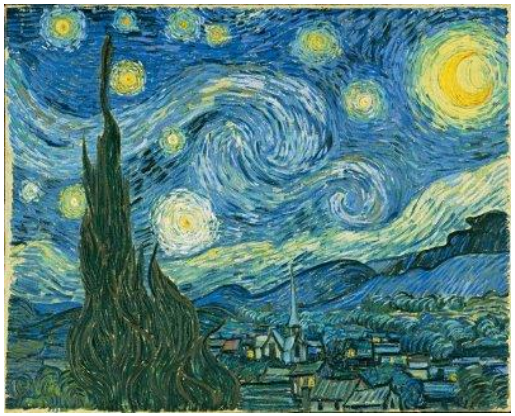
Hallucinations

- Perceiving something that isn't really there
  - Seeing, hearing, touch (occasionally)
  - Stress-related
  - May occur in low light conditions
  - Fleeting and non-disturbing
- Can often be treated
  - Side effect of some medications
  - 25% of those taking PD medications may experience hallucinations
  - Inform your doctor!



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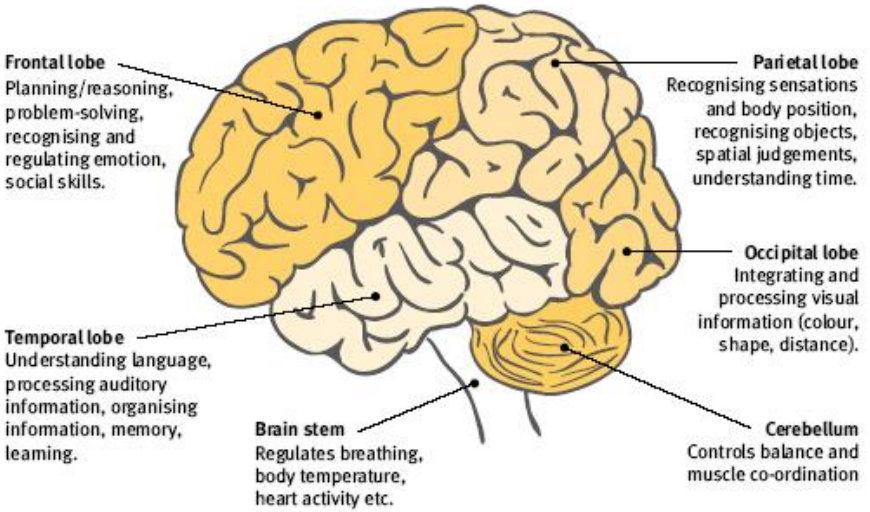
Cognitive Symptoms

- Cognitive changes are very common (>70%)
- Dementia affects ~25% of all PD patients
- Cognitive changes are related to slow information transfer
- Memory loss, word-finding are most troubling to patients and caregivers
- Cognitive Domains
  - Attention and Processing Speed
  - Executive Dysfunction
  - Language
  - Memory
  - Visuoperception



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Attention and Processing Speed

- Main problem is an overall slowing of information transfer in brain areas supporting cognition
- Bradyphrenia is cognitive equivalent of bradykinesia
  - Delay in responding to verbal or other stimuli
  - Take longer to complete tasks
- Difficulty sustaining attention over long periods of time
- Can be mistaken for depression

Executive Function

- Problems planning, executing and completing multi-step tasks
  - Difficulties generating, maintaining, shifting and blending different ideas and concepts
- Difficulties with problem-solving
  - Takes longer and may lead to feelings of being overwhelmed
- May show impaired judgment or impulse control
- May have difficulty initiating new tasks or behaviors
- Caused by reduced neurotransmitters to frontal lobes of the brain and overall slowed information transfer

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Language and Visuoperception

- Language
  - Most reported difficulty is word retrieval
    - “Tip-of-the-tongue”
    - Likely due to slowed processing speed
    - Will be more noticeable in individuals with lower vocabulary skills
    - Also tend to use simpler speech and speak less overall
- Visuoperception
- Poor depth perception and navigation
  - Driving can become unsafe

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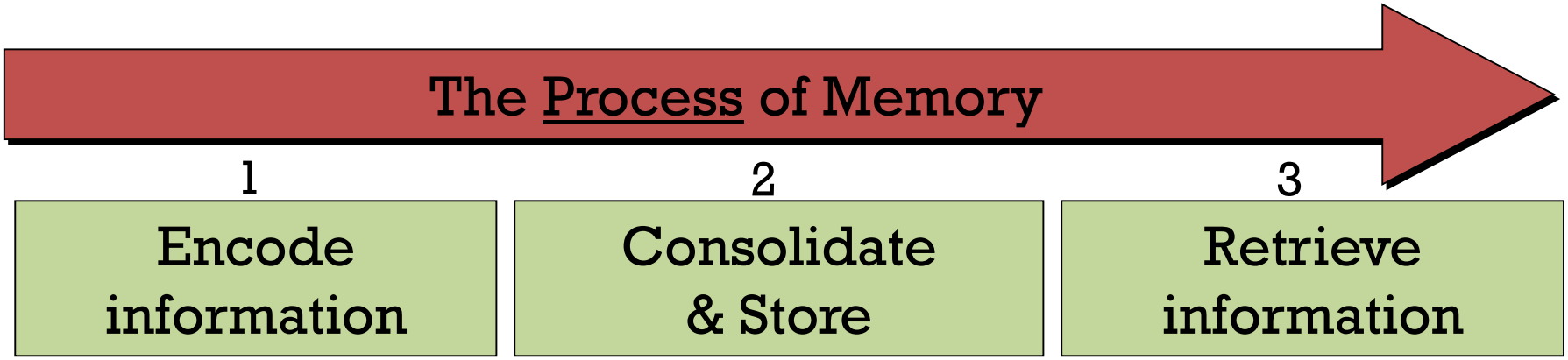
Memory

- Roughly half of people with PD report memory changes
- Due to poor encoding and retrieval, not retention
- Different pattern than Alzheimer's disease
- Benefit from cueing
- Retentive memory loss in PD may indicate dementia



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Parkinson's Dementia

- More severe cognitive changes
- Cognitive changes affect ability to do daily tasks
- Generally include significant memory loss
- Usually occurs late in disease
- May affect 25-50% of people with PD
- Not all patients develop dementia

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What Can You Do?

- Brain Fitness Strategies
  - Medications
  - Stress reduction
  - Physical activity
  - Other lifestyle choices
  - Diet
  - Mental activity

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Mental Activity

- Accelerates the rate new brain cells are created
- Enhances the chances of new neurons' survival
- Strengthens the synapses (connections) among neurons
- Leisure activity involving mental effort decreases risk for dementia

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Mental Activity

- The 3 key principles for good brain exercise
  - Novelty
  - Variety
  - Challenge

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Mental Activity

- Any kind of mentally challenging activity could be protective
  - Crosswords
  - Social interactions
  - Learning language(s) (reading)
  - Listening to music
  - Card games
  - Chess and strategy games
  - Visit museums and historical sites
  - Attend workshops

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Mental Activity

- Try to learn something new every day:
  - a new concept
  - a new word
  - a new exercise
  - engage with people
  - use your brain instead of a device

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Tips To Strengthen Your Memory

- It's easier to remember things you have practiced!
- The more one activates a memory, the stronger the memory becomes
- Poor input of memories makes retrieval of memories more difficult
- Reduce distractions when trying to create new memories
- Use memory strategies
  - Chunking, rhyming, music, linking

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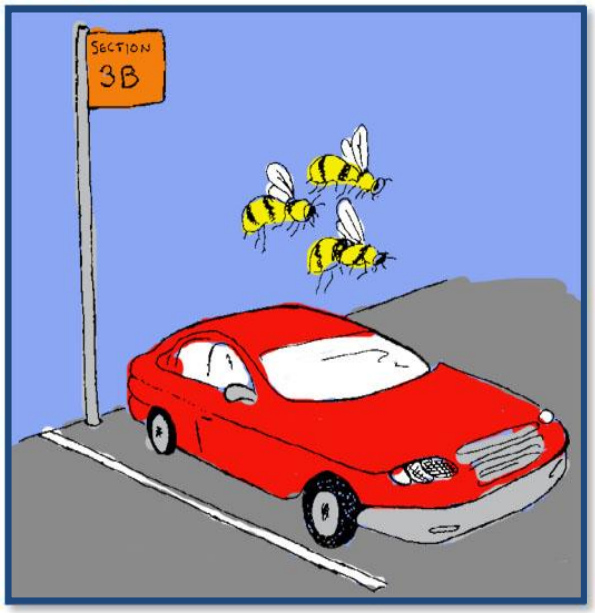
Remembering New Information

- Attend
  - Actively pay attention and reduce distractions
  - Focus on what you are doing
- Visualize
  - Create a vivid mental image
  - The more outrageous the better
- Connect
  - Link images to create a memorable scene



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Remembering Names

- Commit yourself to learning the name
- Repeat name during conversation
- Comment if person reminds you of someone you know
- Ask the name's spelling or pronunciation
- Use the name when you say good-bye

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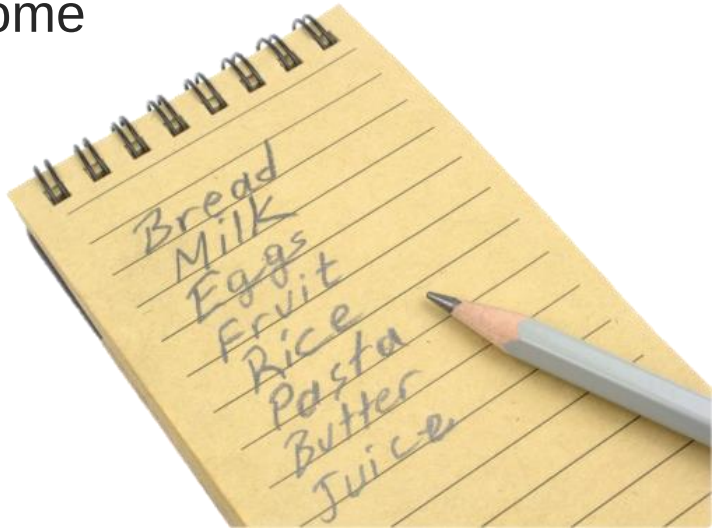
General Recommendations For Care Partners

- Written notes and lists are helpful,
  - …but only if you orient to them
  - Put them in a prominent place in the home
- Use prompts and cues if possible
  - “Did Linda call?”
- Keep things in routine places
- Use timers and reminders
- Elaborate on information
- Allow time to come up with words or information



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Take Home Points

- If you have non-motor symptoms, ask your doctor to evaluate them and report their impact on your quality of life
- Recognize that caregiver stress is related to severity of non-motor symptoms
- Most cognitive symptoms are related to slowing of information processing, similar to motor symptoms
- Keep your brain active with novelty, variety, challenge
- Focus on learning something new every day
- Commit to remembering and use cues and strategies

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THANK YOU FOR YOUR ATTENTION

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