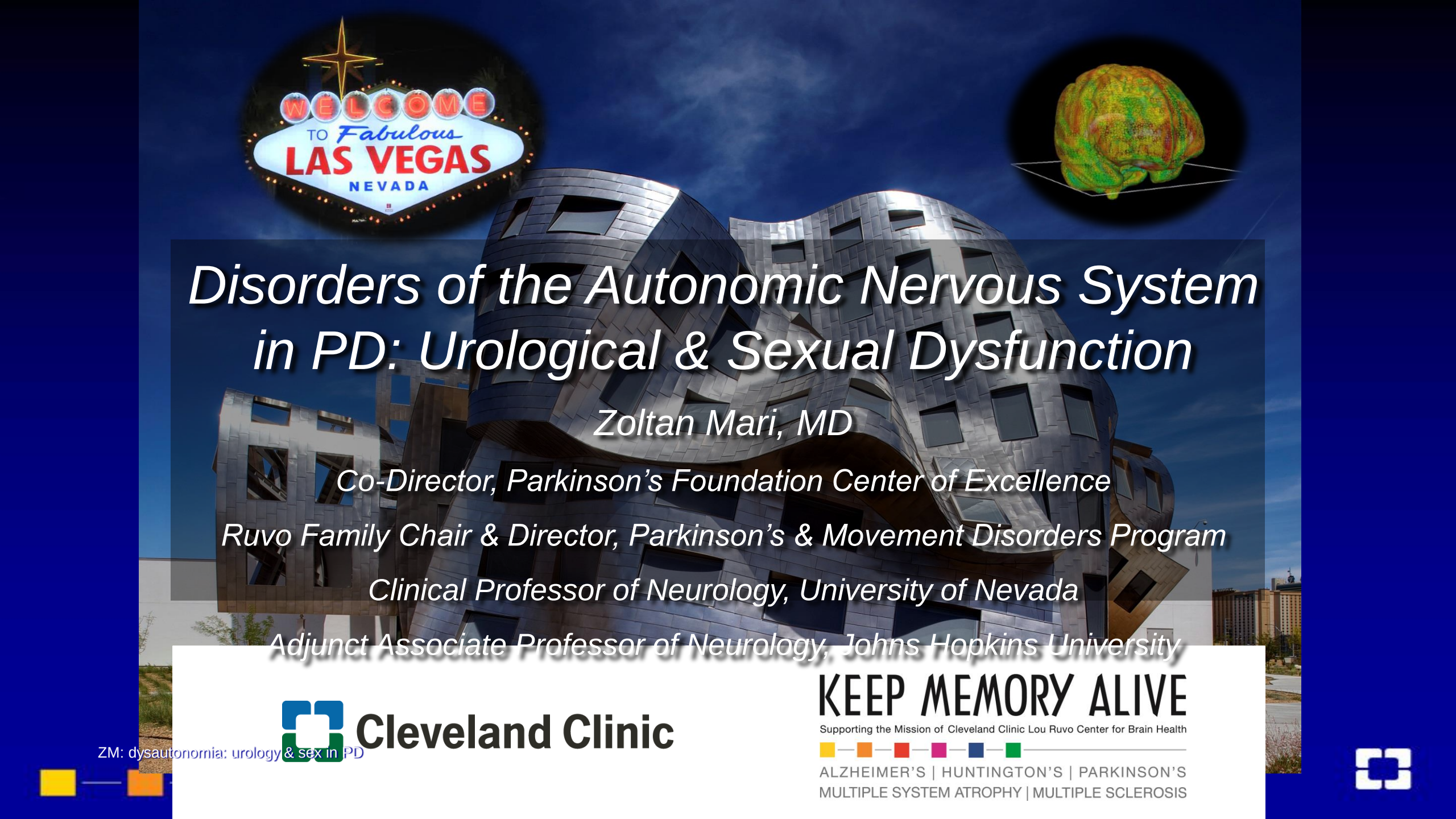

Disorders of the Autonomic Nervous System in PD: Urological & Sexual Dysfunction

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Cleveland Clinic

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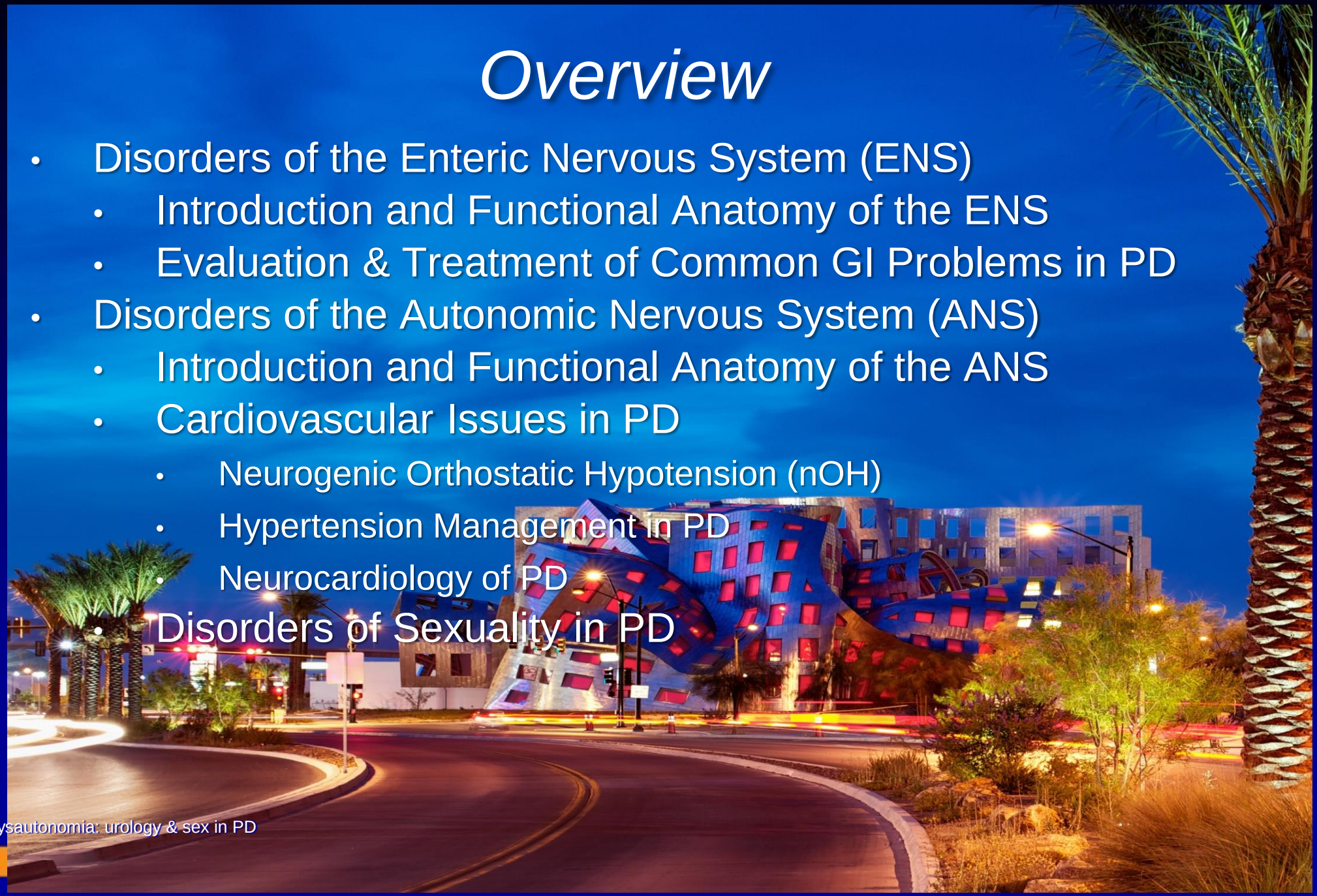
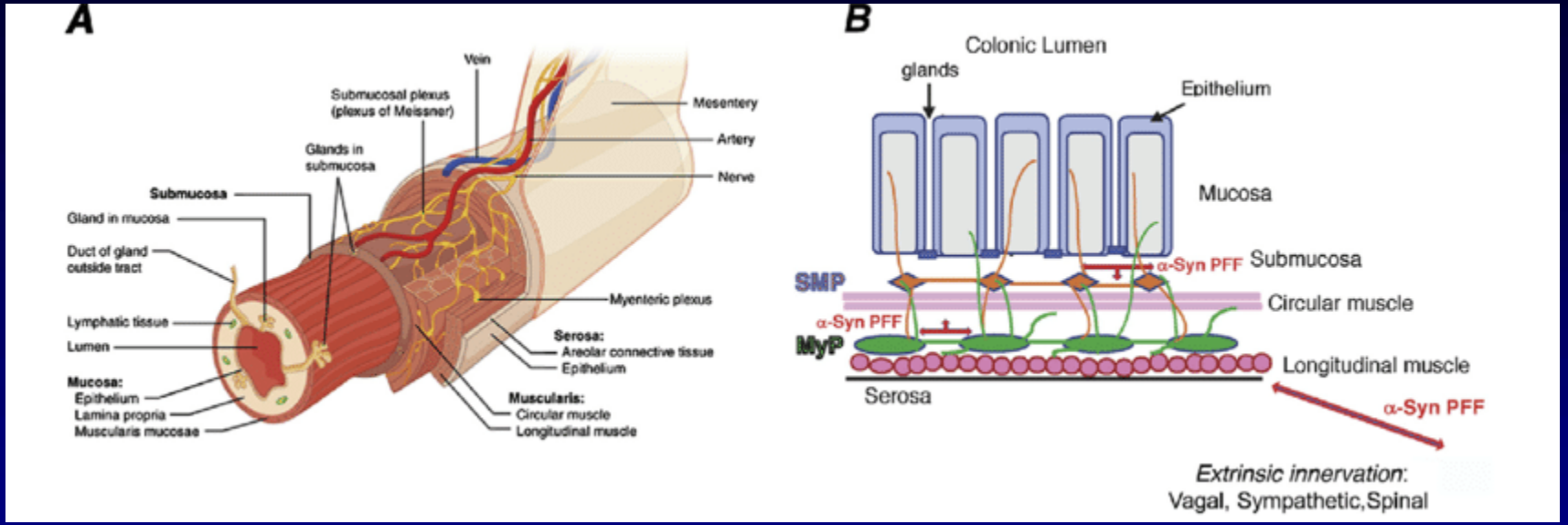
ALZHEIMER'S | HUNTINGTON'S | PARKINSON'S
MULTIPLE SYSTEM ATROPHY | MULTIPLE SCLEROSIS

Overview

- Disorders of the Enteric Nervous System (ENS)
  - Introduction and Functional Anatomy of the ENS
  - Evaluation & Treatment of Common GI Problems in PD
- Disorders of the Autonomic Nervous System (ANS)
  - Introduction and Functional Anatomy of the ANS
  - Cardiovascular Issues in PD
    - Neurogenic Orthostatic Hypotension (nOH)
    - Hypertension Management in PD
    - Neurocardiology of PD
  - Disorders of Sexuality in PD



Functional Anatomy of the ENS

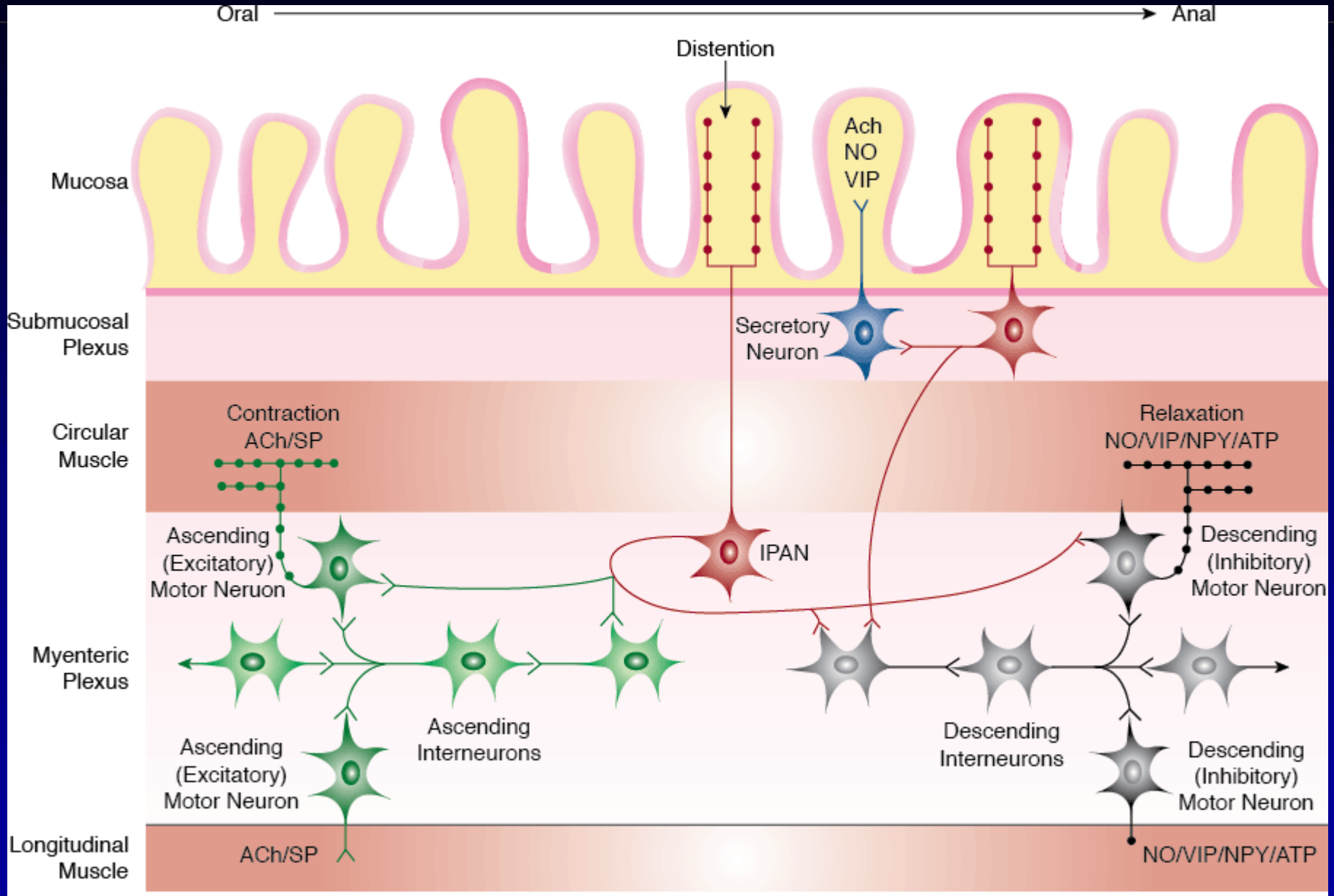


Organization of the enteric nervous system and potential pathways for a-synuclein propagation. A: Schematic illustrating the laminar organization of the bowel in three-dimensions from the mesentery to the lumen. The two major plexuses of the ENS are the myenteric plexus (MyP), located in between the circular and longitudinal muscle layers in the muscularis externa, and the submucosal plexus (SMP), located in the submucosa. Image obtained from Wikimedia and reproduced under the Creative Commons Attribution-Share Alike 3.0 Unported license. B: Schematic of a cross-section of the colon illustrating the interconnected enteric plexuses (MyP and SMP), which are both unmyelinated and contain neurons projecting to the mucosa. Alpha-synucleopathies (a-Syn preformed fibrils [PFF], red arrows) could propagate from pre-synaptic nerve terminals to vulnerable post-synaptic neurons both within the ENS, and from the ENS to the CNS through extrinsic projections to the gut, which include vagal, sympathetic and spinal afferent fibers. This could be one of the factors in the progression of Parkinson's disease.

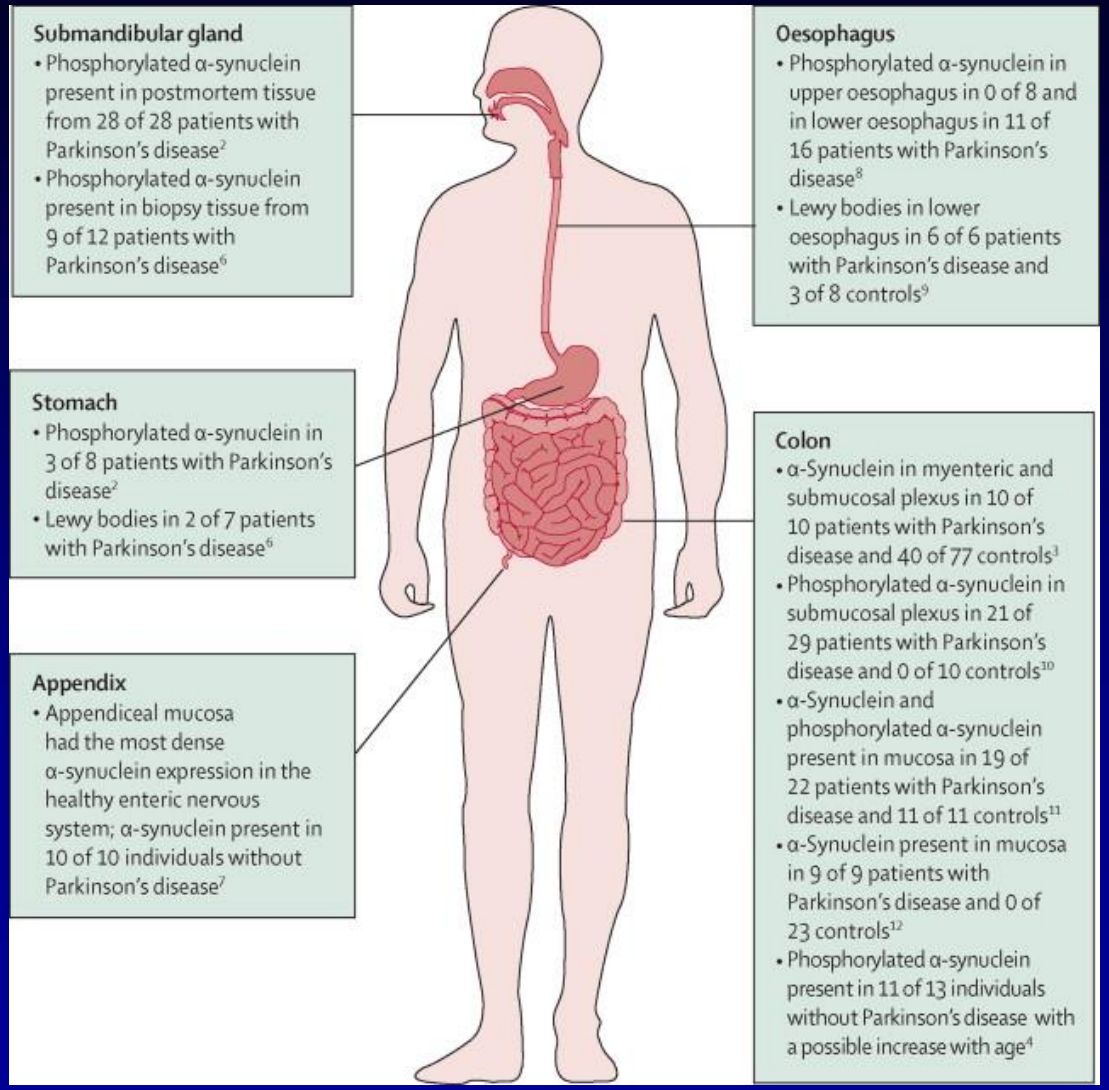
Alcmène Chalazonitis & Meenakshi Rao
Enteric nervous system manifestations of neurodegenerative disease
Brain research 1693(Pt B) · January 2018
DOI: 10.1016/j.brainres.2018.01.011

ZM: dysautonomia: urology & sex in PD

Functional Anatomy of the ENS – cont.



Areas of Known Synucleinopathy in the GI System



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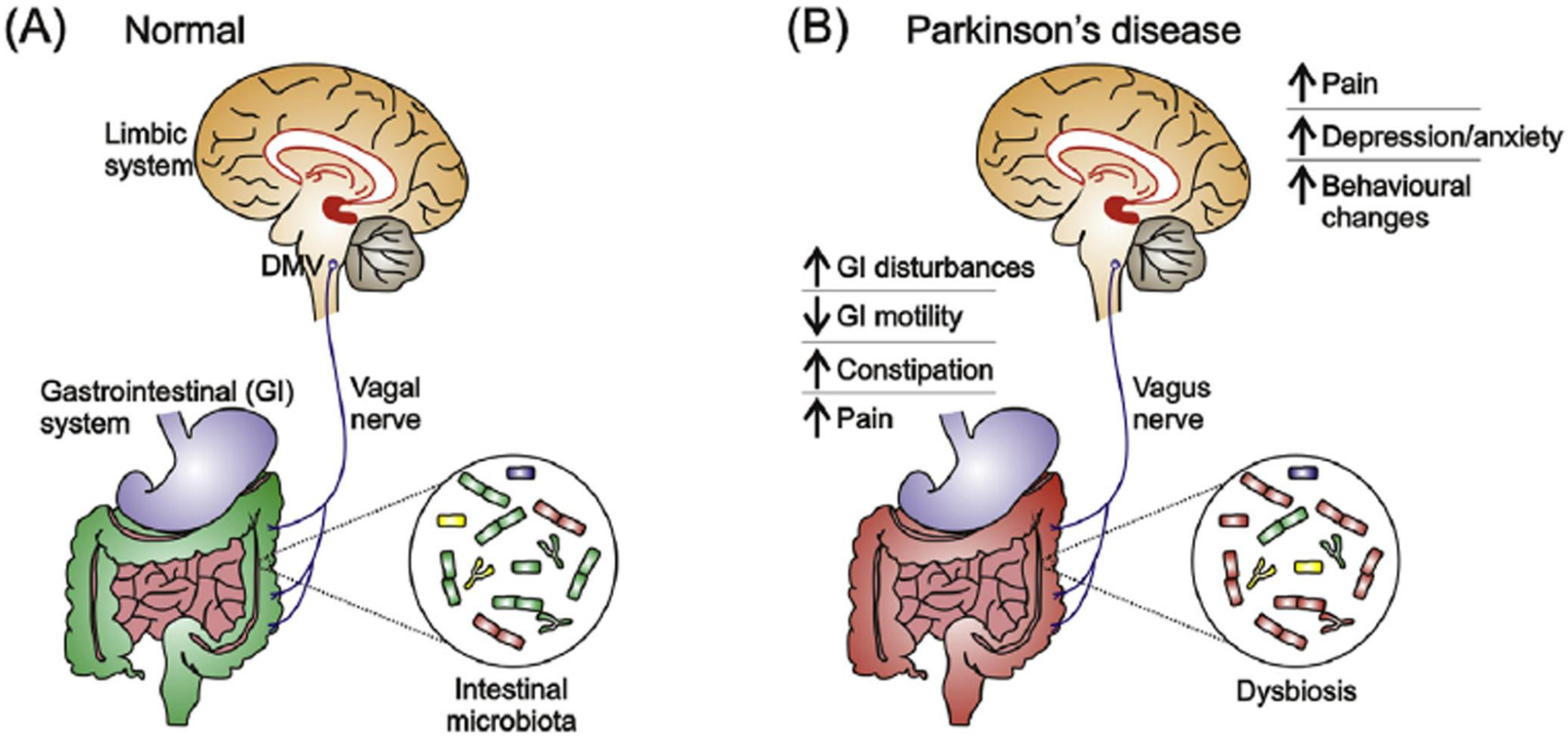
ZM: dysautonomia: urology & sex in PD

GI Symptoms May Not Be Exclusively from ENS Dysfunction



Credit: Felice VD et al./Parkinsonism Relat Disord 2016

ZM: dysautonomia: urology & sex in PD

https://www.gutmicrobiotaforhealth.com/en/new-insights-role-gut-microbiota-parkinsons-disease/

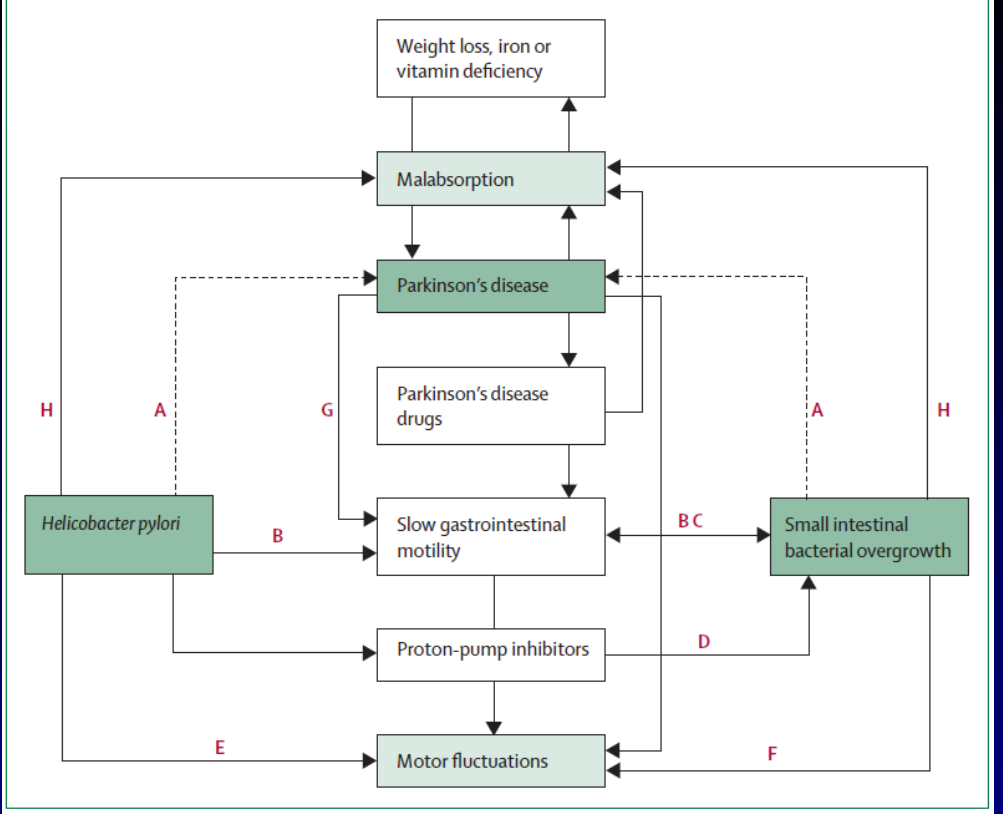


***Figure 3*: The complex association between *Helicobacter pylori*, small intestinal bacterial overgrowth, and Parkinson's disease**

(A) *H pylori* and small intestinal bacterial overgrowth (SIBO) might affect the progression of Parkinson's disease through induction of the peripheral immune response, disruption of the blood–brain barrier, and mediation of neuroinflammation.[81,84] The dotted line represents no clear evidence. (B) *H pylori* and SIBO negatively affect gastrointestinal motility by means of various mechanisms—eg, reduction in the production of ghrelin.[85] (C) Slow motility might lead to increased prevalence of SIBO.[86] (D) The use of proton-pump inhibitors and hypochlorhydria related to atrophic gastritis increases the likelihood of concomitant SIBO in patients infected with *H pylori*. (E) *H pylori* can affect motor fluctuations by means of gastric hypochlorhydria (levodopa is highly soluble in an acidic environment); the presence of adhesins on the bacteria surface that directly bind to levodopa; local production of reactive oxygen species, which inactivate levodopa; levodopa acting as a nutrient for bacterial growth; impairment of stomach motility, leading to a prolonged transit time and exposure of the drug to bacteria and enzyme activity; and disruption of the mucosa in the small intestine, which is the main site of levodopa absorption.[83] (F) SIBO can affect motor fluctuations through levodopa malabsorption owing to changed chyme composition as a result of mucosal injury (loss of activity of brush-border disaccharidases) or the bacterial fermentation of sugars and deconjugation of bile acids (thus leading to the production of lithocholic acid, which is directly toxic to enterocytes).[82] (G) Parkinson's disease affects motor fluctuations through its effects on gastric emptying (like *H pylori* and SIBO). (H) *H pylori* and SIBO are common causes for malabsorption of important nutrients.

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Prevalence of GI Symptoms in PD

	Proportion of patients with Parkinson's disease	Proportion of healthy controls
Drooling		
Eadie and Tyrer[24]	50% (n=76)	5% (n=96)
Edwards et al[25]	70% (n=94)	6% (n=50)
Edwards et al[26]	77% (n=13)	14% (n=7)
Siddiqui et al[27]	52% (n=44)	13% (n=24)
Verbaan et al[28]	73% (n=420)	7% (n=150)
Nicaretta et al[29]	10% (n=14)	NA (n=8)
Kim et al[30]	26% (n=23)	4% (n=23)
Leibner et al[31]	59% (n=58)	14% (n=51)
Yu et al[32]	46% (n=90)	13% (n=270)
Muller et al[33]	42% (n=207)	6% (n=175)
Damian et al[34]	81% (n=62)	25% (n=287)
Picillo et al[35]*	16% (n=200)	2% (n=96)
Taste impairment		
Shah et al[36]	27% (n=75)	1% (n=74)
Deeb et al[37]	22% (n=50)	1% (n=23)
Kashihara et al[38]	9% (n=285)	0% (n=61)
Pont-Sunyer et al[39]*	14% (n=109)	1% (n=107)
Swallowing disorders		
Edwards et al[25]	52% (n=94)	6% (n=50)
Edwards et al[26]	77% (n=13)	14% (n=7)
Clarke et al[40]	30% (n=64	4% (n=80)
Siddiqui et al[27]	30% (n=44)	8% (n=24)
Verbaan et al[28]	55% (n=420)	19% (n=150)
Kim et al[30]	13% (n=23)	0% (n=23)†
Yu et al[32]	28% (n=90)	21% (n=270)†
Muller et al[33]	19% (n=207)	6% (n=175)
Damian et al[34]	53% (n=60)	22% (n=290)
Picillo et al[35]*	9% (n=200)	3% (n=96)

(Table 1 continues in next column)

	Proportion of patients with Parkinson's disease	Proportion of healthy controls
(Continued from previous column)		
Constipation		
Eadie and Tyrer[24]	61% (n=76)	13% (n=96)
Edwards et al[25]	29% (n=98)	10% (n=50)
Singer et al[41]	7% (n=48)	6% (n=32)
Wang et al[42]	71% (n=62)	NA
Edwards et al[26]	31% (n=13)	14% (n=7)
Gonera et al[43]	4% (n=60)	8% (n=58)
Abbott et al[44]‡	10% (n=96)	4% (n=6694)
Sakakibaraet al[45]	50% (n=12)	20% (n=10)
Chaudhuri et al[46]	47% (n=123)	26% (n=96)
Kaye et al[47]	59% (n=156)	21% (n=148)
Verbaan et al[28]	22% (n=420)	2% (n=150)
Krogh et al[48]	27% (n=416)	5% (n=45)
Kim et al[30]	26% (n=23)	4% (n=23)
Savica et al[49]	36% (n=196)	20% (n=196)
Ramjit et al[50]	67% (n=58)	22% (n=51)
Yu et al[32]	70% (n=90)	48% (n=270)
Muller et al[33]	39% (n=207)	14% (n=175)
Gaenslen et al[51]‡	25% (n=93)	11% (n=93)
Damian et al[34]	63% (n=62)	31% (n=286)
Picillo et al[35]*	16% (n=200)	14% (n=93)
Szewczyk-Krolikowski et al[52]*	41% (n=490)	34% (n=176)†
Pont-Sunyer et al[39]*	39% (n=109)	13% (n=107)
Schrag et al[53]‡§	32% (n=7232)¶ 25% (n=4769)‖ 20% (n=1680)**	19% (n=40 541)¶ 15% (n=25 544)‖ 14% (n=8305)**

NA=not available. *Early disease stage, drug-naive patients. †Group comparisons were not statistically significant; all other differences between patients and controls are significant. ‡Symptoms were assessed during the premotor phase. §Prevalence of gastrointestinal symptoms was assessed at different time intervals before diagnosis: ¶2 years, ‖2–5 years, and **5–10 years.

***Table 1*: Prevalence of major gastrointestinal symptoms in patients with Parkinson's disease reported in case-controlled studies**

ZM: dysautonomia: urology & sex in PD

Alfonso Fasano, Naomi P Visanji, Louis W C Liu, Antony E Lang, Ronald F Pfeiffer: Gastrointestinal dysfunction in Parkinson's disease

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Drooling in PD

	Dose	Evidence in patients with Parkinson's disease	Outcomes	Side-effects
Systemic anticholinergics				
Glycopyrrolate	1–2 mg twice or three times daily	4-week randomised double-blind, placebo-controlled crossover trial in 23 patients[112]	Significant change in sialorrhoea scoring scale	No difference from placebo (blood–brain barrier not crossed); behavioural changes reported in children and young adults with cerebral palsy;[113] could cause peripheral side-effects (eg, constipation)
Topical anticholinergics				
Sublingual atropine	0·5 mg twice daily (eg, 1 drop of 1% atropine solution)	1-week open-label study in six patients[114]	Improvement in objective and subjective measures	Can cross the blood–brain barrier, producing the same side-effects as systemic administration, including confusion[114]
Sublingual ipratropium bromide	21–42 μg (1–2 sublingual sprays) up to four times daily	5-week randomised double-blind, placebo-controlled, crossover study in 17 patients[115]	No improvement in objective evaluation (primary endpoint) but improvement in subjective ratings	No difference from placebo (blood–brain barrier not crossed)
Tropicamide	Intra-oral films up to 3 mg, one dose	Single-dose pilot study with a randomised double-blind, placebo-controlled, crossover design in 12 patients[116]	A non-significant improvement was seen in the 0·3 mg and 1 mg dosage groups	No difference from placebo
Systemic alpha-2 agonists				
Clonidine	0·15 mg per day	12-week double-blind, placebo-controlled study in 32 patients[117]	Significant improvement of the frequency of clearing saliva	Diurnal somnolence, dizziness, and dry mouth
Systemic alpha-1 agonists				
Modafinil	100 mg per day	A study in patients with Parkinson's disease and Hoehn and Yahr grade 2–3 with moderate to severe drooling;[118] study type not available	Reduction in drooling severity score and patient-reported improvement	Positive effect on drooling might be related to the improvement of dysphagia[22]
Botulinum neurotoxin serotype A and B				
Onabotulinumtoxin A	Parotid gland 5–50 U; submandibular gland 5 U	A case series;[119] three open-label studies;[120–122] an open-label case-control study;[123] a randomised placebo-controlled study;[124] and a randomised double-blind, placebo-controlled study[125]	Similar positive outcomes for botulinum neurotoxin A (abobotulinumtoxin A) and botulinum neurotoxin B, but a faster effect after botulinum neurotoxin B, probably in view of an increased affinity of rimabotulinumtoxin B for autonomic terminals[126]	Safe; only minimum side-effects reported—dryness of mouth and increased saliva viscosity, which might depend on the distribution of botulinum neurotoxin in the major salivary glands
Abobotulinumtoxin A	Parotid gland 75–146·2 U; submandibular gland 78·7 U	A case series;[127] two randomised double-blind, placebo-controlled studies;[128,129] and a randomised double-blind, crossover trial compared with rimabotulinumtoxin B[126]		
Rimabotulinumtoxin B	Parotid gland 500–2000 U; submandibular gland 250 U	Two open-label studies;[130,131] three randomised double-blind, placebo-controlled studies;[132–134] and a randomised double-blind, crossover trial compared with abobotulinumtoxin A[126]		

Table 2: Pharmacological treatments for drooling in patients with Parkinson's disease

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Gastroparesis in PD

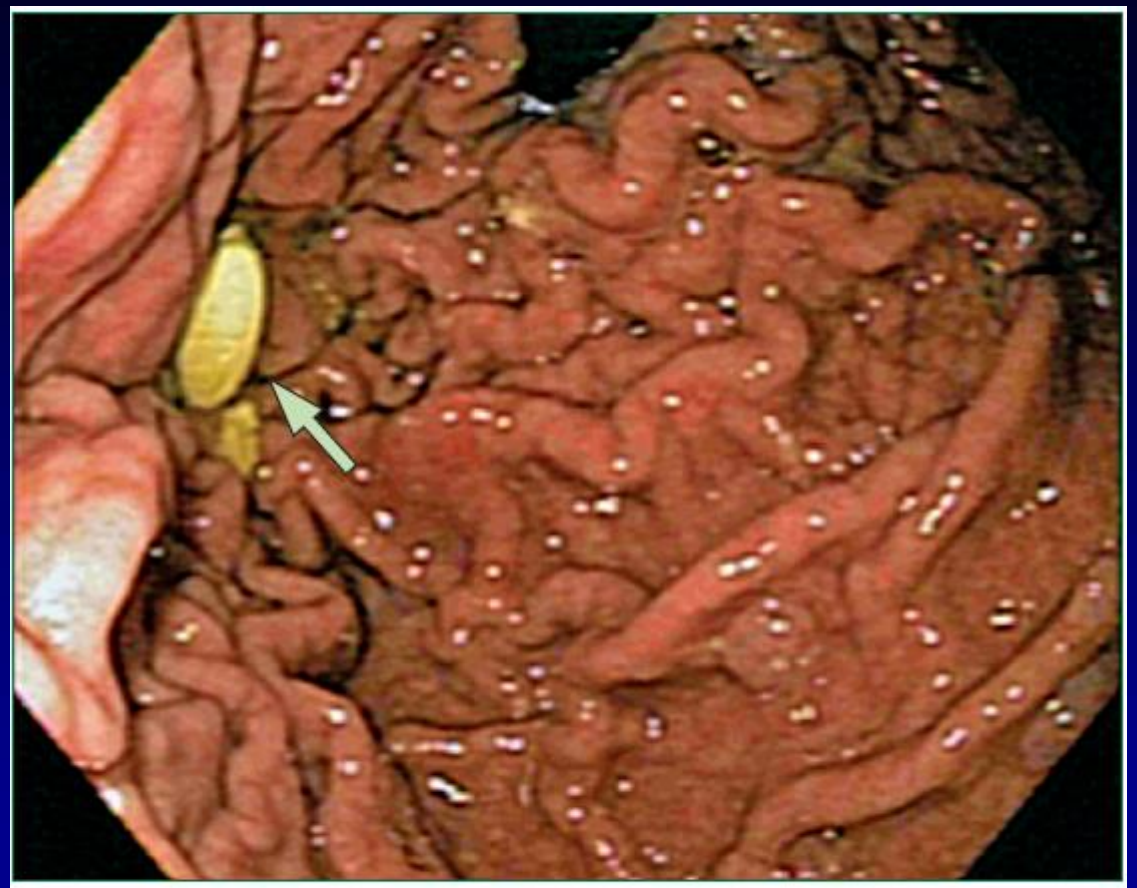

Figure 2: **Delay in gastric emptying**
Photograph taken during gastroscopy. Arrow points to a carbidopa tablet remaining intact in a patient's stomach about 1·5 h after intake.

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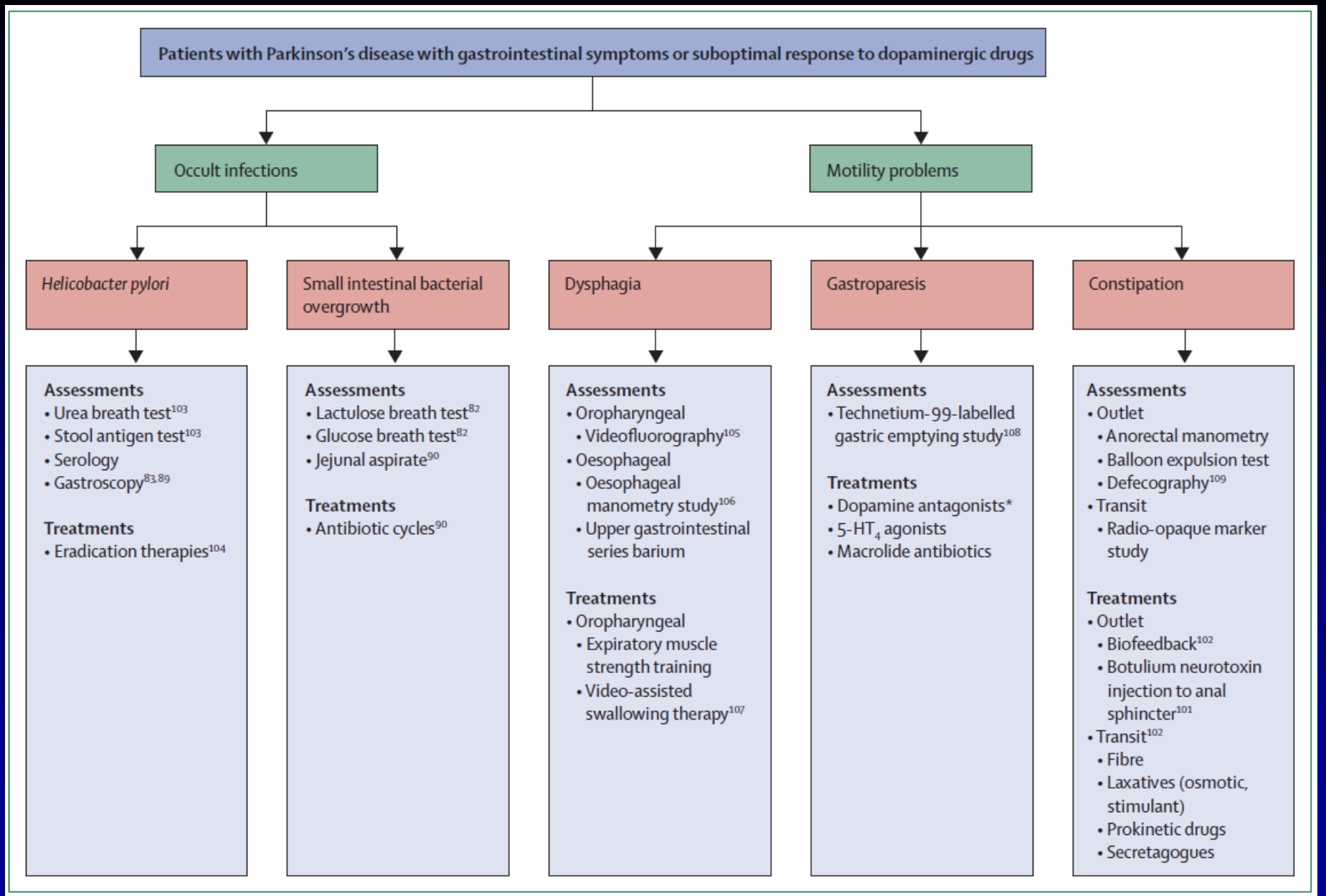

Figure 4: A practical algorithm for the assessment of patients with Parkinson's disease with gastrointestinal dysfunction

*All dopamine antagonists used for their anti-enteric effects (eg, metoclopramine) are contraindicated in Parkinson's disease with the exception of domperidone.

Alfonso Fasano, Naomi P Visanji, Louis W C Liu, Antony E Lang, Ronald F Pfeiffer: Gastrointestinal dysfunction in Parkinson's disease

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	Rationale with regard to gastrointestinal dysfunction	Highest level of evidence	Advantages	Disadvantages
Orally dissolving levodopa	Easily administered in patients with swallowing difficulties (orally disintegrating levodopa is swallowed with saliva)	Single-dose, double-blind, double-dummy, crossover study in 20 patients[156]	Can be taken without water	Not a true sublingual preparation; absorbed in the gastrointestinal tract rather than through the oral mucosa; only a small pilot study is available with no significant group differences[156]
Levodopa methyl ester (melevodopa) effervescent tablets	The liquid formulation limits the effect of delayed gastric emptying	Randomised double-blind, double-dummy, controlled parallel-group trial in 221 patients[157]	Improvement of afternoon dose failures (increased bioavailability and decreased time to onset) compared with standard levodopa[163,164]	No improvement of total off-time besides a statistical trend (p=0·07)[157]
Dispersible levodopa	The liquid formulation limits the effect of delayed gastric emptying	Open-label crossover trial in eight patients[158]	Fast onset of action	Few good-quality studies, pulsatile and erratic delivery, and poor solubility in water
Levodopa-carbidopa intestinal gel	Levodopa is delivered into the jejunum; bypassing the stomach ensures a rapid and reliable onset of action	Randomised double-blind, double-dummy trial in 66 patients[162]	Significant reduction of off-episodes and disabling dyskinesias; simplification of oral treatment, with reduction of dopaminergic side-effects[165]	Levodopa undergoes competition with dietary aminoacids for transport across the blood–brain barrier;[166] high rate of percutaneous endoscopic gastrostomy complications; not approved for 24 h continuous infusion
Apomorphine	Subcutaneous delivery of a strong dopamine agonist, bypassing the gastrointestinal system; can be given either with intermittent (pen-jet) or continuous infusion (micro-pump)	Double-blind, single-dose, crossover trial in 62 patients[160]	Effectively aborts off-episodes as a rescue treatement;[167] continuous infusion reduces motor fluctuations and dyskinesias[168]	Few good-quality studies for continuous infusion; side-effects might be both local (subcutaneous nodules) and systemic (nausea, hypotension, psychosis)
Rotigotine patch	Subcutaneous delivery of a dopamine agonist, bypassing the gastrointestinal system	Randomised double-blind, controlled study of the rotigotine patch *vs* placebo and ropinirole in 561 patients[159]	Improvement of non-motor symptoms; reduced incidence of psychiatric complications;[169] good strategy when oral therapy cannot be used (eg, pre-surgery and post-surgery)	High rate of reactions at the application site
Deep-brain stimulation of the subthalamic nucleus	Direct targeting of basal ganglia dysfunction	Randomised controlled study of deep-brain stimulation *vs* best medical therapy in 251 patients[161]	Significant reduction of off-episodes and disabling dyskinesias; reduction of oral medications mainly possible with deep-brain stimulation of the subthalamic nucleus but not the globus pallidus interna[161,170]	Surgical risk (bleeding); postoperative depression and suicide; stimulation-induced side-effects (hyphophonia)

Table 3: **Treatments designed to account for the presence of gastrointestinal dysfunction in patients with Parkinson's disease**

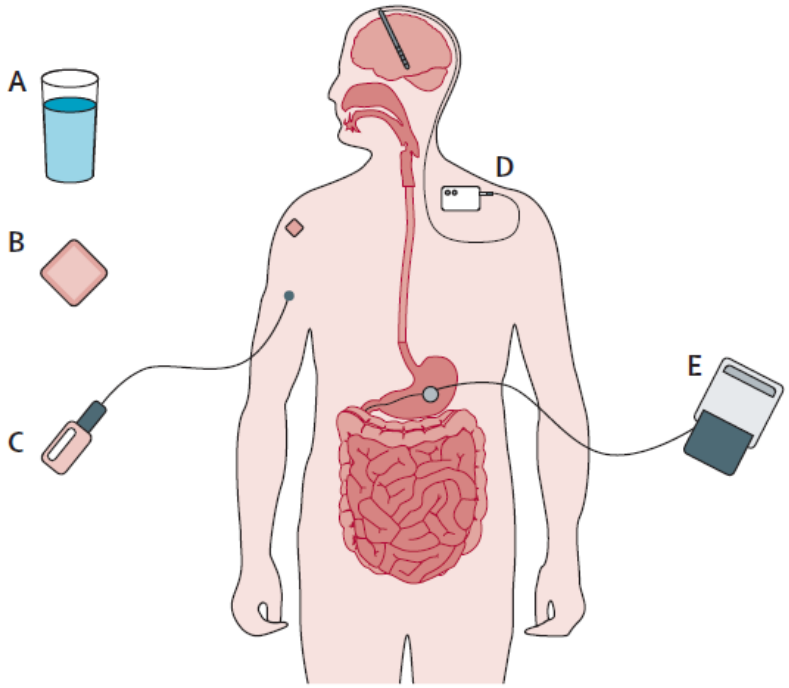

***Figure 5*: Treatment options developed to bypass gastrointestinal dysfunction in patients with Parkinson's disease**

(A) Liquid levodopa formulations, in the form of dispersible levodopa or soluble melevodopa, might enable more rapid onset of drug action than standard formulations.[156-158] Parenteral administration routes including (B) the rotigotine patch and (C) subcutaneous apomorphine are marketed in many countries.[159,160] (D) Deep-brain stimulation of the subthalamic nucleus allows a reduction in levodopa equivalent daily dose of about 50%, which might decrease gastrointestinal related side-effects.[161] (E) The stomach can be bypassed by intrajejunal infusion of a levodopa-carbidopa gel through a tube inserted into a percutaneous endoscopic gastrostomy.[162]

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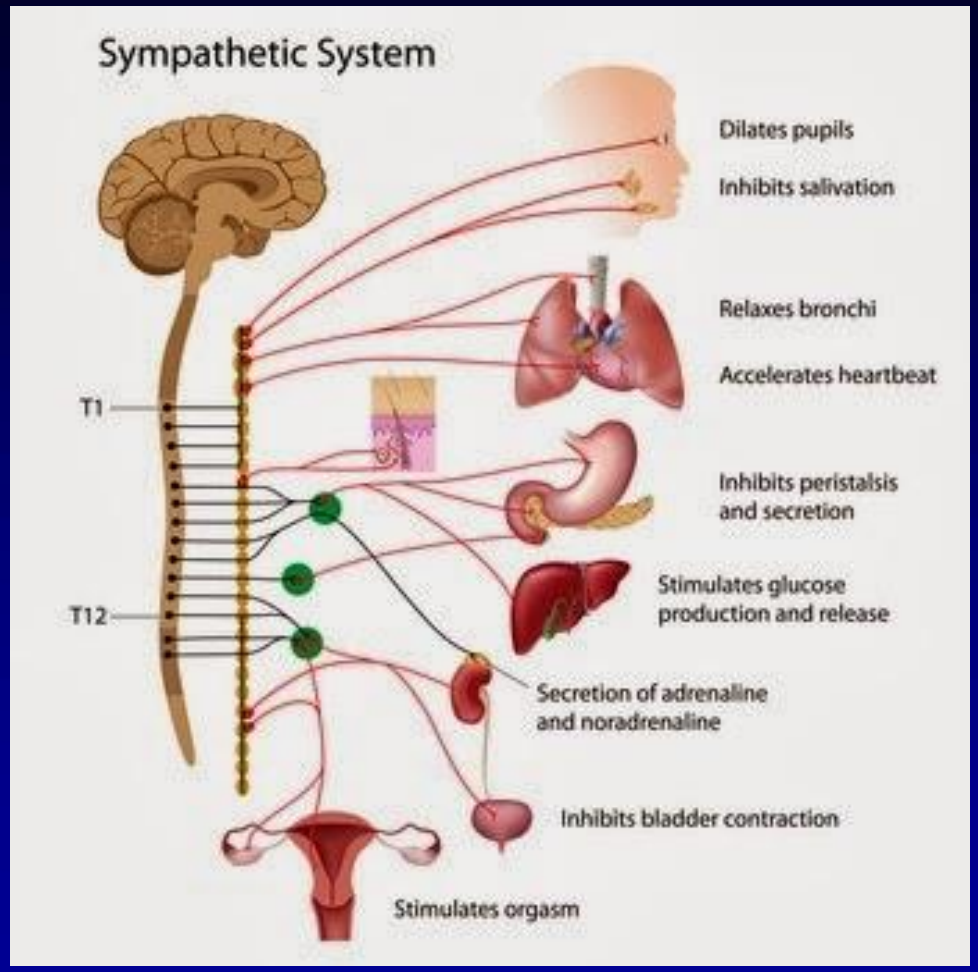
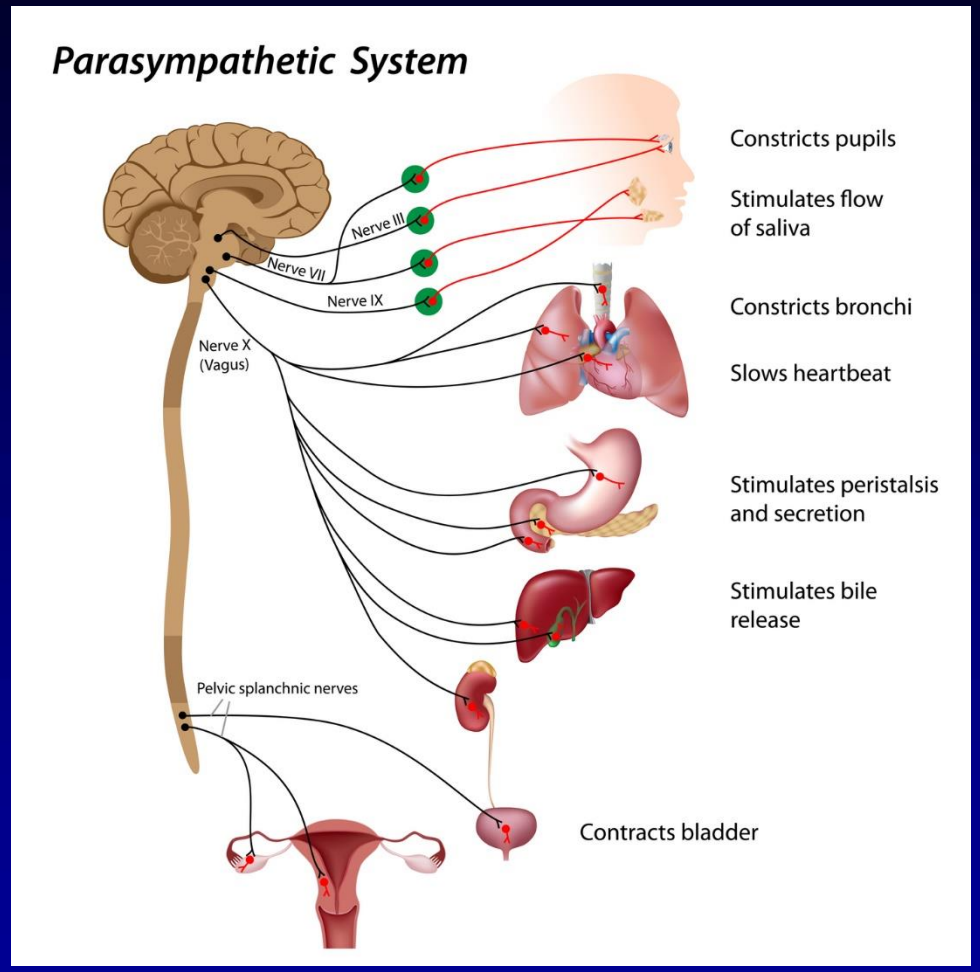
Dysfunctions of the Autonomic Nervous System (ANS) in PD

- ANS first described by Langley in the 1800s
- Refers to NS outside of the CNS and PNS
- Classical classification include:
  - ENS
  - Parasympathetic cholinergic
  - Sympathetic cholinergic
  - Sympathetic noradrenergic
  - Adrenomedullary hormonal
- Multiple components may be affected in PD

Acknowledgment to: Stacy Horn, MD, Clinical Assistant Professor in the Department of Neurological Sciences at the University of Pennsylvania

Functional Anatomy of the ANS

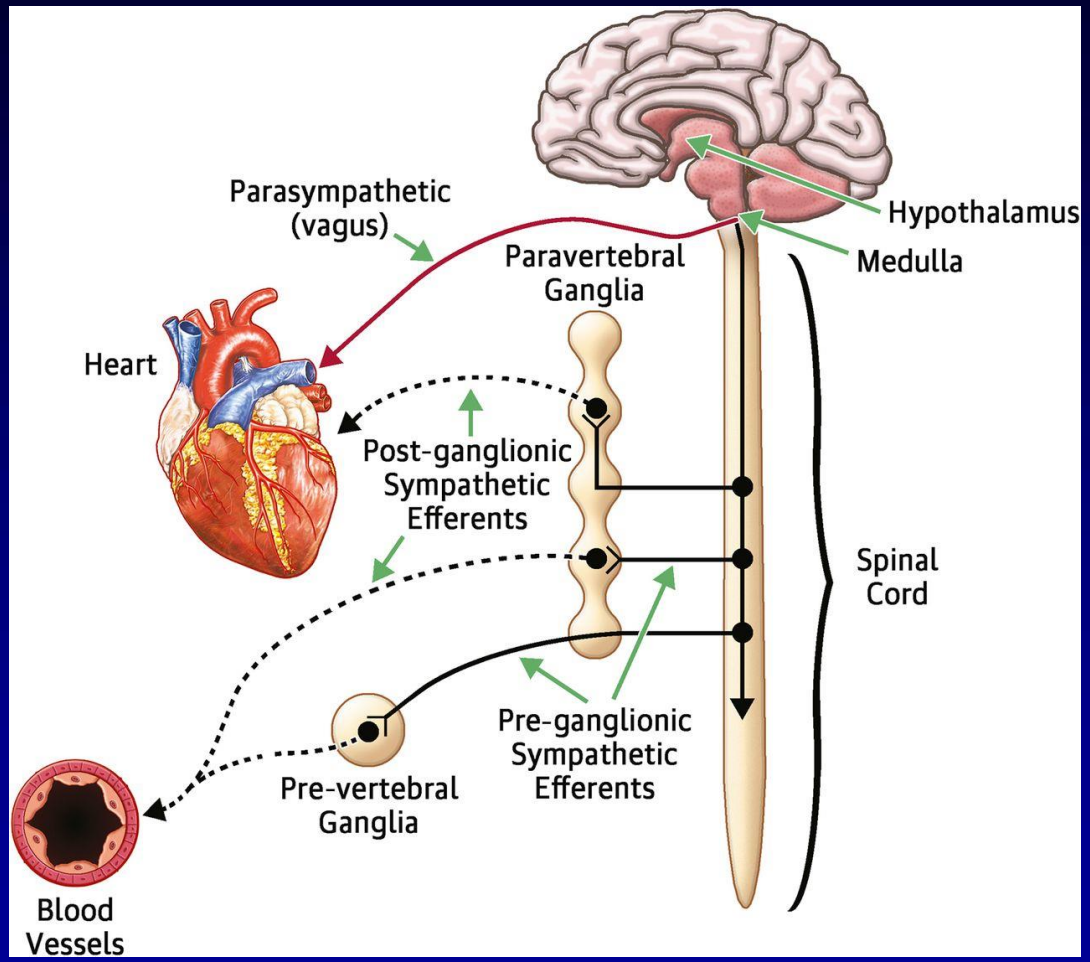




ZM: dysautonomia: urology & sex in PD

https://ageonicsmedical.com/medical-services/nervous-system-testing/

ANS in Cardiovascular Regulation



Mirnela Byku and Douglas L. Mann
Neuromodulation of the Failing Heart
JACC: Basic to Translational Science
Volume 1, Issue 3, April 2016
DOI: 10.1016/j.jacbts.2016.03.004

Genitourinary Dysfunction

- Urinary problems
  - Occurs in 37-70% of patients
  - Equal incidence in males and females
  - Urgency, frequency, nocturia, retention, incontinence
  - Diagnosis obtained with urodynamic studies
- Sexual dysfunction
  - Erectile dysfunction, ejaculatory abnormalities, decreased libido

Urinary Dysfunction

- Detrusor hyperactivity (2/3)
  - Treated with anticholinergic medications
    - Oxybutynin IR, XR, transdermal patch
    - Tolterodine LA 4 mg per day
    - Darifenacin 7.5-15 mg per day
    - Hyoscyamine IR, SR
    - Trospium 20-40 mg per day
    - Flavoxate 100-800 mg per day
    - Solifenacin 5-10 mg per day
    - Imipramine 10-25 mg per day
- Detrusor areflexia (10%)
  - Intermittent straight catheterization
  - Indwelling Foley catheter
  - Suprapubic catheter

Acknowledgment to: Stacy Horn, MD, Clinical Assistant Professor in the Department of Neurological Sciences at the University of Pennsylvania

Orthostatic Hypotension

- 20-50% of patient population
- Defined as a decrease in systolic blood pressure at least 20 mm Hg or decrease in diastolic blood pressure at least 10 mg Hg (Lying after 10 minutes and standing after 5 minutes/head up tilt table test)

- Treatment
  - Conservative measures
    - Elevate bed, increase salt and fluids, thigh high compression hose, small frequent meals
    - Discontinue unnecessary medications that may be contributing
      - Antihypertensives, selegiline, diuretics, dopamine agonists, alpha 1-adrenegic blockers

- Sympathetic denervation
  - Lewy body formation in sympathetic ganglion
  - Reduced venous levels of norepinephrine
- Diagnosis
  - Orthostatic blood pressure monitoring
  - Tilt table testing/Autonomic studies
  - ? Cardiac PET scan
- Pharmacological therapies
  - Fludrocortisone 0.1-1 mg per day (Sodium retaining mineralocorticoid)
  - Midodrine 2.5-30 mg per day (Alpha agonist)
  - Northera

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Sexual Dysfunction in PD

- Parkinson disease is a multifaceted, multisystem disease that can and often does impair sexual function. The way it does that is complex and the contributing factors greatly vary individually among patients
- Sexual dysfunction is common in PD so when seen in PD it's often automatically attributed to PD. However, there are few important points when evaluating sexual dysfunction in PD:
  - Please remember that there are many other potential causes besides PD as sexual dysfunction is common in individuals in a matching age group even without PD.
  - Sexual dysfunction could signal another disease process!

- <u>Therefore, it is imperative to investigate and rule out alternative and potentially reversible causes of sexual dysfunction before attributing it to PD</u>

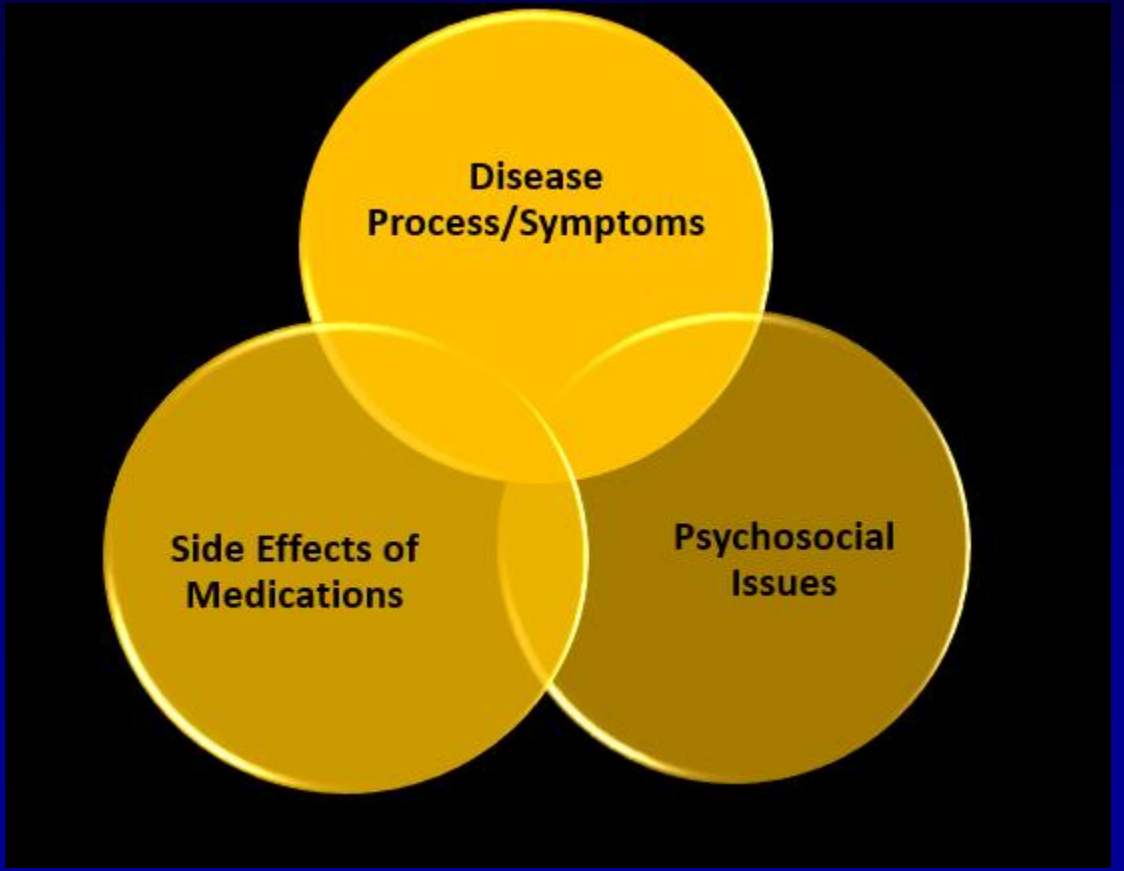
Sexual Dysfunction in PD – cont.

- Sexual dysfunction is common in PD so when seen in PD it's often automatically attributed to PD. However, there are few important points when evaluating sexual dysfunction in PD:
  - Please remember that there are many other potential causes besides PD as sexual dysfunction is common in individuals in a matching age group even without PD.
  - Sexual dysfunction could signal another disease process!

- Again: it is imperative to investigate and rule out alternative and potentially reversible causes of sexual dysfunction before attributing it to PD

Three Groups of Overlapping Factors That May Adversely Affect Sexuality in PD

- The (Direct) Disease Process
- Side Effects of Medication(s)
- Psychosocial Issues (Indirect Disease Process)



Disease Process: Motor Symptoms Affecting Sexuality

- Motor symptoms may make the process of love making physically difficult or inconvenient:
  - Bradykinesia (slowness – may interfere with speed and thrust necessary for sex)
  - Dyskinesia (inadvertent/adventitious often continuous involuntary movements, typically induced by levodopa)
  - Tremor (shaking – can be distracting or may interfere with movement)
  - Rigidity (stiffness – may cause limited range of motion)
  - Imbalance/falls (imbalance may affect posture necessary for sex, falls may leave sore or injured body parts)
  - Dysrhythmia (lost ability to generate rhythm – rhythm needed to achieve/maintain arousal/erection and achieve orgasm)
  - Sialorrhea – may adversely affect spouse's arousal in a badly timed moment (kissing)

Disease Process: Non-Motor Symptoms Affecting Sexuality

- Autonomic nervous system controls sexual response and functions
- Dysautonomia (disordered autonomic nervous system) can result in sexual dysfunction:
  - Arousal and orgasm are both heavily dependent on healthy circulation and autonomic reflexes, either or both of which may be impaired in PD
  - Fatigue may cause reduced libido
  - Problems getting and sustaining erection
  - Inability to ejaculate
  - Vaginal dryness among women
  - Difficulty reaching orgasm

Disease Process: Non-Motor Symptoms Affecting Sexuality (cont.)

- Reduced desire to engage in sexual activity:
  - Apathy can reduce or abolish desire to seek pleasure
  - Depression and anxiety are more common in PD and impact sex
  - Disorders of mentation, behavior, and mood in PD are both part of the non-motor spectrum of symptoms *and* are the leading cause in the biopsychosocial group of factors impacting sexuality, thus are listed *both* as direct/biological (as in diminished libido) and as indirect (psycho-social) factors (discussed later)
  - Sexual activity could become triggers of anxiety and even panic
  - Phobias born out of the fear of failure or sex turning into awkward and unpleasant experiences
- Reduced cognitive processing from mild cognitive impairment or dementia:
  - Loss of the sophisticated processing needed for sexual behavior
  - Missing cues and reading context necessary for arousal or enhancing spousal arousal

Side Effects of Medication(s)

- Diminished sexual response and desire have been linked to some PD medications, e.g. trihexyphenidyl
- Many antidepressants can delay or inhibit the ability to achieve orgasm
- Hypersexuality (abnormally increased sex drive) has been linked to dopaminergic meds, esp. dopamine agonists (DAs):
  - It may occur initially as intrusive thoughts/urges, and then, lead into adverse behaviors
  - Development of paraphilias that were not present pre-PD
  - In itself high sex drive only a problem if unmatched by partner

Side Effects of Medication(s) – cont.

- Carefully evaluate the risk-benefit ratio – QoL gains from meds could outweigh (minimal) adverse sexual effects' impact on QoL
- Hypersexuality and other impulse control disorders are routinely attributed to DAs, but careful consideration should be given to alternative explanations (e.g. underlying/previously undiagnosed bipolar disease's sub-manic phase unmasked by DAs)
- Hypersexuality in itself isn't necessarily harmful – could be identified as a "problem" by the spouse (the patient herself/himself more often doesn't see it as a problem, if it wasn't for the spouse's distress) – in some cases after careful evaluation and clinical mental health counseling addressing values it can be "turned into" from ill to boon (expert and thorough analysis needed)

Psychological Issues that affect Sexuality in PD

- Depression: very common with greater than 60% lifetime prevalence in PD
  - May be brought on by chemical imbalance associated with PD and, or, psychosocial response to the disease
  - Needs to be distinguished from apathy
  - Sexual dysfunction could be the first sign of depression in PD

Psychosocial Issues that affect Sexuality in PD – cont.

- Apathy
- Anxiety/Panic attacks
- Dementia
- Phobias
- Psychosocial Reality of PD
  - Emotional response to effects of the disease
  - Anger
  - Stress on individuals and their care partners
  - Reduced self esteem (muscle atrophy, drooling, reduced ability to perform one's activities of daily living – may trigger self esteem issues)
- Care partner's burden

Care Partner Burden and Sexuality in PD

- Disease progression requires increasingly more intense and more complex care giving provided by care partners, who themselves can be facing health issues
  - Strong association between disease severity and caregivers' strain
- The strain of caregiving may cause fatigue and resentment on the part of care partners
  - This may manifest as worsening anxiety, fear and, depression
- Sleep disturbances (brought on by the care-giving process)
  - 27% of spouses who are care givers reported sleep problems

The Spouse in Caregiving role: Balancing the Complex Dynamic

- Romantic partnership is often built on dreams of “growing old together” “enjoying life together,” “watching the sun set together”
- Depending on perspectives, PD may interrupt the naturally idealized/romanticized dreams – the importance of value system
- There is a continuous shift in relationship within the dynamic of spousal and caregiving roles
  - Spouse taking the role of a nurse/caregiver
  - Change in lifestyle
  - Loneliness while being a caregiver to your spouse; dealing with apathy

On Loneliness While Being a Caregiver to Your Spouse

"…What eats at me is the loneliness. There is no romance and I gave up trying. It is so different when you are their caretaker, nurse etc, than when you were their sweetheart. I used to try to talk about deep things, feelings and I would hear her snoring. Life happens. I don't have the answers. I am afraid for me it is just living one day at a time and finding a moment of joy by myself, like a sunset or a good meal when I am shopping…" (Tom, B. caregiver.com, 2014)

Management Strategies

- Attend to emerging sexual dysfunctions – but without necessarily pathologizing – remember unusual sexual behaviors are not pathologic by and in themselves if both spouses are overall accepting and satisfied with it – for example in the setting of changing disease state, as a result of physical limitations, unconventional but satisfying (to both spouses) paraphilias or alternative sexual behaviors (e.g. cuckoldry) could emerge – these need to be evaluated without societal/religious/etc judgment, however, the future feasibility and potential risks must be carefully discussed (e.g. emerging cognitive decline could turn an otherwise satisfying but complex kink into a very distressing state once the patient loses his/her ability to process and handle complexity)
- Libido differences can happen between members of any couple and may be normal or abnormal – the overall concept isn't unique to PD, but must be evaluated in the context of PD specific medial issues
- If loss of libido is an issue: investigate factors such as depression, fatigue, pain, hormone deficiency, couple relationship problems, and medication side effects (i.e. anti-depressants, etc); get treated.

Management Strategies – cont.

- If hypersexuality is an issue: consider talking to the prescribing physician about reducing the dose or stopping the triggering medication (usually dopamine agonist). Do not stop/change medications without the prescriber's knowledge and approval! The problem that causes could be worse than the problem of hypersexuality.
- Less commonly, if it's related to cognitive impairment, then treatment of this issue and setting up healthy boundaries may be needed. It is a very complex area to properly evaluate patient (spousal) sexual value systems AND physical abilities AND cognitive abilities to properly advice on best sex.
- An awareness and understanding of this phenomenon as a possible side effect of medication can help lessen the expected shock and hurt that this may cause. Religious bigotry/misguidance could contribute to demonizing hypersexuality – working on spousal value systems requires a particularly difficult and sophisticated approach with the goal of finding a balance with hard-wired values and practically driven and necessary adjustment in values to achieve acceptance through redirecting and reinterpreting – the distress caused by hypersexuality must guide strategy and balance between medication changes and value adjustments

Management Strategies – cont.

- Compartmentalize caregiving duties and spousal roles
  - Set aside period of time in the day when couples should only discuss non-medical issues. Take this time to discuss fond topics, family, grandkids, fond memories
  - Time for attending to medical issues such as toileting, administering medication should be set aside.
  - If you can get help (from relatives, hired nurse, aids, etc.), take it.
  - Couples' counseling and/or sexual therapy counseling may be an effective way to get help

Management Strategies – cont.

- Giving while receiving
  - Words of gratitude, expressions of empathy and love, etc., are ways that individuals with PD can give back to their spouses who provide care in managing PD
  - Your situation can be an opportunity to get close to each other.
  - Communicate and be willing to come to a compromise

Management Strategies – cont.

- Physical/medical options outside of counseling
  - A multi-disciplinary/integrative care setting, approach is needed
  - PD medication adjustments to be evaluated
  - The importance of physical activity/exercise & healthy living
  - Proper sleep evaluation, treatment
  - The role of comorbidities (diabetes, cerebrovascular disease, DJD)
  - Careful assessment of sexual performance enhancing options