

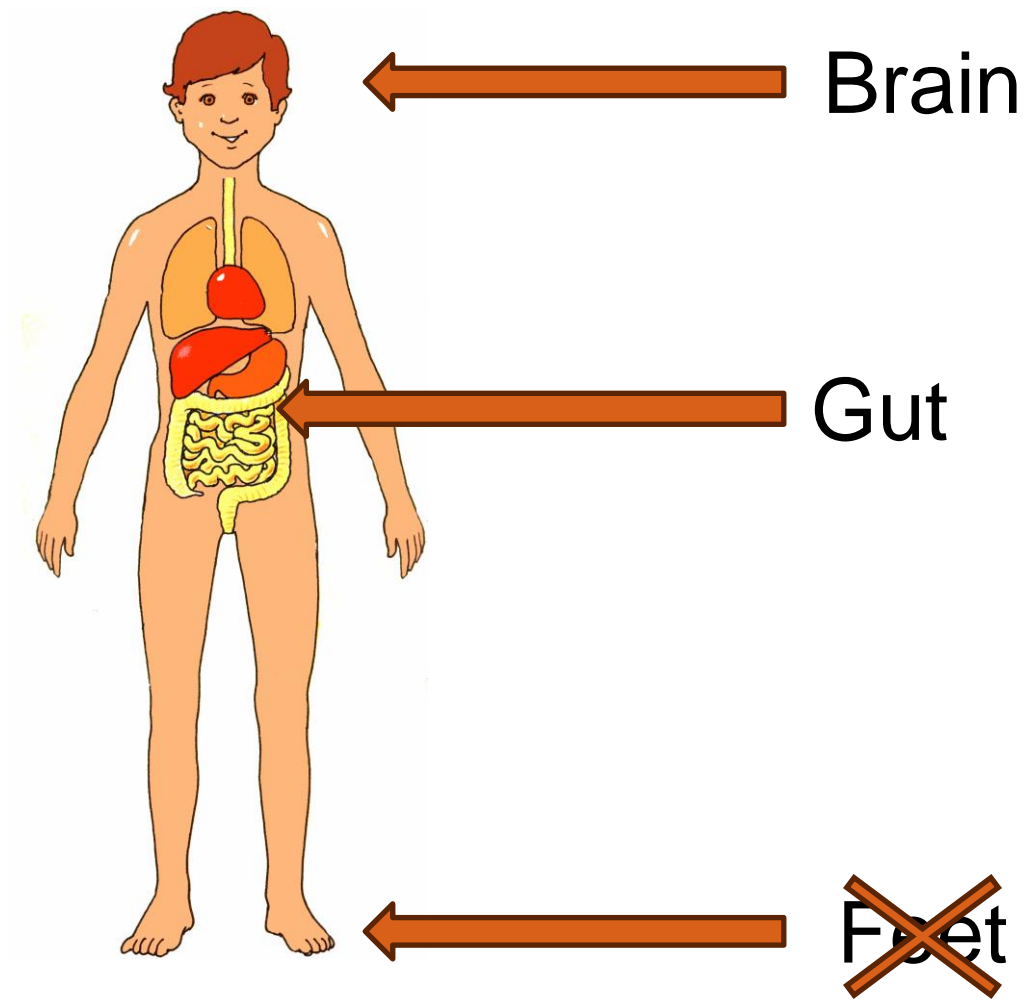
The Brain and Gut in Parkinson's

C Chauncey Spears, MD

Assistant Professor of Neurology, University of Michigan



MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN



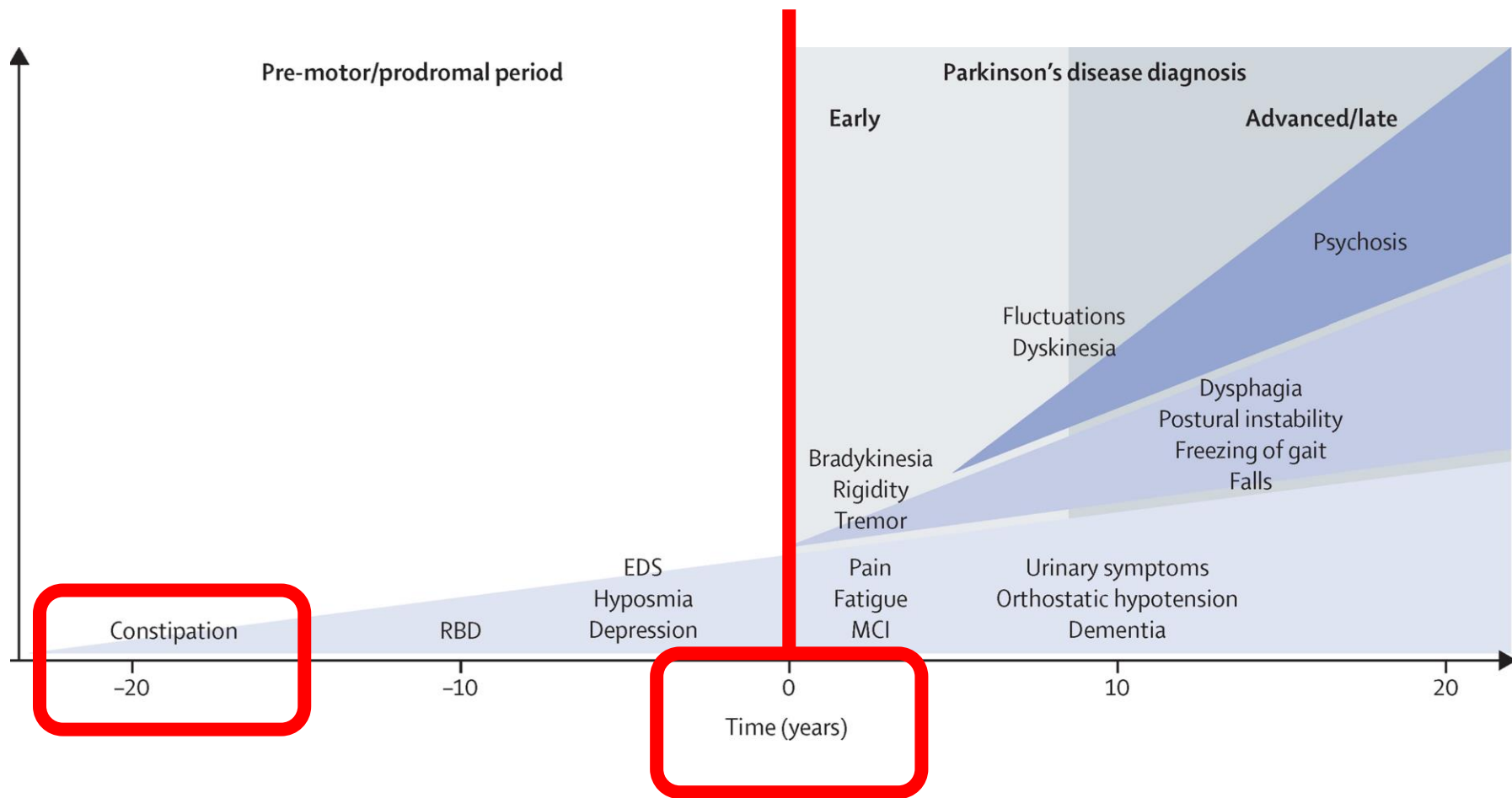


AGENDA

1. What you put in...
Diet in PD
2. What's in there...
The Gut Microbiome
3. What you get out...
Constipation in PD



1. What you put in...
Diet in PD
2. What's in there...
The Gut Microbiome
3. **What you get out...**
Constipation in PD

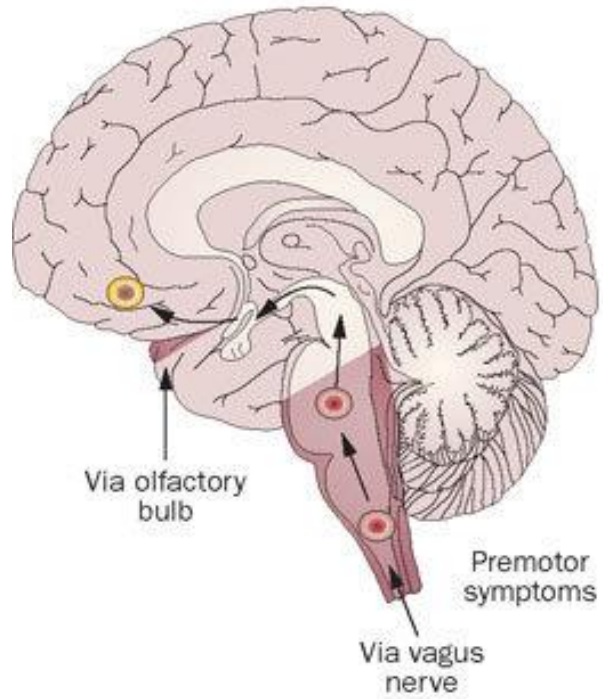




**But Why
Constipation?**

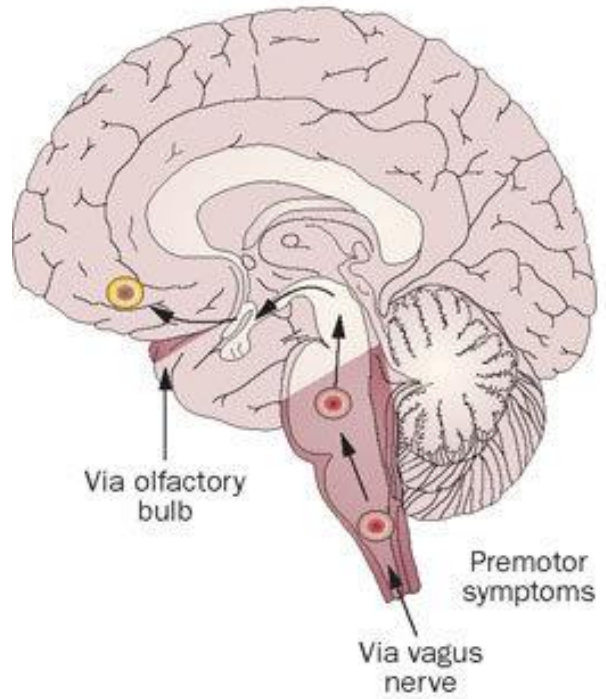
Braak stages 1 and 2

Autonomic and olfactory
disturbances



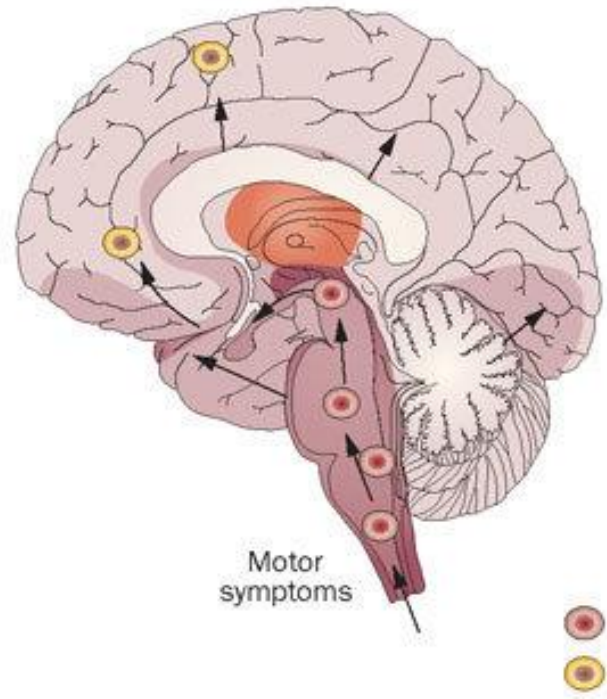
Braak stages 1 and 2

Autonomic and olfactory disturbances



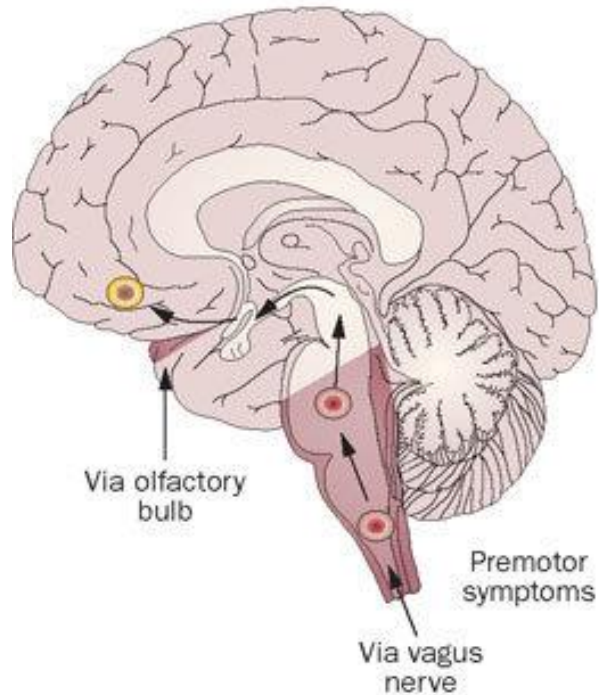
Braak stages 3 and 4

Sleep and motor disturbances



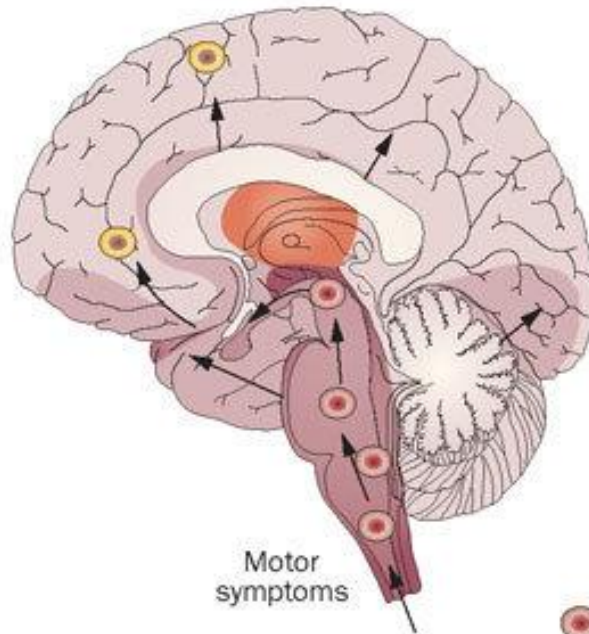
Braak stages 1 and 2

Autonomic and olfactory disturbances



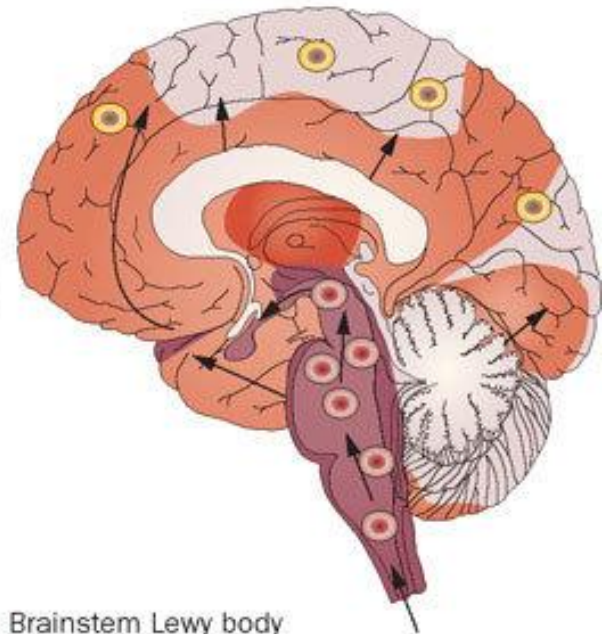
Braak stages 3 and 4



Sleep and motor disturbances



Braak stages 5 and 6

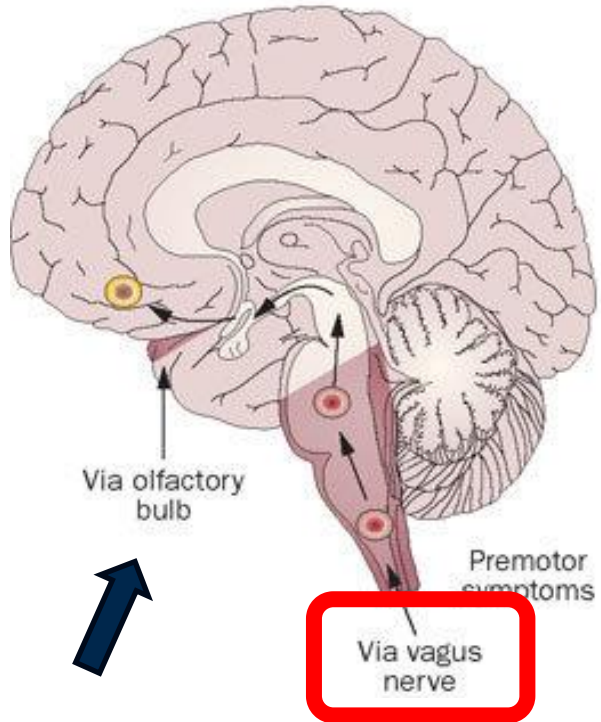
Emotional and cognitive disturbances

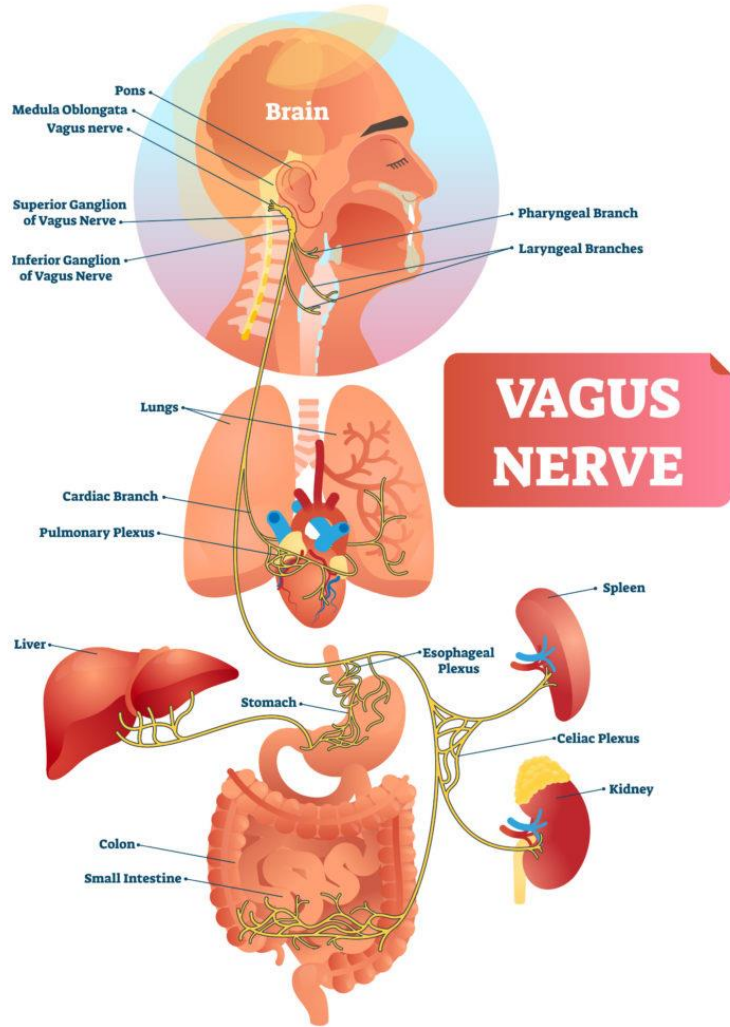


-  Brainstem Lewy body
-  Cortical Lewy body

Braak stages 1 and 2

Autonomic and olfactory
disturbances





And other Autonomics

- Blood pressure control
- Bladder function

Constipation Treatment

- Stay hydrated!
- Exercise!
- Eat Dietary fibers!
- Try fiber supplements (ex. Metamucil)



Use as directed for occasional constipation.



Constipation Treatment

- Stay hydrated!
- Exercise!
- Eat Dietary fibers!
- Try fiber supplements (ex. Metamucil)
- Try Miralax



AGENDA

1. What you put in...
Diet in PD
2. **What's in there...**
The Gut Microbiome
3. What you get out...
Constipation in PD

nature

outlook

The gut microbiome

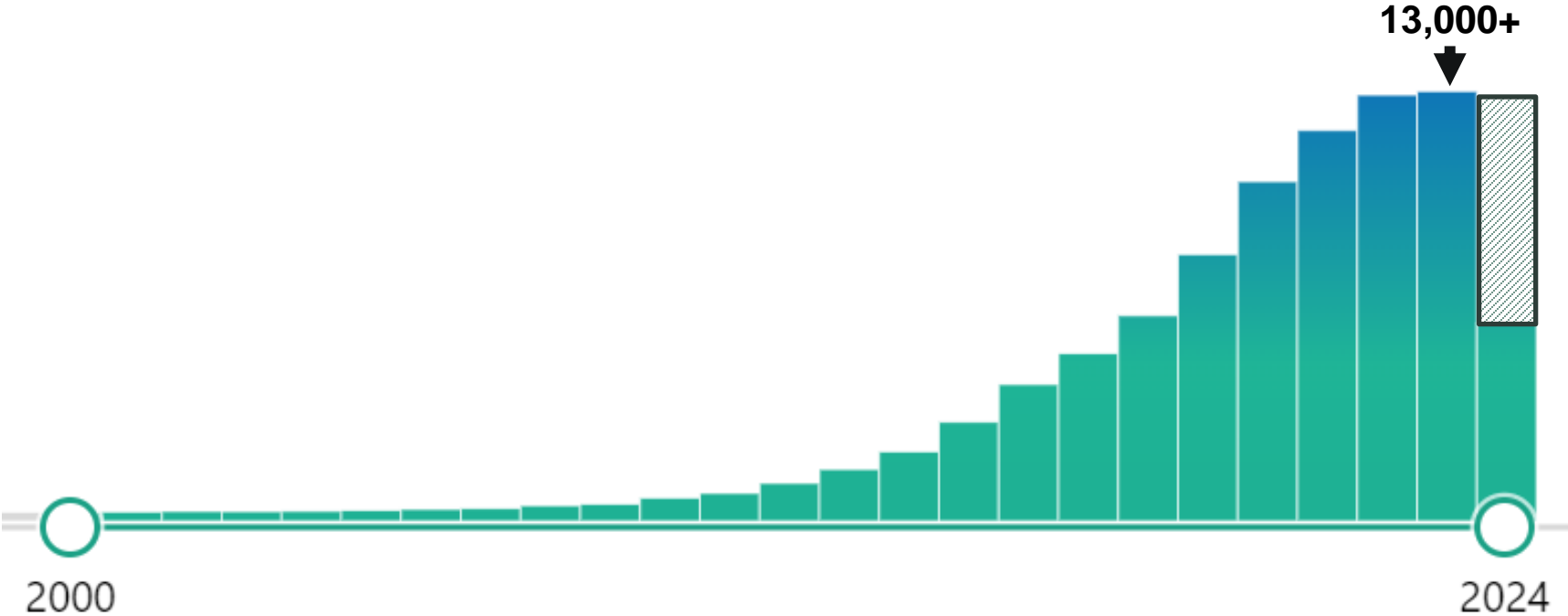


Exploring the microbes
that affect human health

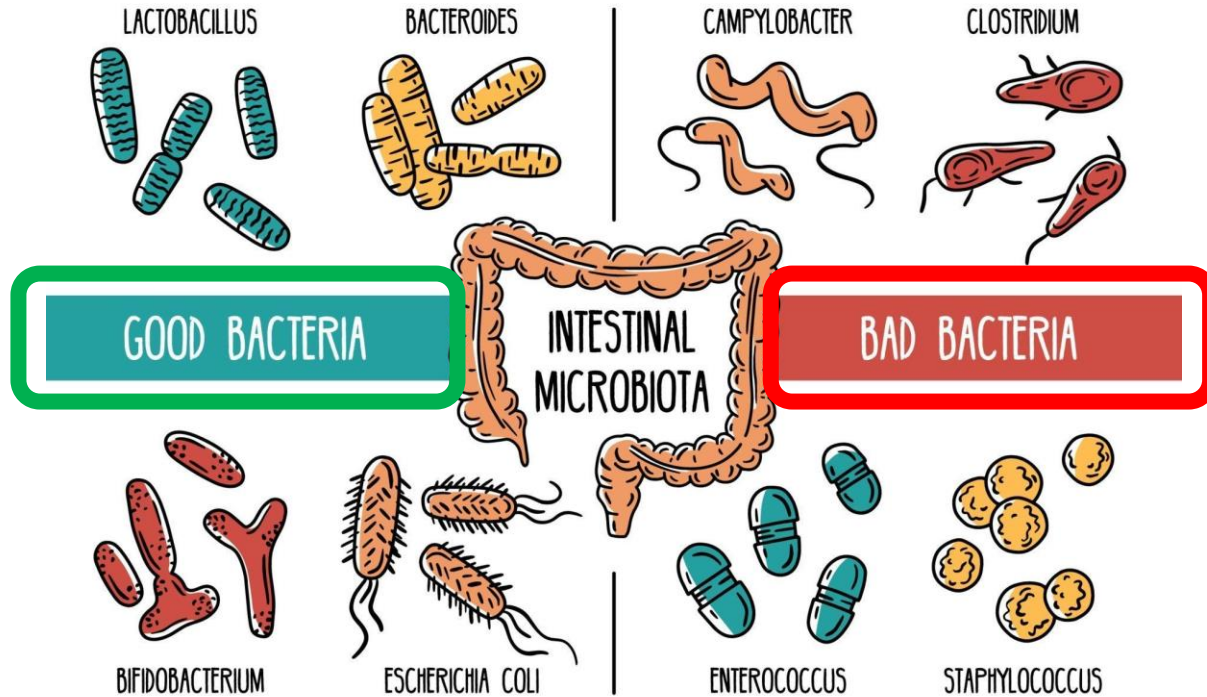
Produced with support from:



Number of Gut Microbiota Articles each year



Gut Microbiota



Good Gut Microbiota

Helps breakdown food

Contributes to good gut motility



Good Gut Microbiota

Helps breakdown food

Contributes to good gut motility

Mediates Immune Health

Integrity of Gut-Blood Barrier

Bad Gut Microbiota

~~Helps metabolize food~~

~~Contributes to good motility~~

~~Mediates Immune Health~~

~~Integrity of Gut-Blood Barrier~~

Promotes inflammation



↑↑ Enterobacteriaceae...

... walking difficulties

↓↓ Bacteroides fragilis...

... ↓↓ motivation

Bifidobacterium...

... hallucinations/delusions

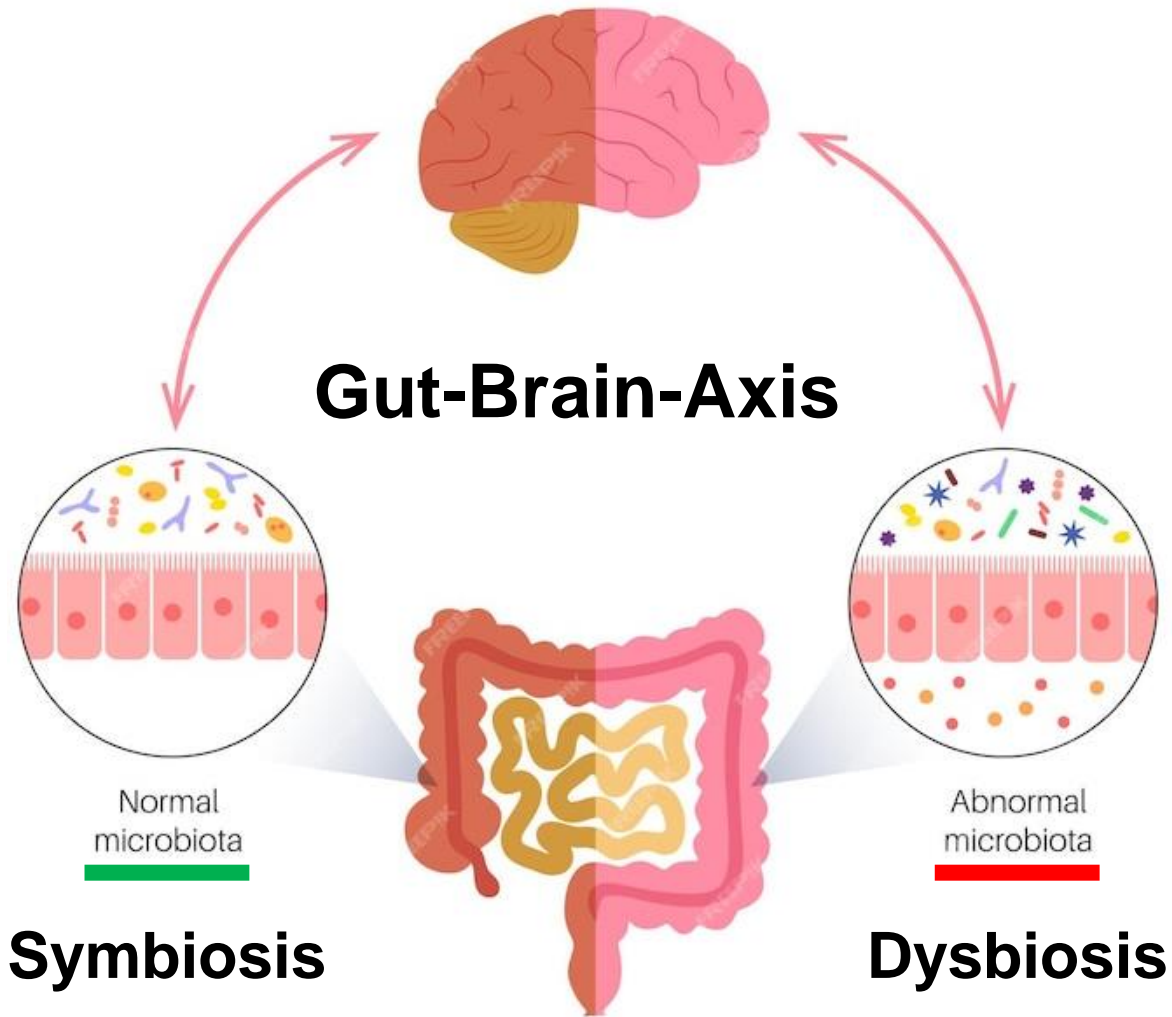
Enterobacteriaceae

... tremor-dominant PD

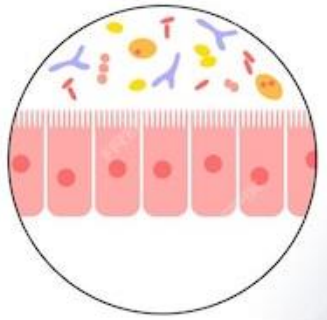
Clostridium

Verrucomicrobia

Akkermansia



Gut-Brain-Axis



Normal
microbiota



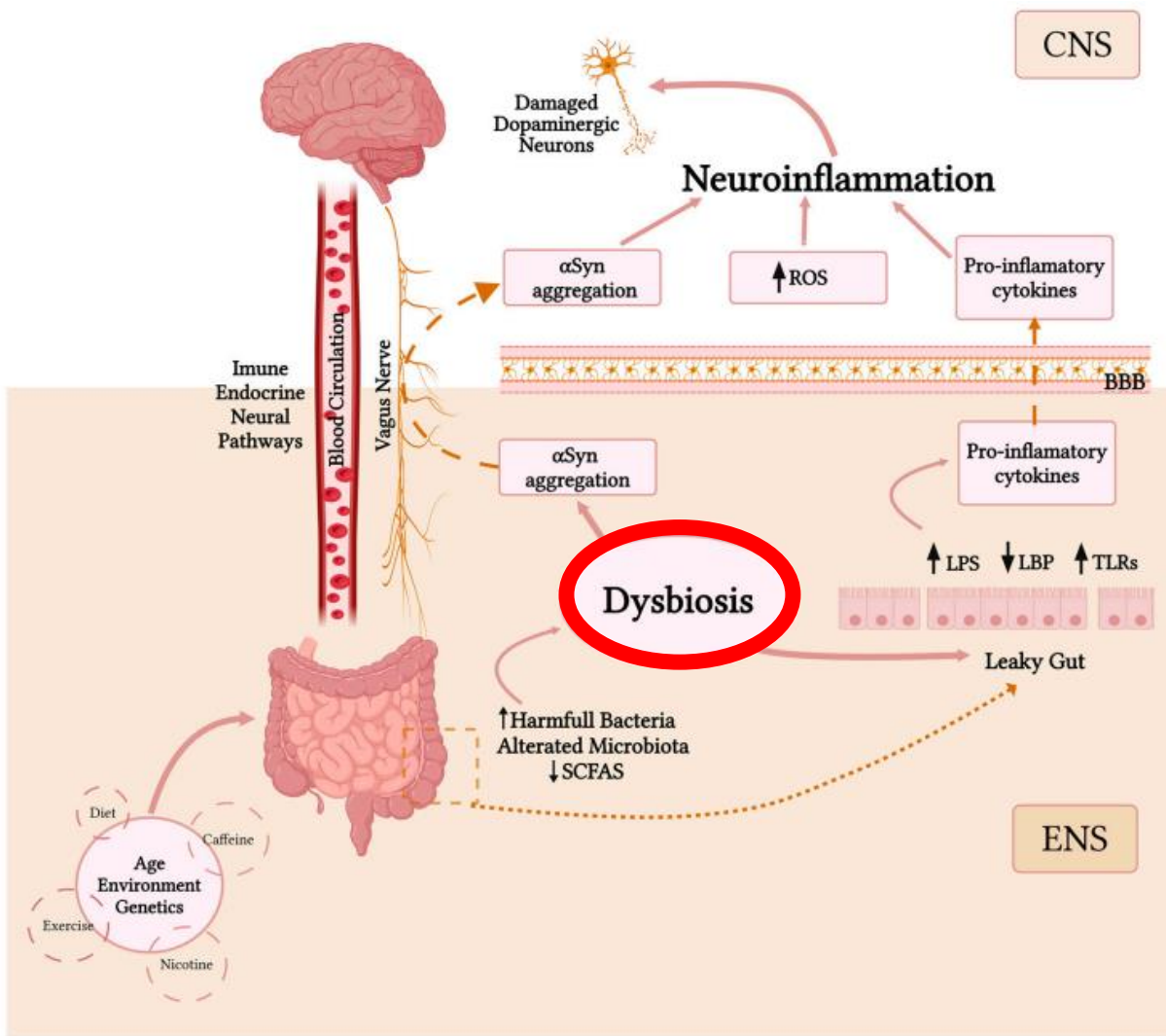
Symbiosis



Abnormal
microbiota

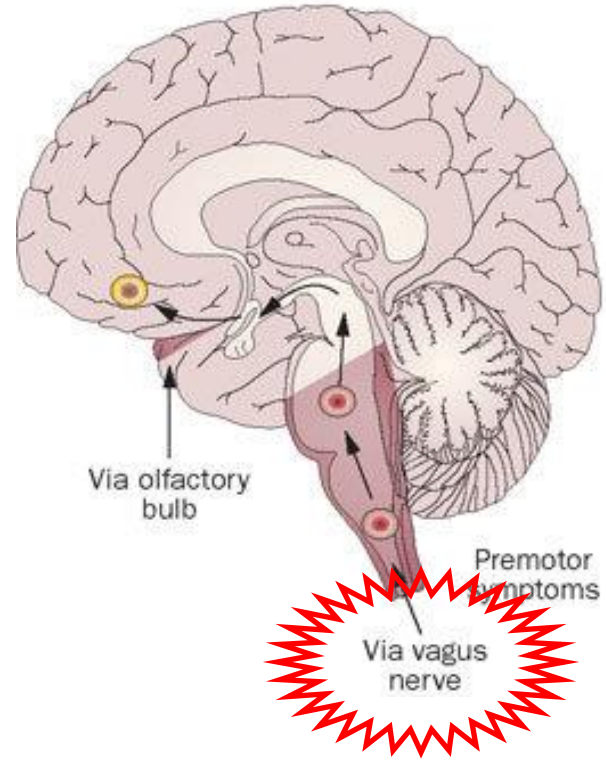


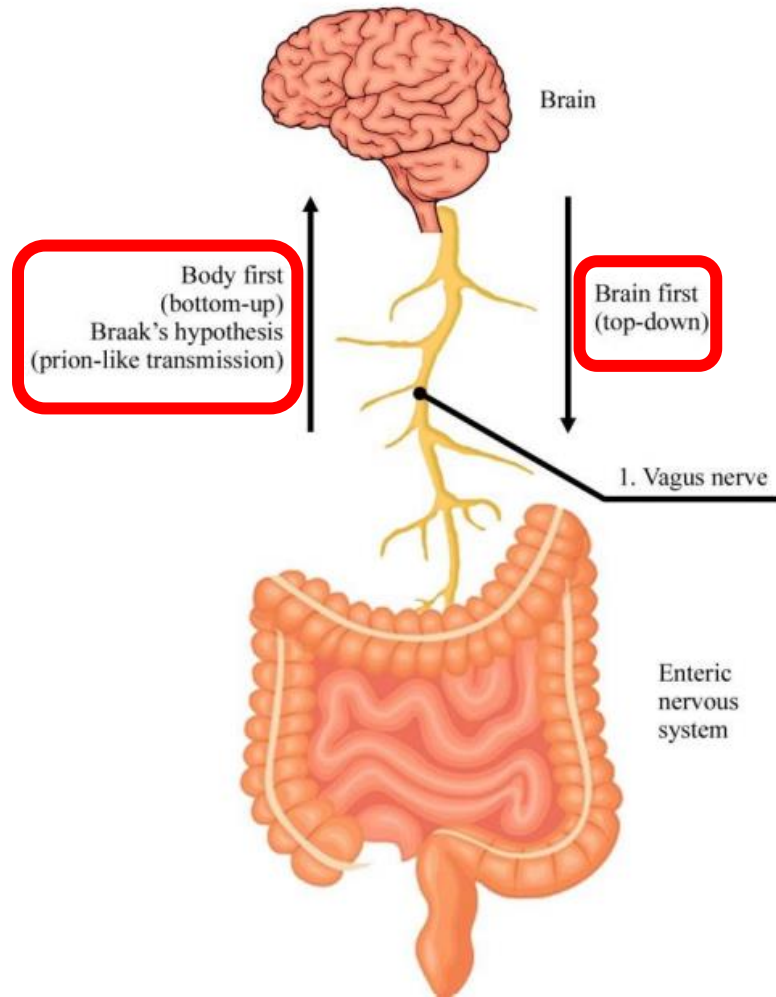
Dysbiosis



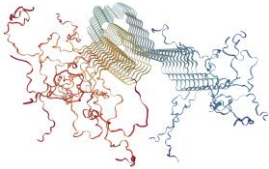
Braak stages 1 and 2

Autonomic and olfactory disturbances



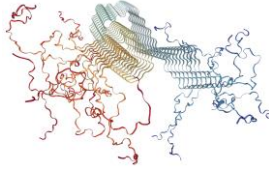


Submandibular Glands



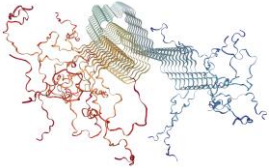
synuclein

Esophagus



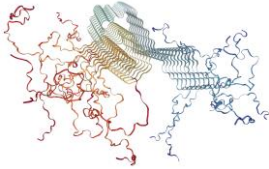
synuclein

Stomach



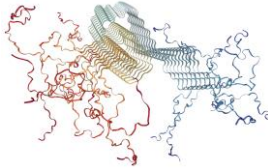
synuclein

Colon

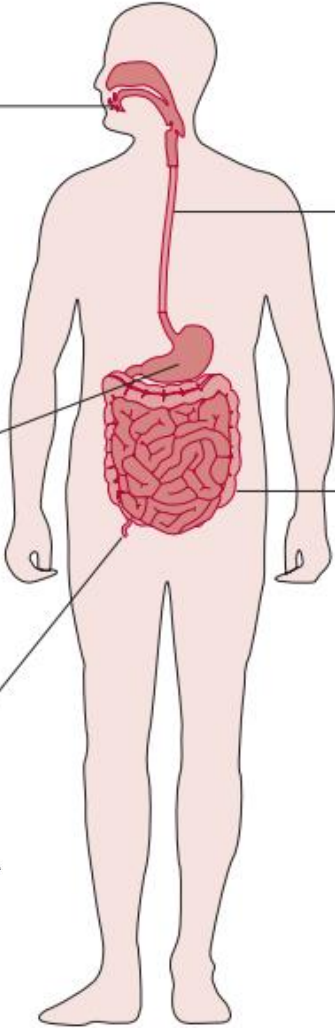


synuclein

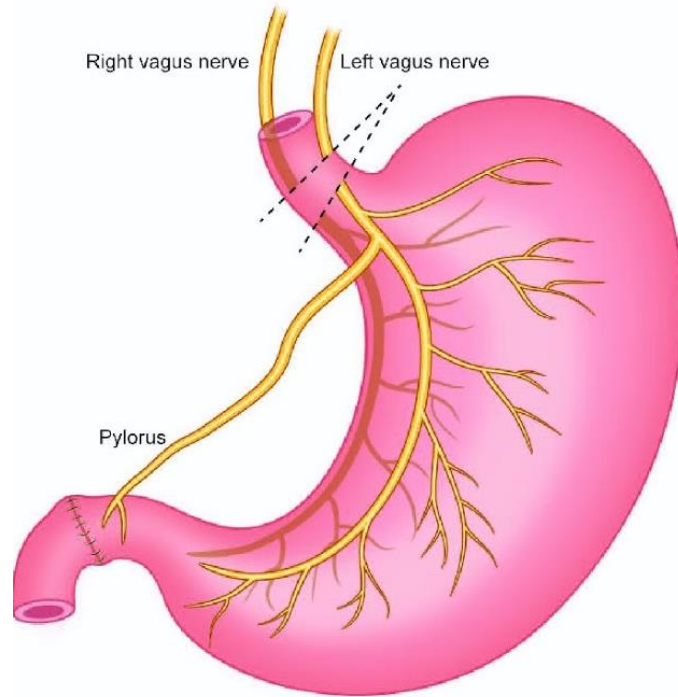
Appendix



synuclein



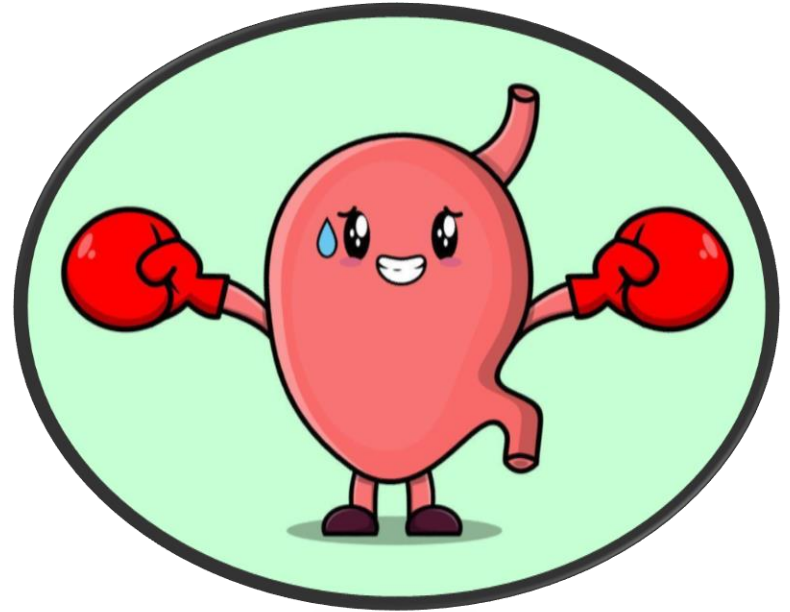
Vagotomy and Subsequent Risk of Parkinson's Disease



“Brain First”



“Gut First”

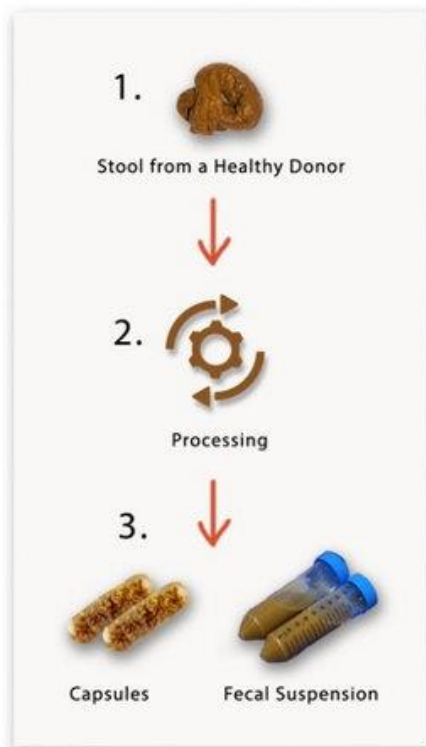




AGENDA

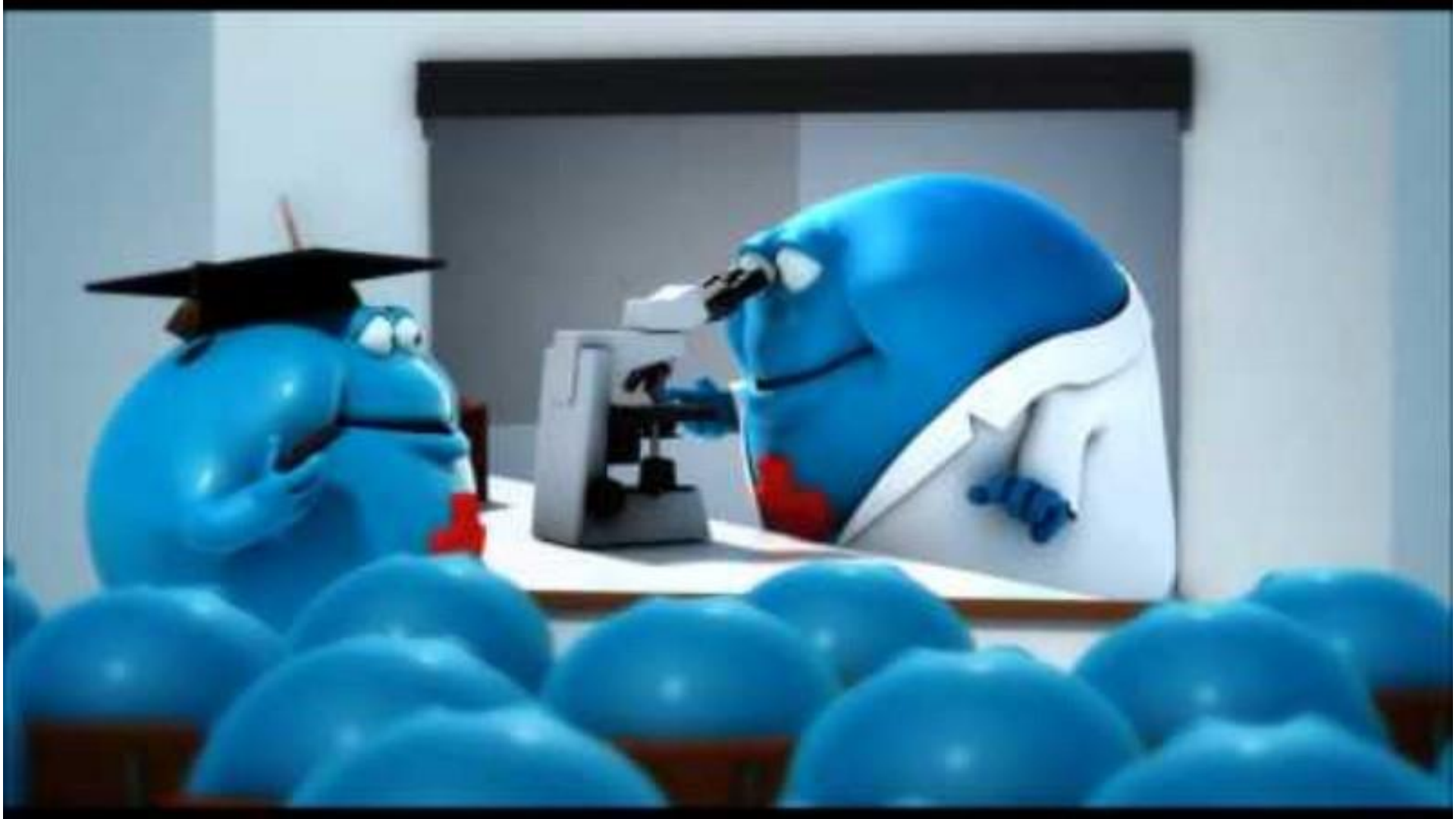
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FECAL MICROBIOTA TRANSPLANTATION



4. Delivery through
naso-jejunal tube
or gastroscopy





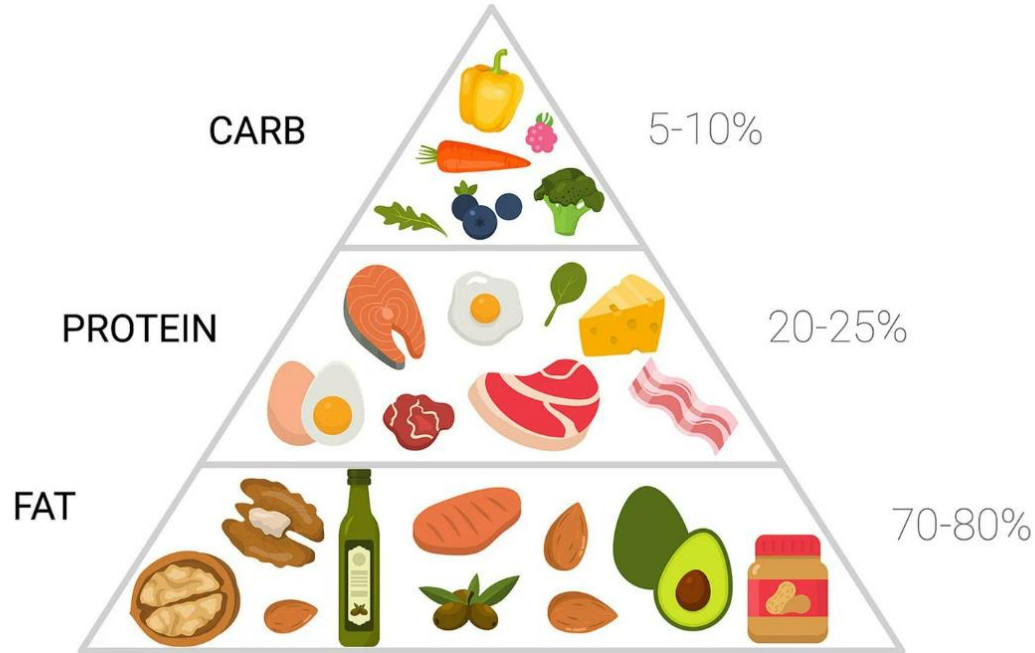
Probiotics... ... live microorganisms to improve gut health

Prebiotics... ... substrates intended to influence gut microbiota

Synbiotics... ... a combo of probiotics and prebiotics

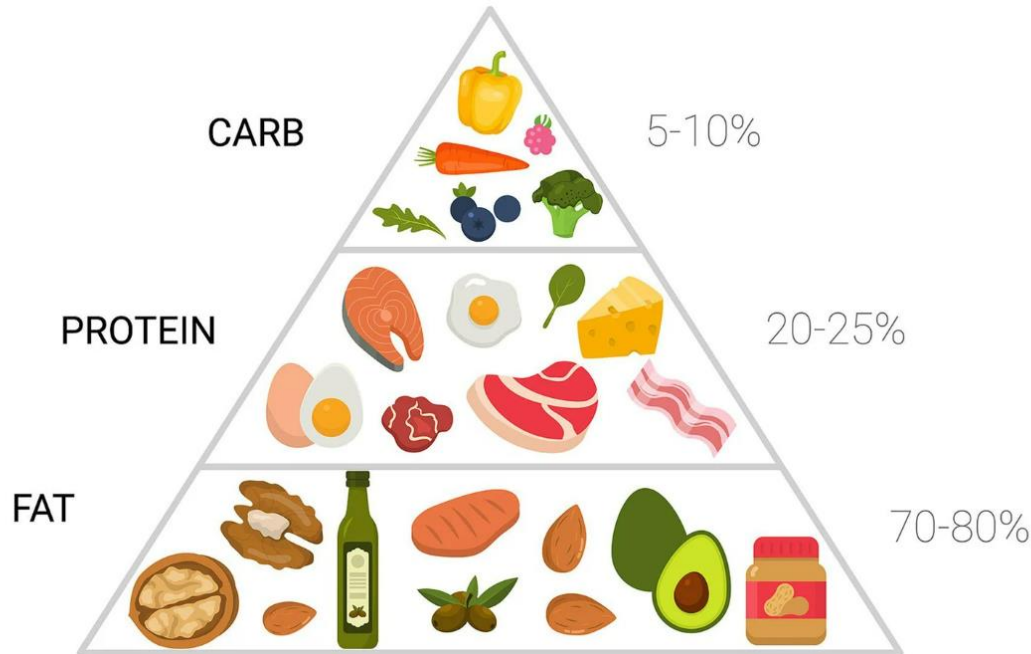
The Ketogenic Diet

~ Low Low Carbs, High Fat, Some Protein ~



The Ketogenic Diet

~ Low Low Carbs, High Fat, Some Protein ~



BREAD



POTATOES



SUGAR



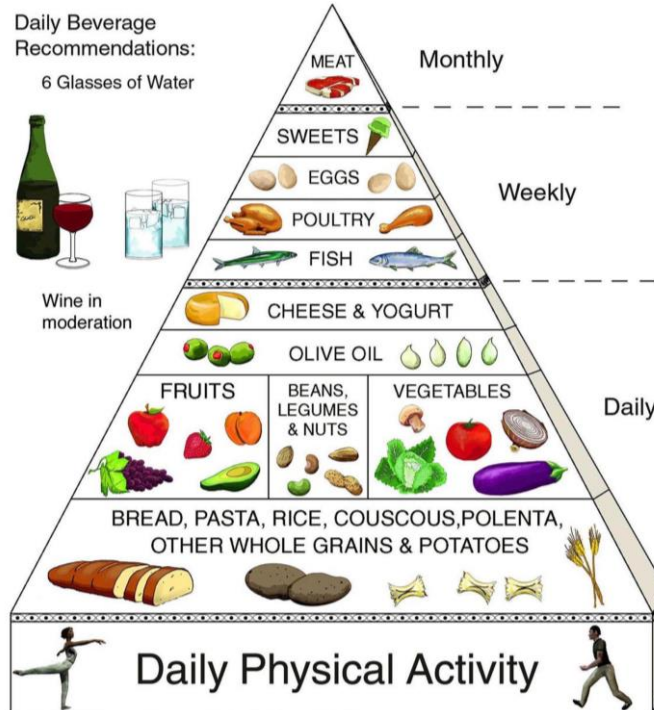
BEER



FRUIT

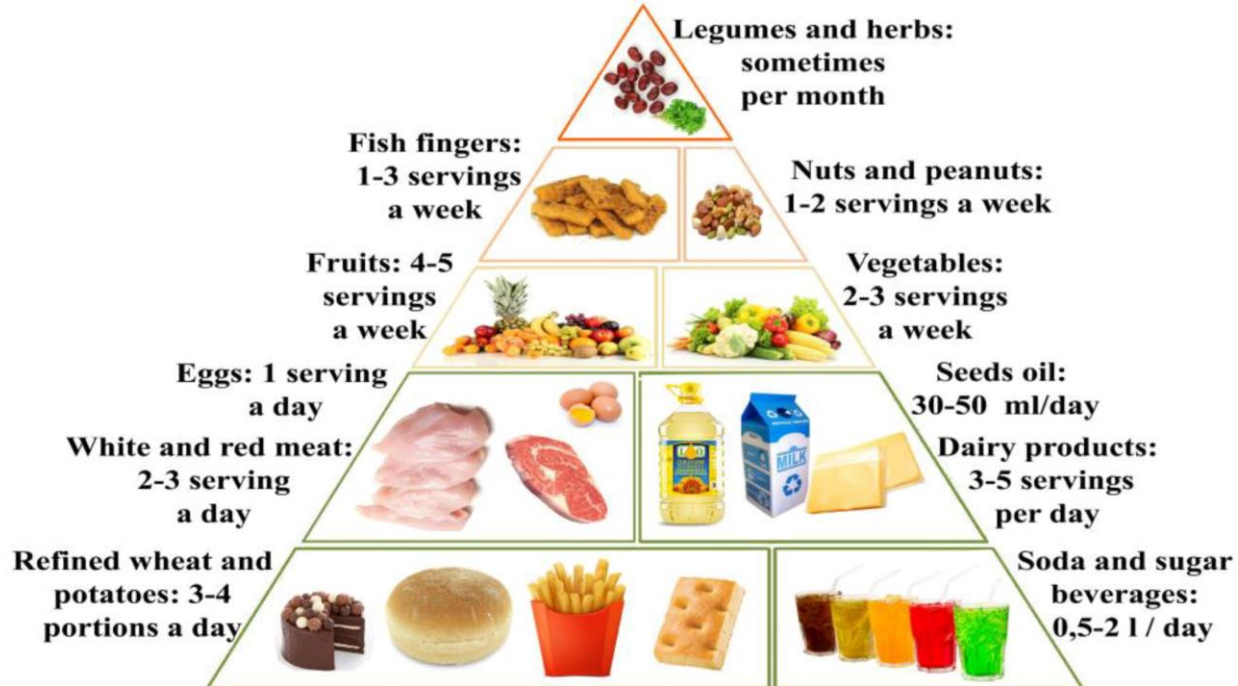
The Mediterranean Diet

~ High Fiber, Whole Natural Foods ~



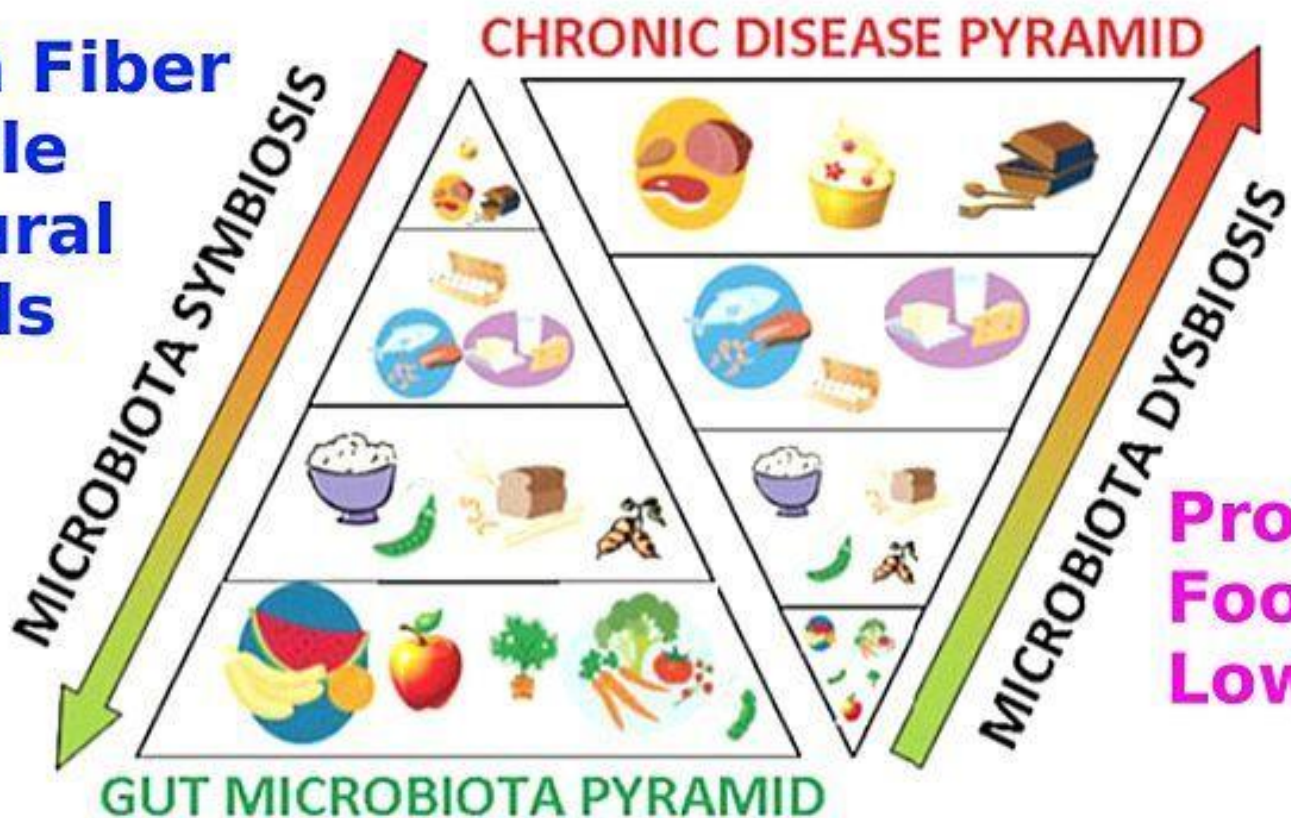
The Western Diet

~ High Fats, Refined Carbs, Animal Proteins ~



Mediterranean vs Western Diet

High Fiber
Whole
Natural
Foods





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THANK YOU



QUESTIONS