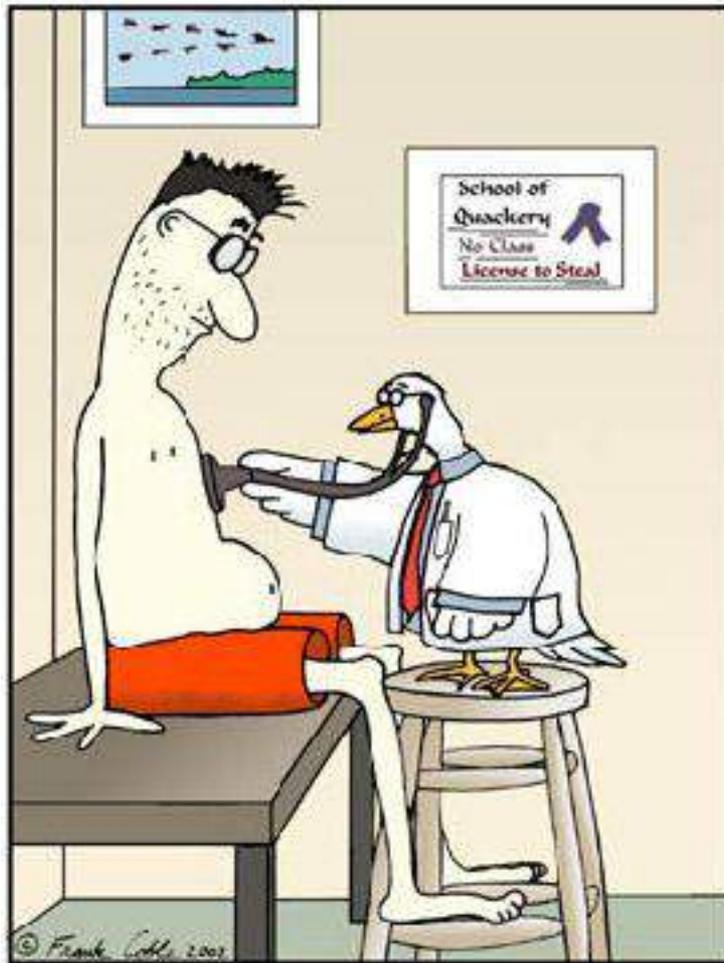




Nutritional Wellness and Parkinson's Disease

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Frank started to get a funny feeling
that his doctor was a quack.

Key Concepts

- The dopamine production pathway.
- Neurological Reserve

Dopamine Production Pathway

Dietary Protein



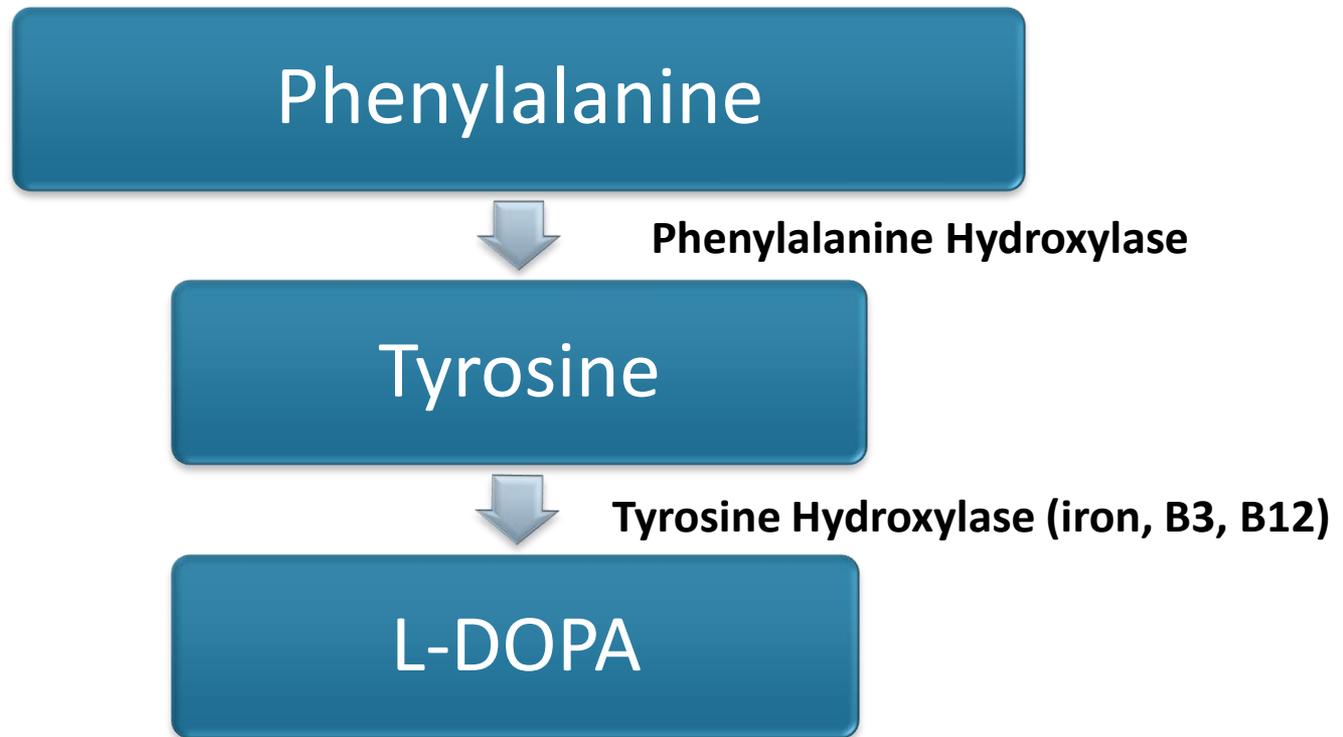
Broken down by stomach acid, proteases



Zinc Dependent Carbonic anhydrase

Absorbed into the bloodstream

Dopamine Production Pathway



Dopamine Production Pathway

Transfer of L-DOPA across Blood Brain Barrier



COMT, Dopa decarboxylase - Vit B6

DOPAMINE



Dopamine beta-hydroxylase (Cu, Vit C)

Norepinephrine and Epinephrine

These two neurotransmitters are used in stress reactions

Neurological reserve

- Cognitive reserve and brain reserve are evolving concepts in neurology.
- We can think of the combination of them as our total neurological reserve.
- They are used to describe mental and neurological capacity to tolerate injury, illness, and aging.
- The greater our total neurological reserve, the more resilient we are in the face of neurological disease like Parkinson's disease.

Neurological Reserve

- **Cognitive reserve** – reflects the number and complexity of neuronal networks based upon how we use our brain.
- **Cognitive reserve** is higher in people with post-secondary education, multiple languages, mentally demanding careers, meditators.
- **We can expand our cognitive reserve** at any age by exercising our brains (sudoku, language learning, crossword puzzles, socializing...)

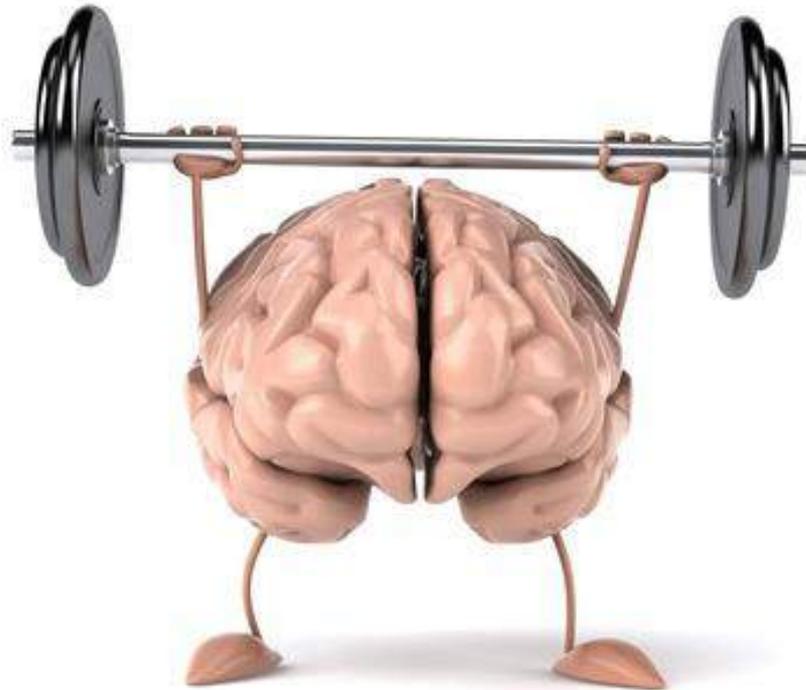
Neurological Reserve

- **Brain reserve** reflects actual brain mass, and is dictated by many factors including:
 - Genetics
 - Nutrition
 - Brain injury
 - Toxin exposure
 - Smoking, Drug and Alcohol abuse
 - Inflammation
 - Exercise and circulation
 - Sleep

Key concepts

- Nutrition plays a major role in both:
 - Dopamine production
 - Precursors
 - Co-factors for enzymatic conversions
 - Neurological reserve
 - Your brain depends on your diet for fuel and resources to build and rebuild and repair itself, ongoing, through your entire life.

Enhancing Brain Performance



Enhancing brain performance

- Three essential factors that affect brain function:
 - Stable Blood sugar
 - Sleep
 - Exercise

Stable blood sugar

- The brain primarily uses glucose for fuel.
 - If blood sugar is unstable (too high or too low) the brain will not function properly.
 - Unstable blood sugar is a stress for the brain
 - Long term high blood sugar impairs the brains ability to uptake and use glucose properly.
 - Frequent and chronic blood sugar lows cause ongoing energy stress and results in neuronal damage over time.

Stable blood sugar

- Stable blood sugar means stable brain performance
 - Clearer thinking
 - Better mood and energy
 - More predictable response to medications

How to stabilize blood sugar?

1. Avoid skipping meals
2. Eat every 2 to 3 hours
3. Ensure snacks contain a complex carbohydrate, a bit of protein (if on daytime protein restriction this can be difficult), and a healthy fat.
 - Good examples:
 - Avocado on toast
 - A handful of nuts and seeds with an apple
 - Celery with chickpea hummus

How to stabilize blood sugar

- Limit sugary foods to once or twice a week.
- Limit alcohol to 2-3 units per week, spread out.
- Limit caffeine to:
 - 1 cup of coffee per day – not past noon, not if you are having sleep difficulties
 - OR – 2 cups of black tea – same exceptions
 - OR – 3 cups of green tea – same exceptions IF it stimulates you.

Sleep (ideally, better than a baby)



Sleep

Exercise

- PD patients who underwent an intense exercise program showed improvements in measures for sleep quality, motor symptoms, and daytime sleepiness. These changes were not seen in controls.

Sleep

- Melatonin
 - Measurements of melatonin levels in PD patients show a decrease in melatonin surge at night and lower total melatonin production vs. controls.
 - Melatonin levels were most attenuated in PD patients with daytime sleepiness.

Sleep

- Melatonin (2015 meta-analysis)
 - *“Treatment with melatonin effectively improved the clinical and neurophysiological aspects of rapid eye movement (REM) sleep behavior disorder (RBD), especially elderly individuals with underlying neurodegenerative disorders. This meta-analysis provided some evidence that melatonin improves sleep quality in patients with AD and PD, and melatonin can be considered as a possible sole or add-on therapy in neurodegenerative disorders patients with RBD.”*

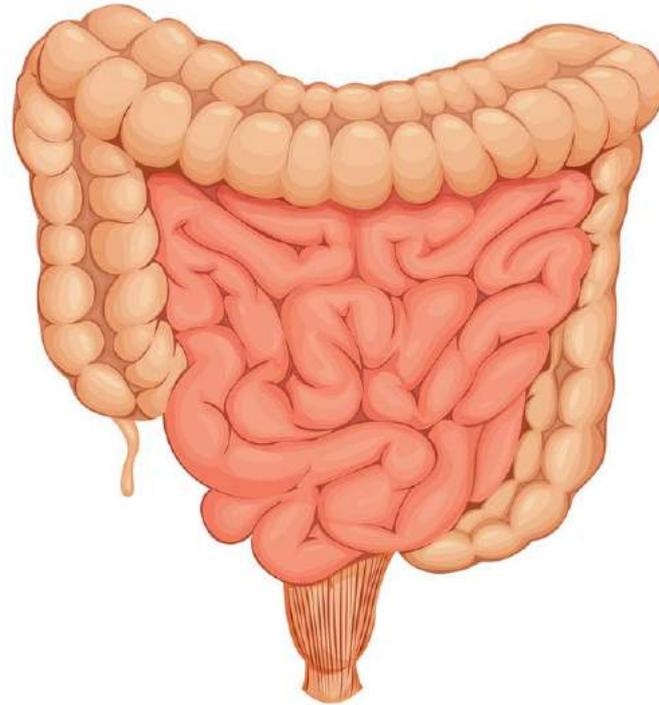
Melatonin doses

- Effective dose is best determined by titration to effect (starting low and gradually increasing the dose)
 - Clinical experience – best results with liquid or sublingual versions.
 - Start with 1 mg and gradually increase every 2 to 3 nights in 1 mg increments.
 - Waking with improved alertness and a sense of improved sleep quality without grogginess means you have achieved a good dose.
 - Safe to take from 1 to 10mg, per night.
 - Do not take if on MAO-B inhibitors (Azilect, Zelpar)

Exercise

- Improves sleep quality, which improves brain function
- High intensity exercise prescriptions found to improve mood, cognition, as well as motor function.
- Improves blood sugar control – which in turn also improves cognitive function
- Likely one of the most important interventions for PD.

Addressing Constipation



Constipation

- Another 'motor' symptom
- Several effective treatment options (*try one at a time – probiotics can be combined with any of the other interventions*)
 - Prunes and high fiber foods
 - Psyllium husks
 - Probiotics
 - Hydration – 8-10 glasses of water per day.

Prunes

- Soaked prunes are more effective than non-soaked
 - Soak in filtered water overnight
- Take as small servings, several times a day instead of one serving per day. This spreads out the fiber and sugars through a greater portion of your day and ensures more consistent effect on stool formation.
- Figs will also do the same job, soaked and taken frequently.

Psyllium husk powder

- Caution – if you have difficulty swallowing do not take psyllium husk capsules as they can lodge and swell in your throat.
- Psyllium husk powder does not interfere with PD medications
- Improves L-DOPA absorption, tempers the dose curve, and reduces dyskinesia.
- DOSE: 1 tsp stirred in warm water, twice daily, followed by a second, large glass of water.

Probiotics

- 2011 study:
 - Probiotic intake caused a statistically significant increase in the number of days per week in which stools were of normal consistency, and significant reductions in the number of days per week in which patients felt bloated, experienced abdominal pain, and had a sensation of incomplete emptying
 - Study used a 65 mL fermented milk drink containing 6.5 Billion CFUs daily.

Probiotics

- Clinical experience
 - Generally effective for many patients.
 - Secondary benefits include less bloating, improved digestion, reduced reflux, improved immune system function, better mood and more.
 - Dose ranges from 6 to 100 billion CFUs are available.
 - Seek professional advice for doses over 6.5 billion CFUs.

Maintaining optimal weight

- Weight loss is a common problem for people with PD
- Due to:
 - Loss of smell – food is less interesting
 - Early Satiety/Slow gastric emptying (gastroparesis)making it difficult to eat.
 - Difficulty chewing and swallowing
 - Difficulty with controlling utensils and preparing food alone
 - Malabsorption and/or poor digestive capacity
 - Leaky Gut Syndrome
 - Loss of appetite

Maintaining optimal weight

- A good blender is indispensable for getting high quality nutrition for someone with PD
 - Can help with swallowing concerns
 - Easy to pack in high density nutritional foods without a lot of effort. Food is broken down and much more digestible.
 - Smoothies can have many things added to them (reduces pill load):
 - Omega 3 fish oils
 - Protein powders
 - Probiotics
 - Coconut oil or Medium Chain Triglycerides
 - High calorie foods like oils, avocado, nuts and seeds in smoothies can help improve caloric balance.
 - Psyllium husks (must drink right away – follow with water)

Maintaining optimal weight

- Improve gut health and digestive and absorptive capacity.
 - PD patients have higher test scores for gut permeability than normal controls. (Leaky Gut)
- Steps to improved gut function
 - Digestive enzymes with each meal – often patients report later satiety, improved gastric emptying.
 - Probiotics – improve gut function, reduce dysbiosis and gut permeability

More steps to improved gut function:

- Assessment for food allergies and sensitivities
 - Reactive foods can promote gut dysfunction and perpetuate leaky gut problems, which in turn can cause new reactions to additional foods.
 - Blood tests can assess for reactive foods
 - IgE blood tests and skin prick tests – NDs, GPs and Allergists.
 - IgG and Lymphocyte proliferation tests – NDs
 - Elimination or Hypoallergenic diets can be used.

Neuroprotective foods and nutrients

- Food-based antioxidants appear to be absorbed better when in their natural state.
- Berries are the most researched antioxidant foods for brain health:
 - Found to modulate cell signaling pathways involved in inflammation, cell survival, neurotransmission, and neuroplasticity – improving overall brain health.
 - Improve motor and cognitive functions

Vitamin E

- Doses of 1000 IU and 2000 IU per day have been found to be both safe, and to improve capacity for activities of daily living while reducing caregiver burden. (AD and MCI studies)
- Fat-soluble antioxidant used in high amounts in the brain. Considered neuroprotective.
- Seek professional advice if: taking blood thinners, bruise easily, on low-dose aspirin therapy, taking other mild blood thinners like fish oil or curcumin.

Omega 3 fatty acids

- Used in high amounts by the brain for cell membrane integrity.
- Excellent anti-inflammatory effects. Crosses the blood brain barrier easily
- O3 fatty acids in fish oil are in a form our body uses right away (EPA and DHA)
- Flax and hemp seed oils are high in omega 3 fatty acids our body can convert into EPA and DHA.

Omega 3 fatty acids

- Start with a lower dose and build up to prevent gut upset. Can cause some reflux, so take with a full meal.
- 1 gram of fish oil in capsule or liquid is a good starting point. Work up to 3 grams per day – ideally divided into two meals, but you can take in one if you find your stomach is fine with it.
- Best sources are small fish based oils (sardines, herring, anchovies) from companies that do third party testing for contaminants.

Omega 3 Fatty acids

- Flax and hemp seed dosing
 - 1 tbsp, twice daily
 - Can be added to a smoothies
 - Good on popcorn, added to salad dressings
 - DO NOT cook with this oil or heat it – this changes these oils into a volatile, toxic compound.

Mood – Depression

- Dopamine, Norepinephrine and Epinephrine as well as Serotonin all play a role in mood control.
- It is not uncommon for depression to be an early symptom of Parkinson's Disease. There is a normal depressive reaction to the realities and uncertainties of having PD.
- Stress plays a role in depressive symptoms. It also worsens PD symptoms.

Mood - Depression

- Exercise
 - Many trials show that mood is one of the non-motor symptoms that is positively affected by exercise in PD.
 - High intensity training (aerobic and weight based) both have mood benefits. A mix of both is ideal for managing PD.

Mood - Depression

- **If you are taking an MAO-B inhibitor – you cannot take natural anti-depressants such as St John's Wort.** You may be able to take SAMe – which can help – however this must be done under physician (MD or ND) supervision.
- If you are on Sinemet – 5 HTP can be a helpful intervention. This should be done under physician supervision.

Mood - Depression

- Always ensure that there is not a secondary cause for this problem by having the following things checked by your doctor (treat as needed):
 - Thyroid health
 - Iron and Vitamin B12 levels
 - Blood sugars
 - Liver and Kidney health
 - A complete blood cell count.

Protein and Levodopa

- There are concerns that protein in the diet will interfere with L-dopa uptake from the gut and into the brain through the blood brain barrier
- Common ways to attempt to deal with this is to put the patient on either:
 - Low protein diet (LDP)
 - Redistributed protein diet (RDP)
- Another option is a low protein diet with Amino Acid supplementation.

Protein and L-DOPA

- Low Protein diet
 - This is typically a problematic approach.
 - 2015 study demonstrated that PD patients were in a negative nitrogen balance (which means they were suffering from protein deficiency) with a diet of 1.1 grams per kilogram of body weight.
 - This is not a low protein intake for a neurotypical control, who would not be in negative nitrogen balance.

Protein and L-DOPA

- PD may actually increase protein needs, and so a low protein diet would cause a growing protein deficiency which would worsen blood sugar control, muscle mass, immune system function, brain function and so forth.

Protein redistribution

- In this diet, protein is kept minimal through the day and then loaded high in the nighttime meal after the last dose of Levodopa/carbidopa has taken effect (kicked-in)
- This can be an effective approach, however it is hard to achieve protein balance with this as well due to limits on meal size people experience with PD (ie, it may not be feasible as the person simply cannot take in all that protein in the evening).

Protein Redistribution plus Amino Acid supplementation

- Amino acid supplementation to a protein restricted diet in PD patients showed maintenance of blood sugar control AND no change in available glutathione in the blood stream (a measure of antioxidant status) compared to controls.
- All PD patients were taking Sinemet.
- Medication effects were stable at 3 and 6 months in the Amino Acid group.

Clinical experience

- There is great variability in the PD population in terms of how their system uses Levodopa.
- I have seen situations where it was clear the patient was well controlled with no major changes needed in protein intake all the way to people who needed decent protein restriction to make sure they got the most out of their medication.

Clinical experience

- Timing protein intake after a medication has kicked in can help improve protein balance and medication effects.
 - Typical kick in time is 20-40 minutes.
- If taking a controlled release nighttime Sinemet, make sure you do this 2 hours after your high protein nighttime meal.
- Improving digestive capacity can be a real game changer in terms of L-DOPA absorption and medication effect.
- Working with a knowledgeable dietician and ND can help to craft a diet that works best for you and your system.

Questions?

- Thank you for coming!

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