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Parkinson Society British Columbia

Nutrition and Parkinson's Disease

Dr. Pamela Hutchison ND

MOVING FORWARD *together*

DISCLOSURES

- Owner of Acacia Health Ltd, Victoria BC
- No shares in fruits and vegetables to disclose

LEARNING GOALS

- Deeper understanding of nutrition and its relation to PD
- Understanding of Neurological Reserve – and how nutrition affects it
- Working knowledge of the microbiome and how to feed it well
- How to determine if protein is causing problems with Levodopa, and what to do about it
- Changed nutrient needs in PwP
- How the Positive Deviants behave (food/exercise)

WHAT ARE WE TALKING ABOUT?

- What are nutrients?
  - Definition of nutrient:
    - A substance that provides nourishment essential for growth and the maintenance of life. Oxford English Dictionary
      - "fish is a source of many important nutrients, including protein, vitamins, and minerals"
- What nutrients do not enter the body through the gut?
- What nourishes us that is something we DO vs something we RECEIVE?

WHY NUTRITION MATTERS

- Nutrients form the building blocks of your entire body, brain included
- Nutrients/diet affects the 100 trillion organisms that make up the gut microbiome – which has far reaching effects on the entire body, including the brain.
  - Even non-dietary ‘nutrients’ effect gut microbiome population and diversity
    - Sun exposure
    - Exercise
    - Pet dander (is this a nutrient🤔)

WHY NUTRITION MATTERS

- What/when/how you eat affects medication kinetics
- Gut health is an important aspect of PD – PwP often report gut symptoms as problematic, diminishing quality of life – constipation, GERD, SIBO, Gastroparesis
  - What you eat affects gut health

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WHY NUTRITION MATTERS

- Evidence that nutrition plays a role in development of PD
  - Animal studies indicate potential neurotoxic effect of dairy products (increased oxidative stress, contaminants like rotenone, paraquat toxic to SN neurons)
  - 2019 review by Boulos, C. et al – looked at 7 cohort studies showing dairy intake increasing risk of developing PD

WHY NUTRITION MATTERS

- Findings are confusing
  - Low fat dairy appears to confer higher risk
  - Dairy intake seems worse for men (although one cohort did show a correlation with dairy intake and women with PD)
  - In Greece milk was a problem but yogurt and cheese were not associated with increased risk.

WHY NUTRITION MATTERS

- Recent meta analysis – PD risk increases by 17% for every 200g/day increase in milk intake, 13% for every 10g/day increase in cheese (Jiang W et al 2014).
- Correlation between faster progression and higher intake of milk, yogurt, and ice cream in the CAM Care PD dataset (Mischley LK 2019 – unpublished)

WHY NUTRITION MATTERS

- Also associations with prevention or delayed onset of symptoms
  - Coffee (28% risk reduction developing PD) 3 cups per day maximum benefit (Qi, H. 2014)
  - Tea (3+ cups per day associated with 7.7 year delay in motor symptoms) Green or Black (Kandinov, B. 2009)
  - Exercise
  - PUFAs
  - Smoking (not recommended)
  - Vitamin D levels
  - Increased dietary antioxidants
  - Mediterranean diet

NEUROLOGICAL RESERVE

- The sum total of Brain reserve (BR) and Cognitive reserve (CR)
- BR = The total volume of our brains
  - Dictated by many factors (genes, nutrition, injury, smoking, toxin, drug abuse, sleep, inflammation, exercise, circulation)
- CR = The number of and complexity of neuronal networks based upon how we use our brain.
  - Higher in multilingual people, post-secondary education, mentally demanding careers, meditators

NEUROLOGICAL RESERVE AND YOU

- Folks with higher neurological reserve are more resilient to all neurdegenerative diseases (PD, AD) and have lower symptomatology with MS
- My goal is for you to see your Neurological Reserve like a savings account – the more you have in it, the more you can afford to lose and still live well.
- Much of what we (NDs) and other health professionals do to help folks with PD comes down to techniques that retain or build neurological reserve.

NEUROLOGICAL RESERVE AND DIET

- Nutrition plays a key role in neurological reserve
- Provides fuel for brain to build and re-build and repair
- Provides antioxidants and anti inflammatory factors to help the brain protect itself from damage through inflammation, toxins etc.
- Provides precursors for NT and co-factors for enzymatic conversions.
- Encourages (or discourages) the production of pro-myelination (nerve insulating) factors by augmenting microbiome activity.
- Provides substances that improve neuronal connections (for example: Vitamin D)

NEUROLOGICAL RESERVE AND NUTRIENTS

- What nutrients support neurological reserve (some examples)?
  - Omega 3 Fatty acids (Wild Fish, Seeds, Nuts)
  - Antioxidants
    - Blueberries
    - Leafy greens
    - Colourful fruits and veggies
    - Spices and herbs (turmeric, ginger, parsley…)
  - Choline (good sources)
    - Fish, egg yolks, Collard greens, Swiss chard, Brussels sprouts, cauliflower, Asparagus, Broccoli

NUTRITION AND GUT MICROBIOME

- Gut Microbiome
  - We have over 100 Trillion passengers in/on our body
  - Bacteria, fungi, protozoa, viruses
  - The bacteria in our large intestine form the majority of our microbiome.
  - They – help us digest our food, regulate our immune system, protect us against pathogenic bacteria/fungi, produce vitamins including B12, thiamine, riboflavin, Vitamin K.

NUTRITION AND THE GUT MICROBIOME

- Some interesting facts about the gut microbiome
  - More cells in our guts than our entire body
  - Diversity seems to matter - less diverse populations associated with obesity, Type 1 DM, other chronic illnesses
  - Dust from the homes of dogs appear to reduce immune response to allergens in general by adjusting the microbiome.
  - Eating junk food regularly for as little as two weeks creates massive changes in the microbiome towards organisms that encourage inflammation.

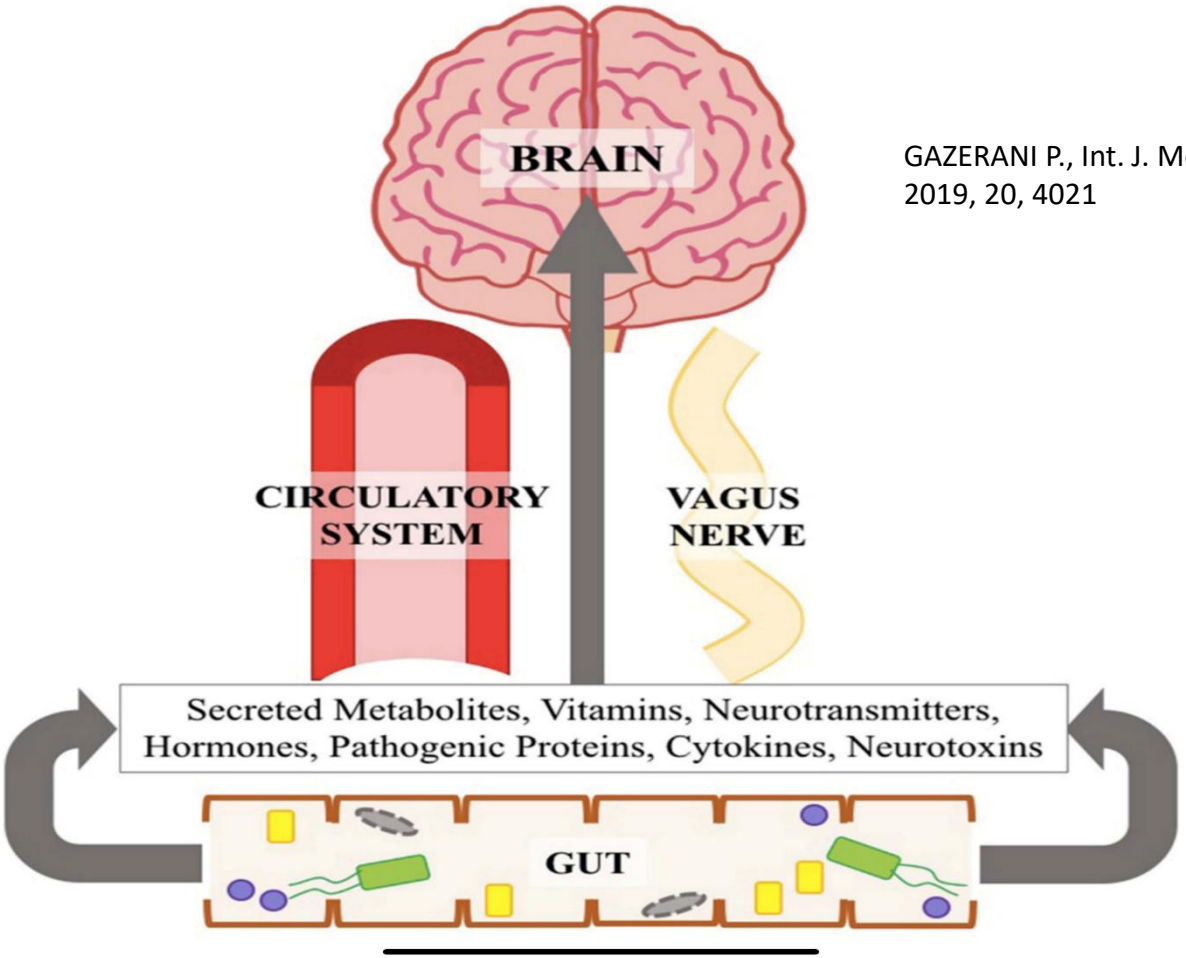
PWP HAVE ALTERED GUT MICROBIOMES

- Studies so far have poor reproducibility – only a few signals that seem relatively consistent so far.
- Most studies looked at medicated patients, and some medications appear to affect the microbiome themselves (COMT inhibitors, Anticholinergics) – the consequences of these alterations are currently unknown and could be positive or negative.
- PD patients appear to have (vs. Controls)
  - Higher Lactobacilli, Bifidobacteria, Akkermansia
  - Lower Prevotella, Lachnosperaceae

GUT MICROBIOME CHANGES IN PWP

- Lachnospiraceae is a major producer of short chain fatty acids (SCFA) in the colon
- SCFA depletion has been implicated in the pathogenesis of PD in several studies.
- SCFA are produced by healthy gut bacteria breaking down fiber (think veggies, fruits and whole grains) in your colon.
- SCFA are the main source of energy for the cells lining the colon.
- SCFA – local and distant effects on gut integrity, inflammation (body and brain), immune system homeostasis

MICROBIOME AND NEUROLOGICAL RESERVE



GAZERANI P., Int. J. Mol. Sci 2019, 20, 4021

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MICROBIOME AND NEUROLOGICAL RESERVE

- Microbiota in the gut produce large amounts of neurotransmitters, vitamins, biologically active metabolites (SCFA), hormones, cytokines, pathogenic proteins, and neurotoxins
- These have far reaching and impressive effects on the immune system, levels of neurotransmitters in the brain (not necessarily directly), neuroinflammation, blood brain barrier integrity, and more.

MICROBIOME AND NEUROLOGICAL RESERVE

- Example – mouse model for epilepsy - ketogenic diet found to only be effective for reducing seizures if gut microbiota present.
  - Two strains that are high in mice fed ketogenic diet are known to increase hippocampal GABA and glutamate by decreasing gut Gamma glutamylation.

MICROBIOME AND NEUROLOGICAL RESERVE

- In MS research – bacterial metabolites have been found to gain access to the brain and control microglial cell activation (cells that play a large role in inflammation in the brain) – and this can be augmented by diet.

HOW TO IMPROVE YOUR MICROBIOME

- We can cultivate a healthier microbiome by what we eat and by exercising, getting sun exposure, and ensuring adequate sleep.
- Limiting sugar, fried foods, highly processed foods, and artificial sweeteners, reduces the harmful effects these substances have on our microbiome.
- Increasing ‘prebiotic fibers’ provides fuel for healthy gut microbes – think asparagus, garlic, onions, whole grains

HOW TO IMPROVE YOUR MICROBIOME

- Eat fermented foods – especially from vegetables and organic soy such as:
  - Saurkraut
  - Lactofermented pickles (in fridge at grocery store)
  - Any lactofermented vegetable
  - Kim Chi
  - Tempeh
  - Miso soup

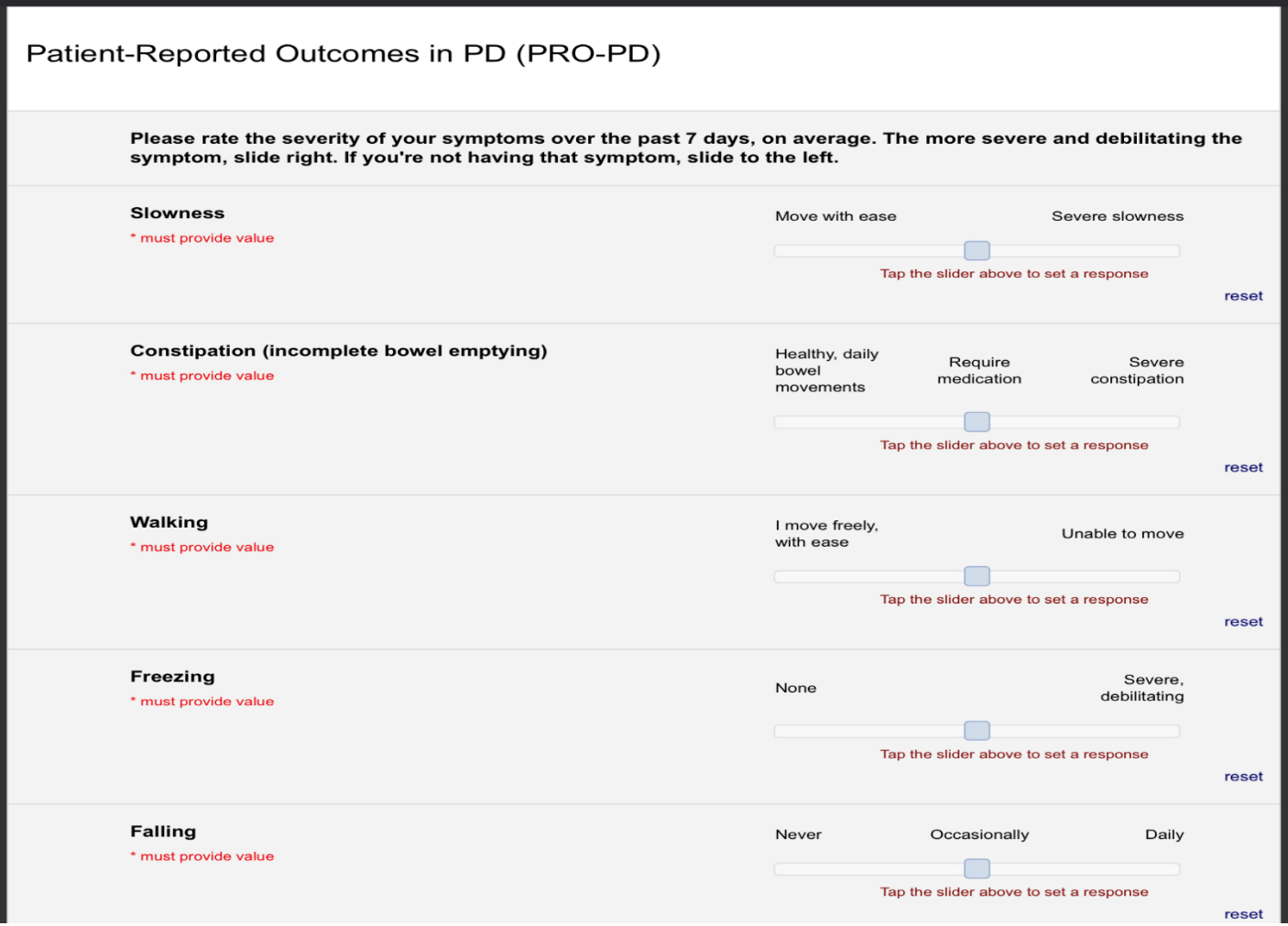
PROGRESSION – WHO DOES IT SLOWLY?

- Positive Deviance
  - In any community, there are certain individuals or groups of individuals who have adopted behaviours and strategies that allow them to thrive despite the collective challenges of that community.
  - Knowing what the Positive Deviants in the PD community do, do not do, do more of, or less of, can help guide the greater PD community to adopt their strategies.
  - Although correlation is not causation, when a trend towards certain low risk behaviours is associated with better outcomes, what is the harm in adopting those behaviours?

PRO PD SCALE

- Developed by Dr Laurie Mischley ND PhD
  - Track folks over time – motor and non-motor symptoms
  - Monitor progression
  - What activities, behaviours, dietary differences etc… are common among the SLOW PROGRESSORS
  - Presented 2019 data set at PD School 2019

PRO PD SCALE – WWW.PROPD.ORG



Patient-Reported Outcomes in PD (PRO-PD)

Please rate the severity of your symptoms over the past 7 days, on average. The more severe and debilitating the symptom, slide right. If you're not having that symptom, slide to the left.

Slowness
* must provide value

Move with ease — Severe slowness

Tap the slider above to set a response

reset

Constipation (incomplete bowel emptying)
* must provide value

Healthy, daily bowel movements — Require medication — Severe constipation

Tap the slider above to set a response

reset

Walking
* must provide value

I move freely, with ease — Unable to move

Tap the slider above to set a response

reset

Freezing
* must provide value

None — Severe, debilitating

Tap the slider above to set a response

reset

Falling
* must provide value

Never — Occasionally — Daily

Tap the slider above to set a response

reset

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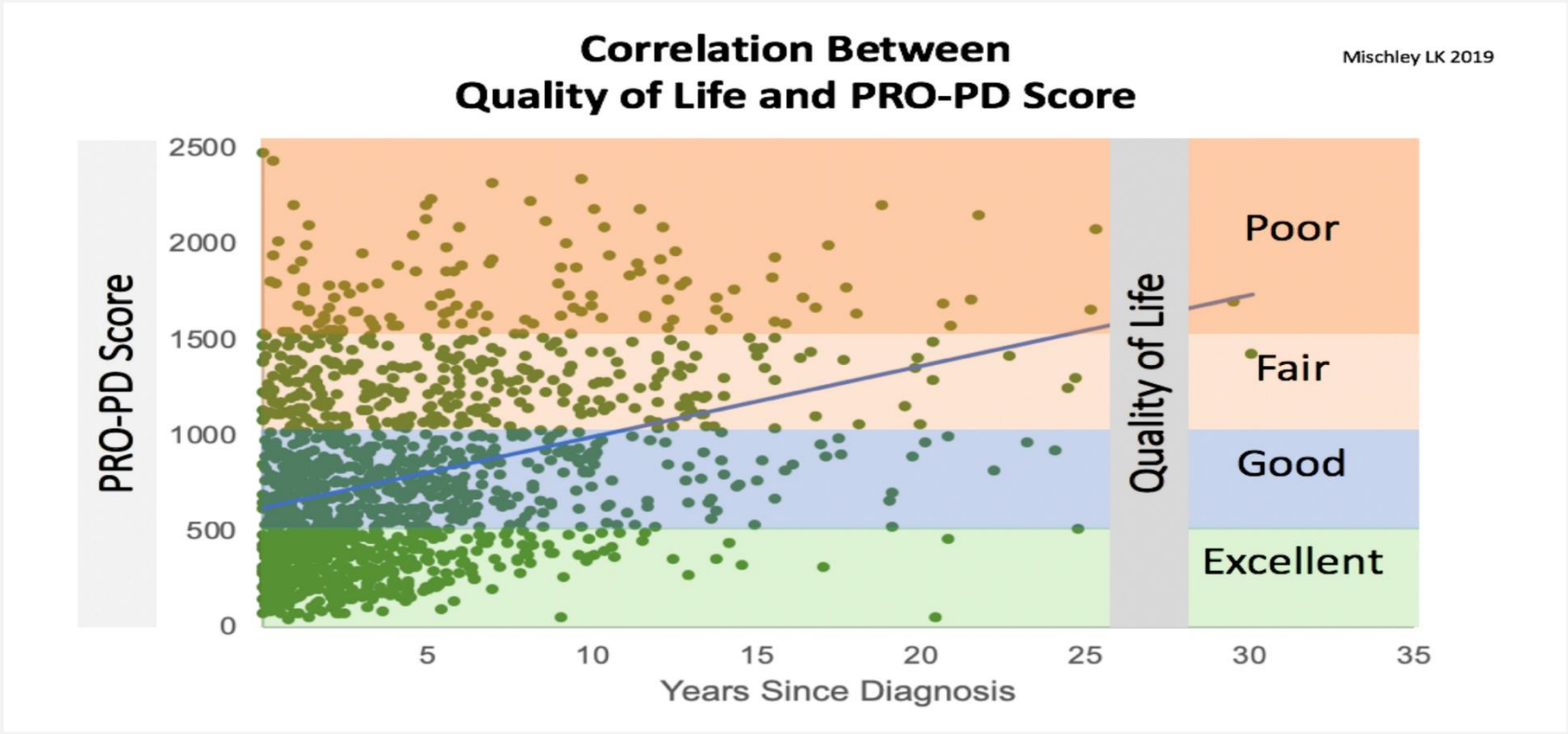
PRO PD SCALE



Please contact lmischley@bastyr.edu for questions about using this scale.

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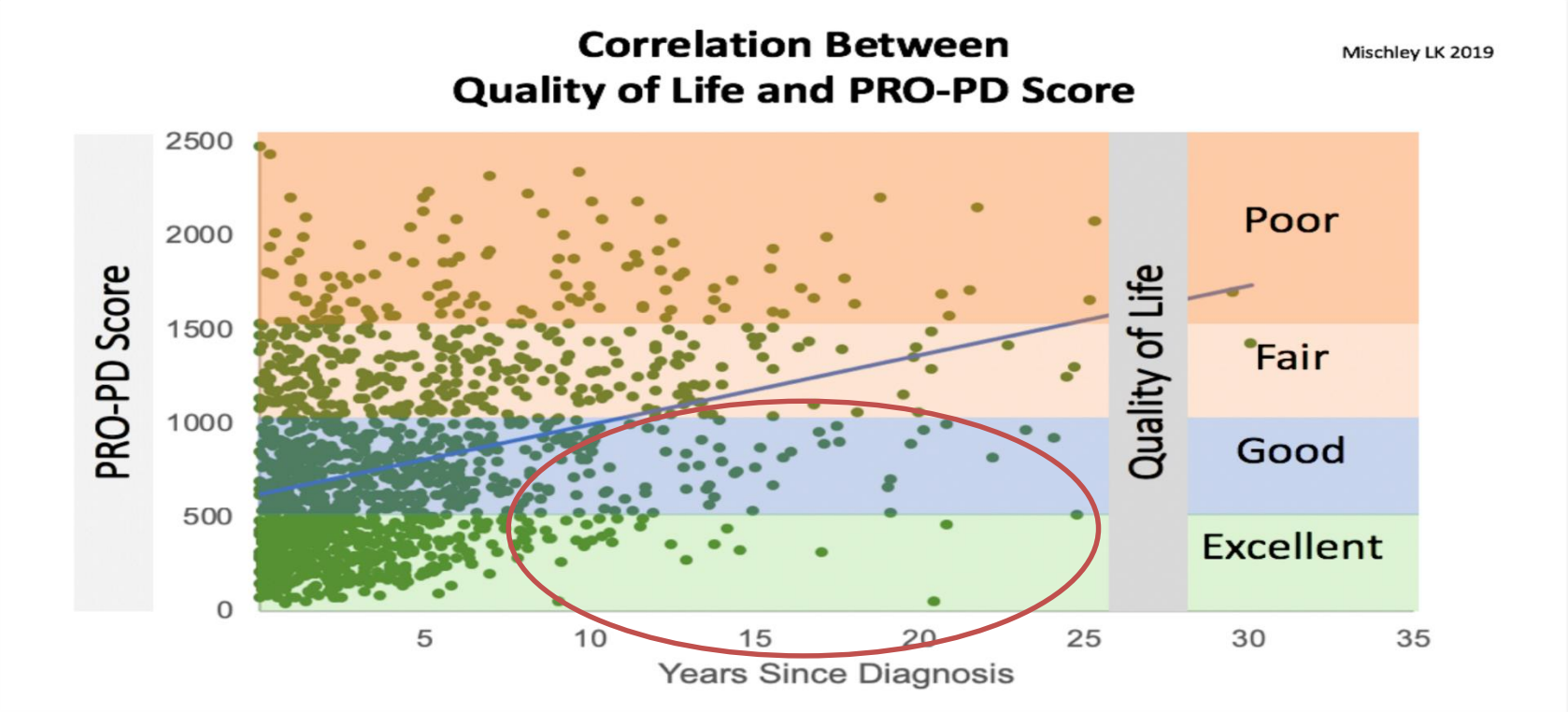
PRO PD – IMPORTANT KNOWLEDGE

- Average progression is 38 points per year
- Each of 33 motor, mood, and non-motor symptoms are rated on a scale of 0-100
- 0-500 = excellent condition (PD no to very minor impact)
- 500-1000 = good condition (PD creating minimal impacts)
- 1000-1500 = fair condition (PD is impacting life)
- Over 1500 = poor condition (PD with severe impacts)

PRO PD SCALE – POSITIVE DEVIANTS



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DIET AND PRO PD

- Intake of specific foods is measured on a 10-point scale
- <1/month, 1/month, 2-3×/month, 1/week, 2–4×/week, 5-6×/week, 1/day, 2–4×/day, 5-6×/day.
- Dose dependent response found for both foods associated with slower progression and those associated with faster progression.

POSITIVE DEVIANTS EAT (2019 DATA)

- Fresh vegetables
  - 1/wk correlates with 49 point reduction PROPD score
  - 5-6x/d 490 point reduction
- Fresh fruit and veggies
  - 46 – 400 pt reductions
- Nuts and seeds
  - 40 - 400 pt reductions
- Non-fried fish
  - 34 – 350 pt reductions

POSITIVE DEVIANTS EAT (2019 DATA)

- Wine
- Olive oil
- Fresh herbs
- Coconut oil
- Green tea

POSITIVE DEVIANTS LIMIT (2019 DATA)

- Dose dependent responses here too
  - Canned fruit
  - Fried food
  - Diet soda (diet soft drinks)
  - Canned vegetables
  - Soda (soft drinks)
  - Beef
  - Ice cream
  - Frozen vegetables
  - Yogurt and Milk

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POSITIVE DEVIANTS AND EXERCISE (2019 DATA)

- Frequency matters
- No benefit seen in folks who exercise 2 or less times per week (30+ min sessions)
- Dose dependent response as frequency goes up
  - 7 days a week – 351 pt reduction
  - 6 days a week – 343 pt reduction
  - 5 days a week – 294 pt reduction
  - 4 days a week – 270 pt reduction
  - 3 days a week – 201 pt reduction

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POSITIVE DEVIANTS AND EXERCISE (2019 DATA)

- Type of exercise makes a difference:
  - Of the surveyed exercise types
    - Running and Park cycling program showed greatest reductions in the PROPD scale (237 and 228 respectively)
    - Dance and Walking had reductions but less so – 64 and 74 respectively
- What do we make of this?
  - Intensity matters?
  - What else?

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POSITIVE DEVIANTS AND BEHAVIOURS (2017)

- When asked about behaviours over the past 6 months(Mischley L, 2017)

PwP who answered "True"	Average change in PROPD score
I routinely prepare meals for others.	- 112.8
I cook most of my meals.	- 135.4
I buy food from local farmers (co-op, farmer's markets).	- 97.2
I try to eat organically grown foods when possible.	- 74.9
I drink from a plastic bottles	+ 11.9

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SOCIAL EXPOSURE – BRAIN NUTRIENT?

- People who answered yes to “I am lonely” had a 354 increase in PRO PD scale.
- Social exposure is recognized as an important factor in preventing/slowing dementia.
- Social exposure causes an increase of BDNF (Brain Derived Neurotrophic Factor) in the brain – “Miracle Grow for the Brain” – required for neuronal development, survival and plasticity.
- PwP who feel they “Have lots of friends” had an average 177 decrease in PROPD

WHAT ABOUT DIETARY EFFECTS ON MEDS?

- Gastric acid secretion in the stomach provides an acidic environment for foods to be broken down.
- Levodopa has high solubility in acid environments but low in water/neutral pH.
- Approximately 40% of PwP have low stomach acid production – this impairs Levodopa solubilization and subsequent absorption.

INCREASING STOMACH ACID

- Diet/Supplementation can help:
  - Take med with
    - lemon juice (30 ml – R. Shinkeigaku study 1994)
    - Vitamin C (as Ascorbic Acid) 500 mg capsule.
    - Apple cider vinegar
    - Betaine HcL capsule
  - Dietary practices that increase HCL secretion/Stomach acidity
    - Eat mindfully, minimize stress during meals

PROTEIN AND MEDICATION

- Levodopa competes with amino acids from dietary protein for access to the blood stream (from the gut) AND access to the brain (from the bloodstream)

- Signs that this could be a problem for you:
  - Long time for med to kick in
  - More time in off state than typical – especially related to high protein meal
  - “Dose Failures” where the med does not seem to work at all – especially related to protein in diet

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PROTEIN AND MEDICATION – WHAT TO DO

- Determine if this is the problem
  - Keep a diet journal with date and time of what you ate or drank, and also track medication times AND results.
    - Bring this to your dietician or doctor
  - OR – do a 4-day low protein diet and see if you get better symptom control

HIGH PROTEIN FOODS

- Flesh foods (meat, chicken, turkey, pork, fish)
- Eggs
- Most dairy
- Nuts and nut butters, Seeds and seed butters
- Soy beans and soy products (tofu, edamame, soy milk)
- Protein powders
- Ensure or Boost
- Beans and peas, lentils
- Desserts made with eggs or cheese/dairy products

PROTEIN AND MEDICATION – WHAT TO DO

- If you determine it is an issue (pick one and try it):
  - Take levocarb on an empty stomach – 30 min before or 1 hour after meals. Even better – take it with an acid as well.
  - Limit protein intake during the day to prevent the interaction during your most active times.
    - You must still get essential protein with this method
    - Eat a high protein dinner meal
  - Plant protein may interfere less than animal flesh protein and eggs – reserve the latter fo nighttime intake

CHANGED NUTRIENT NEEDS IN PWP

- Your body has altered nutritional requirements due to PD
- AND recommendation of high frequency exercise for treatment and progression slowing ADDS to the nutrient demands for your system

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HYDRATION

- Increased nighttime urination, low blood pressure, medication effects, altered thirst signaling – all contribute to a greater need for adequate hydration.
- I encourage folks with PD to aim to get 2 liters spaced out through the day (instead of large servings) to help maintain blood pressure, reduce cramping from dehydration.
- Additional water needed before/during/after exercise
- Electrolytes help reduce muscle cramping and improved blood pressure control – have with water around exercise, and during the day if OH or muscle cramping a concern.

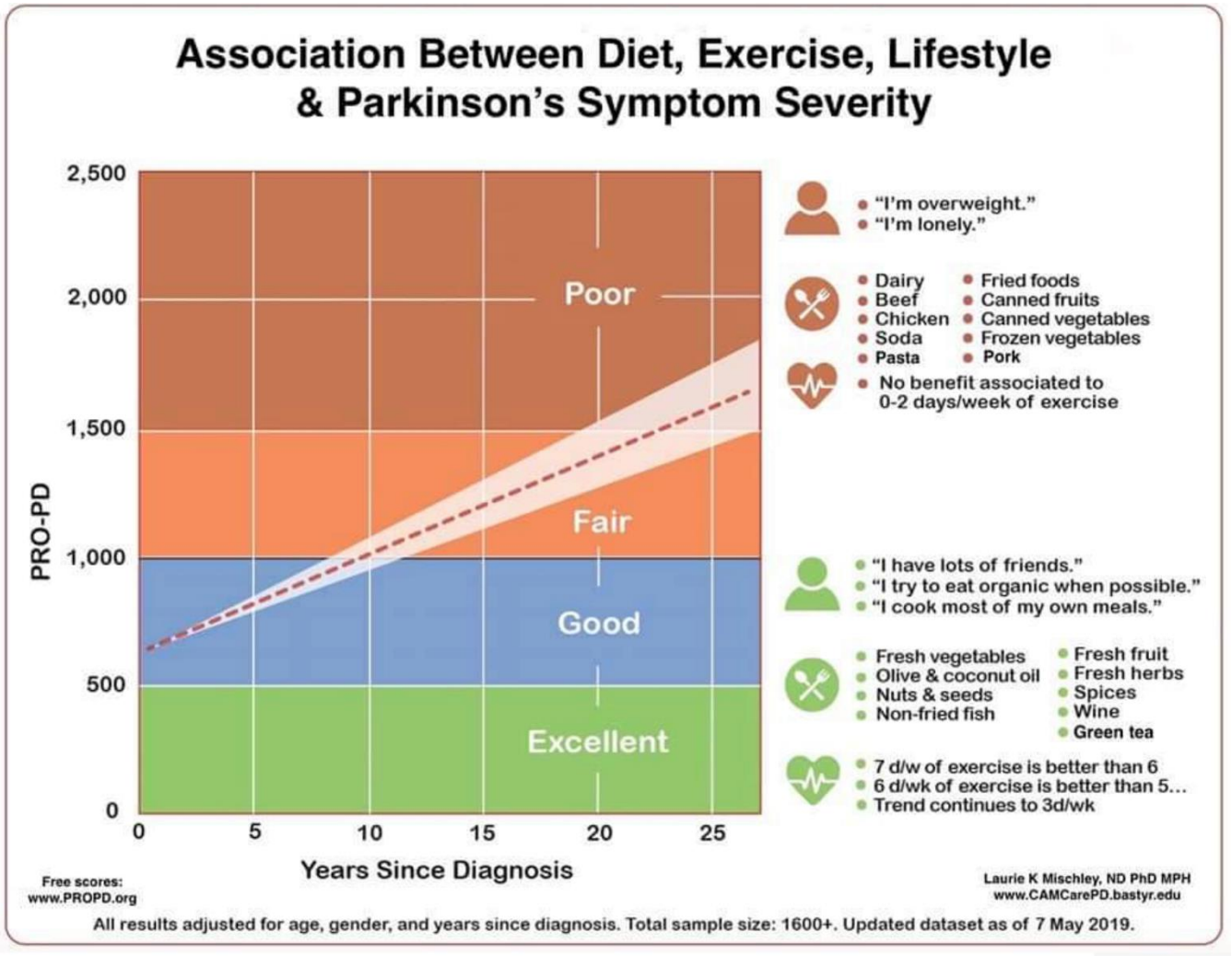
VITAMIN D

- Folks with PD tend to have lower Vitamin D levels than age matched controls (Sleeman, I. et al, 2017)
- Lower Vitamin D at diagnosis is associated with greater severity in motor symptoms 36 months later (Sleeman, I. et al 2017)
- Supplementation recommended (liquid form or gel caps)
  - 2000-4000 IU D3/day to maintain levels
  - 6000 IU D3/day to attain healthy levels
- I like to test, treat, and re-test – because I find it can be challenging, in PwP, to get to healthy levels.

FIBER

- Fiber is highly therapeutic for PwP, and arguably the needs for fiber increase in folks with the condition.
- Fiber improves levodopa bioavailability
- Fiber provides food for healthy microbiota cultivation, and subsequent gut wall health and integrity
- How to get more fiber
  - Eat 4-6 cups of vegetables per day (with half being leafy greens), 1-2 cups berries and fresh fruit per day
  - Eat whole grains whenever having any grain.
  - Supplement with psyllium husk powder (this can improved levodopa absorption and reduce constipation)

TAKE HOME MESSAGES



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THANK YOU

- Contact information:
  - pam@acaciahealth.ca

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