

Nutrition & Parkinson's

Laurie K Mischley, ND PhD MPH

Kelly Morrow, MS, RDN, FAND



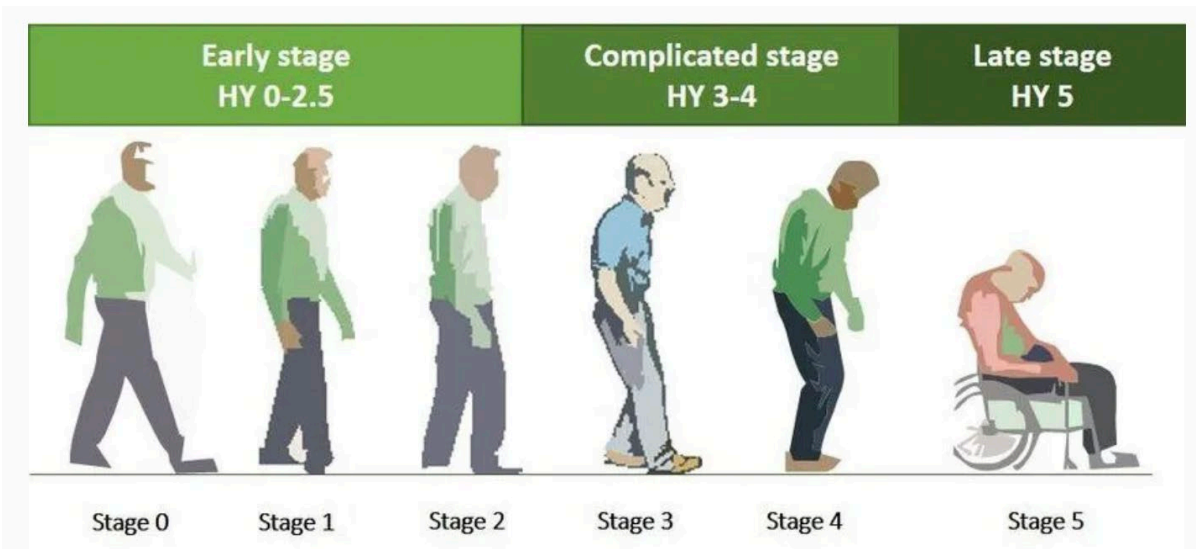
LKM Disclosures/ Affiliations

- **Seattle Integrative Medicine** - clinic
- **Bastyr University** – epidemiology research
- **University of Washington** – MRS research in nutritional deficiencies
- **Parkinson-School.com** - online education
- **Parkinson Center for Pragmatic Research (CPR)** - founder
- **ParK-9, SPC** – Canine Dog Detection of Parkinson's
- **Parkinson Symptom Tracking (PRO-PD) App** – owner (FREE)
- Patient-Reported Outcomes in PD (**PRO-PD**) Scale – inventor (FREE)

Kelly Morrow's Disclosures/Affiliations

- Seattle Integrative Medicine, clinical practice
- Affiliate Instructor, Osher Center for Integrative Health, University of Washington
- Affiliate Associate Professor, Department of Nutrition and Exercise Science, Bastyr University
- Co-Editor, Krause and Mahan's Food and the Nutrition Care Process 15th and 16th eds
- Content Developer, Integrative and Functional Certificate of Training, Academy of Nutrition and Dietetics
- Working Group Member, KDIGO Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease
- Content Developer, Integrative and Functional Nutrition Academy
- Content Developer, Parkinson's School

“Parkinson Progression”



<https://www.parkinsonsnsw.org.au/understanding-the-five-stages-of-parkinsons/>

LK Mischley Jan 2025

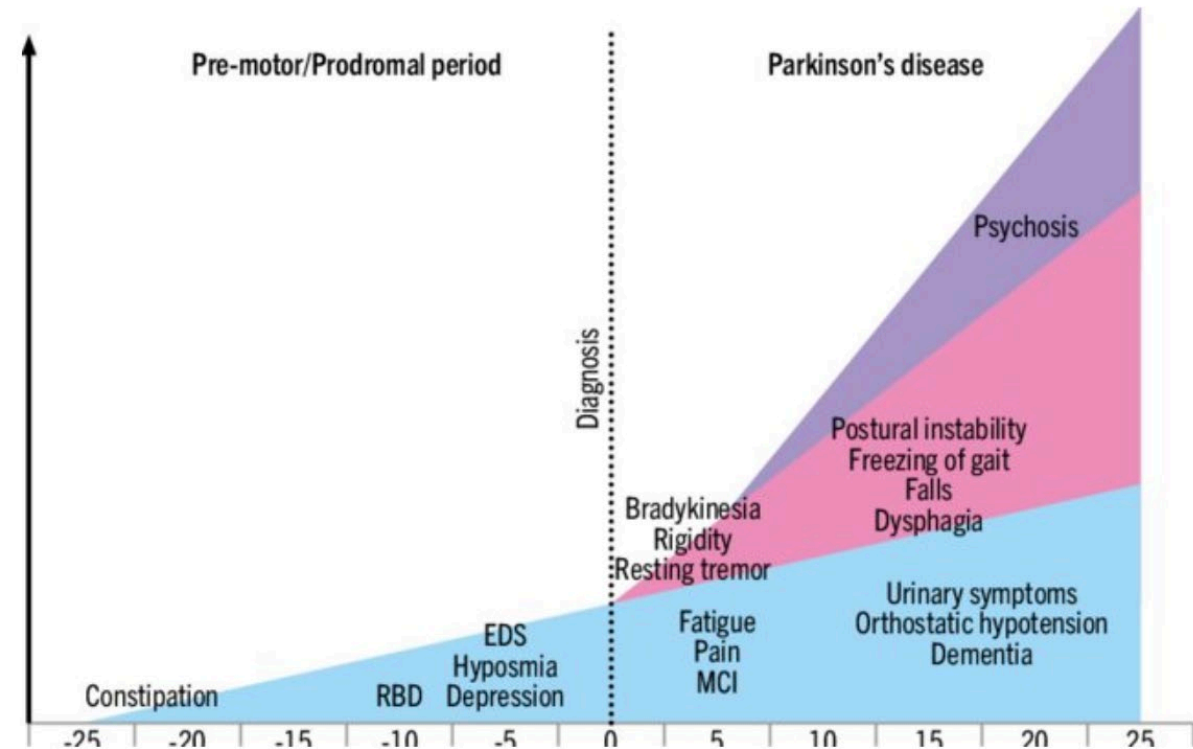


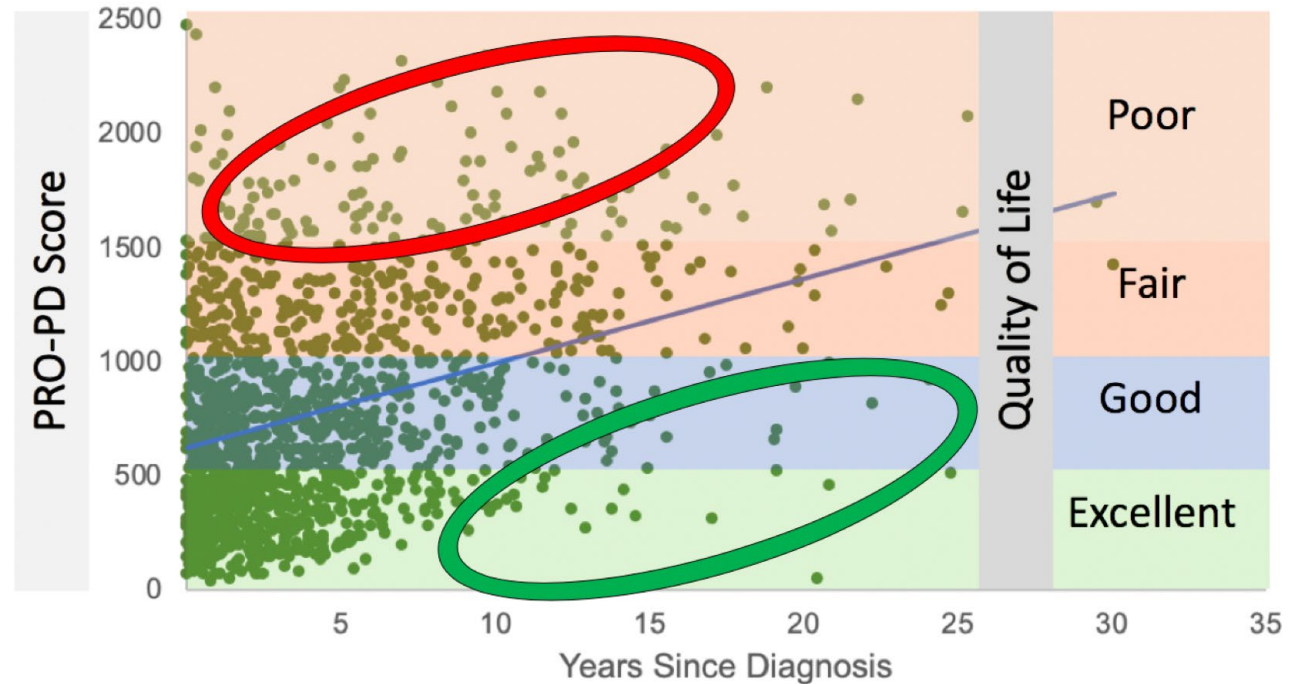
Illustration of the progression of Parkinson's disease (adapted from Kalia and Lang 2015 2). Abbreviation key: REM sleep behavior disorder (RBD), excessive daytime somnolence (EDS), and mild cognitive impairment (MCI).

Positive Deviance Model:

Identify the People Doing Best/ Worst

What are they Doing Differently?

- Instead of trying to control for diversity, use it to our advantage.
- What are the people doing best doing differently?
- Patient-reported outcomes.



Modifiable Variables in Parkinsonism

www.MVP-Study.com

The Purpose of the Study

There is a tremendous amount of diversity among people with Parkinsonism (PwP); some people seem to progress quickly and others barely at all. Our goal is to collect information that will make it possible to identify relationships between your daily choices and therapies associated with different rates of progression.

 mvp-study.com

Formerly known as Complementary and Alternative Medicine in Parkinson's Disease

[HOME](#)

[WHAT IS MVP?](#)

[CONTACT US](#)

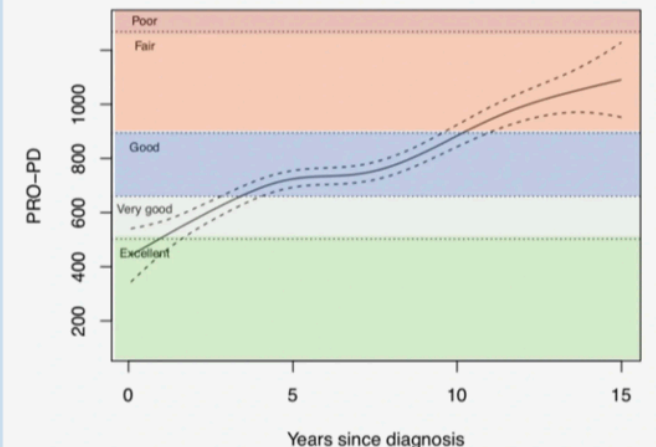
[10 YEAR SUMMARY REPORT](#)

Modifiable Variables in Parkinsonism (MVP) Study

Do Your Decisions Impact Rate of Progression?

[JOIN THE STUDY HERE](#)

Patient-Reported Parkinson's Disease Progression & Quality of Life



Parkinson is a Set of Symptoms

[that a LOT of people have]

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



dis·ease

/dəˈziːz/

noun

a disorder of structure or function in a human, animal, or plant, especially one that has a known cause and a distinctive group of symptoms, signs, or anatomical changes.

"bacterial meningitis is a rare disease"

Similar:

illness

sickness

ill health

infection

ailment

malady

disorder

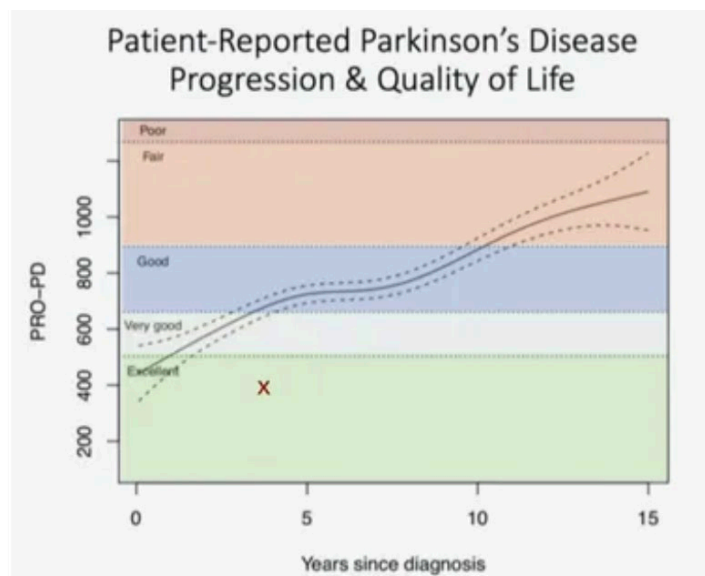


- a particular quality, habit, or disposition regarded as adversely affecting a person or group of people.
"departmental administration has often led to the dread disease of departmentalitis"

Parkin-Syndrome

Patient-Reported Outcomes in PD (PRO-PD)

“PRO-PD was found reliable and valid for monitoring symptoms in a representative sample of outpatients with PD.”



Observational Study > *Mov Disord.* 2023 Sep;38(9):1668–1678. doi: 10.1002/mds.29517.

Epub 2023 Jun 29.

Validation of the Swedish Patient-Reported Outcomes in Parkinson's Disease Scale in Outpatients

Daniel von Below^{1 2}, Susanna M Wallerstedt^{1 3}, Filip Bergquist^{1 2}

Affiliations + expand

PMID: 37382300 DOI: [10.1002/mds.29517](https://doi.org/10.1002/mds.29517)

Abstract

Background: Successful treatment of Parkinson's disease (PD) requires symptom monitoring. Patient-Reported Outcomes in Parkinson's Disease (PRO-PD) is a broad scale that covers 35 motor and nonmotor symptoms, but its validation is limited.

Objective: The aim was to validate PRO-PD in a random sample of outpatients with PD.

Methods: Of 2123 PD patients who visited outpatient clinics in West Sweden over a 12-month period, 25% were randomly selected and invited to participate in a longitudinal observational study. Included patients were assessed at baseline, 1 year, and 3 years, with a subset also assessed at 3 to 6 months. The assessments included PRO-PD, other patient-reported scales, and Clinical Impression of Severity Index for Parkinson's Disease (CISI-PD).

Results: The study included 286 PD patients. PRO-PD ratings were available from 716 (96%) of 747 study visits. All PRO-PD items exhibited positive skewness without ceiling effects. Internal consistency at baseline was excellent (Cronbach's α : 0.93). Six-month test-retest reliability was good (intraclass correlation coefficient: 0.87). Convergent validity was good, with correlation coefficients between total PRO-PD and the 8-Item Parkinson's Disease Questionnaire of 0.70, the Non-Motor Symptoms Questionnaire of 0.70, EuroQoL Five-Dimension Five-Level Scale of 0.71, and CISI-PD of 0.69. Median PRO-PD score at baseline was 995 (interquartile range: 613–1399), with a median yearly increase of 71 (interquartile range: –21 to 111). Items representing axial motor symptoms increased most over time. The minimal clinically important change in total score was 119.

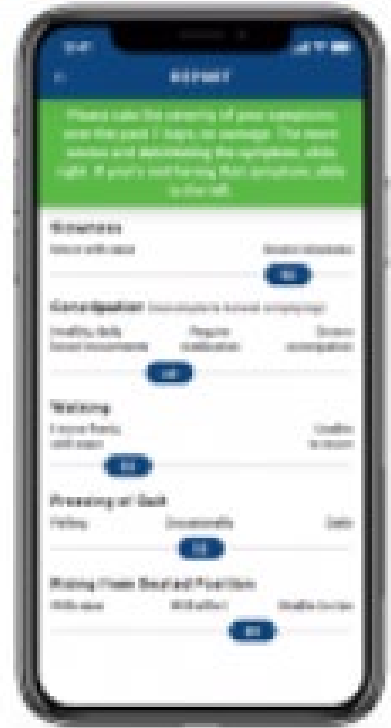
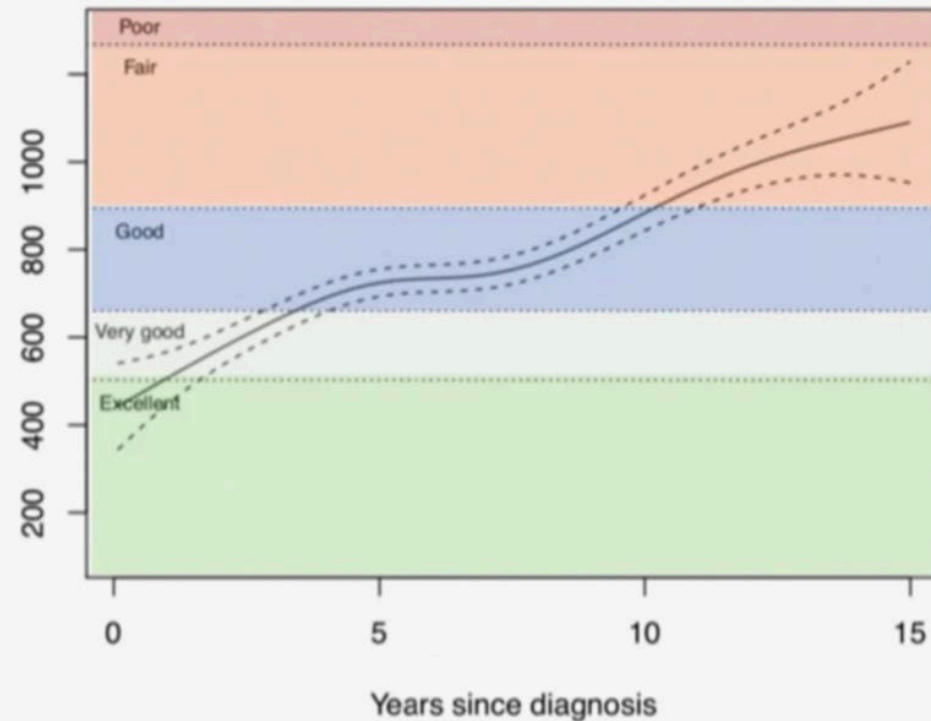
Conclusions: PRO-PD was found reliable and valid for monitoring symptoms in a representative sample of outpatients with PD. © 2023 The Authors. Movement Disorders published by Wiley Periodicals LLC on behalf of International Parkinson and Movement Disorder Society.

Universal Agreement

0= Everyone is Happy

Dyskinesia (rocking, writhing, twisting, squirming movements associated with medication.)	None Sometimes, mild Severe, debilitating
Tremor	None Slight & infrequently present Severe, debilitating
Balance	Sturdy, steady Occasional falls Lose balance spontaneously
Control of Body Temperature (symptoms may include cold hands and feet or sweating)	No problem Severe dysregulation
Dizzy on standing	None Severe
Visual Disturbance	None Severe
Insomnia (Inability to sleep)	Not a problem Severe problem
REM Sleep Behavior Disorder (acting out dreams)	None Vivid dreams, talking in sleep Yelling, kicking, interferes with sleep
Restless Leg Syndrome (urge to move legs in order to stop unpleasant sensations.)	None Severe

Patient-Reported Parkinson's Disease Progression & Quality of Life



FREE for iOS & Android



Parkinson Symptom Tracking

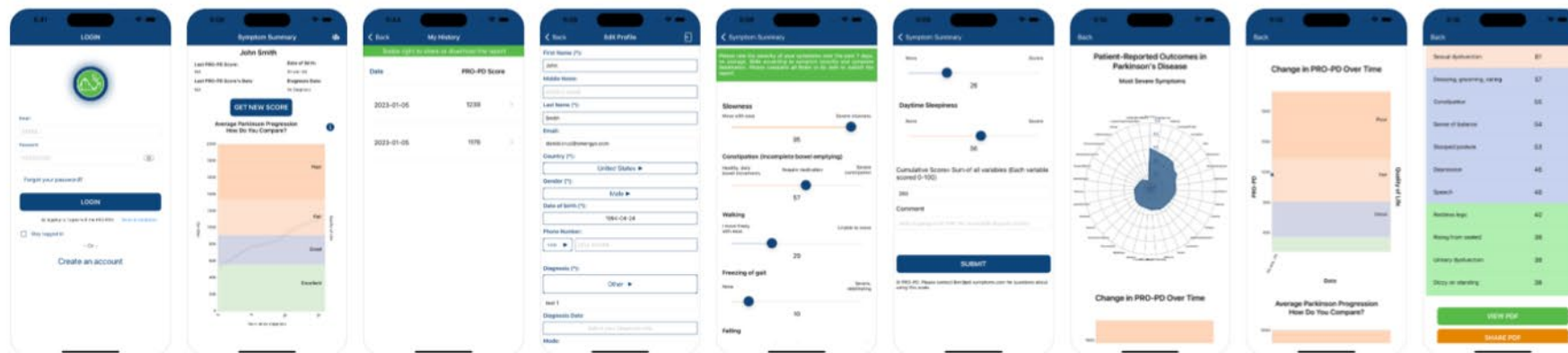
✓ iOS 1.9.8 Ready for Sale

Parkinson Symptom Tracking (PRO-PD App)

A Tool for Taking Control

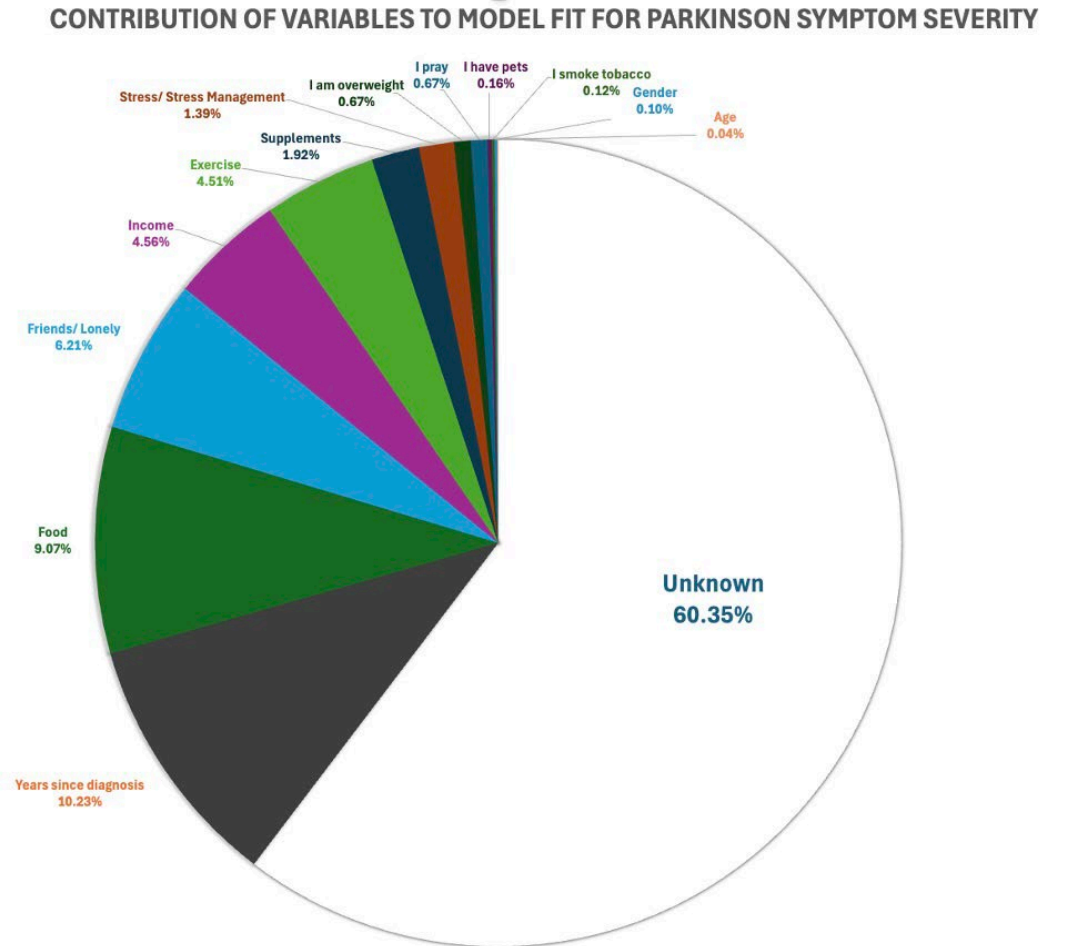
[FREE PRO-PD SCORE HERE](#)

- iPhone 6.7" Display (Optional)
- iPhone 6.5" Display (Required)
- iPhone 5.5" Display (Required)
- iPad Pro (6th Gen) 12.9" Display (Required)
- iPad Pro (2nd Gen) 12.9" Display (Required)

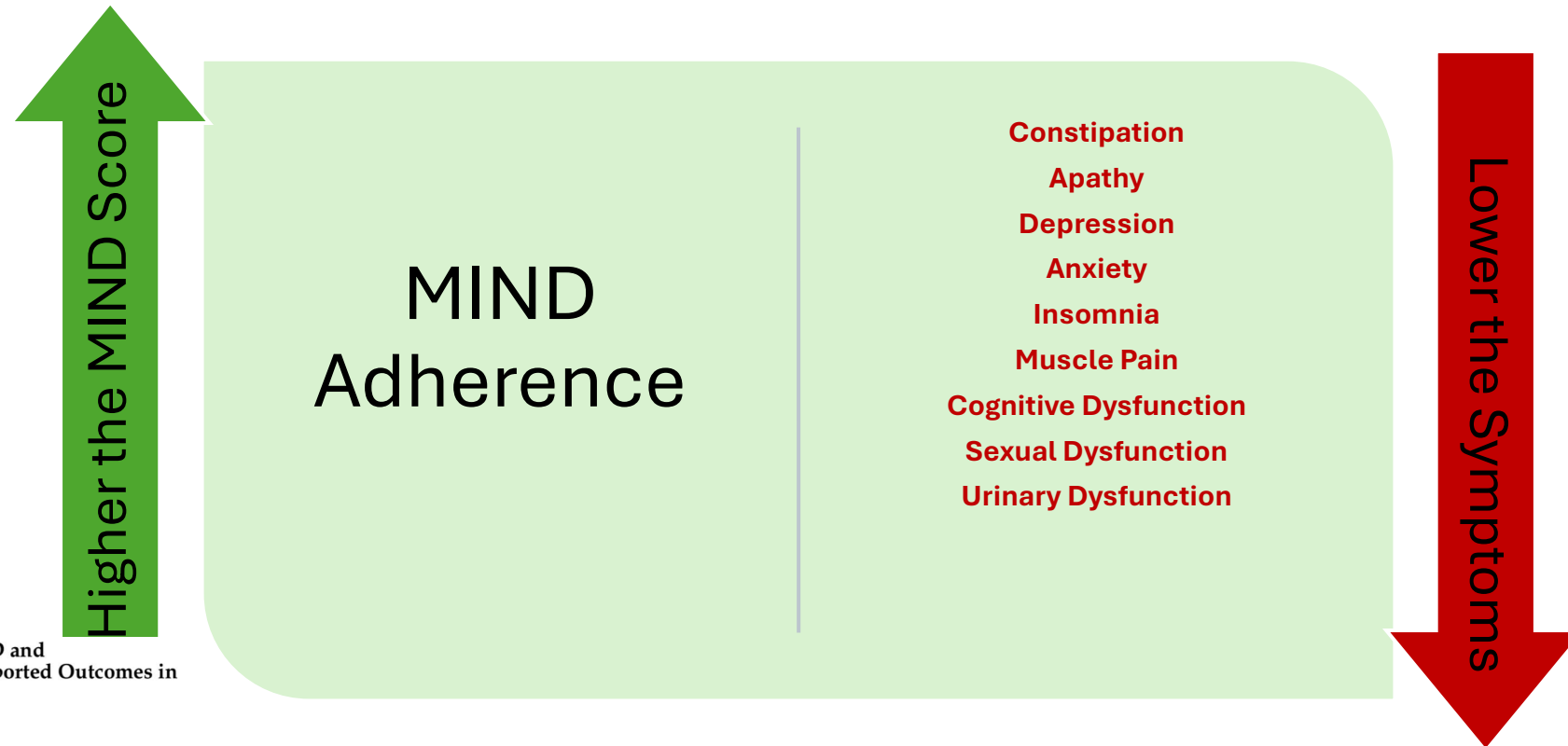


Predictive Modeling

- What do we know?
- How much does it matter?
- What might be in the UNKNOWN category?
 - Pollution, neurotoxicants
 - Genetics
 - HRV
 - Laboratory abnormalities



Symptoms Associated with MIND Adherence

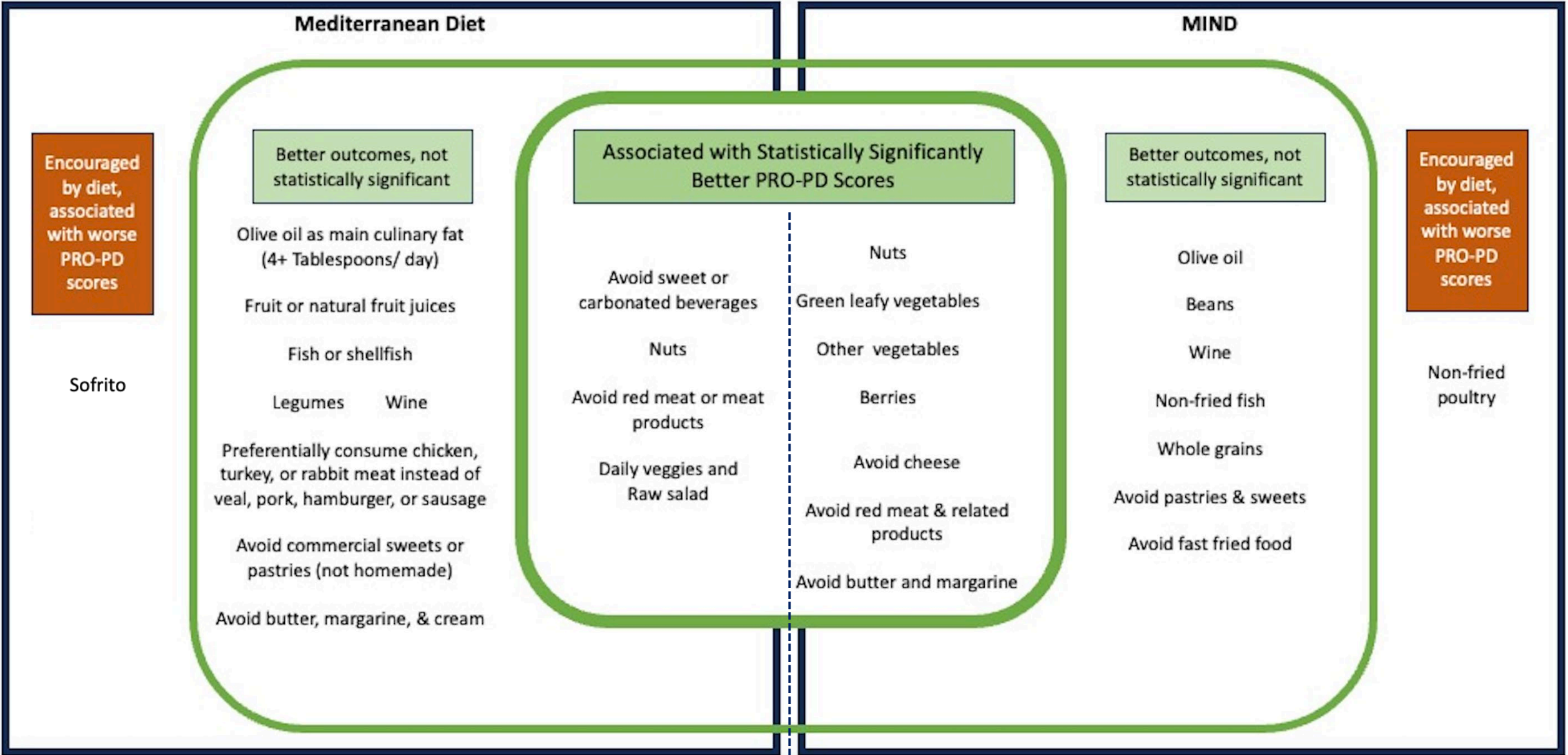


Comparison of Associations between MIND and Mediterranean Diet Scores with Patient-Reported Outcomes in Parkinson's Disease

Devon J. Fox¹, Sarah JaeHwa Park² and Laurie K. Mischley^{1,2,3,*}

Table 2. Non-motor symptom correlation with MEDI and MIND diet scores. Correlations were assessed via linear regressions adjusted for age, gender, income, and years since diagnosis with a Holm–Bonferroni post hoc adjustment.

Components of MIND & Mediterranean Diets Associated with Parkinson Outcomes



Using MVP Study Data

- The more people who enroll and share their data with us, the more nuance we will be able to discern. **Power in numbers.**
- These data adjusted for age, gender, income, and years since diagnosis
- Highlighted foods statistically significantly associated with:
 - **Red** - worse symptoms
 - **Green** - better symptoms

LK Mischley Jan 2025

	n	Baseline Only (2013-2022) impact (SE)	p-value	R^2
Herbs & Spices				
Spices-1/4 teaspoon	1789	-5.31 (4.43)	0.2	0.146
Fresh Herbs-1 tsp	1781	-11.1 (4.13)	0.007	0.147
Vegetables & Fruits				
Frozen Vegetables	1789	16.1 (4.56)	<0.001*	0.149
Frozen Fruit	1787	-3.53 (4.26)	0.4	0.145
Fresh Fruit	1785	-23.7 (6.38)	<0.001*	0.151
Fresh Vegetables	1787	-29.9 (6.06)	<0.001*	0.158
Nuts, Seeds, Beans				
Beans	1773	-10.8 (5.32)	0.04	0.146
Soy - 3 ounces	1778	-8.92 (5.41)	0.1	0.142
Nuts/Seeds-1/4 cup	1788	-25.6 (4.90)	<0.001*	0.156
Oils				
Fried foods-4 ounces	1774	34.7 (6.01)	<0.001	0.161
Plant-based oils	1776	5.43 (4.40)	0.2	0.145
Olive oil	1782	-9.5 (4.39)	0.03	0.149
Coconut oil	1769	-16.3 (3.91)	<0.001*	0.155
Grains				
Millet	14	70.1 (64.5)	0.3	0.119
White rice	200	18.8 (22.6)	0.4	0.162
Pasta-1 cup	1788	15.9 (6.24)	0.01	0.147
Bread-1 slice	1768	9.20 (4.52)	0.04	0.145
Oats	196	5.79 (16.2)	0.7	0.138
Oatmeal - 1 cup	1778	-2.77 (4.28)	0.5	0.142
Barley	1807	-2.64 (57.1)	0.9	0.179
Brown rice	732	-8.55 (20.1)	0.7	0.165
Quinoa	249	-18.7 (22.0)	0.4	0.196
Farro	74	-61.4 (54.5)	0.3	0.0118
Buckwheat	46	-76.5 (42.4)	0.08	0.268
Dairy				
Ice Cream-1/2 cup	1787	31.2 (4.76)	<0.001*	0.163
Butter-1 tsp	1781	19.5 (3.91)	<0.001*	0.156
Cheese-1/2 oz.	1787	17.3 (3.96)	<0.001*	0.152
Yogurt-3/4 cup	1457	14.8 (4.42)	<0.001*	0.141
Milk(cows)-1 cup	1785	12.6 (3.47)	<0.001*	0.148
Cream-1/4 cup	1781	8.82 (5.26)	0.09	0.145
Meat & Eggs				
Beef	1791	28.3 (5.31)	<0.001*	0.157
Chicken	1795	18.7 (5.47)	<0.001*	0.149
Pork	1786	18.0 (5.69)	0.002	0.152
Turkey	1274	2.71 (7.88)	0.7	0.121
Fish	1783	-26.5 (5.88)	<0.001*	0.153
Eggs	1788	-4.38 (4.99)	0.4	0.146
Alcohol				
Wine-6 oz	1786	-21.5 (3.87)	<0.001*	0.161
Red wine-6oz	217	-9.21 (11)	0.4	0.126
White wine-6oz	215	2.71 (14.49)	0.9	0.121
Beer-12 ounce	1779	-4.27 (5.4)	0.4	0.143
Liquor-1 oz	1772	5.35 (5.56)	0.3	0.143
Canned (1/2 cup)				
Canned Beans	68	53.9 (30.67)	0.08	0.228
Canned Fruit	1782	43.5 (6.18)	<0.001*	0.168
Canned Vegetables	1788	26.0 (4.95)	<0.001*	0.156
Canned food (general)	1780	14.0 (5.42)	<0.001	0.147
Canned Fish	67	-18.4 (29.4)	0.5	0.191
Beverages				
Diet soda - 12 ounces	1775	30.3 (4.79)	<0.001*	0.163
Non-diet soda - 12 ounces	1778	26.8 (6.11)	<0.001*	0.155
Plastic bottled drinks	1778	19.8 (3.82)	<0.001*	0.157
Juice - 8 oz.	1785	9.01 (4.06)	0.03	0.146
Coffee - 8 oz/1 oz espresso	1785	0.99 (3.54)	0.8	0.144
Black tea - 1 cup	1774	0.29 (3.98)	0.9	0.144
Green tea -1 cup	1778	-10.6 (3.99)	<0.001	0.146
Canned Coconut milk	68	-57.6 (43.9)	0.2	0.213

PRO Diet

Attempt at
turning this
into a diet
1.0

LK Mischley Jan 2025

	Baseline Only (2013-2022)			
	n	impact (SE)	p-value	R ²
Herbs & Spices				
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Nuts, Seeds, Beans				
Beans	1773	-10.8 (5.32)	0.04	0.146
Soy - 3 ounces	1778	-8.92 (5.41)	0.1	0.142
Nuts/Seeds-1/4 cup	1788	-25.6 (4.90)	<0.001*	0.156
Oils				
Fried foods-4 ounces	1774	34.7 (6.01)	<0.001	0.161
Plant-based oils	1776	5.43 (4.40)	0.2	0.145
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Canned Coconut milk	68	-57.6 (43.9)	0.2	0.213

PRO Diet Based on Patient-Reported Outcomes in Parkinson's

Points Based on Observational Data: Food Choices & Patient Reported Outcomes (PRO) in PD <i>From Clinical Epidemiology to Therapeutic Tool</i>				
	Serving size	Strength of the Association	Multiply by unit of consumption x 0: never x 1: <1/month x 2: 1/month x 3: 2-3/month x 4: 1/week x 5: 2-4x/week x 6: 5-6x/week x 7: 1x/day x 8: 2-4x/day x 9: 4-6x/day	
Avoid	Fruit from a can	½ cup	44	
	Fried food	4 ounces	34	
	Ice cream	1 scoop, ½ cup	31	
	Diet soda	12 oz., 1 can	30	
	Beef	4 oz., 1 medium patty	28	
	Soda, not diet	12 ounces, 1 can	27	
	Vegetables from a can	½ cup	26	
	Butter	1 teaspoon	20	
	Drink from plastic bottles		20	
	Chicken	4 ounces	19	
	Pork	4 oz., 1 medium patty	28	
	Cheese	1 slice, ½ oz., 1 Tablespoon	17	
	Frozen vegetables	½ cup	16	
	Pasta	1 cup	16	
Eat	Yogurt	¾ cup, 6 ounces	15	
	Milk, from mammals	1 cup	13	
	Bread	1 slice	9	
	Juice	8 ounces, 1 glass	9	
	Total insult points			+
	Fresh vegetables	½ cup	-30	
	Fish	4 ounces	-27	
	Nuts and seeds	¼ cup, 2 Tablespoon spread	-25	
	Fresh fruit	½ cup	-24	
	Fresh herbs	1 teaspoon	-11	
	Wine (red)	6 ounces, 1 glass	-22	
	Coconut oil	1 teaspoon	-16	
	Beans, legumes	½ cup	-11	
	Green tea	1 cup	-11	
	Olive oil	1 teaspoon	-10	
	Spices	¼ teaspoon	-10	
	© LK Mischley 20 Oct 2023, Model-1 Baseline data only			Total protective points
	© LK Mischley 20 Oct 2023, Model-1 Baseline data only Version 1			Total PRO Diet Points

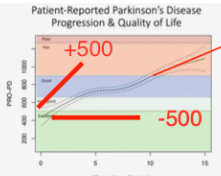
2 pieces of pizza
2x per month

*The average person
gains ~ 50 PRO-PD
points per year*

PRO Diet

Example:
2 slices of pizza
2x/ month

Based on Patient-Reported Outcomes in Parkinson's

Points Based on Observational Data: Food Choices & Patient Reported Outcomes (PRO) in PD From Clinical Epidemiology to Therapeutic Tool						
Patient-Reported Parkinson's Disease Progression & Quality of Life		Serving size	Strength of the Association	Multiply by unit of consumption		
				x 0: never x 1: <1/ month x 2: 1/month x 3: 2-3/month x 4: 1/ week x 5: 2-4x/week x 6: 5-6x/week x 7: 1x/day x 8: 2-4x/day x 9: 4-6x/day		
Avoid	Fruit from a can	½ cup	44	tomato sauce	x3=132	
	Fried food	4 ounces	34			
	Ice cream	1 scoop, ½ cup	31			
	Diet soda	12 oz, 1 can	30			
	Beef	4 oz, 1 medium patty	28			
	Soda, not diet	12 ounces, 1 can	27			
	Vegetables from a can	½ cup	26			
	Butter	1 teaspoon	20			
	Drink from plastic bottles		20			
	Chicken	4 ounces	19			
	Pork	4 oz, 1 medium patty	28			
	Cheese	1 slice, ½ oz, 1 Tablespoon	17	3Tbsp/slic @ 4/mo=12/mo/4=3wk	x5= 85	
	Frozen vegetables	½ cup	16			
	Pasta	1 cup	16			
	Yogurt	¾ cup, 6 ounces	15			
Milk, from mammals	1 cup	13				
Bread	1 slice	9	4 sl /mo=1/wk	x4= 36		
Juice	8 ounces, 1 glass	9				
Total insult points				+ 253		
Eat	Fresh vegetables	½ cup	-30			
	Fish	4 ounces	-27			
	Nuts and seeds	¼ cup, 2 Tablespoon spread	-25			
	Fresh fruit	½ cup	-24			
	Fresh herbs	1 teaspoon	-11			
	Wine (red)	6 ounces, 1 glass	-22			
	Coconut oil	1 teaspoon	-16			
	Beans, legumes	½ cup	-11			
	Green tea	1 cup	-11			
	Olive oil	1 teaspoon	-10			
	Spices	¼ teaspoon	-10			
	Total protective points				-	
© LK Mischley 20 Oct 2023 Model-1 Baseline data only						
© LK Mischley 20 Oct 2023 Model-1 Baseline data only Version 1						
Total PRO Diet Points						

A black and white cow is shown from the chest up, looking back over its right shoulder towards the camera. The cow has a white face with a black patch around its eye and a black ear. Its body is covered in black and white patches. The background is a clear, solid blue sky.

Dairy

What about goat milk?

What about sheep milk?

What about camel milk?

What if it's organic?

What if it's not pasteurized?

What about A2 milk?

What about my bones?!

Dairy & Parkinson's

- We have decades of data from multiple countries that clearly demonstrates dairy consumption in midlife is associated with increased risk of Parkinson's diagnosis later in life.
- People want to know, “**Does dairy consumption after diagnosis impact rate of progression?**”

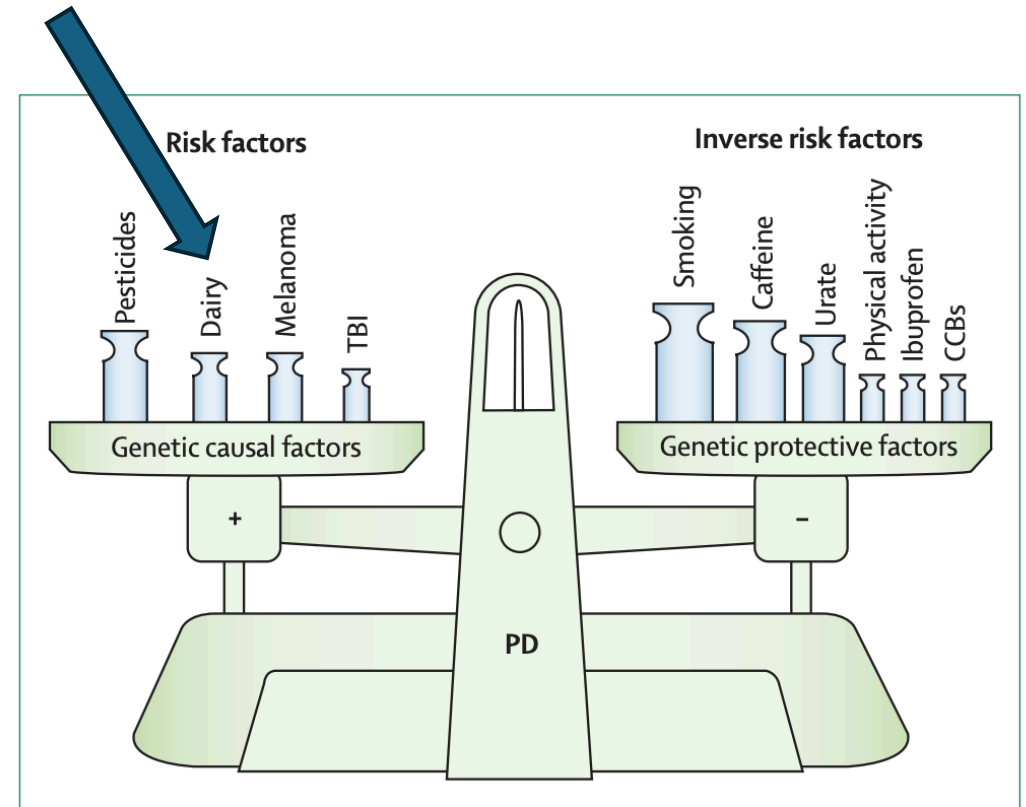
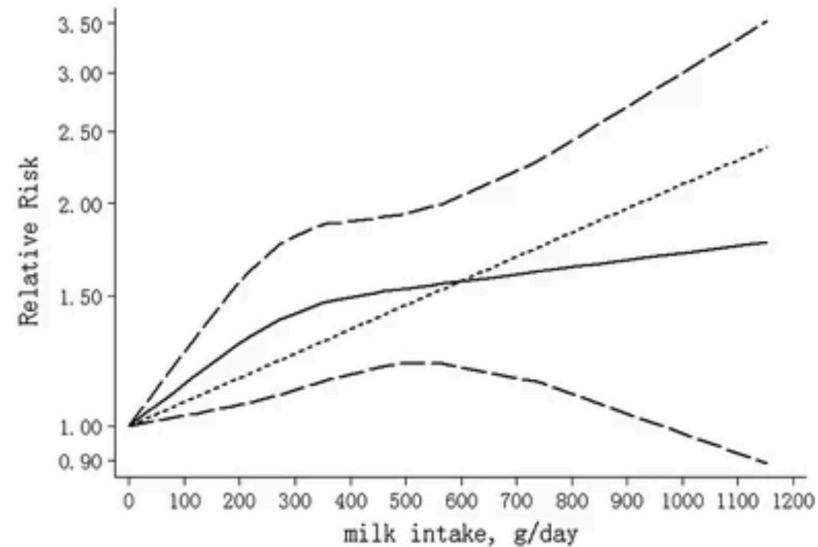


Figure 4: The balance of genetic and environmental factors that underlie Parkinson's disease occurrence

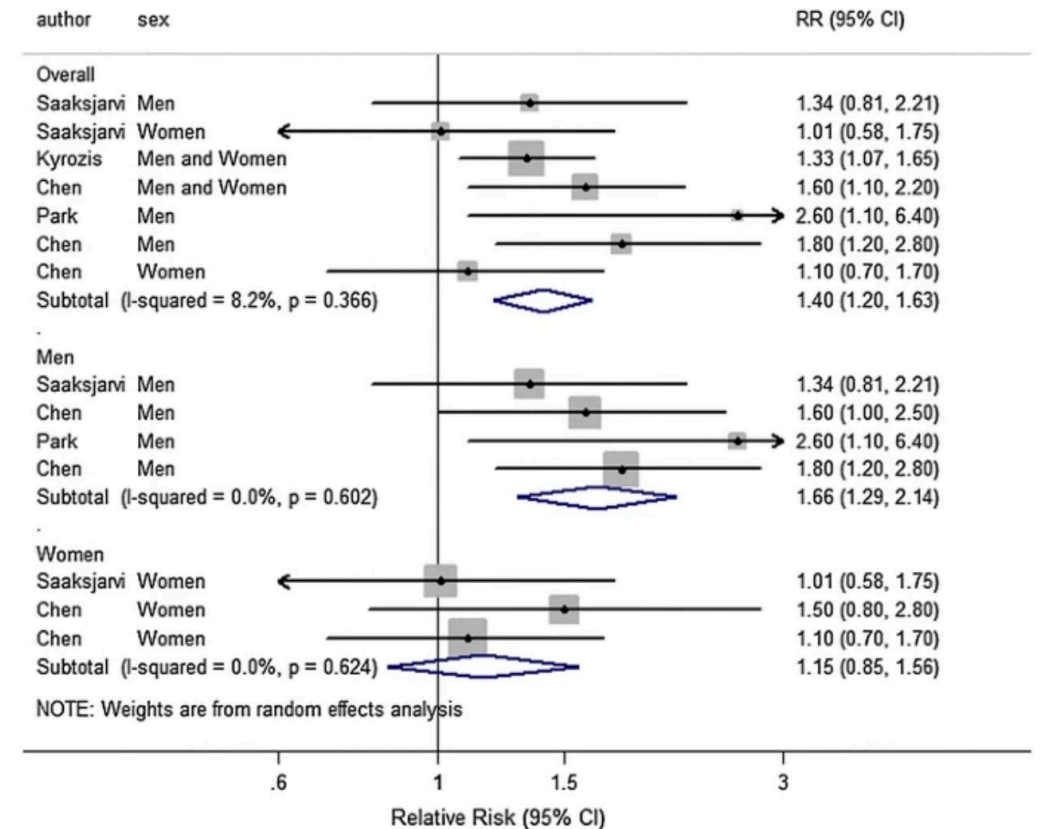
Larger weights have been used for those factors with stronger epidemiological evidence. We have included only factors supported by multiple prospective studies, but the presentation is not exhaustive and it is meant only for illustrative purposes. Factors included might or might not be causal. TBI=traumatic brain injury. PD=Parkinson's disease. CCBs=calcium channel blockers.

Dairy & Parkinson's



The dose-response analysis between milk intake and risk of PD. The *solid line* and the *long dash line* represent the estimated relative risk and its 95 % confidence interval. *Short dash line* represents the linear relationship

Fig. 1



The forest plot for dairy intake (highest vs. lowest category) and risk of Parkinson's disease. The size of gray box is positively proportional to the weight assigned to each study, which is inversely proportional to the standard error of the RR, and horizontal lines represent the 95 % confidence intervals. The results of margarine, butter and total milk and milk product were combined as the result for total dairy foods with a random effect model in the study by Saaksjarvi et al. [7]

Jiang, W., Ju, C., Jiang, H. et al. Dairy foods intake and risk of Parkinson's disease: a dose-response meta-analysis of prospective cohort studies. *Eur J Epidemiol* 29, 613–619 (2014).

Dairy & Parkinson's

- We have decades of data from multiple countries that clearly demonstrates dairy consumption in midlife is associated with increased risk of Parkinson's diagnosis later in life.
- People want to know, “**Does dairy consumption after diagnosis impact rate of progression?**”



	Baseline Only (2013-2022)				2022 Data Only			
	n	impact (SE)	p-value	R^2	n	impact (SE)	p-value	R^2
Dairy								
Ice Cream-1/2 cup	1787	31.2 (4.76)	<0.001*	0.163	709	38.1 (8.59)	<0.001*	0.240
Butter-1 tsp	1781	19.5 (3.91)	<0.001*	0.156	707	16.2 (6.80)	0.02	0.225
Cheese-1/2 oz.	1787	17.3 (3.96)	<0.001*	0.152	705	24.5 (7.48)	0.001	0.232
Yogurt-3/4 cup	1457	14.8 (4.42)	<0.001*	0.141	706	18.8 (6.22)	0.003	0.229
Milk(cows)-1 cup	1785	12.6 (3.47)	<0.001*	0.148	705	23.9 (6.46)	<0.001*	0.234
Cream-1/4 cup	1781	8.82 (5.26)	0.09	0.145	705	17.6 (10.3)	0.09	0.220

(Good) Dairy Free Options...



Toum – the Ultimate Garlic Sauce

1 large bulb garlic =60-70 grams peeled garlic cloves (a little more than ½ cup)

40 mL / 2.5 tablespoons fresh lemon juice

200 mL / 7 ounces Olive Oil

1 Teaspoon salt

1 Tablespoon cold water

Directions:

Place all ingredients into a 1 quart mason jar or the container for an immersion blender with the blender firmly on the bottom of the container and puree until smooth without lifting the blender.

It should be as thick as mayonnaise

Use like mayo, sour cream, on fish, veggies, as a dip, on grains, to add more flavor to soup...



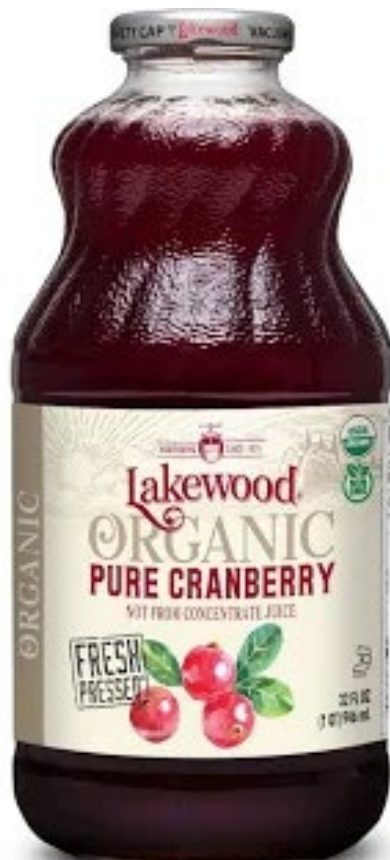
<https://bakinghermann.com/toum/>

Juice





Is It All Equally Bad?



SMOOTHIE MEALS

Start your day with the power of produce! A good smoothie is a quick and tasty way to pack a plentiful array of micronutrients, protein, fiber, and antioxidants into your diet. Smoothies are easy to digest and can even be prepared the night before (just stir or shake before serving). Smoothies are great “vegetable delivery agents” for kids and anyone suspicious of greens. Blend spinach, kale, or chard in a fruit smoothie and the taste is almost imperceptible! For a balanced smoothie that will satisfy your hunger, make sure you include 5 essential components: fruit (fresh or frozen), colorful vegetables, protein, fat, and a liquid base.

Pick and Choose Your Favorites from Each Column for a Perfect Smoothie Meal!

LIQUID +	FRUIT +	VEGETABLES +	PROTEIN +	HEALTHY FAT +	SUPPLEMENTS (optional)
• Almond milk • Coconut milk • Soy milk • Hemp milk • Oat milk • Flax milk • Cashew milk • Coconut water • Filtered water • Cold water herbal tea infusions • Fresh pressed fruit and vegetable juices • Kefir water or coconut kefir (fermented)	• Blueberries • Blackberries • Cherries • Raspberries • Cranberries • Marionberries • Huckleberries • Acai berries • Apples • Pears • Banana • Peaches • Plums • Apricots • Nectarines • Kiwis • Pineapple • Papaya • Pomegranate • Mango • Oranges	• Rainbow Chard • Kale • Arugula • Spinach (fresh or frozen) • Lettuce (romaine, red leaf, green leaf) • Cucumber • Pumpkin, Winter Squash, or Sweet Potato (cooked or raw) • Carrots • Beets (can shred to incorporate easier)	• Silken tofu • Nuts/seeds • Nut/seed butter • Protein powder (hemp, pea, soy etc.) • Cooked quinoa or oats • Kite Hill dairy Free Greek or <u>Sigis</u> Plant based protein yogurts (many dairy free yogurts are lower in protein)	• Nuts/seeds (walnuts, almonds, pecans, cashews, sunflower seeds, flax, chia, hemp, pumpkin seeds or sesame seeds etc.) • Nut/seed butter • Avocado • Coconut oil • Coconut butter • Flax, coconut or hemp oil	• Ginger, cinnamon, turmeric, mint or other herbs • Raw cacao or carob • Maca, goji berry or other “superfood” powders • Seaweed powder • Psyllium powder

Great Smoothie Combinations

Smoothies are easy to make without a recipe! Simply play with amounts to get the consistency and taste you like. **Start with 1 ½ C liquid + 1 C fruit + 2 C raw leafy greens or 1 C frozen greens or other veggies + ½ C protein + ¼ C nut butter or other fat.** If the taste of vegetables is too strong, cover up with more fruit or add a little natural sweetener like honey or maple syrup until you are used to the taste. Try these combinations (following page) or make up your own!



Image credit: freepik.com



Image credit: freepik.com

What if My Bread is Gluten-Free?

Grains			
Millet	14	70.1 (64.5)	0.3
White rice	200	18.8 (22.6)	0.4
Pasta-1 cup	1788	15.9 (6.24)	0.01
Bread-1 slice	1768	9.20 (4.52)	0.04
Oats	196	5.79 (16.2)	0.7
Oatmeal - 1 cup	1778	-2.77 (4.28)	0.5
Barley	1807	-2.64 (57.1)	0.9
Brown rice	732	-8.55 (20.1)	0.7
Quinoa	249	-18.7 (22.0)	0.4
Farro	74	-61.4 (54.5)	0.3
Buckwheat	46	-76.5 (42.4)	0.08

2025 Update: Univariate Analysis

- **TRUE/ FALSE** section

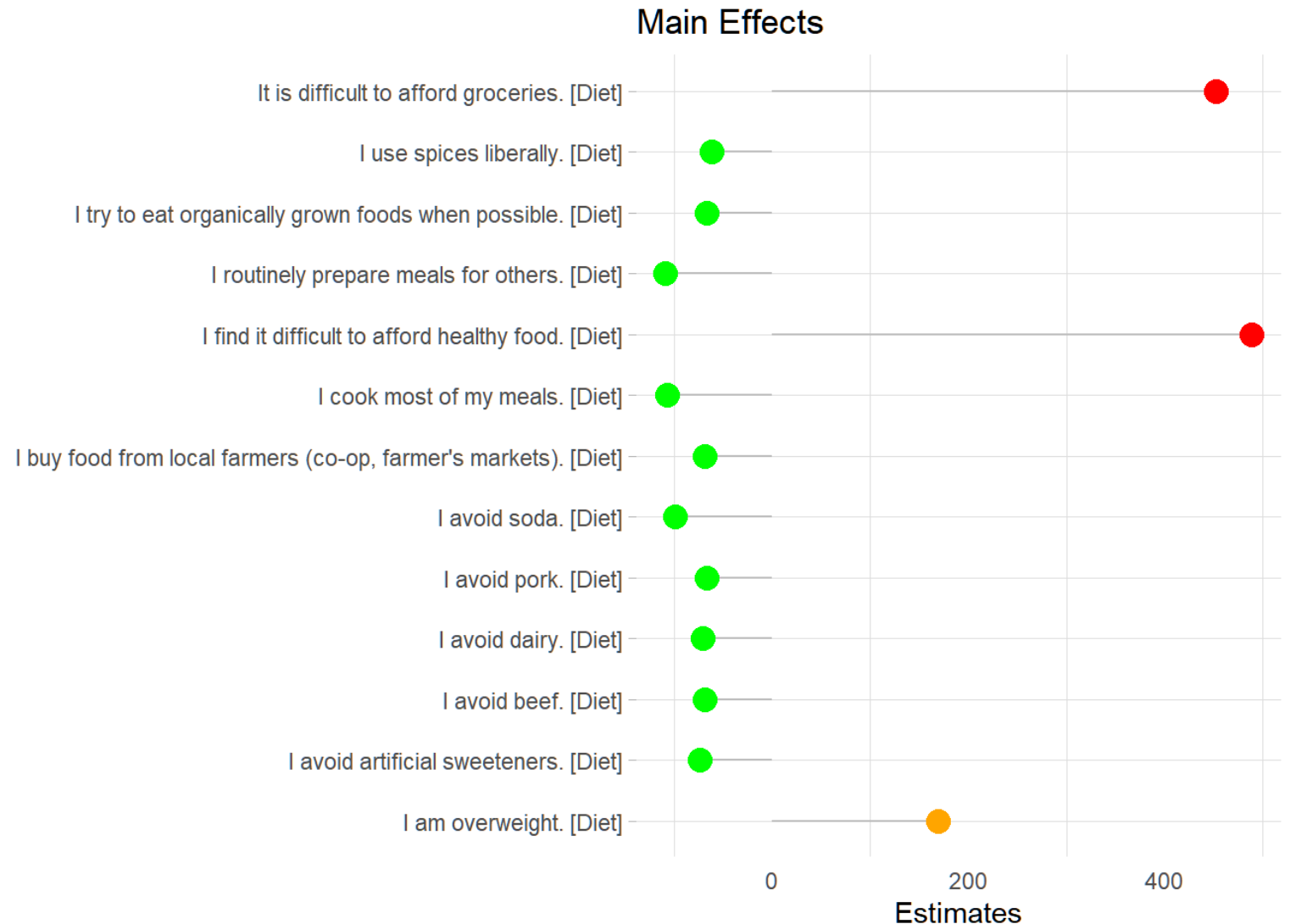
- People who say TRUE to these statements are doing:

- **Green** →

Statistically **Better** than average

- **Red** →

Statistically **Worse** than average





I am overweight

- We're not using a scale, we're just asking people.
- Is obesity a surrogate for other habits associated with poor health?
 - Lack of exercise
 - Poor diet
- Is adipose tissue so 'inflammatory' that it contributes to progression?
- Does obesity contribute to stress via stigma and discrimination?
- **Healthy weight should be a priority.**
 - There are a LOT of options available that weren't a couple years ago.
 - Noom, GLP-1 drugs, meal delivery programs, supervised ketogenic diets, etc.

Weight Gain “Toggle Switches” that make a difference

- Parkinson’s management
- Calorie density
- Physical activity
- Blood sugar
- Hormones
- Stress
- Sleep



Image credit: freepik.com

Weight Issues with Parkinson's

AKA: Eating the right amount for you

Hunger Cues

- High perception of hunger and low perception of fullness
- Affected by: blood sugar, dopamine balance, stress, poor sleep

Accessibility

- Keep foods available and easily accessible that you want to eat
- Assess your food environment

Portions and calorie density

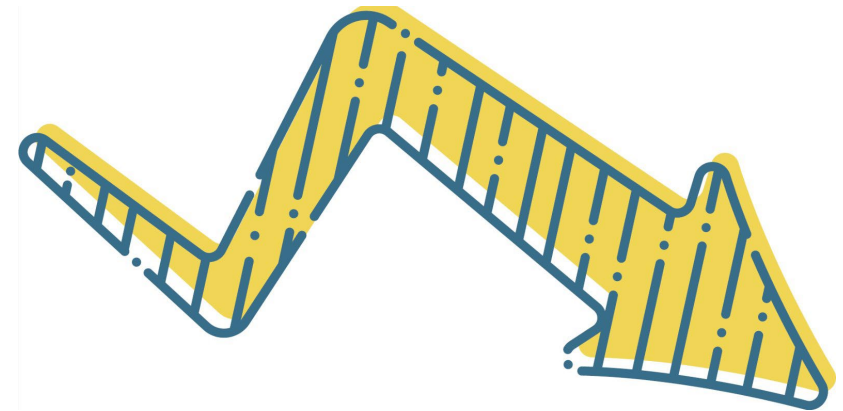
- Assess what it takes to feel satisfied – mindful eating
- Awareness of calorie dense foods

Hunger Tracking Diet Diary

[illegible]

Some Strategies to Decrease Calories

- Are you eating the right amount for you?
 - Are you eating regular meals to prevent getting too hungry?
 - Are you able to pay attention to hunger and satiety cues when you eat – eat slowly
 - Could you eat a 20% smaller portion?
- Can you increase your vegetables and fiber?
- Is your environment free of temptation – or are the foods you overeat harder to get to?
- Am I really hungry for a snack or am I soothing my feelings?
- Are my liquids free of calories
 - Iced tea with lemon, herbal tea, bubbly water...



Diet Patterns that have been studied in PD

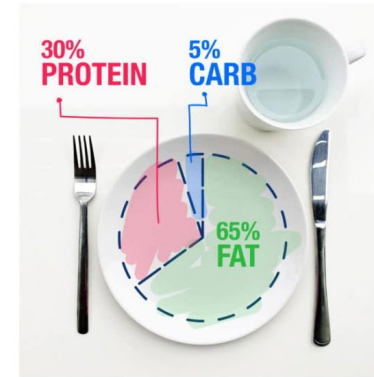
- **PRO Diet / MVP Study** – evolving, similar to the MIND diet but dairy free
- **Mediterranean** – many studies for many conditions including PD
- **MIND** – similar to Mediterranean Diet – more recommendation for seafood, greens and berries
- **Vegetarian / Vegan / Plant based diets**
- **Pescatarian** – vegetarian + fish
- ~ **Intermittent Fasting** – be careful if losing weight
- ~ **Ketogenic** – can be hard to follow and low in fiber

WHAT'S ON THE **MIND DIET?**

 AT LEAST THREE SERVINGS OF WHOLE GRAINS EACH DAY		
AT LEAST ONE DARK GREEN SALAD AND ONE OTHER VEGETABLE EACH DAY 	 BERRIES AT LEAST TWICE A WEEK	
 AT LEAST A ONE-OUNCE SERVING OF NUTS EACH DAY 		
 BEANS OR LEGUMES AT LEAST EVERY OTHER DAY	POULTRY AT LEAST TWICE A WEEK 	 FISH AT LEAST ONCE A WEEK
NO MORE THAN ONE TABLESPOON A DAY OF BUTTER OR MARGARINE; CHOOSE OLIVE OIL INSTEAD 	 CHEESE, FRIED FOOD AND FAST FOOD NO MORE THAN ONCE A WEEK	
PASTRIES AND SWEETS LESS THAN FIVE TIMES A WEEK 		

Ketogenic Diets

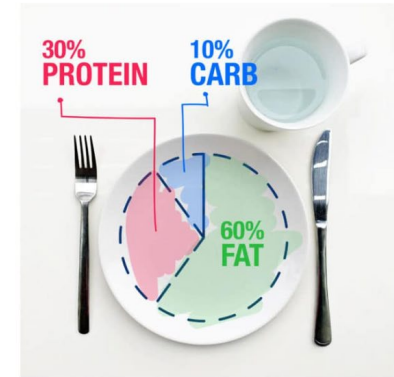
- There are multiple ways to follow a ketogenic diet
- It is a very high fat, low carbohydrate diet
- Some people report better motor symptom management although the results are stronger in animals than humans
 - may help stabilize mitochondria, preserve dopamine producing neurons (animal studies) and reduce oxidative damage in the brain
- Small studies (only 5 controlled trials so far) and no long term data, more animal than human data



MODIFIED ATKINS

Limits the amount of carbohydrate, encourages fat, and does not limit protein. Carbohydrates are to be accompanied by fat when consumed.

Macronutrient Ratio: 0.8:1

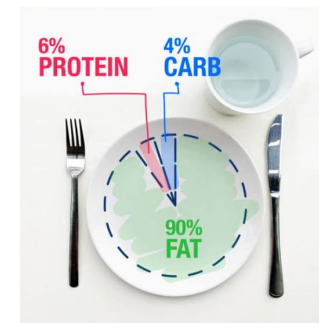


LOW GLYCEMIC INDEX

An individualized but less structured diet, it uses exchange lists for planning meal and emphasizes complex carbohydrates. It is not intended to promote ketosis.

Macronutrient Ratio: 2:3

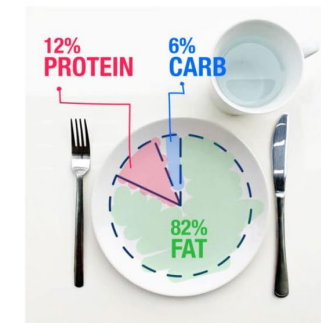
VARIATIONS OF THE DIET



CLASSIC KETO

An individualized and structured diet that provides specific meal plans. Foods are weighed and meals should be consumed in their entirety for best results.

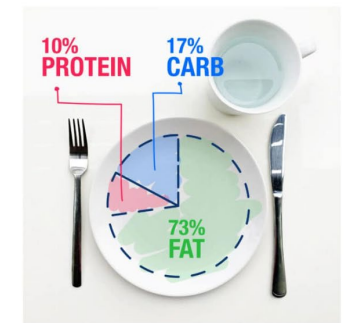
Macronutrient Ratio: 4:1



MODIFIED KETO

Modifying the restrictiveness of classic keto can be helpful when starting the diet, or when tapering down to a more sustainable, long term diet.

Macronutrient Ratio: 3:1 to 1:1 (range)



MCT

An individualized and structured diet containing highly ketogenic Medium Chain Triglycerides (MCT), allowing for more carb and protein than classic keto.

Macronutrient Ratio: 1.9:1

RESEARCH ARTICLE



Impact of a keto diet on symptoms of Parkinson's disease, biomarkers, depression, anxiety and quality of life: a longitudinal study

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24 week pilot trial
N= 7 participants
78% fat diet
75 grams protein
16 grams net carbs (5-10% of kcals)
11 grams fiber

ABSTRACT

Aim: Evidence suggests low-carbohydrate diets (LCHF) may assist in treating neurodegenerative diseases such as Parkinson's disease (PD); however, gaps exist in the literature.

Patients & methods: We conducted a small 24-week pilot study to investigate the effects of an LCHF diet on motor and nonmotor symptoms, health biomarkers, anxiety, and depression in seven people with PD. We also captured patient experiences during the process (quality of life [QoL]).

Results: Participants reported improved biomarkers, enhanced cognition, mood, motor and nonmotor symptoms, and reduced pain and anxiety. Participants felt improvements enhanced their QoL.

Conclusion: We conclude that an LCHF intervention is safe, feasible, and potentially effective in mitigating the symptoms of this disorder. However, more extensive randomized controlled studies are needed to create generalizable recommendations.

ARTICLE HISTORY

Received 22 December 2023

Accepted 29 April 2024

KEYWORDS

biomarkers of health;
CESD-R-20; ketogenic diet;
low-carbohydrate diet;
Parkinson's disease; PAS;
quality-of-life

Considerations on a Ketogenic Diet

- The Medi, MIND and PRO diets all show similar benefits and have more dietary variety, phytonutrients and fiber
 - Know your numbers – what is your blood glucose, fasting insulin and HOMA-IR
 - Prevent spiking your blood sugar
- Often leads to weight loss
 - Not good for those who are underweight or frail
- Can be hard to follow socially and practically, especially if dairy free
- Can increase constipation and risk of cardiovascular disease – check your cholesterol and triglycerides



Calculate Your HOMA-IR

- Ratio of your fasting insulin and fasting glucose
- Predicts your risk of insulin resistance
- Aim to be below 2 (below 1.5 is even better)

HOMA-IR (Homeostatic Model Assessment for Insulin Resistance)

Approximates insulin resistance.

When to Use ▾	Pearls/Pitfalls ▾	Why Use ▾
---------------	-------------------	-----------

Insulin	7.2	μIU/mL ↵
---------	----------------------------------	----------

Glucose	95	mg/dL ↵
---------	---------------------------------	---------

1.7

Several studies suggest a cut-off of >2 for any insulin resistance, but "normal" values appear to vary greatly by population.

Copy Results 📄

Next Steps >>>

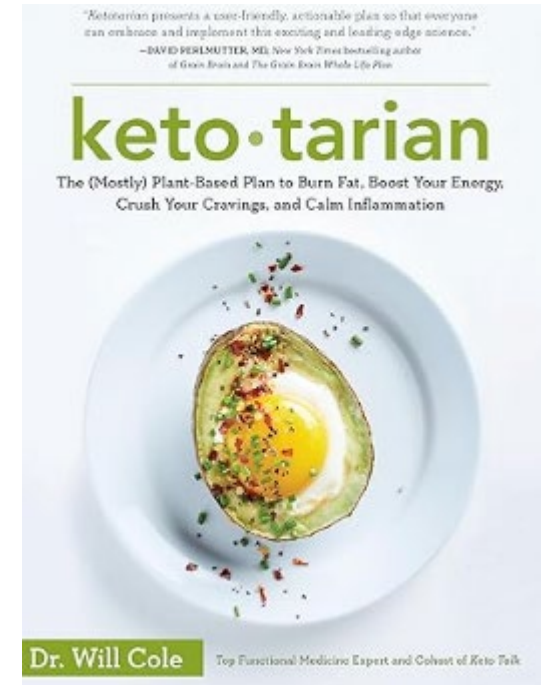
>> Next Steps

📄 Evidence

👤 Creator Insights

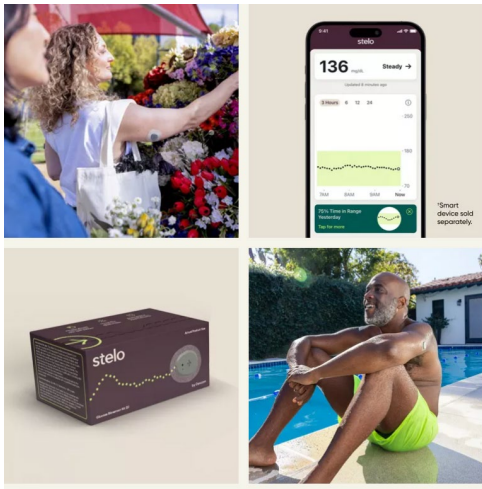
Resources for a Ketogenic Diet

- **See a dietitian**
- Avoid cream, cheese, bacon, excess animal fats
- Do eat nuts and seeds, lots of good olive oil, avocados, fish
- Recipes:
 - Diet Doctor: <https://www.dietdoctor.com>
 - Plant Based Keto: <https://greatist.com/eat/meal-planning-for-plant-based-keto#veggies-galore>
 - Vegan Keto: <https://nutriciously.com/vegan-keto-recipes/>
- Carb like products:
 - Keto breads, wraps, tortillas, muffins, crackers
 - Get adequate fiber! Fiber supplements will likely be necessary
- Most people use a keto shake – Metagenics and Garden of Life are good brands
- If you want to measure whether you are in ketosis there are meters that help with that: <https://www.dietdoctor.com/low-carb/keto/best-ketone-meter> Your reading for ketones - betahydroxybutyrate (BHB) - should be in the 2-4 range

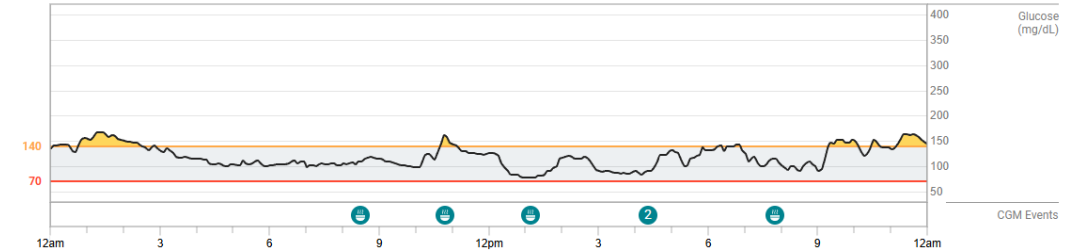


Continuous Glucose Monitoring

- Dexcom G7 (prescription)
- Stelo by Dexcom (no prescription needed – buy online stelo.com)
- Libre 3 (prescription)

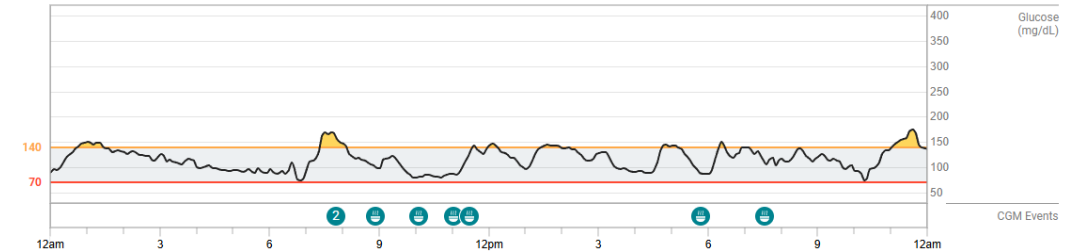


Wed, Jan 8, 2025



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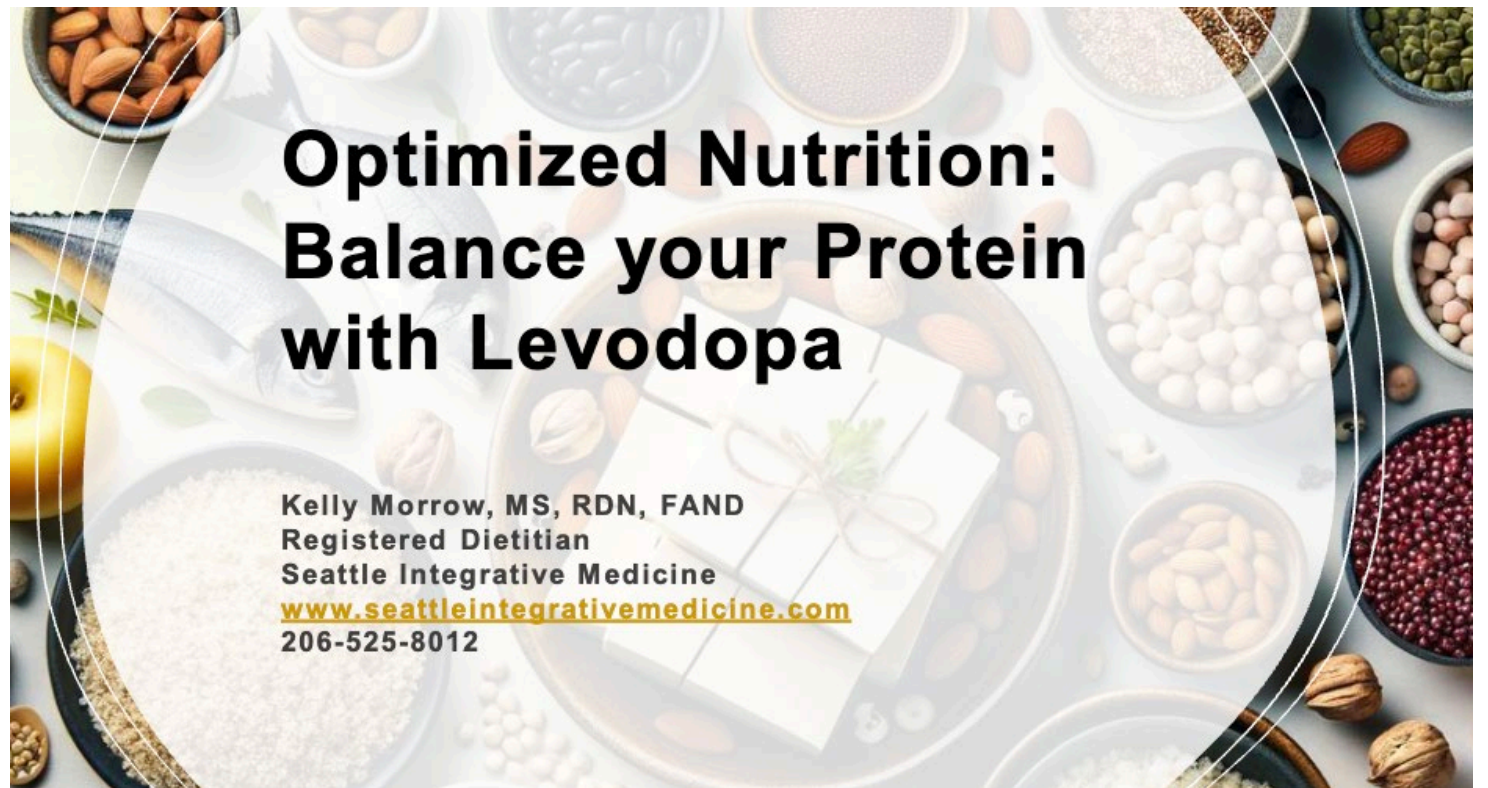
Tue, Jan 7, 2025



Protein

Kelly has a great class
posted in
Parkinson-School.com

- Meeting protein requirements
- Enabling meds to work reliably throughout day



Protein and Levodopa

- Dopamine is a neurotransmitter made from L-Dopa (amino acid/protein molecule)
- Dietary protein can inhibit the absorption of L-Dopa if taken at the same time
 - Dietary protein and L-dopa use the same absorption pathway into cells
- Most people taking levodopa do better when they restrict protein around the time they take their medication
- It is still important to meet protein needs daily

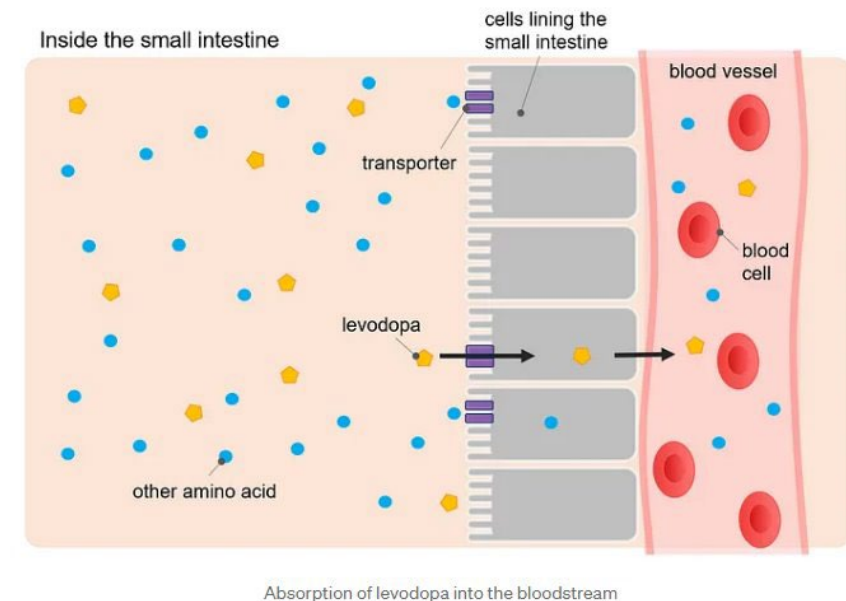


Image credit: <https://depositphotos.com/photos/clock.html>

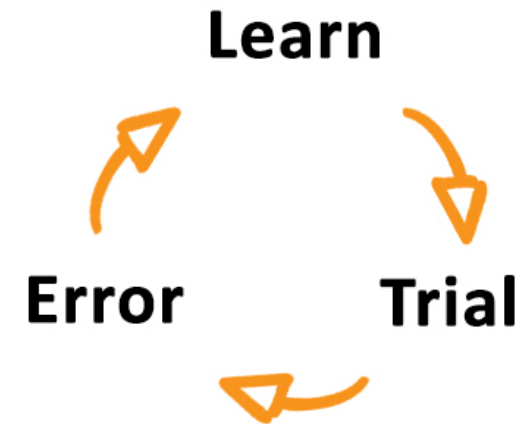


What do the studies say?

- **High protein eaten during the day causes more motor symptoms (off times, dyskinesias)**
- **Definition of a low protein diet varies significantly**
- **Protein restricted diets significantly reduce off times and lead to prolonged on periods**
 - In some people they can lead to dyskinesia
- **Evaluate for risk of malnutrition and weight loss with low protein diets esp in those who are underweight and frail**
 - Fluctuations in levodopa often greater in those with advanced disease

How Much Protein is Needed?

- Protein is essential! *How it is distributed during the day is important*
- To calculate your need: Usually, 0.8-1.2 grams protein per kilogram body weight per day (this can change based on several factors such as weight, age, state of health...)
- Everyone needs to find the amount of protein they tolerate at meals if taking levodopa
- Some people are very sensitive to all protein
- Some people find that plant proteins (beans, grains, nuts and seeds) are less problematic than animal proteins (meat and fish)
- **5-10 grams of protein per meal and snack during the day and 20 – 30 grams protein in the evening works for many people**



Evaluating Protein Concentration

- **Highest levels / most concentrated (more likely to cause a DNI with levodopa for many people)**
 - Beef, pork, poultry and fish, shellfish
 - Eggs
 - Tofu (esp firm and extra firm)
 - Milk, yogurt and cheese
 - Protein powders, bars and drinks
- **Less concentrated: (moderate risk of DNI)**
 - Legumes
 - Nuts and seeds and nut butters
 - Pseudograins like quinoa, teff and amaranth
- **Least concentrated (lower risk of DNI)**
 - Whole grains and starches
 - Vegetables
 - Fruit

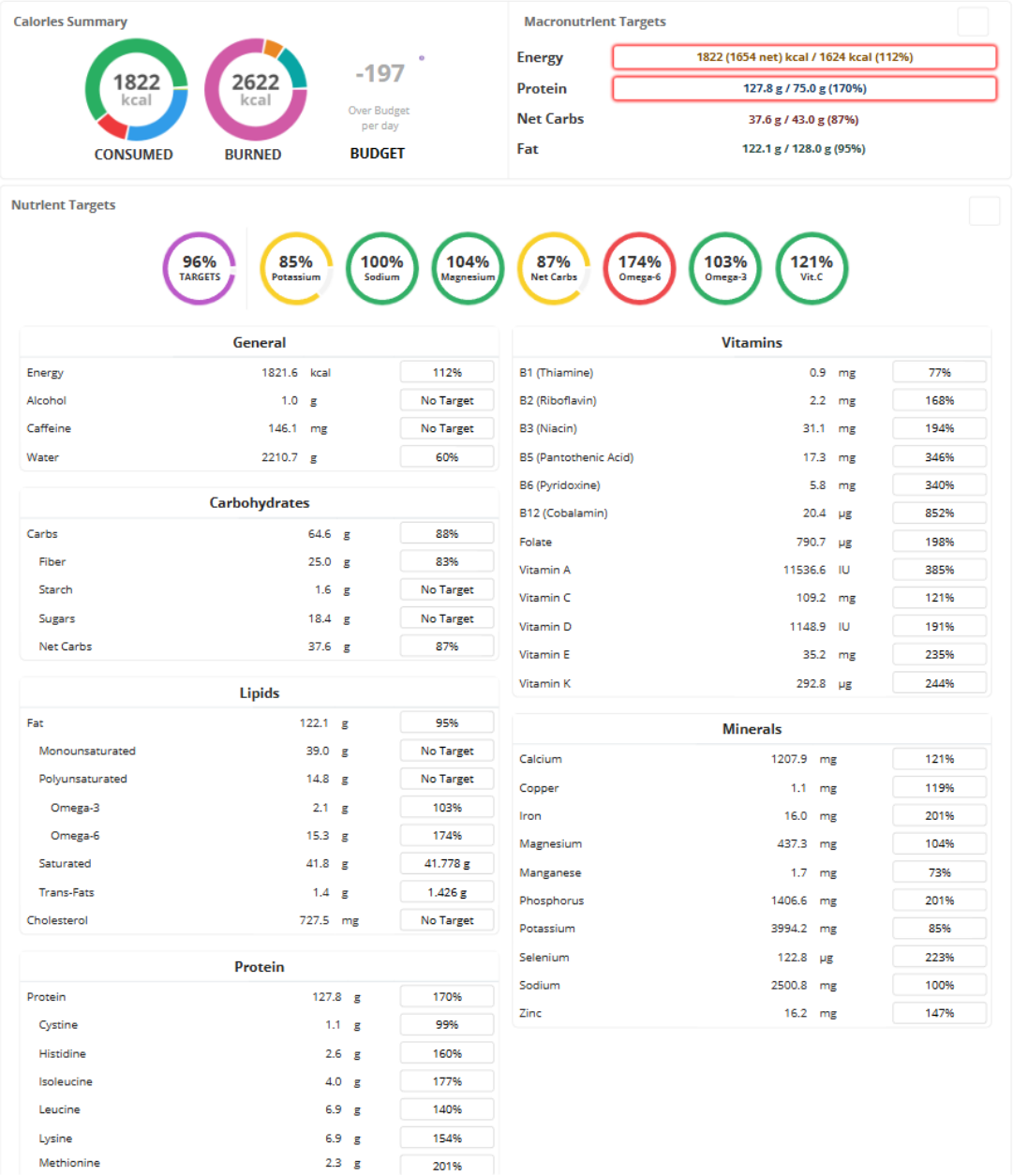
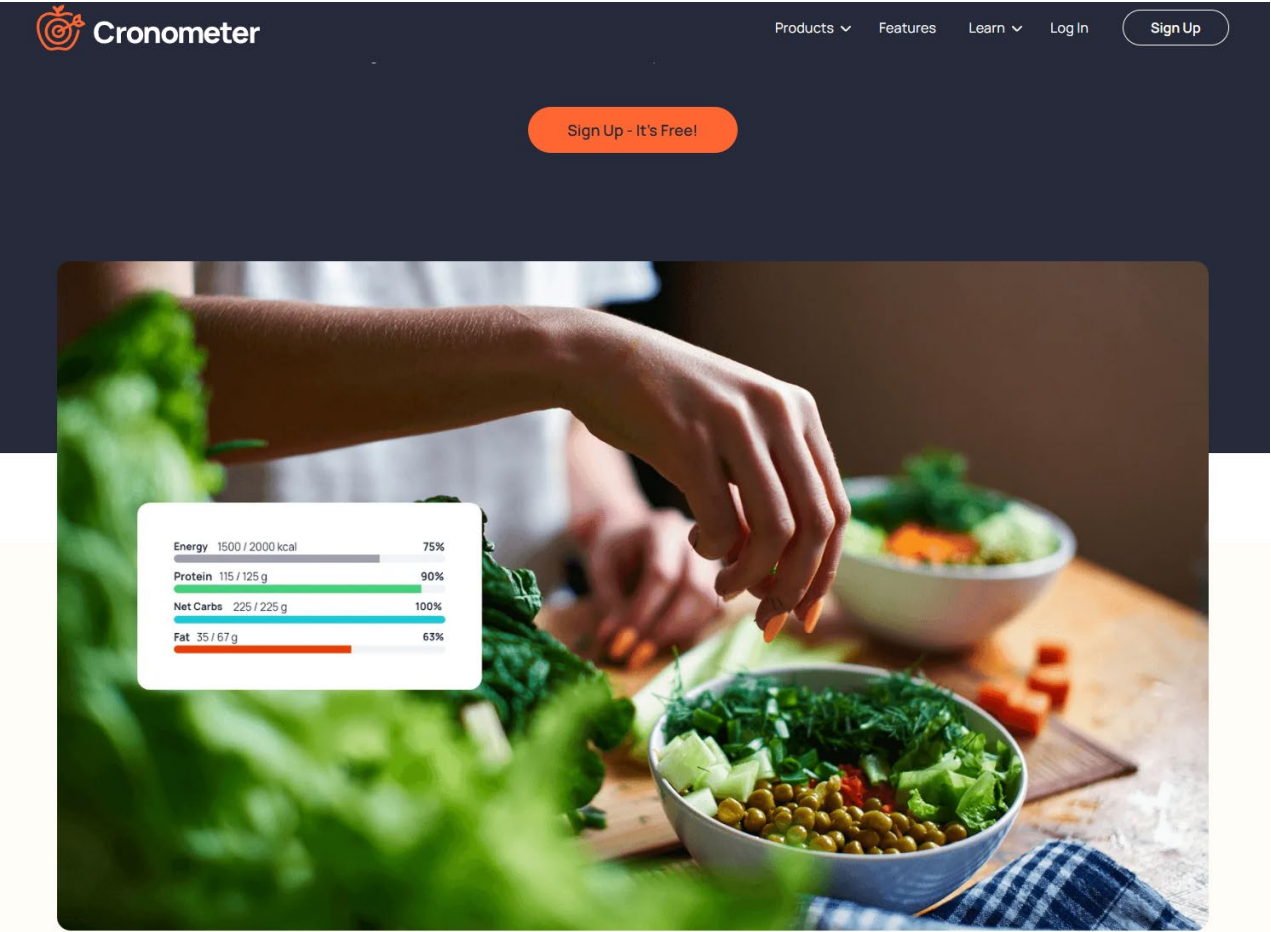


Image credit: Shutterstock.com

Measuring PRO Protein

- **What counts for 5 – 10 grams of protein?**
 - 1 egg = 7 grams
 - 1.5 ounce (size of 1/2 deck of cards) meat or fish = 10 grams
 - ½ cup cooked beans (legumes) = 8 grams
 - ¼ cup firm tofu = 10 grams
 - ½ cup silken (soft) tofu = 8 gram
 - 2 Tablespoons humus = 2.5 grams
 - ½ cup cooked quinoa, farro, wheat, sorghum or teff = 4 grams
 - 1 cup cooked brown rice or oatmeal = 5 grams
 - ¼ cup most nuts and seeds = 4 - 9 grams
 - 2 Tablespoons peanut or almond butter = 8 grams
 - 1 medium potato or sweet potato = 4 grams
 - 2 slices bread (including gluten free) = 4 - 6 grams
 - Vegetables 1 cup cooked = 2-3 grams
- **Look at food labels to confirm protein amount per serving**
 - Source: Food Data Central <https://fdc.nal.usda.gov/>

Diet Tracking – Cronometer.com



Start with the Stuff Everyone Agrees On

- Eat:
 - **Fresh vegetables, fruits, & herbs**
 - **Nuts, seeds, legumes**
 - **Fish (not-fried)**
 - **Olive** and coconut oil
 - **Spices**
- Avoid
 - **Beef, pork, chicken**
 - Dairy
 - **Fried food**, refined grains (bread, pasta)
 - Juice
 - Drinking from plastic bottles
 - Minimize canned foods

Similarities and Differences Between Popular Parkinson Diets				
	PRO	MIND	Medi	Keto
Vegetables		green leafy		
Nuts & Seeds				
Seafood, Fish				
Olive oil				
Fruit		berries		
Wine				
Legumes				
Coconut oil				
Green tea				
Fresh herbs				
Spices				
Buy organic				
Cook at home				
Whole Grains				
Egg				
Dairy			low-fat	high-fat
Poultry				
Canned fruit, Canned vegetables				
Chicken				
Drinking from plastic bottles				
Sweets & Pastries				
Pasta				
Refined Grains				
Pork				
Red meat				
Fried food				
Soda / Carbonated beverages				

There is Power in Numbers

- Please consider letting us document your journey

www.MVP-Study.com

- BIG DATA
- We are more powerful together
- By telling us every 6 months who you are, how you're doing, and what you're doing, we will be increasingly more able to tell you which of the choices generate the most bang-for-your-buck.

Modifiable Variables in Parkinsonism 10 Year Report Now Available

Whether or not you choose to participate, you should come by and see what we're up to!



mvp-study.com

Formerly known as Complementary and Alternative Medicine in Parkinson's Disease

HOME

WHAT IS MVP?

CONTACT US

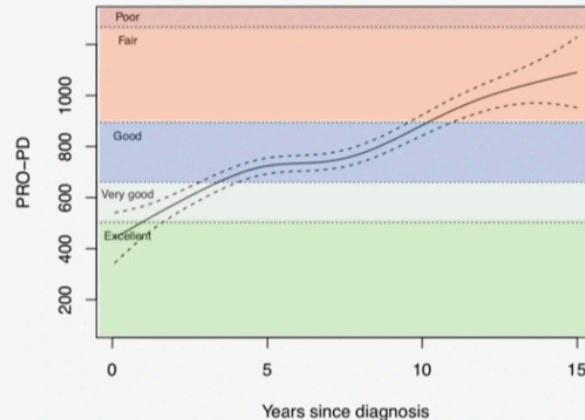
10 YEAR SUMMARY REPORT

Modifiable Variables in Parkinsonism (MVP) Study

Do Your Decisions
Impact Rate of
Progression?

JOIN THE STUDY HERE

Patient-Reported Parkinson's Disease
Progression & Quality of Life



Modifiable Variables in Parkinsonism (MVP) Study: Summary of Study Findings

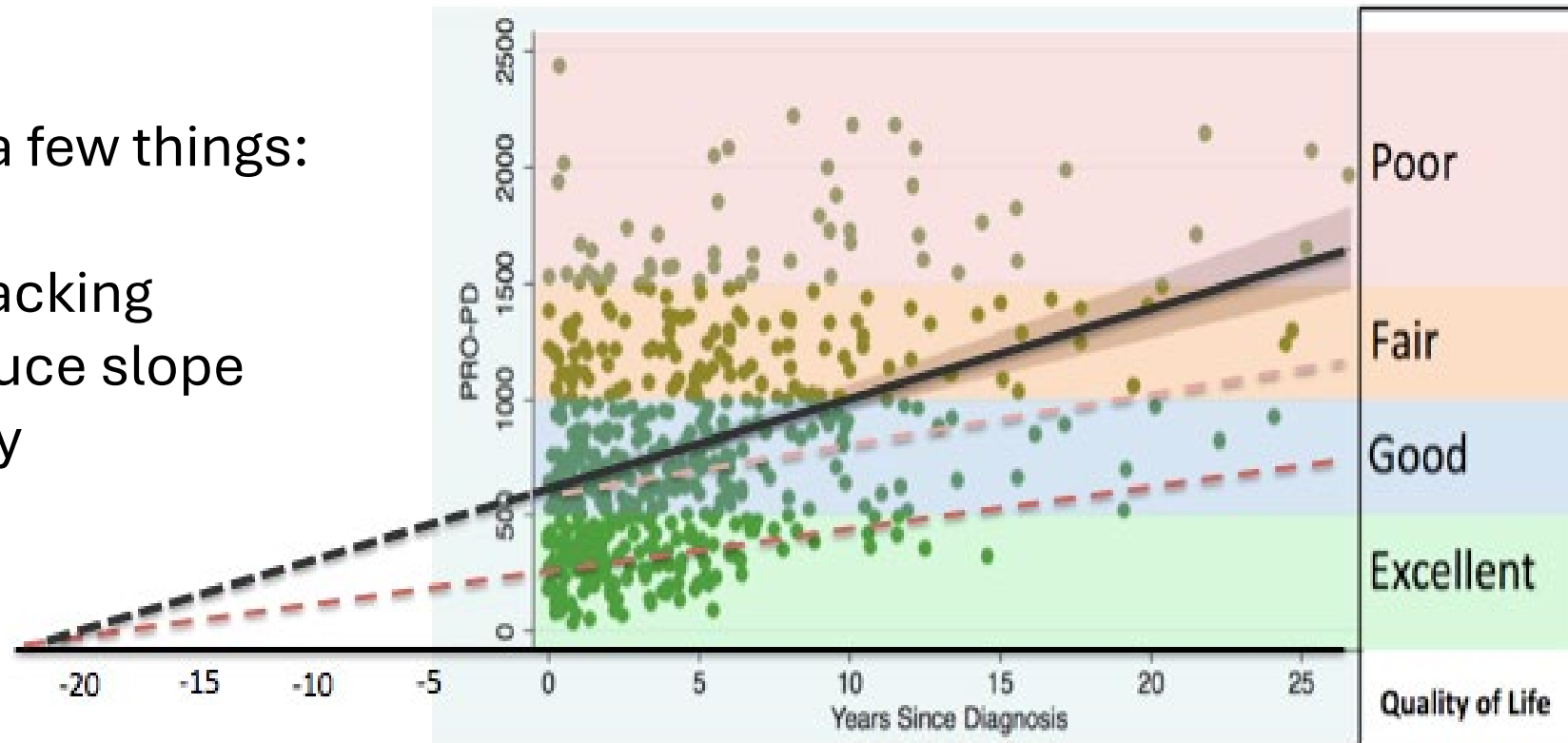
2013-2023

Principal Investigator (PI): Laurie Mischley, ND PhD MPH
BASTYR UNIVERSITY | 14500 JUANITA DR. NE, KENMORE WA USAS

Why Early Detection Matters

We only need a few things:

- Tool(s) for tracking
- A way to reduce slope
- Get to it early



The dotted lines represent a 50% reduction in *rate* of progression. (Easy!)



Parkinson School

Monthly Membership Includes Access to
All Live & Recorded Sessions

Parkinson School was created to be a scientifically-sound, comprehensive, integrative, affordable resource for helping patients and their support team navigate Parkinson's. Over 3000 students from 55 different countries are currently enrolled in Parkinson School. We invite you to watch recorded sessions, participate in live classes, teach us what you know, and learn from us what you can!

Program Contents

The Library covers the basics.
The seminars, discussions, chats, and community meet-ups are how we maintain momentum & dive deeper.



Parkinson School Library
The Basics



Dr. Laurie K Misch...



Seminar Series with Dr. Mischley
Creative Concepts and Conversations - The 28th of every month at 12pm PT



Dr. Laurie K Misch...



Dietary Implementation Ideas
Diet, Nutrition, and Eating with Kelly Morrow - 4th Monday of every month at...



Kelly Morrow, M...



Speaker Series
People with Parkinsonism Tell Their Story - 14th of every month



Dr. Laurie K Misch...



Partner Program
A supportive space for loved ones of PwP - 1st Monday of every month at 8am PT



Dr. Karin Duncan...



Men's Circle
Men in Parkinson's with Joshua Farahnik - 3rd Wednesday of every month at 12pm...



Dr. Joshua Farah...



2023 Simply Social - Every Tuesday 1 pm PT
Camaraderie is Key



Dr. Laurie K Misch...



How to Use the PRO-PD App



Dr. Laurie K Misch...

[View All Products](#)

Choose a Pricing Option

Both the Monthly and Annual membership options grant you access to the ENTIRE Parkinson's School Library AND the monthly live discussions that are hosted.

☒ **\$10/month**

Monthly Membership



PARKINSON'S SCHOOL

An Online Course for Patients and Providers

Choose a Pricing Option

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☒ **\$10/month**

Monthly Membership

[Enroll now](#)

www.Parkinson-School.com

Free 1-month Pass

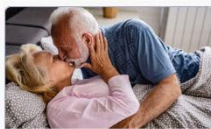
Coupon: APDA- NUTRITION



Partner Program
A supportive space for loved ones of PwP - 1st Monday of every month at 8am PT
Dr. Karin Duncan, ND



Interceptive Sensitivity and Parkinsonism
Exercising Our "6th Sense" Makes Sense (28 Dec 2023)
Dr. Laurie K Mischley, ND, PhD, MPH



Sexual Health and Parkinson's Disease
An Open and Honest Conversation About Sex, Pleasure, Intimacy and PD
Dr. Samantha Evans, ND



Healthy Convenience Foods
Kelly Morrow, MS, RDN, FAND



Meal Prep: Cook Once, Eat for Multiple Meals
Kelly Morrow, MS, RDN, FAND



Brain Food
Kelly Morrow, MS, RDN, FAND



Contributors to Parkinson Progression
Controlling the Environment As Much As We're Able
Dr. Laurie K Mischley, ND, PhD, MPH



Orientation
What Does Diagnosis Mean?
Dr. Laurie K Mischley, ND, PhD, MPH



Dopamine Repletion
Making Medications Last Longer & Work Better
Dr. Laurie K Mischley, ND, PhD, MPH



Environmental Threats to Brain Health
Awareness, Avoidance, & Elimination
Dr. Joshua Farahnik, ND



B12 Deficiency in Parkinsonism
Why EVERY Patient Should be Screened at Baseline
Dr. Laurie K Mischley, ND, PhD, MPH



Weight Loss in Parkinsonism
Nutritional Density, Enhancing Absorption, Measures of Malnutrition
Dr. Laurie K Mischley, ND, PhD, MPH



Add Spice to Your Life
Kelly Morrow, MS, RDN, FAND



Sugar, Sweets & Treats
How to be Healthy and Indulgent
Kelly Morrow, MS, RDN, FAND



One Pot Meals
Kelly Morrow, MS, RDN, FAND



How Do We Know What We Know?
Research Considerations in PD
Dr. Laurie K Mischley, ND, PhD, MPH



How to Eat
The Role of Food in Parkinson's
Dr. Laurie K Mischley, ND, PhD, MPH



What to Eat
Foods Associated With Better PD Outcomes Over Time
Dr. Laurie K Mischley, ND, PhD, MPH



Single, Dating, and Navigating Relationships
Considerations for People with Parkinsonism
Dr. Laurie K Mischley, ND, PhD, MPH



Bone Health in Parkinson's
Invited Guest Lecture: Dr. John Neustadt
Dr. Laurie K Mischley, ND, PhD, MPH



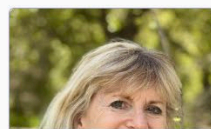
Hair Element Analysis in Parkinsonism
Alkaline Metal Depletion (Lithium, Potassium, Sodium, Rubidium), Cobalt, Manganese, and other Essential...
Dr. Laurie K Mischley, ND, PhD, MPH



Diet and Parkinson Progression
2023 Update - Summary of 10 Year of Data from the MVP Study
Dr. Laurie K Mischley, ND, PhD, MPH



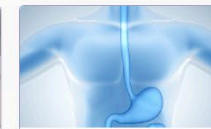
2023 Simply Social - Every Tuesday 1 pm PT
Camandarie is Key
Dr. Laurie K Mischley, ND, PhD, MPH



Sharon K
How I turned my life around after my Parkinson's diagnosis
Dr. Laurie K Mischley, ND, PhD, MPH



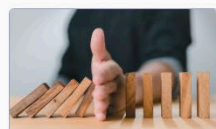
What Labs to Order
Metabolic Evaluation of Parkinsonism
Dr. Laurie K Mischley, ND, PhD, MPH



Intestinal Health
Parkinson's and the Gut
Dr. Laurie K Mischley, ND, PhD, MPH



Supplements & Nutraceuticals
Unique Nutritional Requirements for People with Parkinsonism
Dr. Laurie K Mischley, ND, PhD, MPH



Risk Assessment & Prevention
Don't Wait Until It's Too Late
Dr. Laurie K Mischley, ND, PhD, MPH



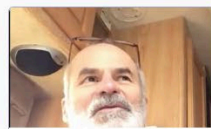
Upcoming Events
Register for Ongoing Discussion Groups
Dr. Laurie K Mischley, ND, PhD, MPH



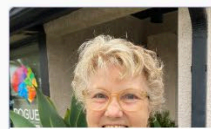
Jackie
Defining Strength in My New Normal
Dr. Laurie K Mischley, ND, PhD, MPH



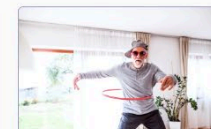
Brian
Risky Business: How to measure risk, how to live with risk and how to reduce risk
Dr. Laurie K Mischley, ND, PhD, MPH



Rick N
A Deep Dive into People's Learned Lessons & Current Perspectives
Dr. Laurie K Mischley, ND, PhD, MPH



Teri J
I got better and you can, too!
Dr. Laurie K Mischley, ND, PhD, MPH



Exercise in PD
How Often and What Kind?
Dr. Farley, Dr. Coomer, Dr. McLean and Russ Parker



Yoga, Tai Chi & Meditation
Why Yoga, Meditation and Tai Chi Work in PD
Dr. Laurie K Mischley, ND, PhD, MPH



What About Weed?
Marijuana as Medicine
Dr. Sexton and Tracy Buttender



Healthy Holidays
Kelly Morrow, MS, RDN, FAND



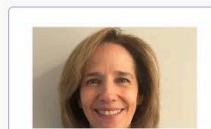
Spice Up Your Life
Dietary Implementation Ideas with Kelly Morrow
Kelly Morrow, MS, RDN, FAND



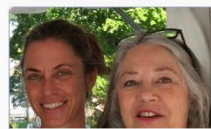
Cooking on a Budget
Kelly Morrow, MS, RDN, FAND



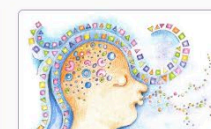
Katie R
Lean In
Dr. Laurie K Mischley, ND, PhD, MPH



Sharon B
Wounded Healer
Dr. Laurie K Mischley, ND, PhD, MPH



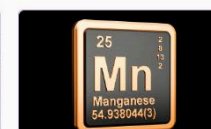
Chante and Suzanne
Mother Daughter in PD
Dr. Laurie K Mischley, ND, PhD, MPH



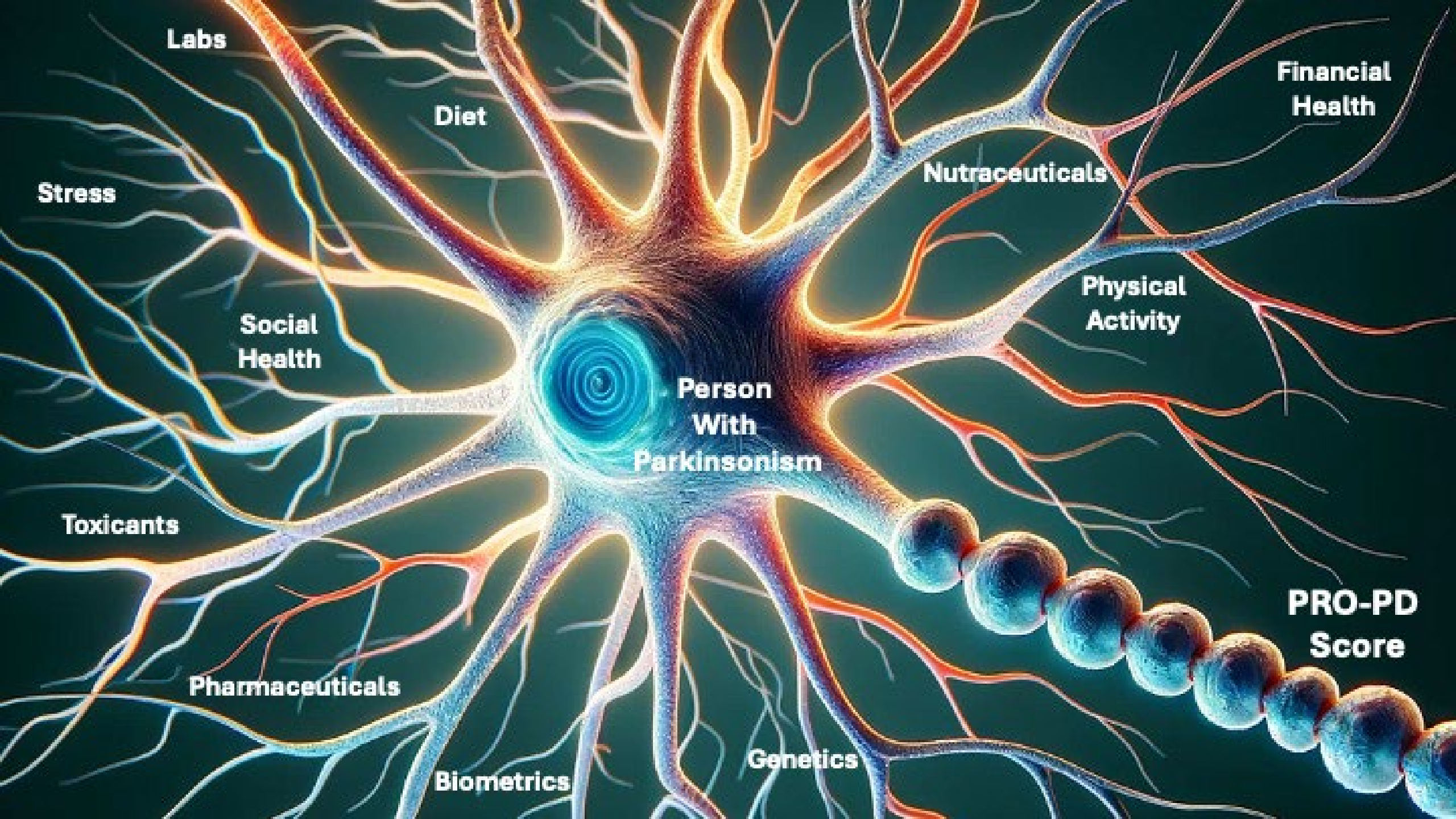
Conditionally Essential Nutrients in PD
Because of Your Diagnosis, You Need More
Dr. Laurie K Mischley, ND, PhD, MPH



Friends & Family
Social Health in PD
Dr. Laurie K Mischley, ND, PhD, MPH



Environmental Medicine & Parkinson's Disease
Toxicology & Environmental Medicine in Parkinson's
Dr. Bjerke, Dr. Riegler, Dr. Holder, Dr. Mischley



Action Steps

- Download PRO-PD App & start tracking outcomes
- Enroll in free month of Parkinson-School.com
 - Coupon: APDA-NUTRITION
 - Watch Nutrition Classes, Join Discussions
 - 1-on-1 help, if wanted or needed
- Make your own list:



Things that need to improve	Strategies & Solutions
French fries have become a habit	Avoiding burger joints, eat elsewhere
Potato chips during football games	Veggie trays, get creative with healthier nachos
Too much dairy	Butter -> Olive oil, Cheese -> Aioli,
More green leafy veggies	Swimming rama, ball jar salads, kale in soup, ...

Strategies for Following the PRO Diet

- Set realistic goals
- Small steady steps / consistent
- 5,4,3,2,1 – Go and 1 minute rule
- Seek help if you need it
- Data collection can be helpful
 - Cronometer.com (diet tracking)
 - Oura ring / Fitness watch/band
 - Continuous glucose monitoring



Image credit: shutterstock.com