PD ExpertBriefing:

Nutrition and Parkinson’s Disease

Presented by:
Christy C. Tangney, Ph.D., C.N.S, F.A.C.N.
Rush University Medical Center

Will begin:
Wednesday, February 23, 2010
at 1:00 PM ET
Welcoming Remarks

Robin Elliott
Executive Director
Parkinson’s Disease Foundation
Nutrition and Parkinson’s Disease

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Christy C. Tangney, Ph.D., C.N.S., F.A.C.N.
Rush University Medical Center
Managing Nutritional Biggies

• Maintaining a healthy weight
  ➢ Nutrition
  ➢ Exercise
• Constipation
• Focus on fluids
• Maintain bone strength
• Difficulties with eating/practical aides
Managing Nutritional Biggies

• Chewing/swallowing problems
• Stress/depression
• Protein and levodopa
Body Weight Changes with PD

PD ONSET

Clinical DX

Food Intake ↓

Food Intake

Food Intake ↓

Difficulty eating and walking

What you put In and what you put Out

Time (Years)

Parkinson's Disease Foundation
Weight

DROP
- Difficulty eating
- Difficulty swallowing
- Nausea

GAIN
- Less active, because less secure balance
- Less active, harder to start movement

What you put In ↔ what you put Out
Aim for A Healthy Weight

• BMI between 18 to 25

http://www.nhlbisupport.com/bmi

• Calculate your BMI

\[
\text{BMI} = \frac{\text{weight in pounds} \times 703}{\text{height in inches}^2}
\]

\[
= \frac{135 \times 703}{69 \times 69}
\]

\[
= 19.9
\]
What You Put Out: Physical Activity

• Where do you fit in?

*In steps/day*

• Very inactive ..........2500
• Inactive.............2501-5000
• Moderately Active...5001-7500
• Active................7501-10,000
• Very Active............10,000+
Constipation: The Most Common Symptom Complaint

Physical activity

Fluids/water

Fiber-rich foods
Water

- 6 glasses per day or at least 1500 mL or 1.5 L/day (2.7-3.7L/day:AI)
- Sources of water include beverages, food and drinking water
  - 35-54% from drinking water
  - 49-63% from other beverages
  - 19-25% from foods (fruits, vegetables, etc)
Constipation

Not to be ignored: Megacolon or bowel perforation!!
Dry Mouth

- Drink more fluids
- Frequent sips of water
  - Also aids in swallowing
- Sucking on ice chips
- Using mouth spray or oral rinse
# TIPS

#1: Use cups with a lid and spout (such as travel mug) to help stop spillages

#2: Weighted cups can help prevent tremor while drinking
Inadequate Water

- Impaired mental function
- Impaired motor control (bowel)
- Under stress reduced cardiac output
- Increased core temperature with exercise
- Increased heart rate
- Fainting
Fiber-Rich Foods

• Why?
• Filling yet low in calories
• Contribute to healthier bowel function; enhanced motility
• Additional benefits for chronic disease prevention

Recommended Intakes 25-35g/day
Fiber-Rich Foods: What does this mean?

• Meals/snacks made with whole grains, such as
  ➢ millet
  ➢ quinoa
  ➢ whole-wheat bread
  ➢ rye bread
  ➢ oatmeal

• Legumes, such as lentils and other beans
  ➢ Humus, bean dips
  ➢ Chili, lentil or black Bean soups

• Fruits and vegetables

• Nuts

• Special Foods: Fiberful, Metamucil, Fibercon
Whole Fiber-Rich Grains

= Seeds with 3 main parts:

• Bran
  ➢ Fiber, B-vitamins, trace minerals, phytochemicals

• Endosperm
  ➢ Starchy inner portion low in vitamins and minerals; **most refined grains made up of only this portion**

• Germ
  ➢ Vitamin E, trace minerals, B-vitamins, essential fatty acids
More Examples of Whole Grains

- Brown rice
- Quinoa
- Barley
- Corn
- Whole grain breads (with 3 grams or more dietary fiber)
- Light popcorn
- Chickpeas
- Millet
- Oatmeal
- Rye crackers
- Organic chips
- Whole grain cereals (with 4 grams or more dietary fiber)
- Wheat pasta
- Couscous
Fiber-Rich Foods

• Viscous or soluble fibers
  ➢ Traps bile acids, and shuttles them out of your body
  ➢ This taps into the body’s cholesterol pools to make more bile acids
  ➢ Lowering overall cholesterol level
  ➢ Oats, barley, psyllium, flaxseed, okra, eggplant
Fruits and Vegetables

- Great source of fiber
- Great source of water
- Great source of folate, ascorbic acid, carotenoids
  - Beta carotene, alpha carotene
  - Lutein
  - Beta cryptoxanthin
Fruits and Vegetables

- Recommendations for 1-2.5 cups/day fruit
  - 75% of Americans consume less than 1.5 cups
- Recommendation for 0.3 to 1.3 cups/day dark green vegetables, orange vegetables, legumes
  - Americans (75%) consume 0.35 cups/day
Fiber in Vegetables

• Eat at least 25 grams of fiber/day
  ➢ 1/2 cup of asparagus = 2 grams of fiber
  ➢ 1/2 cup broccoli = 4 grams of fiber
  ➢ 1/2 cup green beans = 4 grams of fiber
  ➢ 1/2 cup of cooked beans = 6 grams of fiber
  ➢ 1 medium ear of corn = 4 grams of fiber
  ➢ 1 cup spinach = 3 grams of fiber
  ➢ 1/2 cup carrots = 2 grams of fiber
Fiber in Fruits

• Eat at least 25 grams of fiber/day
  ➢ 1 medium apple = 5 grams of fiber
  ➢ 1 medium banana = 4 grams of fiber
  ➢ 1/2 cup of strawberries = 3 grams of fiber
  ➢ 1/2 cup of raspberries = 4 grams of fiber
  ➢ 1 medium peach = 2 grams of fiber
  ➢ 1 medium orange = 7 grams of fiber
  ➢ 1 medium nectarine = 2 grams of fiber
Nuts

- Almonds, Walnuts, Pistachios
- “Cholesterol-lowering pills”: rich sources of monounsaturated fats, some fiber, some omega-3 fats, phytosterols
- Lower cholesterol by 3-19%
- Aim for 1.0 -1.5 oz per day
- Calories!!!
Omega-3 Fatty Acids

Recommended amounts 1.1 g for women, 1.6 g for men
α-linolenic acid (18:3n-3)

Wheat Germ

Black current oil
Canola oil
Mustard seed oils
Soybean oil
Walnut oil
Wheat germ oil

Soybeans, walnuts

Human milk
<table>
<thead>
<tr>
<th>Fish</th>
<th>EPA (g)</th>
<th>DHA (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herring, Atlantic</td>
<td>0.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Mackerel, Pacific and Jack</td>
<td>0.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Salmon, Atlantic, Farmed</td>
<td>0.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Salmon, Atlantic, Wild</td>
<td>0.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Tuna, Bluefin</td>
<td>0.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Whitefish</td>
<td>0.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Canned Tuna</td>
<td>trace</td>
<td>0.2</td>
</tr>
</tbody>
</table>
Mediterranean Dietary Pattern

- Fish
- Nuts
- Olive oils
- Whole grains
- Fruits & vegetables
- Wine
Adopting a Mediterranean Style Diet

• Healthy weight
• Lower risk of Coronary heart disease
• Lower risk of diabetes
• Less cognitive impairment? Less MCI? AD?
Is there a Special Diet for Persons with PD?

No, but generally Atkins or low carbohydrate diet is strongly advised against!!!
Nutrition and Physical Activity for Better Health and Weight Control

Vitamins D, K, B12
Vitamin D

- AI: Orally 51-70 years: 10 mcg
  71+ years 15 mcg
  (400, 600 IU)
  with an Upper Limit... 500 mcg or 2,000 IU
- Others disagree: 10,000 IU

- Why?
  - Bone health: to prevent Osteomalacia/Rickets
    - Reduces falls and fractures
  - Maximize calcium absorption
  - Immunity: diabetes, multiple sclerosis, etc
Sources of Vitamin D

1 erythermal dose = 20000 IU

1 cup milk = 100 IU

Activation of over 200 genes, D-1-a-hydroxylase is not only in the kidney.

- Increased intestinal absorption of calcium and phosphate
- Increased bone mineralization
- Bone resorption to maintain serum calcium
### Dietary Sources of Vitamin D

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving</th>
<th>IUs Vitamin D</th>
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</thead>
<tbody>
<tr>
<td>Cod liver oil</td>
<td>1 Tbs</td>
<td>1360 IU</td>
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<tr>
<td>Salmon, canned pink</td>
<td>3 oz</td>
<td>360 IU</td>
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<tr>
<td>Sardines, canned</td>
<td>3 oz</td>
<td>250 IU</td>
</tr>
<tr>
<td>Mackerel, canned</td>
<td>3 oz</td>
<td>214 IU</td>
</tr>
<tr>
<td>Tuna, canned</td>
<td>3 oz</td>
<td>200 IU</td>
</tr>
<tr>
<td>Milk, fortified</td>
<td>8 oz</td>
<td>100 IU</td>
</tr>
<tr>
<td>Orange juice, fortified</td>
<td>8 oz</td>
<td>100 IU</td>
</tr>
<tr>
<td>Margarine, fortified</td>
<td>2 tsp</td>
<td>50 IU</td>
</tr>
<tr>
<td>Cereal, fortified</td>
<td>1 cup</td>
<td>40 IU</td>
</tr>
<tr>
<td>Liver, beef, cooked</td>
<td>3.5 oz</td>
<td>30 IU</td>
</tr>
<tr>
<td>Egg</td>
<td>1 whole</td>
<td>20 IU</td>
</tr>
</tbody>
</table>

Table adopted from Martini et al. Vitamin D Status and the Metabolic Syndrome. *Nutrition Reviews*: 64(11)479-486.
Who Can Synthesize in Winter?

Vitamin D Winter: Very little if any vitamin D can be synthesized in the skin from November through February at latitudes north of 37 degrees.

Vitamin D Winter:
Lack of exposure to 290-315 nm of light at latitudes north of 37 degrees Nov.-Feb.
Factors Affecting Low Vitamin D Levels

- Latitude
  - Exposure to UVB needed to synthesize is absent during several wintertime months at latitudes > 37°
- Time of day
- Obesity
- Season
- Melanin content of skin
- Use of sunscreen
- Clothing
- Age
- Cloud cover
- Air Pollution

Vitamin K

• Coagulation vitamin
• Important to bone integrity as well!
• Much of our needs are supplied by bacteria in our colon
  ➢ On antibiotics: that source is no longer!
• Needs:
  ➢ 90, 120 ug/day (F, M)
Vitamin B12

- Anyone 50 years or older: Food bound malabsorption
  - Gastric atrophy
  - Achlorhydria
  - Lack of critical absorption facilitators or intrinsic factor
  - Bacterial overgrowth
  - Celiac or Crohn’s
- Intake is poor: Vegan
Consequences of Low Vitamin B$_{12}$

- **Hematological effects:**
- Macrocytic anemia (*Pernicious anemia*)
- *Irreversible* neurological effects:
  - Sensory/motor/visual disturbances
  - Cognitive decline
  - Insomnia
  - Impaired bowel/bladder control (late stages)


Treatment: Vitamin B₁₂

- Crystalline form of vitamin B₁₂
  - Orally with fortified products
  - 100 to 1000 mcg intramuscularly
  - 500 mcg intranasally in one nostril once a week
  - Sublingual preparations under tongue or a patch???
How Do I Know if I’m Getting the Right Amounts of Nutrients

• Ask your doctor for a referral to a dietitian
• Very little is know about persons with PD and what they are at most risk for
• Weight changes and changes in skin and mouth are crude signs
Timing of Levodopa and Nausea

- When one first begins with Sinemet, you may experience nausea
- Take Sinemet about 30 to 60 minutes before you eat a meal
- Often nausea ceases in a few weeks
- If not, take with foods without protein (e.g., ginger ale, vanilla wafer, cracker)
TIPS

#3: A food platter may be placed on a silicone or rubber mat to prevent slipping
Protein and Medication Efficacy

- If you take Sinemet with your meal, it may take long to take effect, and then may not be effective.
Timing of Levodopa to Maximize the Dose that Gets to your Brain

- Low protein or protein redistribution diet
- Low protein in the earlier part of the day when you need the most time “ON”
  - Breads and cereals (less than 3g/serving)
  - Vegetables and fruit
  - clear and vegetable soups (none containing lentils, peas or creamed soups)
  - Spreads (honey, jam)
  - Sweets
- OR take levodopa/Sinemet on an empty stomach (CK with your physician about this)
Figure 1. Diary results: 24 h OFF time is significantly shorter after LPP diet than after NO-LPP diet ($P = 0.01$); 24 h dyskinetic ON time is significantly longer after LPP diet ($P = 0.04$).

LPP Diet or the Protein Redistribution Diet Maximizes

Many authors Pincus et al; Barichella et al *Nutr Neurosci* 2007;10:129
Protein Redistributed!!

- Critical to get the ratio of carbohydrates to Protein 4-5:1 at least...7:1
- Be certain to make up protein by the end of the day
- RDA for protein: 46, 56 g/day (F, M) or 0.03 oz per pound of body weight
TIPS

#4: Serve the meal on a raised level (plate on a small box, so food is nearer the mouth
#5: Place elbows on the table to steady hands and arms when eating
DYSPHAGIA

Recommend the use of thickening agents

ORAL NUTRITIONAL SUPPLEMENTS (Low-protein)

BALANCED CALORIE DIETS (Use of low-protein products)

DIETARY COUNSELLING FOR LOW-PROTEIN REGIMENS (Introduction of low-protein products)

DIETARY COUNSELLING FOR PROTEIN REDISTRIBUTION (Second course only at dinner)

BALANCED MEDITERRANEAN-LIKE DIET (58-60%, carbohydrates; 12-15%, proteins; 25-30%, fats)

PERIODIC NUTRITIONAL ASSESSMENT BY BOTH CLINICAL NUTRITIONIST AND DIETITIAN (Anthropometry, biochemistry, energy intake and dietary pattern)

WATER (At least 1,500 mL/day)

REGULAR PHYSICAL ACTIVITY (Resistance exercise training)

FIBER (30-35 g/day)

L-DOPA TREATMENT

ORAL L-DOPA Advice to take medications 30 minutes before meals

DUODENAL - JEJUNAL L-DOPA INFUSION
TIPS

#7: Keep chin tucked down on chest to aide in swallowing
What if You Are Losing Weight?

- Reduce physical activity:
  - Usually no!

- Increase the number of times you eat during the day
  - Healthy snacks rich in carbohydrates and good fats
    - i.e., Peanut butter and apples
    - If worried about levodopa interactions
      - Stick to the vegetables and fruits
<table>
<thead>
<tr>
<th>Item</th>
<th>Mini Nutritional Assessment (MNA) score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item I</td>
<td>Anthropometric assessment (8 points)$^a$</td>
</tr>
<tr>
<td></td>
<td>Body weight and height, with the calculation of BMI</td>
</tr>
<tr>
<td></td>
<td>Arm and calf circumference</td>
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<tr>
<td></td>
<td>Body weight loss in the last 3 months</td>
</tr>
<tr>
<td>Item II</td>
<td>Global assessment (9 points)</td>
</tr>
<tr>
<td></td>
<td>Life-style</td>
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<tr>
<td></td>
<td>Recent acute events</td>
</tr>
<tr>
<td></td>
<td>Decubitus lesions</td>
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<tr>
<td></td>
<td>Number of medications taken on</td>
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<tr>
<td></td>
<td>Cognition</td>
</tr>
<tr>
<td></td>
<td>Mobility</td>
</tr>
<tr>
<td>Item III</td>
<td>Dietary assessment (9 points)</td>
</tr>
<tr>
<td></td>
<td>Number of meals</td>
</tr>
<tr>
<td></td>
<td>Intake of solid and liquid food</td>
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<tr>
<td></td>
<td>Self-sufficiency in eating</td>
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<tr>
<td>Item IV</td>
<td>Subjective assessment (4 points)</td>
</tr>
<tr>
<td></td>
<td>Self-perception of health and nutritional status</td>
</tr>
</tbody>
</table>

$^a$The cut-off values correspond to the 10th percentile of measurements obtained in French subjects over 80 years of age.$^{9,10}$
Questions and Answers
Closing Remarks

Robin Elliott
Executive Director
Parkinson’s Disease Foundation
The archive for this *PD ExpertBriefing* will be available on

**Monday, March 1**

Please visit [www.pdf.org](http://www.pdf.org) for more information.
PD ExpertBriefings
Schedule

What’s in the Parkinson’s Pipeline?
David G. Standaert, M.D., Ph.D.
Tuesday, April 20, 2010 at 1 PM ET

Fatigue, Sleep Disorders and Parkinson's Disease
Joseph Friedman, M.D.
Tuesday, June 1, 2010 at 1 PM ET
Do You Have Questions About Parkinson’s Disease?

We can help.

Call Monday through Friday, 9 AM to 6 PM ET
Submit your questions online and hear back in 8 to ten days.

(800) 457-6676

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This 100-page comprehensive print guide includes over 650 community resources throughout the US and around the world.

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