



# Nutrition and Carcinoid

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# Good Food + Exercise Are The Most Important Steps To Good Health

- 60-90% reductions in risk of heart disease, cancer, diabetes with Mediterranean or 'prudent Western' diets
- May reduce cancer progression (WINS)
- 40%+ reduction in dementia, significantly improved lifespan
- Daily exercise appears additive
- Nurses Health, Lyon Heart, HALE, Greek EPIC...



# Whole Food Mediterranean Diet

For most people, most of the time

- ‘Healthy fat’, not necessarily ‘low fat’
  - Nuts, fish, avocado, extra virgin olive oil, whole oilseeds such as sesame, sunflower and flax
  - Not hydrogenated oils
  - EV olive oil as main vegetable fat; sesame, soy, canola are second- choices
- 5-10 servings of fruit and vegetables daily
- Whole grains and beans
- Dairy mostly in cultured form: yogurt, cheese
- Other animal proteins in modest amounts

# Foods to avoid

- Hydrogenated oils: Often contain significant amounts of *trans* fat, even if the label says 'NO TRANS FAT'. For practical purposes these are nutritionally worthless and probably harmful
- Refined carbohydrates: 'enriched' flour (white flour), refined sugar, high fructose corn syrup: Empty calories. Think twice about fruit juice
- Fake foods, particularly sugar substitutes: Oddball chemicals with no nutritional benefit, potential harm, and maintain your sweets tooth





# Useful Food Axiom

- In general, in our society of over-manipulated food: All food is guilty until proven innocent. Particularly in hospitals





# Nutritional supplements

Only use supplements if you have a good reason:  
They are associated with both benefit and harm

“Nutrients and other nonnutritive substances relevant to health are readily available in familiar packages called fruits, vegetables, legumes, grains and animal products and they come in concentrations and combinations with which humans have had a long cultural familiarity”

Joan Gussow



# Nutrition and Carcinoid

- Every individual must weigh general advice against their own experience
- Advice may not apply to a given patient
- The widest variety of reasonable food choices is generally preferable
- Avoid unnecessary rules
- Solid evidence for many recommendations is lacking...so decide for yourself by cautious experimentation



# Key Nutritional Issues For Carcinoid

- Amines in food may cause symptoms
- Increased protein and niacin requirements due to increased serotonin synthesis
- Moderate fat, depending on tolerance, typically 20-30% of dietary calories
  - Emphasize ‘good fat’
- Possible solutions for diarrhea





# Carcinoid Nutrition Survey

## Signs and symptoms with possible nutritional implications

	<u>Before Dx</u>	<u>Current</u>
• No Symptoms	4%	14%
• Flushing	52%	45%
• Diarrhea	56%	51%
• Abdominal pain	54%	33%
• Gas and bloating	45%	51%
• Weight loss	36%	21%
• Skin rash	8%	8%
• Fatigue and weakness	48%	60%
• Nausea		20%

# AMINES

Particularly high in aged, fermented and spoiled foods, and can vary widely between batches.

## AMINES IN FOODS (VERY HIGH)

TYRAMINE, DOPAMINE

- Aged cheeses (cheddar, Camembert, Stilton)
- Alcoholic beverages
- Smoked, salted or pickled fish or meat (herring, salami, sausage, corned beef, bologna, pepperoni)
- Any spoiled protein foods (chicken liver)
- Yeast extracts and Brewers yeast, hydrolyzed proteins
- Broad beans, sauerkraut, shrimp paste, some soybean products, miso soup, soy sauce, tofu

## AMINES IN FOODS (MODERATELY HIGH)

TYRAMINE, DOPAMINE, XANTHENES, THEOBROMINE

- Caffeine containing drinks, coffee (in large amounts), soda
- Chocolate (in large amounts)
- Some nuts (peanuts, coconuts, brazil nuts)
- Some pizzas, raspberries, banana , avocado





# Which Foods cause Most Problems?

2004 study (n=83)

Reaction to:

Main Complaints/Symptoms

- Amine containing foods (n=61)
  - 80% Diarrhea
  - 75% Gas & Bloating
  - 45% Flushing
- Fatty Foods (n=41)
  - 75% Diarrhea
  - 60% Gas & Bloating
- Vegetables (n=35)
  - 33% Gas & Bloating
  - 30% Diarrhea



# Conclusions 2004 ( n=83) #2

## Reaction to:

- Alcohol (n= 40)
- Fruits (n= 25)
- Spicy Foods (n=20)
- Large meals (n=16)

## Main Symptoms

- 83 % Flushing  
35% Diarrhea
- 76% Diarrhea  
15% Gas & Bloating
- 88% Diarrhea  
75% Gas & Bloating
- 16% Diarrhea



# Top Offending Foods (2005)

- Amine containing foods (caffeine drinks, chocolate, some cheeses etc.)
- Fatty Foods
- Raw vegetables
- Alcohol
- Fruits
- Spicy Foods with pepper, cayenne, mustard. Cinnamon and nutmeg seem OK
- Large meals





# SEROTONIN CONTAINING FOODS

To Avoid prior to 24hr Urine 5-HIAA test

## HIGH

### Walnut Family:

Black/ English Walnuts

### Hickory Family:


Shagbark, Pecans

Pineapple, plantains,  
Kiwi fruit, plums,  
tomatoes

## MEDIUM HIGH


Avocado, dates,  
grapefruit, cantaloupe,  
honeydew, olives,  
eggplant

**NOTE:** Serotonin in food will not aggravate symptoms or tumor growth



# Dietary Guidelines For Carcinoid and other Neuro-endocrine Tumors

- If no symptoms or other medical problems:
  - Follow whole food Mediterranean diet or American Institute Cancer Research (AICR) guidelines
  - Daily exercise habit
  - Portion and weight control
  - Adequate sleep



# If One Or More Symptoms Of Carcinoid Syndrome

- Mediterranean or AICR diet, avoiding foods that aggravate symptoms
  - High protein
  - Emphasis ‘good’ fat when making choices, keep fat content moderate or low
  - 5-10 servings of vegetables and fruit daily if tolerated
  - Variety helps, and everyone is an individual
  - Broad variations in amines between batches of a given food



# If One Or More Carcinoid Symptoms

- Foods most likely to provoke symptoms are large meals, high-amine foods, excessive fat, alcohol, spices
  - Smaller servings or different brands may not cause symptoms
- Niacin or nicotinamide e.g. 25-50 mg twice daily
- Maybe a multivitamin
- Consider fish oil 2 x 1000mg daily with largest meal as source of omega 3 fatty acids
- Consultation with Registered Dietician



# Food Sources Of Niacin

- Meat, poultry and fish
- Whole and enriched grains and cereals
- Vegetables
- Legumes, nuts and soy
- Fruit





# Diarrhea

- Benefiber or other fiber supplements works in some cases
- Banana flakes 15g 1-3 times daily. Also provides lots of potassium. Not fried sweetened banana chips
- Glutamine powder: 1tsp-1 TBSP 1-3 times per day, eg in a little bit of juice
- Fresh ground nutmeg 3 tsp once or twice a day. Potent flavor: Mixed with a nut butter on a cracker
- Probiotic eg lactobacillus or S. boulardi (Florastor) 1-2 day
- Coconut if tolerated. Macaroons?



# Diarrhea

- Consider:
  - Eliminating lactose sources
  - Pancreatic enzymes
  - Other food culprits, including sugars, juices
  - Small frequent meals
  - Non-carcinoid causes









# Books

- The New American Plate (American Institute for Cancer Research)
- The Omega Diet (Simopoulos & Robinson)
- Mediterranean Diet Cookbook (Harmon-Jenkins)
- Eat, Drink and Be Healthy (Walter Willett)