

# Nutrition Concerns In Carcinoid Cancers

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Content adapted with permission from  
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# Nutrition Basics

- Eat a plant focused diet
  - Plenty of vegetables, fruits, whole grains, beans
  - Modify types of fiber as needed
- Lean proteins – limit processed meats
- Healthy plant fats
- Limit simple sugars and refined grains
- Aim for a healthy weight
- Drink adequate fluid
- Be physically active daily

# Eat the Rainbow!

BLUE/PURPLE		
Berries, (blue or black) Cabbage (purple) Carrots (purple) Cauliflower (purple)	Dates Eggplant Figs Grapes (purple) Kale (purple) Plums	Potatoes (purple) Prunes Raisins Rice, (black or purple)
Foods		
Anti-cancer Anti-inflammatory	Cell protection Cognitive health	Heart health
Benefits		

RED		
Adzuki beans Apples Applesauce Cranberries Cherries Kidney beans	Plums Pomegranate Radishes Raspberries Red grapefruit Red grapes	Shrimp Strawberries Sweet red peppers Rooibos tea Tomato
Foods		
Anti-cancer Anti-inflammatory	Cell protection DNA health Immune health	Prostate health Vascular health
Benefits		

ORANGE		
Acorn squash Apricots Bell pepper Butternut squash Cantaloupe	Carrots Dried fruit (apricot, mango, papaya) Grapefruit Mango Nectarine	Orange Papaya Sweet potato Turmeric root Winter squash
Foods		
Anti-cancer Anti-bacterial Immune health Cell protection	Reduced mortality Reproductive health	Skin health Source of vit A
Benefits		



## IFM Phytonutrient Spectrum

WHITE/TAN		
Bean dips Cinnamon Clove Dark chocolate Flaxseed meal Garlic Ginger	Hummus Legumes Nuts Onions Refried beans, low-fat Sesame seeds	Shallots Tahini Whole flaxseeds Whole grains (quinoa, brown rice, wheat, spelt)
Foods		
Anti-cancer Anti-microbial Cell protection	Gastrointestinal health Heart health	Hormone balance Liver health
Benefits		

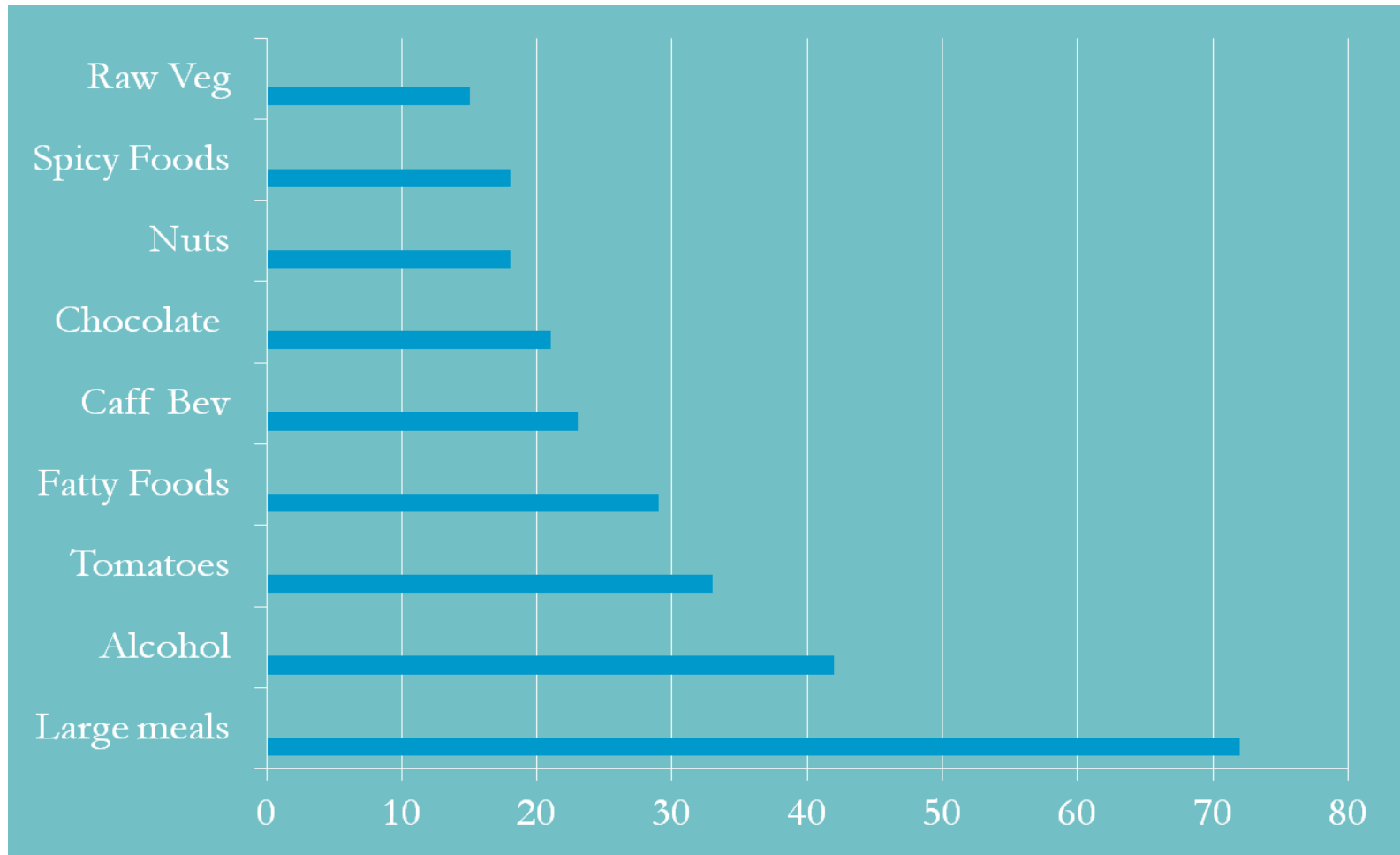
GREEN		
Artichoke Asparagus Avocado Bamboo sprouts Bean sprouts Bok choy Broccoli Brussels sprouts Cabbage	Celery Chard/Swiss chard Cucumbers Green beans Green peas Green tea Greens (Beet, dandelion, collard, mustard, turnip) Lettuce	Okra Olives Rosemary Spinach Soy (edamame, tempeh, tofu, tofu burger, miso, natto, soy milk, soy yogurt) Snow peas Watercress
Foods		
Anti-cancer Anti-inflammatory	Brain health Cell protection Skin health	Hormone balance Heart health Liver health
Benefits		

YELLOW		
Bell peppers Corn Corn-on-the-cob	Greens Kale Popcorn	Spinach Succotash
Foods		
Anti-cancer Anti-inflammatory	Cell protection Cognition Eye health	Heart health Skin health Vascular health
Benefits		

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# Modify your diet if symptomatic

# Percentage Reacting to Food



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More than 100,000 patients' data, [www.carcinoid.org](http://www.carcinoid.org)  
Every day we transform our patients  
into cancer survivors.

# Nutrition Issues for Carcinoid

- Amines in food may cause symptoms
- Increased protein and niacin requirements due to increased serotonin synthesis
- Fats depending on tolerance, MCT
- Explore solutions for diarrhea

# Avoid Vasoactive Amines

Avoid high tyramine, dopamine content foods

- Aged Cheese: Cheddar, Camembert, Stilton
- Alcoholic beverages
- Spoiled, smoked, salted, fish/meats/liver
  - Herring, salami, sausage, bologna, pepperoni
- Yeast extracts, Brewer's yeast, fava/soybeans
- Fermented foods: miso, tempeh, sauerkraut

# Limit These Amines

Limit moderate sources of tyramine, dopamine, xanthenes, theobromine

- Caffeine in large amounts - coffee
- Chocolate, especially dark
- Peanuts, brazil nuts, coconut
- Raspberries, avocado, banana



# Flushing

Occurs in 40 – 50% of patients with GI tumors, worse where liver can't effectively inactivate the hormones responsible

Aggravated by:

- Hot temperature foods
- Alcohol, beef: increase gastrin secretion
- Spicy foods, esp. capsaicin/peppers
- Sodium nitrates, cured meats; sulfites/salad
- Wine: tyramine, histamine, sulfites

# Carcinoid Disease and Niacin Deficiency

Tryptophan is diverted to make excessive amounts of serotonin, limiting the production of niacin in those with symptoms.

- For carcinoid syndrome: Treatment: 25 – 50 mg/ twice a day
  - Niacinamide, “No flush”, or niacin with 1/2 baby aspirin to counter prostacyclins
  - High protein, with lean meats; 0.7 grams per pound or 1.5 grams per kilogram of body weight

# Somatostatin-Analog Therapy

14-amino acid peptide; binds to somatostatin receptors present on 80% of tumors

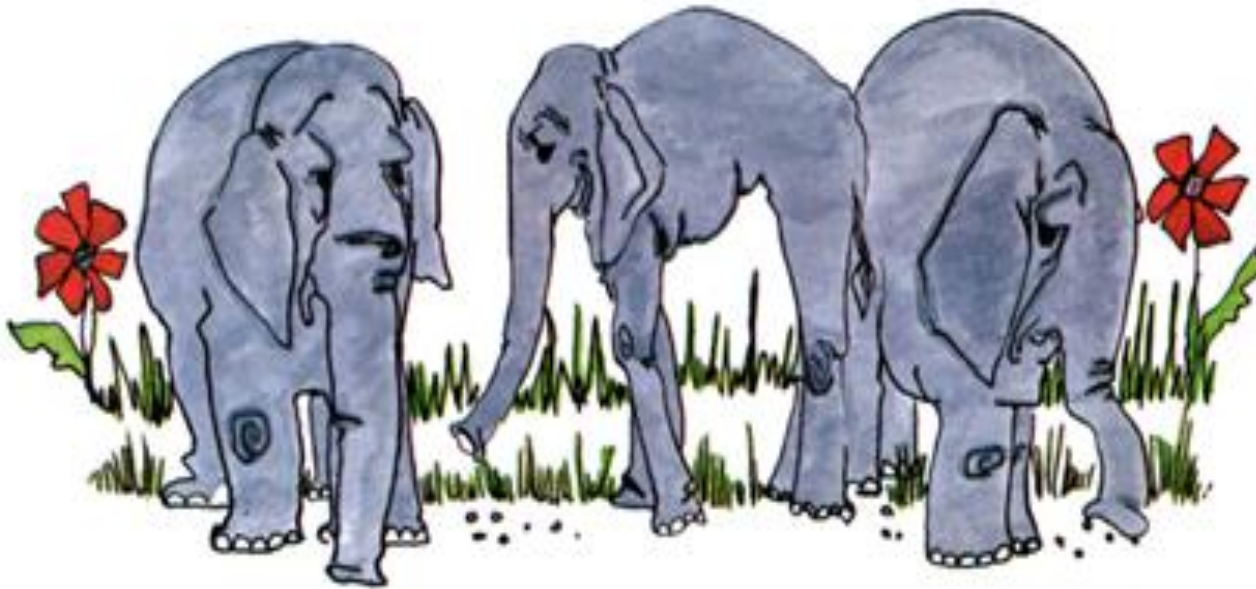
- Blocking secretion of many hormones
  - Reducing symptoms in 80% patients
- Inhibiting growth of small bowel tumors

# Somatostatin-Analog Therapy Side Effects

- Inhibits gallbladder contractions
  - Risking gallstones
- Limits pancreatic function, leading to malabsorption in many
- Possible hyperglycemia, hypothyroid

# Nutrition Challenges in GI Carcinoid Cancers

- Eating enough to maintain weight
  - Problem with appetite, taste and volumes
- Absorbing what is eaten
  - Malabsorption
    - Limited intestinal tract, from surgical resection
    - Sandostatins impact on gallbladder, pancreas → malabsorption of fat, protein



**So you've been losing weight and  
you're just not interested in eating...**

# Strategies to try

- **Set up a schedule!** Eat often
  - Set cell phone timers
- **Post a list: “Things I Tolerate”**
  - Lower your expectations
- **Start “healthy”, but with calories!**
  - With small volumes, nothing is problematic
- **Make it easy, near chair/bed**
  - Pace eating/drinking with commercials

*Pick easier things on “bad” days*



# Diet Strategies, Beyond Amines

Choose foods that limit rapid transit

Low fiber/low residue foods

- White rice (congee), peeled potatoes, cream of wheat, some cooked vegetables, canned fruits, peeled apples
- Avoid high fiber foods; extreme temps

Decrease demands on the GI tract

Avoid irritants: magnesium, coffee, caffeine, peppers

Take care with foods creating osmotic pull

Dairy/Lactose May be tolerated with OTC lactase pills

Sugar alcohols, mannitol, sorbitol, xylitol

Consider ground nutmeg: 1 tsp 3 times per day



# Soluble Fiber Foods

Rice	Pasta
Oatmeal	Barley
White or sourdough bread	Rice cereals
Corn meal	Corn cereals
Flour tortillas	Corn tortillas
Soy	Quinoa
Carrots	Yams and sweet potatoes
Potatoes	Rutabagas
Parsnips	Beets
Winter squash	Pumpkins
Mushrooms	Chestnuts
Avocados	Bananas
Peeled apples and applesauce	Mangoes and Papayas

# Replace Fluids! Dehydration Makes Everything Worse



**Cells don't work well as "raisins"**

## **Advice to "non-drinkers"**

- **Mix it up!** Avoid burn out with variety
- Eat "solid" fluids: soup, popsicles, etc.
- Pace it with 2 oz at every commercial

# Carcinoid Disease = Multiple Causes of Diarrhea

Tumor secretion of serotonin

- Treat with Sandostatin

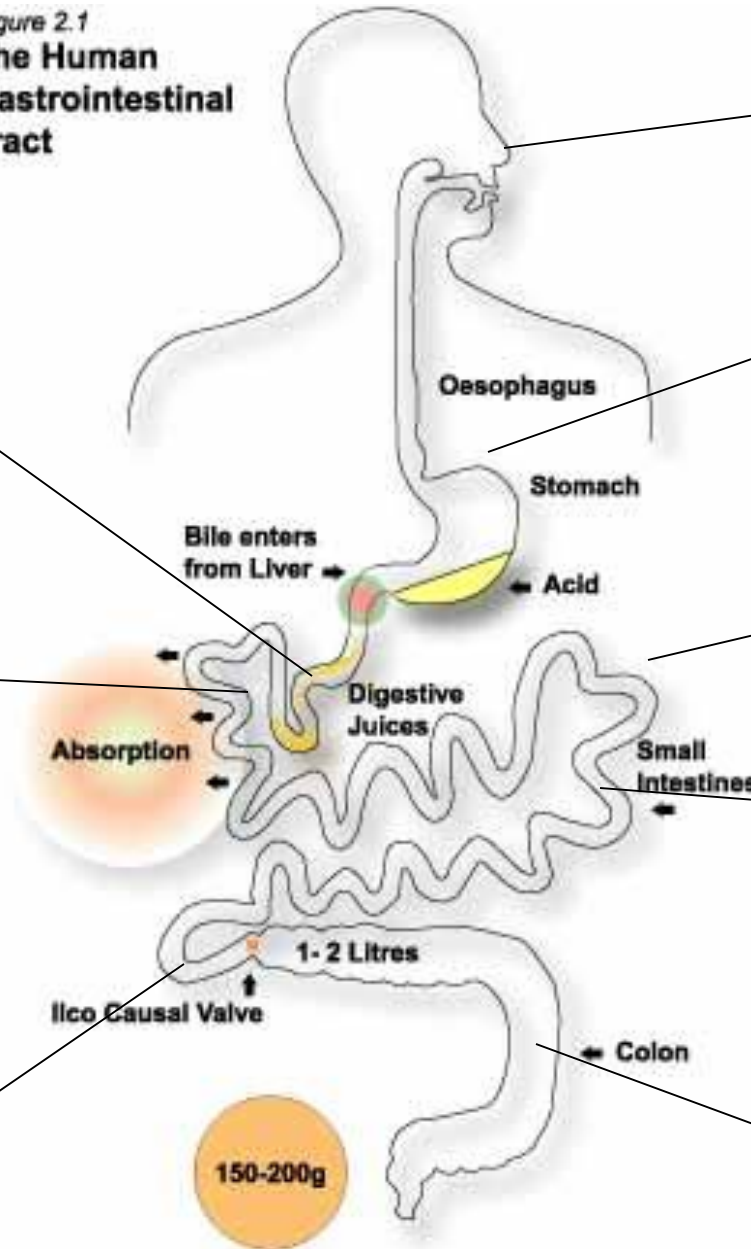
Surgical resection of the small bowel

- Limiting absorption: slow transit with meds/diet
- Terminal ileum: issues with bile, B12

Sandostatin related changes

- Decreased gall bladder contractions/bile
- Decreased pancreatic enzyme production

Figure 2.1  
The Human  
Gastrointestinal  
Tract



## Mouth

- Amylase/starch

## Stomach 2-3 hours

- Alcohol

## Jejunum

- Lactose
- Maltose

## Jejunum – Ileum

- Water Soluble Vitamins
- Protein/Amino Acids

## Colon 24 - 48 hours

- Water (1 – 2 L)
- Potassium
- Short Chain FA
- Sodium Chloride

## Duodenum

- Calcium
- Magnesium
- Iron

## Duodenum – Jejunum

- Glucose
- Fatty Acids
- Fat soluble vitamins

## Ileum

- D → I: 4 hours
- B-12
- Bile Salts

# What Causes Malabsorption?

**Digestion and absorption requires:**

- Enough **enzymes** to break down the food
- Enough **time** in the small bowel
- Enough **GI surface area** to absorb it

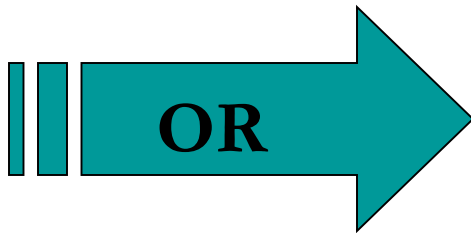
**A picnic for bacteria/fermentation**

***Gas and Bloating***

**Unabsorbed Fat/GI irritation**

***Foul smelling, yellow stools  
that float in the stool basin***

***Diarrhea and weight loss***



# Problem Solving for Ongoing Malabsorption

- **Rapid transit time:** + Anti-diarrheals
- **Inconsistent enzyme therapy**  
Enzymes not taken consistently Rationale/symptoms are not understood
  - Timing with meals; to travel the gut together
  - Missed doses = a malabsorbed meal or snack
- **Inadequate dose:** Adjust dose
  - Flex dose with fat content of meal/snack
  - Try half at beginning and half midway through a meal
- **Continued malabsorption on higher doses**
  - Control stomach acid with PPIs, H2blockers **Alternate causes: infection, excess bile**

# Combining the right diet and medications can help!

- Avoid carcinoid flushing/symptoms
- Maintain your weight
- Manage any GI problems/symptoms
- Prevent any nutrient deficiencies
- Supplements?
  - 1 – 2 multivitamins (liquid), + 50 – 100 mg Niacin
  - Check Vitamin D levels