
Medical Nutrition Interventions for Common Digestive Disorders



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Performance Indicators

8.1.5 Applies medical nutrition therapy in disease prevention and management.

8.3.1 Maintains the knowledge and skill to manage a variety of disease states and clinical conditions.

8.3.6 Keeps abreast of current nutrition and dietetics knowledge and trends.

8.3.7 Integrates new knowledge and skills into practice.

Learning Codes

2070 Macronutrients: carbohydrate, fat, protein, fiber, water

3100 Supplemental nutrients, botanicals

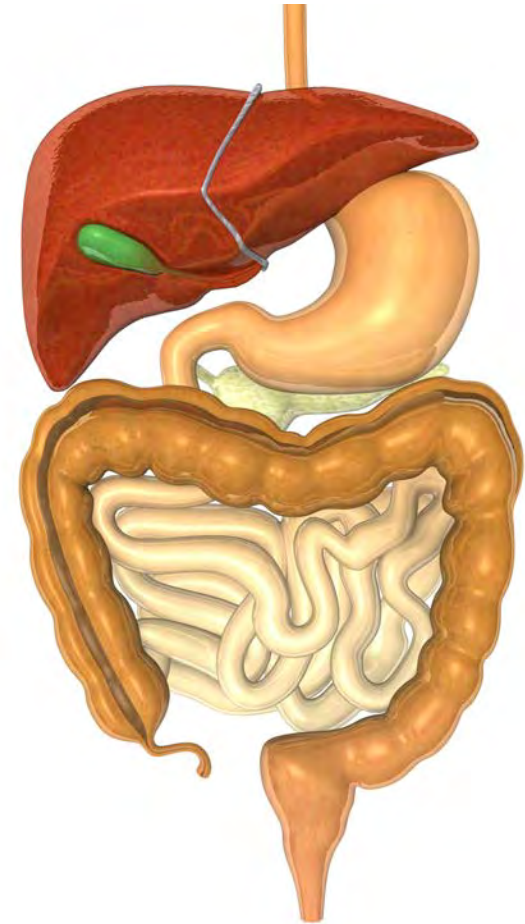
5220 Gastrointestinal disorders



Overview

Medical Nutrition Therapy for:

- Functional Gut Disorders
 - *Irritable Bowel Syndrome (IBS)*
 - *Gastroparesis*
- Gas & Bloating



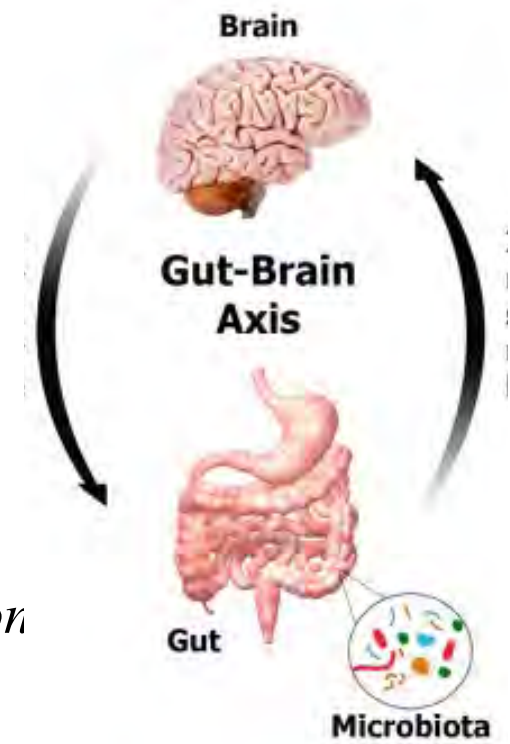
Functional Gut Disorders



Functional Gut Disorders

Definition

- Disorder where the body's normal activities are impaired (gut-brain interaction)
 - *Movement of the intestines*
 - *Sensitivity of the nerves of the intestines*
 - *Way in which the brain controls some of these function*
 - *Gut microbiome*
- There are NO structural abnormalities that can be seen by endoscopy, x-ray, or blood tests



Functional GI Symptoms

- Acid reflux/ heartburn
- Abdominal cramping
- Vomiting
- Nausea
- Abdominal pain
- Constipation
- Diarrhea
- Bloating
- Changes in motility (movement of digestive organs)
- Gas / excess flatus (passing gas)

Functional Disease States

- Functional heartburn
- Functional dyspepsia (indigestion)
- Functional vomiting
- Functional abdominal pain
- Functional constipation
- Functional diarrhea
- Functional dysphagia (trouble swallowing)
- Aerophagia (swallowing excess air)
- ***Irritable bowel syndrome***

Irritable Bowel Syndrome (IBS)



Facts & Figures



- **Functional Gut Disorders**

- ~1 in 4 people or more in the U.S. have one of these disorders
- 40% of GI problems seen by doctors and therapists

- **Irritable Bowel Syndrome**

- Affects 25-45 million people in US – 10-20% of population
- About 2 in 3 IBS sufferers are female
- Approx. 20-40% of all visits to gastroenterologists are for IBS symptoms

iffgd – aboutibs.org

Irritable Bowel Syndrome

Definition:

- Recurrent abdominal pain on average at least 1 day/week in the last 3 months, associated with two or more of the following:
 - *Related to defecation*
 - *Associated with a change in frequency of stool*
 - *Associated with a change in form of stool*

* Criterion fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

Rome IV criteria, 2016

Bristol Stool Chart

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. Entirely Liquid



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SUBTYPE

STOOL TYPE 1 & 2

STOOL TYPE 6 & 7

IBS with predominant constipation

More than 25%

Less than 25%

IBS with predominant diarrhea

Less than 25%

More than 25%

IBS with mixed bowel habits

More than 25%

More than 25%

IBS Unclassified: Patient who meets diagnostic criteria for IBS but whose bowel habits cannot be accurately categorized into one of the three subtypes above.

Source: Lacy BE, et al. Bowel Disorders. Gastroenterology. 2016;150:1393-1407.



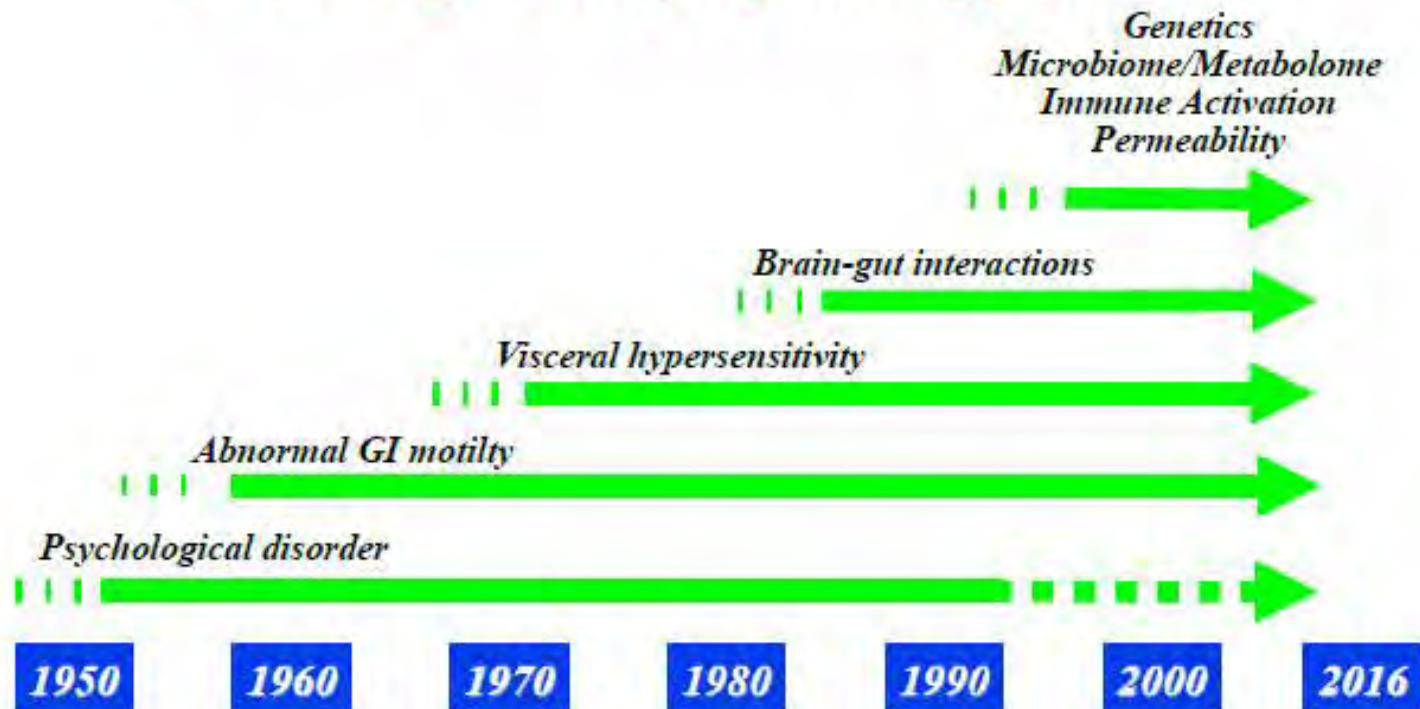
IBS

IrritableBowelSyndrome.net // IBS subtypes

Health

Irritable Bowel Syndrome

Evolving Pathophysiology of IBS



Courtesy William Chey MD



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Next Steps?

What to do?

- Pharmacotherapy
- Modify stress
 - *Gut-Directed Hypnotherapy*
 - *Cognitive Behavioral Therapy*
 - *Mindfulness Meditation*
- Work on comorbidities
- ***Diet Interventions***



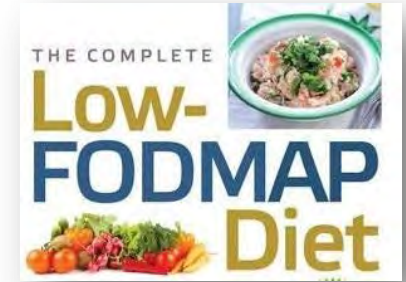
Next Steps?

What to do?

- Diet Interventions
 - *Fiber (psyllium husk)*
 - *Supplements such as probiotics*
 - *Fat amounts / types*
 - *Proteins (A1 β -casein, rubisco, lectin, α -ATII, gluten)*
 - *NICE Guidelines*
 - ***Low Fodmap Diet***

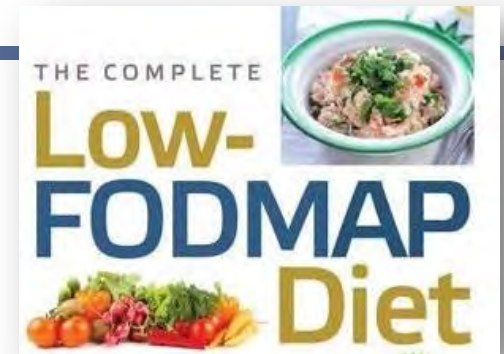


Low FODMAP Diet



- Created at Monash University, Australia in 1999
- Acronym for specific sugars that ferment in the gut and contribute to GI symptoms
 - **F** – *fermentable*
 - **O** – *oligosaccharides* (Fructans and Galacto-Oligosaccharides)
 - **D** – *disaccharides* (Lactose)
 - **M** – *monosaccharides* (excess Fructose)
 - **A** – *and*
 - **P** – polyols (sorbitol, mannitol, maltitol, xylitol, isomalt)

Facts & Figures



- 50%-86% of patients respond to the low-FODMAP diet
- 64–77% of patients report high adherence rates following low FODMAP diet counselling from a dietitian
- +75% of patients can reintroduce FODMAPs and maintain symptom control
- Satisfaction with symptoms in 72.1% of responders at a mean of 15.7 months follow-up

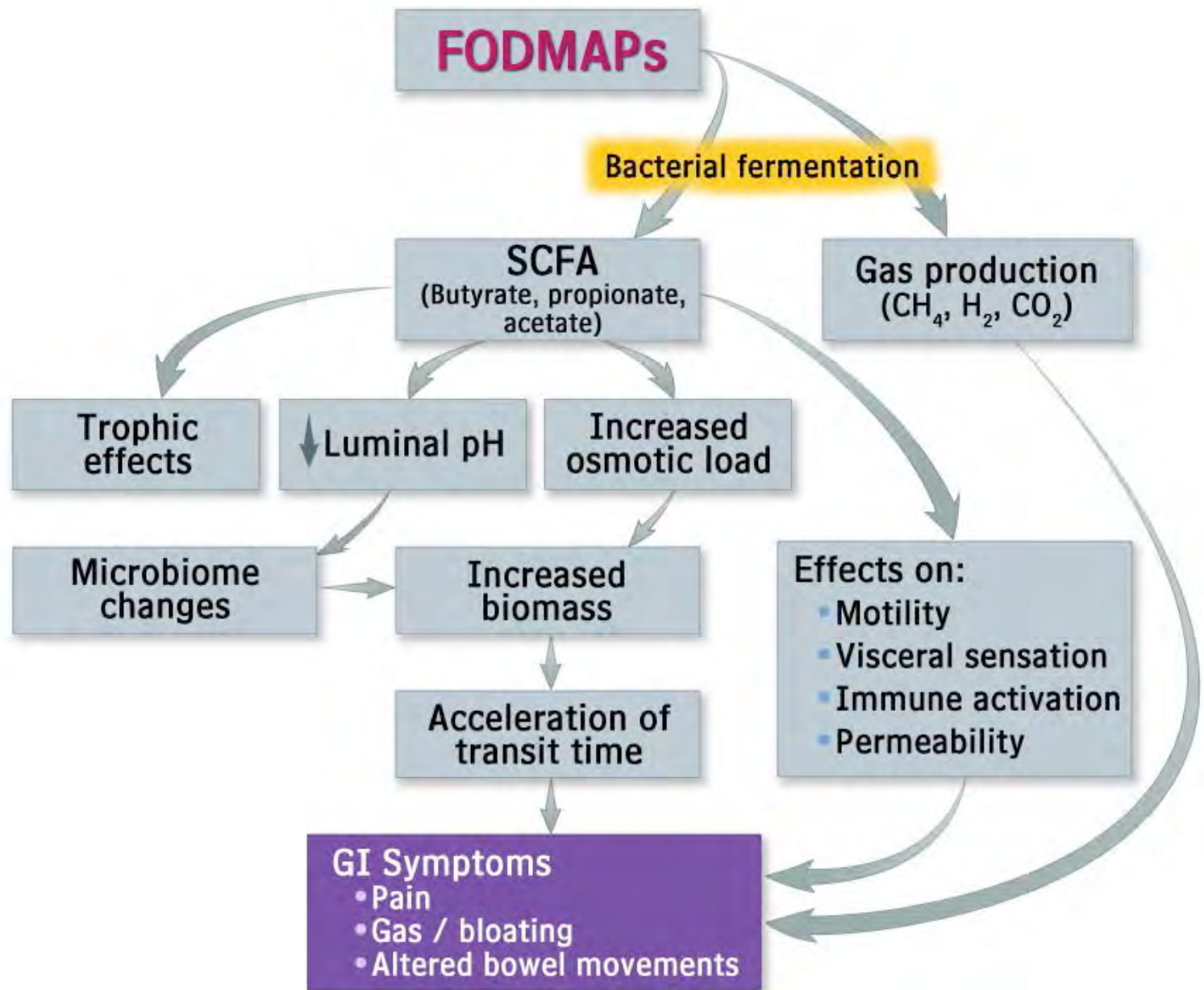


Tuck et al, JGH, 2017
De Roest et al, Int J Clin Pract, 2013
Peters et al, Ali Pharmacol Ther, 2016



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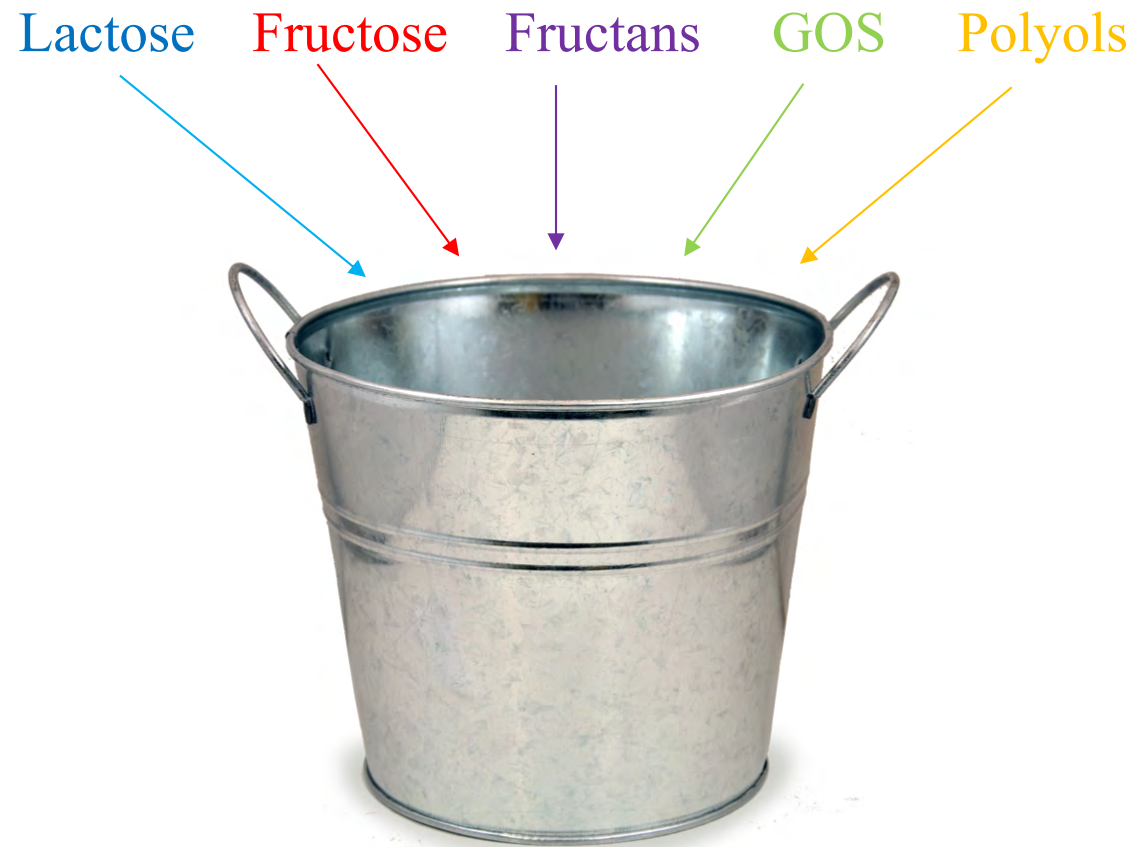
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Eswaran. NGM. April 2017



The FODMAP Problem



The FODMAP Problem

	Fructans / GOS	Fructose / Polyols	Lactose
Osmotic Effect	+	+++	+++
Fermentation	+++	+	++
Result?	Gas and bloating	Diarrhea	Diarrhea, possible gas and bloating

Courtesy Kate Scarlata

HIGH FODMAP DIET CHECKLIST

FOODS TO AVOID

By Kate Scarlata RDN, FODMAP & IBS expert



high lactose

[creates gas +
pulls water into the gut]

CHEESE

COMMERCIALLY PREPARED
RICOTTA CHEESE, COTTAGE
CHEESE

BEVERAGES

COW, SHEEP, & GOAT MILK

OTHER

EVAPORATED MILK, YOGURT,
ICE CREAM, CUSTARD

excess fructose

[pulls water into the gut]

VEGETABLES

JERUSALEM ARTICHOKES,
ASPARAGUS, SUGAR SNAP
PEAS, SUN-DRIED TOMATOES

FRUIT

APPLES, BOYSENBERRY,
CHERRIES, FRESH FIGS,
MANGO, PEARS, TAMARILLO,
WATERMELON

SWEETENERS

AGAVE, HIGH FRUCTOSE
CORN SYRUP, HONEY

ALCOHOL

RUM

high fructans/GOS

[creates gas]

VEGETABLES

ARTICHOKES, GARLIC, LEEK AND
SCALLION BULBS (THE WHITE PARTS),
SHALLOT, ONION, ONION & GARLIC
POWDER, PEAS, SOYBEANS, KIDNEY BEANS

FRUIT

BANANA (> 1/3), CURRANTS, DATES,
FIGS (DRIED), GRAPEFRUIT, NECTARINE,
PERSIMMON, PLUMS, PRUNES, WHITE
PEACHES, WATERMELON

GRAINS

RYE, WHEAT, BARLEY

NUTS

PISTACHIOS, CASHEW

LEGUMES

BORLOTTI BEANS, MATURE SOYBEANS
(MOST SOY MILK, SOY FLOUR), BAKED
BEAN, BLACK BEANS, FAVA BEANS, KIDNEY
BEANS, NAVY BEANS, SPLIT PEAS

OTHER

OOLONG TEA, CHAMOMILE AND FENNEL
HERBAL TEA, CAROB, CHICORY ROOT
EXTRACT, INULIN OR FOS
(FRUCTOOLIGOSACCHARIDE)

high polyols

[pulls water into the gut]

VEGETABLES

CAULIFLOWER, MUSHROOMS,
SNOW PEAS

FRUIT

APPLES, APRICOTS,
BLACKBERRIES, CHERRIES,
NECTARINES, PEARS, YELLOW
PEACHES, PLUMS, PRUNES,
WATERMELON

SWEETENERS

SORBITOL, MANNITOL,
ISOMALT, XYLITOL

The FODMAP elimination diet is to be followed for a limited time, approximately 2-6 weeks. Work with a FODMAP knowledgeable registered dietitian to provide guidance on the reintroduction phase of the diet and to ensure your diet is nutritionally adequate and balanced.

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REFERENCE: MONASH UNIVERSITY LOW
FODMAP APP; USDA NUTRIENT DATABASE.
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MEDICAL DISEASES. IT IS STRICTLY FOR
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SEEK THE ADVICE OF YOUR PHYSICIAN OR
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REPLACE THEIR MEDICAL ADVICE, ALWAYS
CHECK INGREDIENTS ON FOOD TO ENSURE
THEY COMPLY WITH THE LATEST LOW
FODMAP DIET GUIDELINES.

Low FODMAP diet checklist

By Kate Scarlata RDN, FODMAP & IBS expert

low lactose

CHEESE

BRIE, CAMEMBERT, COLBY, CHEDDAR, GOAT CHEESE, FETA, HAVARTI, MOZZARELLA, PARMESAN, PECORINO, SWISS, LACTOSE FREE COTTAGE, LACTOSE FREE CREAM CHEESE

BEVERAGES

LACTOSE FREE COW'S MILK (WHOLE, 2%, 1% OR FAT FREE), CANNED COCONUT MILK (FULL FAT & LIGHT), HEMP MILK, ALMOND MILK, RICE MILK

OTHER

LACTOSE FREE ICE CREAM, SORBET FROM ACCEPTABLE FRUITS, LACTOSE FREE YOGURT, GOAT'S MILK YOGURT, COCONUT YOGURT, LACTOSE FREE SOUR CREAM, WHIPPED CREAM

GF = GLUTEN FREE
C. = CUP
TB = TABLESPOON
TSP = TEASPOON

no excess fructose

FRUIT

LIMIT TO ONE FRUIT SERVING PER MEAL

BANANA (1/3 RIPE), DRIED BANANA CHIPS, BLUEBERRIES, CANTALOUPE, DURIAN MELON, CLEMENTINE, FRESH AND DRIED COCONUT, DRAGON FRUIT, GRAPES (RED, GREEN & BLACK), RIPE GUAVA, HONEYDEW, KIWIFRUIT (GOLD & GREEN), KUMQUATS, LEMONS, LIMES, ORANGE, PAPAYA, PASSION FRUIT, PINEAPPLE, PRICKLY PEAR, PLANTAIN, RASPBERRIES, RHUBARB, STAR FRUIT, STRAWBERRIES, TANGELO, TAMARIND

SWEETENERS & BAKING

PURE MAPLE SYRUP, WHITE SUGAR, BROWN SUGAR, STEVIA, PALM SUGAR, RAW SUGAR, RICE MALT SYRUP, DARK CHOCOLATE, COCOA POWDER, VANILLA

ALCOHOL

MOST WINE & BEER, GIN, VODKA, WHISKEY

low fructans/GOS

VEGETABLES

ARUGULA, BAMBOO SHOOTS, BOK CHOY, BEAN SPROUTS, 4 SLICES BEET ROOT, 1/4 C. BUTTERNUT SQUASH, BELL PEPPERS, 1/2 C. BROCCOLI, CARROTS, CELERIAC, CHIVES, COLLARD GREENS, COMMON GREEN & RED CABBAGE, SWEET CORN (1/2 OF COB), RED & GREEN CHILI, CUCUMBER, EGGPLANT, ENDIVE, FENNEL BULB & STALK, GREEN BEANS, FRESH & GROUND GINGER ROOT, KABOCHA SQUASH, KALE, LETTUCE, PARSNIP, PATTY PAN SQUASH, 1/4 C. CANNED PUMPKIN, POTATO (WHITE) OR 1/2 C. SWEET POTATO, RADISH, RUTABAGA, SCALLIONS & LEEKS (GREEN PART ONLY), SPAGHETTI SQUASH, SPINACH, SWISS CHARD, SUMMER SQUASH, NORI SEAWEED, 1/2 C. TARO, TOMATOES (CANNED, CHERRY, PLUM & COMMON BEEFSTEAK), TURNIP, OIL INFUSED WITH GARLIC OR ONION, WATER CHESTNUTS, ZUCCHINI, WATERCRESS, GREEN & BLACK OLIVES

FRUITS

1/2 SMALL POMEGRANATE, 1 TB DRIED CRANBERRIES OR RAISINS, 1/4 C. DRIED COCONUT & those listed on the no excess fructose and low polyol sections.

GRAINS

GF BREAD, GF PASTA, MILLET, OATS, RICE, RICE CAKES, QUINOA, QUINOA FLAKES, SLOW LEAVENED SOURDOUGH WHEAT OR SPELT BREAD, SOBA NOODLES, POLENTA, CORN TORTILLAS

NUTS/SEEDS

10 ALMONDS, 10 BRAZIL NUTS, 10 CHESTNUTS, 10 HAZELNUTS, 20 MACADAMIAS, 32 PEANUTS, 10 PECANS, 1 TB PINE NUTS, 10 WALNUTS, 2 TB CHIA SEEDS, 2 TB POPPY SEEDS, 2 TB PUMPKIN SEEDS, 1 TB SESAME SEEDS, 2 TSP SUNFLOWER SEEDS

LEGUMES

1/4 C. DRAINED & RINSED CANNED CHICKPEAS, 1 C. EDAMAME, 1/2 C. DRAINED AND RINSED CANNED LENTILS, FIRM TOFU, TEMPEH (PLAIN)

HERBS

BASIL, CILANTRO, CORIANDER, CURRY LEAVES, KAFFIR LIME LEAVES, LEMONGRASS, MINT, ROSEMARY, PARSLEY, SAGE, TARRAGON, THYME

COFFEE AND TEA

COFFEE, ESPRESSO, TEAS: BLACK, GREEN AND WHITE TEAS, HERBAL PEPPERMINT TEA

low polyols

FRUIT

BANANA (1/3 RIPE), DRIED BANANA CHIPS, BLUEBERRIES, CANTALOUPE, DURIAN MELON, CLEMENTINE, FRESH AND DRIED COCONUT, DRAGON FRUIT, GRAPES (RED, GREEN & BLACK), RIPE GUAVA, HONEYDEW, KIWIFRUIT (GOLD & GREEN), KUMQUATS, LEMONS, LIMES, ORANGE, PAPAYA, PASSION FRUIT, PINEAPPLE, PRICKLY PEAR, PLANTAIN, RASPBERRIES, RHUBARB, STAR FRUIT, STRAWBERRIES, TANGELOS, TAMARIND

VEGETABLES

1/8 AVOCADO, 1/4 C. BUTTERNUT SQUASH, 1/4 STALK CELERY, 1/2 C. SWEET POTATO, OYSTER MUSHROOMS

SWEETENERS AND BAKING

PURE MAPLE SYRUP, WHITE SUGAR, BROWN SUGAR, STEVIA, PALM SUGAR, RAW SUGAR, RICE MALT SYRUP, DARK CHOCOLATE, COCOA POWDER, VANILLA

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REFERENCE: MONASH UNIVERSITY LOW FODMAP APP; USDA NUTRIENT DATABASE.
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Reintroduction Phase

- Slow and progressive reintroduction of the 5 sugar categories
- Completed after 2-6 weeks; patient is 50+% better with diet
- Each sugar tested over a 3 day period at differing levels to assess tolerance and thresholds

Day	Quantity / Food	Time Taken	Symptoms	Time of Symptoms
1	1 teaspoon honey			
2	2 teaspoon honey			
3	3 teaspoon honey			

Tuck et al, JGH, 2017



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Resources

- **Kate Scarlata's FODMAP Website:**
 - <http://blog.katescarlata.com/fodmaps/>
 - Checklists high vs low fodmap foods
 - Grocery list and meal ideas
 - Great weekly blog
 - Recipes
 - Fodmap brands

[illegible]

HIGH FODMAP DIET CHECKLIST

FOODS TO AVOID

By Kim Swanson RD, FODMAP & IBS expert

high lactose

(milk and milk products)

CHEESE
RECHEURTE PREPARED
RICOTTA CHEESE, COTTAGE
CHEESE

BEVERAGES
CONDENSED MILK, GOAT MILK

ICE CREAM
FANTASTICALLY GOOD ICE
CREAM, CUSTARD

ICE CREAM, CUSTARD

excess fructose

(high fructose fruits and veg)

VEGETABLES
BUTTERBEAN ARCHPEAS,
KIDNEYBEANS, TOMATO, ZUCCHINI,
PASTA, SUN-DRIED TOMATOES

FRUIT
APPLES, BERRYFRUIT
CHERRIES, FRUIT PIES,
MANGO, FRUIT JUICE, SASSAPARILLA,
WATERMELON

SWEETENERS
AGAVE, HIGH FRUCTOSE
CORNFLOUR, HONEY

ALCOHOL
RUM

high fructans

(wheat and grain)

VEGETABLES
ARTICHOKE, CARLIC, LEEK AND
SCALLIONS, THE WHITE PART OF
SHALLOT ONION, ONION AND CARLIC
FLOUR, FIVE, SEITRANS, KIDNEY BEAN

FRUIT
BANANA, FIVE, CHERRANTS, DATES,
FIG, DRIED, GRAPEFRUIT, NECTARINE,
POMEGRANATE PLUM, PRUNE,
PEACHES, WATERMELON

GRAINS
RYE, WHEAT, BARLEY

VEGETABLES
RICE, RETACHIO, CASHW

high polyols

(sugar free sweeteners)

VEGETABLES
CAULIFLOWER, MUSHROOMS,
SNOW PEA

FRUIT
APPLES, APRICOTS,
BLACKBERRY, CHERRIES,
NECTARINE, PEARS, YELLOW
PEACHES, PLUMS, PRUNE,
WATERMELON

SWEETENERS
SORBITOL, MANNITOL,
SUCRALOSE, XYLITOL

*The information provided is not to be construed for a medical diet, opportunity or claims. Always use common sense and consult your physician. Registered dietitians provide guidance on the introduction of the diet and to ensure your diet is nutritious, safe and balanced.

*This is a general guide to FODMAPs. It is not intended to be a substitute for professional medical advice. Always consult your physician or a registered dietitian for more information. FODMAPs are a group of carbohydrates that are difficult to digest. They are found in a variety of foods, including grains, fruits, and vegetables. The FODMAP diet is a low-FODMAP diet that is used to manage symptoms of irritable bowel syndrome (IBS) and other digestive disorders. The diet is based on the understanding that FODMAPs are not absorbed in the small intestine and are instead fermented by bacteria in the large intestine, which can lead to symptoms such as bloating, gas, and diarrhea. The diet is based on the understanding that FODMAPs are not absorbed in the small intestine and are instead fermented by bacteria in the large intestine, which can lead to symptoms such as bloating, gas, and diarrhea. The diet is based on the understanding that FODMAPs are not absorbed in the small intestine and are instead fermented by bacteria in the large intestine, which can lead to symptoms such as bloating, gas, and diarrhea.

Resources

- **MONASH FODMAP app:** <https://itunes.apple.com/au/app/monash-university-low-fodmap/id586149216?mt=8&ign-mpt=uo%3D4>
- **Low Fodmap Central:** <https://www.nestlehealthscience.us/lowfodmap>
- **University of Michigan FODMAP site:** <http://www.myginutrition.com/index.html>



Gastroparesis (GP)



Gastroparesis

Definition

- Gastro = stomach
- Paresis = weak muscles / partial or full paralysis
 - *Delayed stomach emptying*
- Measured using Gastric Emptying Study



Gastroparesis

Cause

- Gastroparesis in the Community Research Survey 2016
 - 1423 adults with GP
 - 44% idiopathic
 - 15% not told potential cause
 - 12% diabetes
 - Remaining – vagal nerve injury, virus, surgery, autoimmune disorder (lupus, scleroderma), medication-induced



Facts & Figures

- 50 in 100,000 persons in USA have gastroparesis
- Estimated to affect up to 5 million individuals
- More common in females
- Since initial diagnosis, 60.0% of patients experience weight loss



iffgd – aboutgastroparesis.org



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Gastroparesis

Symptoms

- Early satiety
- Postprandial fullness despite portions
- Loss of appetite
- Abdominal fullness
- Abdominal bloating
- Abdominal distention
- Abdominal discomfort or pain
- Nausea
- Vomiting



Next Steps?

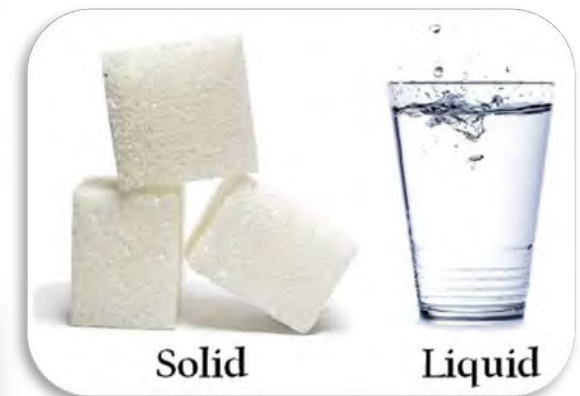
What to do?

- Medications
 - *Prokinetics*
 - *Antiemetics*
- Diet
 - ????????



Anecdote vs Evidence?

- Few studies on dietary advice for GP
- Basic advice
 - *Low fat*
 - *Smaller meals*
 - *Lower in fiber*
 - *Fluids separate from solids*



Wytiaz et al, Dig Dis Sci, 2015
Homko et al, NGM, 2015
Parrish, Prac Gastro, 2011
Yu et al, Dig Dis Sci, 2017
Parrish, Gastro Clin N AM, 2015

Anecdote vs Evidence?

Food Toleration and Aversion Survey (2015)

- *Poorly tolerated:*

- Orange and tomato juice
- Fried chicken
- Oranges
- Sausages and bacon
- Pizza
- Peppers
- Onions
- Lettuce
- Coffee
- Salsa
- Broccoli and cabbage
- Roast beef



- *Well tolerated:*

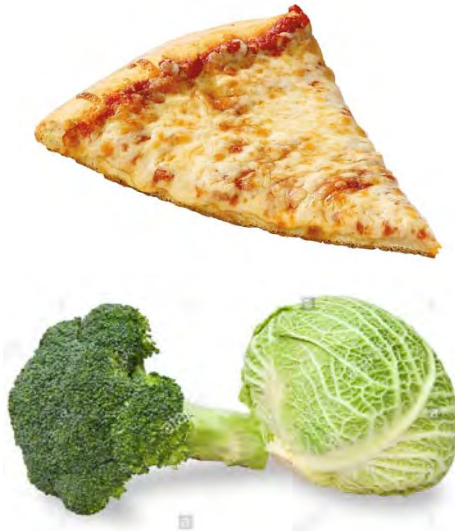
- Saltine crackers
- Jello
- Graham crackers
- Pretzels
- Potatoes
- Salmon and white fish
- Clear soups
- White rice
- Popsicles
- Applesauce
- Ginger ale
- Pasta



Anecdote vs Evidence?

Symptom-provoking foods:

- *Spicy*
- *Fatty*
- *Acidic*
- *Roughage*



Wytiaz et al, Dig Dis Sci, 2015

Tolerated foods:

- *Bland*
- *Sweet*
- *Salty*
- *Starchy*

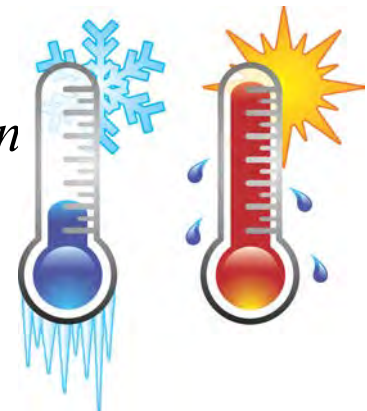
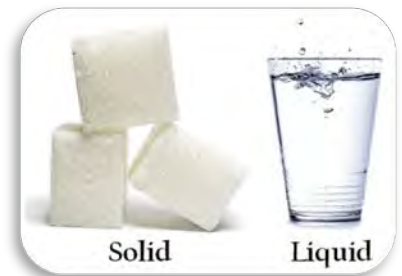


Ask Your Patient



Important Questions:

- Time
 - *Of meals in regards to symptoms; night vs morning?*
- Temperature
 - *Of foods; hot vs cold?*
- Texture / Consistency
 - *Liquids vs solids? – liquid emptying preserved in GP*
 - *Ground vs solids? – ground/pureed are more broken down*
- Amount
 - *Larger volume = slower emptying*
 - *4-6+ meals daily*



Ask Your Patient

Important Questions:

- Fat
 - *Higher vs lower?; higher likely to lead to nausea*
 - *Releases cholecystokinin which delays gastric emptying*
 - *Liquid vs solid in food?*
 - *High-fat solid > low-fat solid > high-fat liquid > low-fat l*



Wytiaz et al, Dig Dis Sci, 2015
Parrish, Prac Gastro, 2011
Parrish, Gastro Clin N AM, 2015
Homko et al, NGM, 2015



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Ask Your Patient

Important Questions:

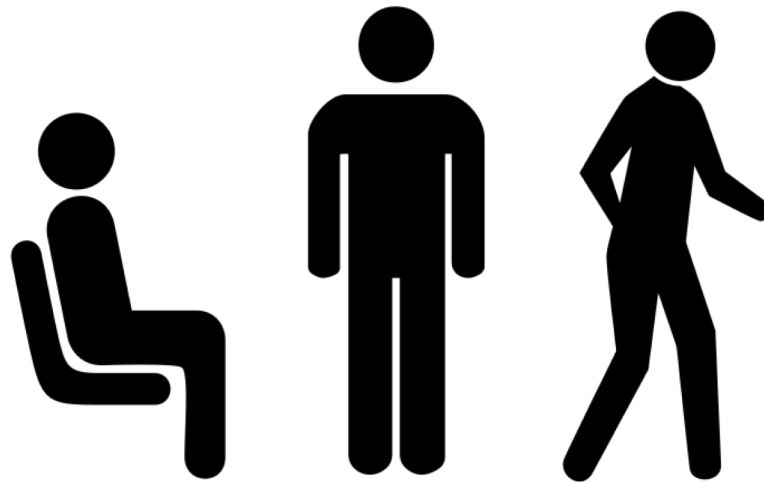
- Fiber
 - Insoluble fiber = problem
 - *Bezoars*
 - *Bloats out top portion of stomach*
 - Soluble fiber
 - *Absorbs water, moves to bottom of stomach(?)*
 - Viscous = *delayed emptying*
 - Fermentable = *delayed laxation*



Ask Your Patient

Important Questions:

- Body Position
 - *Sitting upright or walking = gravity helps encourage emptying*



Wyntaz et al, Dig Dis Sci, 2015

Parrish, Prac Gastro, 2011

Parrish, Gastro Clin N AM, 2015



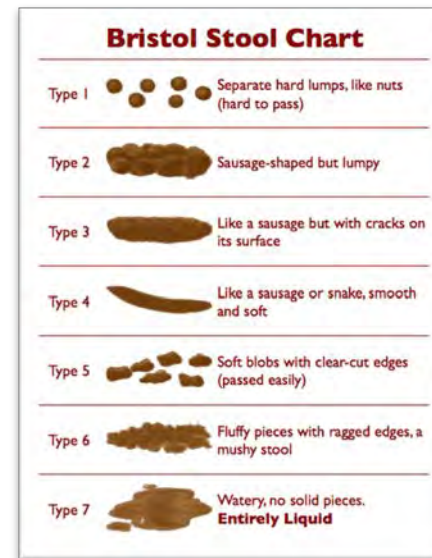
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Gastroparesis

Side Effects

- Constipation
 - *Osmotic laxatives and stool softeners*
- Glycemic control
- Unintentional weight loss
 - *UBW vs current weight*
 - *Using ideal body weight = overestimation/underestimation of degree of nutrition risk*
 - *Unintentional weight loss greater than 5-10% over 3-6 months*
 - *May require EN/PN*



Parrish, Prac Gastro, 2011

Parrish, Gastro Clin N AM, 2015



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Gastroparesis

Parkman et al, Gastroenterology, 2011

- Used NIDDK Gastroparesis Registry
 - *Gastroparesis (on PO intake) = 305 total; (204 idiopathic, 101 diabetic)*
 - *Completed diet questionnaires (Block FFQ) at 7 centers*
- Majority of patients with gastroparesis consume diets deficient in
 - *Calories (average 1168 calories)*
 - *Carbohydrates (48% of intake; 139 +/- 95 grams)*
 - *Protein (16% of intake; 49 +/- 38 grams)*
 - *Vitamins*
 - *Minerals*



Gastroparesis

Energy deficient diet vs. energy appropriate

- Vitamin A (50% vs 10%)
- Thiamin (62% vs 4%)
- Riboflavin (50% vs 2%)
- Vitamin B6 (55% vs 5%)
- Vitamin B12 (45% vs 5%)
- Vitamin C (66% vs 19%)
- Vitamin D (71% vs 44%)
- Niacin (66% vs 5%)
- Folate (90% vs 31%)
- All minerals (40% to 63% more patients were inadequate in their intake)



Gastroparesis

Side effects

- Vitamin / Mineral / Calories / Protein Deficiencies
 - *Depending on anatomy (gastric surgeries)*
 - *Chewable and liquid supplements = better tolerated*
 - *Watch for GI irritant inactive ingredients (polyols, fructose)*
 - *May require EN/PN*



Nutrition Facts

Serving Size 1 Carton (11 FL. OZ.)

Servings Per Container 1

Amount Per Serving

Calories 220 Fat Calories 50

% Daily Value*

Total Fat 6g 9%

Saturated Fat 1g 5%

Trans Fat 0g

Cholesterol 0mg 0%

Sodium 190mg 8%

Potassium 170mg 5%

Total Carbohydrate 25g 8%

Dietary Fiber 2g 8%

Sugars 9g

Protein 16g 32%

Vitamin A 25% • Vitamin C 25%

Calcium 10% • Iron 10%

Vitamin D 25% • Vitamin E 25%

Thiamine 10% • Riboflavin 20%

Niacin 20% • Vitamin B6 15%

Folate 25% • Vitamin B12 25%

Biotin 10% • Pantothenic Acid 25%

Phosphorus 30% • Iodine 25%

Magnesium 20% • Zinc 20%

Copper 25%

*Percent Daily Values are based on a 2,000 calorie diet.



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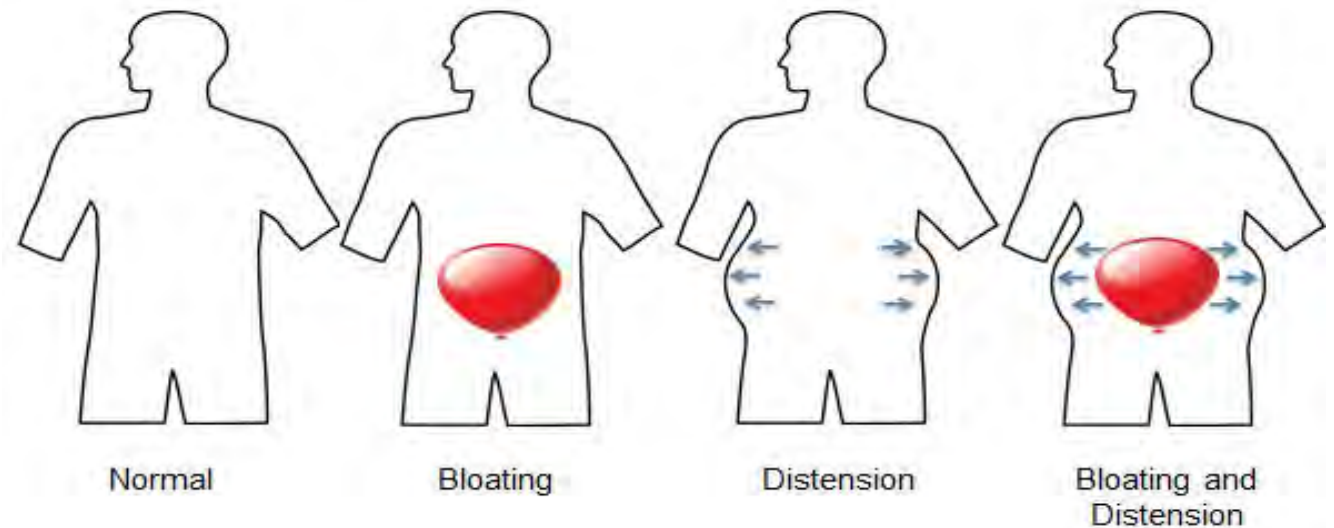
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Gas & Bloating



Gas & Bloating

- **Bloating:** *the subjective sensation or feeling of increased abdominal pressure*
- **Distention:** *the objective increase in diameter of the abdominal area*



Courtesy Lynn Connolly MD MSCR

Facts & Figures

- Affects 20-30% of general population
 - *50% say severity affects daily activities*
- More frequent in women (2:1)
- 76-96% of IBS patients have bloating
 - *2nd most common symptom after pain*
 - *Up to 60% rate bloating as most problematic symptom*
- 50% of functional dyspepsia and chronic constipation patients have bloating

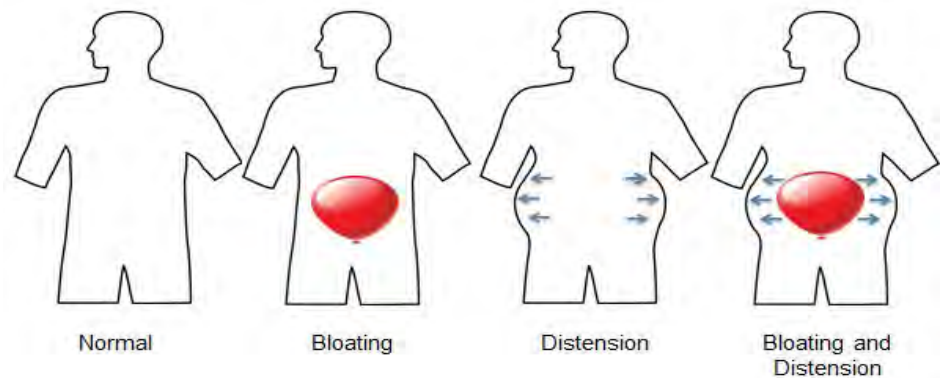


Courtesy Lynn Connolly MD MSCR

Next Steps?

What to do?

- Medications
- Procedures / Testing
- **Look for food triggers**
- Add in anti-gas supplement



The FODMAP Problem

	Fructans / GOS	Fructose / Polyols	Lactose
Osmotic Effect	+	+++	+++
Fermentation	+++	+	++
Result?	Gas and bloating	Diarrhea	Diarrhea, possible gas and bloating

Courtesy Kate Scarlata



David Geffen
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UCLA Health

Sulfur-Contributing Foods

Malodorous Flatus

Hydrogen sulfide gas creation:

1. Colonic bacteria degrade cysteine and methionine (conversion to homocysteine) - *Enterococci*, *Enterobacteria*, and *Clostridia* (*E. coli*)
2. Pyruvate and α -ketobutyrate = electron donors to generate more H_2S
3. Inorganic sulfur from cruciferous and alliums
4. γ -Proteobacteria reduce iron flavoproteins to produce H_2S



Sulfur-Contributing Foods

Dietary sources derived from Sulphur-containing AAs and special metabolites:

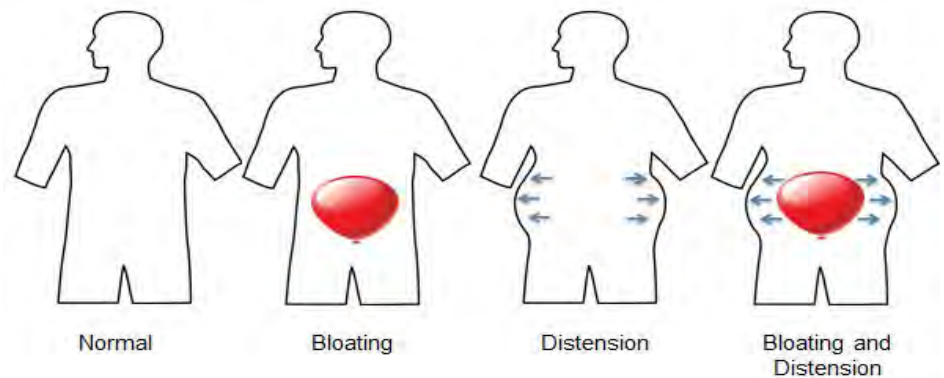
- Legumes (including peanuts and peas)
- Beans
- Soybeans
- Aged cheese (Swiss, muenster, provolone, etc.)
- Eggs (yolk)
- Beef
- Fish (pink)
- Garlic / Onion
- Whey
- Broccoli
- Cauliflower
- Brussels sprouts
- Asparagus
- Cabbage



Next Steps?

What to do?

- Medications
- Procedures / Testing
- Look for food triggers
- **Add in anti-gas supplement**



Digestive Enzymes



Gas from GOS:

- **α -galactosidase** - 300 GALU taken with high GOS foods provides clinically significant reduction in symptoms in GOS-sensitive individuals with IBS

Gas from Lactose

- **β -galactosidase** - 20 grams lactose required 3000 ALU to achieve symptoms reduction in lactose-intolerant individuals



Tuck, *Am J Gastro* 2017

Montalto, *Eur J Clin Nutr.* 2005



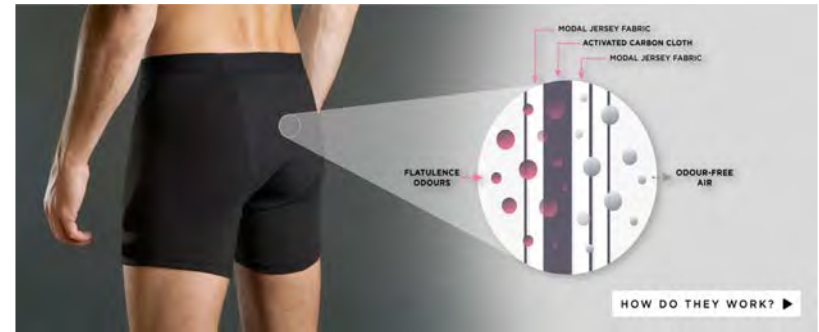
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Simethicone + Charcoal

Limited Studies

- Simethicone alone
 - *Surfactant to ease passage of gas, increase transit time*
- Activated Charcoal
 - *Significant reduction in bloating and gas (n=99)*
- Simethicone, activated charcoal, magnesium
 - *FD (n=276) vs placebo: significant reduction in post-prandial fullness, epigastric pain, burning, abdominal bloating*
- Charcoal underpants





Peppermint & STW-5



- **Peppermint:**
 - Smooth muscle calcium channel antagonist – *decrease contractions*
 - Normalization of orocecal transit time – *slow motility*
 - Carminative effects – *prevent flatulence*
 - Serotonergic (5HT3) antagonism – *antiemetic*
- **STW-5:**
 - Preparation combining 20 different herbs
 - Meta-analysis - double-blind, placebo-controlled, multi-center trial
 - *STW5 more effective than placebo for functional dyspepsia*
 - *Bloating was not studied - “Relieved the sensations of fullness and tension, which could be considered a surrogate for bloating”*

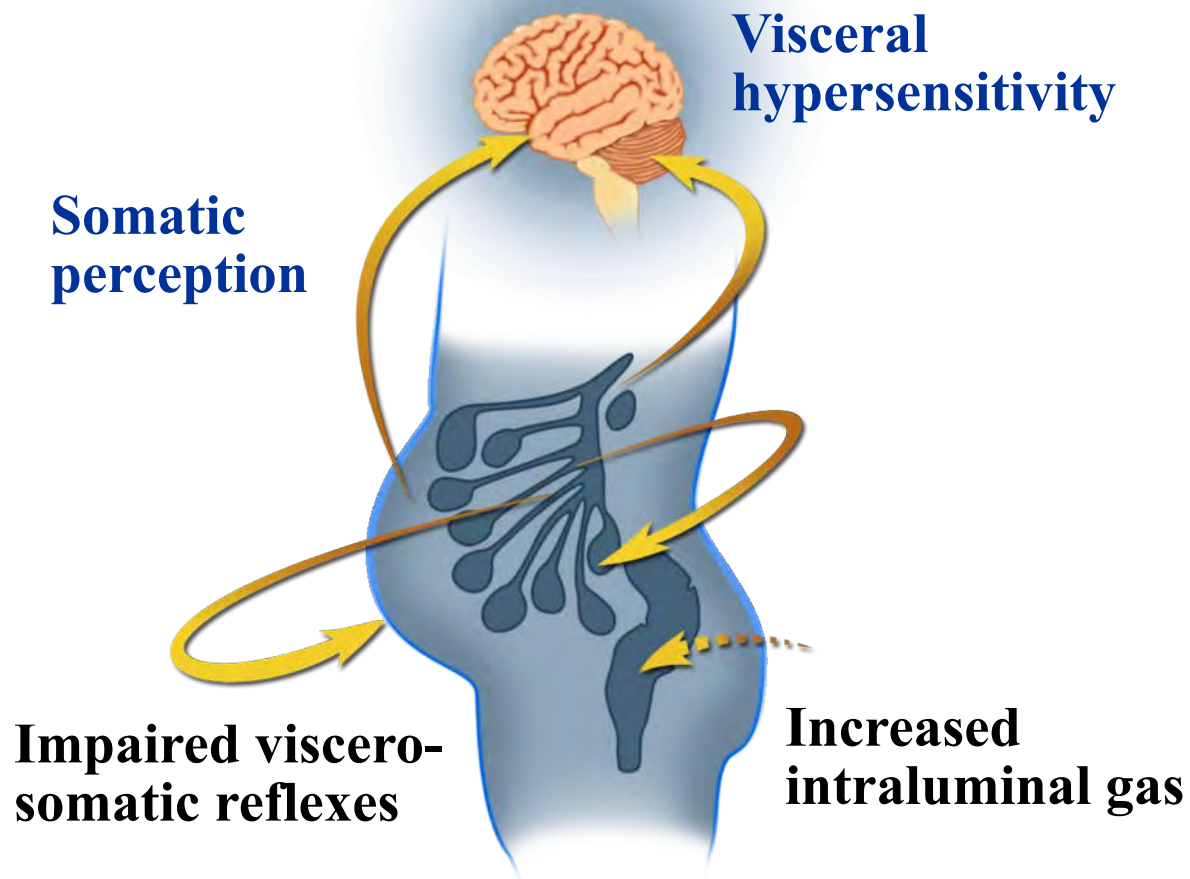
Madisch, Aliment
Pharmacol Ther. 2004



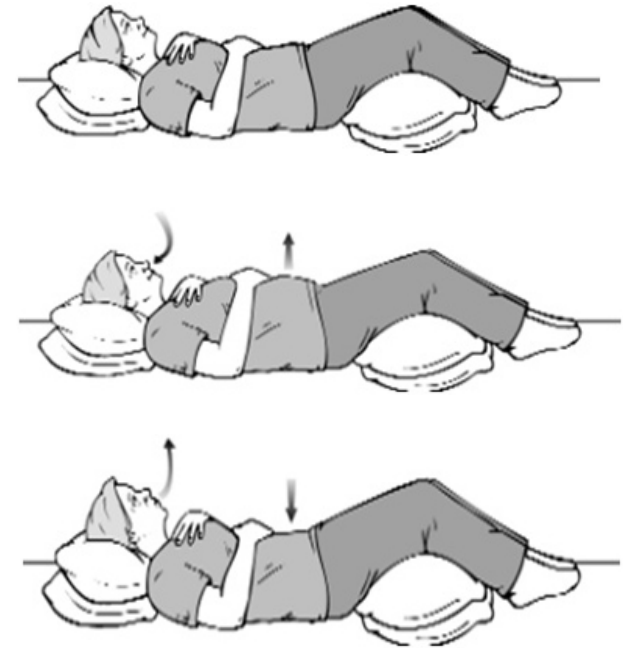
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Distention & the Diaphragm



Diaphragmatic breathing exercises



Adapted from Azpiroz F, Malagelada J-R. Gastroenterology 2005



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Take Home Messages

- Irritable Bowel Syndrome
 - *Needs a well rounded / whole being approach*
 - *Low fodmap diet as first line treatment*
- Gastroparesis
 - *Individualized for patient needs*
 - *Be careful of deficiencies and weight loss*
- Gas and Bloating
 - *Food triggers vs supplements*
 - *Diaphragmatic breathing exercises can help distention only patients*



Thank You!!



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Questions to Keith –

IBS:

- 1) how often do you use low fodmap?
- 2) What about IBS-C patients?
- 3) Do you use probiotics?
- 4) what about digestive enzymes

GP:

- 1) how often do you prescribe oral supplements?
- 2) can you use fiber supplements for constipation in GP?



What do I want Keith to say – bio

Nancee graduated from California State University, Los Angeles, where she earned her masters of science in nutrition. She completed her dietetic internship at the Cedars-Sinai Medical Center and at the University of California, Los Angeles, where she was mentored by Dr. Lin Chang of the G. Oppenheimer Center for the Neurobiology of Stress and Resilience.

Nancee was invited to join the UCLA Vatche and Tamar Manoukian Division of Digestive Diseases in 2012, where she is an integral part of the Celiac Disease Program and Digestive Health & Nutrition Clinic. She is involved with direct patient interaction during individual nutrition counseling sessions on such disease states as irritable bowel syndrome, inflammatory bowel disease, celiac disease, short bowel syndrome and idiopathic or functional bowel.

Nancee was a reviewer for the American Gastroenterological Association patient initiatives for short bowel syndrome and the low fodmap diet in 2016. She also helps mentor the division's fellows and is asked to speak on nutrition and digestive disorders at conferences inclusive of the Southern California Society of Gastroenterology. Nancee is currently working on research regarding the reintroduction phase of the low fodmap diet with Dr. Lin Chang.