INE INSTITUTE OF NUTRITIONAL ENDOCRINOLOGY

Food Principles: FODMAPs

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FODMAPs

- FODMAPs were discovered AFTER the SCD and GAPS diets were developed
- Low FODMAPs Diet was developed in 1999 at Monash University in Australia by Susan Shepherd and Peter Gibson

The FODMAPS Acronym:

- Fermentable
- Oligosaccharides
- Di-saccharides
- Mono-saccharides
- And….
- Polyols

Low FODMAPs Diet is Helpful For:

- IBS symptoms
- Crohn's
- Colitis
- SIBO
- Leaky gut
- Celiac disease

Clients Typically Affected

- Gas and bloating within 3 hours of eating
- Leaky gut
- Multiple food allergies
- Celiac
- Diagnosis of SIBO
- History of IBS or IBD

FODMAP Intolerance Symptoms

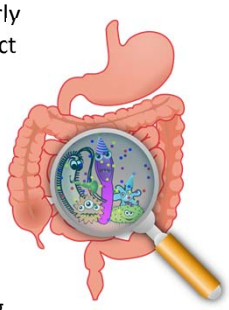
- Gas
- Bloating
- Diarrhea
- Constipation
- Burping
- Abdominal pain
- Diagnosis of SIBO

Understanding FODMAPS Symptoms:

- Gas in the digestive system is created through fermentation
- Foods will be fermented if poorly digested
- Bacteria in our digestive tracts will adapt to ferment ANYTHING we can't digest

Fermentable

- High FODMAP foods are poorly absorbed in the intestinal tract and can feed bacteria
- A wide variety of bacteria ferment FODMAPS
- Fermentation in the large intestine = normal
- Fermentation in the small intestine creates gas/bloating



Oligosaccharides

- Oligo = "a few, a small amount" of saccharides (sugars)
  - More than "di" (2)
  - Not "poly" (many)

Fructans & Fructo Oligo Saccharides (FOS)

- Chains of fructose molecules with a glucose molecule at the end
- **Examples:**
  - Wheat
  - Onions
  - White bulbs of green onions
  - Garlic
  - Leeks
  - Legumes: peas, dry beans, and lentils (these are also alpha-linked GOS)
  - Cabbage
  - Brussels sprouts
  - Artichokes
  - Beets
  - Asparagus
  - Chicory
  - Dandelion tea
  - Inulin and FOS in prebiotics and other supplements

Galactans & Galacto Oligo Saccharides (GOS):

- **Galacto = "milk" - a less sweet sugar found in:**
  - Dairy products
  - Sugar beets
  - Jerusalem artichokes
  - Manufactured by the body during lactation as glucose is converted into galactose
  - GOS foods may be included on a low FODMAP diet IF tolerated
- **Examples:**
  - Chick peas
  - Lentils
  - Cabbage
  - Brussels sprouts
  - Legumes: beans, peas, soy
  - Green beans

Oligosaccharide Examples

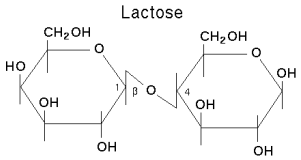
- Onions
- Green onions (white part)
- Garlic
- Leeks
- Peas
- Legumes
- Lentils
- Cabbage
- Brussels sprouts
- Artichokes
- Beets
- Asparagus
- Chicory
- Dandelion tea
- Inulin
- Chick peas
- Green beans
- Beans (other types)
- Wheat
- Soy
- FOS (powders and supplements)

Oligosaccharide-Rich Meals

Disaccharides

- Lactose, sucrose, maltose, and isomaltose
- Under 4 mg of lactose is often tolerated
- The following have 1 mg of lactose:
  - 2 tablespoons of cottage cheese
  - 1 tablespoon of cream or sour cream
  - 1 teaspoon of cream cheese

Lactose



Disaccharide Examples

- Sweet potato
- Turnip
- Pears
- Kamut/spelt
- Edamame
- Raw broccoli
- Pickles or pickled foods
- Malted grains - sprouted and dried
- Kiwi
- Wheat
- Corn
- Peas

Disaccharide-Rich Meals

Monosaccharides

- Glucose
- Fructose
- Galactose

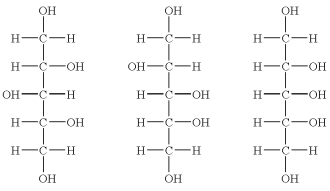
Monosaccharides: About Fructose

- Fructose: Sugars derived from fruits
- Low FODMAPS diet is LOW and/or BALANCED fructose
- Digestive tract has both fructose and glucose transporters for absorption
- Piggyback effect:
  - When fructose is less than or equal to glucose
  - Less digestive disturbance

Monosaccharide-Rich Meals

Polyols

- Sugar alcohols that often end in "-ol"
- In some "sugar-free" foods
- Naturally occurring in many fruits/veg



Polyol Examples

- Sugar alcohols:
  - Sorbitol, mannitol, maltitol, xylitol, erythritol, etc.
  - Often end in "-ol"
- Fruits:
  - Apples, apricots, blackberries, cherries, nectarines, lychees, pears, plums, prunes, watermelon, avocado
- Vegetables:
  - Cauliflower, mushrooms, snow peas

Polyol-Rich Foods

Oopsie

- Fruits contain both glucose and fructose
- Xylitol and Erythritol are polyols
- Shiritake noodles are very, very high FODMAP (miracle noodle)

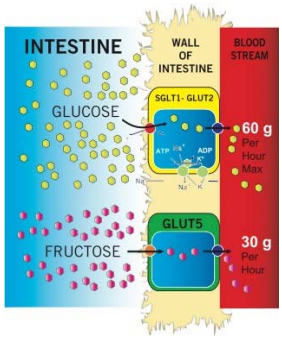
FODMAPS, GAPS, and SCD

- The GAPS diet removes disaccharides and polysaccharides (Glucose, Fructose, and Galactose are allowed)
- The SCD diet removes disaccharides and polysaccharides
- Monosaccharides are the only sugars in SCD / GAPS
- The Low FODMAP diet lowers mono/di/oligo saccharides, polyols, and theoretically fructose
- The diets are *similar* but implemented differently
- SCD and GAPS often encourage repopulating diverse digestive bacteria
- The elemental diet and juice (depending on the juice) or water fasting are also low FODMAP…

Fructose Malabsorption and the Gut/Brain Connection

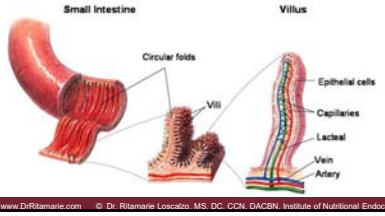
- Fructose malabsorption reduces gut motility
- Fructose malabsorption = decreased plasma tryptophan
- Decreased tryptophan = decreased serotonin
- Low serotonin = anxiety, depression, sleep problems
- Individuals with autistic spectrum disorders have been shown to be deficient in fructose AND glucose transporters
- No/low fructose AND no/low glucose may be best for some people

Fructose and Glucose Absorption



Digestive Enzymes and FODMAPs

- Almost ALL edible plants contain FODMAPS
- FODMAPs are part of a range of carbohydrates
- FODMAPs are digested with the help of Brush Border Enzymes
- BB Enzyme production = FODMAP tolerance



SIBO

- Small Intestinal Bacterial Overgrowth
- Imbalanced bacteria
  - E. Coli, Klebsiella, Clostridium, Staph, Strep
- Produce D Lactic Acid (change environment)
- Alert the immune system
- Grow out of proportion
- Reduce mucosa

Symptoms of SIBO

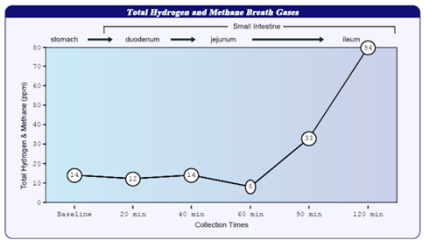
- Gas
- Bloating
- Fatigue
- Autoimmunity
- Fibromyalgia
- Nutrient deficiencies
- Pain (digestive)
- Symptoms of irritable bowel
- Diarrhea or constipation

Breath Testing

- Lactulose, lactose, glucose, or fructose = methane or methane AND hydrogen gas
- Breath test
- Can diagnose SIBO
- Can assess severity of SIBO
- Fructose + gas = fructose malabsorption
- Lactose + gas = lactose "intolerance"
- Glucose used as reliably as lactulose

About Breath Testing

- Glucose results = Lactulose results in most cases
- Quintron tests currently most reliable (ask your lab)
- Breath testing preparation foods are not ideal



Low FODMAPs Food Trial

- Alternative to breath testing
- Find an elimination system that works for you
- Some avoid fructose/lactose first, some avoid all
- Nobody digests oligosaccharides and polyols, so best avoid
- Fruits may be included with careful blood sugar monitoring if not producing gas
- Will need a provocation/testing phase
- Foods are meant to be added back to determine tolerance threshold
- Any FODMAP elimination is best short-term

Implementing the FODMAPs Trial

- **Elimination phase:** Avoid all high FODMAP foods for 2-8 weeks
- **Provocation phase:** Re-introduce one FODMAP category at a time
  - Start with a small serving size (1/2 cup or less)
  - If tolerated, add the category back into the diet and move on to the next category
  - If not tolerated, eliminate from diet and move on to the next category
  - FODMAP reactions can be cumulative… think MEAL totals
  - Oils of high FODMAP foods are fine

Garlic and shallot oil infusions can add flavor to a Low FODMAPs Diet without provoking symptoms. Thoroughly peel and clean (to avoid any potential contamination from Clostridium Botulinus - the bacteria responsible for tetanus and botulism that lives in the soil and is produced as they ferment) 8 - 10 raw garlic or 1/2 cup chopped shallots and place in a glass jar with 1 cup of flax, hemp, or chia oil (olive and other oils will solidify in the fridge). Refrigerate for 24-48 hours and then strain thoroughly. Will keep in the fridge for 10 days.

FODMAPs with Dysbiosis

- SCD/GAPS + low FODMAPs combo = safest to start with
- Dietary and herbal protocols are followed for 8 - 12 weeks
  - Gas, bloating, constipation, diarrhea, and other symptoms should improve
- Breath test can be repeated after 90 days

Improving FODMAP Tolerance

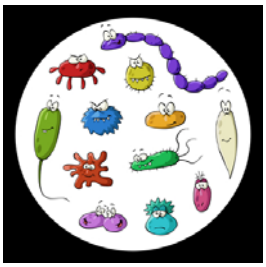
- Remove high FODMAP foods to stop "feeding" wrong bacteria
- Address bacterial overgrowth with a customized protocol
- Improve small intestinal motility
- Re-populate the gut with the proper probiotics
- Steaming or cooking and pureeing low FODMAPs vegetables can improve tolerance
- Test back categories over time

Improving Small Intestinal Motility

- Reduce Clostridia, E. Coli, H. Pylori, Klebsiella, Citrobacter, and other dysbiotic bacteria
- Increase beneficial Lactobacillus bacteria such as Plantarum, Fermentum, and Bulgaricus as well as Bacillus Subtilis and Clausii, bacteria shown to reduce SIBO and improve motility
- Support adrenal health
- Investigate thyroid hormones
- Support liver health and bile production
- Investigate dehydration
- Sleep on an empty stomach
- Support sleep
- Resolve Candida and blood sugar issues
- Look for spinal abnormalities
- Support the nervous system

Bacteria for Small Intestinal Motility

- **Reduce:**
  - Clostridia
  - E. Coli
  - H. Pylori
  - Klebsiella
  - Citrobacter
  - Other dysbiotic bacteria
- **Increase:**
  - Plantarum,
  - Fermentum
  - Bulgaricus
- Bacillus Subtilis and Clausii shown to reduce SIBO and improve motility



Low FODMAPs Diet Pros & Cons

- **Pros:**
  - Can be effective in reducing bacterial overgrowth symptoms
  - Can be effective for relief of IBS symptoms
- **Cons:**
  - Diet alone may not resolve SIBO or IBS
  - Adds another level of dietary restriction

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