

# Digestive Health and Medical Diets Demystified

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## Outline

- ▶ GUT basics
  - ▶ Mouth
  - ▶ Esophagus
  - ▶ Stomach
  - ▶ Small intestine
  - ▶ Large intestine
- ▶ Signs of dysfunction
  - ▶ Functional bowel disorder
  - ▶ Inflammatory bowel disease
  - ▶ Intestinal permeability
    - ▶ Aka: leaky gut syndrome
- ▶ The GUT Brain
- ▶ The Role of Probiotics
- ▶ Medical diets
  - ▶ Elimination diet
  - ▶ Paleolithic diet
  - ▶ Ketogenic diet
  - ▶ Specific carbohydrate diet (SCD)
  - ▶ Gut and psychology syndrome (GAPS) diet
- ▶ Weston A. Price Foundation

## GUT Basics

- ▶ Mouth
  - ▶ Chewing increases the surface area of food
    - ▶ Teeth
    - ▶ Tongue
    - ▶ Saliva glands
  - ▶ An enzyme (called salivary amylase) begins the process of carbohydrate and fat digestion.
    - ▶ You'll notice that the longer you chew, grains will become sweeter
- ▶ Esophagus
  - ▶ The conduit through which food passes to reach the stomach.
  - ▶ Most common problem:
    - ▶ Heartburn (Gastroesophageal Reflux disorder or GERD for short)
    - ▶ Which can progress to 'Barrett's Esophagus' the stage before cancer of the esophagus develops.

## GUT Basics

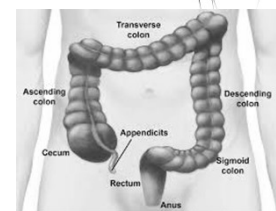
- ▶ Stomach
  - ▶ Food gets progressively smaller with the muscular contractions or 'churning' of the stomach.
    - ▶ The goal remains to increase the surface area of food
  - ▶ Stomach acid begins the process of protein digestion
    - ▶ Protective against bacteria and fungi
    - ▶ Decreased supply with aging, adrenal insufficiency, alcohol consumption, and medications
- ▶ Most common problems:
  - ▶ GERD. Why? Usually because of insufficient stomach acid.
  - ▶ Ulcers. Why? H. Pylori infection. 90% duodenal ulcers and 70% gastric ulcers
  - ▶ How can I tell? Burping, gnawing feeling under the ribcage, burning behind the sternum, repeating food, nausea, bloating and rosacea

## GUT Basics

- ▶ Small Intestine
  - ▶ This is where the majority of digestion and absorption take place.
  - ▶ Gut wall lined with protrusions called 'villi'.
    - ▶ Coated with 'enterocytes'
      - ▶ Complete process of digestion
      - ▶ "brush border" of enzymes
    - ▶ Vulnerable to damage
  - ▶ Also the site of roughly 80% of our immunity
    - ▶ Gut Associated Lymphoid Tissue.
    - ▶ Secretory IgA
      - ▶ First line defence against pathogenic material
  - ▶ Damage to small intestine caused by:
    - ▶ Gluten and other food intolerances
    - ▶ Antibiotics
    - ▶ Dysbiosis
    - ▶ Acute/Chronic stress
    - ▶ Birth control pill
    - ▶ Birth\*
  - ▶ Site of "intestinal permeability"....

## GUT Basics

- ▶ The large intestine
  - ▶ Largely tasked with absorbing remaining water from digestive material.
  - ▶ Vitamins K1 and K2 are produced here
    - ▶ Involved in blood clotting and bone health
  - ▶ Biotin and other Bs are produced here as well
    - ▶ Via bacterial flora
  - ▶ Most common problems:
    - ▶ IBS, diverticulosis, Crohn's, Ulcerative Colitis and Colorectal cancer
  - ▶ How can I tell? Constipation, diarrhea, bleeding and mucus in the stool.
  - ▶ Why? Food sensitivities, antibiotics, chronic constipation and autoimmune dysfunction



### Functional GUT disorders

- ▶ Lasting a total of 12 weeks over the last 12 months
- ▶ Absence of structural or biochemical abnormality
  - ▶ Bloodwork, endoscopy, colonoscopy, ultrasound
  - ▶ All normal
- ▶ Conventional treatment aimed at alleviating symptoms while leaving the cause unaddressed
- ▶ Symptoms range
  - ▶ Burping
  - ▶ Reflux
  - ▶ Abdominal pain
  - ▶ Gas/bloating
  - ▶ Constipation/obstipation
  - ▶ Loose stool/diarrhea

### Small Intestine Bacterial Overgrowth (SIBO)

- ▶ Mild to moderate cases
  - ▶ Bloating, gas, abdominal discomfort/pain, diarrhea, and constipation
- ▶ Severe cases
  - ▶ Signs of malabsorption
    - ▶ Unexplained weight loss
    - ▶ Malnutrition
    - ▶ Fat in the stool
    - ▶ Liver lesions (changes to tissue)
    - ▶ Skin lesions
    - ▶ Joint pain
    - ▶ Autoimmunity
- ▶ Testing:
  - ▶ Hydrogen breath test most common
  - ▶ Gold standard of aspirating contents of jejunum and subsequent culture
    - ▶ Invasive
    - ▶ False positives
  - ▶ Is usually not done leaving patients with ineffective medications as 'treatment' while the cause goes unaddressed
  - ▶ Rifaximin and Neomycin are treatments of choice
    - ▶ Not systemically absorbed

### Inflammatory Bowel Disease (IBD)

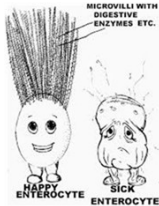
- ▶ Crohn's disease
  - ▶ Stool: porridge-like with presence of fat (steatorrhea)
  - ▶ Fever is a common feature
  - ▶ Can develop 'fistulae' or communicate with other compartments of anatomy
    - ▶ E.g bladder
  - ▶ Weight loss is common
- ▶ Ulcerative colitis
  - ▶ Stool: mucus-like with blood
  - ▶ Urgent need to visit toilet
  - ▶ Severe disease indicated by fever
- ▶ Conventional treatment
  - ▶ Steroids
  - ▶ Immunosuppressant drugs
- ▶ Can occur anywhere along digestive tract
  - ▶ Small and large intestine most common
- ▶ Common feature of both
  - ▶ GUT flora is completely altered
  - ▶ Perform entirely different functions
    - ▶ Perpetuate inflammation

### Intestinal Permeability: Leaky Gut Syndrome

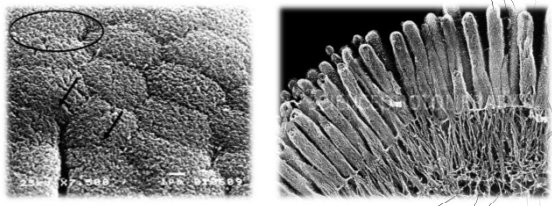
- ▶ Dysfunction at the level of the enterocyte (cells along the small intestine wall)
  - ▶ Tight junctions allow foreign material across the gut wall
  - ▶ Picked up by regional lymphatics and bloodstream as 'foreign'
    - ▶ Subsequent antibody development
      - ▶ Creates confusion in immune system
        - ▶ Over react: Atopic conditions (eczema, allergies, asthma)
        - ▶ Attack self: autoimmunity (celiac, rheumatoid arthritis, multiple sclerosis)

### Intestinal Permeability: Leaky GUT Syndrome

- ▶ Often, but not always, associated with gastrointestinal symptoms
  - ▶ Gas, bloating, reflux, pain, constipation, diarrhea (functional changes)
- ▶ Chronic irritation to gut wall allows for more food particles and waste material to enter
- ▶ Immune system becomes increasingly reactive
  - ▶ Continued antibody formation and inflammation. Recall:
    - ▶ Atopy: eczema, asthma, allergies
    - ▶ Autoimmune disorders
    - ▶ Mood/behavioral disorders
- ▶ Over time gut architecture becomes compromised
  - ▶ Lose ability for optimal absorption and assimilation of food
    - ▶ Nutritional compromise
- ▶ Susceptibility to infection
  - ▶ H. pylori
  - ▶ Fungal infection
  - ▶ Parasites




### Small Intestine: A Comparison




## The GUT Brain

- ▶ Leaky Gut associated with
  - ▶ Migraines
  - ▶ Depression/Anxiety
  - ▶ ADD/ADHD
  - ▶ ASD
  - ▶ Obesity
- ▶ How?
  - ▶ Via vagus nerve
    - ▶ 80% of fibers send info TO the brain
      - ▶ Affected by gut microflora
        - ▶ Metabolites are neuroactive
          - ▶ GABA, noradrenaline, serotonin, dopamine
      - ▶ Negative emotions suppress activation
        - ▶ Decreased stomach acid
        - ▶ Reduces secretion of pancreatic enzymes
        - ▶ Decreased blood flow to digestive tract
        - ▶ Suppresses Iga
    - ▶ Chronic inflammation
      - ▶ Chemical messengers travel to brain and activate immune cells in the brain
      - ▶ Result is SLOWER nerve conduction



## Antibiotics: Friend or Foe?

- ▶ Prior to 1940, infectious disease most common cause of death
  - ▶ Presently, cardiovascular disease, cancer and diabetes are most common causes
- ▶ ADD/ADHD, ASD, Atopy and autoimmunity are all on the rise
  - ▶ While wiping out presenting infection, ABCs also wipe out protective bacteria
  - ▶ ABC misuse leads to drug resistant bacteria
    - ▶ Refractory to treatment
- ▶ Side effects of ABCs
  - ▶ Nausea/Vomiting
  - ▶ Rashes
  - ▶ Diarrhea
  - ▶ Abdominal pain
  - ▶ Increase risk of:
    - ▶ Pseudomembranous colitis
    - ▶ C. difficile
    - ▶ Lowered immunity
      - ▶ Lacking protective effect of beneficial bacteria
    - ▶ Intestinal hyper permeability
  - ▶ Hygiene hypothesis said to be linked to increases in autoimmunity and Atopy



## Probiotics: What's the big deal?

- ▶ Immune benefits
  - ▶ Crowd out harmful bacteria
  - ▶ Induce immune tolerance
    - ▶ Help cope with environmental pathogens
  - ▶ Protect against autoimmunity
  - ▶ Protect against mood disorders
  - ▶ Initiates immune development in infants
    - ▶ Entero-mammary pathway
  - ▶ Reduces risk of atopy
- ▶ Digestive benefits
  - ▶ Reduces putrefaction of foods
  - ▶ Reduces bloating and gas
  - ▶ Aids elimination
  - ▶ Stimulates bile release
  - ▶ Manufactures nutrients
    - ▶ Vitamin K2, folate
  - ▶ Converts fiber into short chain fatty acids
    - ▶ Feed the gut wall
  - ▶ Protective against excessive weight gain
  - ▶ All cultures have some source of fermented food



## Medical Diets: The Elimination Diet

- ▶ First line therapy when addressing functional GUT disorders in addition to:
  - ▶ Joint pain
  - ▶ Fatigue
  - ▶ Hormonal dysregulation
  - ▶ Brain fog
  - ▶ Skin lesions
- ▶ Eliminates most common sources of food intolerances for 4-6 weeks

Gluten	Eggs (AIP)
Dairy (AIP)	Corn (AIP)
Soy (AIP)	Nightshades (AIP)
Sugar (AIP)	Peanuts (AIP)
Shellfish	Beef and Pork

## Medical Diets: The Paleolithic Diet

- ▶ Helpful when results are limited with elimination diet
  - ▶ Indicative of increased damage to GUT wall
- ▶ Removes further obstacles to digestion
  - ▶ Grains and pseudo-grains
  - ▶ Legumes
  - ▶ Tree nuts (AIP)
  - ▶ Dairy
  - ▶ Refined sugar
- ▶ Lectins
  - ▶ Resist digestion, inhibit enzymatic activity and stimulate the immune system
- ▶ Phytic Acid
  - ▶ Suppress activity of digestive enzymes
  - ▶ Act as 'anti-nutrient' to mineral absorption
- ▶ Saponins
  - ▶ Acts as a 'detergent' and degrades cell membranes of enterocytes
  - ▶ Nightshade vegetables

## Medical Diets: Specific Carbohydrate Diet

- ▶ Was invented in the 1950s by renowned pediatrician, Dr. Sidney Valentine Haas
  - ▶ Patients did very well with animal fats and proteins but intolerant to complex carbohydrates and their various sources (grains and starchy vegetables)
  - ▶ Useful for all digestive disorders of the time
    - ▶ Crohn's, ulcerative colitis, celiac
  - ▶ Popularized by Elaine Gottschall, author of "Breaking the Vicious Cycle"
    - ▶ Daughter cured of Ulcerative colitis and neurological issues after 2 years on SCD
- ▶ Monosaccharides are the only permissible starch
  - ▶ Glucose, fructose and galactose
  - ▶ Must omit di and poly - saccharides
    - ▶ Difficult to digest. Left to ferment
    - ▶ Feed harmful bacteria - source of inflammation in the bowel
  - ▶ Grains and legumes have only been consumed for 10,000 years vs 2 million years of human existence.
    - ▶ The exceptions are lentils, split peas and dried beans only after 12 hours of soaking.
  - ▶ Goal is to starve harmful bacteria and restore function to GUT wall

## Medical Diets: The Ketogenic Diet

- ▶ Forces the body to burn fat and not starch
    - ▶ 'Carb' adapted vs 'keto' adapted
  - ▶ Used in the 1920s to treat epilepsy in children
    - ▶ Fell out of favor with the introduction of anti-convulsant drugs
    - ▶ Revival with the popularity of the 'Atkin's Diet' in the 1990s
  - ▶ Well constructed plan limits the development of troublesome side effects
  - ▶ Used to treat: Alzheimer's, diabetes, PCOS, Autism, MS etc...
- ▶ Goals
    - ▶ Protein based on amount needed to maintain lean muscle mass of 'reference weight' (-25%)
    - ▶ Carbohydrates are set to 60 gms or less (10-15%)
    - ▶ Remaining calories are to come from fat (70-75%)
      - ▶ MCT oil/coconut oil
      - ▶ Rendered animal fats
      - ▶ Heavy creams
      - ▶ Avocados
    - ▶ Requires: 2 cups of dark greens, LOTS of water, salt your food
    - ▶ Be aware of side effects of transition and have a plan in place to treat

## Medical Diets: The GAPS diet

- ▶ Based on Elaine Gotschall's work (recall SCD)
- ▶ Intro diet divided into 6, 5 day stages to initiate and expedite gut repair
  - ▶ Heal and seal the GUT
- ▶ Adds the element of meat stocks and bone broths to provide the material for repair
  - ▶ Source of minerals: calcium, phosphorus, magnesium, and potassium
  - ▶ Source of amino acids: glycine and proline (not in muscle meat)
  - ▶ Source of chondroitin sulfate and glucosamine
  - ▶ Source of collagen - needed for tissue repair
- ▶ Avoids irritating fibers from vegetables that could exacerbate ulcerations in the GUT lining
- ▶ Emphasizes repopulating the GUT with healing, beneficial bacteria - since these microbes orchestrate enterocyte repair
- ▶ The end result is the 'Full GAPS diet' - requires 6-24 months

## Weston A. Price Foundation: A Diet for All

- ▶ Not all diets mentioned here are appropriate for all