THE INFAMOUS GASTRO INTESTINAL TRACT

Ayaz Matin (Gastroenterology Fellow)
What is it responsible for...

- Breakdown of food to allow absorption of smaller molecules to provide energy
How does it do it...

- Ingestion of food
  - Mouth
  - Esophagus
- Digestion (breakdown) of food
  - Stomach
  - Intestines
  - Hormones
  - Enzymes

- Absorption of nutrients (energy)
  - Intestines
- Elimination of waste products
  - Large intestine
Organs of the Digestive System

- Mouth
- Tongue
- Pharynx
- Esophagus
- Liver
- Stomach
- Gallbladder
- Pancreas
- Large intestine
- Small intestine
- Rectum
- Anus
First Step...

- **Mouth**:  
  - **Teeth**:  
    - Chewing and mechanically breaking down the food into small pieces  
  - **Tongue**:  
    - Helps break down all the food in the mouth by bringing it in contact with the teeth  
    - Makes a ‘bolus’  
    - Moves the food down into the esophagus  
  - **Saliva**:  
    - Lubricates the food bolus and helps in the chewing process  
    - Starts digestion
Going down...

- The bolus (‘ball’) of food moves into the esophagus and passes through the ‘lower esophageal sphincter’ into the stomach by a squeezing motion (peristalsis)
My X Ray swallows
by spladgum
In the stomach...

- The food is churned into a **tomato soup consistency** by the action of stomach muscles and then passed down into the small intestine.
- Digestion of proteins is also started in the stomach by the action of **pepsin** (enzyme) and **acid** (HCl).

- Food remains in the stomach for approximately 2 to 4 hours.
In the small intestine...

- Approximately 6 m (20 feet) long
- Food continues to be broken down by action of muscles
- Food is mixed with enzymes from the pancreas and the intestine itself and is broken down into smaller particles for absorption
  - Lactase is an enzyme on the intestinal mucosa and is absent or deficient in people with lactose intolerance
- Unabsorbed food is then transferred to the large intestine (i.e. colon)
Small intestine and Friends

- Liver
- Gallbladder
- Common Bile Duct
- Pancreatic Duct
- Stomach
- Pancreas (lies behind the stomach)
Pancreas

- Digestive enzymes
  - Breakdown carbohydrates, fat and protein

- Hormones
  - Insulin for controlling glucose levels in the blood

- Can be injured in setting of long term alcohol intake or more suddenly in gallstones
Liver

- Toxin check for the body
- Makes bile and secretes into small intestine to help with fat absorption
- Can get inflamed with infections, medications, excessive fat and alcohol
Large Intestine

- AKA ‘Colon’
- Serves as a reservoir for unabsorbed food products
  - Corn kernels, fiber, etc
- Helps in absorption of water
- Rectum is the lower most part of the colon which holds solid stool and maintains continence
Nutrients

- Vital nutrients
  - Carbohydrates
  - Fats
  - Proteins
  - Minerals
  - Vitamins
  - Water
The food pyramid

- Fats, Oils and Sweets: use sparingly
- Milk, Yogurt and Cheese Group: 3 servings
- Vegetable Group: 3 servings
- Fortified-Cereal, Bread
- Meat, Poultry, Fish: 2 servings
- Dry Beans and Nut Group: 2 servings
- Fruit Group: 2 servings
- Rice and Pasta: 6 servings

- Water: 8 servings

+ Calcium, Vitamin D, Vitamin B-12 Supplements
Carbohydrates

- Starches
- Sugars
- Fiber
Fats

- Fats are essential for proper functioning of the body
- Is an important source of energy
- Helps in absorption of essential vitamins
- Excessive fats are stored throughout the body
Proteins

- Essential for making enzymes, antibodies, muscle cells and for energy
- Found in meats, dried beans, eggs, dairy and whole grains
Minerals and Vitamins

- Help in the chemical reactions that occur throughout the body
- Help in cell growth
Water

- Makes a large part of the body including blood
- Maintains the integrity of the cells
- Takes part in chemical reactions
- Body looses a large amount of water daily
How to achieve a good balanced diet...

- Set the goals – nothing drastic
- Always eat in moderation and maintain a good intake of all food groups
- It also matters how you eat
- Eat colorful and eat natural
- More whole grains
- Avoid unhealthy fats and enjoy healthy fats
- Right amount of proteins
- Add calcium (milk, vegetables, greens and beans)
- Limit sugar and salt
- Plan healthy meals and focus grocery shopping on that
  - Shop the perimeter of the grocery store
What does she have...
Some common ailments...

- Heartburn
  - Gastroesophageal Reflux Disease
- Indigestion
  - Dyspepsia
- Gas and abdominal pain
- Irritable bowel syndrome
- Constipation
- Gastrointestinal procedures
Heartburn

- Gastro-esophageal reflux and in worse cases gastro-esophageal reflux “disease”

- Symptoms can vary from heartburn to cough, asthma or no symptoms at all
Heartburn

**Table 1**

**Examples of Factors That Can Contribute to Heartburn**

- Drinking caffeinated or carbonated beverages
- High consumption of fatty or fried foods
- Smoking
- Excessive consumption of alcohol
- Obesity
- Reclining within a short time after eating
- Use of certain medications (e.g., aspirin and other nonsteroidal anti-inflammatory drugs, theophylline, progesterone, calcium channel blockers, potassium supplements)
- Stress

Other factors that may contribute to GERD include:

- obesity
- pregnancy
- smoking

Common foods that can worsen reflux symptoms include:

- citrus fruits
- chocolate

- drinks with caffeine or alcohol
- fatty and fried foods
- garlic and onions
- mint flavorings
- spicy foods
- tomato-based foods, like spaghetti sauce, salsa, chili, and pizza
Heartburn: Workup

- Endoscopy
- 24 hour acid monitoring
Heartburn : Treatment

- **Lifestyle modification**
  - Limit caffeine intake
  - Avoid reflux causing foods
  - Smoking cessation
  - Maintain ideal body weight
  - Avoid tight clothing
  - Do not lie down for 2 hours after eating
  - Bed block – raising head of bed 6 – 8 inches
  - Eat smaller meals
Heartburn: Treatment

- Antacids (Peptobismol)
- Anti histamine (Pepcid, Zantac)
- Proton pump inhibitors (Protonix, Prevacid, Omeprazole)
- Surgery
Heartburn: Complications

- Ulcers
- Narrowing of the esophagus
- Barrett’s esophagus (precancerous)
- Esophageal cancer
Indigestion: Dyspepsia

- Fullness during meal
- Fullness after meal
- Epigastric pain
- Epigastric burning
- Nausea and bloating
Indigestion

- Can be sign of:
  - GERD
  - Ulcer disease
  - Cancer
  - Abnormality of the pancreas or bile ducts
  - Stomach infection
    - Helicobacter pylori
Indigestion

- **Workup:**
  - Similar to that of heartburn

- **Treatment:**
  - Specific to finding
  - Antacids, antihistamine, proton pump inhibitors
Gas: Belching and Flatulence

"He gets credit for inventing language, but he was just belching."

©2009 http://balconycartoonblog.blogspot.com

www.jeffssite.net
Gas

- Most people produce 1 to 4 pints a day and pass gas about 14 times a day
- Although common it can be a nuisance
Gas: Causes

- Swallowed air:
  - Eating too fast
  - Chewing gum
  - Smoking
  - Wearing lose dentures
Gas: Causes

- Breakdown of undigested foods
  - Sugar, starches and fiber found in many foods is not digested
  - These are acted on by bacteria in the large intestine and produce gases.
  - These are eliminated from the rectum
Which foods cause gas...

- **Sugars**
  - Raffinose
    - Beans
    - Cabbage, brussel sprouts
  - Lactose
    - Milk
  - Fructose
    - Onions, artichokes
    - Sweetener in drinks
  - Sucrose
    - Fruits
    - Artificial sweetener in diabetic and sugar free foods
Which foods cause gas...

- **Starches**
  - Potatoes, corn, pasta, wheat
  - Rice does not cause gas

- **Fiber**
  - Not absorbed and passes down to the colon where bacteria act on it
Gas: Symptoms

- Belching
- Flatulence
- Abdominal bloating
- Abdominal pain

Extra sensitive to sensation of gas in the abdomen. May have IBS
Gas : Diagnosis

- History
- Diet diary
- Symptom diary
- Other tests depending on symptoms and history
Gas : Treatment

- Diet
- Medications:
  - Non prescription
    - Lactaid
    - Beano
    - Gas-X
- Avoid swallowing air
IBS: Irritable Bowel Syndrome

- Disorder of the movement of the gut
- Patients have belly pain, bloating and abnormal bowel movements (too much or too little)
IBS: Symptoms

- Stomach pain and cramps, often right after eating
- Diarrhea or constipation (some people switch back and forth between diarrhea and constipation)
- Bloating
- Gas
- Feeling full too quickly when eating
- Nausea
IBS: Causes

- Extra sensitive gastro intestinal system
- Abnormal movement of intestinal contents
- Stress
- Foods
- Infection
- Celiac disease
IBS : Diagnosis

- No particular test
- Food and symptom diary
- Stool test
- Blood test
- Colonoscopy
- Endoscopy
IBS : Treatment

- Fiber
- Diet
- Water
- Exercise
- Stress management
- Adequate sleep
- Medications
  - Laxative
  - Anti diarrheal
  - Antispasmodic
  - Anti depressant
  - Probiotics
CONSTIPATION

Just a nice way of saying
“You’re Full of Crap!”
Constipation

- **Defination**
  - Bowel movement fewer than 3 times / week
  - Stools are hard, dry, small in size and difficult to eliminate

- Most common gastrointestinal symptom in the US
Constipation: Causes

- Lack of fiber
- Lack of activity
- Medications
- IBS
- Changes in life (pregnancy, aging, and travel)
- Abuse of laxatives
- Ignoring the urge to have a BM
- Dehydration
- Stroke
- Colon and rectal problems
- Intestinal problems
Constipation: Diagnosis

- Colonoscopy
- Pressure measurements
Constipation: Treatment

- Diet
- Lifestyle changes
- Laxatives
  - Bulk forming
  - Stimulant
  - Osmotic
  - Stool softeners
  - Lubricants
  - Saline laxatives
  - Chloride channel activators
Probiotics

- The gastrointestinal system has many bacteria both good and “not so good” but they are in a balance.
- The balance can be upset by using antibiotics, certain foods or by infections.
- Probiotics help replenish the good bacteria.
  - Bacteria
  - Yeast
Probiotics

- Not all probiotics are the same and they don’t work in the same way.
- Most commonly used are:
  - Lactobacillus
  - Bifidobacterium
  - Saccharomyces
How do they work

- Boost immune system
- Produce substances to prevent infection
- Prevent harmful bacteria from attaching to gut wall
- Enhance the function of the natural protection against infection in the gut
- Destroy toxins released by certain bad bacteria
- Produce B vitamins necessary for metabolizing the food we eat
What conditions do they benefit

- Irritable bowel syndrome
- Inflammatory bowel disease
- Infectious diarrhea
- Antibiotic related diarrhea
- Other uses
  - Healthy mouth
  - Skin conditions
  - Urine infections
  - Allergies
Are they safe...

- Not all of them and not in every condition
- May be harmful if the immune system is severely affected
- May interfere with certain medications
- Not FDA controlled so different companies may have different substances
- May cause gas and bloating or even allergic reactions
Which one should I take...

- Be aware of the many companies out there and stick with the better known ones
  - Attune, Culturelle, Dannon, Kraft, Nestle, VSL Pharmaceuticals, Procter & Gamble, and Yakult.
- They are available in yogurts and shakes
- Check the label
  - Content
  - How many bacteria will actually be alive when you take it
Colon Cancer

- Colorectal cancer is the third largest cause of cancer related death in the US
- Incidence might be increased in the first decade after transplant (especially kidney transplant)
- Patients may present with change in the caliber of stools, bleeding in the stools (visible or microscopic), stomach pains, low iron levels and feeling of tiredness
- Some patients may not have symptoms till very late in the disease
Colon Cancer

- Colon cancer can be prevented in the average population by ‘screening’ – looking for polyps in the beginning stage
- Recommended routinely after age 50 or sooner if risk factors present
- Screening tests:
  - Stool blood test
  - Flexible sigmoidoscopy
  - Colonoscopy
  - CT colonography
A look inside...
Video clip of a Colonoscopy Taken by Dr. Julio ...
Taking off a polyp
Virtual Colonoscopy
BEND OVER, BOYS: help crack colon cancer

Get Tested Today
Medication side effects

- **Cyclosporine**:
  - Nausea (23%), diarrhea (3% to 13%), gum hyperplasia (2% to 16%), abdominal discomfort (<1% to 15%), dyspepsia (2% to 12%)

- **Prograf**:
  - Diarrhea (24% to 72%), abdominal pain (29% to 59%), nausea (32% to 46%), constipation (23% to 36%), anorexia (7% to 34%), vomiting (14% to 29%), dyspepsia (18% to 28%)
Medication side effects

- **Cellcept/Myfortic**:  
  - Abdominal pain (25% to 63%), nausea (20% to 55%), diarrhea (31% to 51%), constipation (19% to 41%), vomiting (33% to 34%), anorexia (25%), dyspepsia (22%)  
  - Abdomen enlarged, dysphagia, esophagitis, flatulence, gastritis, gastritis enteritis, gastrointestinal hemorrhage, gastrointestinal moniliasis, gingivitis, gum hyperplasia, ileus, melena, mouth ulceration, oral moniliasis, stomach disorder, stomach ulcer, stomatitis, xerostomia, weight gain/loss.
Immunosuppression

- Successful heart transplants
- Low risk of rejection
- Increased survival
- **Aspirin prevents colon cancer**
- They do have side effects but nothing you can’t handle!
Effect of immunosuppression on the GI Tract

- **Infections**
  - **Viral** (cytomegalovirus-CMV and herpes-HSV)
    - Usually in the first year after transplant or with treatment of rejection
    - Affect the mouth, esophagus, small intestine and the colon
    - Requires early treatment
    - Suspect in anyone getting high dose immunosuppression and presenting with fever, pain on swallowing or persistent diarrhea
Infection

- Fungal (Candida)
  - Usually affects esophagus
  - Patients have difficulty and pain with swallowing
  - Treated with antifungal medications
  - Have to monitor cyclosporine levels in patients treated with fluconazole
Infection

- C. Difficile causing diarrhea
- Helicobactor Pylori infection in the stomach may lead to symptoms of indigestion
Diarrhea, Nausea and Vomiting

- Maybe due to infections
- Largely due to the medication effect
  - Prograf more than Cellcept or Sirolimus
- Can be improved by changing the dosage or splitting the dose
Ulcers

- Many factors:
  - Stress from surgery
  - The use of NSAIDS (non steroidal anti inflammatory drugs)
  - Steroids and cellcept
- May lead to through and through breaks in the stomach wall, especially in the setting of steroids
- May lead to significant bleeding
- Some may start treatment before symptoms – others wait
- Treatment of ulcer is usually with Prilosec, Protonix, Nexium or Zantac and Pepcid
- These treatments may interact with Cyclosporine levels
Gallbladder stones

- May lead to sudden onset of pain and infection in the bile ducts, liver and pancreas
- Increase in patients with cyclosporine and prednisone
- May be fatal
- Need urgent evaluation and treatment
  - Cholecystectomy
  - Endoscopy
Cancer

- Certain cancers are increased in the transplant population and so is colon cancer and rectal cancer.
- Screening is recommended at regular intervals.
Hypercholesterolemia

- Occurs in 60 to 83% of patients after heart transplant
- Can be attributed to medications
  - Corticosteroids
  - Cyclosporine
- Can be controlled by use of
  - Statins
  - Fibrates
  - Zetia
  - Niacin
  - Bile acid resins
  - Diet control
Conclusion

- If you have concerning symptoms talk to your doctor and maybe see a gastroenterologist
- Eat healthy
- Get your screening
- Stay healthy
Thank you!

Questions