

# THE INFAMOUS GASTRO INTESTINAL TRACT

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# What is it responsible for...

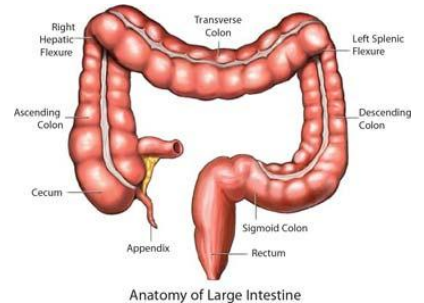
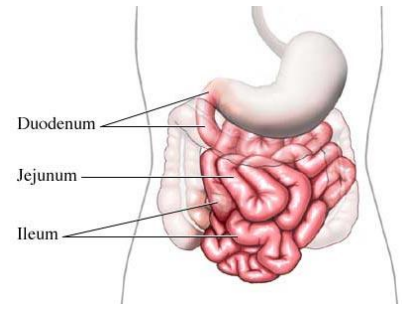
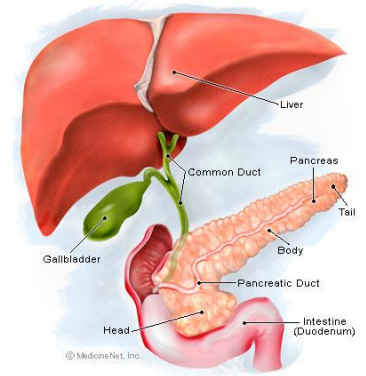
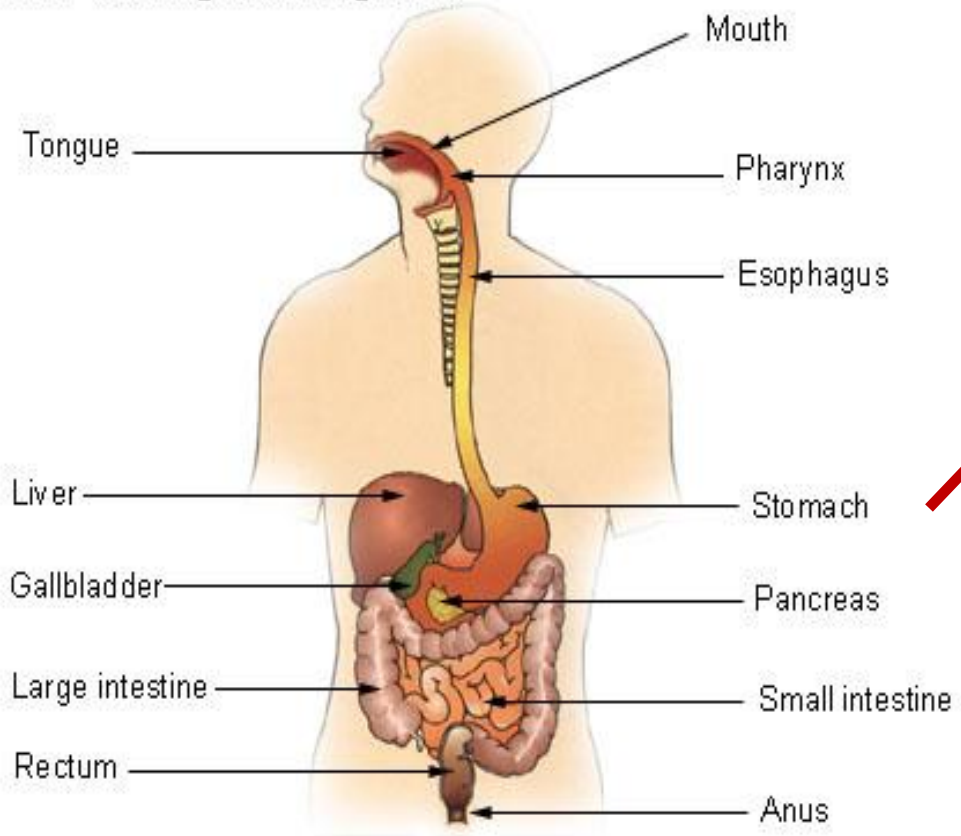
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- Breakdown of food to allow absorption of smaller molecules to provide energy

# 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



# First Step...

## □ Mouth :

### □ Teeth

- Chewing and mechanically breaking down the food into small pieces

### □ Tongue

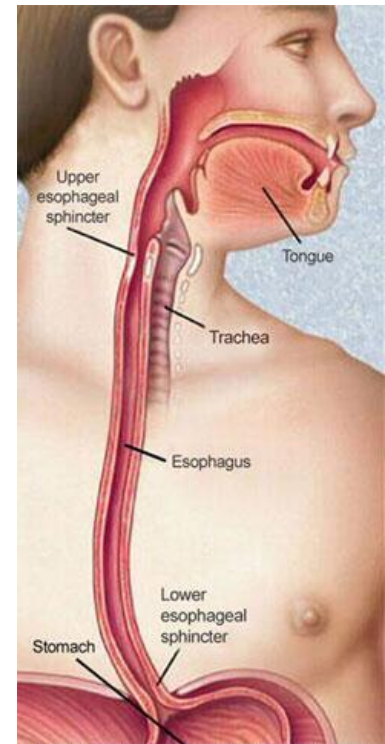
- Helps break down all the food in the mouth by bringing it in contact with the teeth
- Makes a 'bolus'
- Moves the food down into the esophagus

### □ 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)

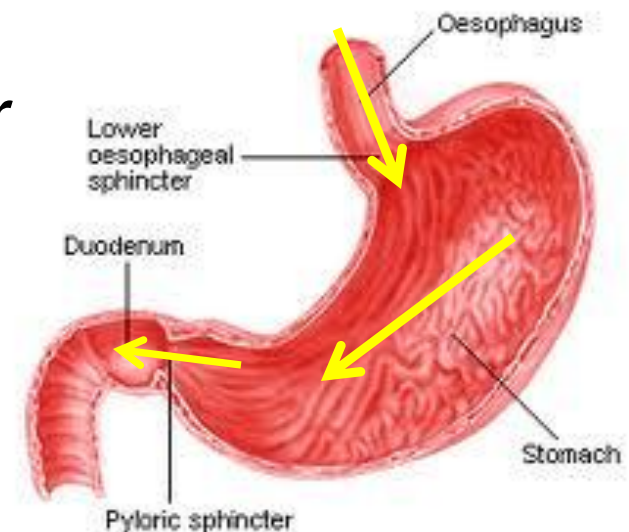


**My X Ray swallows**  
by spladgum



# In the stomach...

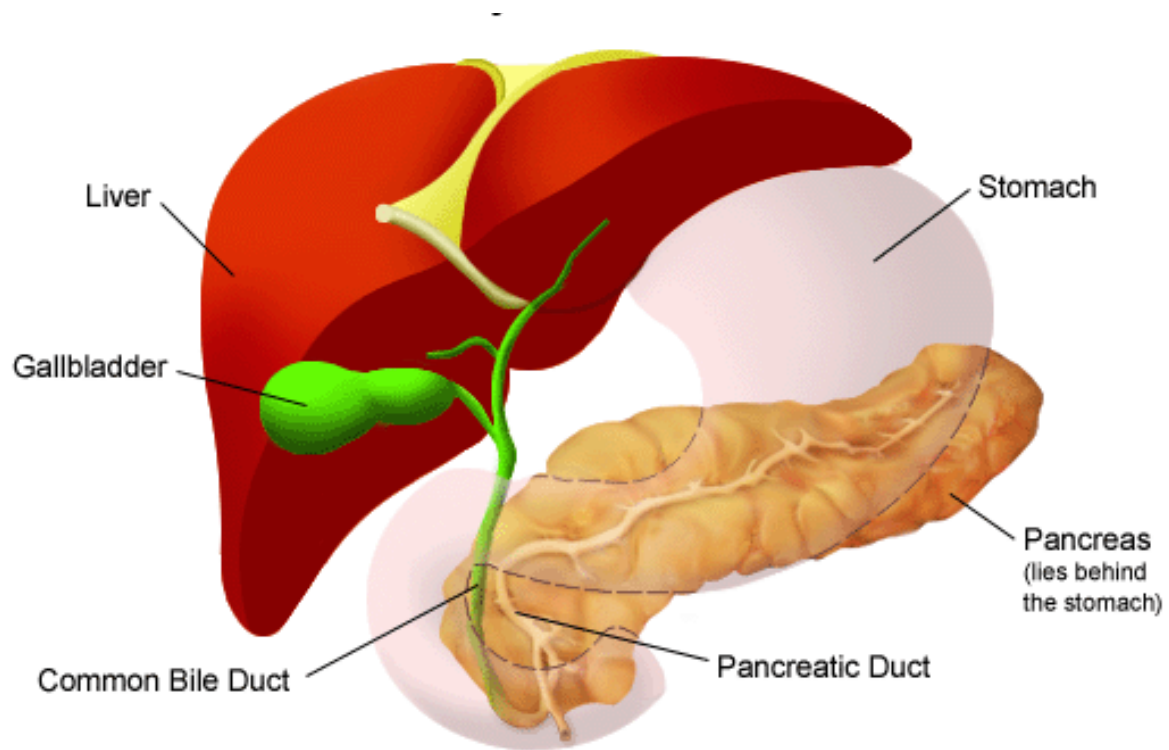
- The food is churned into a **tomato soup consistency** by the action of stomach muscles and then passed down into the small intestine
- Digestion of proteins is also started in the stomach by the action of **pepsin** (enzyme) and **acid (HCl)**
- Food remains in the stomach for approximately 2 to 4 hours



# In the small intestine...

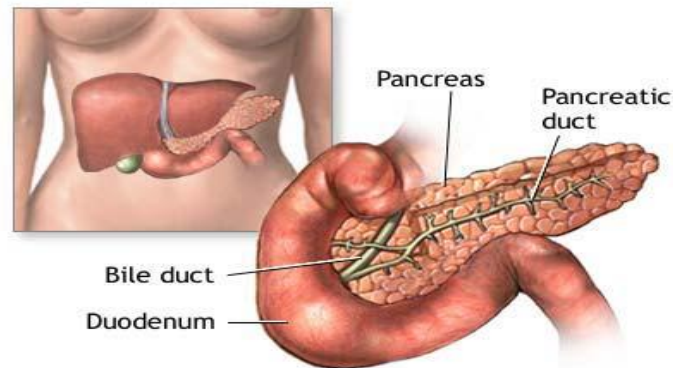
- Approximately 6 m (20 feet) long
- Food continues to be broken down by action of muscles
- Food is mixed with enzymes from the pancreas and the intestine itself and is broken down into smaller particles for absorption
  - ▣ Lactase is an enzyme on the intestinal mucosa and is absent or deficient in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

# Small intestine and Friends



# 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



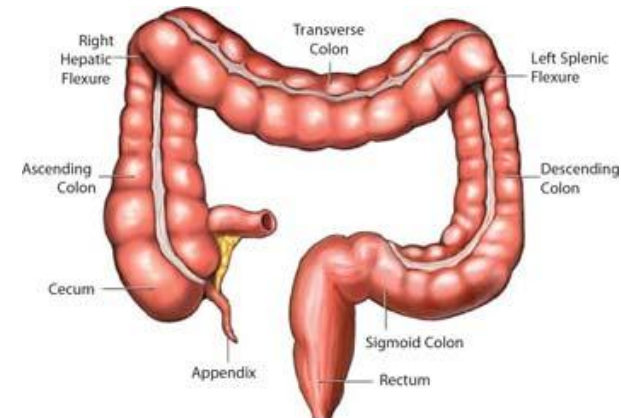
# Liver

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- ❑ 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



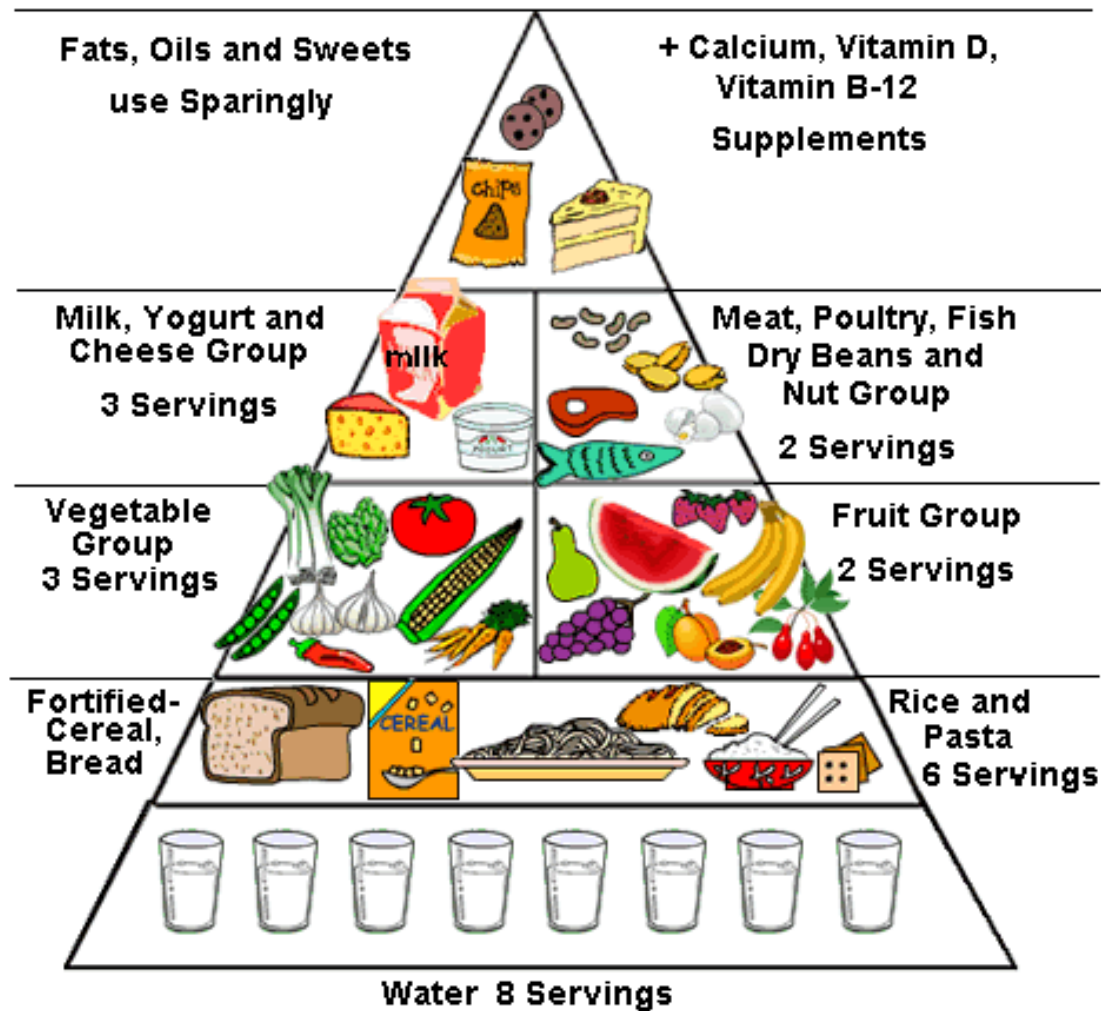
Anatomy of Large Intestine

# Nutrients

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- Vital nutrients
  - Carbohydrates
  - Fats
  - Proteins
  - Minerals
  - Vitamins
  - Water

# The food pyramid



# Carbohydrates

- Starches
- Sugars
- Fiber



# Fats

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- 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

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

# Minerals and Vitamins

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- 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 loses 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...

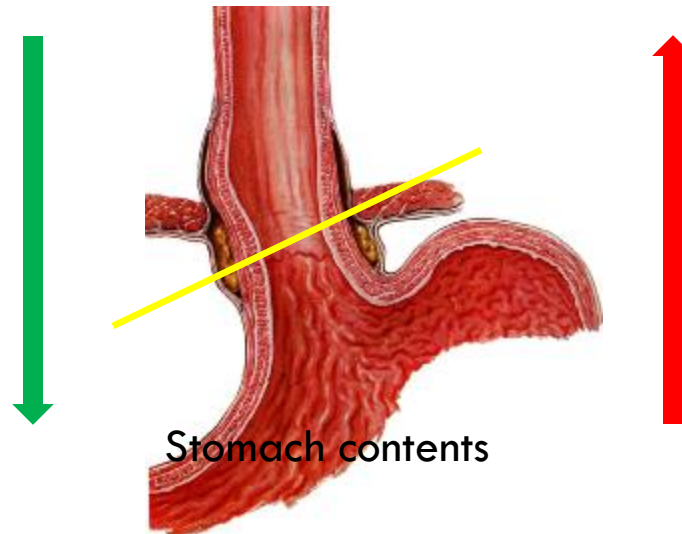


# Some common ailments...

- 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 (eg, aspirin and other nonsteroidal anti-inflammatory drugs, theophylline, progesterone, calcium channel blockers, potassium supplements)
- Stress

Other factors that may contribute to GERD include

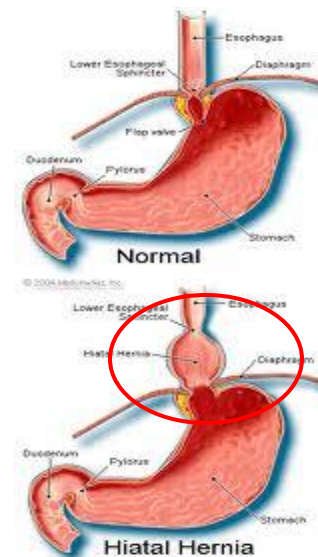
- obesity
- pregnancy
- smoking

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

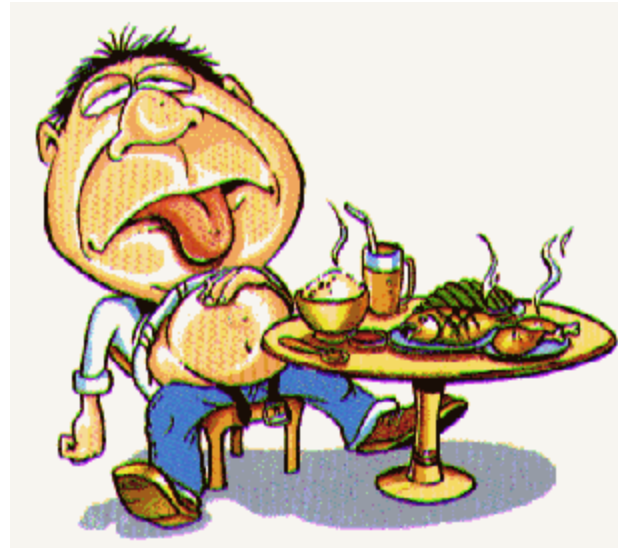
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- Ulcers
- Narrowing of the esophagus
- Barrett's esophagus (precancerous)
- Esophageal cancer

# Indigestion : Dyspepsia

Fullness during  
meal

Fullness after  
meal



Epigastric  
pain

Epigastric  
burning

Nausea and  
bloating

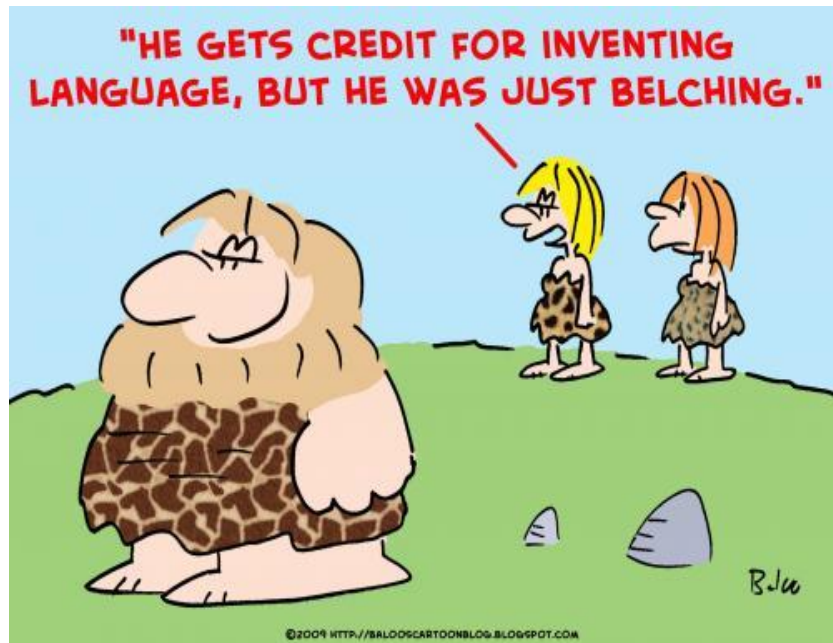
# Indigestion

- 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



# 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

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- Swallowed air :
  - Eating too fast
  - Chewing gum
  - Smoking
  - Wearing loose 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...

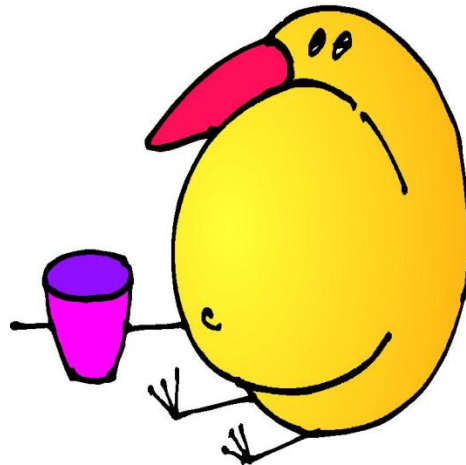
- Starches
  - ▣ Potatoes, corn, pasta, wheat
  - ▣ Rice does not cause gas
- Fiber
  - ▣ Not absorbed and passes down to the colon where bacteria act on it

# Gas : Symptoms

- Belching
- Flatulence
- Abdominal bloating
- Abdominal pain



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



# Gas : Diagnosis

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- 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)



**Irritable Bowel Syndrome  
(IBS)**

# 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

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- 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

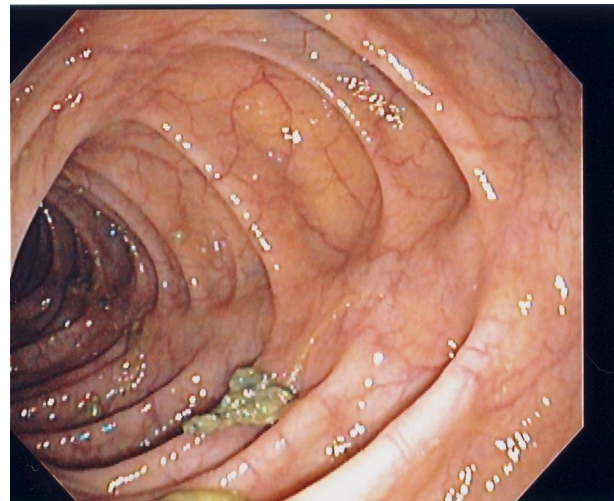
- Defination
  - ▣ Bowel movement fewer than 3 times / week
  - ▣ Stools are hard, dry, small in size and difficult to eliminate
- Most common gastrointestinal symptom in the US

# 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

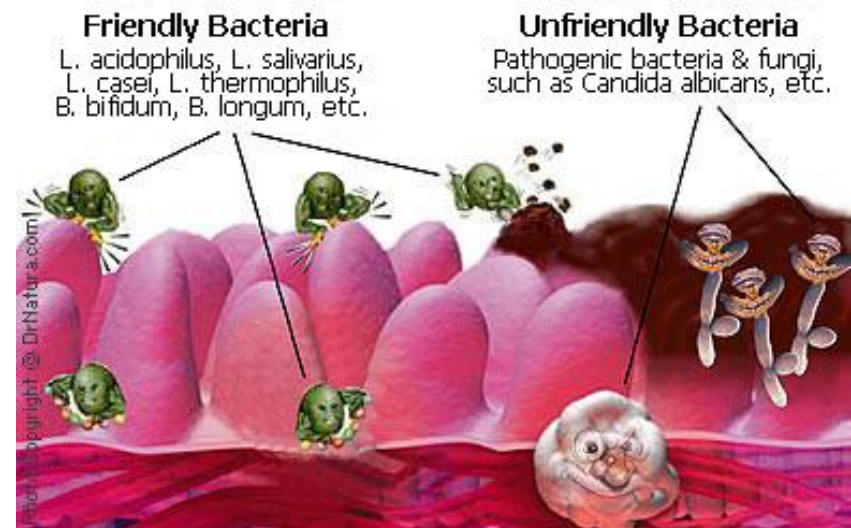


# Constipation : Treatment

- 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

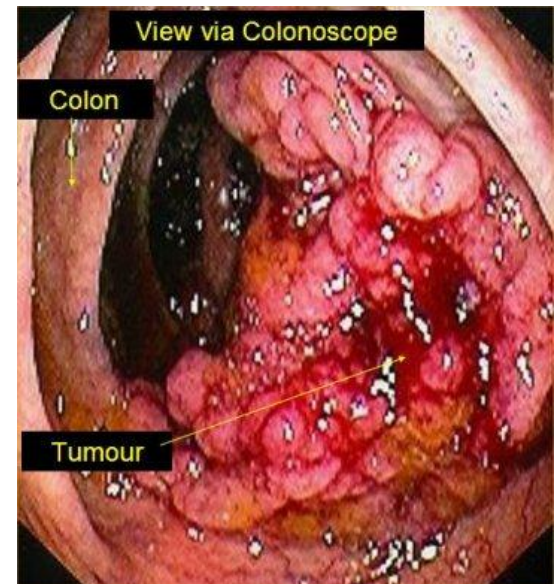


# Colon Cancer

- 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...



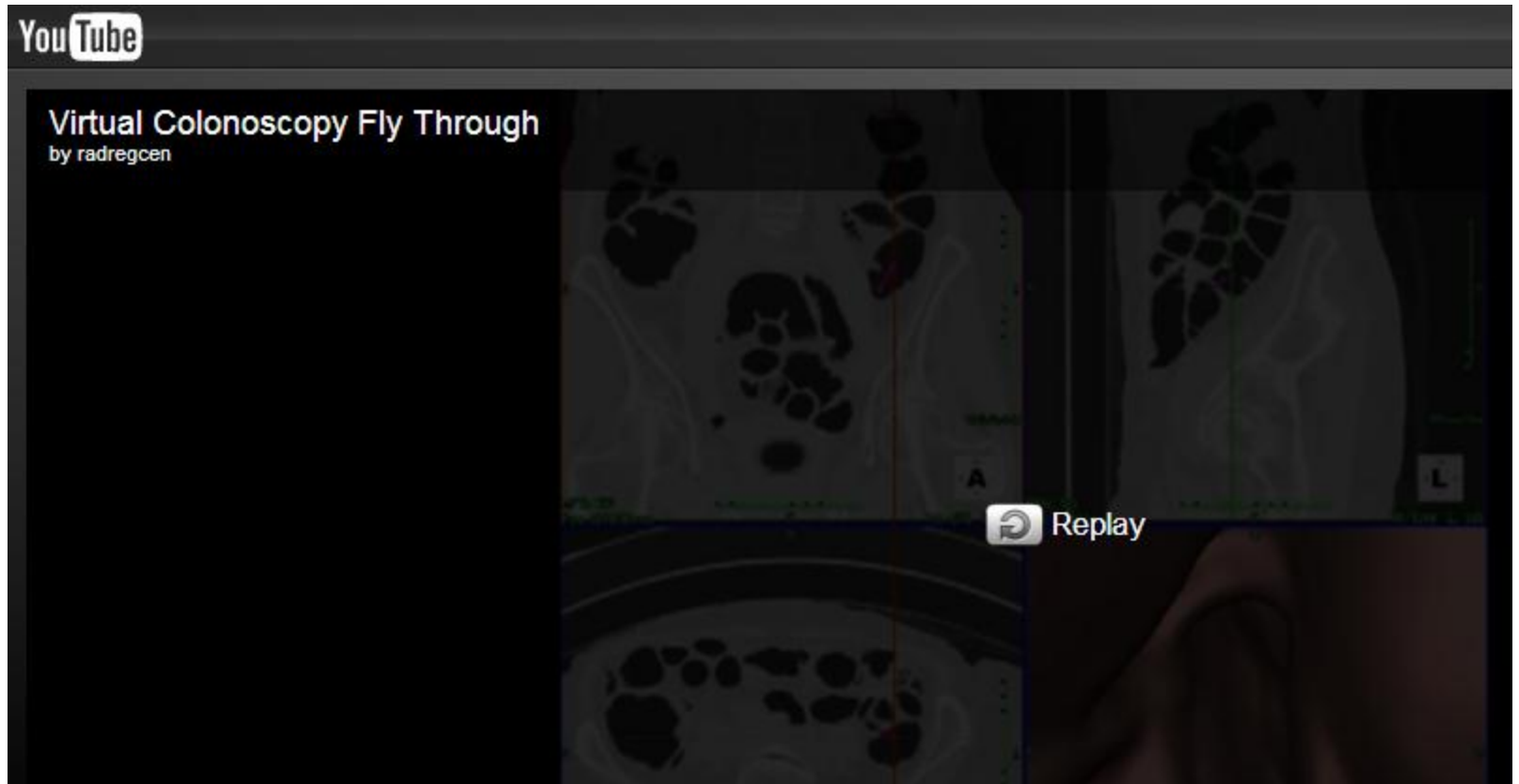
Video clip of a Colonoscopy Taken by Dr. Julio ...



# Taking off a polyp



# Virtual Colonoscopy



BEND OVER, BOYS:  
help crack colon cancer

*Get Tested Today*

superstock.com

# 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

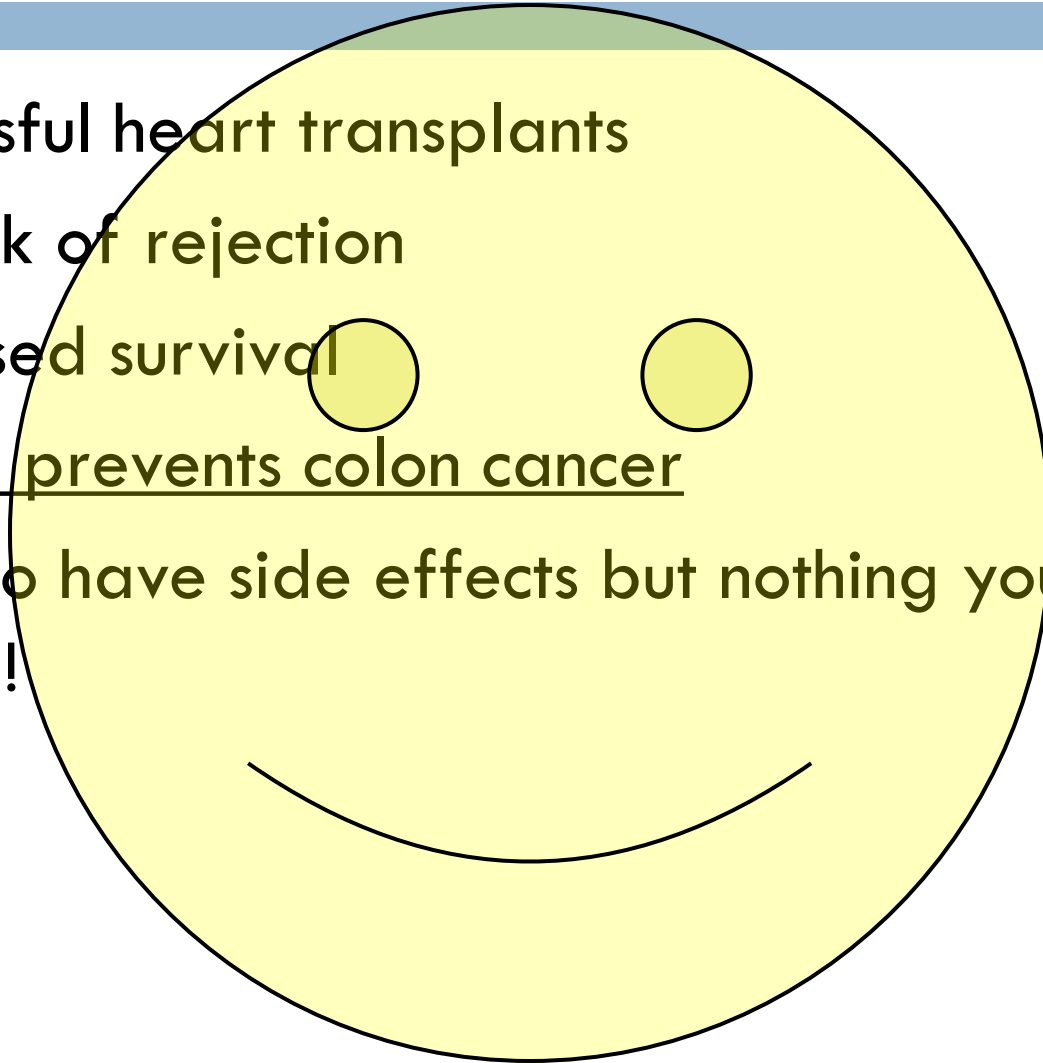
## □ Cellcept/Myfortic :

- 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, gastroenteritis, gastrointestinal hemorrhage, gastrointestinal moniliasis, gingivitis, gum hyperplasia, ileus, melena, mouth ulceration, oral moniliasis, stomach disorder, stomach ulcer, stomatitis, xerostomia, weight gain/loss

**DON'T BE SCARED**

# 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

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- C. Difficile causing diarrhea
- Helicobacter 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

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- 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