

## Quick Summary of Digestion System

Greg Paul – **CrossLife**

### **THE LONG DARK TUBE – A TUNNEL THROUGH OUR BODY**

**As Paul writes in 1 Corinthians 6:19 NIV → “Do you not know that your bodies are temples of the Holy Spirit, who is in you, whom you have received from God? You are not your own.” Every time I look closely at the human digestive system I’m purely amazed at God’s Masterpiece!!!**

#### **Mouth**

1. Teeth break up food to smaller pieces
2. Saliva adds enzymes to help break down food starting in the esophagus
  - a. Amylase enzyme – breaks down carbohydrates

#### **Esophagus**

1. Food moves through esophagus by wave like contractions
2. Food can travel from mouth to stomach in the esophagus whether you are upright or upside down
3. Travel time from mouth to stomach – 7 seconds
4. At the end of esophagus there’s a valve
  - a. Keeps acid in stomach
  - b. Valve closes automatically when pH is 1-2. If pH is above this it will not close tight

#### **Stomach – 2 to 6 hours**

1. J-shaped bag
2. Can expand numerous times bigger than when empty
3. Stomach wall is cover in mucus
  - a. Mucus is produced in mouth, esophagus and stomach and helps improve easy passage of food through the digestive track
  - b. This protect stomach wall from strong acid
  - c. If mucus layer is gone or missing in spots the acid can attack the stomach wall and damage it - ulcer
4. Hydrochloric Acid is secreted into the stomach from specialized (parietal) cells in the stomach
  - a. Acid kills dangerous bacteria – disease causing bacteria
  - b. Acid helps break down food(proteins) into smaller parts for digestion down stream
  - c. Resting pH of stomach is 4-5 and with high protein meal it drops to 1-2
  - d. When we don’t produce enough stomach acid we end up with GERD/acid reflux
  - e. With age these acid secreting cell slow their production
5. Enzymes are secreted in the stomach to help digestion
  - a. These Enzymes plus hydrochloric acid help digest proteins & fats
6. Stomach muscles mix up the food – mixed food called chyme
7. Valve at end of stomach, where food then travels into small intestine

#### **Pancreas, Liver and Gallbladder**

1. Food leave stomach and enters duodenum
  - a. As the “chyme” enters duodenum
    - i. Pancreas sprays bicarb (like liquid baking soda) and enzymes onto it
      1. This bicarb neutralizes chyme’s LOW pH
      2. Enzymes help break down all food groups into smaller digestible pieces
    - ii. Gallbladder sprays bile onto chyme
      1. Liver produces bile - which is stored in the gallbladder
      2. Bile is used to help fats get absorbed in the small intestine

### **Small Intestine – 3 to 5 hours**

1. *About 20 feet long – a Giraffe is about 15 to 17 feet tall!!!*
2. *About 1 -2 inches in diameter*
3. One cell layer thick – blood vessel on other side of cells lining the gut
4. All absorbed nutrients go directly into the blood stream
  - a. Dissolves READILY available food
  - b. Where carbohydrates, proteins, fats, mineral and vitamins are absorbed
  - c. Provide us with energy directly – example glucose flowing into the blood stream rising blood sugar level after eating
  - d. These absorbed nutrient now in the blood go to the liver for filtering
5. Surface of small intestine is covered with Villi and micro villi
  - a. 20,000 projections per sq. inch
6. Size of surface area when all villi & micro all unfolded onto a flat surface
  - a. Tennis court
  - b. About 100X greater surface area than our skin
7. Muscles pushing food through
8. Limited microbe population – 50 million cells/tsp

### **Large Intestine - 4 to 72 hours (3 days)**

1. *About 3 feet long*
2. *About 3 inches in diameter*
3. Recovers water and electrolytes
4. Microbes ferment complex carbohydrates
  - a. Microbes produce
    - i. Vitamins B & K
    - ii. Butyrate – used by colon and other body cells for producing mucus
    - iii. About 20 different hormones
    - iv. Compounds which influence mood
5. All of these compounds are absorbed through colon wall into blood then go through liver all but the last few inches which don't go to liver(Hence this is why suppositories work)
6. Most microbes in body – 500 billion cells/tsp
  - a. Avg. US adult approx. 1,200 different microbe species - Gut is home of 100 trillion bacteria
  - b. Your microbiome can weigh 5 lbs.
  - c. Immune system is closely linked with microbes - 2/3 immune system is trained in the colon

### **Appendix**

1. Reserve storage of microbes
2. When we get sick and have diarrhea and or throw up the appendix is a reserve depot for our microbes

### **Rectum**

1. Where feces accumulate and are stored before they are discharged
2. If valve at the bottom of rectum is operated incorrectly you have issues
  - a. Common issues – hemorrhoids & diverticulitis
    - i. How we sit when pooping cause these problems
  - b. Plugs the paths way to anus - Squatty Potty helps

### **Anus**

1. The exit valve of digestive track – see video “Humorous Lecture on Digestive System by Giulia Ender”
2. 1 gram of fecal material has more microbes than the earth's human population
3. Your stool is 60% by weight microbes