The Gastrointestinal Tract

Definitions

- **Digestion** - the process of making food absorbable by dissolving it and breaking it down into simpler chemical compounds that occurs in the living body chiefly through the action of enzymes secreted into the alimentary canal.

- **Alimentary canal** - the tubular passage that extends from mouth to anus and functions in digestion and absorption of food and elimination of residual waste.

Classification of Animals

- **Carnivores** - eat animal tissue (dogs and cats)

- **Omnivores** - eat plant and animal tissue (humans and pigs)

- **Herbivores** - eat plant tissue (horse, cattle, sheep, goats, rabbits)

The Process of Digestion

- Digestion is an active process consisting of three mechanisms of action:
  1) **Mechanical action** - chewing and contraction of the intestinal tract
  2) **Chemical action** - HCl in the stomach and bile in the small intestine
  3) **Enzymatic action** - carbohydrases, peptidases, lipases

Mouth

- Mastication (chewing - mechanical digestion)

- Saliva added to the ingested food
  - produced by salivary glands
  - adds moisture, mucus, and salivary amylase

Stomach

- HCl secreted
- Pepsinogen secreted
- Some mechanical digestion
Small Intestine
- Divided into 3 sections:
  - duodenum: proximal end of the small intestine; liver and pancreatic secretions enter here through the common bile duct
  - jejunum: middle section of the small intestine; most absorption of nutrients occurs here (largest section of small intestine)
  - ileum: distal end of the small intestine; some absorption occurs here
- pH increases from ~4.5 to 7.8 as it passes through the small intestine

Cecum
- Blind end of the large intestine
- Depending on the species there can be minimal to very significant microbial activity in this section of the GI tract

Large Intestine
- The primary function of the large intestine is water reabsorption
- Water reabsorption is enabled through changes in salt concentrations
- Sometimes also referred to as the colon

Rectum
- Site of fecal excretion

Liver
- Produces bile:
  - alkaline mixture
  - bile salts: help to emulsify fats
- Gallbladder:
  - stores and secretes bile

Pancreas
- Pancreatic juice contains:
  - Bicarbonate
  - Trypsinogen
  - Chymotrypsinogen
  - Procarboxypeptidase
  - Amylase
  - Lipases
  - Nucleases