

Chapter 45 & 46

Digestive System

Key Concepts

- Animal nutrition
- general principles of digestion and absorption of food
- overview of vertebrate digestive systems
- mechanisms of digestion and absorption in vertebrates

Intro to nutrition

- nutrient
 - any substance taken in by an organism that is needed for:
 - survival
 - growth
 - development
 - tissue repair
 - or reproduction
- nutrition
 - process of consuming and using food for nutrients
- animals receive nutrients by consuming food

Dietary categories

- basic similarities in organ system function lead to similarities in nutritional requirements
- different animal physiologies can have different nutrient demands

- Herbivores
 - eat only plants
 - digestive system contains micro-organisms that help digest cellulose

- Carnivores
 - eat only animal flesh or fluid
- Omnivores
 - eat both

Animals are heterotrophic

- Heterotrophs
 - ingest feeders
- cannot manufacture more food
- require already synthesized organic compounds of plants of other animals to supply materials
 - survival
 - maintenance
 - growth
 - reproduction

Gut Tracts

Two types

1. Blind Gut
 - no cavity between gut and body wall
 - one opening
 - primitive form
2. tube-within-a-tube
 - flow through digestive tube
 - body cavity between gut and body wall
 - separate opening (mostly)

Digestion

- the breakdown of large molecules into smaller ones

Digestive enzymes (hydrolases)

- carbohydrases
- proteases
- lipases

- nucleases

Food processing in animals

Occurs in Five phases

1. Ingestion
 - food is taken into the body and moves into a digestive
2. digestion
 - food is broken down into smaller molecules
 - chemical and mechanical
3. transport
4. absorption
 - ions, water, and small molecules are transported into the circulatory system
5. egestion
 - undigested materials and other waste are passed from the body
 - elimination or excretion

Alimentary canal

- digestive tract or tube
 - Gastrointestinal tract
- Five regions of food processing
- Single tube with opening at each end
- contains smooth muscles in walls
- lined with epithelial cells
 - synthesize and secrete digestive enzymes
 - secrete hormones
 - transport digestive materials
- several specialized regions
 - different structures for different processes
 - storage area

Structure of GI Tract

- some general structure from midpoint of esophagus, to the anus or cloaca
 - lumen lined by epithelial and glandular cells
 - secretory cells release a protective layer of mucus
 - other cells release hormones
 - glands release enzymes, acids, water, and ions
- Epithelial cells linked by tight junctions and surrounded by layers of tissue made of smooth muscle, neurons, connective tissues, and blood vessels
 - neurons activated by sight and smell of food and presence of food in tract

Region of Reception

Buccal cavity

- mouth and accessory structures
- ingestion site and digestion site
- chemical and mechanical
- jaws, teeth, cheek muscles, tongue, and salivary glands (saliva)

Pharynx

- back of mouth cavity
- point that respiratory and digestive system cross paths

Region of Conduction

Esophagus

- tube carrying materials from mouth cavity to the rest of the alimentary canal
- forces/pushes food down
- conducts food from pharynx to stomach
- Peristalsis
 - rhythmic wave-like contractions which propel food forward in the GI tract
- No new digestion here
 - only chemical continuation from buccal cavity

Region of digestion and storage

Stomach (mostly)

- sac-like organ evolved for storing food
- muscular nature helps break up food
- partial protein digestion
- regulates rate of emptying into small intestine
- Secretions
 - hydrochloric acid
 - kills microbes
 - dissolves particulate matter
 - secreted by parietal cells
 - Pepsinogen
 - converted to pepsin to begin protein digestion
 - secreted by Chief cells
- Epithelium coated with an alkaline mucus
- carbohydrate digestion continues from mouth
- little lipid digestion happens

- lumen (cavity) stomach
 - pepsinogen + HCL -> pepsin (for protein breakdown)

Region of terminal digestion and absorption

Small intestine

- near

Created 2019-03-31 16:34:31 UTC by Aaron Kimbrell
Updated 2019-04-02 04:26:24 UTC by Aaron Kimbrell