Chapter 11

Gastrointestinal System

Main Terms

Peristalsis- involuntary wavelike movement that assists with movement in the digestive tract.

Ruminants- animals that regurgitate and remasticate food.

General Ideas

All mammals generally have the same parts and accessory organs. The order these occur in are also the same. The length, size, and location vary because of animal size and diet.

Animals are classified by their diet.

Carnivores- eat meat

Omnivores- eat both meat and plants

Herbivores- eat plants

Functions

Transport

Breakdown of Food

Absorption of Nutrients

Carries Waste

Structures

The Mouth

Lips

Covered with a thin skin on the outside.

Some species have tactile hairs that border the lips.

The lips of sheep, goats, and horses are flexible and aid in picking up food.

Lips of cattle and hogs are stiff and immobile.

Rats have lips to come together behind their incisors that permit them to chew through materials like concrete with “eating” any of it.

Concial papillae- (con-shaped projections) help ruminants from losing food during chewing.

Oral Cavity

Formed by the arch of the upper and lower jaw.

Contains gums, teeth, and tongue.

The palate- roof of mouth.

- Soft Palate- partition between the mouth and nasopharynx
- Hard Palate- ridgy bony structure covered with a mucous membrane

Cheeks

Formed by the buccinator muscles and a buccal pad (subcutaneous fat).

The muscles keep the food between the teeth during chewing.

Tongue

Skeletal Tissue fibers pointing the three directions and covered by a mucous membrane.

Keeps food between the teeth during chewing and aids in swallowing.

Lingual torus- thickened mucosa on dorsal surface of the tongue.

Lingual frenulum- thin mucous membrane that anchors the tongue to the floor of the mouth

Papillae- small elevation on the surface of the tongue, categorized by appearance

Filiform- treadlike

Fungiform- mushroomlike, contains taste buds

Vallate- rim-shaped, contains taste buds

Gingivae and Gums

This has mucous membranes which cover the surfaces of the maxilla and mandibles. They are richly vascular and form around each tooth.

Teeth

Terms

Hypsodont (long-crowned) do not have a well-defined neck

Brachydont (short-crowned) teeth

Parts

Each tooth has a crown, neck, and root.

The crown is encased in enamel.

The root is encased in cementum.

Dentin- third layer of the tooth, under the enamel and cementum. Makes up the bulk of the tooth.

Pulp cavity- inside the dentin and contains nerves and blood vessels.

Periodontal ligament- tough, fibrous tissue that connects that cementum to the bone.

Periodontium- contains that periodontal ligament and the cementum.

Types

Incisors- front teeth, shearing and cutting

Canines (fangs, eyeteeth, and tusks) tearing, defense

Premolars and Molars grind food

Surfaces

Lingual- surface of the tooth next to the tongue

Buccal- surface of the tooth next to the cheek

Labial- surface of the tooth next to the lips

Occlusal- chewing or biting surface

Salivary Glands

Parotid, Mandibular, and Sublingual are the major glands.

The fluid these release is known as saliva

Saliva dissolves or lubricates food for swallowing.

Pharynx

Common passageway for food and air

Esophagus

Narrow muscular tube from the pharynx through the diaphragm to the stomach

Swallowing

Three phases

1st – voluntary, makes the food go from the mouth to the pharynx

2nd- instinctive, passes the food to the stomach

3rd - makes the food propel through the cardiac sphincter into the stomach

Nonruminant Stomach

Simple Stomached, Monogastric

Nonruminating, the stomach partially digests the food before it is passed to the small intestine to be digested more.

Stomach has three sections

Fundus- rounded section above the esophageal opening

Body- middle section

Pylorus- the lower, smaller end

Sphincter Muscles

Rings like muscles that contract to close an opening

Cardiac Sphincter- between the esophagus and the stomach, prevents reflux

Pyloric Sphincter- between the stomach and the duodenum

Gastric Coats and Glands

The stomach wall has four coats

- Outer serous coat
- Muscular coat (circular, longitudinal, and oblique)
- Sub mucous coat
- Mucous lining coat

There are numerous glands in the stomach wall. They contain enzymes and HCL. The food mixes with these secretions to form chyme.

Ruminant Stomach

The true stomach of the ruminant is preceded by three chambers (diverticula).

The regurgitate and remastication allow bacteria and protozoans to ferments the food.

This digests the cellulose and produces energy.

"Chewing the cud" The cud is brought back to the mouth for remastication. The fluid goes down the tube and the solid food is brought back into the mouth.

Chambers

The first three chambers ferment food that can then be used for energy.

The Reticulum

AKA honeycomb

Most cranial chamber

Lined with a mucous membrane and contains numerous ridges

The Rumen

Large, muscular sack that extends from the diaphragms to the pelvis and fills most of the left side of the abdominal chamber. 20% of the animal's total weight.

The Omasum

Round with short, blunt papillae inside. These papillae grind the roughage.

The Abomasum

True stomach

Secretes digestive enzymes

Opens into the small intestine.

Abdominal Cavity

Mesentery- a fold in the peritoneum covers all the organs and holds them in place.

Small Intestine

Duodenum- attaches to the stomach and receives the pancreatic and common bile ducts.
Digestion and absorption takes place here.
Jejunum- the middle section, held in place by mesentery
Ileum- the longest portion of the small intestine and where most food absorption takes place, the digested food is absorbed by the intestinal walls into the blood by the villi (threadlike protections in the mucous membranes.)

Large Intestine

The natural diet of a species depends on the development of the large intestine.
Fermentation occurs in the large intestine especially in herbivores.

Three sections
Cecum- First part of the large intestine. Breaks down fibrous materials.
Colon- divided into three sections ascending, transverse, and descending.
Rectum- the section of the descending colon located within the pelvis, it stores feces until they are expelled through the anus

Pancreas

Elongated gland near the first part of the duodenum.
It secretes pancreatic juices that are necessary for digestion.
It also secretes insulin and glucagons.

Liver

The largest gland of the body.

Normally soft and pliable with a reddish color.

Functions

- Secreting bile for digestion
- Providing essential steps in metabolism
- Filtering and destroying foreign matter
- Storing iron, glycogen, and certain vitamins

Gallbladder

Store the concentrated bile deposited by the hepatic and cystic ducts.