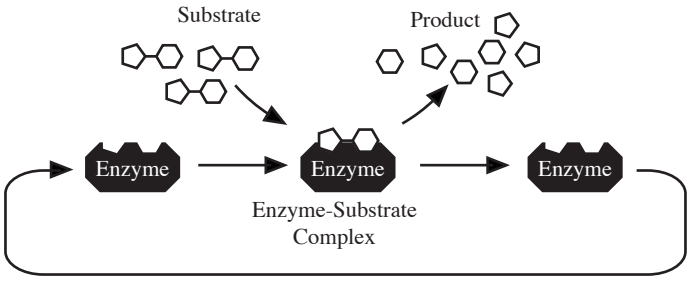
The Digestive System

1. Introduction

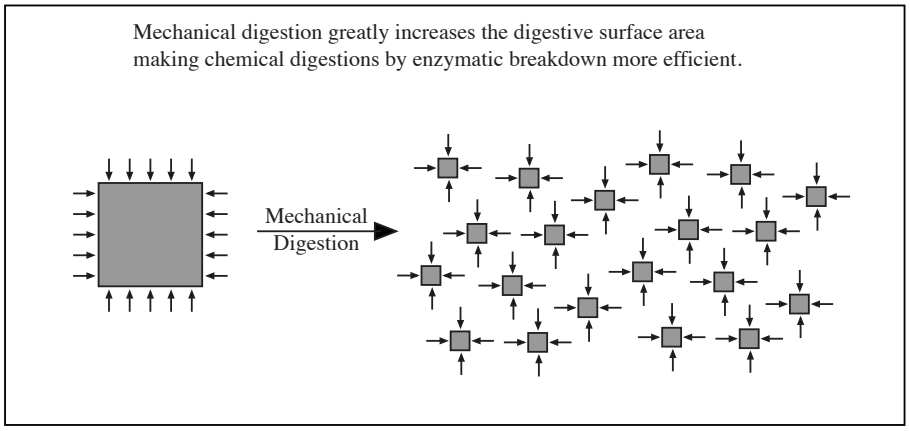


A. Gastrointestinal (GI) Tract or Alimentary Canal

B. Digestive Processes

i. Mechanical Digestion

ii. Chemical Digestion by Enzymatic Breakdown



C. Tissue Structure (Know the illustration below well)

i. Mucosa

- Membrane

a. Epithelia

b. Lamina Propria

c. Aggregated Lymphatic Nodules

ii. Submucosa

a. Accessory Glands

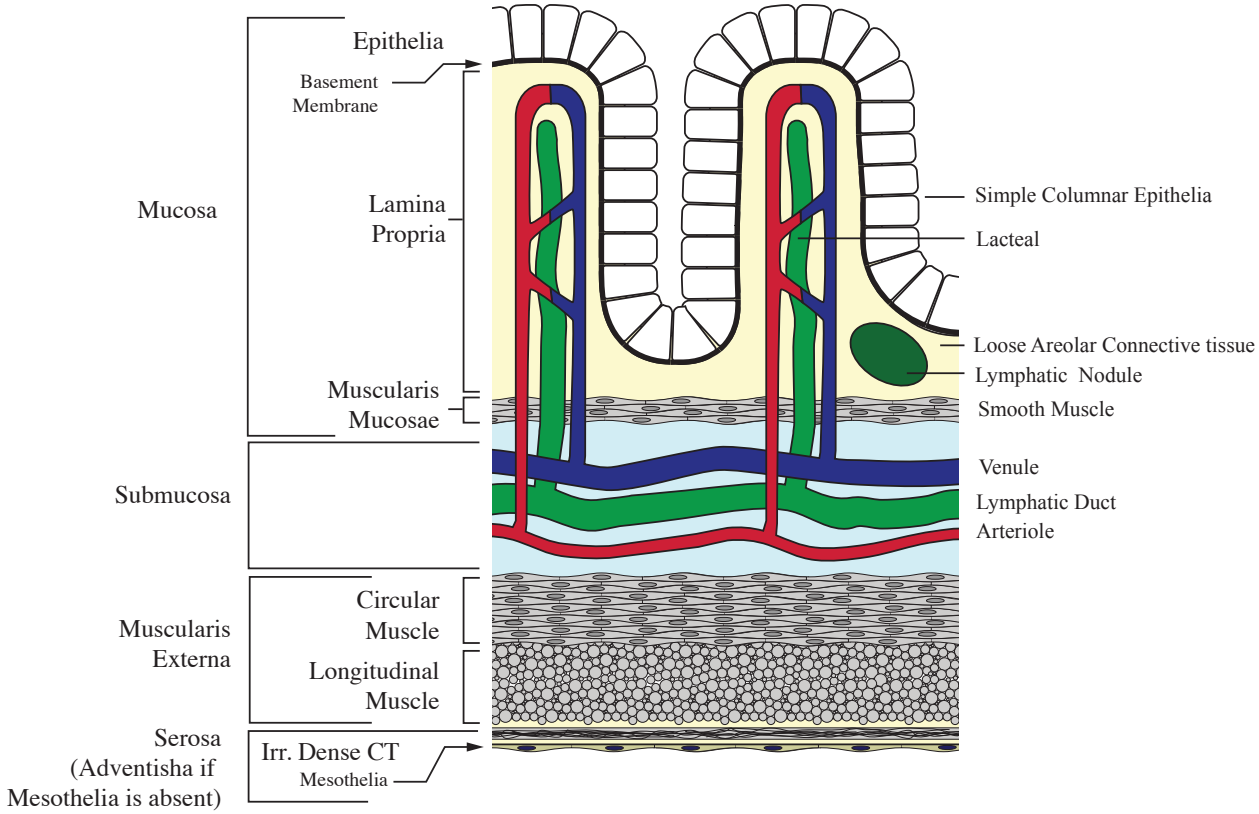
iii. Muscularis Externa

a. Circular Muscle

b. Longitudinal Muscle

iv. Serosa or Adventitia

Know the name and functions or all layers, tissues identified on the illustration below.



2. Mouth

A. Buccal Cavity

B. Oral Cavity Proper

C. Mastication (“Chewing”)

D. Lips and Cheeks

- Trigeminal Nerve

i. Lingual Frenulum

ii. Tissue of Cheeks

a. Mucous Membrane:

Stratified Squamous Epithelium

E. Teeth and Gums

i. Types of Teeth

a. Incisors

b. Canines

c. Premolars

d. Molars

- Wisdom Teeth

ii. Deciduous Teeth (4-2-4)

iii. Permanent teeth (4-2-4-6)

iv. Dentition

	Deciduous Teeth	Permanent Teeth
Incisors	4	4
Canines	2	2
Premolars	0	4
Molars	4	6

v. Periodontal Ligaments

vi. Tooth Anatomy

a. Root
b. Crown
c. Neck
d. Apical Foramen
f. Root Cavity
g. Enamel
h. Dentine
i. Cement
j. Pulp

vii. Mastication

viii. Gums or Gingivae

- Firm Connective Tissue
- Mucous Membrane
- Stratified Squamous Epithelium

F. Tongue

- Mucous Membrane

i. Function

ii. Anatomy of Oral Part

a. Body

- Taste Buds

b. Pharyngeal Part or Root of Tongue

- Lingual Tonsil

iii. Skeletal Muscle and Fine Motor Control

G. Palate

i. Hard Palate

ii. Soft Palate

a. Uvula

H. Salivary Glands

i. Glands

a. Parotid Glands

b. Submandibular Glands

c. Sublingual glands

ii. Saliva

a. Composition

- Mucin

b. Salivary Amylase

c. Bicarbonate

iii. Control of Salivary Secretion

a. Autonomic Nervous System

- Parasympathetic Stimulation
  - * ATP Active Transport Pumps Stimulated
  - * Watery Secretion
- Sympathetic stimulation
  - * ATP Active Transport Pumps Inhibited
  - * Thick Mucus

3. Pharynx

A. Nasopharynx

B. Oropharynx

i. Fauces

- Deglutition or Gag Reflex

C. Laryngopharynx

4. Esophagus

A. Sphincter

i. Lower Esophageal Sphincter

B. Histology

i. Mucosa

a. Tissue

ii. Submucosa

a. Glandular Secretions

iii. Muscularis Externa

a. Peristalsis

iv. Adventitia

a. Tissue

5. Swallowing or Deglutition

    - Bolus

A. Voluntary Oral Phase

B. Pharyngeal Phase

    - Peristalsis
    - Epiglottis

C. Involuntary Esophageal Phase

i. Peristalsis (See Handout)

    - Circular and Longitudinal Muscle Coordination

6. Abdominal Cavity and Peritoneum

A. Abdominal Cavity

i. Abdominal Viscera

ii. Peritoneum

a. Parietal peritoneum

b. Visceral peritoneum

c. Peritoneal cavity

d. Serous fluid

e. Mesenteries

    - Intraperitoneal and Retroperitoneal Organs

B. Abdominopelvic Cavity

i. Pelvic Viscera

7. Stomach

A. Anatomy

i. Greater Curvature

ii. Lesser Curvature

iii. Lower Esophageal Orifice

iv. Pyloric Orifice

B. Regions

i. Cardiac Region

ii. Body

iii. Pyloric Canal

vi. Fundis

C. Histology of Stomach

i. Muscularis Externa

a. Longitudinal Layer

b. Circular Layer

c. Oblique

ii. Rugae

iii. Epithelia and Gastric Pits ***(See handout on Chyme Production)***

Note: On the video, parietal cells and chief cells were mistakenly switched. The outline below is correct!

a. Mucous Cells → Mucous

b. Parietal Cells → HCl

c. Chief Cells → Pepsinogen

d. Enteroendocrine Cells → Gastrin

D. Functions of Stomach ***(See handout on Protein Digestion)***

i. Storage

ii. Make Chyme

E. Digestive Movements

i. Peristaltic Mixing Waves (Stomach Churning)

ii. Pyloric Pump

F. Regulation and Secretion of Gastric Juices
(Pull out handout on Digestive Regulation)

i. Means of Control:

a. Neural Control

b. Hormonal Control

- Secretin
- Cholecystokinin

ii. Phases

a. Cephalic Phase

b. Gastric Phase (and feedback mechanisms)

c. Intestinal phase (and feedback mechanisms)

8. Small Intestine

A. Anatomy

i. Duodenum

ii. Jejunum

iii. Ileum

B. Small Intestine: Adaptations to Increase Absorptive Surface Area

i. Plicae circulares

ii. Villi

- Intestinal Glands (Crypts of Lieberkühn)
- Lacteal

iii. Microvilli

C. Aggregated Lymph Nodules

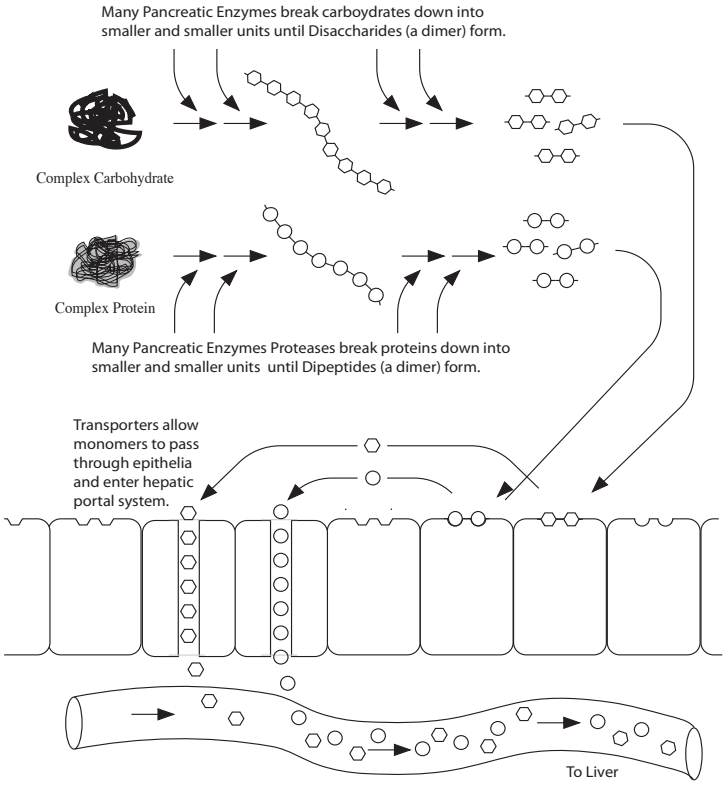
D. Digestive movements of the small intestine

i. Segmenting Contractions

ii. Peristaltic Contractions

E. Digestive Enzymes in the Small Intestine

- Disaccharidases
- Proteases



F. Absorption from the Small Intestine

i. Carbohydrates

ii. Proteins

iii. Lipids – to be dealt with shortly

9. Pancreas as a Digestive Organ

A. Gross Anatomy

i. Head

ii. Body

iii. Tail

B. Ducts and Valves

- Main Pancreatic Duct
- Hepatopancreatic Sphincter
- Accessory Pancreatic Duct

C. Select Pancreatic Enzymes

i. Pancreatic Lipases

ii. Pancreatic Amylase

iii. Pancreatic Proteolytic Enzymes

D. Endocrine Controls

i. Cholecystokinin

ii. Secretin

10. Gallbladder and Biliary System

A. Biliary System and Enterohepatic Circulation

11. The Liver as a Digestive Organ
    A. Anatomy
        i. Falciform Ligament
        ii. Right lobe
            a. Quadrate Lobe
            b. Caudate Lobe
        iii. Left Lobe
    B. Vessels of the Liver
        i. Hepatic Artery
        ii. Hepatic Portal Vein
        iii. Hepatic Vein
        iv. Bile Ducts
            a. Right and Left Hepatic Ducts
            b. Cystic Duct
            c. Common Hepatic Duct
            d. Bile Canaliculi
    C. Microscopic anatomy
        i. Lobules
        ii. Hepatocytes
        iii. Portal Area
        iv. Sinusoids

D. Functions of the Liver

i. Review of Metabolic Pathways Basics

ii. Metabolic Functions, Part #1

a. Conversion of fructose to glucose

b. Glucose as glycogen

c. Synthesis of fatty acids and triglycerides

d. Beta Oxidation

e. Gluconeogenesis from Fatty Acid catabolism

f. Deamination of Amino Acids

g. Detoxification of Ammonia and Urea formation

h. Gluconeogenesis from Amino Acid catabolism

i. Synthesis of nonessential amino acids

iii. Metabolic Functions, Part #2

a. plasma protein production such as albumin

b. Form fetal erythrocytes

c. bilirubin removal

d. lipoprotein, cholesterol and phospholipid formation

e. metabolism (primarily detoxification) of drugs, pesticides, herbicides, environmental pollutants, and poisons.

f. vitamin A synthesis from carotene

g. heat production due to many chemical reactions

iv. Storage Functions

a. Also fat-soluble vitamins (A, D, E, and K)

b. minerals (ie., iron),

c. vitamin B_{12}.

v. Bile Secretion

12. Lipid Digestion and Transport Essay

    (Pull out your handout on Lipid Digestion and Transport)

13. Large Intestine

    A. Gross Anatomy

        i. Cecum
        ii. Ascending Colon
        iii. Transverse Colon
        iv. Descending Colon
        v. Sigmoid Colon
        vi. Haustra

    B. Functions of the Large Intestine

        i. Bacterial Activity

        ii. Composition of Feces

        iii. Movements of the Large intestine

14. Rectum

    A. Anal Canal

    B. Internal Anal Sphincter

    C. External Anal Sphincter

    D. Defecation Reflex