Glencoe Science

Biology

Interactive Classroom

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Mc Graw Hill Glencoe

Chapter 35 Digestive and Endocrine Systems

EXIT

Click on a lesson name to select.

35.1 The Digestive System

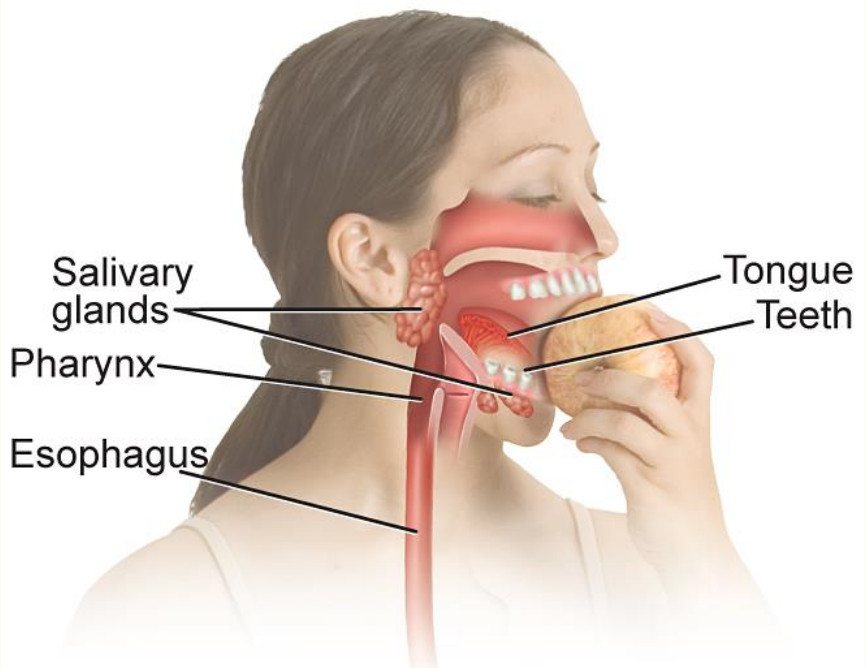
Functions of the Digestive System

- Ingests food
- Breaks it down so nutrients can be absorbed
- Eliminates what cannot be digested

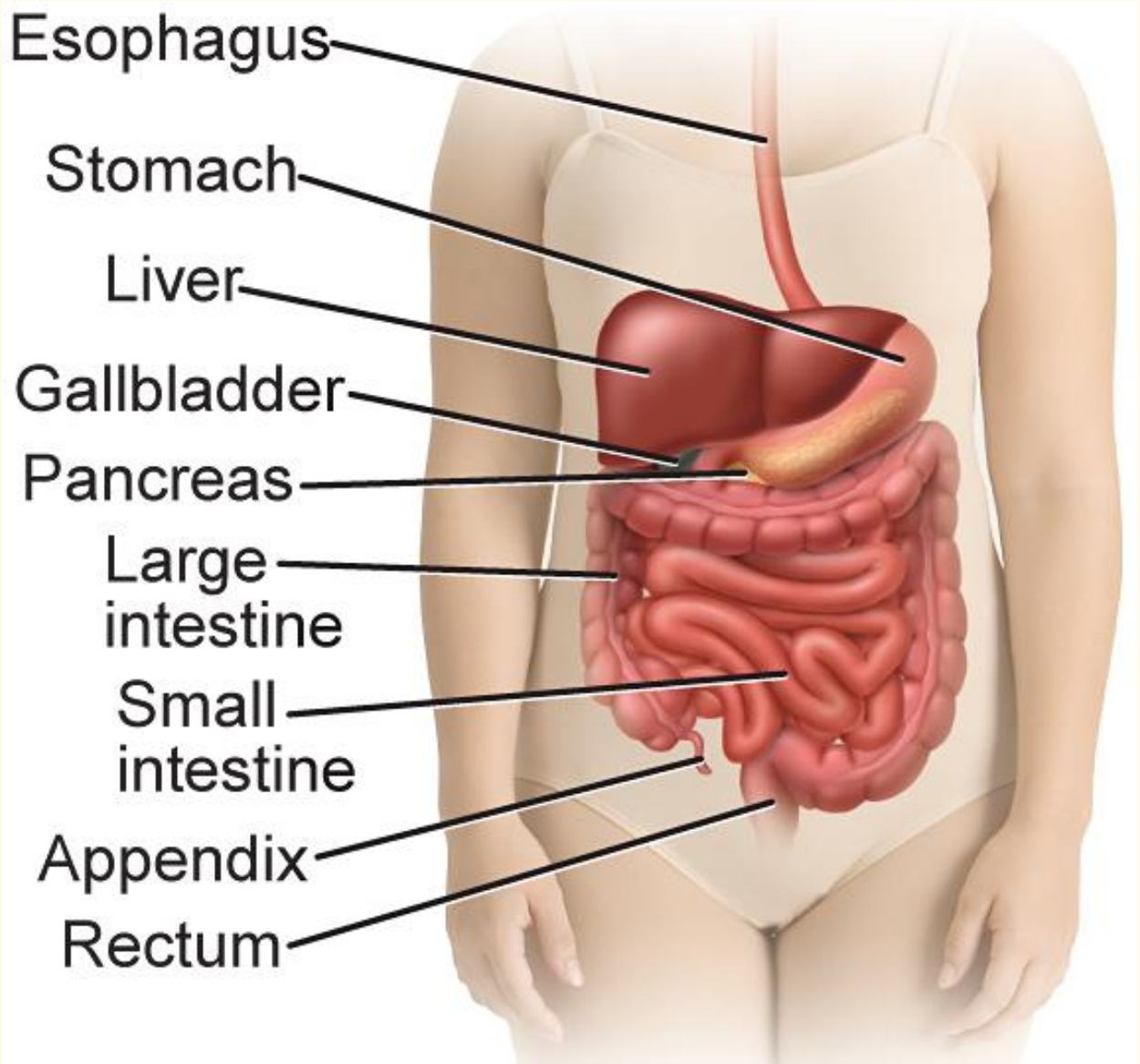
35.1 The Digestive System

Ingestion

- Mechanical digestion
  - Involves chewing food to break it down into smaller pieces
- Chemical digestion
  - The action of enzymes in breaking down large molecules into smaller molecules



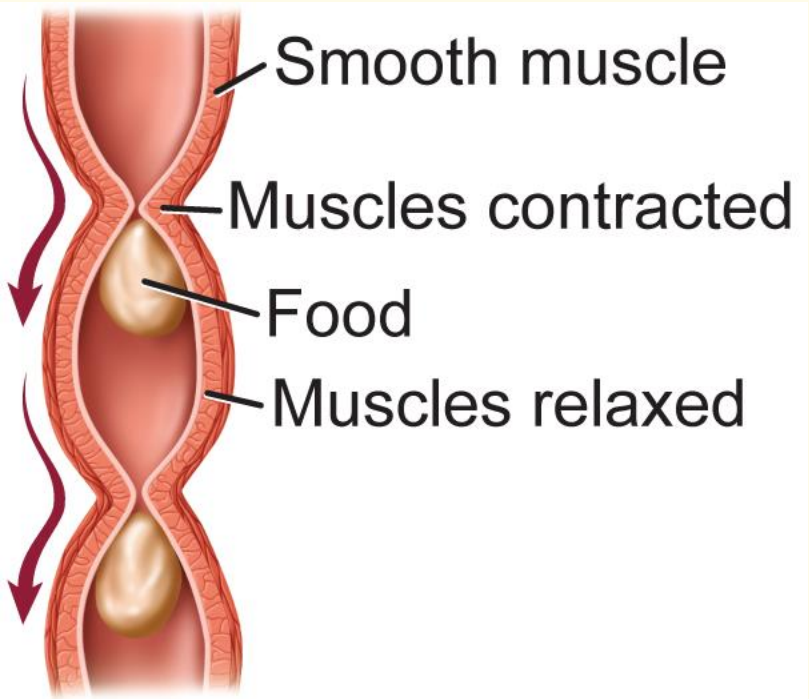
35.1 The Digestive System



35.1 The Digestive System

Esophagus

- Muscular tube that connects the pharynx, or throat, to the stomach



Peristalsis

- Smooth muscles contract rhythmically to move food through the digestive system.

Smooth Muscle Contraction

35.1 The Digestive System

Stomach

- Walls of the stomach are composed of three overlapping layers of smooth muscle that are involved with mechanical digestion.
- Environment inside the stomach is very acidic.
- Pepsin is an enzyme involved in the process of the chemical digestion of proteins.

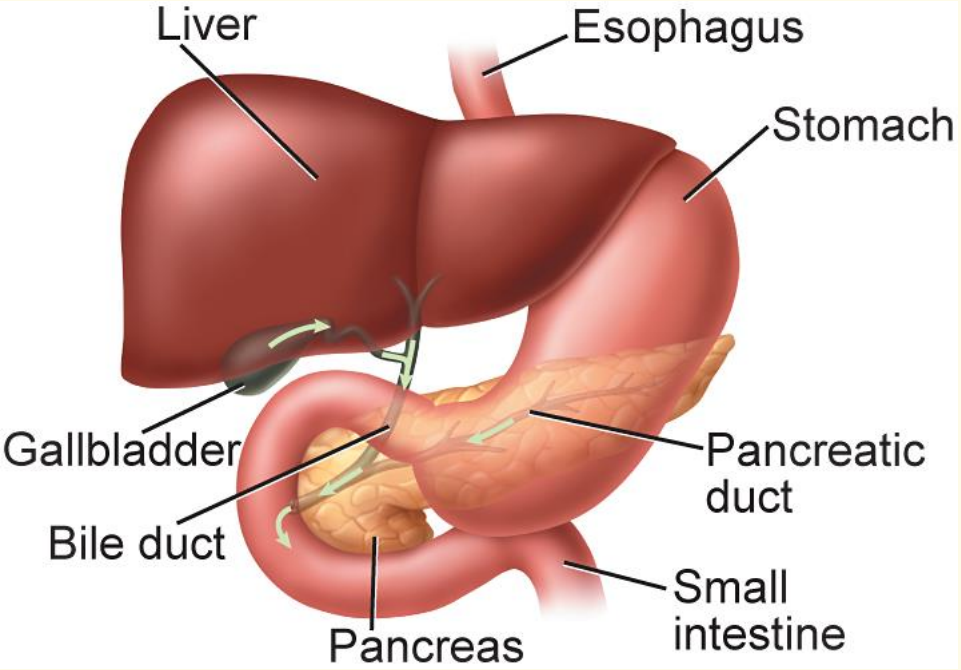
35.1 The Digestive System

Small Intestine

- Smooth muscles in the wall of the small intestine continue the process of mechanical digestion and push the food farther through the digestive tract by peristalsis.

35.1 The Digestive System

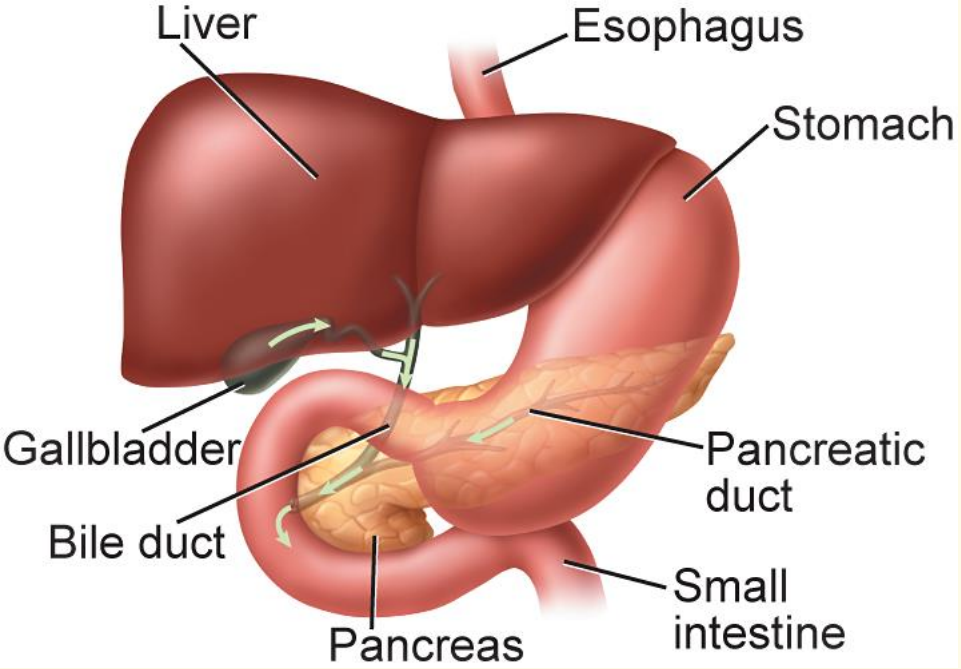
- The completion of chemical digestion in the small intestine depends on
  - Pancreas
  - Liver
  - Gallbladder



35.1 The Digestive System

Pancreas

- Produces enzymes that digest carbohydrates, proteins, and fats
- Produces hormones



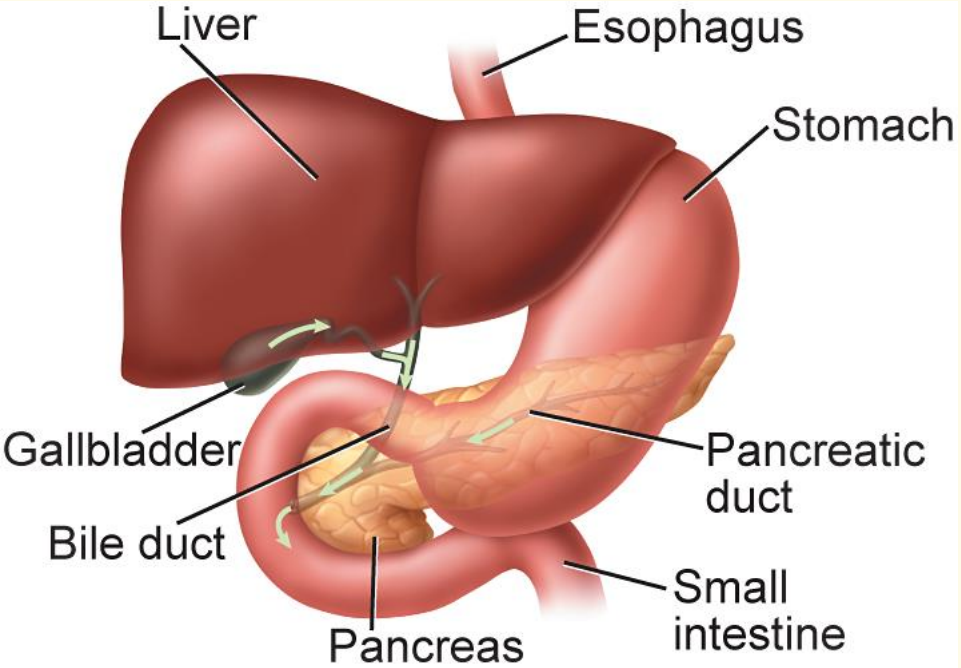
35.1 The Digestive System

Liver

- Produces bile, which helps to break down fats

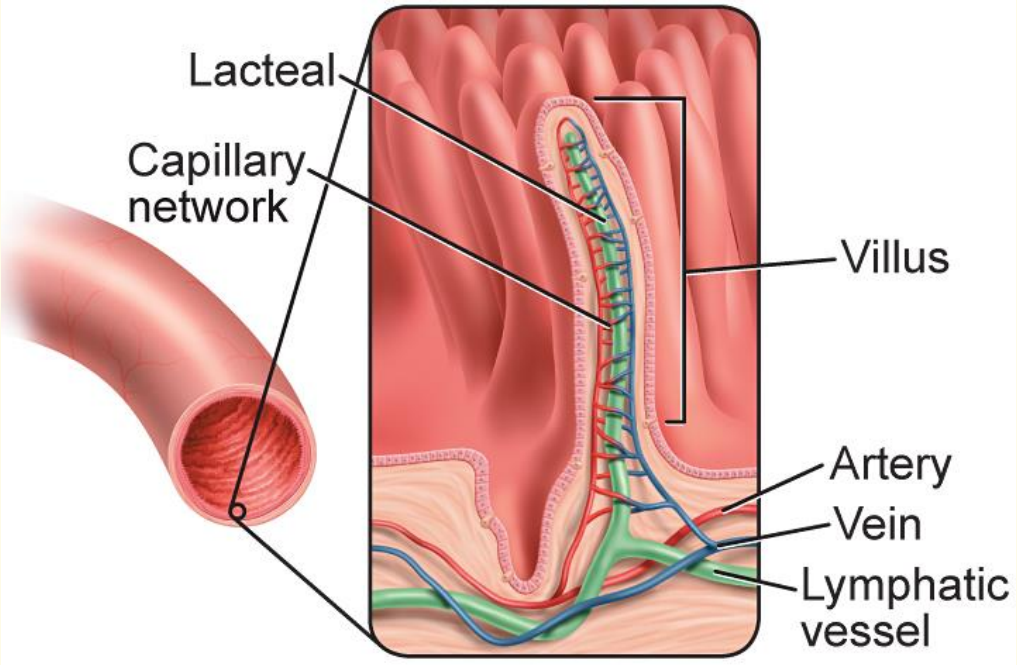
Gallbladder

- Stores excess bile



35.1 The Digestive System

- Food nutrients are absorbed from the small intestine into the bloodstream through fingerlike structures called villi.
- Villi increase the surface area of the small intestine.



35.1 The Digestive System

Large Intestine

- A primary function of the colon is to absorb water from the chyme.
- Peristalsis moves feces toward the rectum.

Concepts In Motion

Table 35.1 Time for Digestion

Digestive Structure	Primary Function	Time Food in Structure
	Mechanical and chemical digestion	5–30 s
	Transport (swallowing)	10 s
	Mechanical and chemical digestion	2–24 h
	Mechanical and chemical digestion	3–4 h
	Water absorption	18 h–2 days

Esophagus | Mouth | Large intestine | Small intestine | Stomach

Drag each option to its corresponding Primary function

Reset | Submit | Show me

35.2 Nutrition

Calories

- Nutrition is the process by which a person takes in and uses food.
- A Calorie is a unit used to measure the energy content of foods.
- The energy content of food can be measured by burning the food and converting the stored energy to heat.

35.2 Nutrition

Activities and Calories Used per Hour

Activity	Calories Used Per Hour	Activity	Calories Used Per Hour
Baseball	282	Hiking and backpacking	564
Basketball	564	Hockey (field and ice)	546
Bicycling	240–410	Jogging	740–920
Cross-country skiing	700	Skating	300
Football	540	Soccer	540

Concepts In Motion

Table 35.2 Activities and Calories Used per Hour

Activity	Calories Used Per Hour	Activity	Calories Used Per Hour
Baseball		Hiking and backpacking	564
Basketball	564	Hockey (field and ice)	
Bicycling		Jogging	740–920
Cross-country skiing		Skating	
Football		Soccer	

240–410 | 282 | 540 | 300 | 546 | 540 | 700

Drag each option to its corresponding category

Reset Submit Show me

35.2 Nutrition

Carbohydrates

- Complex carbohydrates are macromolecules such as starches, which are long chains of sugar.
- Complex carbohydrates are broken down into simple sugars.

35.2 Nutrition

- Simple sugars are absorbed through villi.
- Glucose is stored in the liver.
- Dietary fiber helps keep food moving through the digestive tract.

35.2 Nutrition

Fats

- Fats are the most concentrated energy source available to the body.
- Building blocks for the body
- Classified as saturated and unsaturated
- Meats and cheeses are sources of saturated fats.
- Plants are the main source of unsaturated fats.

35.2 Nutrition

- Fats are digested in the small intestine and broken down into fatty acids and glycerol.
- Fatty acids can be absorbed through the villi and circulated in the blood throughout the body.

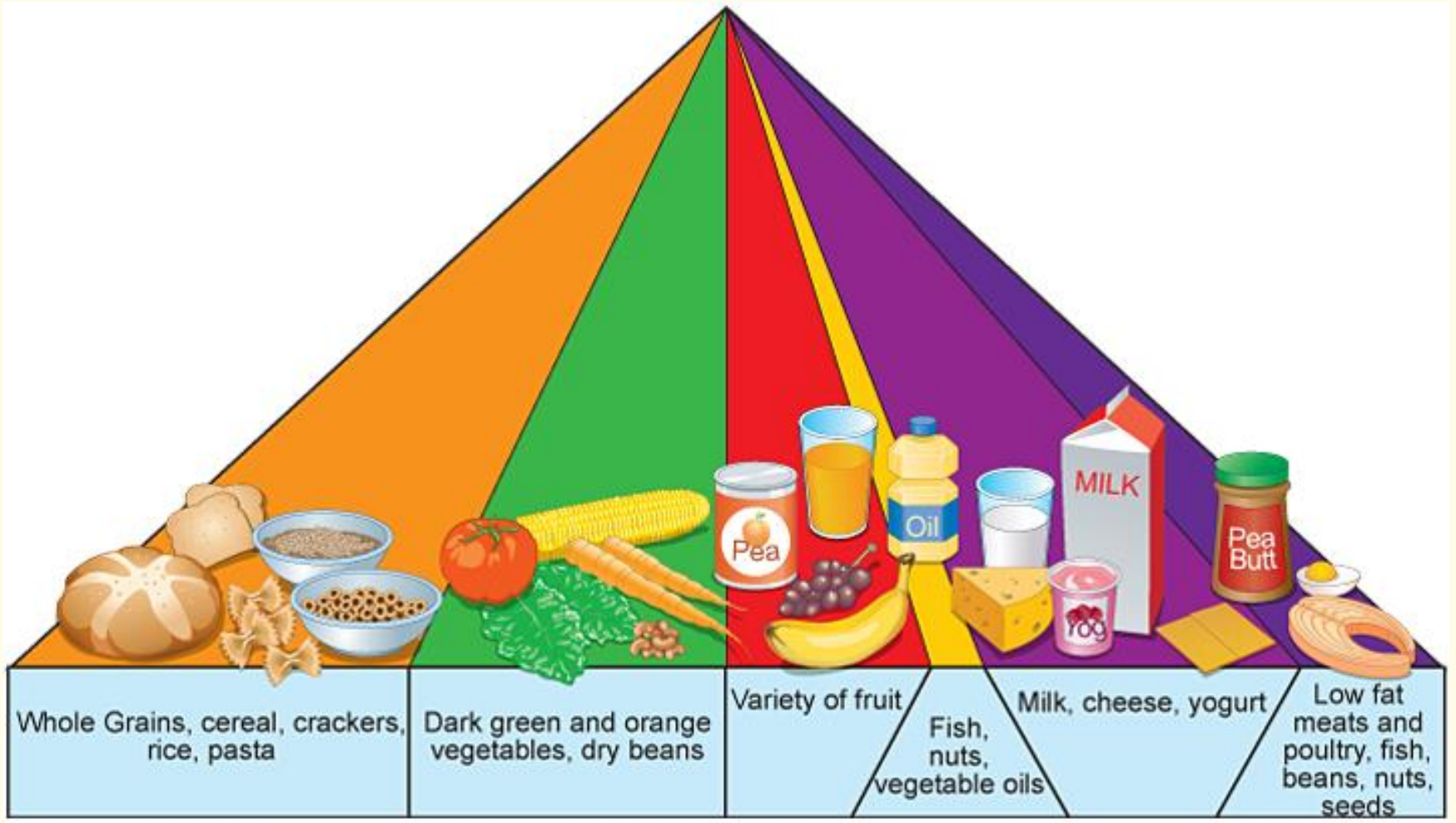
35.2 Nutrition

Proteins

- Proteins are broken down to their subunit amino acids.
- Amino acids are absorbed into the bloodstream and carried to various body cells.
- Essential amino acids are the eight amino acids that must be included in a person's diet.

35.2 Nutrition

Food Pyramid



35.2 Nutrition

Vitamins and Minerals

- Vitamins are organic compounds that are needed in small amounts for metabolic activities.
- Minerals are inorganic compounds used by the body as building material, and they are involved with metabolic functions.

35.2 Nutrition

Major Roles of Some Vitamins and Minerals

Vitamin	Major Role in the Body	Possible Sources	Mineral	Major Role in the Body
A	• Vision • Health of skin and bones		Ca	• Strengthening of teeth and bone • Nerve conduction • Contraction of muscle
D	• Health of bones and teeth		P	• Strengthening of teeth and bone
E	• Strengthening of red blood cell membrane		Mg	• Synthesis of proteins
Riboflavin (B_2)	• Metabolism of energy		Fe	• Synthesis of hemoglobin
Folic Acid	• Formation of red blood cells • Formation of DNA and RNA		Cu	• Synthesis of hemoglobin

35.2 Nutrition

Major Roles of Some Vitamins and Minerals

Vitamin	Major Role in the Body	Possible Sources	Mineral	Major Role in the Body
Thiamine	• Metabolism of carbohydrates		Zn	• Healing of wounds
Niacin (B_3)	• Metabolism of energy		Cl	• Balance of water
Pyridoxine (B_6)	• Metabolism of amino acids		I	• Synthesis of thyroid hormone
B_{12}	• Formation of red blood cells		Na	• Nerve conduction • Balance of pH
C	• Formation of collagen		K	• Nerve conduction • Contraction of muscle

35.2 Nutrition

Nutrition Labels

- Based on a 2000-Calorie per day diet
  - name of the food
  - net weight or volume
  - name and address of manufacturer, distributor, or packager
  - ingredients
  - nutrient content

Chapter Diagnostic Questions

CheckPoint

Which is an enzyme responsible for breaking down starches into sugars?

A. amylase

B. appendix

C. peristalsis

D. pepsin

Chapter Diagnostic Questions

CheckPoint

Cellulose is an example of what type of food?

A. fat

B. protein

C. carbohydrate

D. vegetable

35.1 Formative Questions

CheckPoint

What type of digestion is carried out by the action of smooth muscles in the stomach and small intestine?

A. chemical digestion

B. mechanical digestion

35.1 Formative Questions

CheckPoint

Where does the chemical digestion of starches begin?

A. mouth

B. stomach

C. small intestine

D. large intestine

35.1 Formative Questions

CheckPoint

In what type of solution is the enzyme pepsin most active?

A. acidic solution

B. buffered solution

C. gaseous solution

D. concentrated sugar solution

35.1 Formative Questions

CheckPoint

What is the primary function of the large intestine?

A. absorption of water from chyme

B. chemical breakdown of feces

C. excretion of acids and hormones

D. mechanical digestion of lipids

35.2 Formative Questions

CheckPoint

True or False

Fats are an important part of a healthy diet.

35.2 Formative Questions

CheckPoint

What nutrients are released by the digestion of proteins, absorbed into the bloodstream, and reassembled into proteins in body cells?

A. amino acids
B. folic acids
C. glycerols
D. vitamins

35.2 Formative Questions

CheckPoint

Which nutrients contain the most energy, gram for gram?

A. carbohydrates

B. fats

C. proteins

D. vitamins

35.2 Formative Questions

CheckPoint

Which substances are necessary for proper nerve conduction and muscle contraction?

A. Vitamins A and E

B. Vitamins B_2, B_6, and B_{12}

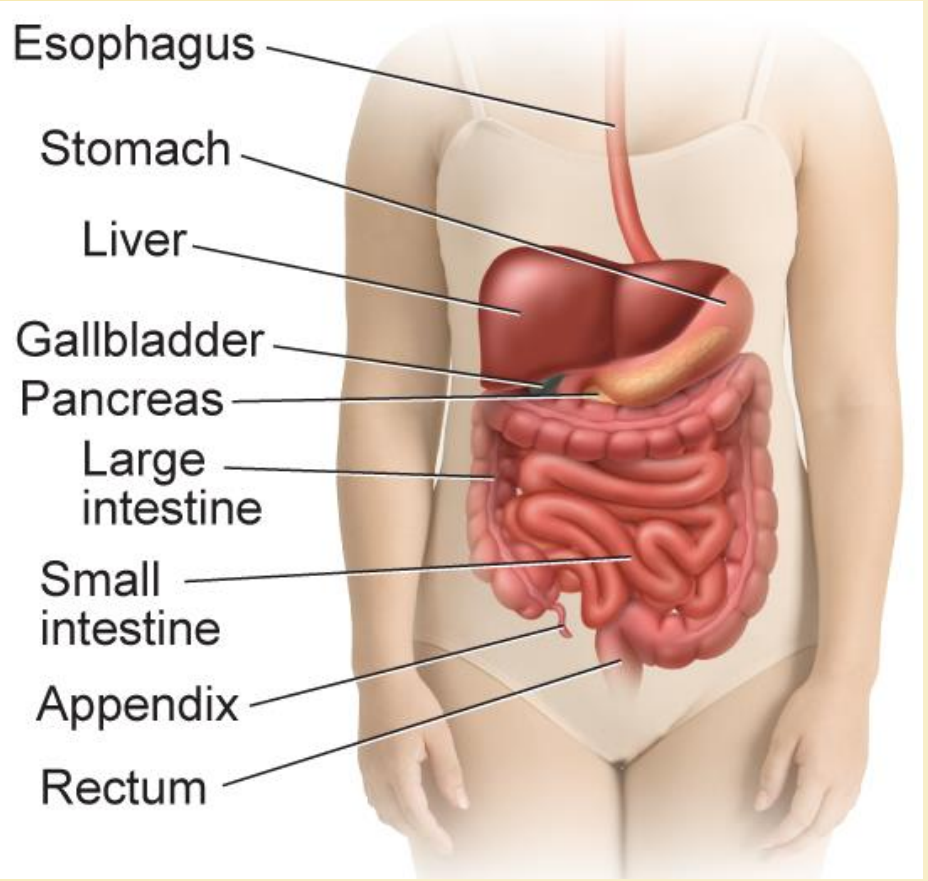
C. the minerals Ca, Na, and K

D. the minerals Fe, Cu, and Zn

Chapter Assessment Questions

CheckPoint

Describe what causes heartburn.



Chapter Assessment Questions

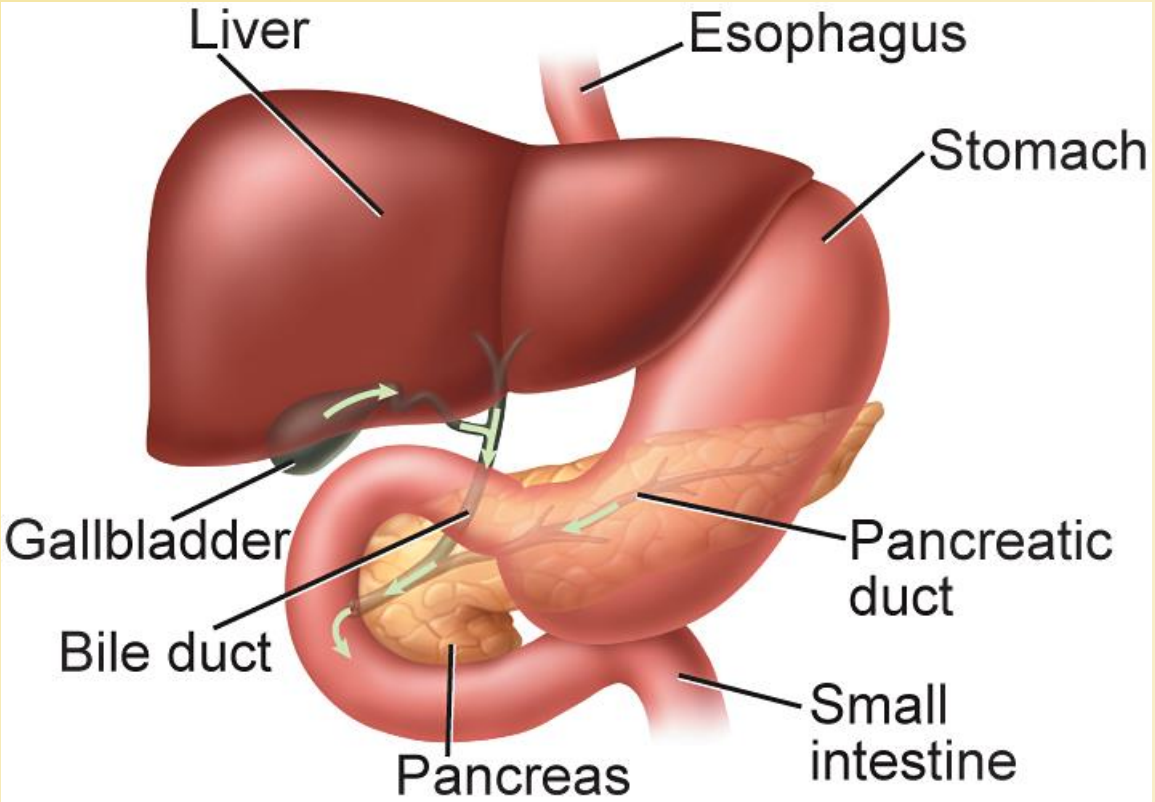
CheckPoint

Answer: If the sphincter in the upper part of the stomach leaks, some of the acid moves into the esophagus causing heartburn.

Chapter Assessment Questions

CheckPoint

What is the primary function of the liver?



Chapter Assessment Questions

CheckPoint

A. produce enzymes

B. produce hormones

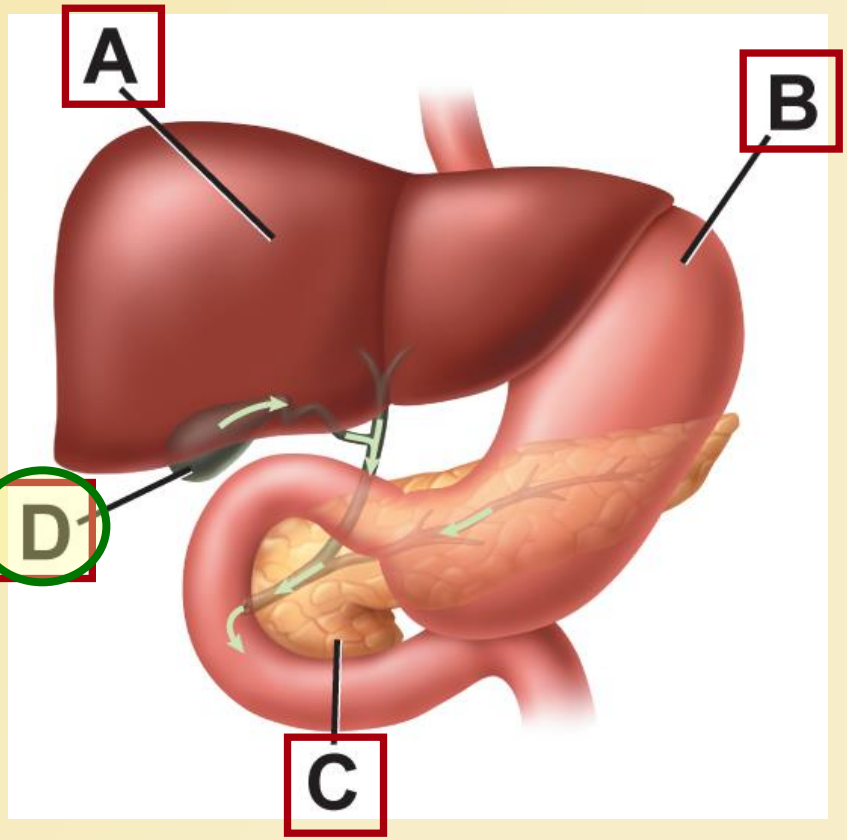
C. produce bile

D. produce protein

Standardized Test Practice

CheckPoint

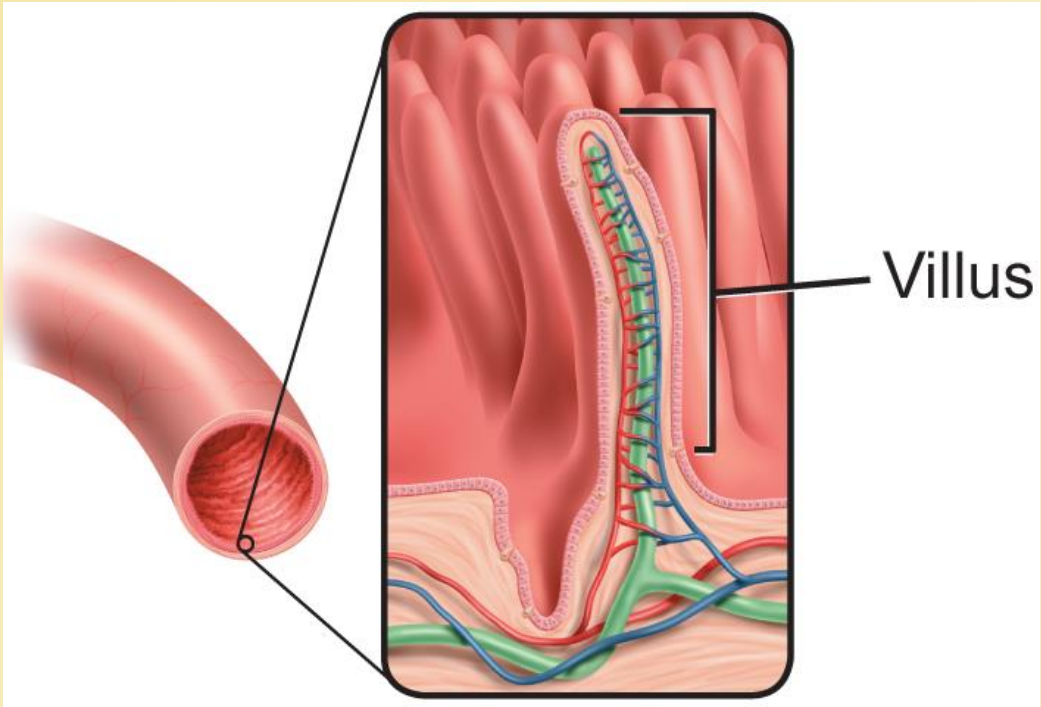
Which organ stores bile and releases it when needed?



Standardized Test Practice

CheckPoint

How does this structure aid in the digestive process?



Standardized Test Practice

CheckPoint

A. It increases surface area.

B. It mechanically digests food.

C. It secretes digestive enzymes.

D. It traps foreign particles.

Standardized Test Practice

CheckPoint

True or False

People should minimize their intake of foods that contain cellulose because humans cannot digest cellulose.

Standardized Test Practice

CheckPoint

Which types of fats are found in corn oil and olive oil?

A. saturated fats

B. unsaturated fats

Standardized Test Practice

CheckPoint

Why does the body need vitamins?

A. They provide energy.

B. They are used to build cells.

C. They help enzymes to function.

D. They recycle nutrient molecules.

Vocabulary

Section 1

- mechanical digestion
- chemical digestion
- amylase
- esophagus
- peristalsis
- pepsin
- small intestine
- liver
- villus
- large intestine

Vocabulary

Section 2

- nutrition
- Calorie
- vitamin
- mineral

Vocabulary

Section 3

- endocrine gland
- hormone
- pituitary gland
- thyroxine
- calcitonin
- parathyroid hormone
- insulin
- glucagon
- aldosterone
- cortisol
- antidiuretic hormone