

## II. PHYSIOLOGY

A) 2 main functions

1.

2.

B) 2 main groups of organs

1.

2.

C) Functions

Ingestion -

Propulsion –

1.

2.

Mechanical digestion -

Chemical digestion -

Absorption -

Defecation -

## THE MOUTH, PHARYNX, AND ESOPHAGUS

### A) Food ingestion and breakdown – MOUTH

Mechanical –

Mastication –

Bolus -

Chemical –

Enzyme action -

Absorption -

### B) Food propulsion– SWALLOWING AND PERISTALSIS

– Deglutition

2 phases:

1.

2.

The Pharynx –

Propulsion –

Route blockage

1.

2.

3.

The Pharynx:

Chemical Digestion?

Absorption?

Uh-oh!

The Esophagus:

Muscle –

Functions –

Peristalsis –

Gravity?

Chemical digestion?

Absorption?

## THE STOMACH

Muscles:

1.

2.

3.

Regions:

1.

2.

3.

Rugae -

Functions:

1.

2.

3.

4.

## Special cells and their secretions

1.

2.

3.

4.

## Mechanical digestion:

Chyme -

## Chemical digestion

Carbohydrates -

Proteins -

Pepsinogen -

Pepsin -

Rennin -

Propulsion:

Peristalsis -

Pylorus/pyloric sphincter -

Stomach empty?

Absorption:

1.

2.

3.

Hormonal control:

Emesis:

Nausea

## Vomiting

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

## SMALL INTESTINE

Mechanical digestion:

Segmentation –

Chemical digestion:

Carbohydrates –

Proteins –

Fat –

Intestinal juice:

Pancreatic juice:

1.

2.

3.

4.

5.

Bile:

1.

2.



Brush border:

1.

2.

Enzymes

Absorption:

Propulsion:

Peristalsis –

Segmentation -

## **V. THE LIVER AND GALL BLADDER**

Digestive functions:

1.

2.

Other functions:

1.

2.

3.

4.

5.

MORE ON THE LIVER A LITTLE BIT LATER, I PROMISE

## **THE PANCREAS**

Functions:

1.

2.

3.

Pancreatic juice:

Enzymes released:

Secretion regulation

## **THE LARGE INTESTINE**

Histology:

Functions:

- 1.
- 2.
- 3.
- 4.

Digestion:

Absorption:

Propulsion:

Peristalsis –

Mass movement -

Defecation:

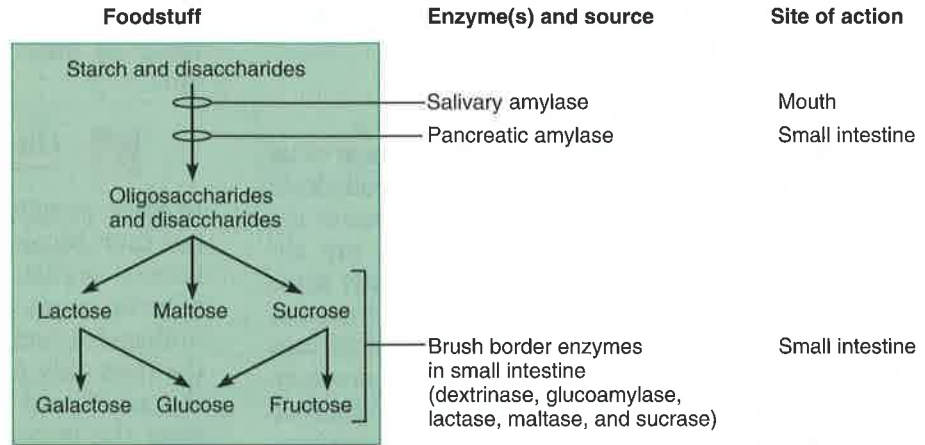
Diarrhea

Constipation

**Path of absorption**

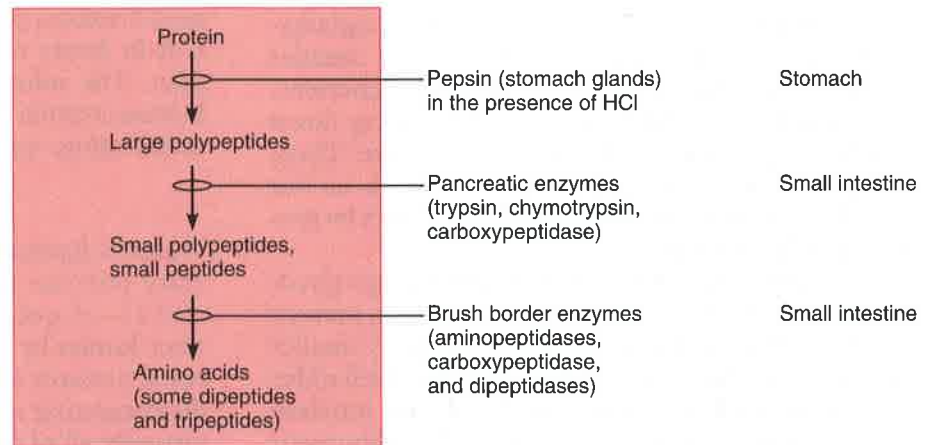
**Carbohydrate digestion**

**Absorption:** The monosaccharides glucose and galactose are absorbed via cotransport with sodium ions; fructose passes via facilitated diffusion. All monosaccharides enter the capillary blood in the villi and are transported to the liver via the hepatic portal vein.



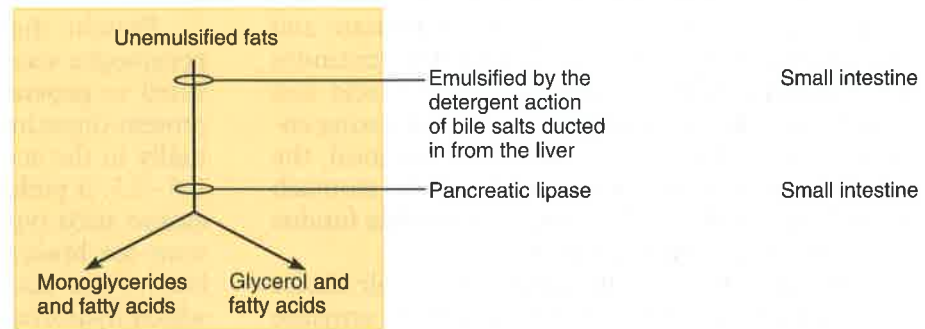
**Protein digestion**

**Absorption:** Amino acids are absorbed via cotransport with sodium ions; they enter the capillary blood in the villi and are transported to the liver via the hepatic portal vein.



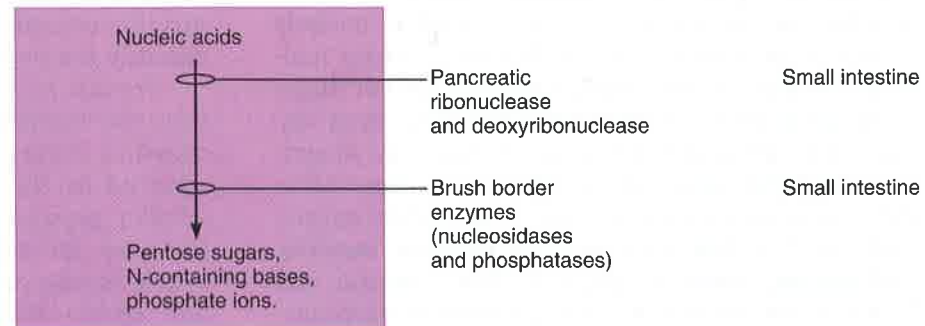
**Fat digestion**

**Absorption:** Fatty acids and monoglycerides enter the intestinal cells via diffusion. They are combined with proteins within the cells, and the resulting chylomicrons are extruded. They enter the lacteals of the villi and are transported to the systemic circulation via the lymph in the thoracic duct. (Glycerol and short-chain fatty acids are absorbed into the capillary blood in the villi and transported to the liver via the hepatic portal vein.)



**Nucleic acid digestion**

**Absorption:** Active transport via membrane carriers; absorbed into capillary blood in the villi and transported to the liver via the hepatic portal vein.



**FIGURE 24.33** Flowchart of chemical digestion and absorption of foodstuffs.

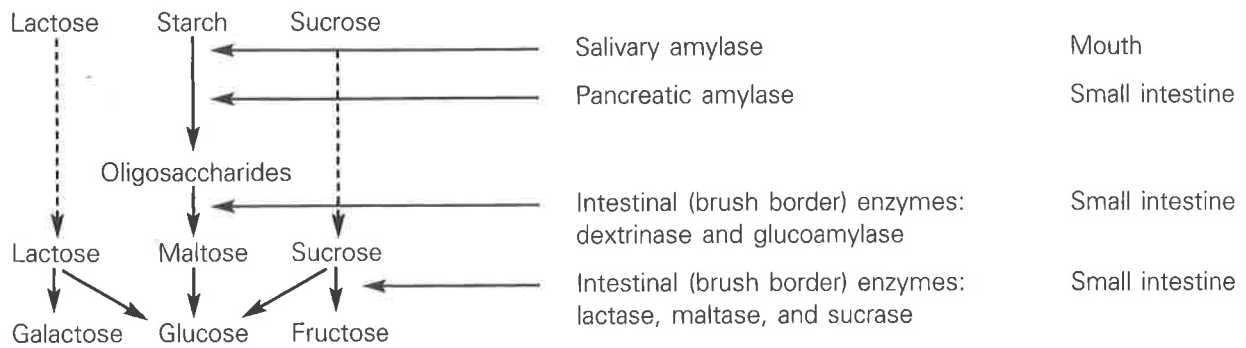
**Table 14.2 Hormones and Hormonelike Products That Act in Digestion**

<b>Hormone</b>	<b>Source</b>	<b>Stimulus for secretion</b>	<b>Action</b>
Gastrin	Stomach	Food in stomach (chemical stimulus)	Stimulates release of gastric juice; stimulates mobility of small intestine; relaxes ileocecal valve.
Histamine	Stomach	Food in stomach	Activates parietal cells to secrete hydrochloric acid.
Somatostatin	Stomach	Food in stomach	Inhibits secretion of gastric juice and pancreatic juice; inhibits emptying of stomach and gallbladder.
Secretin	Duodenum	Acidic chyme and partially digested foods in duodenum	Increases output of pancreatic juice rich in bicarbonate ions; increases bile output by liver; inhibits gastric mobility and gastric gland secretion.
Cholecystokinin (CCK)	Duodenum	Fatty chyme in duodenum	Increases output of enzyme-rich pancreatic juice; stimulates gallbladder to expel stored bile; relaxes sphincter of duodenal papilla to allow bile and pancreatic juice to enter the duodenum.
Gastric inhibitory peptide (GIP)	Duodenum	Fatty chyme in duodenum	Inhibits gastric mobility and secretion of gastric juice.

**Table 14.1 Flowchart of Digestion and Absorption of Foodstuffs**

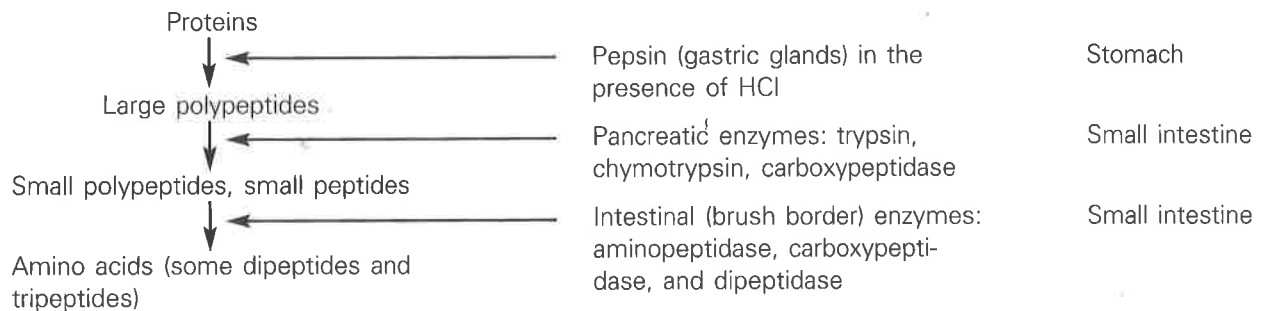
Foodstuff	Enzymes and source	Site of action
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**(a) Carbohydrates: sequence and sites of chemical digestion**



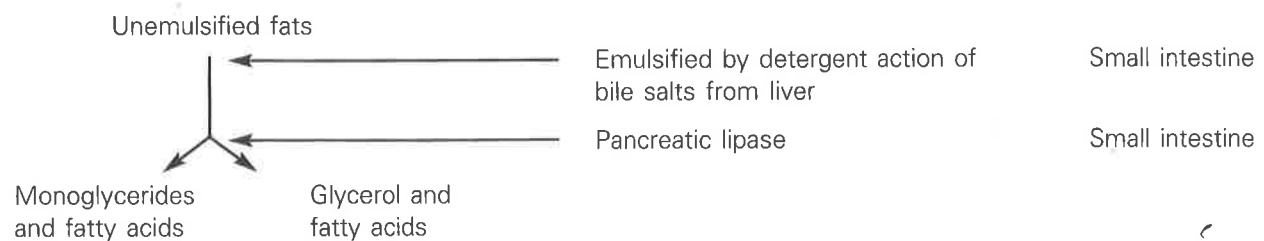
Absorption: Monosaccharides (glucose, galactose, and fructose) enter the capillaries of the villi and are transported to the liver via the hepatic portal vein.

**(b) Proteins: sequence and sites of chemical digestion**



Absorption: Amino acids enter the capillaries of the villi and are transported to the liver via the hepatic portal vein.

**(c) Lipids: sequence and sites of chemical digestion**



Absorption: Absorbed primarily into the lacteals of the villi and transported in the lymph to the systemic circulation via the thoracic duct and then to the liver via the hepatic artery. Glycerol and short-chain fatty acids are absorbed into the capillary blood in the villi and are transported to the liver via the hepatic portal vein.