



# FISIOLOGI

## SALURAN PENCERNAAN

dr AGUSTINA RAHAYU MAGDALEN, MKes

BAGIAN FISIOLOGI - PSKU UNMUL

**Nutrients**

**Foods**

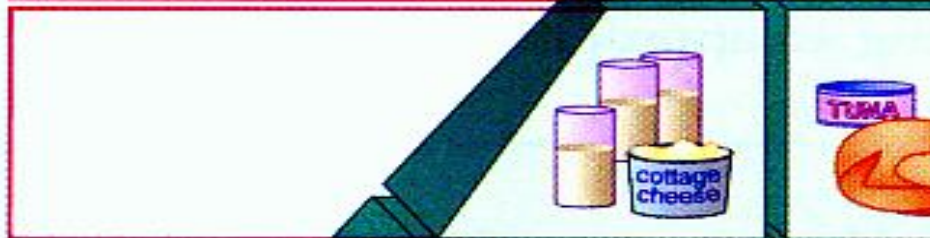
**Functions**

Sugar and fats



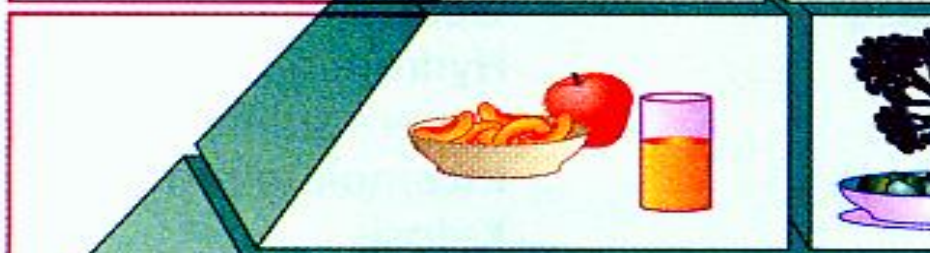
Sugar and fats:  
Stored and backup energy source

Protein



Protein:  
Building blocks for growth and repair

Carbohydrate



Carbohydrate:  
Primary energy source



**Breakfast**

- Orange juice
- Oatmeal
- English muffin with margarine
- Skim milk

**Lunch**

- Tuna-stuffed tomato
- Bran muffin
- Carrot sticks
- Apple
- Skim milk

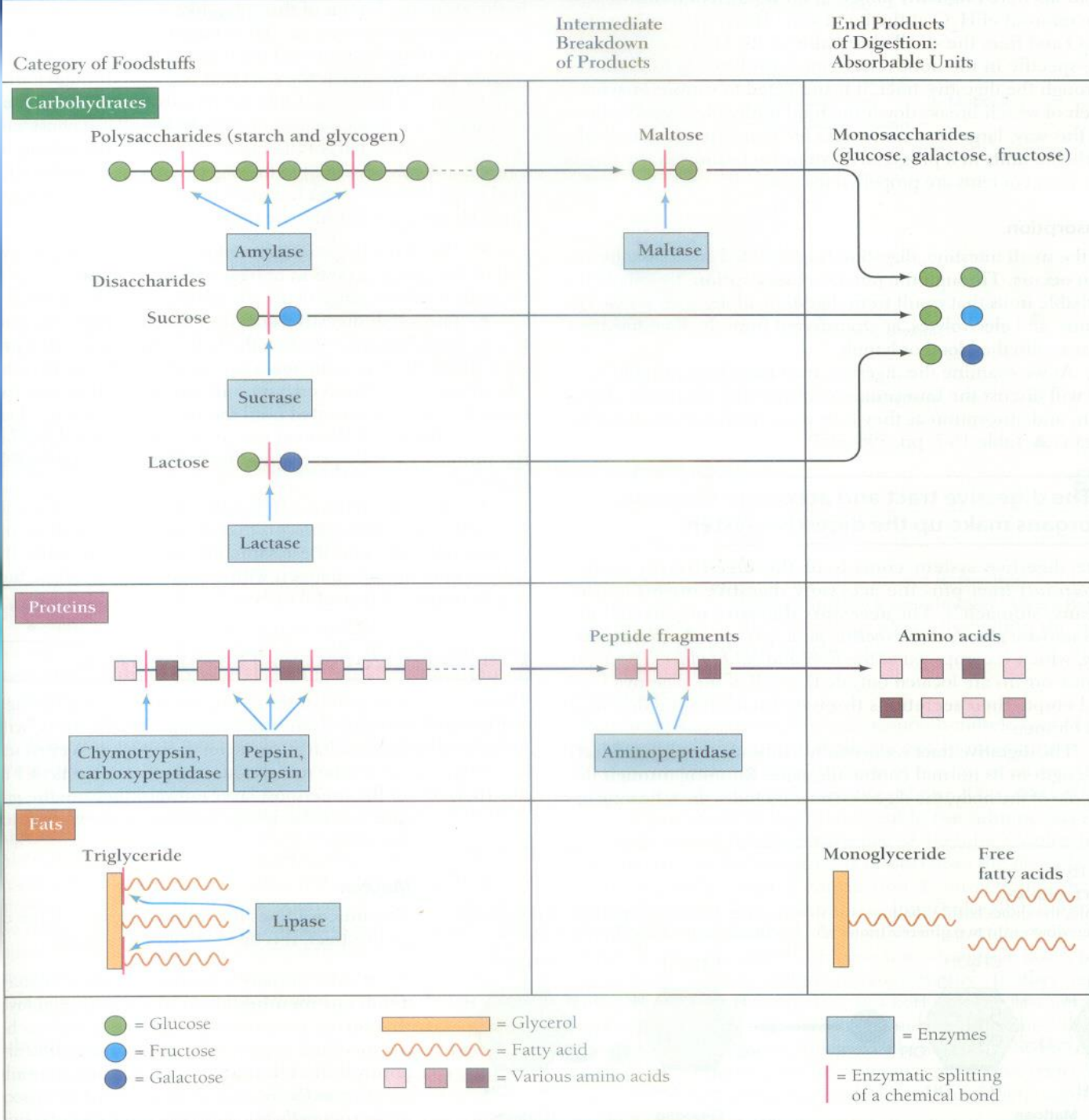
**Dinner**

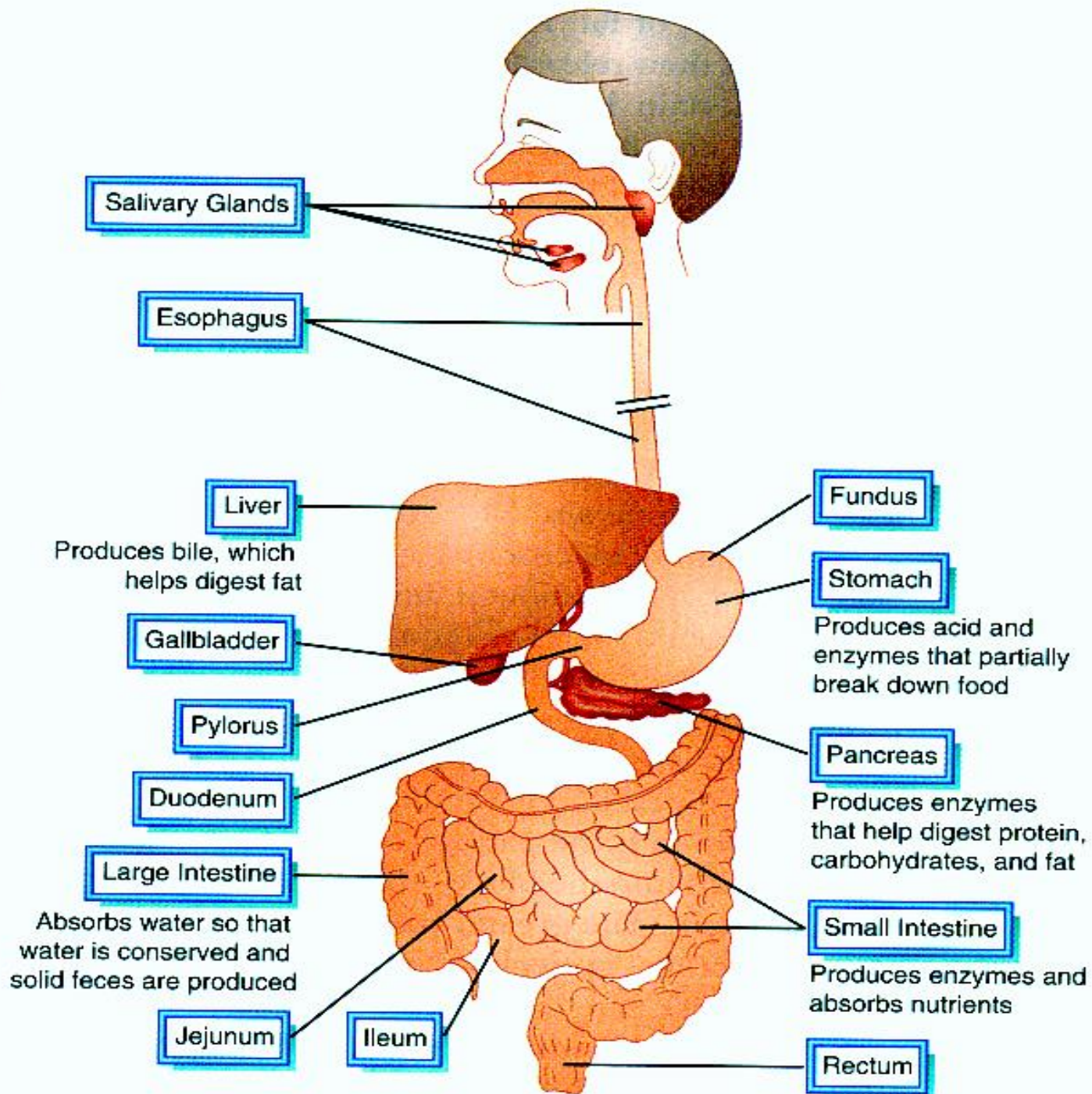
- Broiled chicken
- Steamed rice
- Broccoli spears
- Tossed salad with dressing
- Whole wheat bread
- Sliced peaches
- Skim milk

**Snack**

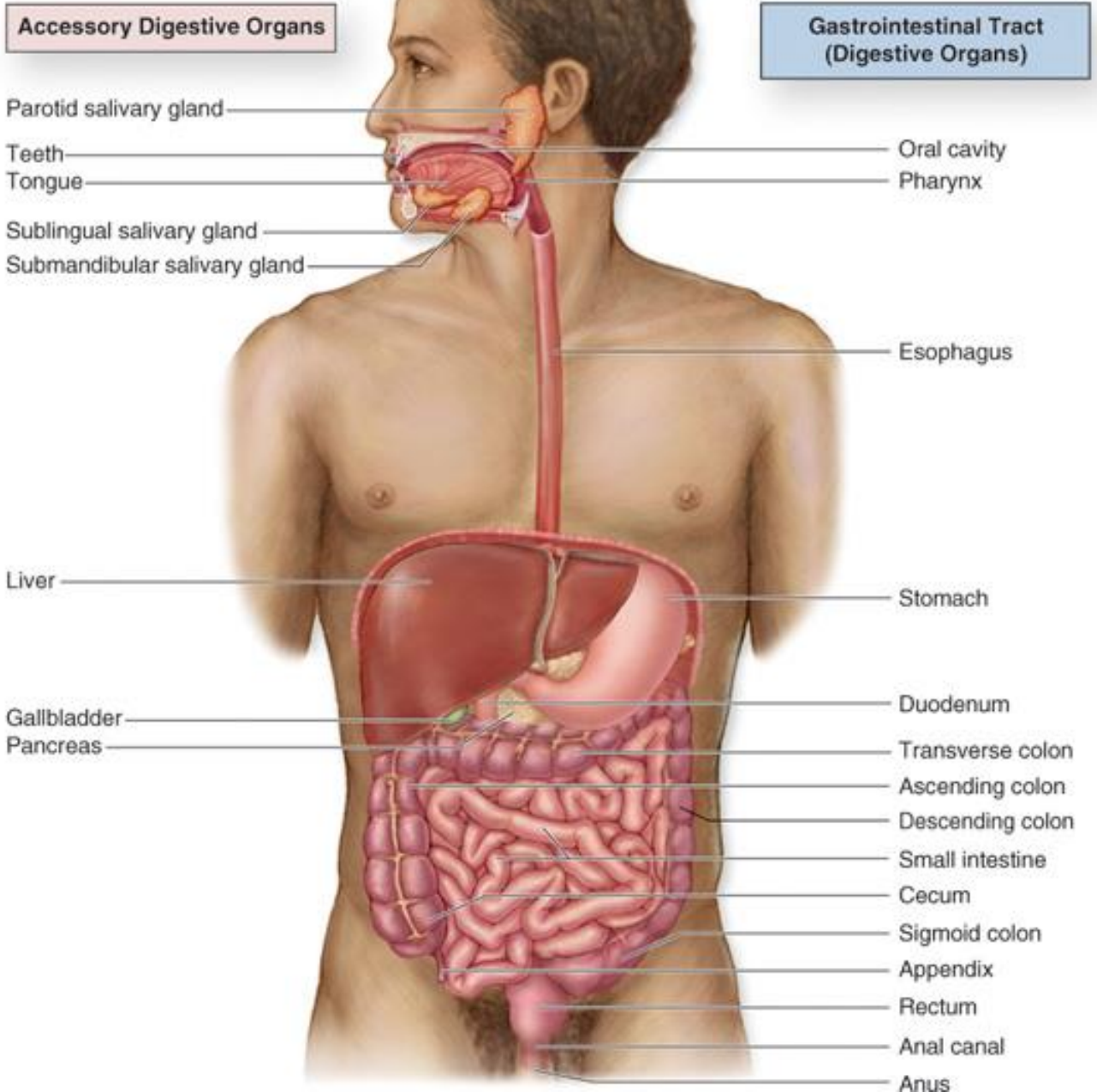
- Cottage cheese



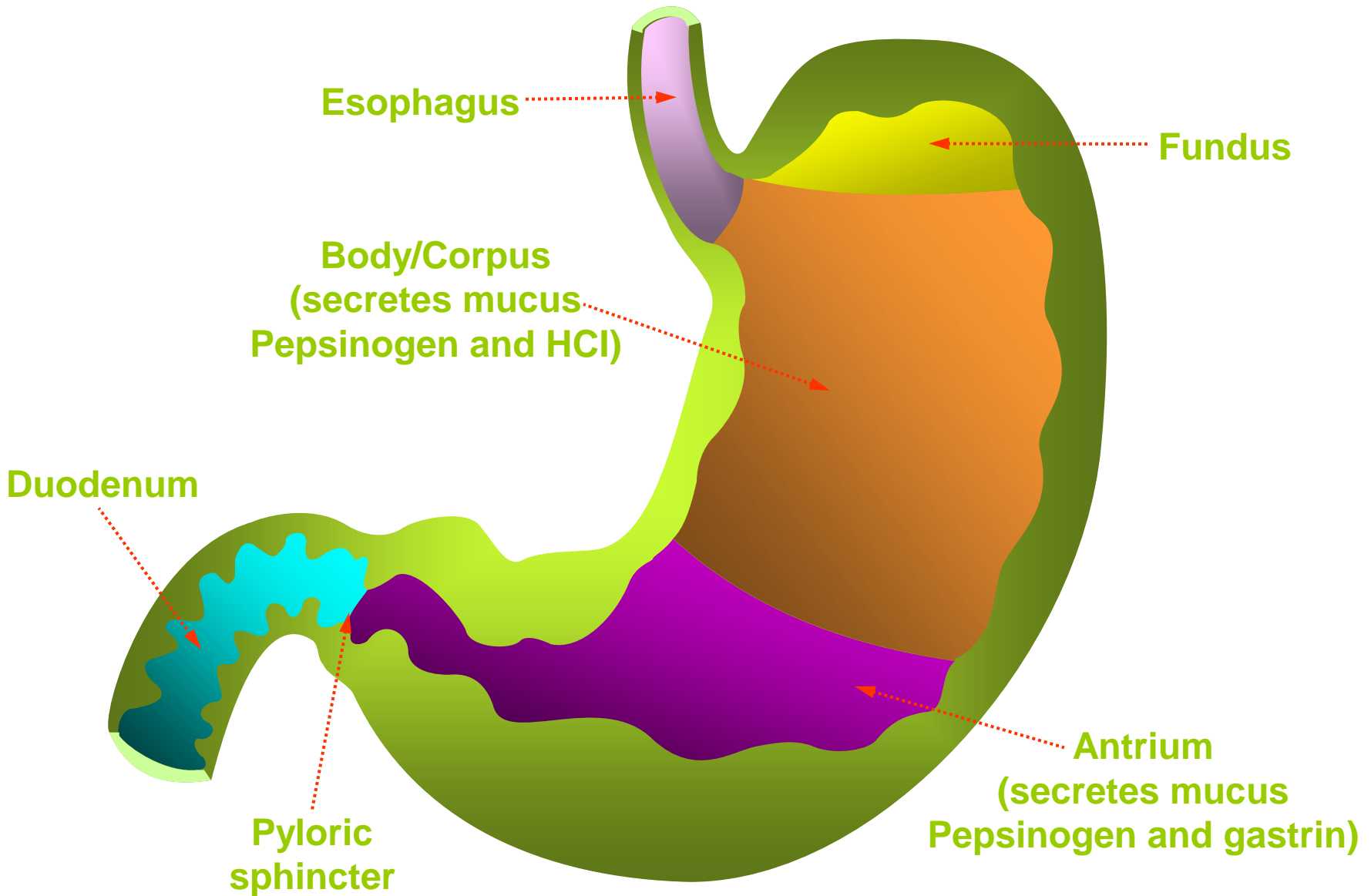


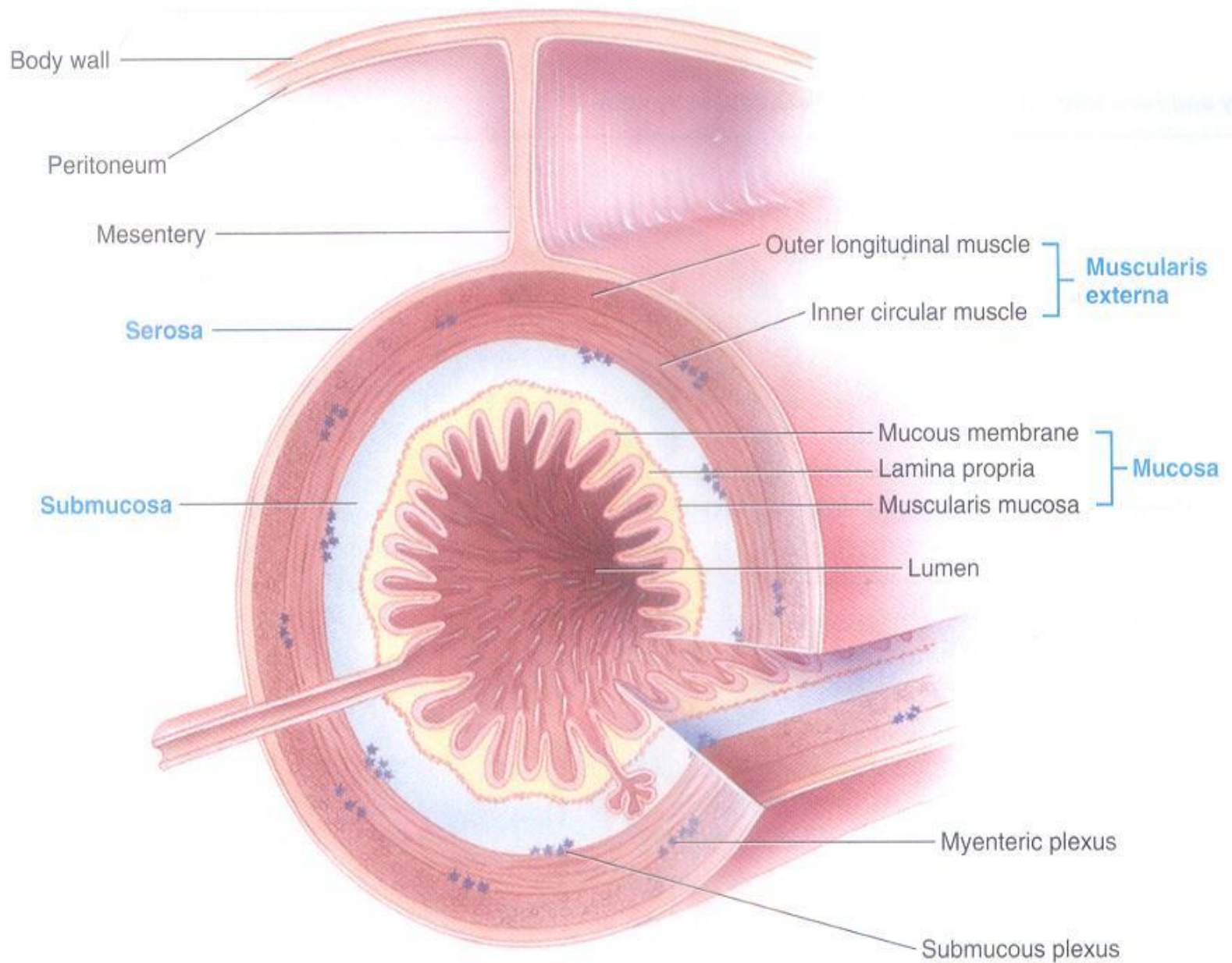






# THE THREE REGIONS OF THE STOMACH : FUNDUS, BODY, AND ATRIUM





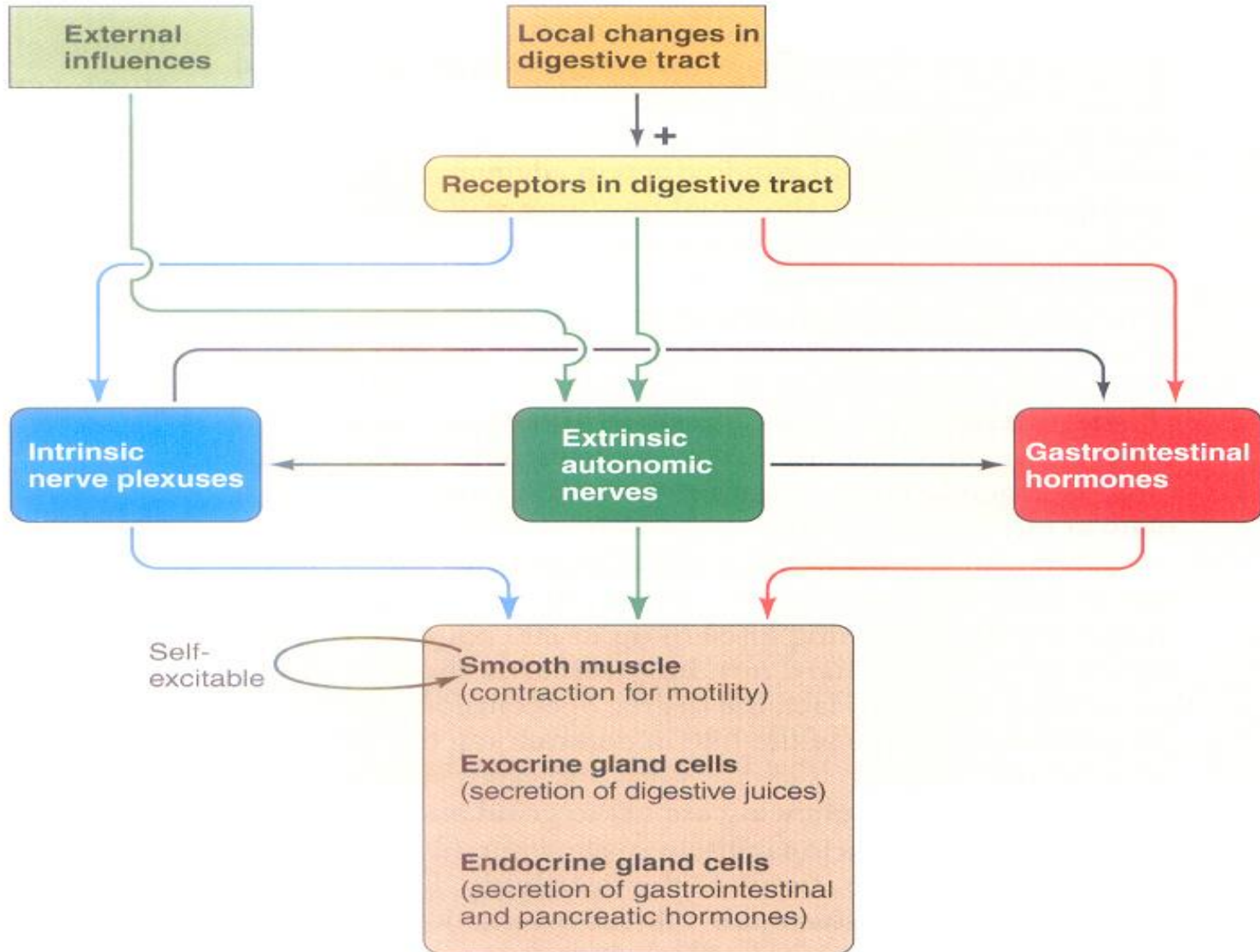
# **PROSES GASTROINTESTINAL**



- 1. MOTILITAS**
- 2. SEKRESI**
- 3. PENCERNAAN**
- 4. ABSORPSI**



# KONTROL SISTEM PENCERNAAN

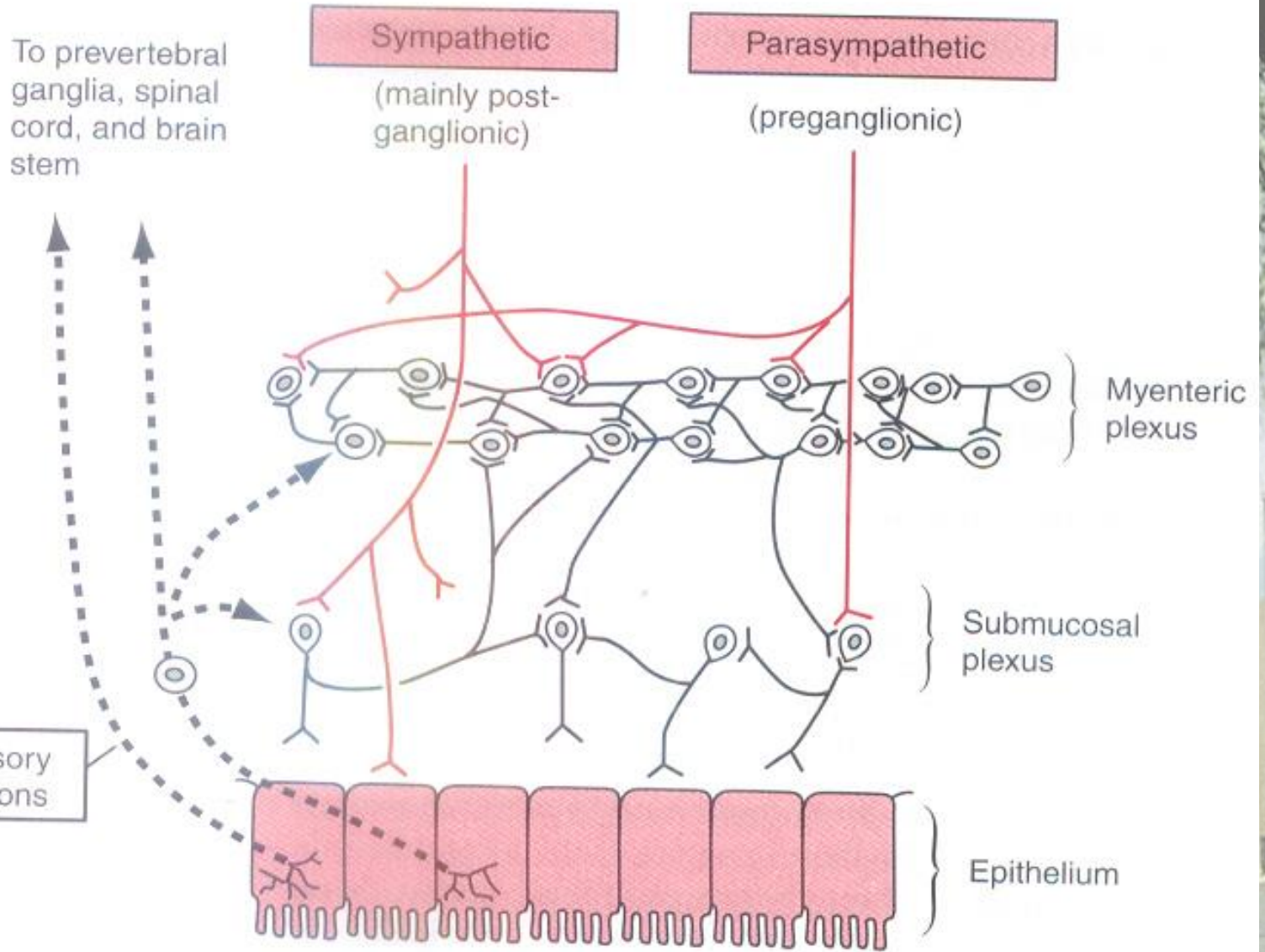


— = Short reflex

— = Long reflex

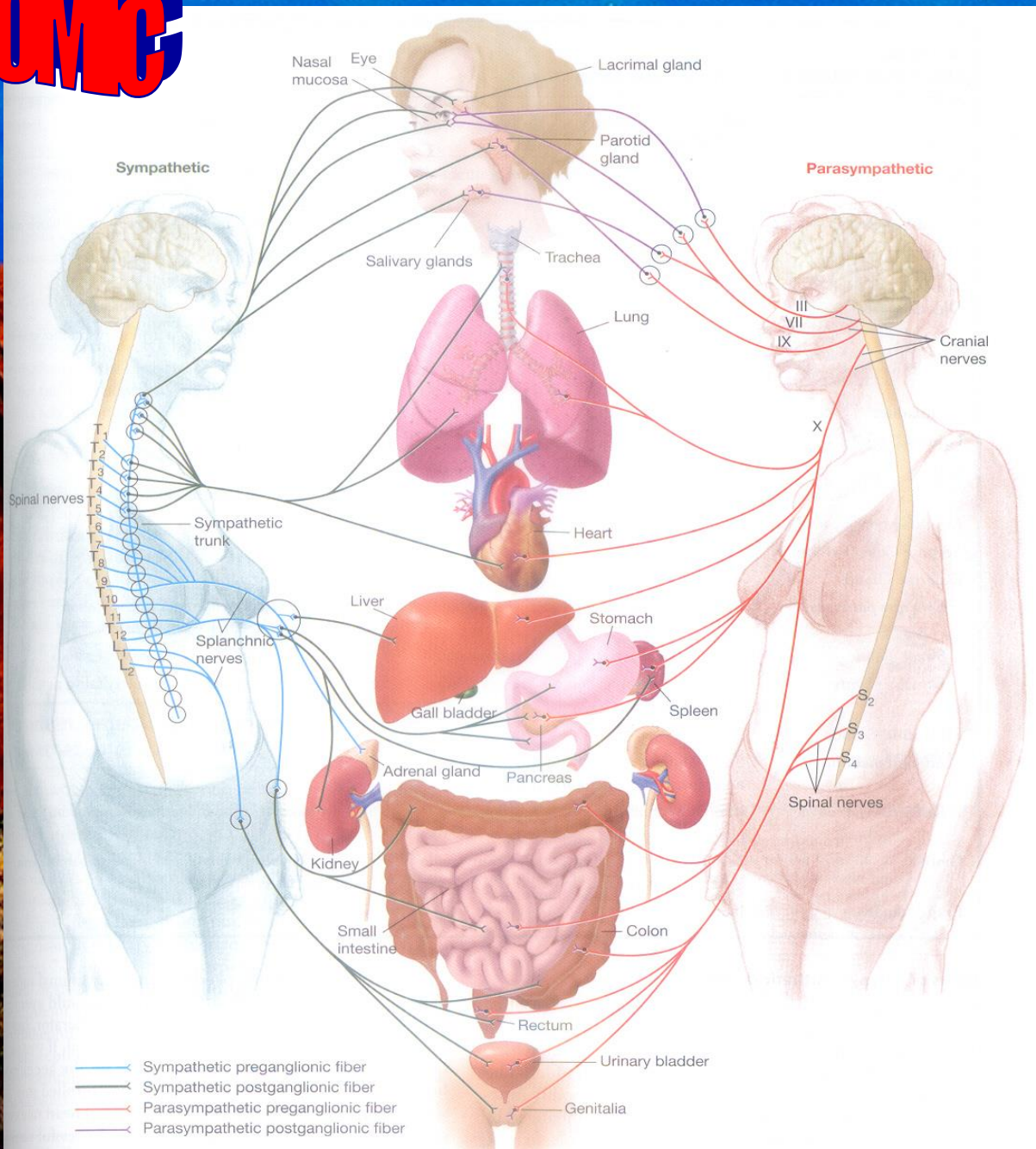
— = Hormonal pathway

# ENTERIC NERVOUS SYSTEM





# AUTONOMIC





The background of the slide is a photograph of a city skyline, likely Toronto, featuring the CN Tower and various skyscrapers. In the foreground, there is a body of water with a small boat. The scene is framed by tree branches and leaves, particularly on the left and right sides.

**MUUT**

**PROSES :**

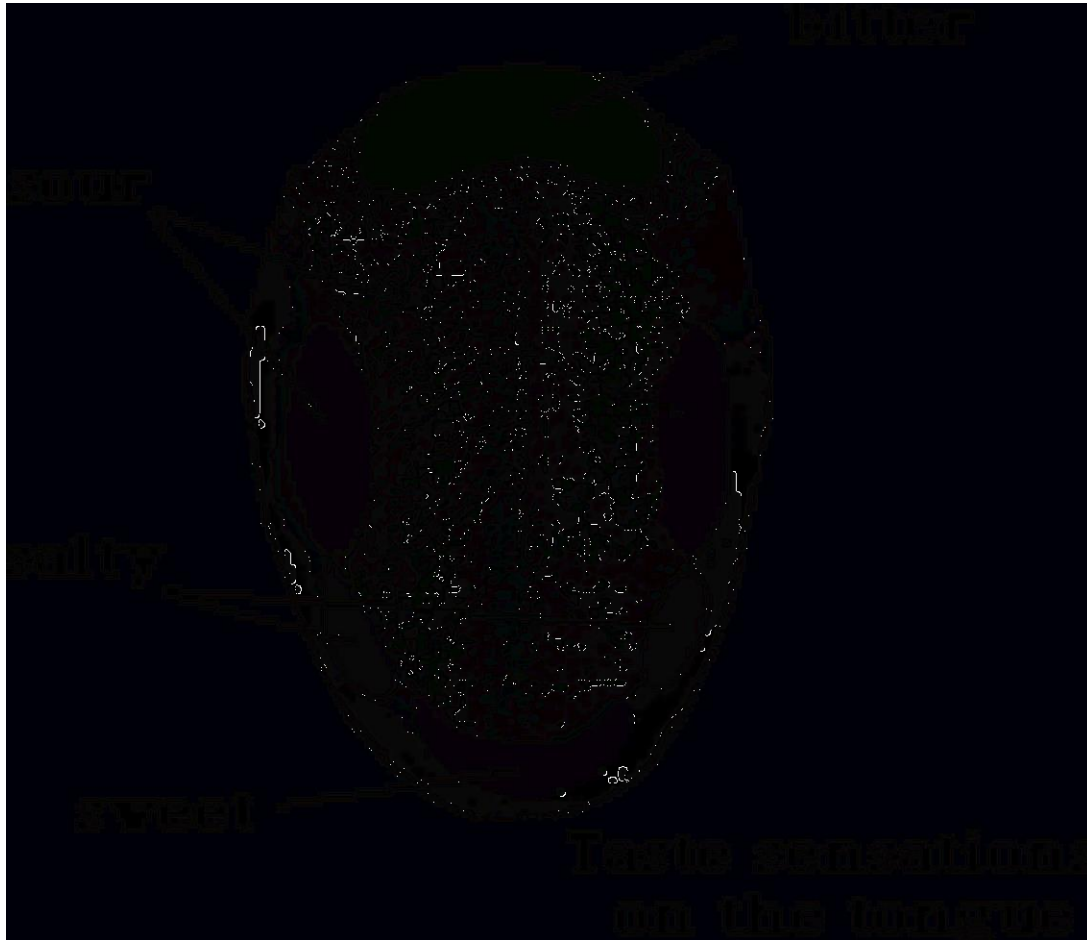
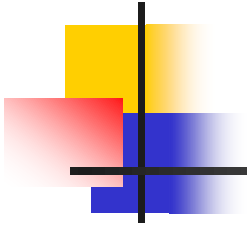
**1. MEKANIS : MASTIKASI**

**2. KIMIAWI : BANTUAN SALIVA**



# **FUNGSI MASTIKASI**

- 1. MEMOTONG / MENGGILING MAKANAN**
- 2. MEMBANTU MENCERNA SELULOSE**
- 3. MEMPERLUAS PERMUKAAN MAKANAN YG MENYEBABKAN ENZIM LBH EFEKTIF**
- 4. MERANGSANG SEKRESI SALIVA**
- 5. MENCAMPUR MAKANAN DG SALIVA**
- 6. MEMPENGARUHI PERTUMBUHAN JAR MULUT**





# **FUNGSI DAH**

- 1. MENDORONG MAKANAN**
- 2. MEMBANTU MENCAMPUR MAKANAN DG SALIVA**
- 3. MEMILAH MAKANAN YANG HALUS UTK DITELAN**
- 4. MEMBERSIKAN SISA MAKANAN**
- 5. MEMBANTU PROSES BICARA**
- 6. MEMBANTU PROSES MENELAN**



**SANA**

- 1. KELENJAR PAROTIS**
- 2. KELENJAR SUBLINGUAL**
- 3. KELENJAR SUBMANDIBULAR**





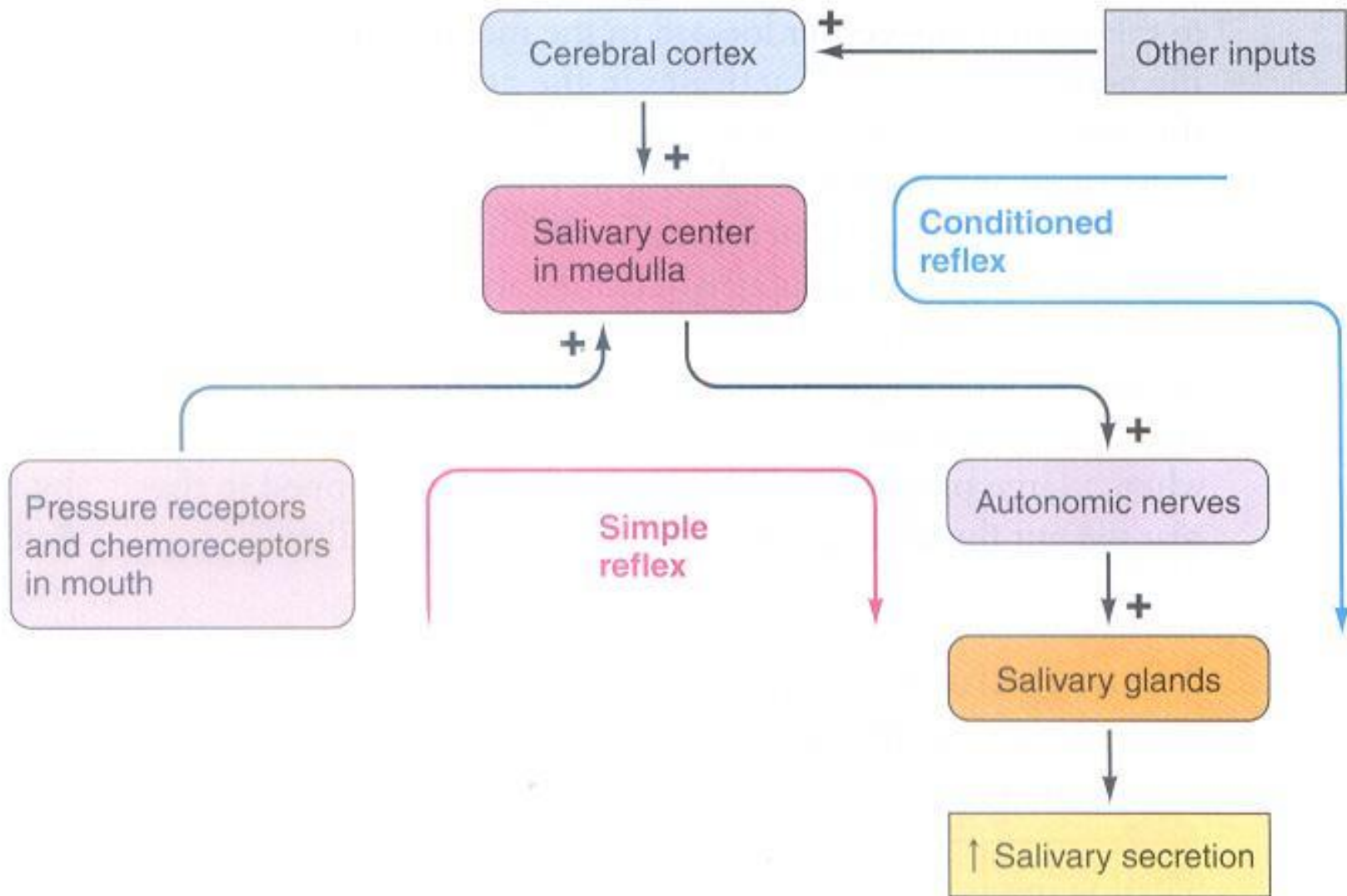
# SALIVA

1. AMYLASE (PTYALIN)
2. MUCIN
3. ELEKTROLIT :  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{H}^+$
4. ANTI BAKTERI : THIOSIANAT, LYSOSIME, PROTEIN ANTIBODI

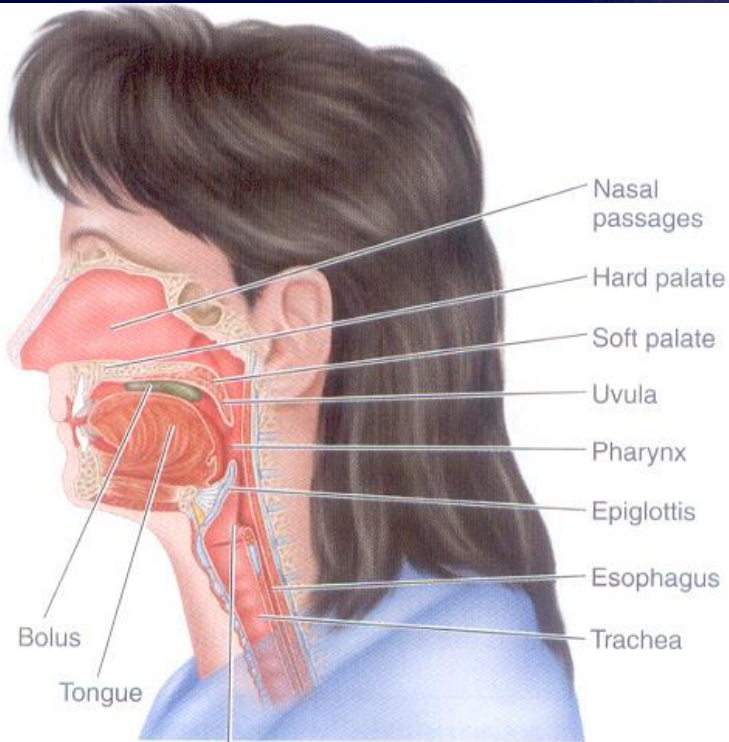


# FUNGSI SALIVA

1. **MENCERNA AMILUM (polisakarida)**
2. **MELUMATKAN MAKANAN**
3. **MENETRALKAN ASAM**
4. **MELARUTKAN MAKANAN**
5. **MELEMBABKAN MULUT**
6. **ANTI BAKTERI**

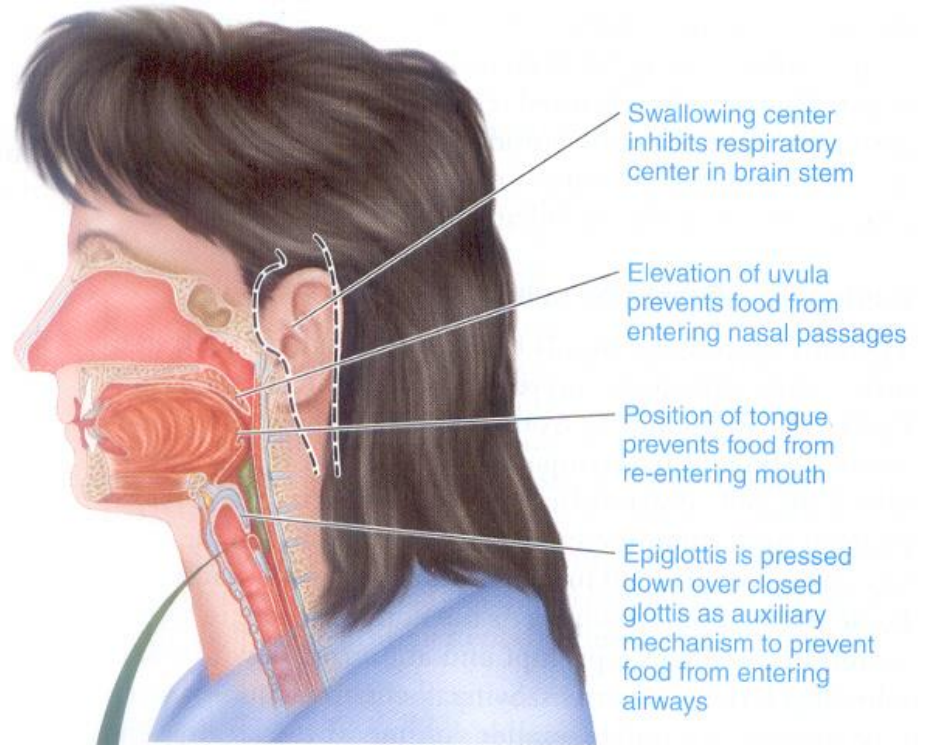






Bolus  
Tongue

Glottis at entrance of larynx



Swallowing center inhibits respiratory center in brain stem  
Elevation of uvula prevents food from entering nasal passages  
Position of tongue prevents food from re-entering mouth  
Epiglottis is pressed down over closed glottis as auxiliary mechanism to prevent food from entering airways



Tight apposition of vocal folds across glottis prevents food from entering respiratory airways (viewed from above)

# ESOPHAGUS

## PENELANAN (DEGLUTION /SWALLOWING)

❖ VOLUNTER

❖ INVOLUNTER

➤ stadium pharyngeal

➤ stadium oesophageal

gelombang peristaltic primer

gelombang peristaltic sekunder

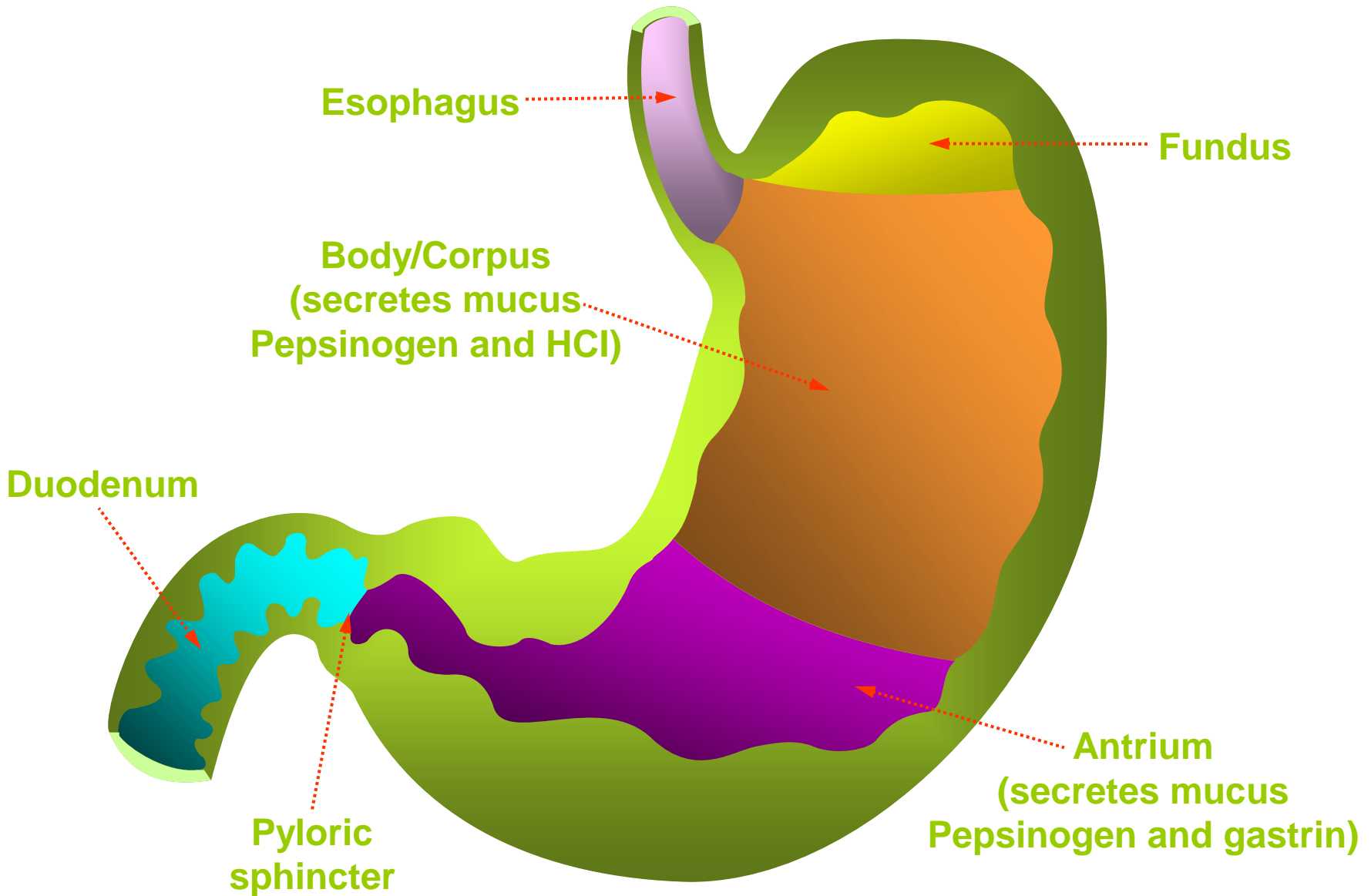


# LAMBUNG or GASTER

## FUNGSI

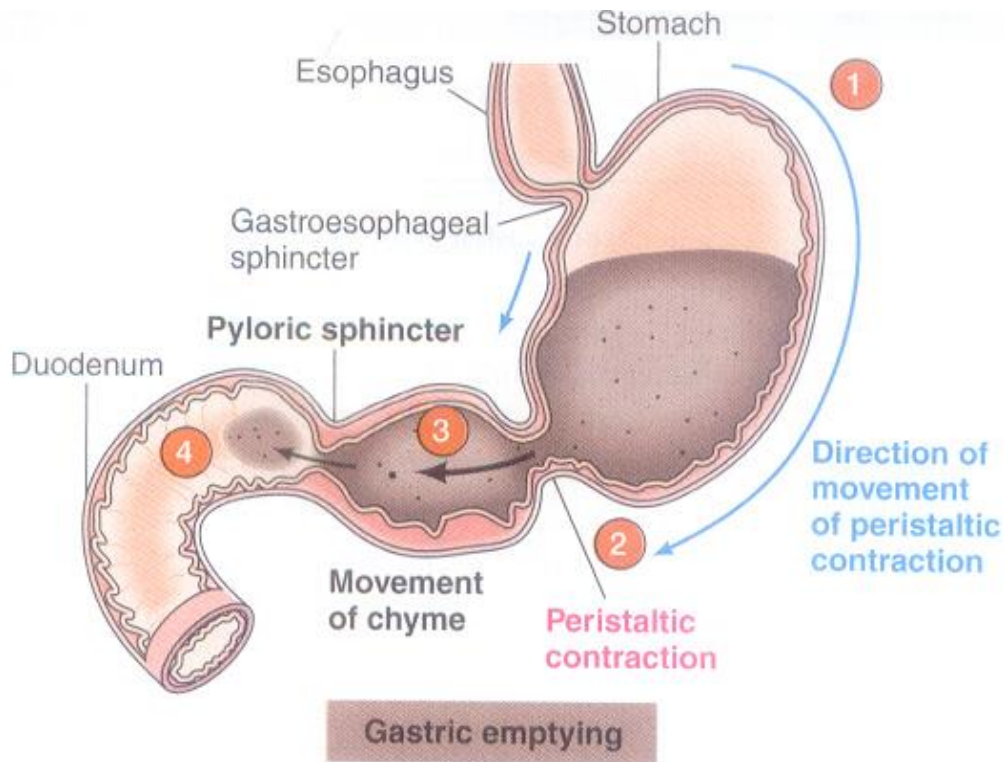
1. TEMPAT PENYIMPANAN MAKANAN
2. TEMPAT MENCAMPUR MAKANAN & GASTRIC JUICE
3. TEMPAT MENGOSONGKAN MAKANAN
4. MENCEGAH MASUKNYA SEBAGIAN KUMAN
5. TEMPAT ABSORBSI ALKOHOL DAN OBAT

# THE THREE REGIONS OF THE STOMACH : FUNDUS, BODY, AND ATRIUM

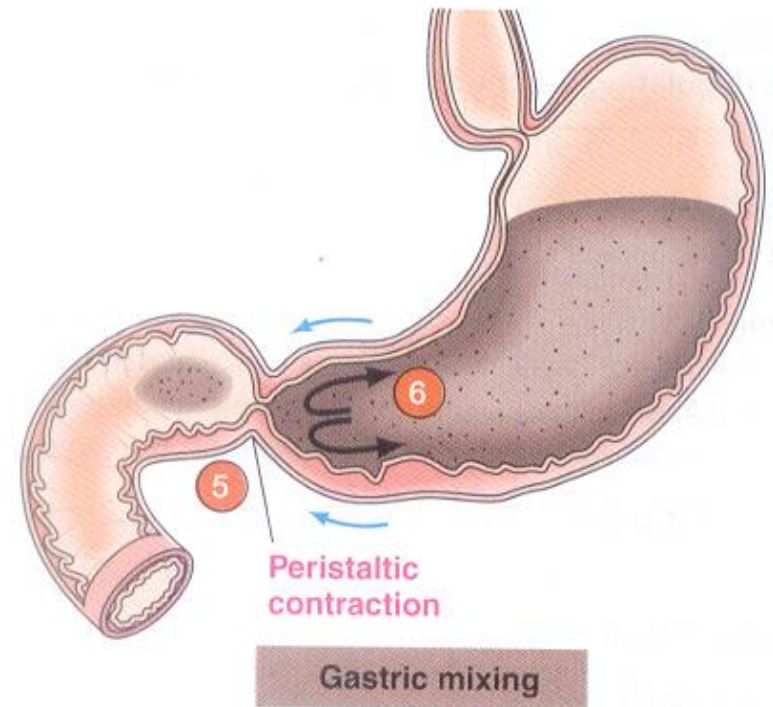




# MOTILITAS LAMBUNG



- 1 A peristaltic contraction originates in the upper fundus and sweeps down toward the pyloric sphincter.
- 2 The contraction becomes more vigorous as it reaches the thick-muscled antrum.
- 3 The strong antral peristaltic contraction propels the chyme forward.
- 4 A small portion of chyme is pushed through the partially open sphincter into the duodenum. The stronger the antral contraction, the more chyme is emptied with each contractile wave.

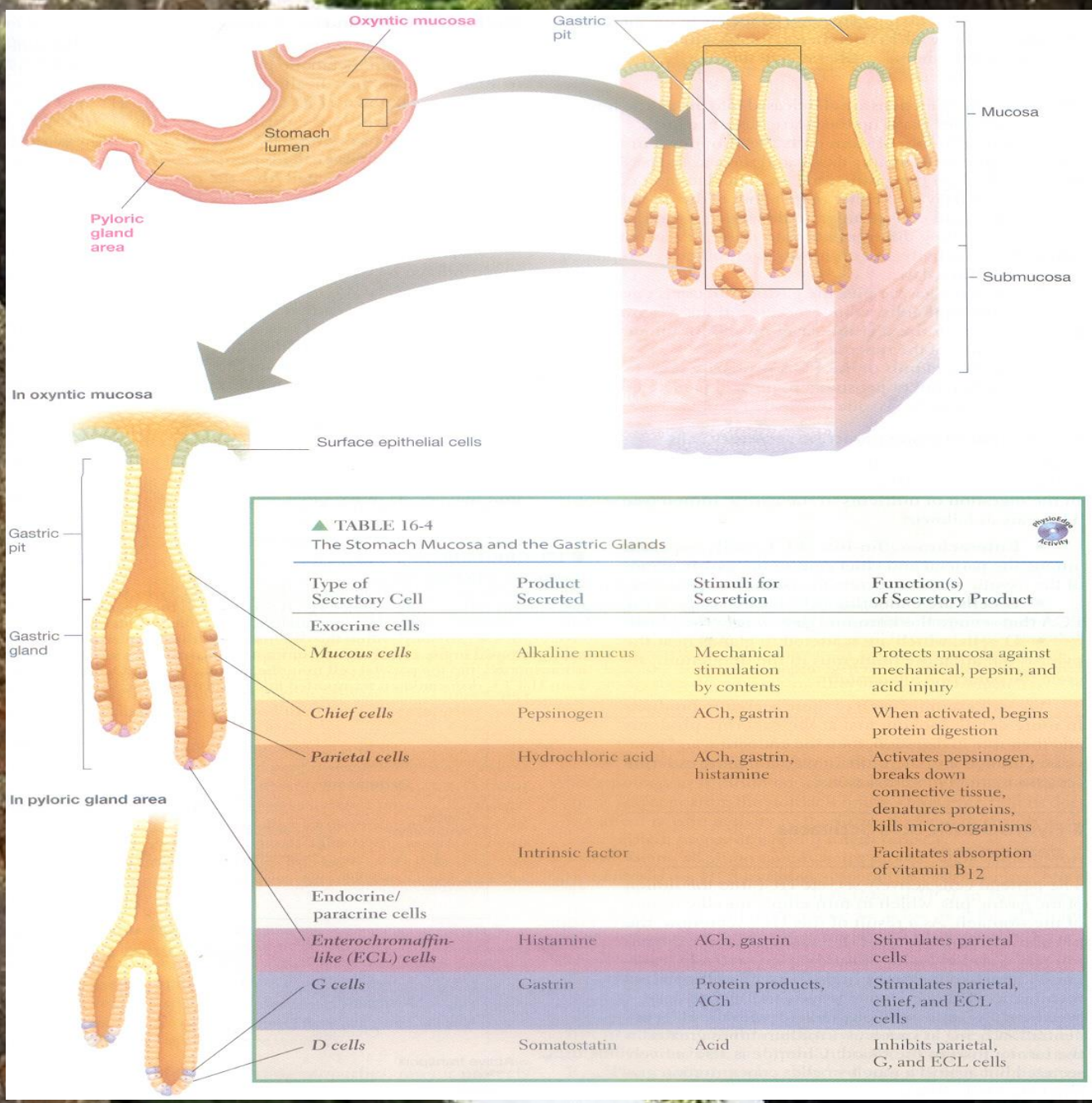


- 5 When the peristaltic contraction reaches the pyloric sphincter, the sphincter is tightly closed and no further emptying takes place.
- 6 When chyme that was being propelled forward hits the closed sphincter, it is tossed back into the antrum. Mixing of chyme is accomplished as chyme is propelled forward and tossed back into the antrum with each peristaltic contraction.

# GASTRIC JUICE

- elektrolit :  $H^+$ ,  $Cl^-$ ,  $K^+$ ,  $Na^+$
- enzim pepsin
- Mucus
- Lipase dan amylase
- Rennin
- Faktor intrinsic
- Histamin
- $HCl$





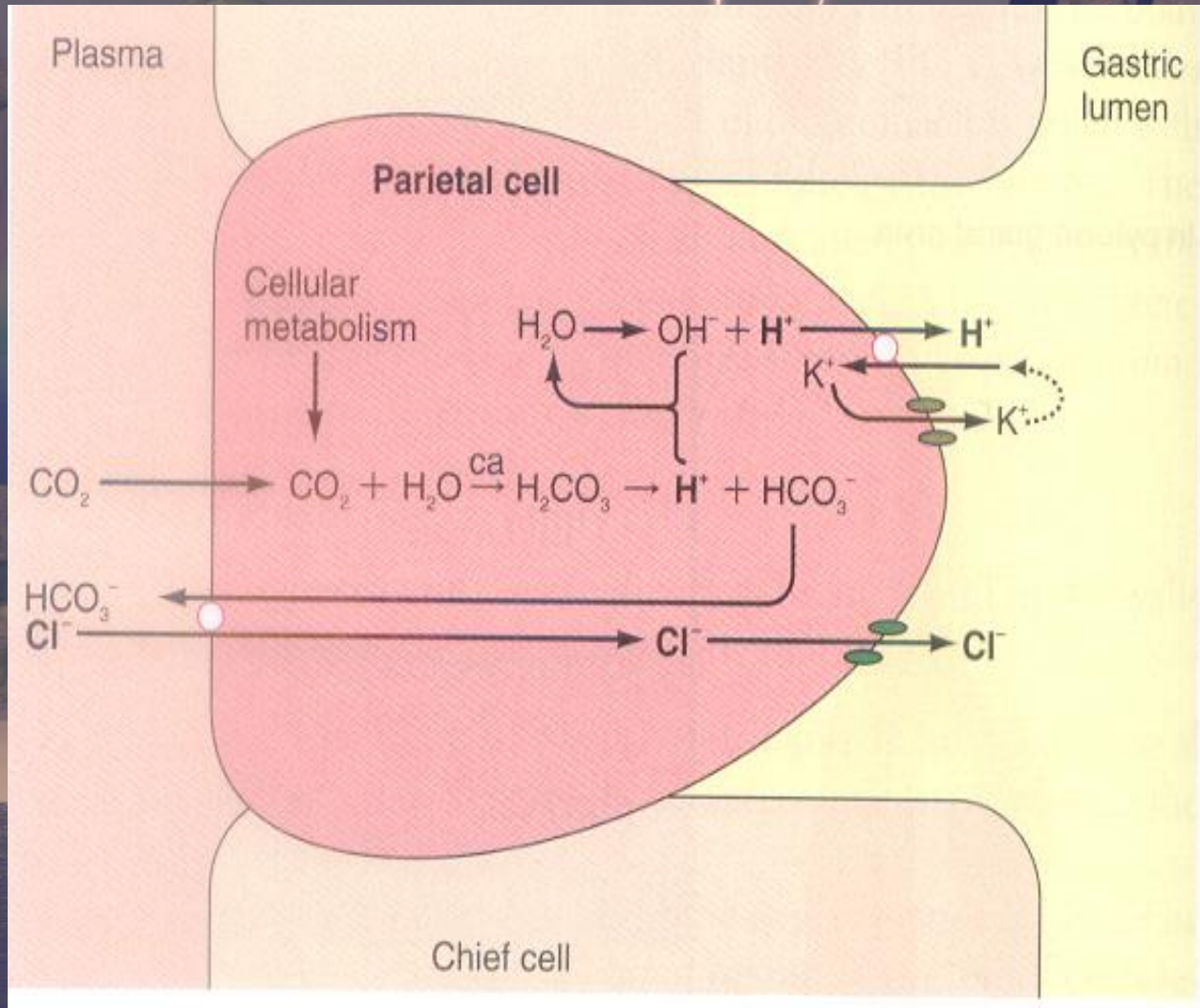
**▲ TABLE 16-4**  
The Stomach Mucosa and the Gastric Glands



Type of Secretory Cell	Product Secreted	Stimuli for Secretion	Function(s) of Secretory Product
<b>Exocrine cells</b>			
<i>Mucous cells</i>	Alkaline mucus	Mechanical stimulation by contents	Protects mucosa against mechanical, pepsin, and acid injury
<i>Chief cells</i>	Pepsinogen	ACh, gastrin	When activated, begins protein digestion
<i>Parietal cells</i>	Hydrochloric acid	ACh, gastrin, histamine	Activates pepsinogen, breaks down connective tissue, denatures proteins, kills micro-organisms
	Intrinsic factor		Facilitates absorption of vitamin B <sub>12</sub>
<b>Endocrine/paracrine cells</b>			
<i>Enterochromaffin-like (ECL) cells</i>	Histamine	ACh, gastrin	Stimulates parietal cells
<i>G cells</i>	Gastrin	Protein products, ACh	Stimulates parietal, chief, and ECL cells
<i>D cells</i>	Somatostatin	Acid	Inhibits parietal, G, and ECL cells



# ASAM LAMBUNG





# FAKTOR YANG MEMPENGARUHI PENGOSONGAN LAMBUNG

## ❖ FAKTOR DARI LAMBUNG

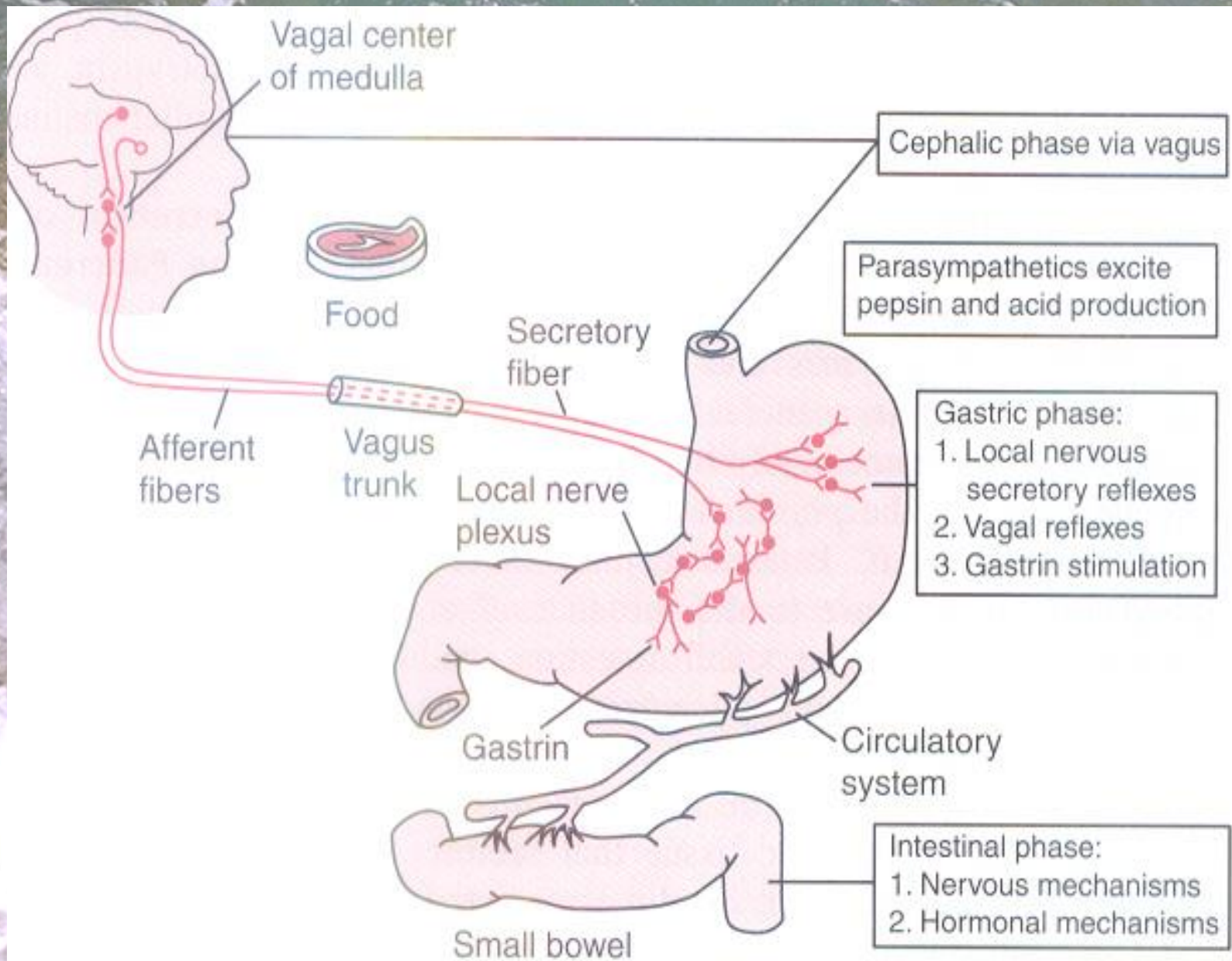
## ❖ FAKTOR DARI DUODENUM

REFLEK ENTEROGASTRIK

SEKRETIN

CCK (cholesistokinin)

GIP



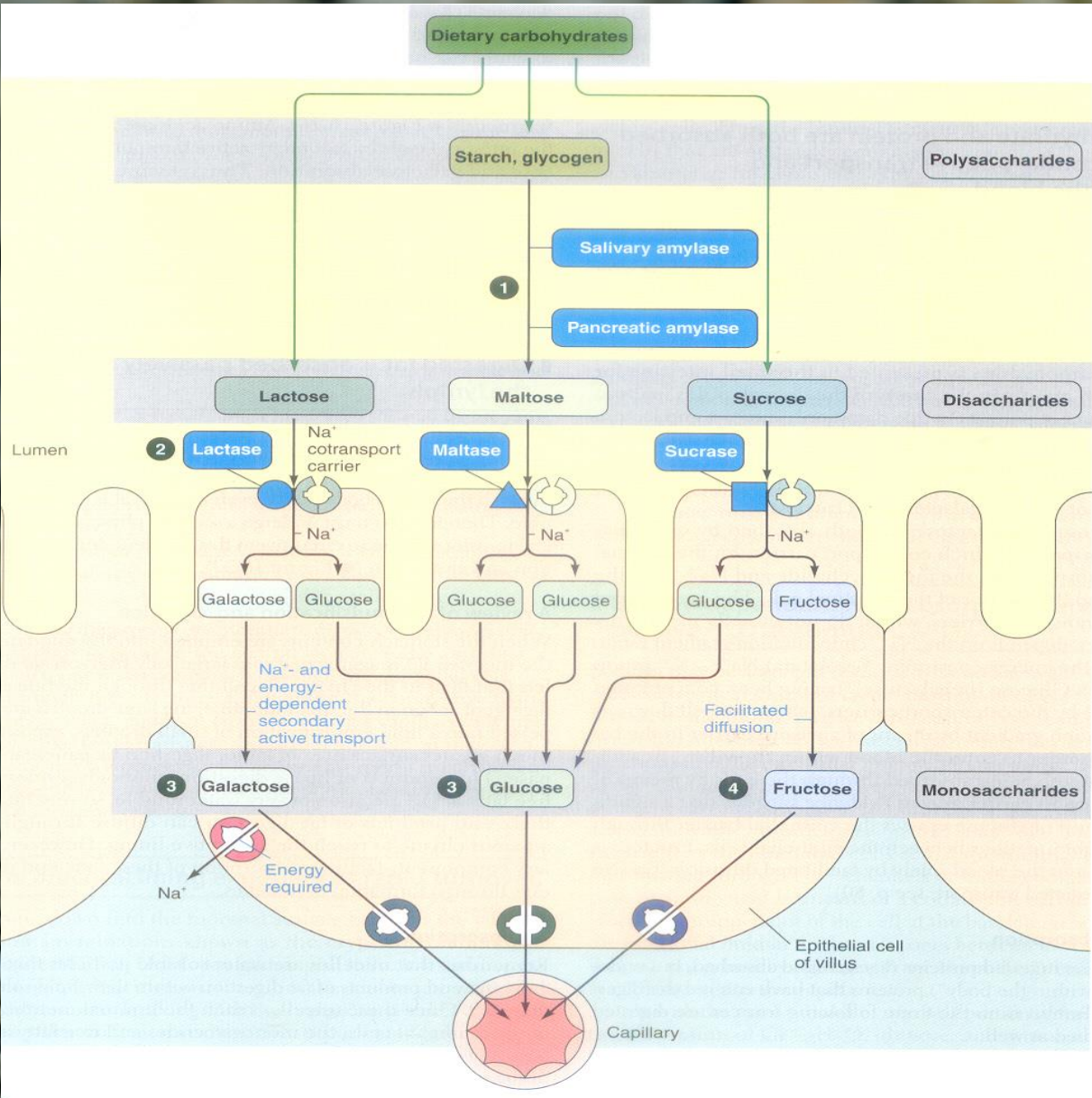


A photograph of a desert landscape featuring rolling sand dunes in the foreground and a range of rugged mountains in the background under a clear blue sky. The dunes are light-colored, and the ground is sandy with sparse, dry vegetation.

**USUS HALUS**

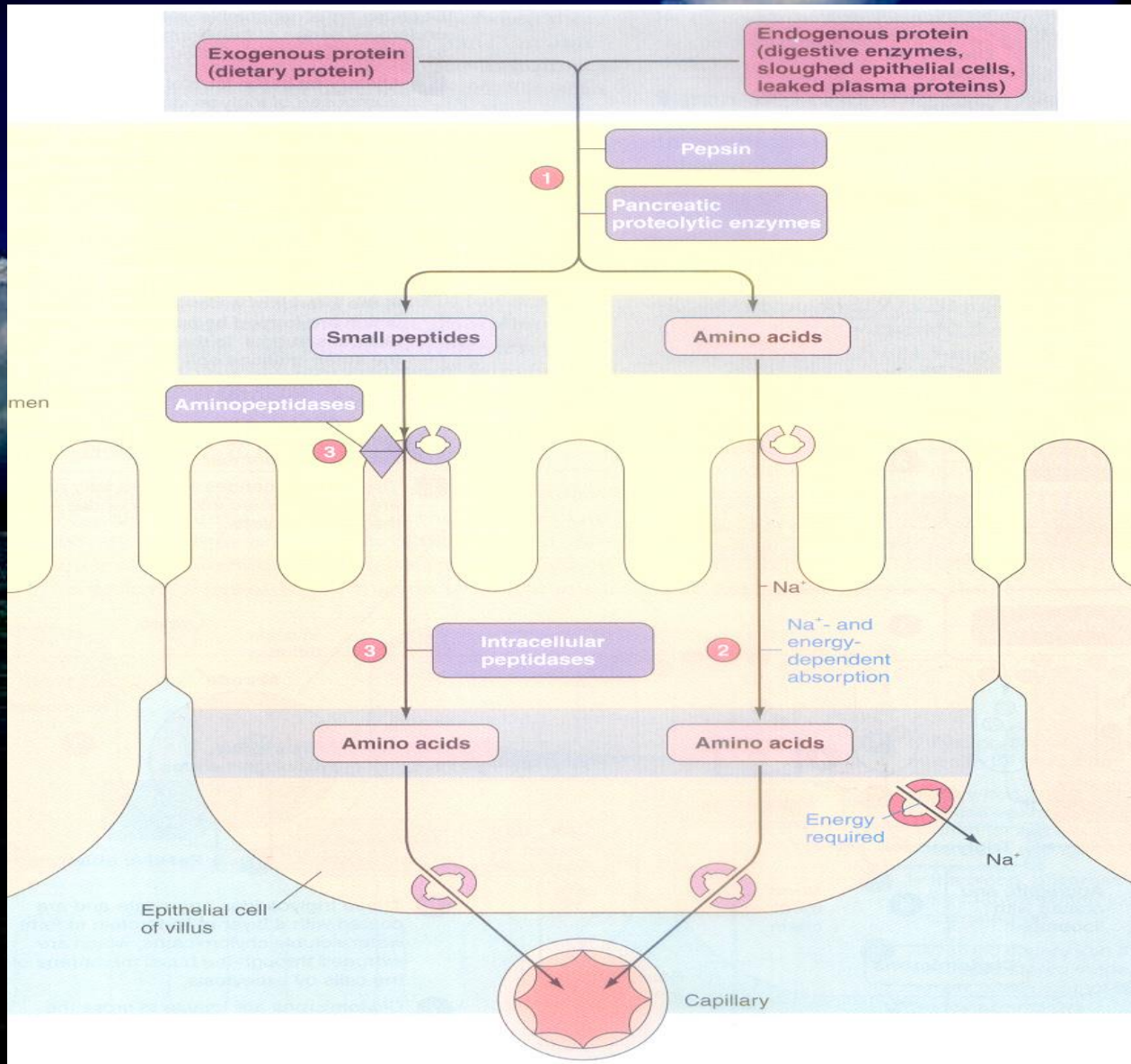
**PENCERNAAN & ABSORBSI MAKANAN**

# KARBOHIDRAT

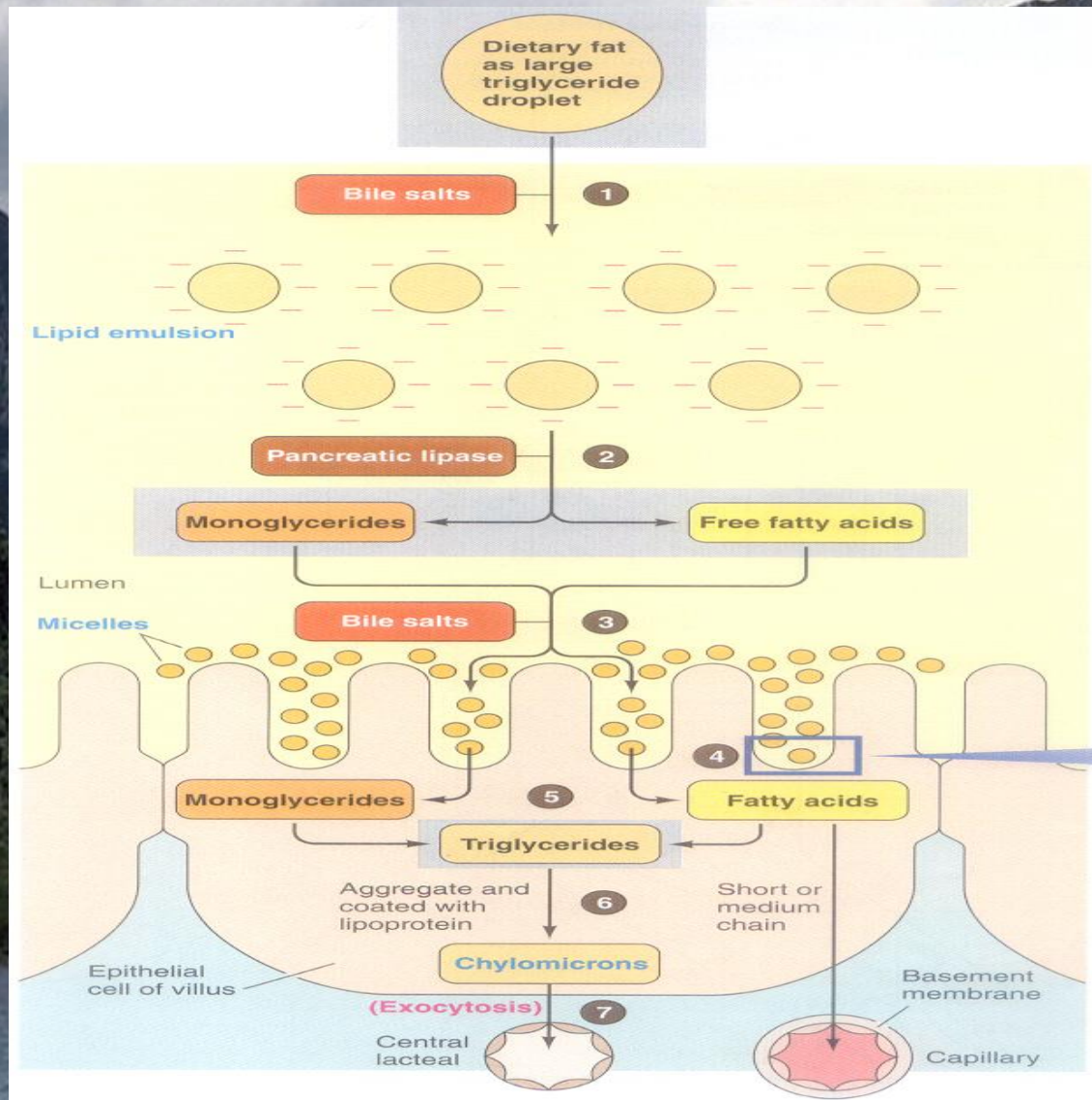




# PROTEIN

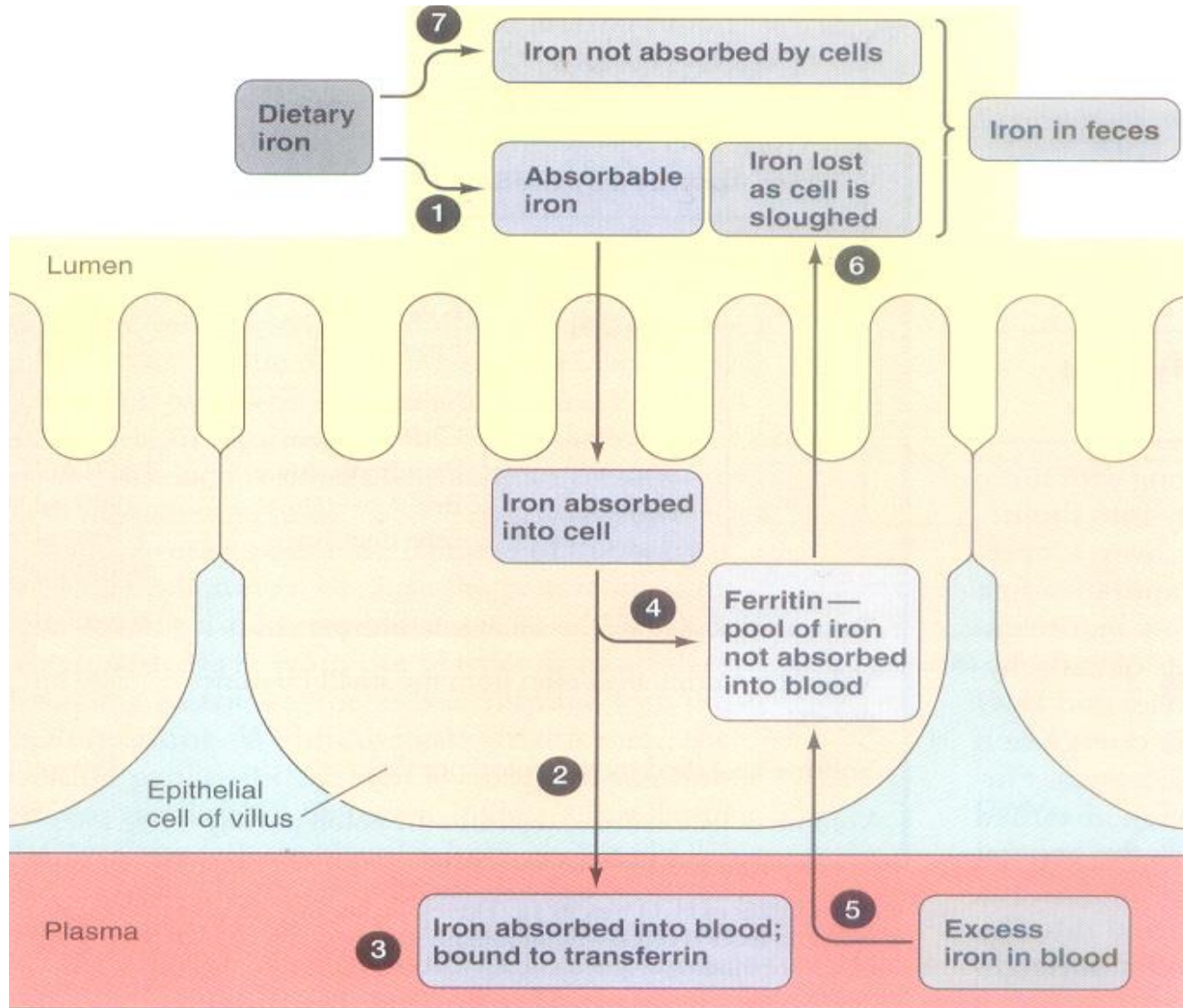


# LEMAX





# Fe



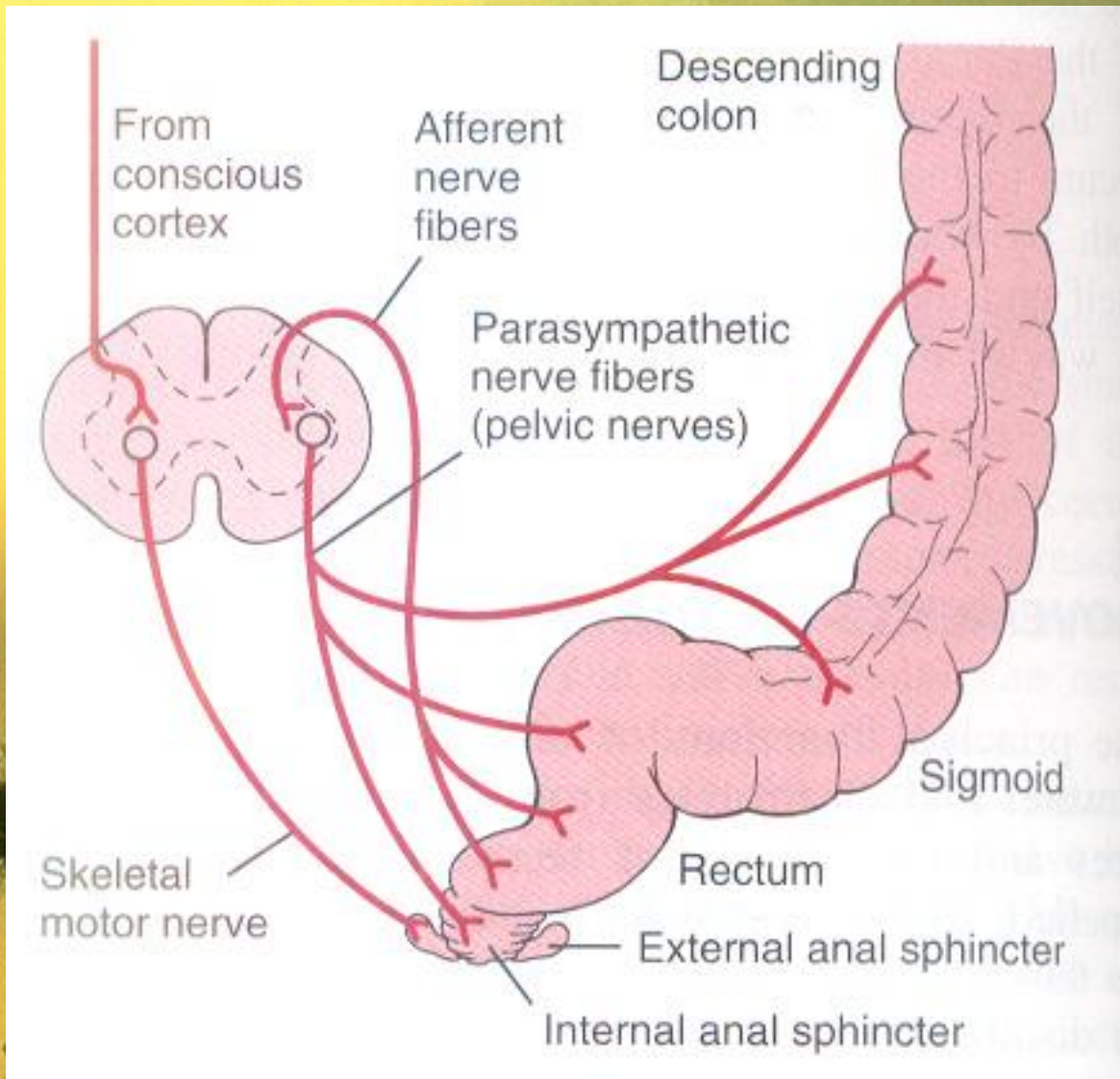
# KOLON

## FUNGSI:

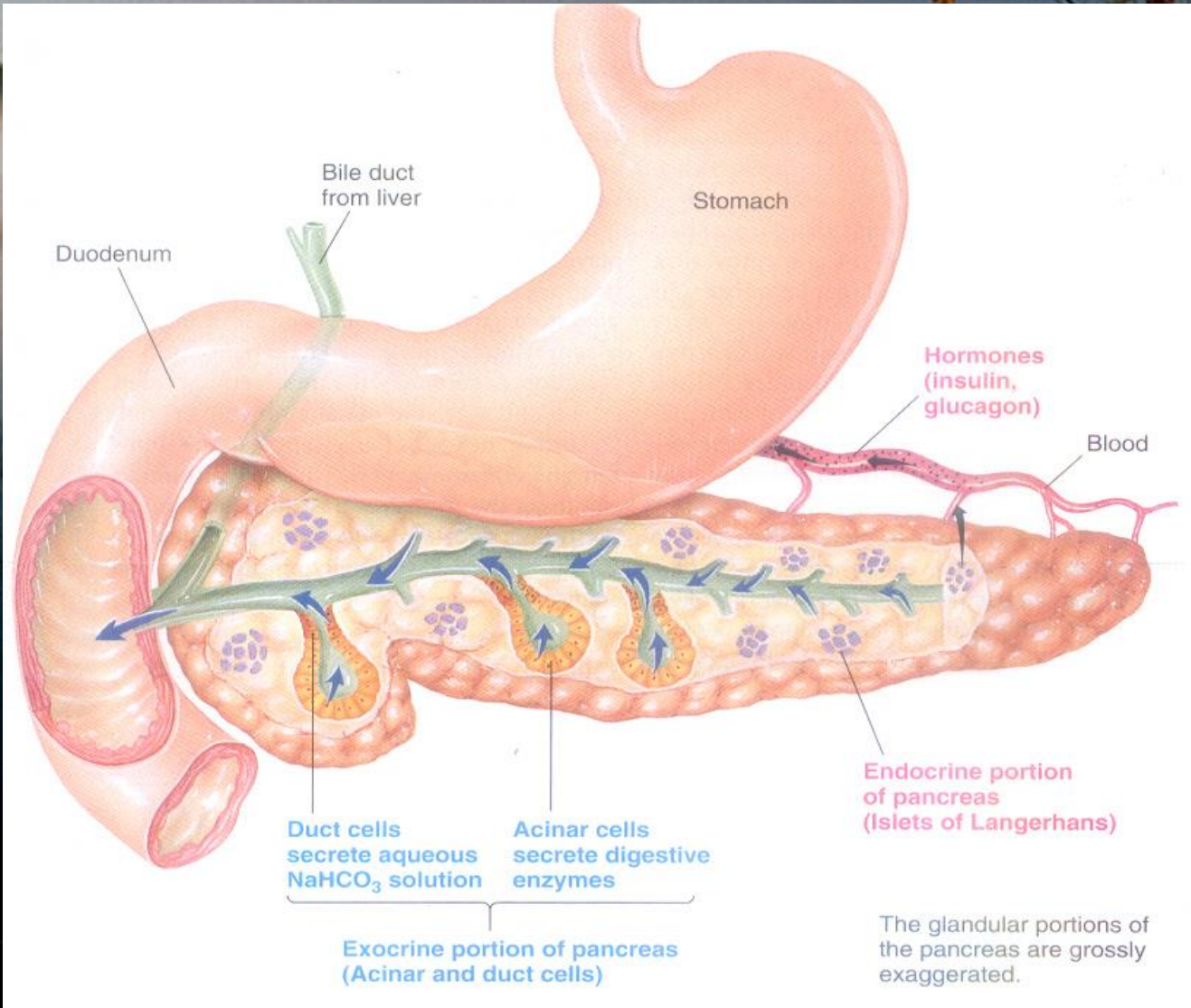
- ❖ TEMPAT ABSORBSI AIR DAN ELEKTROLIT
- ❖ TEMPAT PENYIMPANAN FESES



# DEFECATION



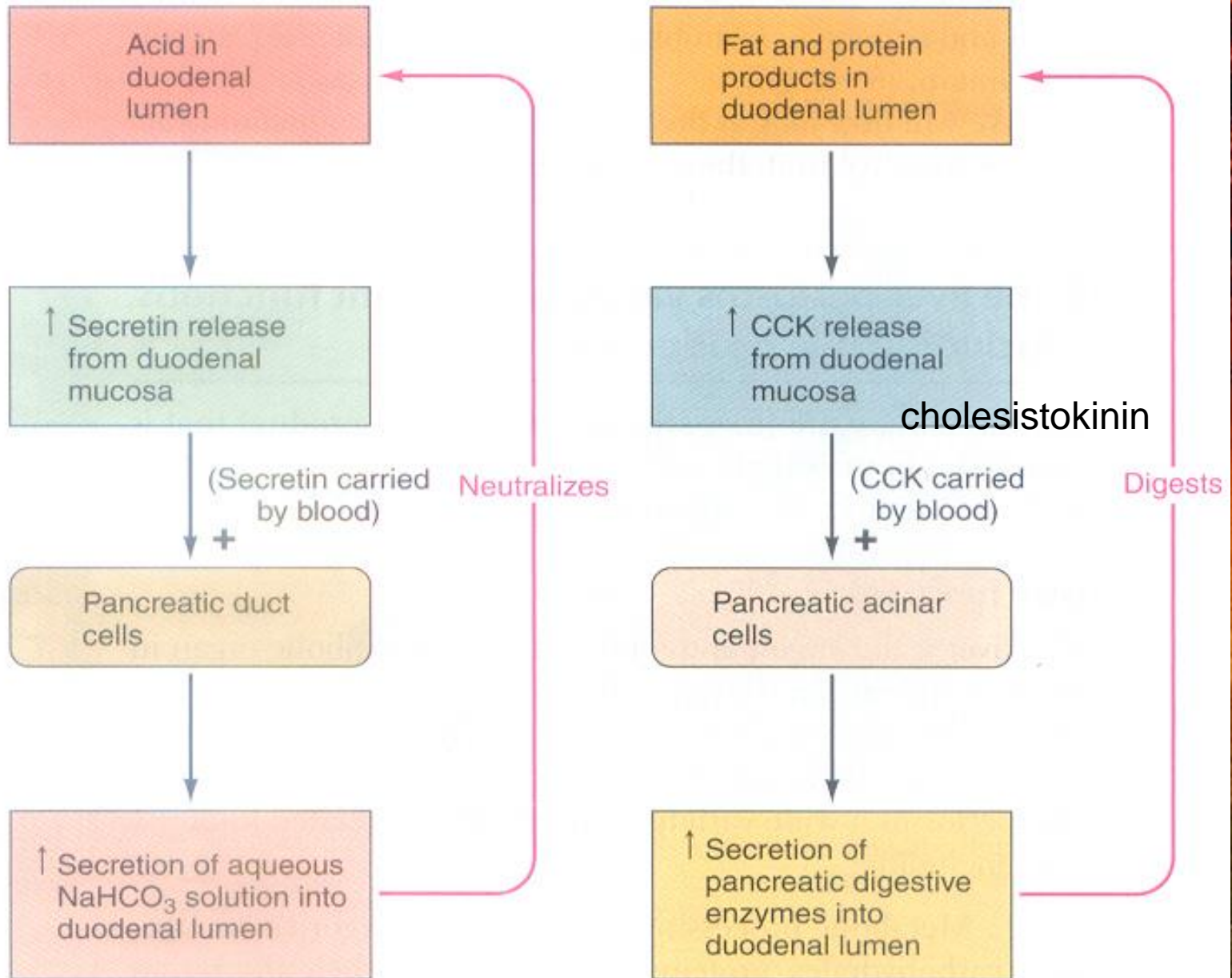
# PANKREAS



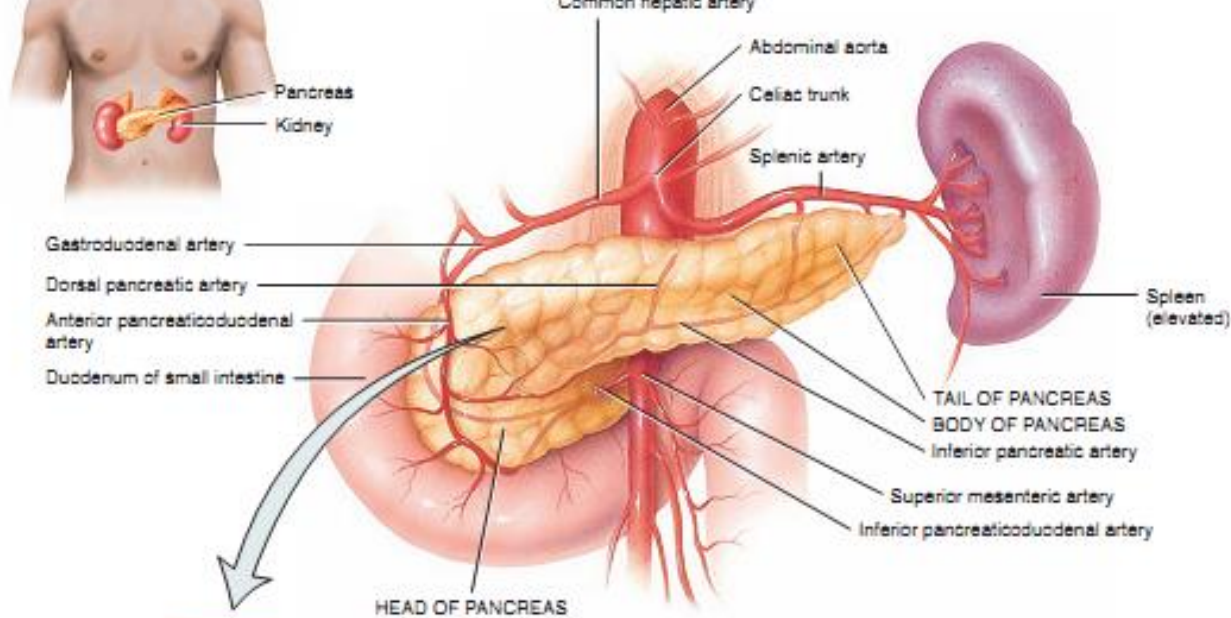


# ENZYME DIGESTION

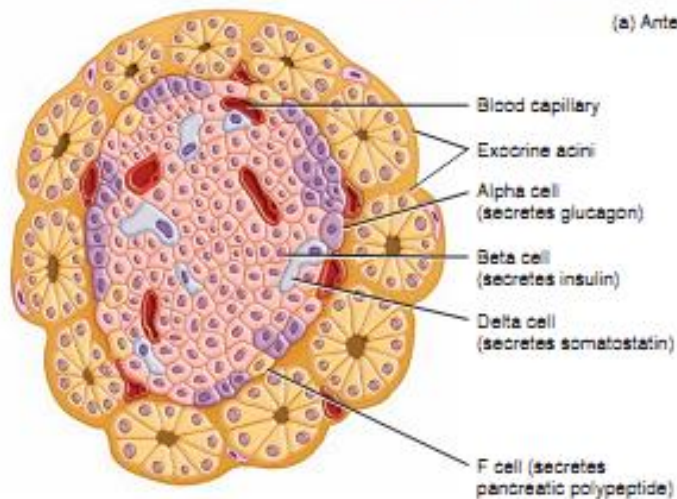
Nutrients	Enzymes for Digesting Nutrient	Source of Enzymes	Site of Action of Enzymes	Action of Enzymes	Absorbable Units of Nutrients
Carbohydrate	Amylase	Salivary glands	Mouth and body of stomach	Hydrolyzes polysaccharides to disaccharides	
		Exocrine pancreas	Small-intestine lumen		
	Disaccharidases (maltase, sucrase, lactase)	Small-intestine epithelial cells	Small-intestine brush border	Hydrolyze disaccharides to monosaccharides	Monosaccharides, especially glucose
Protein	Pepsin	Stomach chief cells	Stomach antrum	Hydrolyzes protein to peptide fragments	
	Trypsin, chymotrypsin, carboxypeptidase	Exocrine pancreas	Small-intestine lumen	Attack different peptide fragments	
	Aminopeptidases	Small-intestine epithelial cells	Small-intestine brush border	Hydrolyze peptide fragments to amino acids	Amino acids and a few small peptides
Fat	Lipase	Exocrine pancreas	Small-intestine lumen	Hydrolyzes triglycerides to fatty acids and monoglycerides	Fatty acids and monoglycerides
	Bile salts (not an enzyme)	Liver	Small-intestine lumen	Emulsify large fat globules for attack by pancreatic lipase	



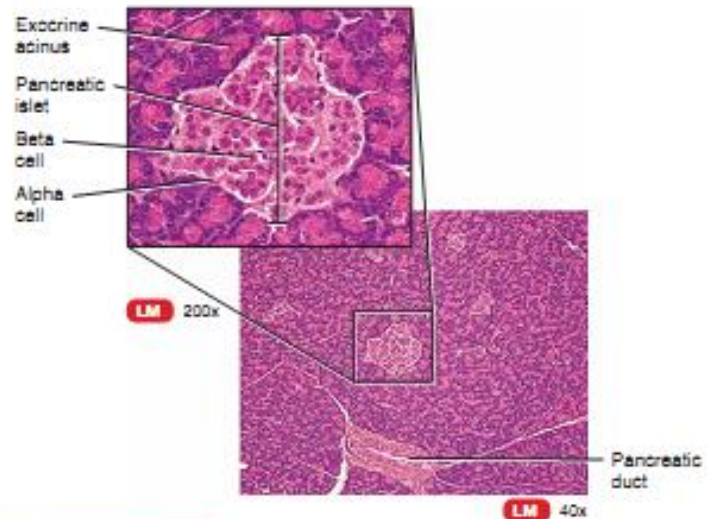




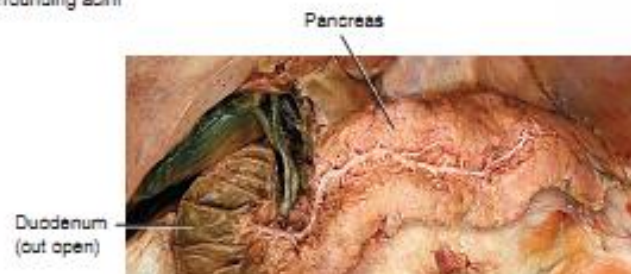
(a) Anterior view



(b) Pancreatic islet and surrounding acini



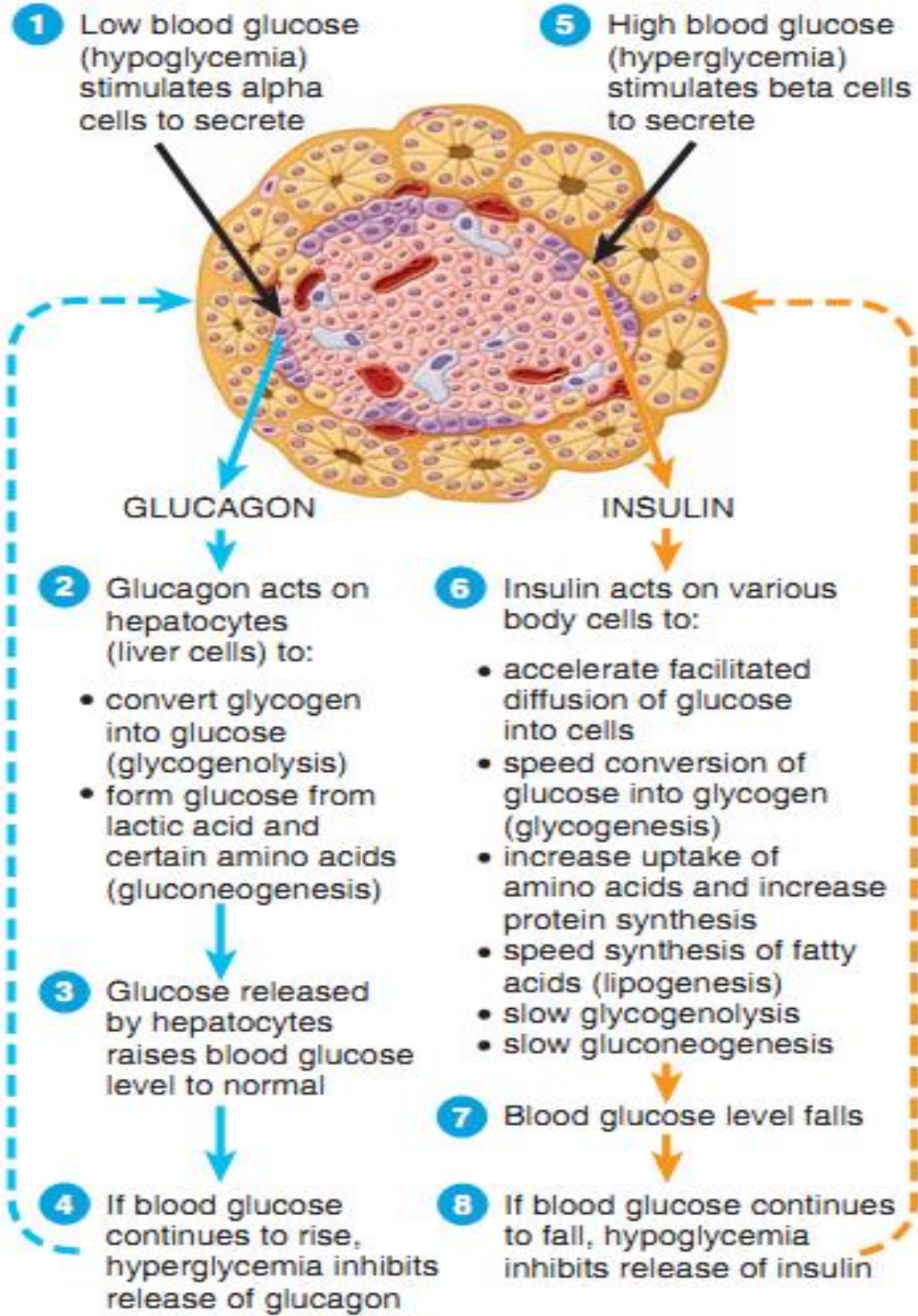
(c) Pancreatic islet and surrounding acini



Each pancreatic islet includes four types of hormone-secreting cells:

- 1. Alpha or A cells** constitute about 17% of pancreatic islet cells and secrete **glucagon** (GLOO-ka-gon).
- 2. Beta or B cells** constitute about 70% of pancreatic islet cells and secrete **insulin** (IN-soo-lin).
- 3. Delta or D cells** constitute about 7% of pancreatic islet cells and secrete **somatostatin** (sō-ma-to-STAT-in).
- 4. F cells** constitute the remainder of pancreatic islet cells and secrete **pancreatic polypeptide**.





**Terima Kasih**

**MATURSUMUN**

**Atas**

**Perhatiannya**

**Now Serving**

**0001**

**TAKE A  
NUMBER**

**9359**

