Chemistry-101

الكيمياء-101

تحضيري-JU

شرح مع أسئلة الإختبارات

Ch-8

ملخصات يوسف زويل

تواصل مستمر مع أستاذ المادة لأي استفسار على الواتس 00966502047005

Chapter 8

What is nutrition?

Nutrition

- ✓ **It is the science of the nutrients and "other substances" in food.**
- ✓ **The processes by which the organism ingests, digests, absorbs transports, utilizes and excretes food substances.**
- ✓ **Their action, interaction, and balance in relation to health and disease.**

1. (سؤال من اختبار سابق)Nutrition _____.

a) includes nutrients action
b) includes nutrients interaction
c) includes nutrients balance in relation to health and disease
d) all of the above

2. (سؤال من اختبار سابق)Nutrition _____.

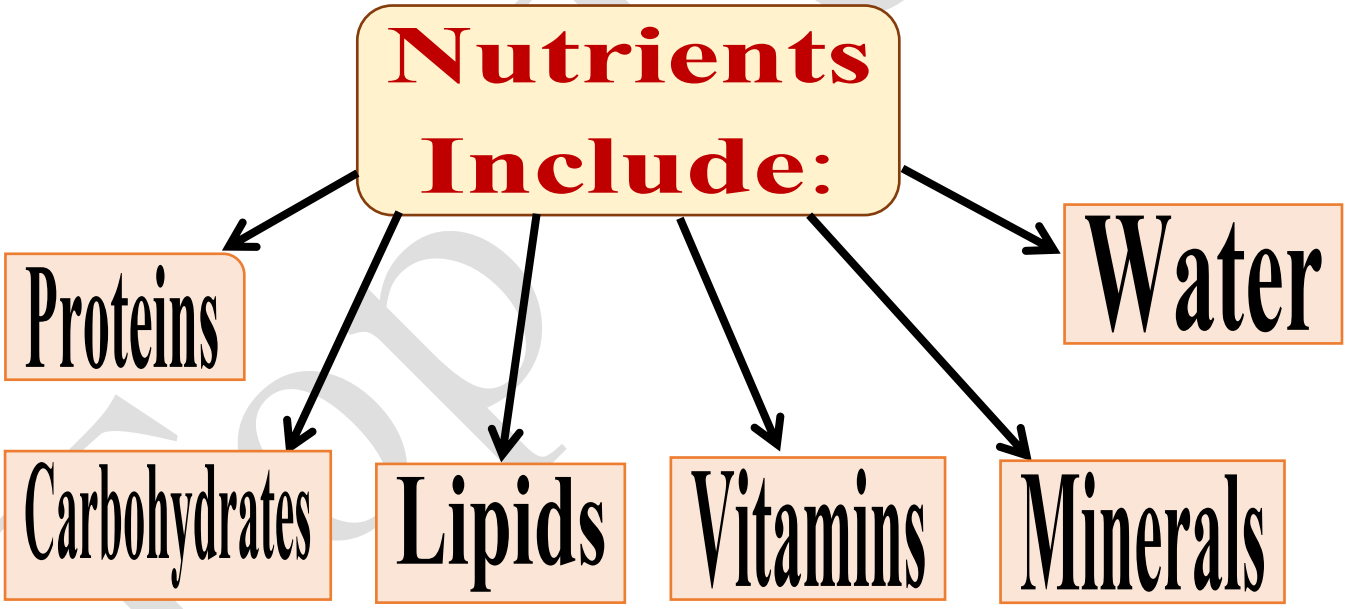
a) includes nutrients action
b) is enzymatic breaks down of large organic molecules into their components
c) is breaking down of foods into smaller pieces
d) a & b

3. (سؤال من اختبار سابق)Nutrition _____.

a) includes nutrients interaction
b) includes nutrients balance in relation to health and disease
c) is enzymatic breaks down of large organic molecules into their components
d) a & b

Nutrients

Substances that we must have in our diets in order for our cells to function properly



4. (سؤال من اختبار سابق)Substances that we must have in our diets in order for our cells to function properly include _____.

a) Vitamins
b) Minerals
c) Water
d) all of the above

5. (سؤال من اختبار سابق)Substances that we must have in our diets in order for our cells to function properly include _____.

a) Lipids
b) Vitamins
c) Carbon dioxide
d) a & b

6. (سؤال من اختبار سابق)Substances that we must have in our diets in order for our cells to function properly include _____.

a) Proteins
b) Water
c) aflatoxins
d) a & b

7. (سؤال من اختبار سابق)Substances that we must have in our diets in order for our cells to function properly include _____.

a) Lipids
b) Vitamins
c) Water
d) all of the above

Digestion & obtaining and processing food

Most animals have one of three kinds of diets.

Kinds of diets

Herbivores	Carnivores	Omnivores
Plant-eaters: cattle, snails and sea urchins قنافذ	Meat-eaters: lions, hawks and spiders	Eating both plants and other animals

8.(سؤال من اختبار سابق) Herbivores _____.

a) one Example of them is crow
b) one Example of them is raccoon
c) are meat-eaters
d) are plant-eaters

9. (سؤال من اختبار سابق)Carnivores _____.

a) one Example of them is spider
b) are plant-eaters
c) one Example of them is raccoon
d) none of the above

10.(سؤال من اختبار سابق) _____ are examples of **Omnivores**.

a) Roaches
b) Hawks
c) Spiders
d) all of the above

11.(سؤال من اختبار سابق) Herbivores _____.

a) one Example of them is crow
b) one Example of them is snail
c) one Example of them are roaches
d) one Example of them is human

12.(سؤال من اختبار سابق) Carnivores _____.

a) one Example of them is lion
b) one Example of them is sea urchin
c) one Example of them is crow
d) none of the above

13.(سؤال من اختبار سابق) _____ are examples of **Carnivores**.

a) Hawks
b) Raccoons
c) Crows
d) a & b

14.(سؤال من اختبار سابق) Herbivores ____.

a) one Example of them is cattle
b) are meat-eaters
c) one Example of them are roaches
d) none of the above

15.(سؤال من اختبار سابق) Carnivores ___.

a) eat both plants and other animals
b) one Example of them is sea urchin
c) one Example of them is human
d) none of the above

16.(سؤال من اختبار سابق) Omnivores __.

a) are plant-eaters
b) one Example of them is raccoon
c) one Example of them is hawk
d) one Example of them is spider

17.(سؤال من اختبار سابق) _____ are examples of **Herbivores**.

a) Roaches
b) Lions
c) Spiders
d) none of the above

18. (سؤال من اختبار سابق)Herbivores _____.

a) eat both plants and other animals
b) one Example of them is spider
c) one Example of them are roaches
d) none of the above

19.(سؤال من اختبار سابق) Omnivores _____.

a) one Example of them are roaches
b) one Example of them is lion
c) one Example of them is hawk
d) one Example of them is cattle

20.(سؤال من اختبار سابق) Herbivores _____.

a) one Example of them is spider
b) one Example of them is human
c) one Example of them is crow
d) none of the above

21.(سؤال من اختبار سابق) Carnivores _____.

a) one Example of them is hawk
b) one Example of them is snail
c) one Example of them is sea urchin
d) none of the above

22. (سؤال من اختبار سابق) Omnivores _____.

a) are meat-eaters
b) one Example of them is hawk
c) are plant-eaters
d) none of the above

23.(سؤال من اختبار سابق) _____ are examples of **Carnivores**.

a) Humans
b) Snails
c) Sea urchins
d) none of the above

Animals ingest their food in a variety of ways

- **1) Suspension feeding**
- **2) Substrate feeding**
- **3) Fluid feeding**
- **4) Bulk feeding**

Substrate feeder

A caterpillar eating its way through the soft green tissues inside an oak leaf

24.(سؤال من اختبار سابق) A _____ is an example of animals that use **Substrate feeding** to obtain and ingest their food.

a) caterpillar
b) mosquito
c) tube worm
d) all of the above

Suspension feeder

A tube worm filtering food from the surrounding water through its tentacles.

25.(سؤال من اختبار سابق) A **tube worm** is an example of animals that use ___ to obtain and ingest their food.

a) Suspension feeding
b) Substrate feeding
c) Fluid feeding
d) all of the above

Fluid feeder

A mosquito sucking blood

26. (سؤال من اختبار سابق)A _____ is an example of animals that use **Fluid feeding** to obtain and ingest their food.

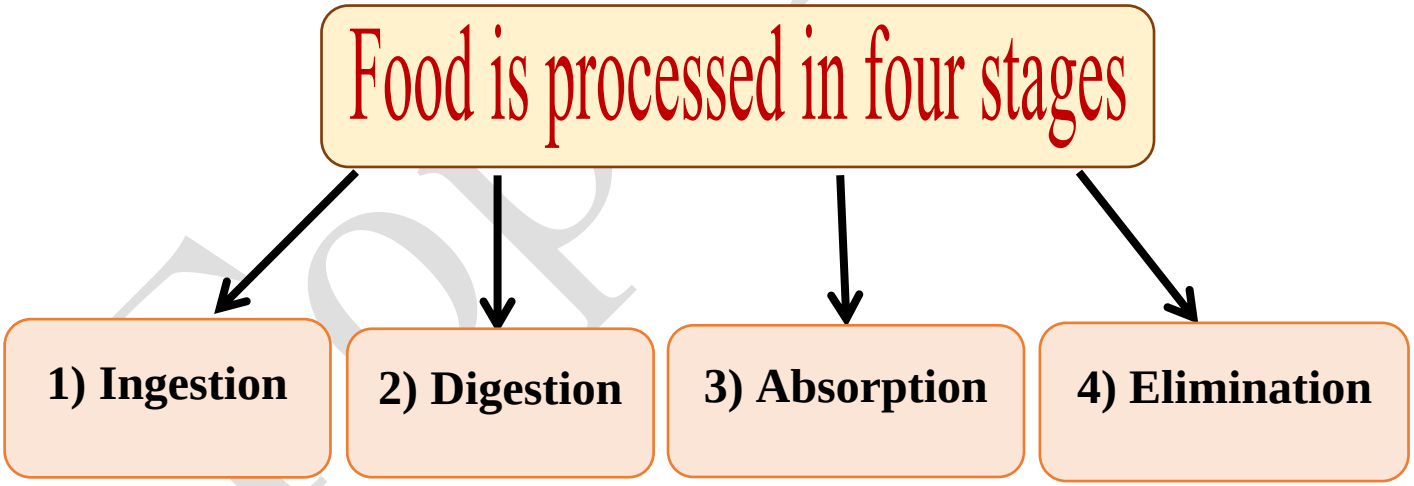
a) Mosquito
b) Tube worm
c) Caterpillar
d) a & b

Bulk feeder

A grey heron preparing to swallow a fish head first and the rest next.

27. (سؤال من اختبار سابق)A **grey heron** is an example of animals that use ___ to obtain and ingest their food.

a) Suspension feeding
b) Substrate feeding
c) Fluid feeding
d) none of the above



28. (سؤال من اختبار سابق)The **Ingestion** is the _____ stage of food processing.

a) first
b) second
c) third
d) all of the above

29. (سؤال من اختبار سابق)The **second stage** of food processing is _____.

a) Digestion
b) Ingestion
c) Absorption
d) none of the above

30. (سؤال من اختبار سابق)The **Absorption** is the _____ stage of food processing.

a) third
b) first
c) second
d) all of the above

31. (سؤال من اختبار سابق)The **third stage** of food processing is _____.

a) Absorption
b) Digestion
c) Elimination
d) none of the above

32. (سؤال من اختبار سابق)The **fourth stage** of food processing is_____.

a) Elimination
b) Ingestion
c) Absorption
d) none of the above

Digestion

1. Mechanical

Digestion: breaks food down into smaller pieces

2. Chemical

Digestion: enzymatic break down of large organic molecules into their components

33. (سؤال من اختبار سابق)Which of the following statements are true?

a) Mechanical digestion breaks food down into smaller pieces
b) There are four types of digestion
c) Mechanical digestion is enzymatic break down of large organic molecules into their components
d) a & b

34. (سؤال من اختبار سابق)Which of the following statements are true?

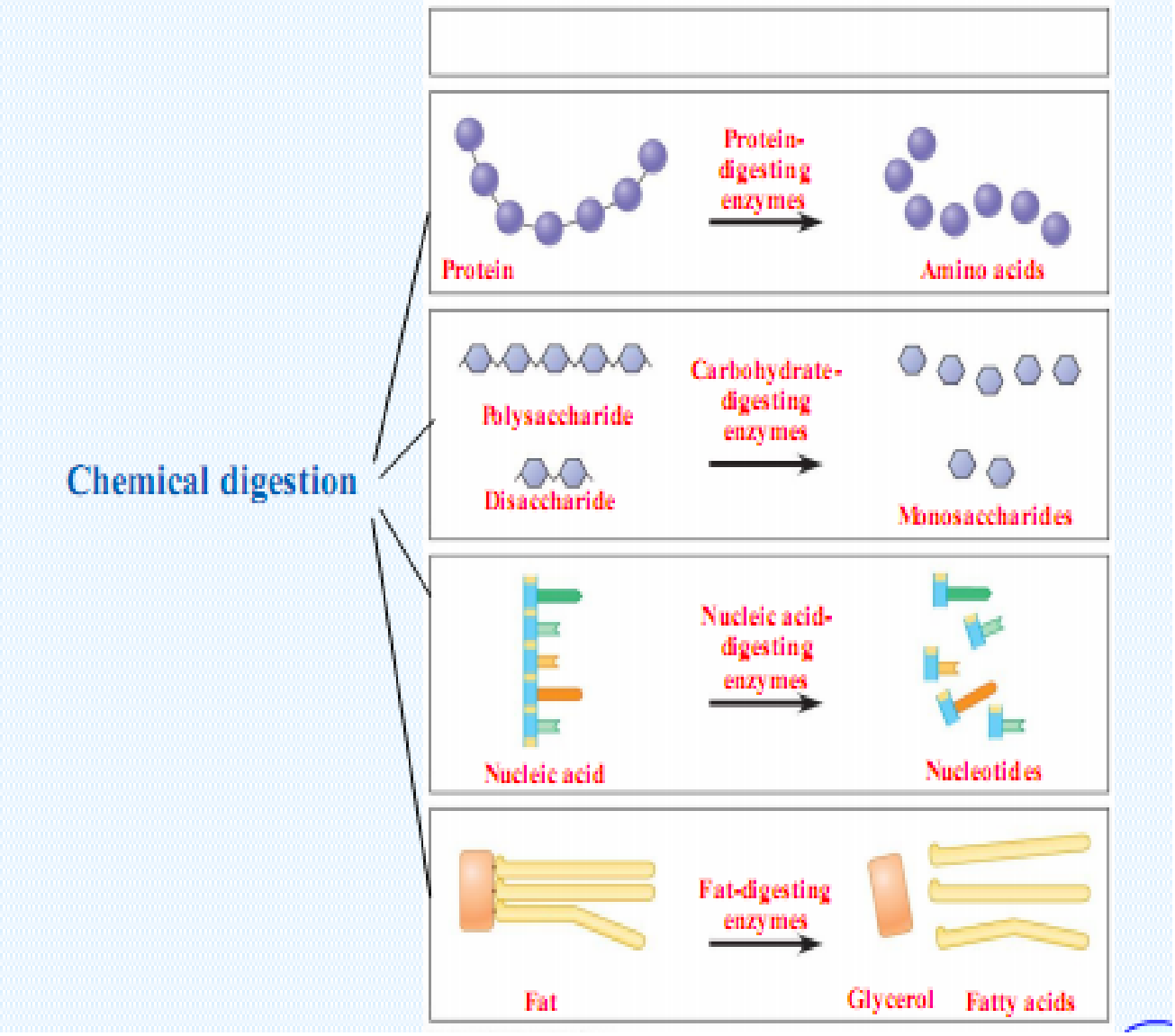
a) There are three types of digestion
b) Chemical digestion breaks food down into smaller pieces
c) Chemical digestion is enzymatic break down of large organic molecules into their components
d) There are four types of digestion

35. (سؤال من اختبار سابق)Which of the following statements are true?

a) Chemical digestion is enzymatic break down of large organic molecules into their components
b) Mechanical digestion is enzymatic break down of large organic molecules into their components
c) Chemical digestion breaks food down into smaller pieces
d) all of the above

36.(سؤال من اختبار سابق) Which of the following statements are true?

a) There are four types of digestion
b) Mechanical digestion is enzymatic break down of large organic molecules into their components
c) Chemical digestion breaks food down into smaller pieces
d) none of the above



Chapter 8

HUMAN DIGESTIVE SYSTEM

Human digestive system consists of:

1) **An alimentary canal**
القناة الهضمية

2) **Accessory glands**
الغدد التابعة

Alimentary canal

Mouth الفم, **pharynx** البلعوم, **esophagus** المريء, **stomach** المعدة, **small intestine** الامعاء الدقيقة, **large intestine** الامعاء الغليظة also known as **the colon** القولون, **rectum** المستقيم and **anus** فتحة الإخراج.

Accessory glands

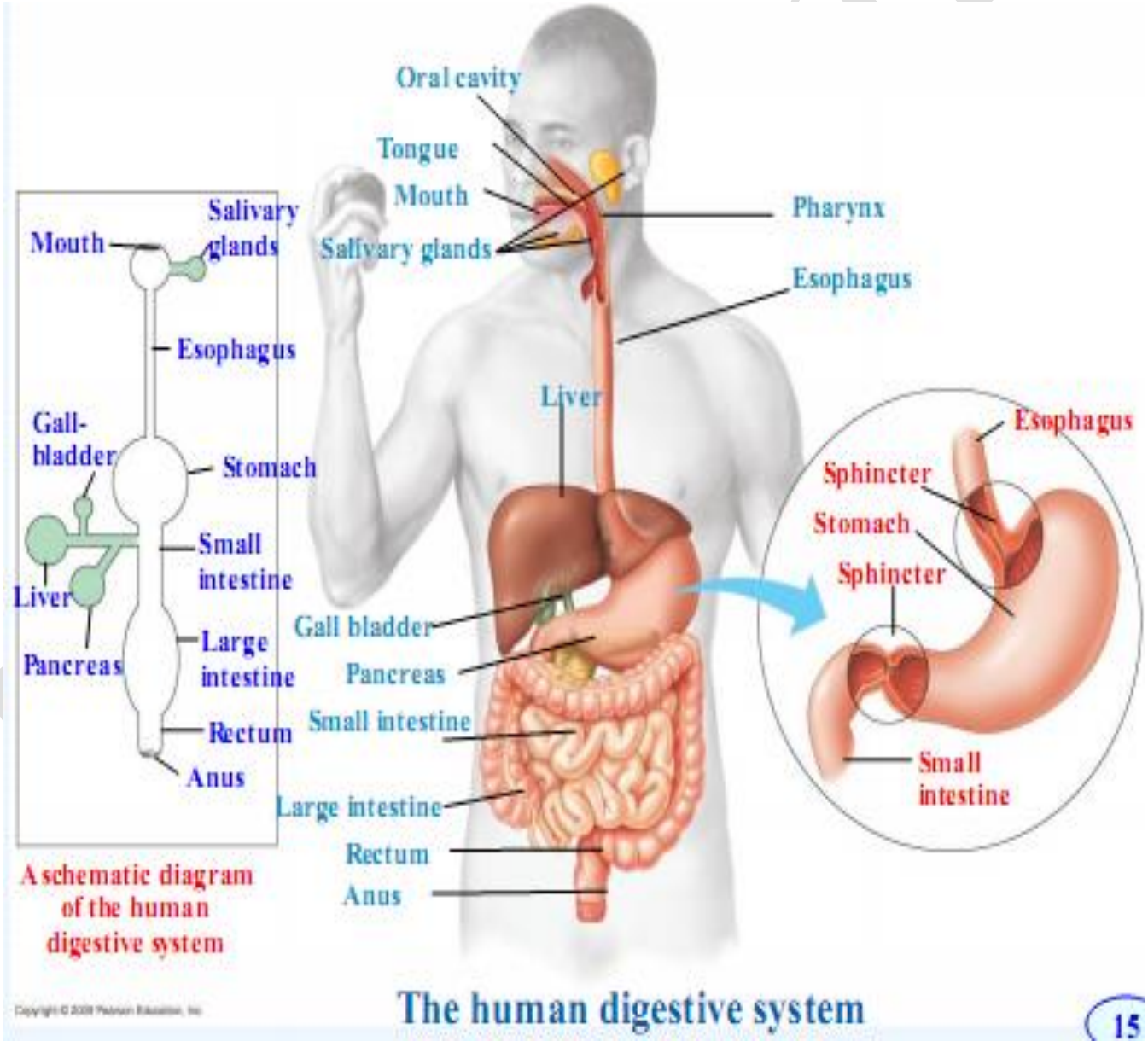
- ✓ **Salivary glands** الغدد اللعابية → **salivary amylase**
- ✓ **Pancreas** → **Pancreatic amylase, chymotrypsin,**
- ✓ **trypsin, lipases and nucleases**
- ✓ **Liver** الكبد → **bile and bile salts**
- ✓ **Gallbladder** المرارة → **bile storage** تخزين الصفراء

1. (سؤال من اختبار سابق)The function of **salivary glands** is the production of_____.

a) salivary amylase
b) chymotrypsin
c) nucleases
d) a & b

2. (سؤال من اختبار سابق)The function of **pancreas** is the production of____.

a) Pancreatic(amylase)
b) salivary amylase
c) bile and bile salts
d) none of the above



Process of Digestion
عملية الهضم

Mechanical – Chewing and mixing of food occurs in the mouth and stomach

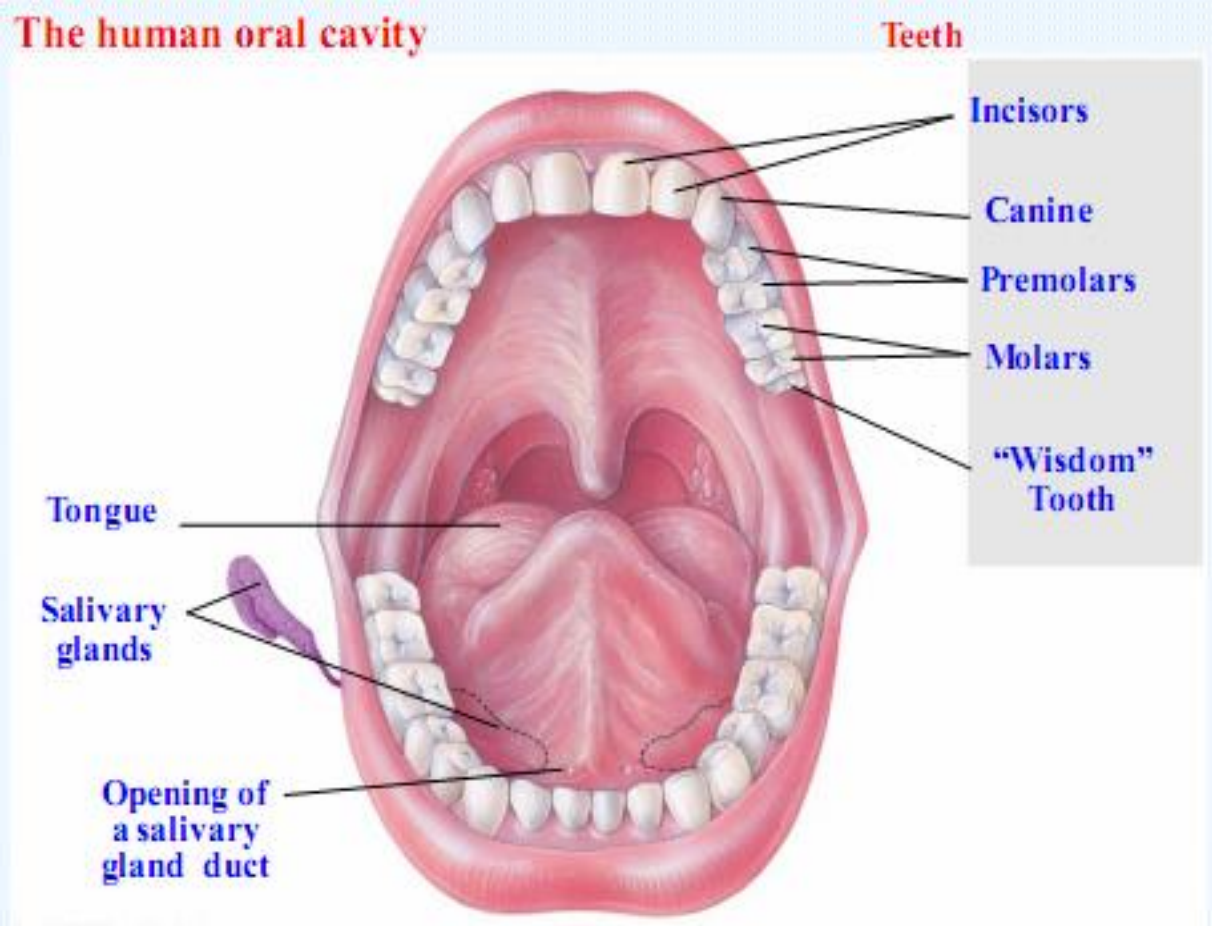
عملية ميكانيكية حيث يتم خلط ومضغ الطعام في الفم والمعدة

3. (سؤال من اختبار سابق)**The Chewing and mixing** of food occurs in the _____.

a) mouth and stomach
b) large intestine
c) rectum
d) none of the above

- ✓ **Teeth break up food, saliva moistens it**
- ✓ **Salivary amylase begins the hydrolysis of starch.**
- ✓ **Antibacterial agent kills some bacteria ingested with food.**

The tongue tastes, shapes the bolus of food, and moves it towards the pharynx.



4. (سؤال من اختبار سابق)The_____ tastes, shapes the bolus of food, and moves it toward the pharynx.

a) pharynx
b) Salivary glands
c) teeth
d) tongue

Food movement in the alimentary canal

Esophagus serves to transport food from mouth to stomach

Alternating waves of contraction and relaxation by smooth muscle in the walls of the canal move food along in a process called peristalsis

Sphincters - a circular muscle arrangement that acts as a valve to regulate passage or flow of food into and out of digestive chambers.

The pyloric sphincter

– Regulates the passage of food from the stomach to the small intestine

– Limits the upward movement of acids into the esophagus

5. (سؤال من اختبار سابق)The _____regulates the passage of food from the stomach to the small intestine.

a) stomach
b) small intestine
c) pyloric sphincter
d) Sphincters

6. (سؤال من اختبار سابق)The ___ serves to transport food from mouth to stomach.

a) Esophagus
b) Sphincters
c) small intestine
d) all of the above

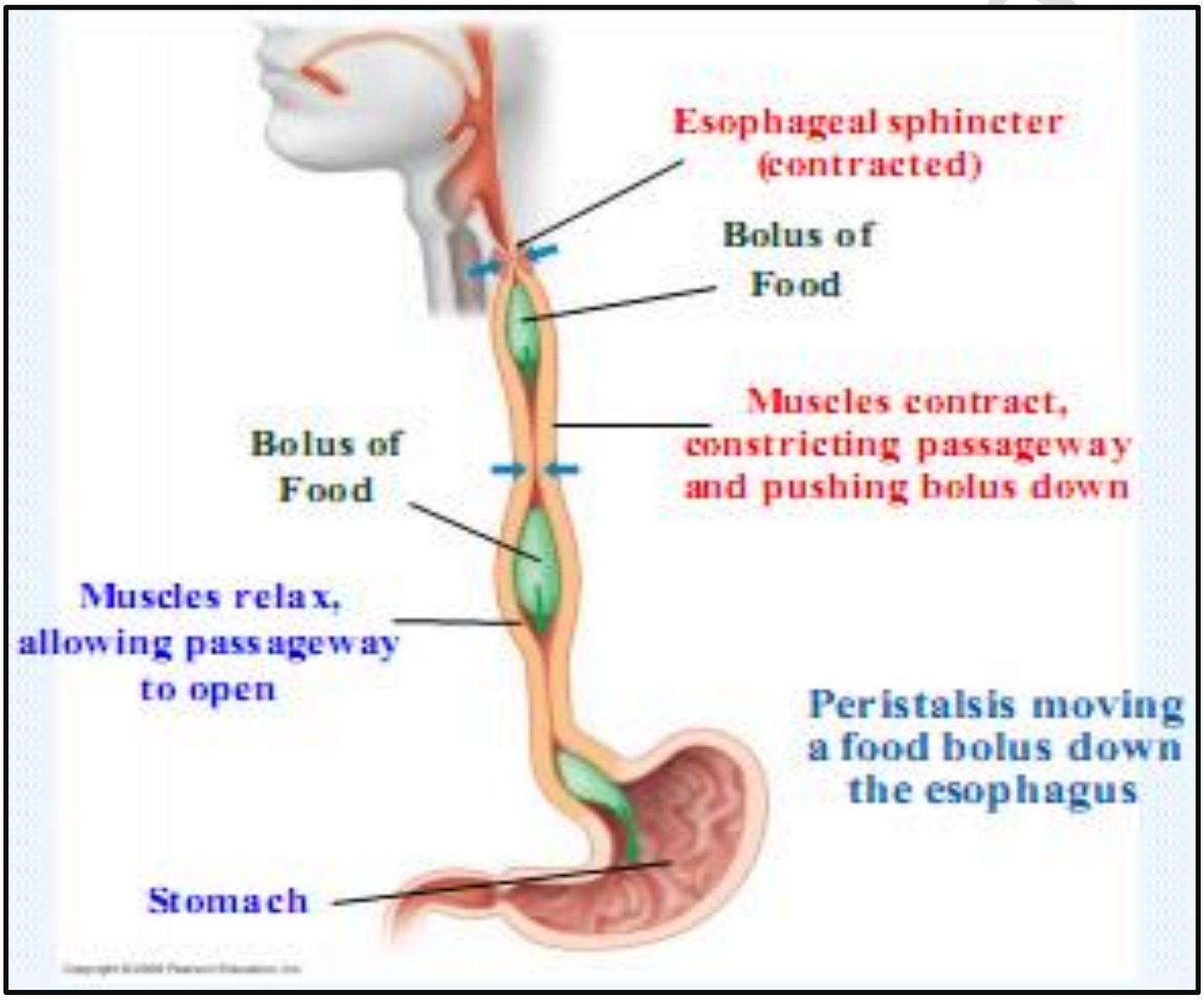
7. (سؤال من اختبار سابق)The__ is a circular muscle arrangement that acts as a valve to regulate passage or flow of food into and out of digestive chambers.

a) Sphincters
b) pyloric sphincter
c) esophagus
d) none of the above

Peristalsis moves food through the esophagus to the stomach

- ✓ **After swallowing البلع, peristalsis الحركة الموجية moves food through the esophagus to the stomach.**
- ✓ **The trachea القصبة الهوائية conducts air to the lungs الرئتين .**
- ✓ **The esophagus المريء conducts food from the pharynx البلعوم to the stomach المعدة .**

Peristalsis moves food through the esophagus to the stomach



In the stomach

☒ **The stomach stores food and breaks it down with acid and enzymes.**

- **In the stomach:**
  - ✓ **Parietal cells produce Acid HCl - pH = 2**
    Acid kills bacteria and breaks apart cells in food.
  - ✓ **Chief cells produce Pepsinogen (inactive).**

    Pepsinogen + HCl ------ pepsin (active)

    Pepsin begins the chemical digestion of proteins
- **Mucous production: helps protect cell wall against HCl and pepsin, cells lining the stomach are renewed about every 3 days.**
  - ✓ **Acidic gastric juices mix with food to produce acid Chyme.**

8. (سؤال من اختبار سابق)The parietal cells in the _____ produce Acid HCl pH 2.

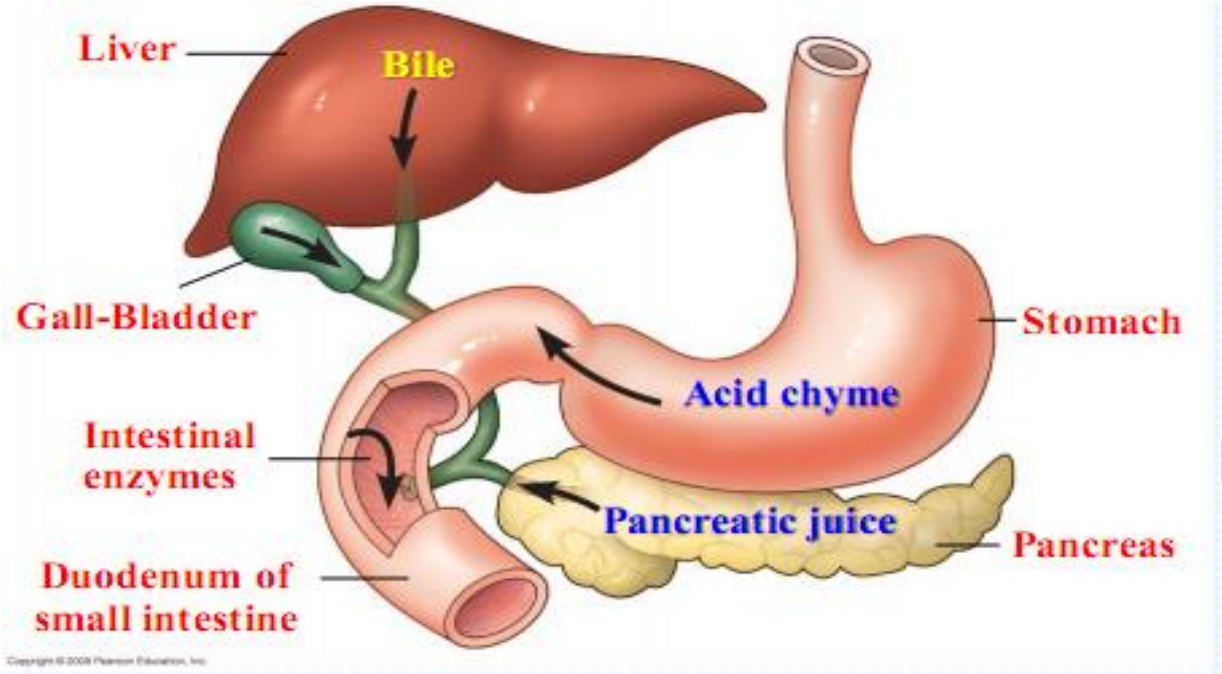
a) stomach
b) Sphincters
c) appendix
d) a & b

Chyme

Acidic gastric juices mix with food

In the small intestine

- ✓ Small intestine is the major organ of chemical digestion and nutrient absorption .
- ✓ Small intestine is named for its smaller diameter —it is about 6 meters long.
- ✓ Alkaline pancreatic juice neutralizes acid chyme and its enzymes .
- ✓ (pancreatic amylase, lipase, proteases and nucleases) digest food.
- ✓ Bile, made in the liver and stored in the gall bladder, emulsifies fat for attack by pancreatic lipase



The small intestine and related digestive organs

TABLE 21.10 ENZYMATIC DIGESTION IN THE SMALL INTESTINE

Carbohydrates

Starch —(Pancreatic amylase)→ Maltose (and other disaccharides) —(Maltase, sucrase, lactase, etc.)→ Monosaccharides

Proteins

Polypeptides —(Trypsin, chymotrypsin)→ Smaller polypeptides —(Aminopeptidase, carboxypeptidase, dipeptidase)→ Amino acids

Nucleic acids

DNA and RNA —(Nucleases)→ Nucleotides —(Other enzymes)→ Nitrogenous bases, sugars, and phosphates

Fats

Fat globules —(Bile salts)→ Fat droplets (emulsified) —(Lipase)→ Fatty acids and glycerol

9. (سؤال من اختبار سابق)The **Fat** is broken down by Fat-digesting enzymes into ___.

a) Nucleotides
b) Amino acids
c) Monosaccharaides
d) none of the above

10. (سؤال من اختبار سابق)The ____ is broken down by enzymes into **Amino acids.**

a) Polysaccharide
b) Disaccharide
c) Nucleic acid
d) none of the above

11. (سؤال من اختبار سابق)The _____ is broken down by Carbohydrate-digesting enzymes into **Monosaccharaides.**

a) Disaccharide
b) Nucleic acid
c) Fat
d) a & b

- ✓ **Surface area for absorption is increased by**
  - **Folds of the intestinal lining**
  - **Finger-like villi**
- ✓ **Nutrients pass across the epithelium and into blood**
- ✓ **Blood flows to the liver where nutrients are processed and stored.**

Liver's functions

☒ Blood from the digestive tract drains to the liver

☒ The liver functions:

1) Glucose in blood is converted to glycogen and stored in the liver

2) Liver synthesizes many proteins including blood clotting proteins and lipoproteins that transport fats and cholesterol

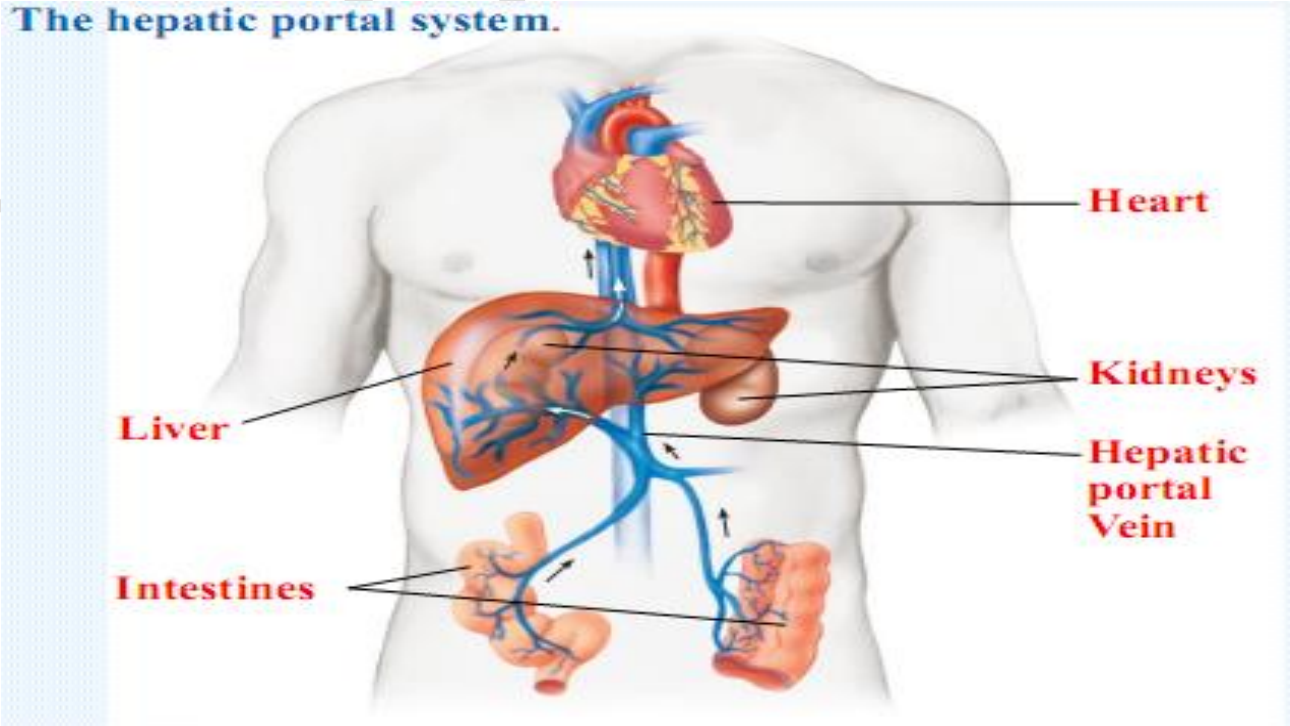
3) Liver changes toxins to less toxic forms

4) Liver produces bile

☒ Storage

☒ Nutrients not used can be stored as:

- ✓ Glycogen
- ✓ Fat



12. (سؤال من اختبار سابق)The function of the liver is the production of_____.

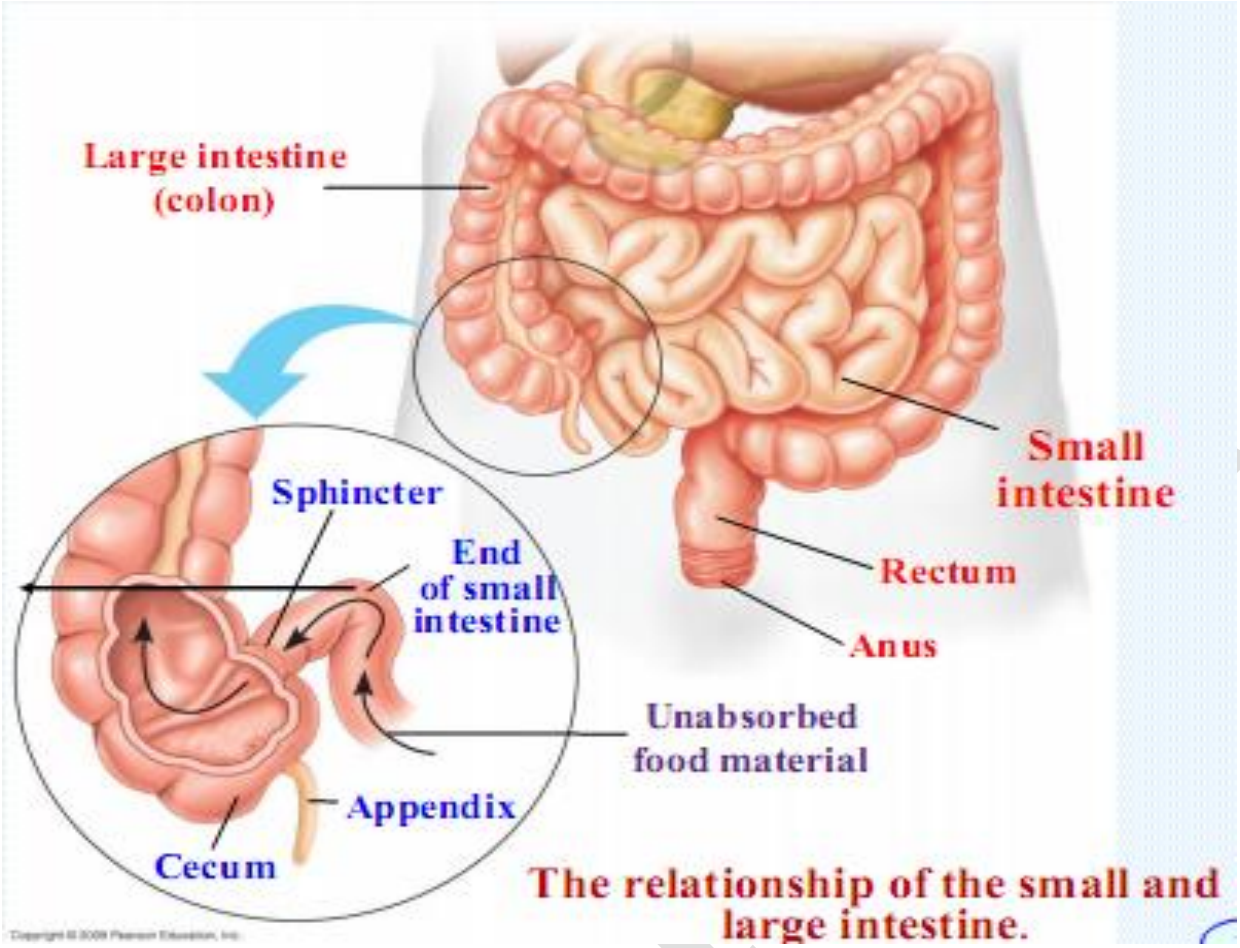
a) salivary amylase
b) Pancreatic(amylase)
c) lipases
d) none of the above

13. (سؤال من اختبار سابق)The function of the liver is the production of____.

a) bile salts
b) chymotrypsin
c) trypsin
d) all of the above

The large intestine reclaims water and compacts the feces

- ✓ **Diarrhea occurs when too little water is reclaimed.**
- ✓ **Constipation occurs when too much water is reclaimed.**
- ✓ **Feces are stored in the rectum.**
- ✓ **Colon bacteria produce vitamins —biotin, vitamin K & B vitamins.**
- ✓ **Appendix**
  - **Located near the junction of the small intestine and colon.**
  - **Makes a minor contribution to immunity.**



The relationship of the small and large intestine.

Chapter 8

A healthy diet satisfies three needs

1) Fuel to power the body.

2) Organic molecules to build molecules.

3) Essential nutrients —raw materials that animals cannot make for themselves like vitamins, minerals and the essential amino acids (animals cannot produce eight of the 20 amino acids named essential amino acids. These eight amino acids must come from the diet).

Chemical energy powers the body

- ✓ **Nutrients are oxidized inside cells to make ATP**
- ✓ **Proteins, carbohydrates, and fats are the main sources of calories.**
- ✓ **Basal metabolic rate (BMR): energy a resting animal requires each day.**
- ✓ **Metabolic rate: BMR plus the energy needed for physical activity .**
- ✓ **Excess energy is stored as glycogen or fat .**
- ✓ **Our metabolic rates typically decrease throughout adulthood.**

1. (سؤال من اختبار سابق)Substances that we must have in our diets in order for our cells to function properly include _____ .

a) Lipids
b) Vitamins
c) Carbon dioxide
d) a & b

2. (سؤال من اختبار سابق)Substances that we must have in our diets in order for our cells to function properly include _____ .

a) Lipids
b) Vitamins
c) Water
d) all of the above

3. (سؤال من اختبار سابق)Nutrients are oxidized inside cells to make _____.

a) NADP
b) ATP
c) NADPH
d) none of the above

4. (سؤال من اختبار سابق)Our metabolic rates typically _____throughout adulthood.

a) increase
b) decrease
c) not changing
d) none of the above

Unhealthy diet

Unhealthy diets are linked to:

- Undernourishment—not enough calories.

- Malnourishment—missing essential nutrients.

5. (سؤال من اختبار سابق)Unhealthy diets are linked to _____.

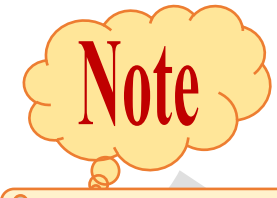
a) undernourishment
b) malnourishment
c) essential vitamins
d) a & b

6. (سؤال من اختبار سابق)Undernourishment _____.

a) missing essential nutrients
b) not enough calories
c) very high calories
d) a & b

7. (سؤال من اختبار سابق)Malnourishment_____.

a) not enough calories
b) enough calories
c) missing essential nutrients
d) none of the above



A healthy diet includes 13 vitamins and many essential Minerals.

8. (سؤال من اختبار سابق)A healthy diet includes _____ vitamins

a) 8
b) 9
c) 11
d) 13

Essential vitamins and minerals

- ✓ **Required in minute amounts.**
- ✓ **Extreme excesses can be dangerous.**
- ✓ **Excess water-soluble vitamins can be eliminated in urine.**
- ✓ **Excess fat-soluble vitamins accumulate تتراكم to dangerous levels in body fat.**

Essential vitamins

- ✓ **Main function is to allow chemical reactions to occur in body.**
- ✓ **Required in minute amounts.**
- ✓ **Help release energy trapped مختزنة in carbohydrates, lipids and proteins.**

9. (سؤال من اختبار سابق) Essential vitamins and minerals.

a) Required in minute amounts
b) Extreme excesses can be dangerous
c) Excess water-soluble vitamins can be eliminated in urine
d) all of the above

13 vitamins divided into two groups:

- **Fat soluble**
  A, D, E, K
- **Water soluble**
  C and B vitamins

10. (سؤال من اختبار سابق)water soluble vitamins are _____.

a) A, D, E, K
b) C and B vitamins
c) All of the above
d)None of the above

11. (سؤال من اختبار سابق)fat soluble vitamins are _____.

a) A, D, E, K
b) C and B vitamins
c) All of the above
d) None of the above

12.(سؤال من اختبار سابق) Fat soluble vitamins include _____.

a) vitamin D
b) vitamin C
c) vitamin B
d) all of the above

Minerals

- ✓ **Minerals are simple inorganic nutrients include:**
- ✓ **Na^{+}, K^{+} and Mg^{++} which usually required in small amounts.**
- ✓ **Ca^{++} and $PO4^{3-}$which are required in larger amounts.**
- ✓ **They are critical for nervous system function, maintaining electrolyte levels, water balance, and skeletal system الجهاز العضلي.**

13. (سؤال من اختبار سابق)_____are simple inorganic nutrients.

a) Proteins
b) Vitamins
c) Minerals
d) None of the above

14. (سؤال من اختبار سابق)Simple inorganic nutrients.

a) minerals
b) vitamins
c) lipids
d) proteins

Diet can influence cardiovascular disease and cancer

- ✓ **A healthy diet may reduce the risk of cardiovascular disease and cancer.**
- ✓ **Two main types of cholesterol.**
  - **LDL: contributes to blocked blood vessels and higher blood pressure. الزيادة منها تسد الاوعية الدموية مسببة جلطات**
  - **HDL: tends to reduce blocked blood vessels. تقلل من انسداد الاوعية**
- ✓ **Exercise increases HDL levels .**
- ✓ **Smoking decreases HDL levels.**

15.(سؤال من اختبار سابق) LDL is a cholesterol, _____.

a) contributes to higher blood pressure
b) tends to reduce blocked blood vessels
c) its level increases by exercise
d) a & b

16. (سؤال من اختبار سابق)LDL is a cholesterol, _____.

a) contributes to blocked blood vessels
b) tends to reduce blocked blood vessels
c) its level increases by exercise
d) all of the above

17.(سؤال من اختبار سابق) LDL is a cholesterol, _____.

a) tends to reduce blocked blood vessels
b) its level increases by exercise
c) its level decreases by smoking
d) none of the above

18. (سؤال من اختبار سابق)HDL is a cholesterol, _____.

a) tends to reduce blocked blood vessels
b) contributes to blocked blood vessels
c) contributes to higher blood pressure
d) all of the above

19.(سؤال من اختبار سابق) Exercise _____ HDL levels.

a) increase
b) decrease
c) not changing
d) none of the above

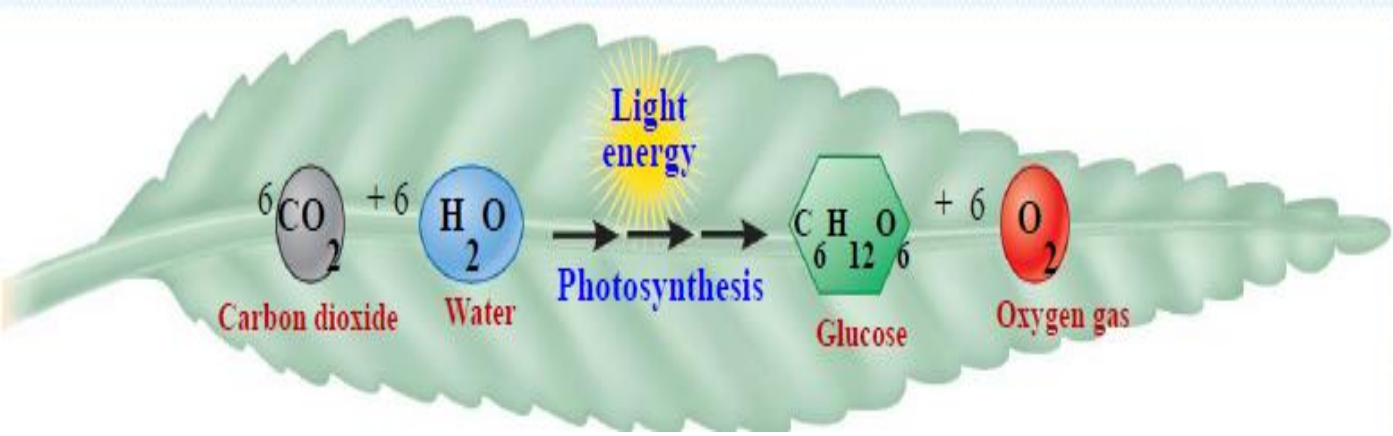
20. (سؤال من اختبار سابق)Smoking _____ HDL levels.

a) increase
b) decrease
c) not changing
d) none of the above

Chapter 8

The uptake and transport of plant nutrients

- ✓ **Plants acquire their nutrients from soil and air.**
- ✓ **Plants take up carbon dioxide from the air to produce sugars via photosynthesis; oxygen is produced as a product of photosynthesis.**
- ✓ **Plants obtain water, minerals, and some oxygen from the soil. Using simple sugars as an energy source and as building blocks, plants convert the inorganic molecules they take up into the organic molecules of living plant tissue.**

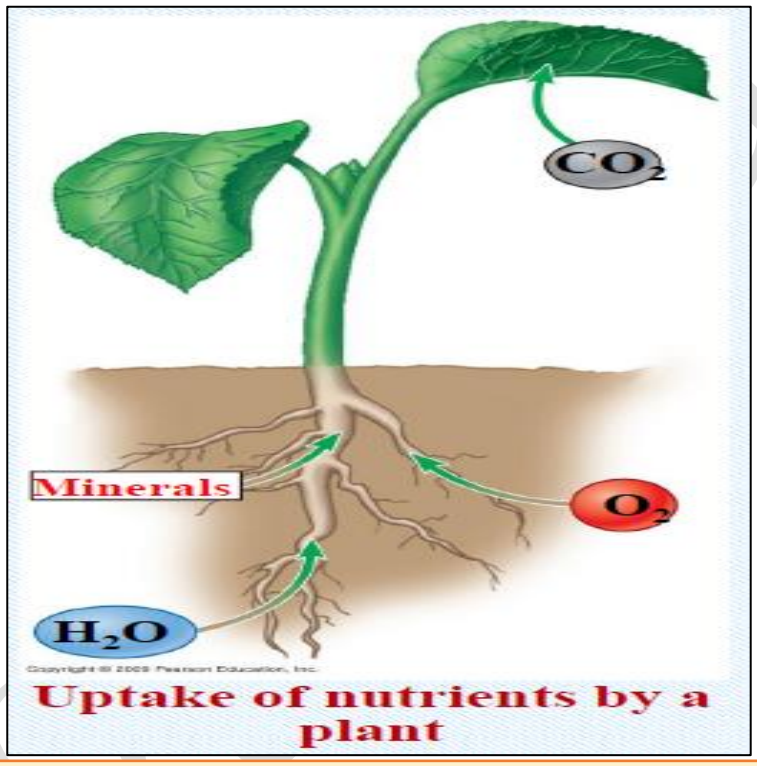


Inorganic molecules taken up by plants

- ☒ Carbon dioxide
- ☒ Nitrogen
- ☒ Magnesium
- ☒ Phosphorus

Organic molecules produced by plants

- ☒ Carbohydrates
- ☒ Lipids
- ☒ Proteins
- ☒ Nucleic acids



Uptake of nutrients by a plant

- ✓ **The plasma membranes of root cells control solute uptake.**
- ✓ **Minerals taken up by plant roots are in a watery solution.**
- ✓ **Water and minerals are absorbed through the epidermis of the root بشرة الجذر and must be taken up by root cells before they enter the xylem الخشب.**
- ✓ **Selective permeability النفاذية الاختيارية of the plasma membrane of root cells controls what minerals enter the xylem.**

1. (سؤال من اختبار سابق)Water and minerals are absorbed through _____.

a) the epidermis of the stem
b) the epidermis of the leaves
c) the epidermis of the root
d) none of the above

There are two pathways by which water and minerals enter the xylem

2) Extracellular route:

water and solutes pass into the root in the porous cell walls مسام جدار الخلية of root cells; they do not enter any cell plasma membrane until they reach the root endodermis.

1) Intracellular route:

water and solutes are selectively taken up by a root epidermal cell, usually a root hair, and transported from cell to cell through plasmodesmata.

2. (سؤال من اختبار سابق)In the extracellular route _____.

a) water and solutes do not enter any cell plasma membrane until they reach the root endodermis
b) water and solutes are selectively taken up by a root epidermal cell, usually a root hair
c) water transported from cell to cell through plasmodesmata
d) all of the above

3.(سؤال من اختبار سابق) In intracellular route _____.

a) water transported from cell to cell through plasmodesmata
b) water and solutes pass into the root in the porous cell walls of root cells
c) The Casparian strip regulates uptake of minerals that enter the root
d) a & b

4. (سؤال من اختبار سابق)In the extracellular route _____.

a) water and solutes do not enter any cell plasma membrane until they reach the root endodermis
b) The Casparian strip regulates uptake of minerals that enter the root
c) water transported from cell to cell through plasmodesmata
d) a & b

☒ **The cells of the endodermis البشرة الداخلية contain a waxy barrier حاجز شمعي called the Casparian strip.**

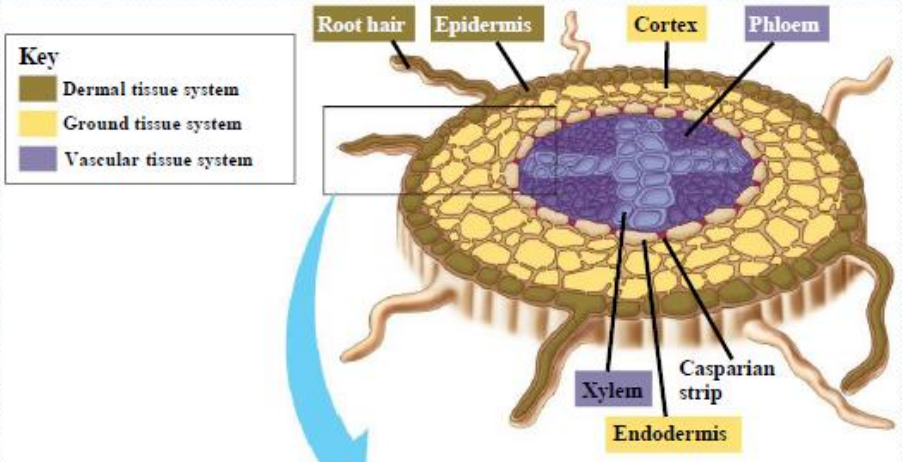
☒ **Specialized cells of the endodermis take up water and minerals selectively.**

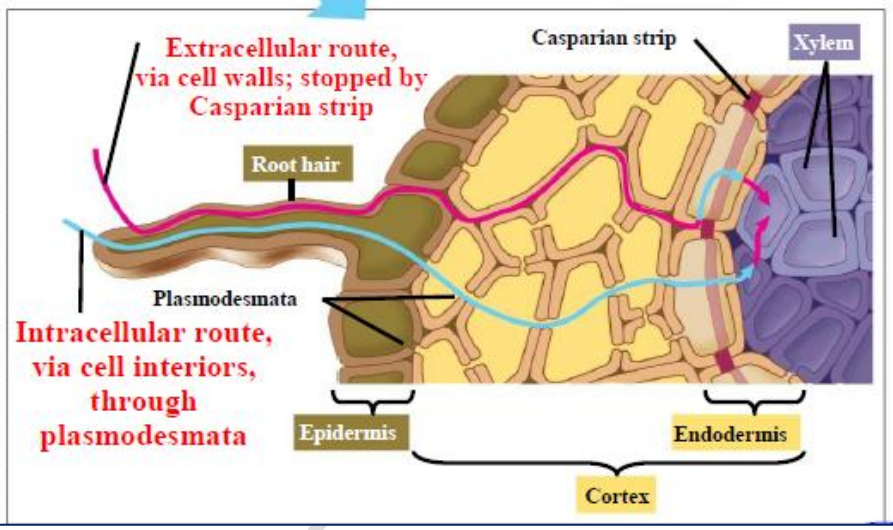
☒ **The Casparian strip regulates uptake of minerals that enter the root via the extracellular route.**

5. (سؤال من اختبار سابق)The cells of the endodermis contain a waxy barrier called_____.

a) Plasma membrane
b) Casparian strip
c) Cortex
d) None of the above

Root hairs of radish seedling





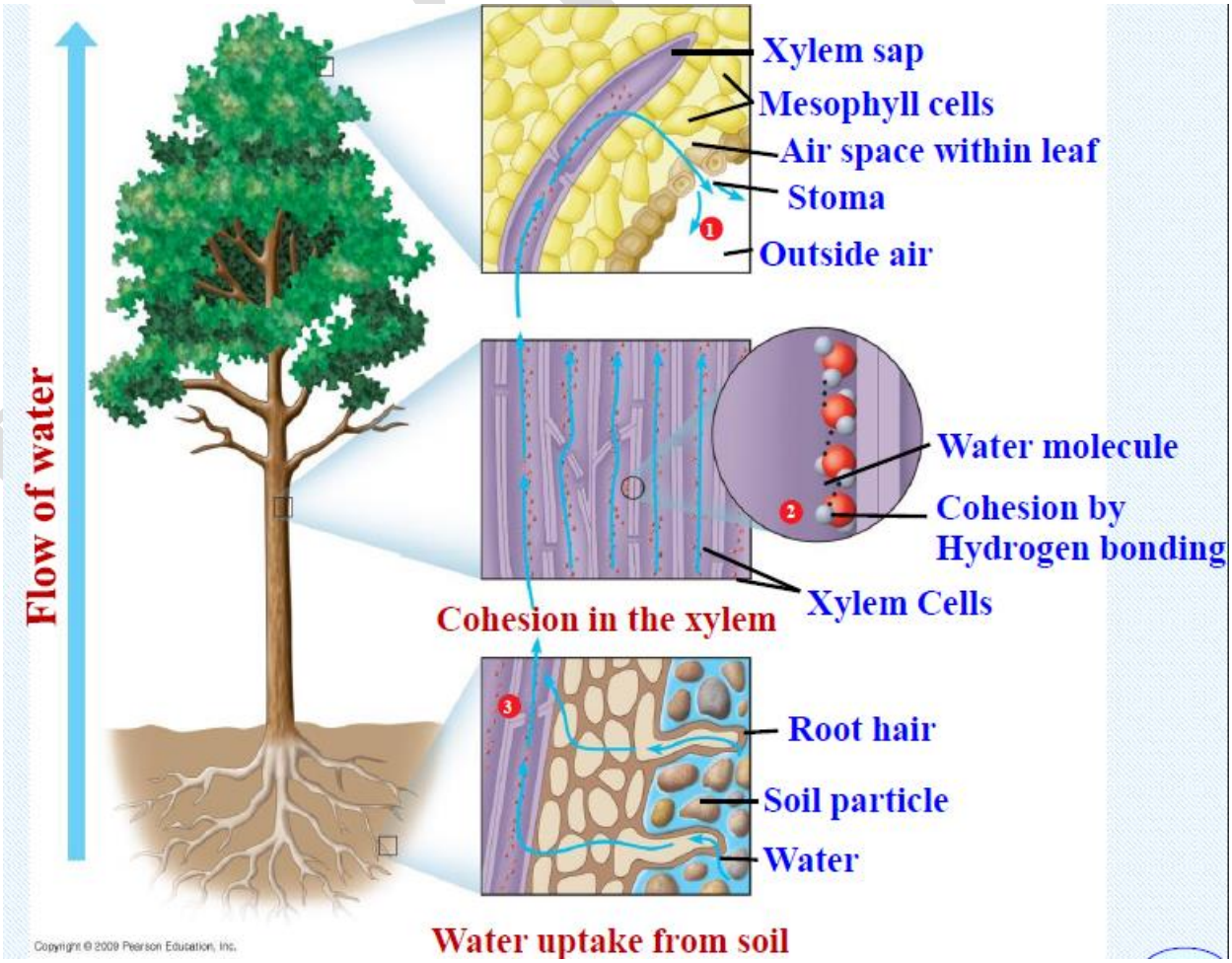
Routes of water and solutes from soil to root xylem

6. (سؤال من اختبار سابق)The cells of the endodermis contain a waxy barrier called_____.

a) endodermis
b) plasmodesmata
c) the Casparian strip
d) none of the above

Transpiration-cohesion-tension mechanism

- ✓ **Water's cohesion describes its ability to stick to itself.**
- ✓ **Water's adhesion describes its ability to stick to other surfaces; water adheres to the inner surface of xylem cells.**
- ✓ **A steep diffusion gradient pulls water molecules from the surface of leaves into much drier air.**
- ✓ **The air's pull on water creates a tension توتر that pulls on water in the xylem; since water is cohesive, it is pulled along, much as when a person sucks on a straw.**



7. (سؤال من اختبار سابق)Evaporation of water from the surface of leaves, called_____.

a) Adhesion
b) Cohesion
c) Transpiration
d)None of the above

8.(سؤال من اختبار سابق) _____allow water to be pulled up to the top of the highest trees.

a) Transpiration
b) Adhesion
c) Cohesion
d) B&C

9. (سؤال من اختبار سابق)_____ describes water ability to stick to other surfaces.

a) Adhesion
b) Cohesion
c) Transpiration
d) All of the above

10. (سؤال من اختبار سابق)Water's _____describes its ability to stick to itself.

a) adhesion
b) solubility
c) cohesion
d) none of the above

Chapter 8

Guard cells control transpiration

- ✓ Plants must open pores in leaves called stomata to allow CO2 to enter for photosynthesis.
- ✓ Water evaporates from the surface of leaves through stomata.
- ✓ Paired guard cells surround each stoma.
- ✓ Guard cells can regulate the amount of water lost from leaves by changing shape and closing the stomata pore.

stomata

Stomata open as a result of a rise in potassium levels, and close when the levels fall.

Stomata open when guard cells take up water

– Potassium is actively taken up by guard cells from nearby cells

– This creates an osmotic gradient and water follows

– Uneven متفاوتة cell walls of guard cells causes them to bow when water is taken up

– The bowing of the guard cells causes the pore of the stoma to open

When guard cells lose K+ ions, the guard cells become flaccid and the stoma closes

How guard cells control stomata

Stoma opening	Stoma closing
More K+ inside guard cell	Less K+ inside guard cell
Day time	Night time
Low CO2	High CO2
Natural Rhythms	Natural Rhythms

1. (سؤال من اختبار سابق)Stomata close_____

- at night time
- at day time
- as a result of a rise in potassium
- First and second choice

2.(سؤال من اختبار سابق) Stomata open_____

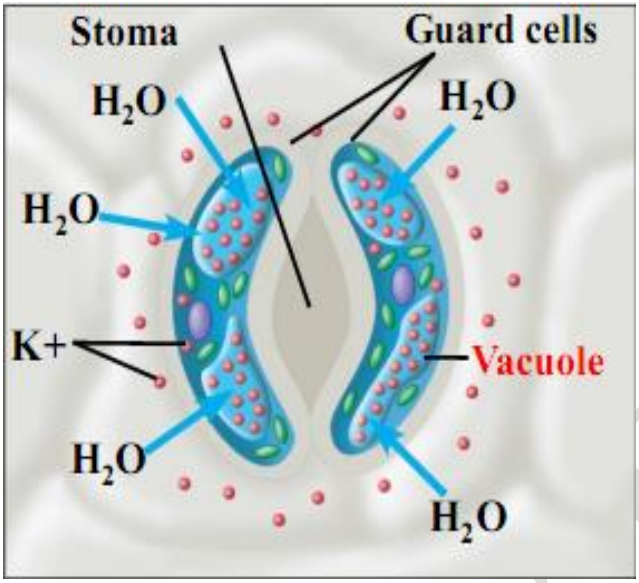
- as a result of a rise in potassium
- at day time
- at night time
- First and second choice

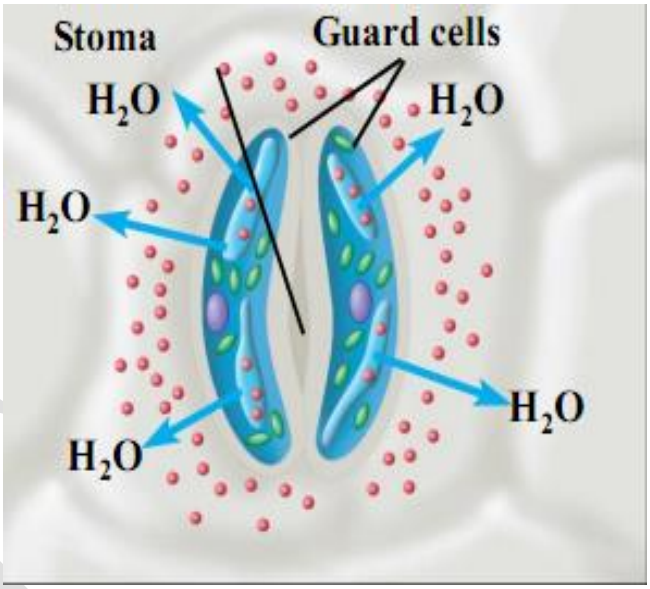
3.(سؤال من اختبار سابق) Stomata close_____

- at day time
- as a result of a rise in potassium
- when guard cells take up water
- First and second choice

4. (سؤال من اختبار سابق)Stomata open_____

- as a result of a rise in potassium
- as a result of bowing of the guard cells
- at day time
- <u>all of the above</u>





Phloem

is composed of long tubes of sieve tube members stacked end to end.

5.(سؤال من اختبار سابق) .....composed of long tubes of sieve tube members stacked end to end.

a) Xylem

b) <u>Phloem</u>

c) Starch

d) Non of the above

Phloem

-Phloem transports sugars.

-Phloem transports the products of photosynthesis throughout the plant.

-Phloem sap moves through sieve plates in sieve tube members.

-Phloem sap is composed of sucrose and other solutes such as ions, amino acids, and hormones.

-Sugars are carried through phloem from sources to sinks.

Sugar source and Sugar sink

sugar source

- is a plant organ that is a net producer of sugar via photosynthesis or breakdown of starch.

.Leaves produce sugars via photosynthesis –

produce sugar via breakdown of Roots and other storage organs – .starch

6. (سؤال من اختبار سابق)A **sugar source** is a plant organ that _____

- is a net producer of sugar via photosynthesis
- breakdown the starch
- store the starch
- First and second choice

sugar sink

- is a plant organ that is a net consumer of sugar or one that stores starch.

Growing organs use sugar in cellular respiration –

Roots and other organs store unused – s ugars as starch.

7. (سؤال من اختبار سابق)A **sugar sink** is a plant organ that _____

- store the starch
- is a net producer of sugar via photosynthesis
- breakdown the starch
- all of the above

8.(سؤال من اختبار سابق) A **sugar sink** is a plant organ that _____

- is a net consumer of sugar
- store the starch
- breakdown the starch
- First and second choice

9. (سؤال من اختبار سابق)Roots and other organs store unused s ugars a s…..

a) Sugar sink

b) Starch

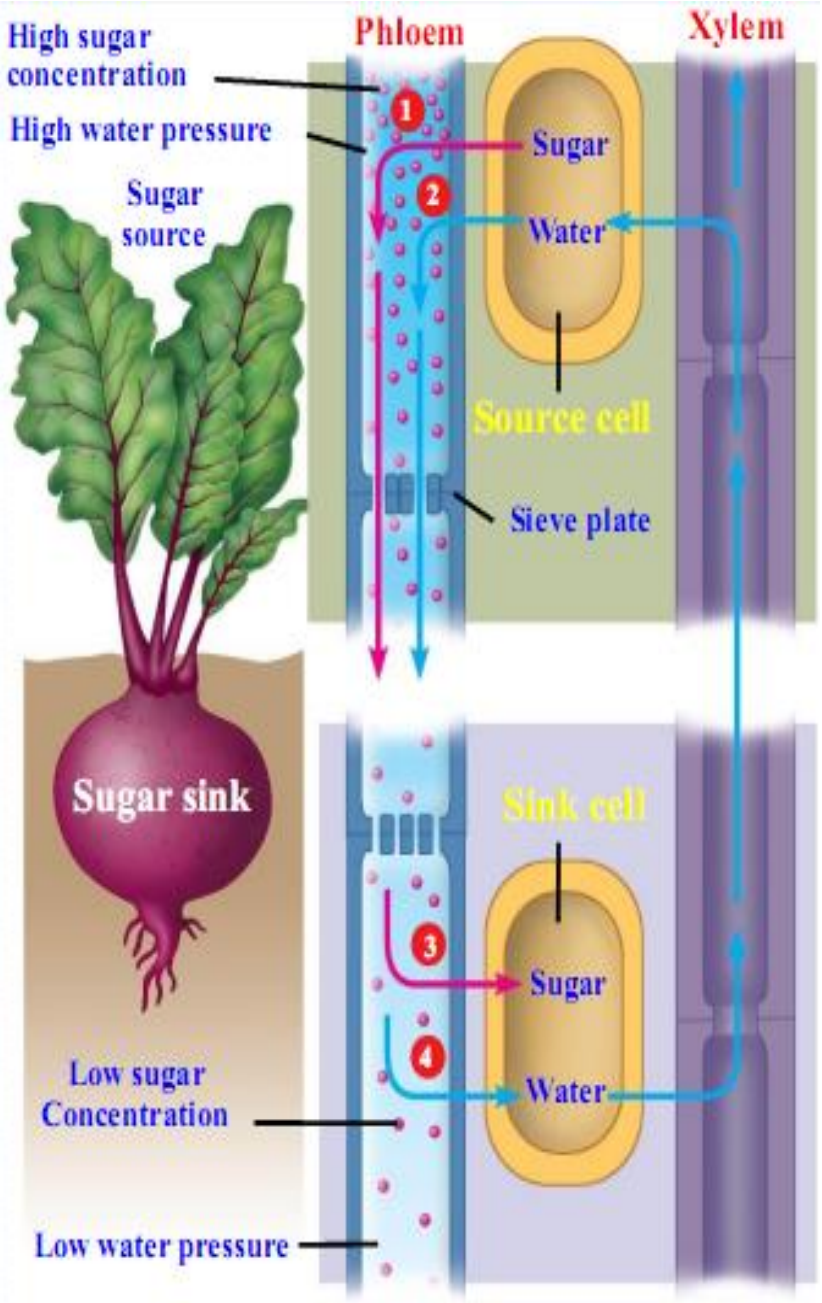
c) Xylem

d) All of the above

The pressure flow mechanism

- ✓ The pressure flow mechanism that transports sugars in the Phloem from source to sink.
- ✓ At sources, sugars are actively loaded into sieve tube members.
- ✓ High solute concentration caused by the sugar in sieve tubes causes water to rush in from nearby xylem cells.
- ✓ Flow of water into sieve tubes increases pressure at sources.
- ✓ At sinks, sugars are unloaded from sieve tubes and solute concentration decreases; water is lost and pressure is low.
- ✓ The pressure gradient drives rapid movement of sugars from sources to sinks.

Pressure flow in plant phloem from a sugar source to a sugar sink (and the return of water to the source via xylem)



Chapter 8

Plant health depends on a complete diet of essential inorganic nutrients

Essential elements

are those that a plant must obtain to complete its life cycle of growth and reproductive success.

There are 17 elements essential to plant growth and reproduction .

– Macronutrients — plants require relatively large amounts of these elements.

– Micronutrients — plants require relatively small amounts of these elements.

– Both types of nutrients have vital functions.

1. (سؤال من اختبار سابق)The macronutrients are _____.

a) elements that required in relatively large amounts by plants
b) elements that required in relatively small amounts by plants
c) often act as cofactors
d) a & b

2.(سؤال من اختبار سابق) There are_____ elements essential to plant growth and reproduction.

a) 10
b) 11
c) 17
d) 18

Plant health depends on a complete diet of essential inorganic nutrients

Macronutrients

Micronutrients

Macronutrients

- ✓ components of organic molecules.
- ✓ Make up 98% of plant dry weight :

– Carbon
– Hydrogen
– Oxygen
– Nitrogen
– Sulfur
– Phosphorus
– Potassium
– Calcium
– Magnesium

Micronutrients

Micronutrients — often act as cofactors:

– Chlorine	**– Zinc**
– Iron	**– Copper**
– Manganese	**– Nickel**
– Boron	**– Molybdenum**

3. (سؤال من اختبار سابق)The micronutrients are _____.

a) often act as cofactors
b) elements that required in relatively large amounts by plants
c) elements that make up 98% of plant dry weight
d) all of the above

4.(سؤال من اختبار سابق) The micronutrients are _____.

a) elements that make up 2% of plant dry weight
b) elements that required in relatively large amounts by plants
c) components of organic molecules
d) none of the above

Fertile soil supports plant growth

- ✓ Soils are affected by geography and climate
- ✓ Soil horizons are layers of soil with different characteristics:
  - ☒ A horizon — topsoil subject to weathering; layer contains humus (decayed organic matter) and many soil organisms
  - ☒ B horizon — clay and dissolved elements
  - ☒ C horizon — rocks of the "parent material" from which soil is formed

Three soil horizons visible beneath grass

5. (سؤال من اختبار سابق)In C horizon soil the_____.

a) layer contains clay
b) layer contains many soil organisms
c) layer contains humus (decayed organic matter)
d) layer contains rocks of the parent material from which soil is form

6.(سؤال من اختبار سابق) In C horizon soil the_____.

a) top soil subject to weathering
b) layer contains many soil organisms
c) layer contains dissolved elements
d) none of the above

7.(سؤال من اختبار سابق) In A horizon soil the _____.

a) layer contains humus (decayed organic matter)
b) layer contains dissolved elements
c) layer contains rocks of the parent material from which soil is form
d) a & b

8.(سؤال من اختبار سابق) In B horizon soil the _____.

a) layer contains clay
b) layer contains dissolved elements
c) layer contains many soil organisms
d) a & b

9.(سؤال من اختبار سابق) In A horizon soil the _____.

a) layer contains many soil organisms
b) layer contains clay
c) layer contains dissolved elements
d) none of the above

10. (سؤال من اختبار سابق)Soils are affected by _____.

a) geography
b) climate
c) size
d) a & b

11. (سؤال من اختبار سابق)_____are layers of soil with different characteristics.

a) Soil types
b) Soil horizons
c) soil nature
d) none of the above

12.(سؤال من اختبار سابق) Rocks of the "parent material" from which soil is formed.

a) A horizons
b) B horizons
c) C horizons
d) none of the above

13.(سؤال من اختبار سابق) topsoil subject to weathering; layer contains humus (decayed organic matter) and many soil organisms.

a) A horizons
b) B horizons
c) C horizons
d) none of the above

Chapter 8

PLANT NUTRITION AND SYMBIOSIS WITH BACTERIA

- ✓ **Most plants depend on bacteria to supply nitrogen.**
- ✓ **Most of the nitrogen in the biosphere is in the atmosphere as N2 gas.**
- ✓ **Plants can only absorb nitrogen as ammonium or nitrates from the soil; they cannot absorb it from air.**

Soil bacteria

☒ **Soil bacteria can convert N2 gas from the air into forms usable by plants via several processes**

1) Nitrogen fixation —N2 is converted to ammonia

2) Ammonification — conversion of organic matter into ammonium

3) Nitrification —conversion of ammonium to nitrates, the form most often taken up by plants

1. (سؤال من اختبار سابق)The conversion of N_2 to ammonia called_____.

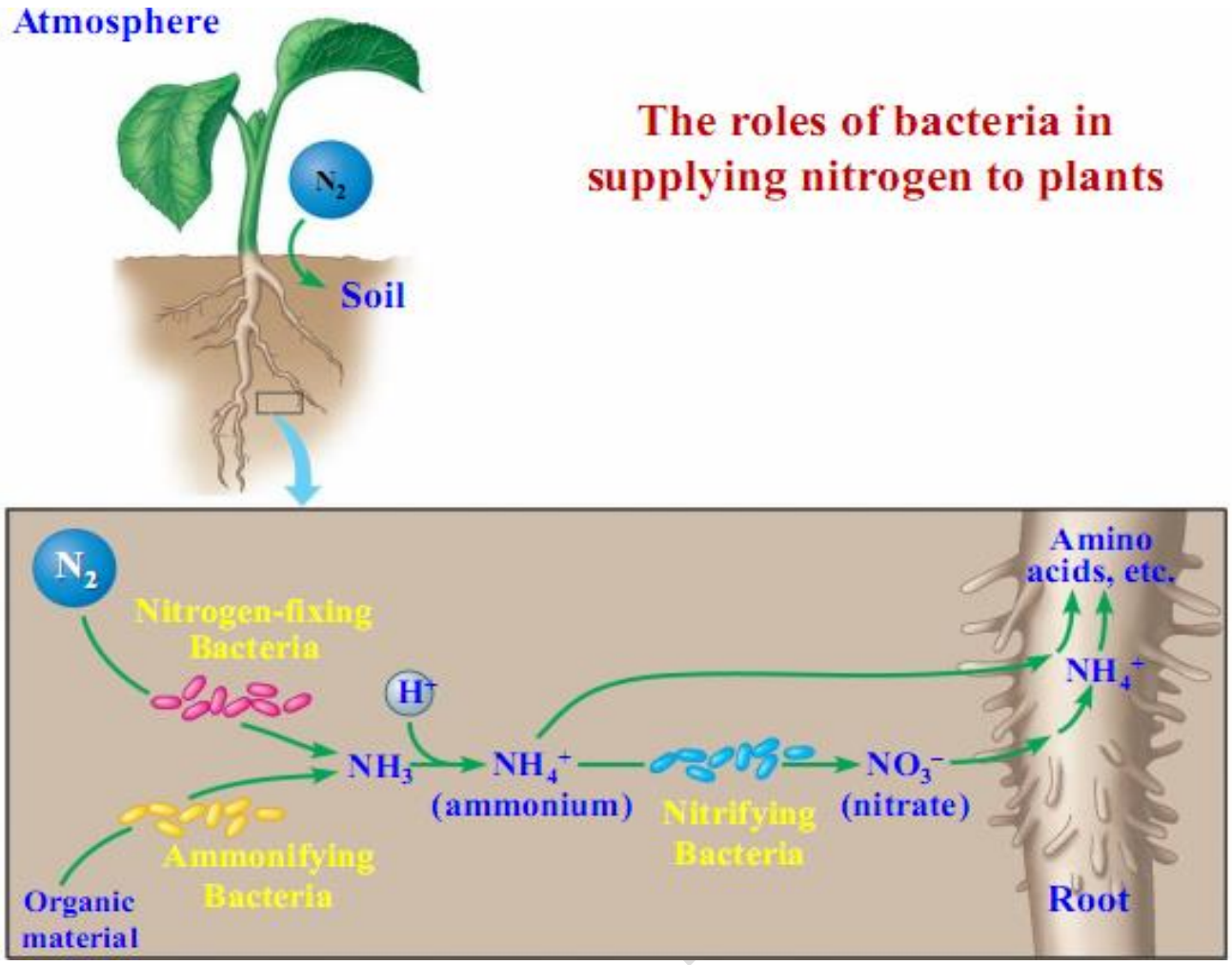
a) nitrogen fixation
b) ammonification
c) nitrification
d) none of the above

2. (سؤال من اختبار سابق)The conversion of ammonium to nitrates, the form most often taken up by plants called_____.

a) nitrification
b) ammonification
c) Carboxylation
d) none of the above

3. (سؤال من اختبار سابق)The conversion of ammonium to nitrates, the form most often taken up by plants called_____.

a) nitrogen fixation
b) ammonification
c) Carboxylation
d) none of the above



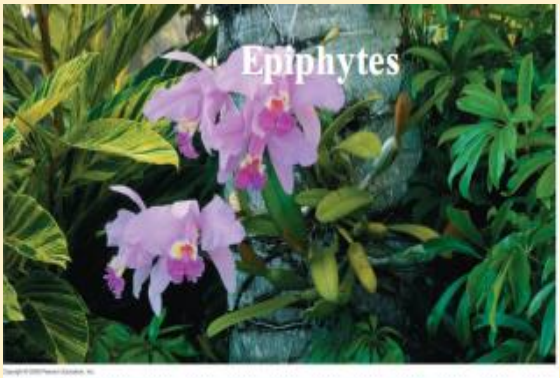
The plant kingdom includes

1. Epiphytes
2. Parasites
3. Carnivores

Epiphytes

– Grow anchored on other plants.

– Absorb water and minerals from rain.



Orchids, a type of epiphyte, growing on the trunk of a tree

4. (سؤال من اختبار سابق)_____Absorb water and minerals from rain.

a) Epiphytes
b) Parasite
c) Carnivores
d) All of the above

Parasites

– Roots tap into the host plant's vascular system.

– Incapable of photosynthesis.

– Absorb organic molecules from host plant .

Dodder growing on a pickle weed

5. (سؤال من اختبار سابق)Parasites _____.

a) absorb water and minerals from rain
b) absorb inorganic elements from prey
c) found in nutrient poor environments
d) none of the above

6.(سؤال من اختبار سابق) Parasites _____.

a) incapable of photosynthesis
b) grow anchored on other plants
c) trap and digest small animals such as insects
d) all of the above

7.(سؤال من اختبار سابق) _____Absorb organic molecules from host plant .

a) Parasite
b) Carnivores
c) Epiphytes
d) All of the above

Carnivores

– Trap and digest small animals such as insects.

– Absorb inorganic elements from prey .

– Found in nutrient poor environments .

A Venus' flytrap digesting a fly

8.(سؤال من اختبار سابق) Carnivorous plants _____.

a) absorb inorganic elements from prey
b) roots tap into the host plants vascular system
c) absorb organic molecules from host plant
d) a & b

9. (سؤال من اختبار سابق)Carnivorous plants _____.

a) found in nutrient poor environments
b) absorb water and minerals from rain
c) incapable of photosynthesis
d) all of the above