



مؤسسة الإمارات للتعليم المدرسي
EMIRATES SCHOOLS ESTABLISHMENT

Biology Department

12G -2022/2023



مراجعة عامة لاختبار الفصل الدراسي
الأول 2022-2023
اعداد معلمات المادة:
سهيله معين/ فاطمة القاضي

اللهم

وفق أبنائنا وبناتنا في اختباراتهم
وأثر بالعلم بصائرهم وعقولهم
واكتب لهم النجاح والفلاح
في الدنيا والآخرة

ملاحظة:

دراسة الصفحات المحددة من الكتاب المدرسي.
المراجعة لا تغطي الأسئلة الإضافية (bonus)

Reactants and Products

substances changes

Change in	substance's appearance(look)	substance's composition(structure)
Chemical bonds	No change	broken/formed Chemical bonds
New substance	No new substance produced	Produce new substance
Type of change	Physical change	Chemical change

Chemical Reaction

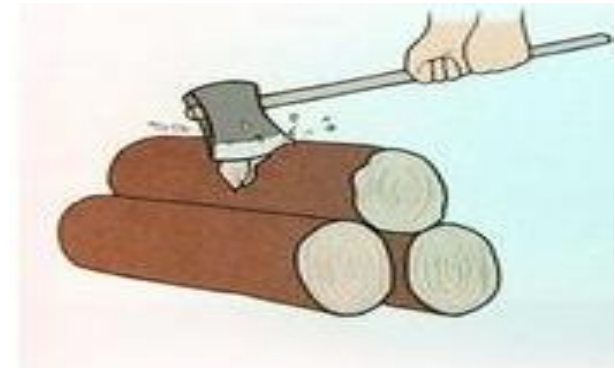
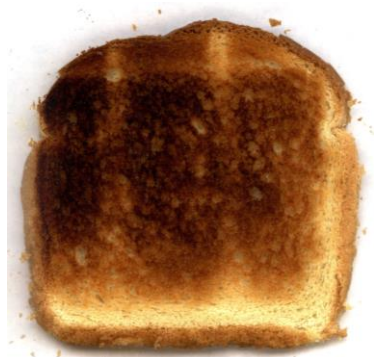
Process by which atoms or groups of atoms in substances are reorganized into different substances



Chemical reaction



Physical reaction





What type of substance change in the picture?

Rusting

- It is a compound called iron oxide (Fe_2O_3)
- It is formed when (O_2) in the air reacted with iron(Fe)



How do you know when a chemical reaction has taken place?

- Surface changing

Which of the following images indicates a **Physical change**? أي صورة مما يلي تشير إلى **تغير فيزيائي**؟



(A)



(B)



(C)



(D)

☐

(B) and (C)

(B) و (C) .a

☐

(D) and (C)

(C) و (D) .b

☐

(A) and (D)

(A) و (D) .c

☒

(B) and (D)

(B) و (D) .d

What does the image show?

- a. a covalent bond
- b. a physical property
- c. van der Waals forces
- ☒ d. a chemical reaction



In which of the following are bonds broken and new bonds formed?

- ☒ a. chemical reactions
- b. isotopes
- c. elements
- d. polar molecules

A chemical reaction is a process by which atoms or groups of atoms in substances are _____.

التفاعل الكيميائي هو عملية تقوم من خلالها الذرات أو مجموعات الذرات الموجودة في المواد _____.

- a.

بالذوبان في مواد أخرى
Dissolved in other substances
- b.

بالتأين عن طريق فقدان بروتونات
Ionized by the loss of protons
- c.

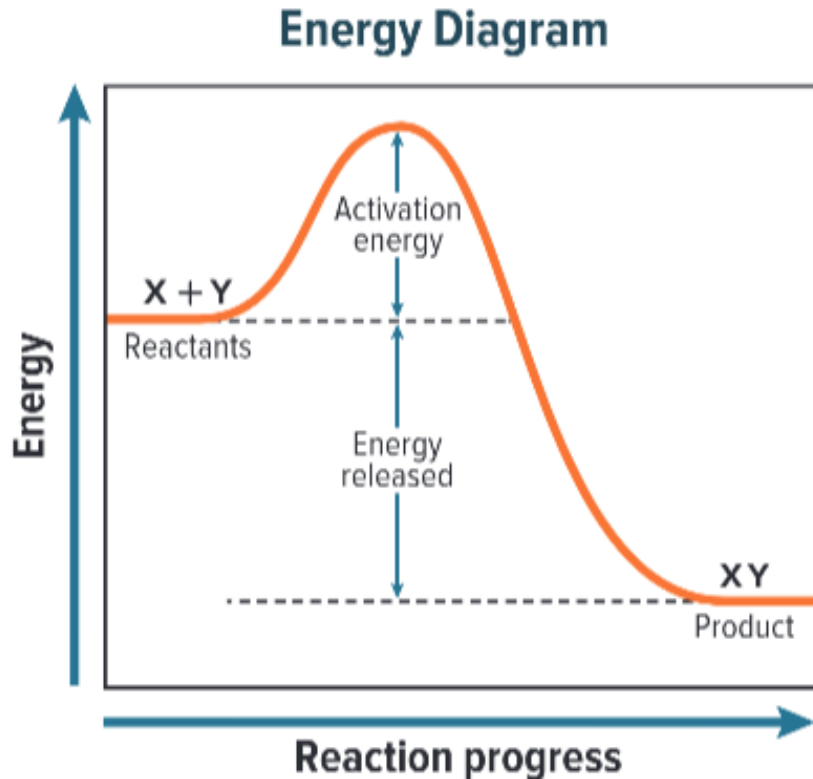
بالاندماج مع ذرات في مواد أخرى
Mixed together with atoms in other substances
- d.

بالتحول إلى مواد أخرى
Reorganized into different substances

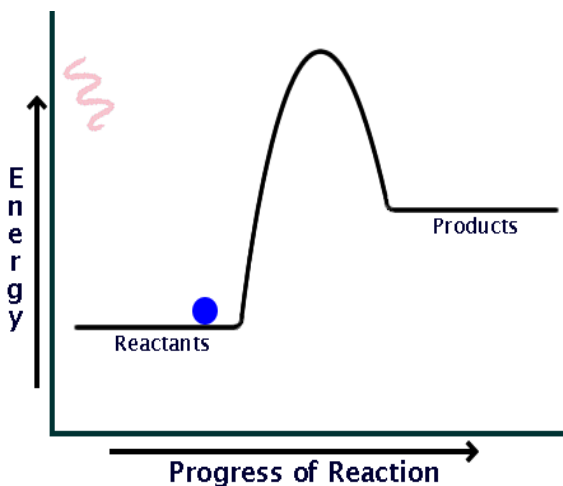
Activation energy

The **minimum amount** of energy needed for **reactants to form products** in a chemical reaction

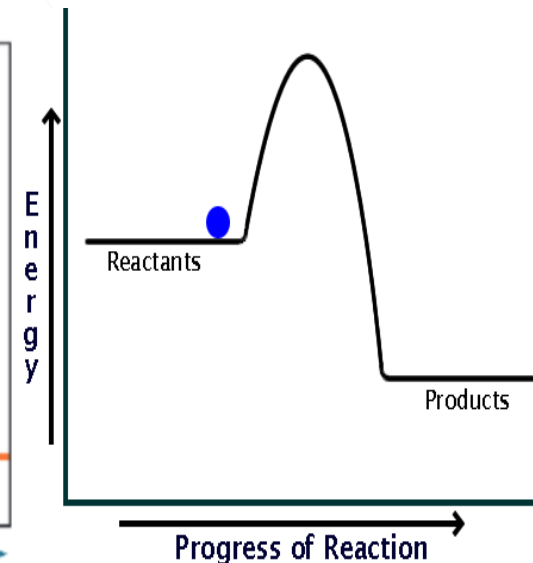
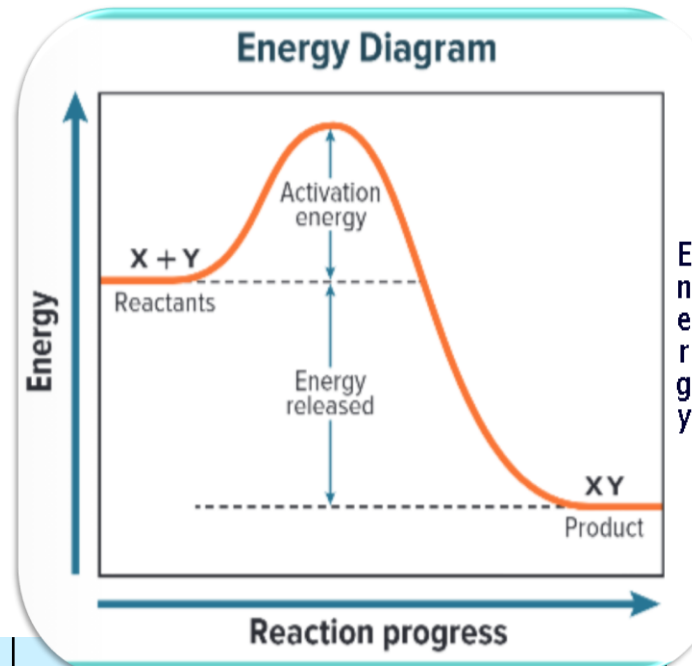
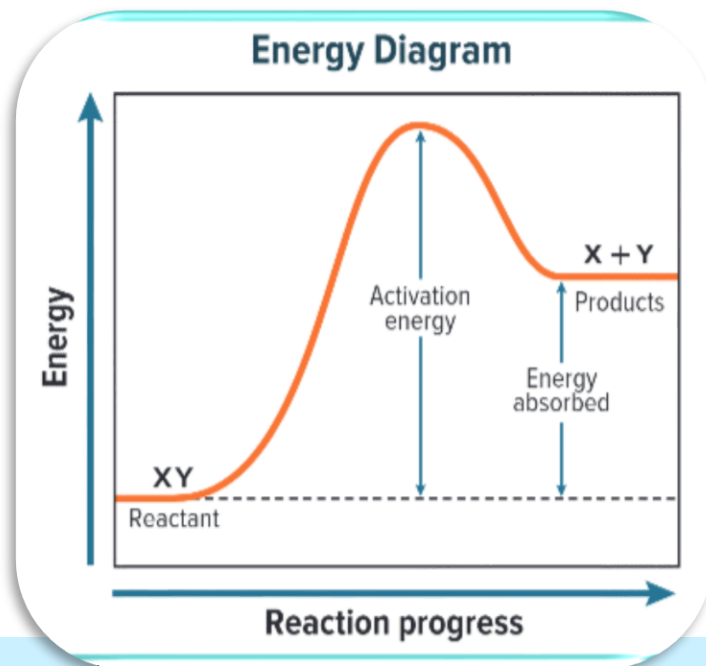
Energy Change in Chemical Reactions



- The flame of the match provides activation energy.
- The amount of energy needed to begin a reaction.
- The reaction gives off energy in the form of heat and light.

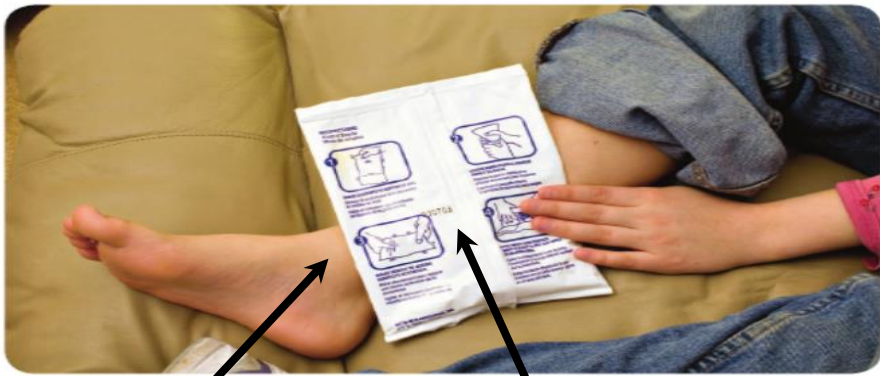


Absorbing energy



Releasing energy

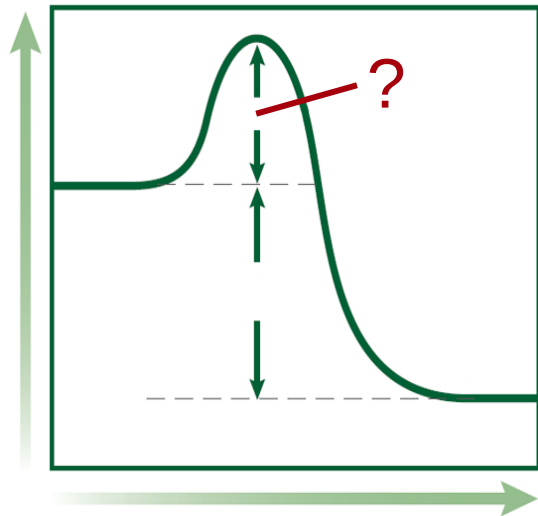
	Reaction	Reaction
(Require/ don't require) activation energy	Require	Require
The amount of activation energy	Higher	Lower
The amount of product energy and the amount of reactant energy	R :Lower. P :Higher	R :Higher. P :Lower
Type of reaction	Endothermic	Exothermic



Exothermic

Endothermic

Look at the following figure. Determine what the upward curve represents.



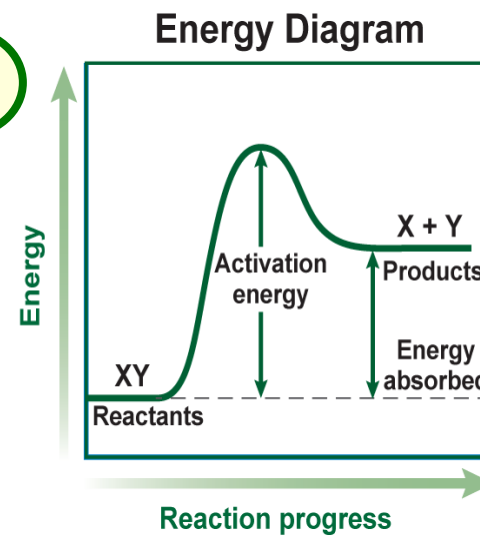
- A.** activation energy
- B.** reactants
- C.** products
- D.** enzymes

Which type of reactions keep our internal body temperature at about **37C** ?

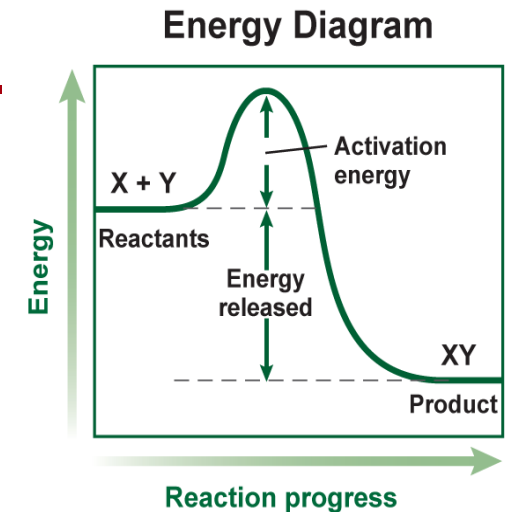
Exothermic

Which chemical reaction is endothermic?

A.



B.



What provides the energy for all living processes?

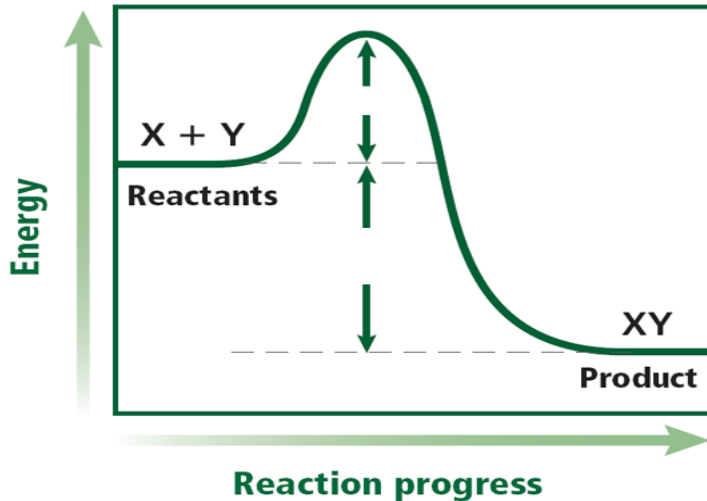
- ☒ A. chemical bonds
- ☐ B. ionic compounds
- ☐ C. radioactive isotopes
- ☐ D. van der Waals forces

Which is a chemical reaction?

- ☒ A. a match burning
- ☐ B. salt dissolving
- ☐ C. water boiling
- ☐ D. gasoline evaporating

What is true of this chemical reaction?

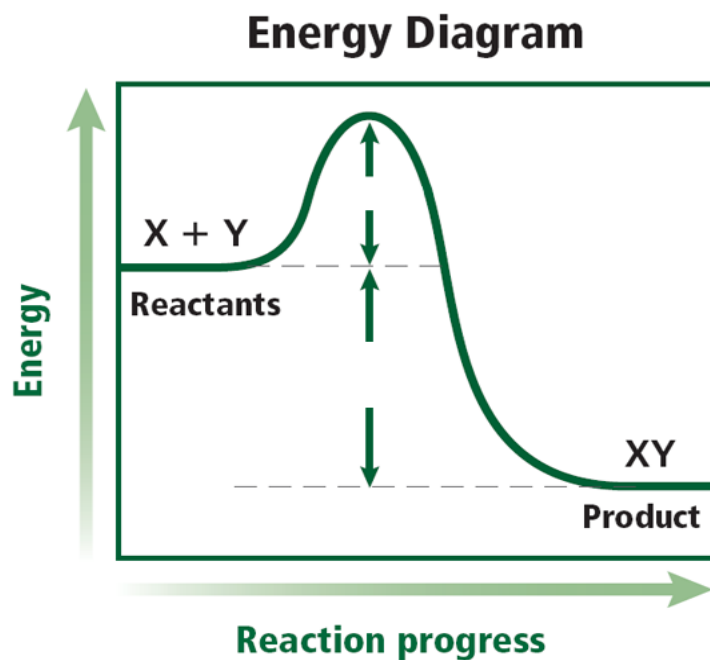
Energy Diagram



- ☐ A. Energy is not needed to start the chemical reaction.
- ☒ B. Heat and/or light energy are released in this reaction.
- ☐ C. The activation energy is greater than the energy released.
- ☐ D. The energy of the products and the reactants is the same.

Which of the following describes the reaction associated to the energy diagram below?

أي مما يلي يصف التفاعل المرتبط بمخطط الطاقة المبين في المخطط أدناه؟



- ☐ The energy of the products is less than the energy of the reactants so this reaction is exothermic

إن طاقة النواتج أقل من طاقة المتفاعلات لذا هذا التفاعل هو طارد للحرارة

.a

- ☒ The reaction requires activation energy, so it is endothermic

يحتاج هذا التفاعل طاقة تنشيط لذا هو ماص للحرارة

.b

- ☐ The reaction requires activation energy, so it is exothermic

يحتاج هذا التفاعل طاقة تنشيط لذا هو طارد للحرارة

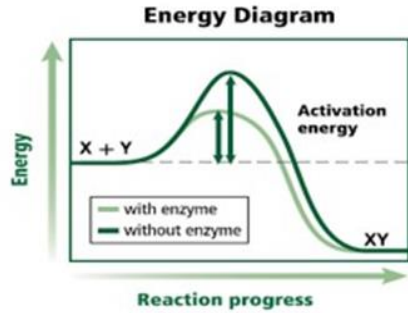
.c

- ☐ The energy of the products is less than the energy of the reactants so this reaction is endothermic

إن طاقة النواتج أقل من طاقة المتفاعلات لذا هذا التفاعل هو ماص للحرارة

.d

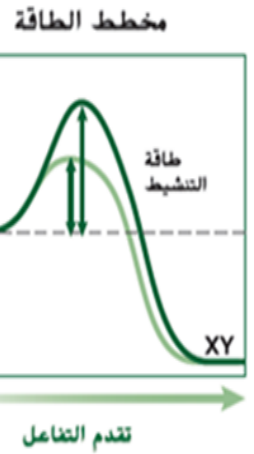
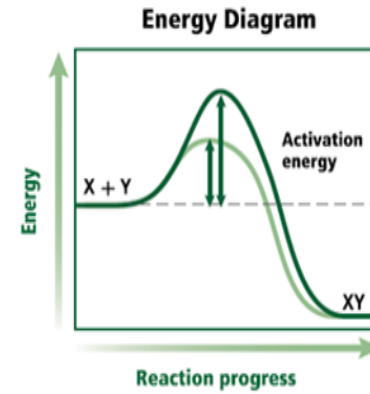
Based on the comparison of the reaction progress in the energy diagram below, which of the following describes the effect of the enzyme on a chemical reaction?



استناداً الى مقارنة سير التفاعل في مخطط الطاقة المبين أدناه، أي مما يلي يصف تأثير الإنزيم في التفاعل الكيميائي؟



Which of the following describes the reaction associated to the energy diagram below?



يزيد وجود الإنزيم طاقة التنشيط للتفاعل الكيميائي

a. The presence of enzyme increases the activation energy of a chemical reaction

يخفض وجود الإنزيم طاقة التنشيط للتفاعل الكيميائي

b. The presence of enzyme decreases the activation energy of a chemical reaction

لا يؤثر وجود الإنزيم على طاقة التنشيط للتفاعل الكيميائي

c. The presence of enzyme does not affect the activation energy of a chemical reaction

يخفض غياب الإنزيم طاقة التنشيط للتفاعل الكيميائي

d. The absence of enzyme decreases the activation energy of a chemical reaction

إن طاقة النواتج أقل من طاقة المتفاعلات لذا هذا التفاعل هو ماص للحرارة

a. The energy of the products is less than the energy of the reactants so this reaction is endothermic

يحتاج هذا التفاعل طاقة تنشيط لذا هو ماص للحرارة

b. The reaction requires activation energy so it is endothermic

يحتاج هذا التفاعل طاقة تنشيط لذا هو طارد للحرارة

c. The reaction requires activation energy so it is exothermic

إن طاقة النواتج أقل من طاقة المتفاعلات لذا هذا التفاعل هو طارد للحرارة

d. The energy of the products is less than the energy of the reactants so this reaction is exothermic

A catalyst is a substance that **lowers** the activation energy needed to **start** a chemical reaction

Biological
catalyst

Enzymes

Properties

- It **doesn't** increase how much product is made
- It **doesn't** get used up in the reaction
- It **can** be used again
- each enzymes are** specific to one reaction (**amylase**)

It is **Special proteins**

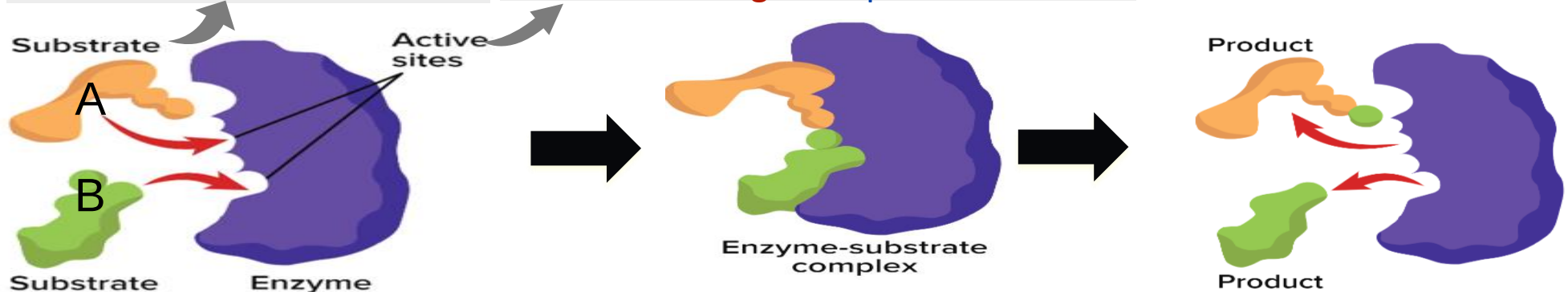
Functions

- Lowers** the activation energy needed to start a chemical reactions
- Speed up** the rate of chemical reactions

How
enzymes
work?

Substrate: The Reactants that **bind** to the enzyme

Active site **changes** shape and form:



From the figure :

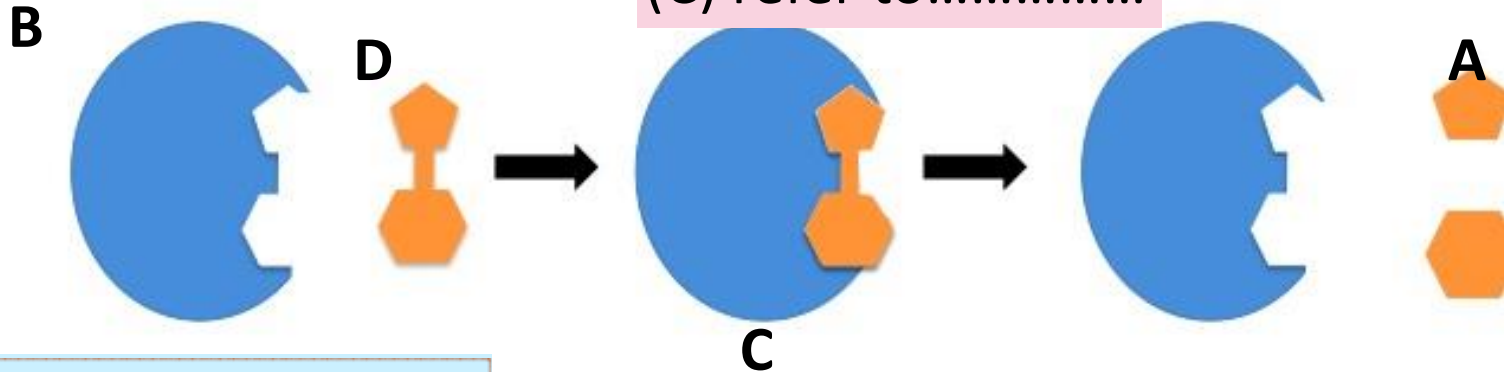
Answer the following questions

(A) refer to.....

(B) refer to.....

(C) refer to.....

(D) refer to.....



Q2: Complete each sentence

1-.....**substrates**.....are the reactants that bind to the enzyme in specific location called...**Active site**

2-The active site changes shape and form the...**Enzyme-substrate complex**

3-This complex helps chemical bonds in the reactants to be.....**broken**.....and new bonds to ...**products**.....

(The **substrate** react to form.....**substrates**.....)

4-The enzyme then releases the...**products**.....

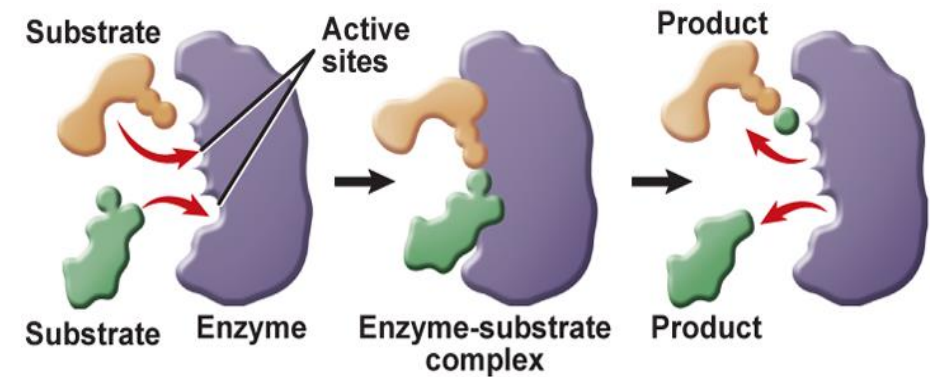
Identify the proteins that speed up the rate of chemical reactions.

- A. substrates
- ☒ B. enzymes
- C. ions
- D. reactants

How does an enzyme increase the rate of a chemical reaction?

- A. It acts as a reactant.
- B. It reduces the amount of heat produced.
- C. It increases the amount of product.
- ☒ D. It lowers the activation energy.

What occurs at the active site in the enzyme substrate complex?



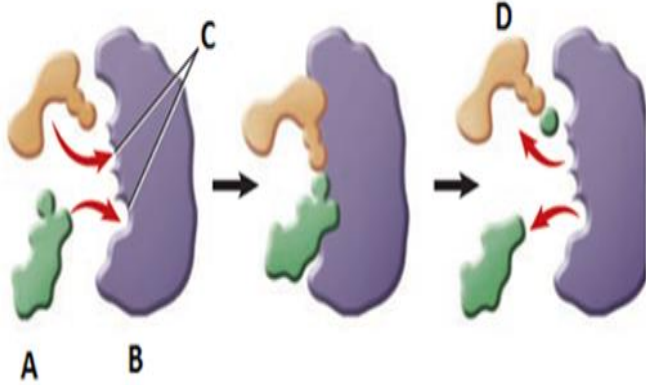
- A. An exothermic chemical reaction takes place.
- ☒ B. Chemical bonds are broken and new bonds are formed.
- C. The enzyme gets used up in the reaction.
- D. The substrates provide energy for the enzyme.

The figure below shows enzyme mechanism of action, study it and answer the question:

الشكل أدناه، يبين آلية عمل الإنزيم، أدرسه ثم أجب عن السؤال:

ما التركيب المشار إليه بالحرف (D)؟

What structure is indicated by the letter (C)?



☒

Active sites

a. المواقع النشطة

☐

Enzyme-substrate complex

b. معقد الإنزيم-المادة المتفاعلة

☒

Product

c. الناتج

☐

Substrate

d. المادة المتفاعلة

Which of the following is not a characteristic of enzymes?

أي مما يلي ليس من خصائص الإنزيمات؟

a.

Not consumed in the reaction لا تستهلك في التفاعل

b.

Speed up a chemical reaction تزيد سرعة التفاعل

c.

Specific to one reaction يختص كل منها في تفاعل واحد

d.

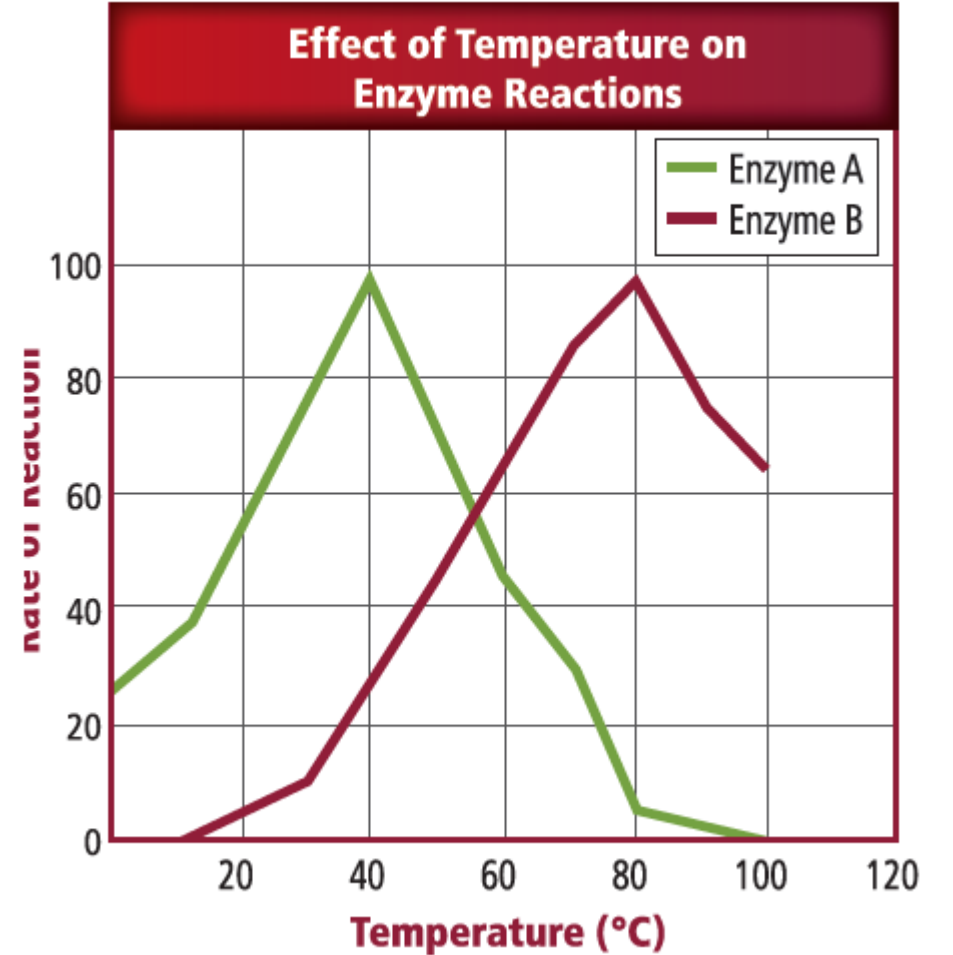
Cannot be used again لا يمكن استخدامها مرة أخرى

24. Which enzyme is more active in a human cell? Why?

ما الإنزيم الأكثر نشاطا في الخلية البشرية؟ لماذا

Enzyme A would be more active in a living cell because the maximal activity is around 37°C. State the relationship between the terms in each pair.

سيكون الإنزيم A أكثر نشاطا في الخلية الحية لأن النشاط الأقصى يبلغ حوالي 37 درجة مئوية





mixtures

Combination of two or more substances
in which each substance retains its
individual characteristics and properties



Homogeneous mixtures

-When a mixture has a
uniform composition
throughout

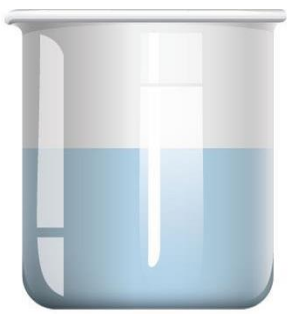
-**A solution** is another name
for a homogeneous mixture.
The water retains its
properties and



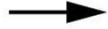
Heterogeneous mixtures

-The components remain
distinct, that is, you can tell
what they are individually.
-2 type: **Suspension**
Colloids





+



Substance in which
another substance
is dissolved **Solvent**

Substance that is
dissolved in the
solvent **Solute**

Uniform
Composition **Solution**

Homogeneous
mixtures



Solvent= Water
Solute= Salt



Solvent= Water
Solute= powder substance



saliva
Solution contains
water , protein
and salt



Air you
breathe
Solution of gases



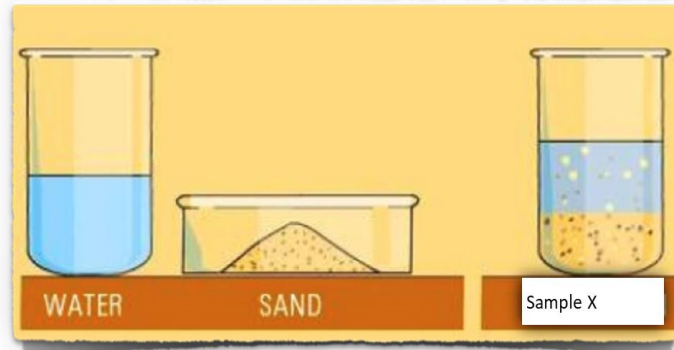
+



Distinct Composition

Heterogeneous mixtures

Types



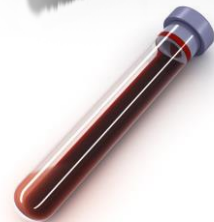
Suspension

The particles settle to the bottom



Colloids

The particles don't settle to the bottom

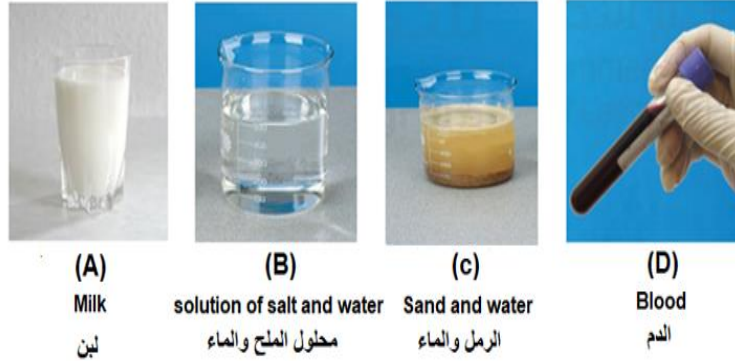


fog, smoke, butter, mayonnaise, milk, paint, and ink. Blood is a colloid made up of plasma, cells, and other substances



The figure below shows different types of mixtures, study it and then answers the following question:

Which letter of the following indicates a heterogeneous mixture (suspension)?



الشكل أدناه يبين أنواع مختلفة من المخاليط، تمعنه ثم أجب عن السؤال:
أي حرف مما يلي يشير إلى خليط غير متجانس (معلق)؟

- ☐ (B) .a
- ☐ (D) .b
- ☐ (A) .c
- ☒ (C) .d

الخليط في الصورة المجاورة تنطبق عليه كل العبارات ما عدا

- a. Homogeneous mixture مخلوط متجانس
- b. colloid is a heterogeneous الغرواني غير متجانس
- c. solution محلول



Which of these is not a characteristic of a solution? أي من هذه

ليست سمة من سمات المحلول؟

- A) substances retain properties المواد تحتفظ بخصائصها
- B) homogenous mixture forms أشكال خليط متجانسة
- C) there is uniform composition هناك تكوين موحد
- D) substances change properties المواد تغير خصائصها

Which of the following is an example of a solute?

أي مما يلي يُعدّ مثلاً للمذاب؟

- a.

التربة العالقة في الماء

Soil suspended in water

☐
- b.

الماء الذي يذيب الملح

Water that dissolves salt

☐
- c.

الماء الذي يحتوي على تربة غير مذابة

Water with undissolved soil

☐
- d.

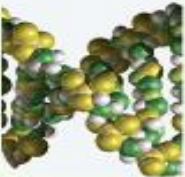
السكر المذاب في الماء

Sugar that is dissolved in water

☒

Table 1

Biological Macromolecules

Group	Example	Function
Carbohydrates	 Bread and grains	• Store energy • Provide structural support
Lipids	 Bees' wax	• Store energy • Provide barriers
Proteins	 Hemoglobin	• Transport substances • Speed reactions • Provide structural support • Make hormones
Nucleic acids	 DNA	• Store and communicate genetic information

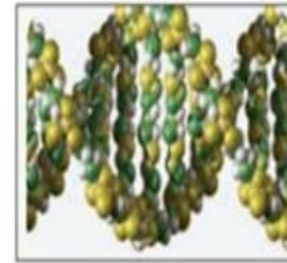
Which of the following macromolecules is responsible for energy storage?

أي من المركبات التالية مسئول عن تخزين الطاقة؟
هـرمونات- الدعم-كل وظائف - أنزيمات

المعلومات الوراثية

الطاقة- الدعم

الطاقة/العزل



(A)

الأحماض النووية
Nucleic acids



(B)

الكربوهيدرات
Carbohydrates



(C)

الدهون
Lipids



(D)

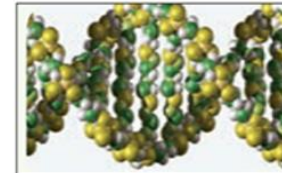
البروتينات
Proteins

The figure below shows examples of biological macromolecules:

الشكل الوارد أدناه يبين أمثلة على الجزيئات الضخمة الحيوية:

Which of the following macromolecules is responsible for Providing structural support?

أي من المركبات التالية مسئول عن توفير الدعم الهيكلي؟



(A)

الأحماض النووية
Nucleic acids



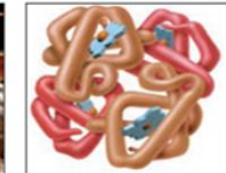
(B)

الكربوهيدرات
Carbohydrates



(C)

الدهون
Lipids



(D)

البروتينات
Proteins

☐

(B) and (D)

(D) و (B)

.a

☐

(A) and (B)

(B) و (A)

.b

☒

(A) and (D)

(D) و (A)

.c

☐

(D) and (C)

(C) و (D)

.d

Which of the following is a function of proteins? أي مما يلي يعتبر من وظائف البروتينات؟

- a. Store and communicate genetic information تخزين المعلومات الوراثية ونقلها
- b. Provide barriers توفير حواجز
- c. Store energy تخزين الطاقة
- d. Make some hormones تكون بعض الهرمونات

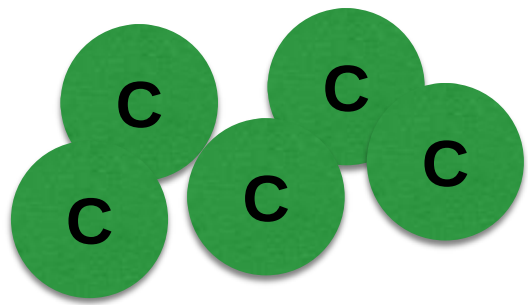
Which macromolecule is involved in nearly every function in the human body? ما الجزيء الضخم الذي يدخل في كل وظائف جسم الإنسان تقريباً؟

Which macromolecule stores energy for an organism?

ما الجزيء الضخم الذي يخزن الطاقة للكائن الحي؟

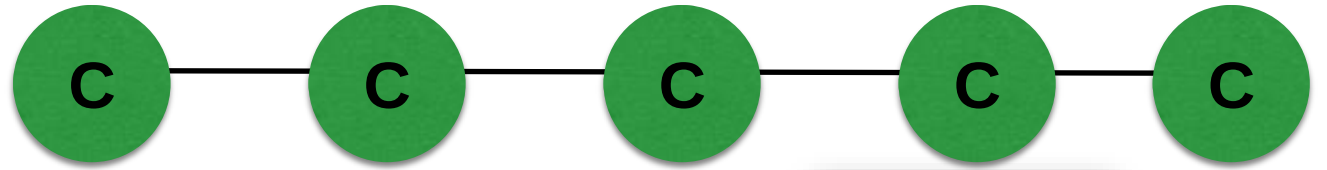
- a. Carbohydrate الكربوهيدرات
- b. Nucleotide النيوكليوتيد
- c. Protein البروتين
- d. Lipid الدهون

- a. Carbohydrate الكربوهيدرات
- b. Lipid الدهون
- c. Nucleotide النيوكليوتيد
- d. Protein البروتين



Carbon atoms

Can be Joined to form



molecules

small
molecules



= Large molecules

Monomers

Small molecules
are linked together
by covalent bonds

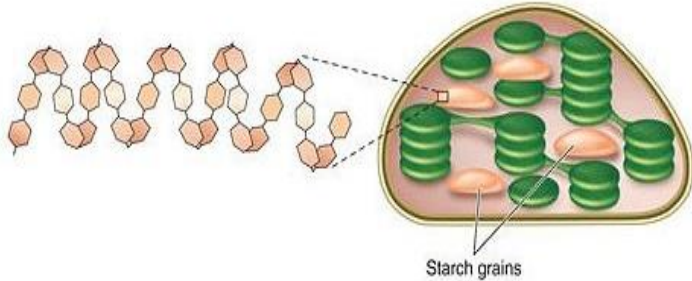
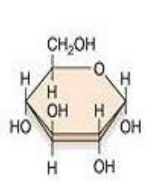
Linked together by
Covalent bonds

Macromolecules

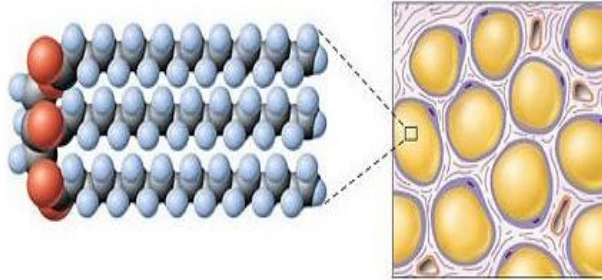
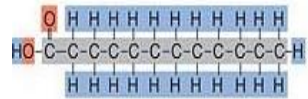
=
Polymers

Large molecules
formed
from repeating
monomers

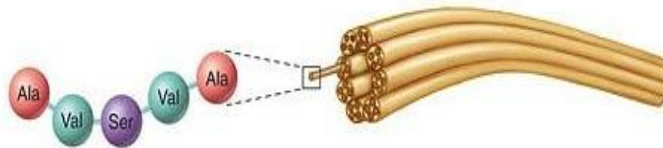
Biological macromolecules are organized into 4 major categories



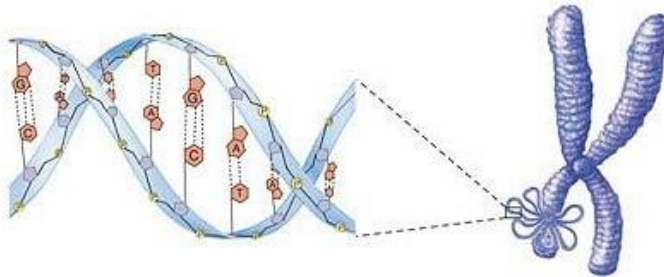
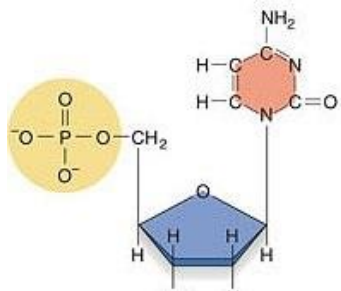
Carbohydrates



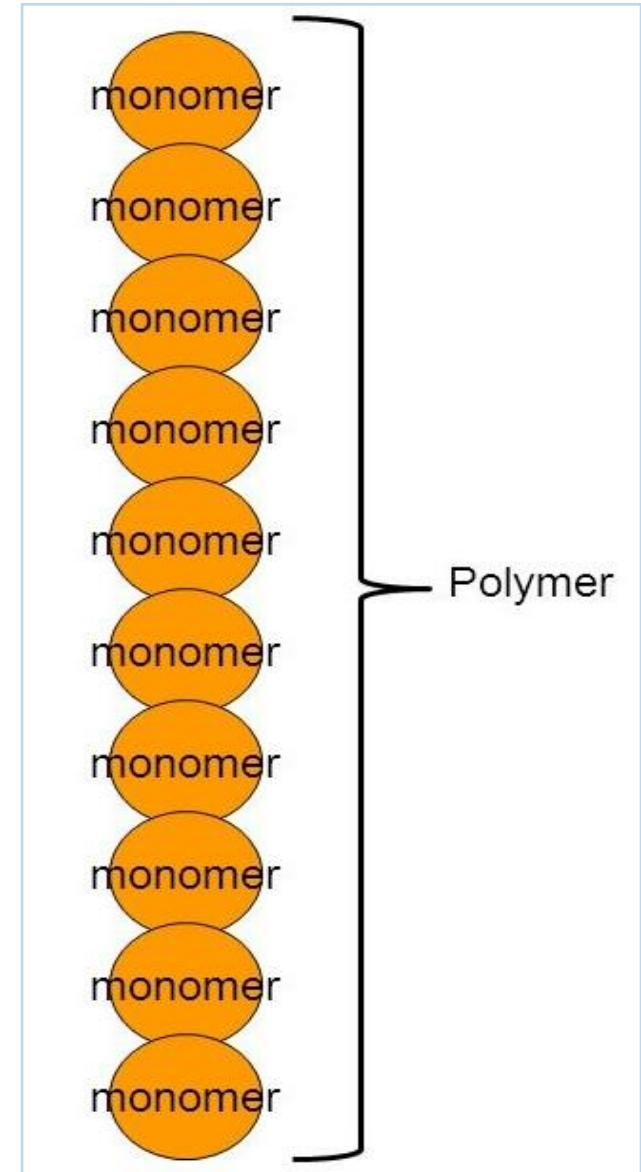
Lipids



Proteins



Nucleic acids



Polymers

Carbohydrates

monomer is



Glucose

Lipids

monomer is



Fatty Acid

Proteins

monomer is



Amino Acid

Nucleic Acids

monomer is



Nucleotides

Which substance would be extensively studied during a college organic chemistry course?

أي من المواد التالية ستُدرس بشكل مفصّل أثناء مقرر الكيمياء العضوية في الجامعة؟

- a. Oxygen الأوكسجين
- b. Sodium الصوديوم
- c. Water الماء
- d. Glucose الجلوكوز

An organic compound is a compound that essentially contains:

المركّب العضوي هو مركّب يحتوي أساساً على:

- a. Sodium الصوديوم
- b. Oxygen الأوكسجين
- c. Carbon الكربون
- d. Hydrogen الهيدروجين

Carbohydrates are compounds composed of **carbon, hydrogen and oxygen** in a ratio of **1:2:1**

General formula



The number of (CH_2O) units in a chain

Carbohydrates with Value of **n** ranging from 3 to 7 called: **simple sugars or monosaccharides**

Types

Carbohydrates

Monosaccharides (simple sugars)



Glucose

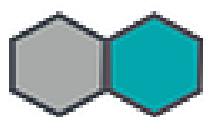


Fructose

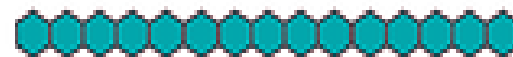
disaccharide



Sucrose
(Table sugar)



Lactose
(Milk sugar)

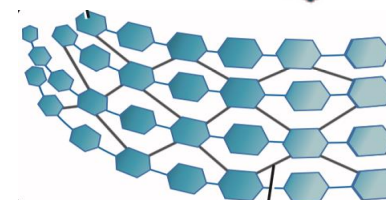


Polysaccharides

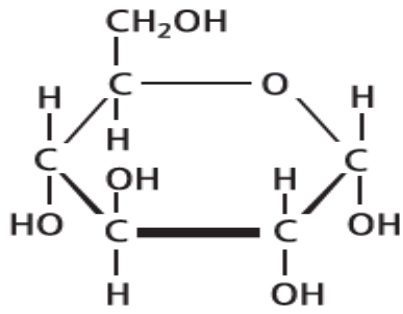
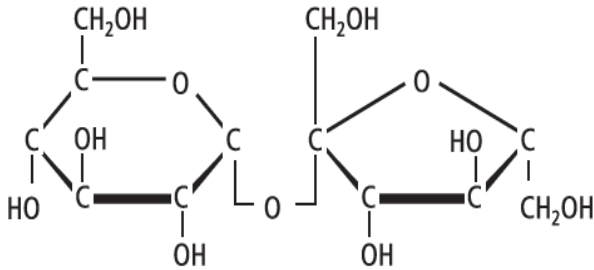
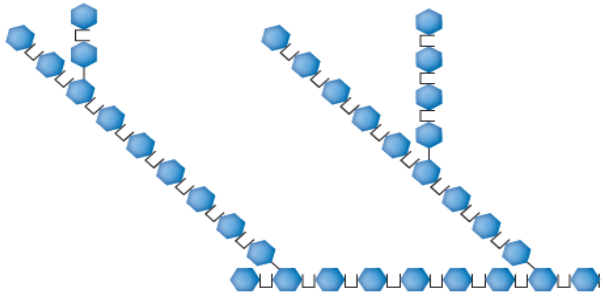
Glycogen

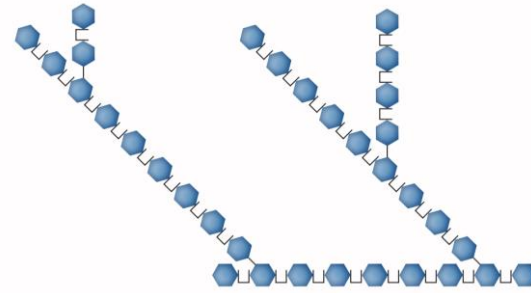
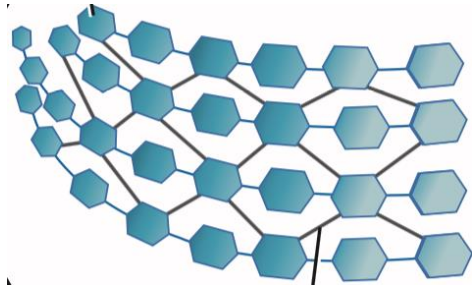


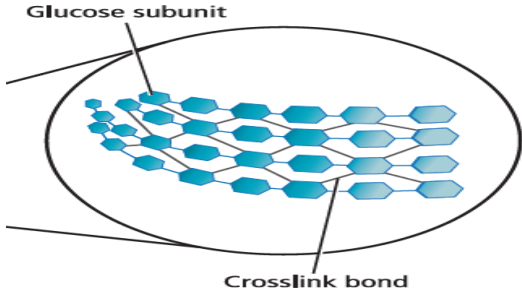
Cellulose



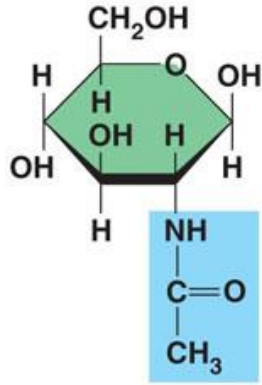
Carbohydrates الكربوهيدرات

	 Glucose (monosaccharide)	 Sucrose (disaccharide)	 Glycogen (polysaccharide)
Example	Glucose Fructose	Sucrose Lactose	Glycogen Cellulose
Function	energy source	energy source	energy storage



Name of structure	Cellulose	Glycogen
Monomer	Glucose	Glucose
Polymer	Carbohydrates	Carbohydrates
appearance (shape)	Chains of glucose with cross link bond(tough fibers)	Branched polysaccharide of glucose
Function	Structure support in cell walls -Chains of glucose Linked together by Crosslink bond to form cellulose  The diagram shows a glucose subunit (blue hexagon) within a cellulose structure. It is labeled 'Glucose subunit' and 'Crosslink bond'.	Energy storage -When body needs energy (between meals or physical activity) it will broken down in to glucose - Gglucose stored in liver and muscle in form of glycogen

Polysaccharides



Nitrogen-containing polysaccharide

Chitin



Lobsters

Hard outer shells of



Shrimp

Hard outer shells of



Fungi

Cell walls of some



Insects

Hard outer shells of

Which of the following is a **disaccharide** composed?

أي مما يلي مركب ثنائي السكر؟

Glucose

الجلوكوز

.a

Glycogen

الجليكوجين

.b

Cellulose

السليولوز

.c

Sucrose

السكروز

.d

Which polysaccharide stores energy in muscle and liver tissue?

A. gluten

B. glycogen

C. starch

D. sucrolose

ما القواسم المشتركة بين السليلوز والكيتين? What do cellulose and chitin have in common?

- A. They are energy-storing polymers.. إنها بوليمرات لتخزين الطاقة
- B. They are found in the cells of animals.. تم العثور عليها في خلايا الحيوانات
- ☒ C. They are structural polysaccharides. من السكريات المتعددة .
- D. They are composed of repeating sucrose units. وهي تتألف من وحدات السكروز المتكررة

Which of the following is a polysaccharide?

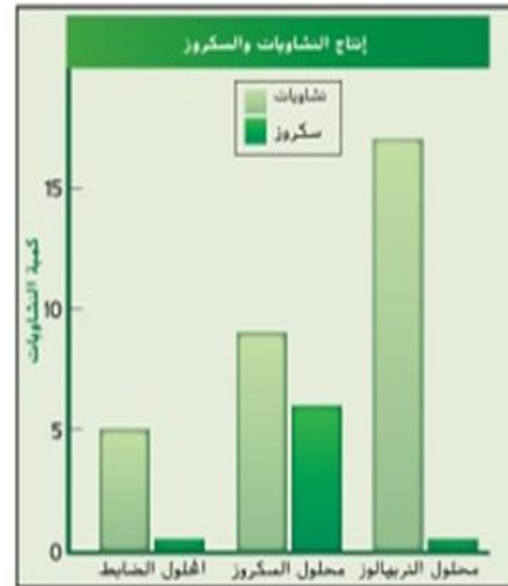
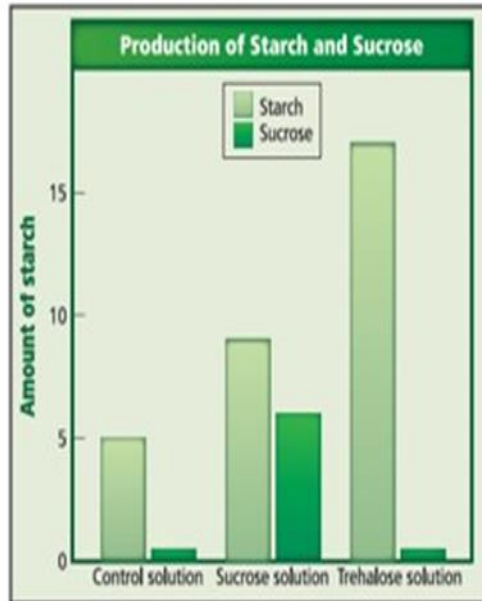
أي مما يلي من عديدات التسكر؟

- | | | | |
|----------------------------------|----------|----|------------|
| ☐ | Sucrose | .a | السكروز |
| ☐ | Glucose | .b | الجلوكوز |
| ☐ | Fructose | .c | الفركتوز |
| ☒ | Glycogen | .d | الجليكوجين |

Starch is the major carbon storehouse in plants.

Experiments were performed to determine if trehalose might regulate starch production in plants. Leaf disks were incubated for three hours in sorbitol (control), sucrose, and trehalose solutions. Then, levels of starch and sucrose in the leaves were measured.

Which of the following conclusions might the researcher have reached based on these data?



تعدّ النشويات مخزن الكربون الأساسي في النباتات. وأجريت تجارب لتحديد ما إذا كان باستطاعة التريهالوز تنظيم إنتاج النشويات في النباتات. حُفظت شرائح من أوراق النبات لمدة ثلاث ساعات في محاليل السوربيتول (الضابط) والسكروز والتريهالوز. ثم تم قياس مستويات النشويات والسكروز في الأوراق. أي من الاستنتاجات التالية قد يتوصل إليها الباحثون بناءً على هذه البيانات؟

يخفض محلول السكروز إنتاج النشا في الأوراق ويزيد إنتاج السكروز

Sucrose solution decreases starch production in leaves and increases sucrose production

يزيد محلول التريهالوز إنتاج النشا في الأوراق ويخفض إنتاج السكروز بصورة كلية تقريباً

Trehalose solution increases starch production in leaves and decreases sucrose production almost entirely

يزيد محلول التريهالوز إنتاج النشا وإنتاج السكروز في الأوراق

Trehalose solution increases starch production and sucrose production in leaves

تنتج الأوراق دائماً كمية من النشا أقل من السكروز في المحاليل الثلاثة

Leaves always showed less starch than sucrose in all three solutions

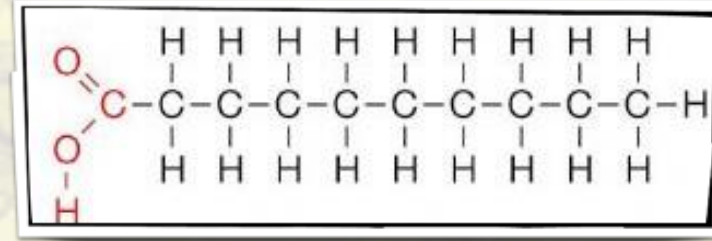
Lipids

made mostly of :

O

H

C



that make up the: **Fats-Oils-Waxes**

Lipid composition

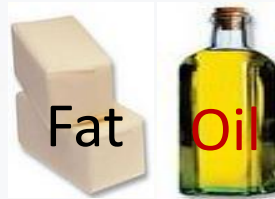
Fatty acid

Glycerol

Other components

Functions

Triglyceride



1-Store energy (Fat cells of the body)

Waxes



2-Prevent water loss (Coated the leaves of tree)

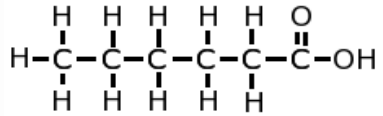
Beeswax



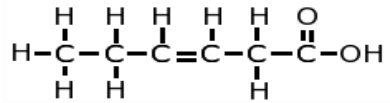
3-Made honeycomb (beehive)

Lipids Types

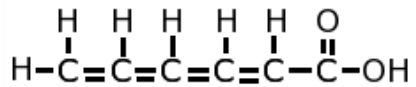
1-Saturated and unsaturated fats



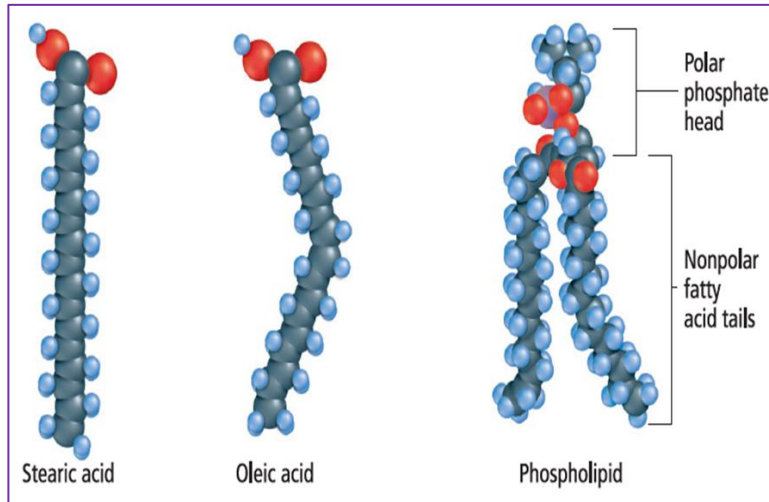
- Saturated fats
- No more hydrogens can bond to the tail



- Unsaturated fats
- can accommodate at least one more Hydrogen

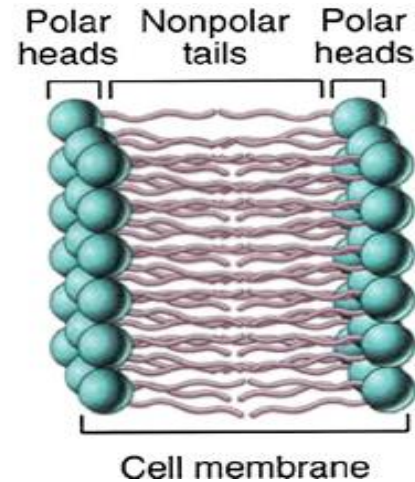


- Polyunsaturated
- can accommodate at least one more Hydrogen



2-phospholipids

- Serve as barriers in biological membrane



3-Steroids

- Include hormones and cholesterol
- It provides the starting point for other necessary lipids such as : vitamin D and Hormones (estrogen and testosterone)

- Fatty acids tails It is the basic structure of a lipid.
- Stearic acid has no double bonds between carbon atoms.
- oleic acid has one double bond.
- Phospholipids have a polar head and two nonpolar tails.

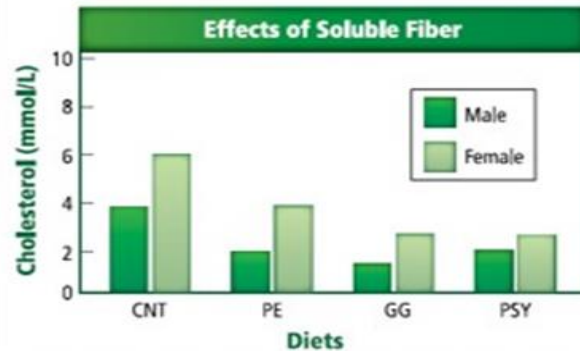
High amount of cholesterol in the blood are associated with the development of heart disease.

In order to study the effects of soluble fiber in the diet on cholesterol, the researchers have done an experiment where they evaluated the effects of three soluble fibers on cholesterol levels in the blood: Pectin (PE), guar gum (GG), and psyllium (PSY).

Based on the data, which of the following describes the effect that soluble fiber appears to have on cholesterol levels in the blood?

Effects of three soluble fibers on cholesterol levels in the blood: Pectin (PE), guar gum (GG), and psyllium (PSY).

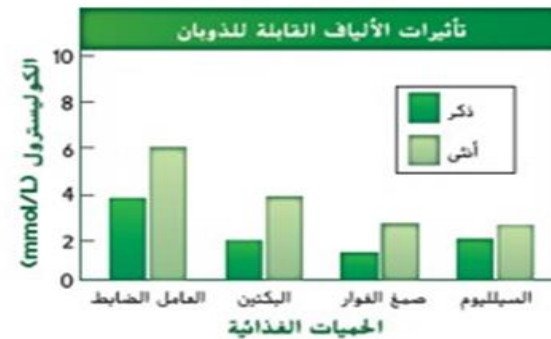
Based on the data, which of the following describes the effect that soluble fiber appears to have on cholesterol levels in the blood?



يرتبط ارتفاع نسبة الكوليسترول في الدم بالإصابة بأمراض القلب.

يهدف دراسة تأثيرات الألياف القابلة للذوبان التي ينطوي عليها النظام الغذائي في مستويات الكوليسترول، قام العلماء بإجراء تجربة قيموا من خلالها تأثيرات ثلاث أنواع من الألياف القابلة للذوبان في مستويات الكوليسترول في الدم وهي: البكتين (PE) وصمغ الغوار (GG) والسيلليوم (PSY). وكان السيلليوز العامل الضابط (CNT). استناداً إلى البيانات، أي مما يلي يصف التأثيرات الظاهرة للألياف القابلة للذوبان في مستويات

في مستويات الكوليسترول في الدم وهي: البكتين (PE) وصمغ الغوار (GG) والسيلليوم (PSY). وكان السيلليوز العامل الضابط (CNT). استناداً إلى البيانات، أي مما يلي يصف التأثيرات الظاهرة للألياف القابلة للذوبان في مستويات الكوليسترول في الدم؟



تخفض الألياف القابلة للذوبان مستويات الكوليسترول عند الذكور والإناث

a. Soluble fiber appears to lower cholesterol levels in males and females

تزيد الألياف القابلة للذوبان مستويات الكوليسترول عند الذكور والإناث

b. Soluble fiber appears to increase cholesterol levels in males and females

لا يؤثر النظام الغذائي على مستوى الكوليسترول في الدم

c. The diet doesn't affect the level of cholesterol in the blood

تخفض الألياف القابلة للذوبان مستويات الكوليسترول عند الذكور فقط

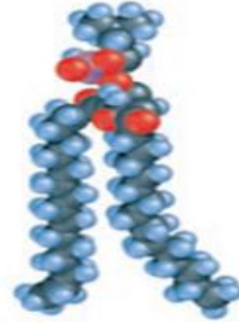
d. Soluble fiber appears to lower cholesterol levels only in males

The figure below shows three different fats structures.

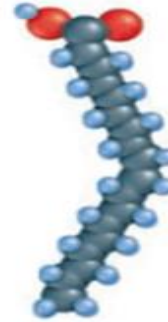
Which of the following distinguishes **phospholipids** from other types of fats?

الشكل أدناه يوضح الهيكل الجزيئي لثلاثة مركبات دهنية.

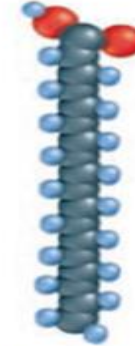
أي مما يلي يميز **الدهون الفسفورية** عن غيرها من أنواع الدهون؟



الدهون الفسفورية
Phospholipid



حمض الزيتيك
Oleic acid



حمض السيتريك
Stearic acid

☐ It has a polar head, and one nonpolar tail end

a. لها رأس قطبي ونهاية غير قطبية واحدة

☐ It has a nonpolar head, and two polar tails ends

b. لها رأس غير قطبي ونهايتين قطبيتين

☐ It has a nonpolar head, and two polar tails ends

c. لها رأس غير قطبي ونهايتين قطبيتين

☒ It has a polar head, and two nonpolar tails ends

d. لها رأس قطبي ونهايتين غير قطبيتين

What are fats, oils, and waxes composed of?

- ☒ A. lipids
- ☐ B. nucleotides
- ☐ C. polypeptides
- ☐ D. sugars

Which is a characteristic of all lipids?

- ☐ A. They are saturated triglycerides.
- ☒ B. They do not dissolve in water.
- ☐ C. They are liquid at room temperature.
- ☐ D. They store less energy than carbohydrates.

Proteins

made mostly of :

S

N

O

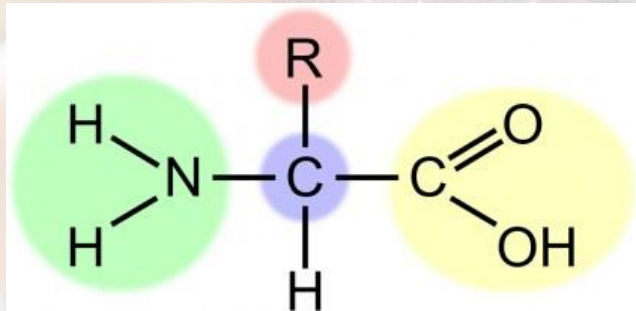
H

C

make up about ...15%...of total body mass

The monomer is Amino acids= 20

Structure



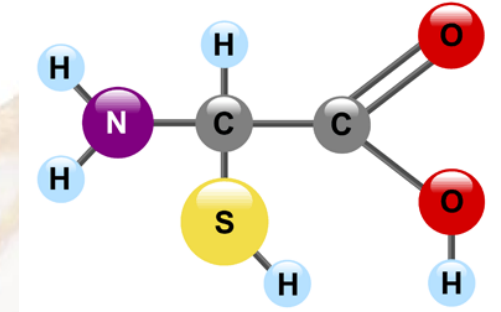
One bonds
With H atom

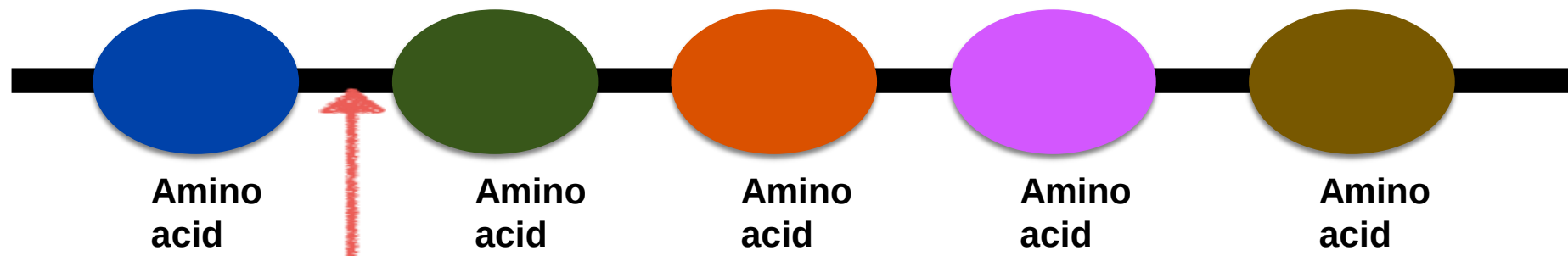
Three bonds
With groups

amino groups(-NH₂)

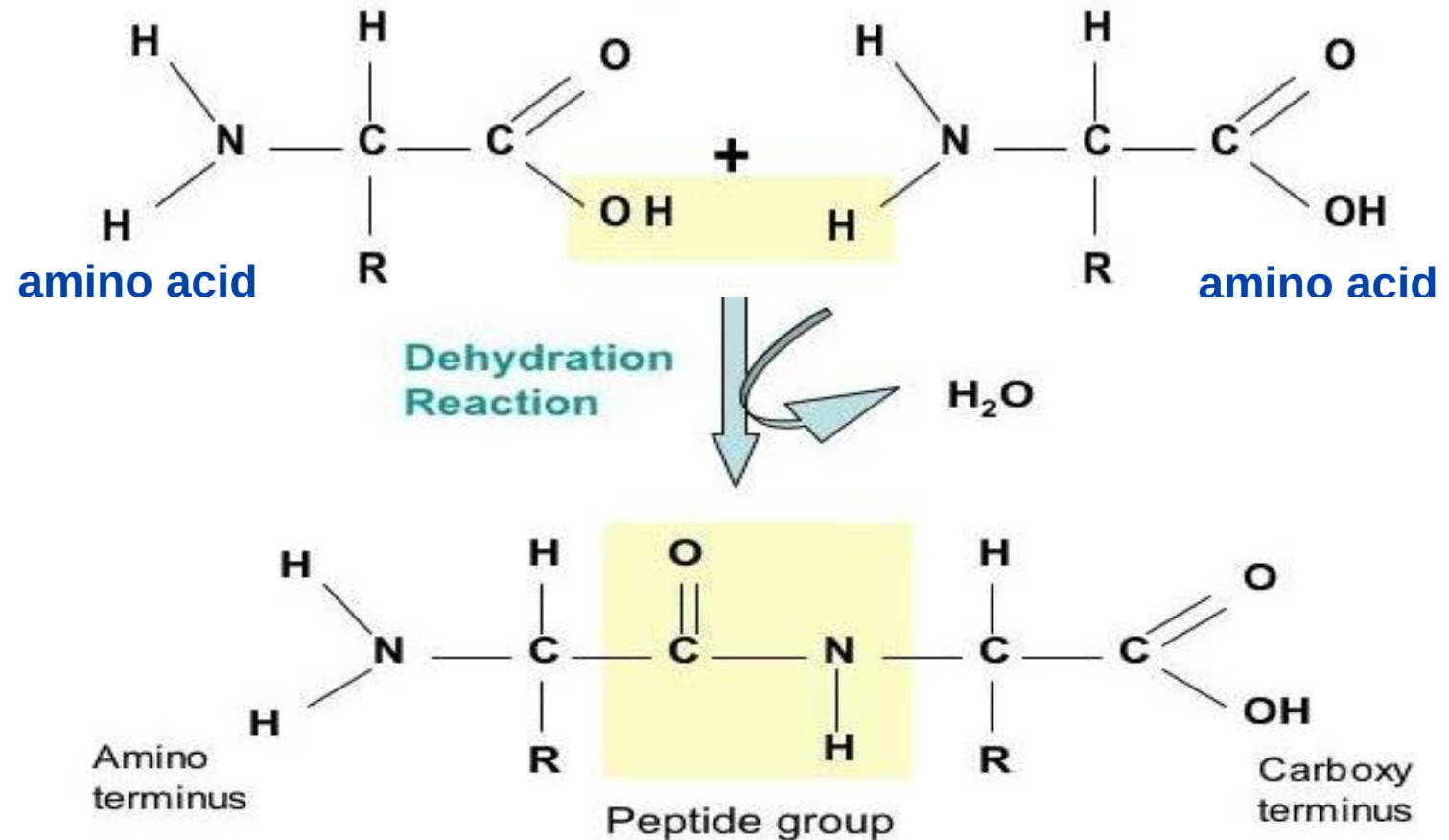
a carboxyl groups(-COOH)

a variable groups(-R)



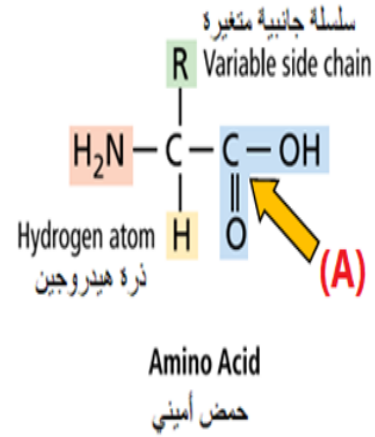


peptides bond **Form between** one amino acid and other amino acid



The figure below shows the structure of an amino acid.

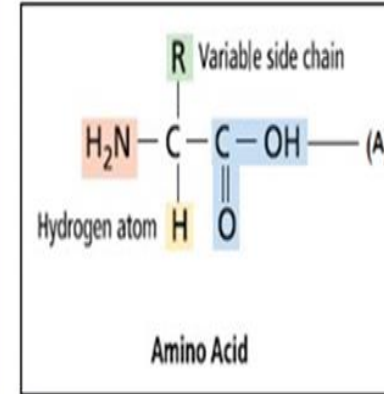
Which of the following does the letter (A) refer to?



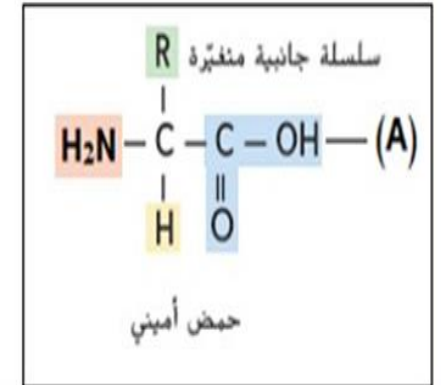
الشكل أدناه يوضح تركيب الحمض الأميني.

أي مما يلي يشير إليه الحرف (A)؟

In the figure below, the letter (A) indicates:



في الشكل أدناه يشير الحرف (A) إلى:



☒ Carboxyl group

مجموعة كربوكسيل

☐ Phosphate group

مجموعة فوسفاتية

☐ Amino group

مجموعة أمينية

☐ Hydroxide group

مجموعة هيدروكسيد

a. Hydroxide group مجموعة هيدروكسيد

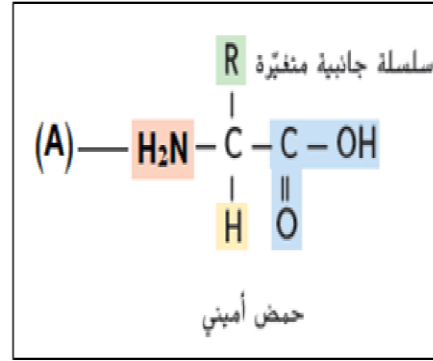
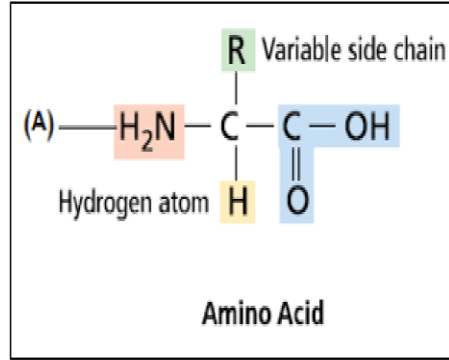
b. phosphate group مجموعة فوسفاتية

c. Amino group مجموعة أمينية

d. Carboxyl group مجموعة كربوكسيل

In the figure below, the letter(A) indicates:

في الشكل أدناه يشير الحرف (A) إلى:



a. Hydroxide group مجموعة هيدروكسيد

b. phosphate group مجموعة فوسفاتية

c. Carboxyl group مجموعة كربوكسيل

d. Amino group مجموعة أمينية

Which two elements are always found in amino acids?

ما العنصران اللذان يتواجدان دائماً في الأحماض الأمينية؟

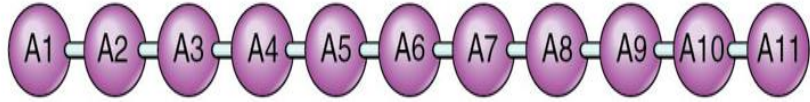
a. Nitrogen and sulfur النيتروجين والكبريت

b. Carbon and oxygen الكربون والأكسجين

c. Hydrogen and phosphorus الهيدروجين والفسفور

d. Sulfur and oxygen الكبريت والأكسجين

Levels of proteins structure organization

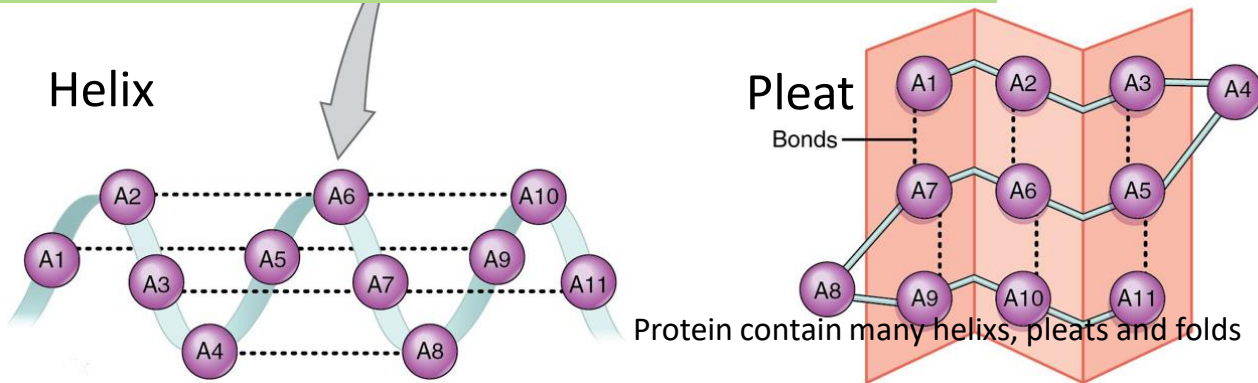


Chain of amino acids

Primary structure

Number of amino acids Order of joining together

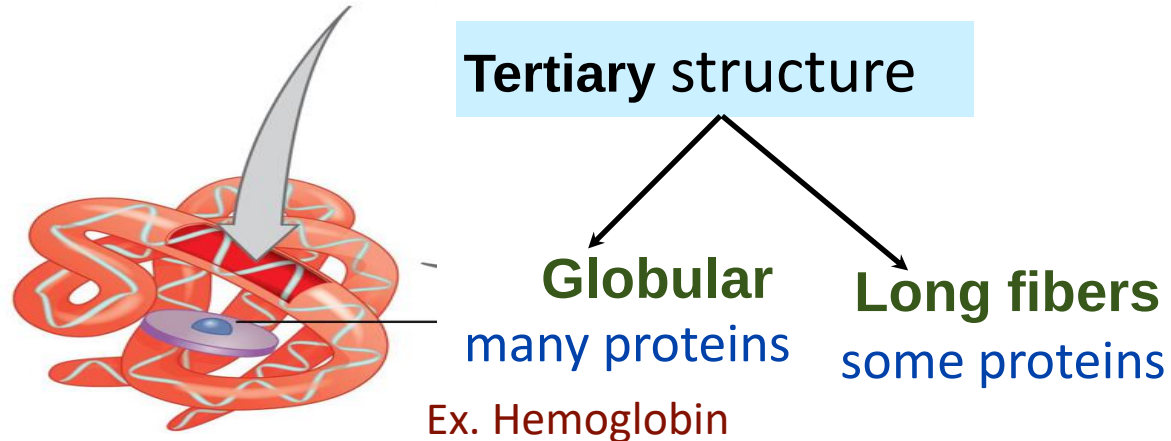
It folds into a three dimensional shape



Secondary structure

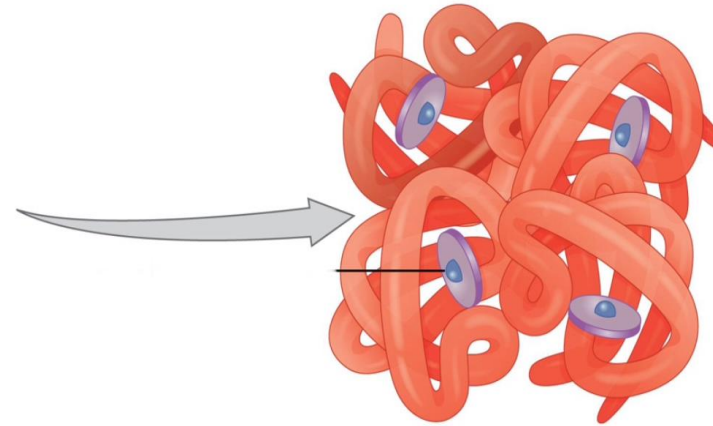
- Depends on the interaction among the amino acids
- Hydrogen bonds helps protein hold its shape

Tertiary structure



Quaternary structure (fourth level)

some proteins
combining with
other proteins



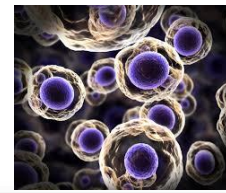
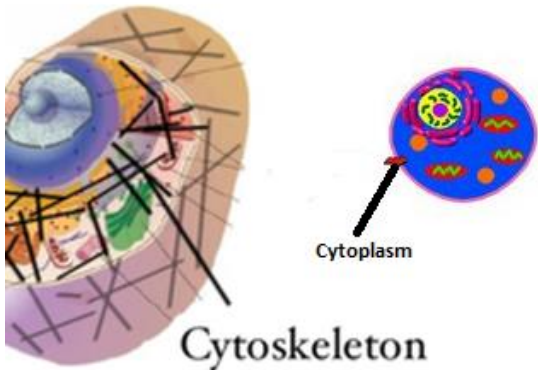


Skin, hair and muscles are made of protein

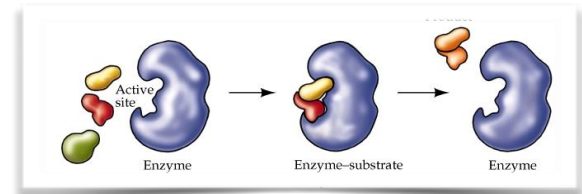
Cell contains 10,000 different proteins

It provides:

*** structural support**



*** control cell growth**



*** speed up chemical reaction**

Proteins Functions

1

2

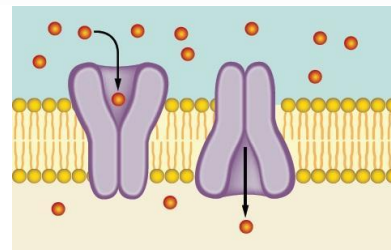
3

6

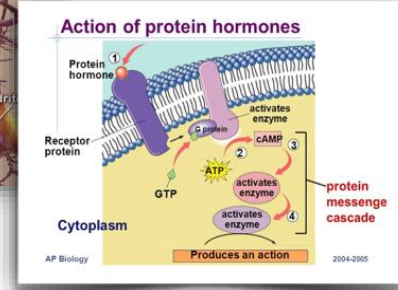
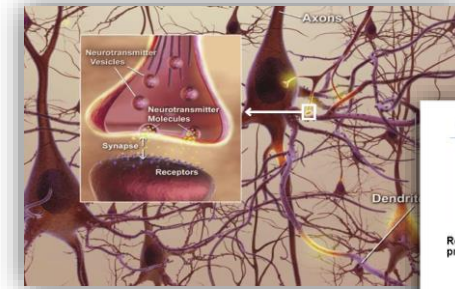
5

4

*** transport substance inside the cell and between cells**



*** communicate signals within a cell and between cells**

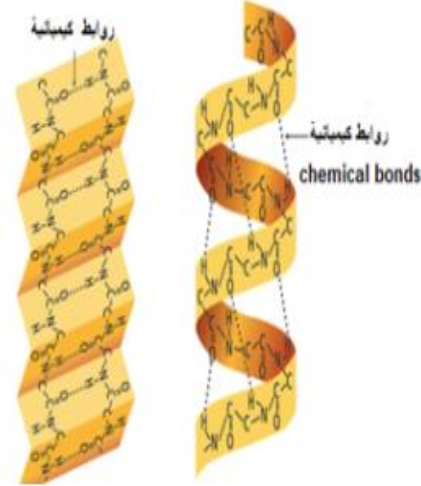


The figure shows secondary protein structures that depend on the interactions between amino acids.

Which of the following help the protein hold its shape?

الشكل يوضح بنية البروتين الثانوية التي تعتمد على التفاعلات بين الأحماض الأمينية.

أي مما يلي يساعد البروتين على الاحتفاظ بشكله؟



Which joins amino acids together?

A. peptide bonds

B. hydrogen bonds

C. van der Waals forces

D. ionic bonds

Peptide bonds

الروابط الببتيدية

.a

Covalent bonds

الروابط التساهمية

.b

Hydrogen bonds

الروابط الهيدروجينية

.c

Ionic bonds

الروابط الأيونية

.d

Which biological molecule transports substances between cells?

A. carbohydrate

B. lipid

C. nucleic acid

☒ D. protein

What type of biological molecule is an enzyme?

A. hormone

B. nucleic acid

☒ C. protein

D. steroid

What are the monomers that make up proteins?

☒ A. amino acids

B. fatty acids

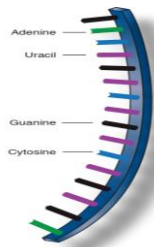
C. glycerols

D. nucleotides

monomer is **Nucleotides**

Functions Store and transmit **genetic information**

Types



RNA

Ribo Nucleic Acid



DNA

DeoxyriboNucleic Acid

Three units:

The shape

1 chain

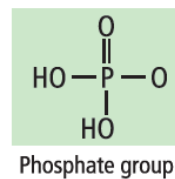
2 chain

Type of sugar

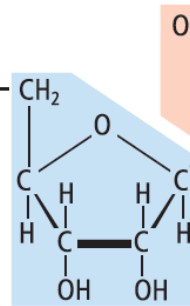
Ribose

Deoxyribose

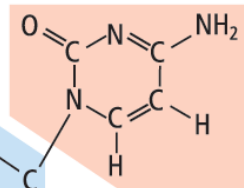
DNA nucleotides contain the sugar deoxyribose. RNA nucleotides contain the sugar ribose.



Phosphate group



Sugar



Nitrogen-containing base

Nucleotide

Structure

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

Nucleotides

monomer

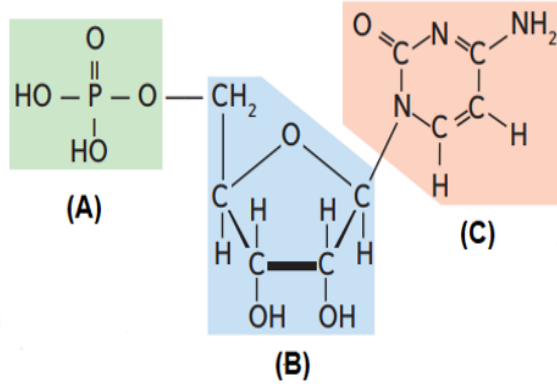
Nucleotides

monomer

Polymer

The figure below shows the structure of a nucleotide, study and answer the question:

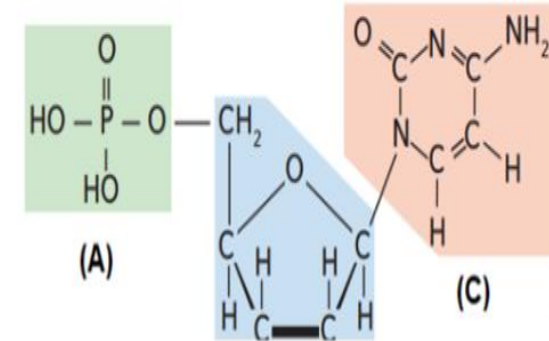
What do the letters (A) and (C) indicate?



الشكل أدناه يوضح تركيب النيوكليوتيد، أدرسة واجب عن السؤال:
علام تشير الأحرف (A) و (B)؟

The figure below shows the structure of a nucleotide, study and answer the question:

What do the letters (A) and (C) indicate?



الشكل أدناه يوضح تركيب النيوكليوتيد، أدرسة واجب عن السؤال:
علام تشير الأحرف (A) و (C)؟

☐ (A): Sugar – (B): Phosphate group

.a (A) سكر – (B) مجموعة فوسفات

☒ (A): Phosphate group – (B): Sugar

.b (A) مجموعة فوسفات – (B) سكر

☐ (A): Nitrogen-containing base – (B): Sugar

.c (A) قاعدة نيتروجينية – (B) سكر

☐ (A): Phosphate group – (B): Nitrogen-containing base

.d (A) مجموعة فوسفات – (B) قاعدة نيتروجينية

(A): Phosphate group – (C): Sugar

.a (A) مجموعة فوسفات – (C) سكر

(A): Nitrogen-containing base – (C): Phosphate group

.b (A) قاعدة نيتروجينية – (C) مجموعة فوسفات

(A): Sugar – (C): Phosphate group

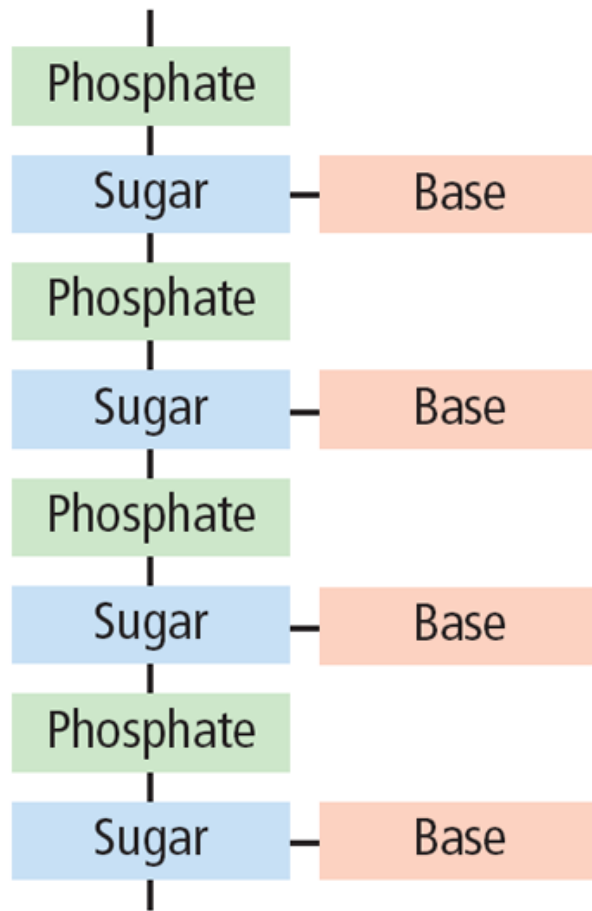
.c (A) سكر – (C) مجموعة فوسفات

(A): Phosphate group – (C): Nitrogen-containing base

.d (A) مجموعة فوسفات – (C) قاعدة نيتروجينية

What is the function of this biological macromolecule?

- A. communicate signals between cells
- B. produce vitamins and hormones
- C. provide support and protection
- D. store and transmit genetic information**



Which substance is not part of a nucleotide?

ما المادة التي لا تُعتبر جزءًا من النيوكليوتيد؟

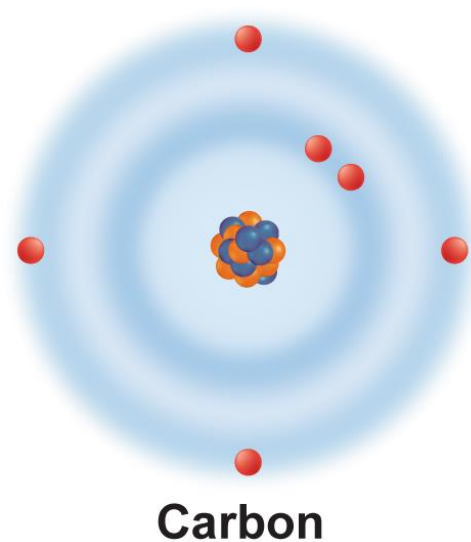
- a. A phosphate الفوسفات
- b. A base القاعدة
- c. A sugar السكر
- d. Water الماء

Which element do almost all biological molecules contain?

- ☒ A. carbon
- ☐ B. nitrogen
- ☐ C. phosphorus
- ☐ D. sodium

How many covalent bonds can carbon form with other atoms?

- ☐ A. 1
- ☐ B. 2
- ☒ C. 4
- ☐ D. 8



Observe the phenotypic traits of different dog breeds



Breed	Phenotypic trait	Actions can do
Beagle	Keen sense of smell	Detective dogs
Husky	Endurance runners and pull sleds long distances	Sled dogs
German shepherd	Highly trainable	Service dogs

Dogs have traits that make them suited for different tasks.

Which trait makes the **Beagle** in the figure below suitable for his police tasks?



تتميز الكلاب بصفات تجعلها مناسبة لمهام مختلفة.
أي صفة تجعل **كلب البیغل** في الشكل أدناه مناسب لمهامه البوليسية؟

المخرجات التعليمية المرتبطة

BIO.3.2.04.010 °

☐ Endurance to run long distances

العدو لمسافات طويلة

☐ Shepherd—high trainability

القابلية للتدريب بدرجة كبيرة

☐ Keen sense of hear

حاسة السمع القوية

☒ Keen sense of Smell

حاسة الشم القوية

Dogs have traits that make them suited for different tasks.

Which trait makes the **Husky** in the figure below suitable for his tasks? أي صفة تجعل **كلب الهاسكي** في الشكل أدناه مناسب لمهامه؟



تتميز الكلاب بصفات تجعلها مناسبة لمهام مختلفة.

☐ Keen sense of hear

.a حاسة السمع القوية

☐ Keen sense of Smell

.b حاسة الشم القوية

☒ Endurance to run long distances

.c العدو لمسافات طويلة

☐ Shepherd—high trainability

.d القابلية للتدريب بدرجة كبيرة

Selective breeding

What selective breeding is ? (Definition)

The process by which desired traits of certain plants and animals are selected and passed on to their future generations.

What hybrids is ?

Offspring resulting from cross-breeding.

How can desired traits be passed on to future generation?

Through the processes of : hybridization, inbreeding .



Mastiff - large and strong but slow and not aggressive.

+



Bulldog - Aggressive and quick but small.



Bullmastiff - Large, quick, strong and aggressive

Perfect!

Which is an example of **selective breeding**?

ما الذي يُعد مثالاً على **الانتخاب الصناعي**؟

Crossing two plants with desirable traits

خلط نباتين لديهما سمات وراثية مرغوبة

.a

Inserting genes from one plant into another

إدخال جينات من نبات إلى آخر

.b

Returning bred plants to their natural habitat

إعادة النباتات التي تمت تربيتها إلى موطنها الطبيعي

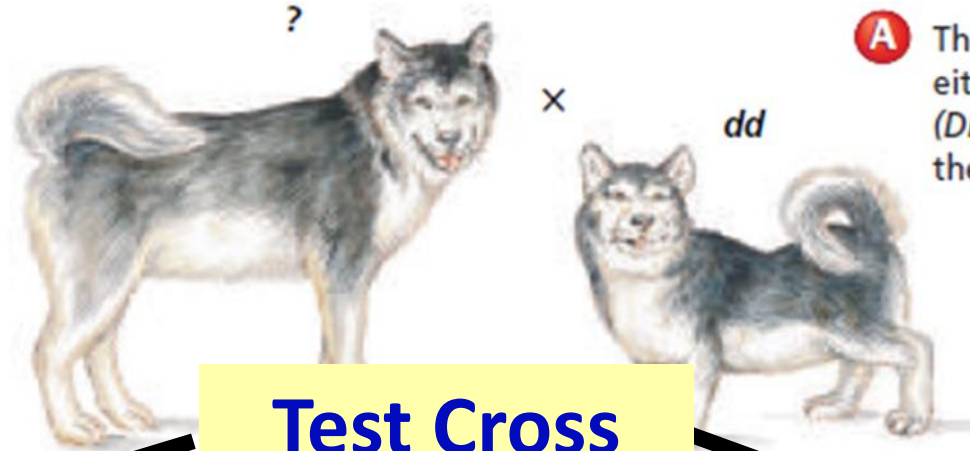
.c

Produce larger fruits and having shorter growing times

إنتاج ثمار أكبر حجمًا وذات فترات نمو أقصر

.d

In this test cross of Alaskan malamutes, the known test dog is homozygous recessive for a dwarf allele (dd), and the other dog's genotype is unknown.



A The unknown dog can be either homozygous dominant (DD) or heterozygous (Dd) for the trait.

Definition

It is Breeding an organism that has **unknown genotype** with other has **homozygous recessive** for the **desired trait**

Steps

1-Breeding

Between **Unknown dominant** genotype and **homozygous recessive** genotype

2-Observed the breeding result

✎ If **all** the offspring have **dominant** phenotype

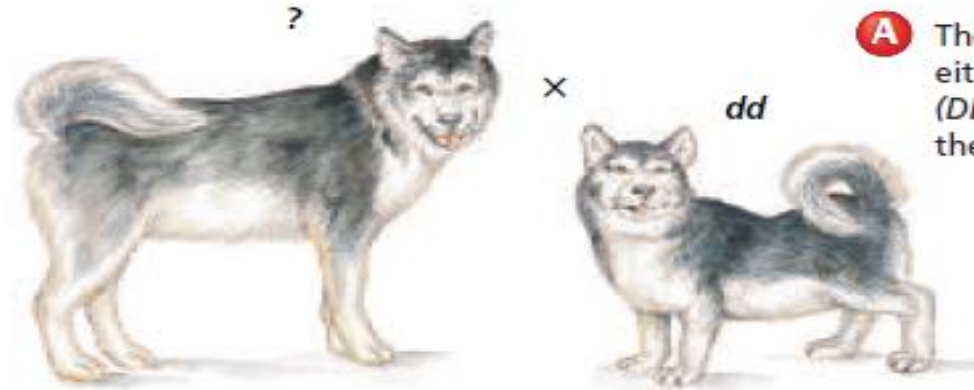
The parent's genotype is **dominant homozygous**

✎ If the offspring show **1:1** phenotypic ratio

The parent's genotype is **dominant heterozygous**

Example

In this test cross of Alaskan malamutes, the known test dog is homozygous recessive for a dwarf allele (dd), and the other dog's genotype is unknown.



A The unknown dog can be either homozygous dominant (DD) or heterozygous (Dd) for the trait.

B If the unknown dog's genotype is homozygous dominant, all of the offspring will be phenotypically dominant.

Homozygous x Homozygous

	DD	dd
d	Dd	Dd
d	Dd	Dd

Offspring: all dominant



C If the unknown dog's genotype is heterozygous, half the offspring will express the recessive trait and appear dwarf. The other half will express the dominant trait and be of normal size.

Heterozygous x Homozygous

	Dd	dd
d	Dd	Dd
d	dd	dd

Offspring: 1/2 dominant
1/2 recessive



Use the illustration below to answer questions 3 and 4.

3. B

4. C

		Heterozygous white grapefruit	
		W	w
Homozygous red grapefruit	W	Ww	ww
	w	Ww	ww

3. What is the genotypic ratio of the offspring in the cross above?
 - A. 1:2:1
 - B. 1:1
 - C. All are homozygous recessive.
 - D. All are heterozygous.
4. The cross above could be used to determine the genotype of a parent with a dominant phenotype. What is this type of cross called?
 - A. a homozygous cross
 - B. a heterozygous cross
 - C. a test cross
 - D. a parental cross

A test cross occurs when an individual with an unknown genotype is crossed with a homozygous recessive individual for the desired trait.

Homozygous dominant

Heterozygous **v**

Homozygous recessive

Polyploid

6. A breeder performs a test cross to determine the genotype of a black cat. He crosses the black cat (BB or Bb) with a white cat (bb). If 50 percent of the offspring are black, what is the genotype of the black cat?

6. The genotype of the black cat is Bb.

A method used to determine the genotype of a plant with a dominant genetic trait.

- Hybridization
- the transfer
- Test cross

• Open Reading Templates

DNA of one
organism



(DNA of another organism)
exogenous DNA

From the figure: **Infer** the definition of **Genetic Engineering**
**Process in which genes (sections of DNA) are taken
from one organism and transferred to another**

This organism called
Genetically engineered organisms



To study specific gene

DNA Tools

Scientists used to

Manipulate
(control)
DNA

Isolate
gene from
genome

- used in genetic engineering are:

Restriction enzymes



DNA from
suspect

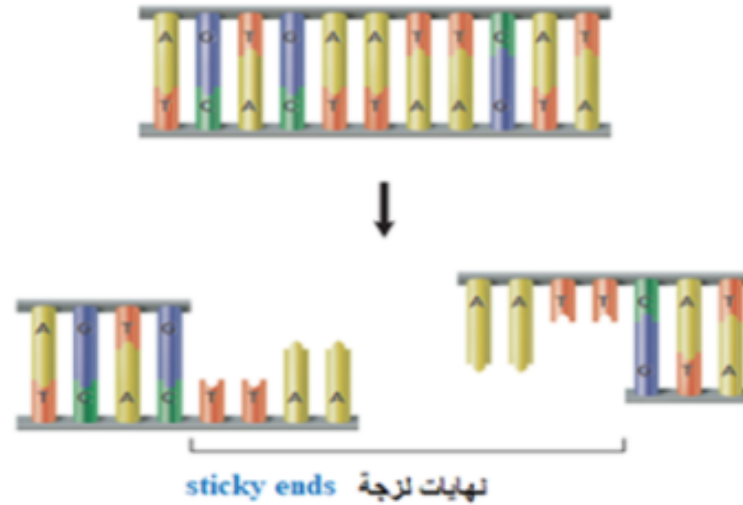
DNA from
blood stain

Gel

Gel electrophoresis

The figure below shows DNA containing the sequence **GAATTC**. Which of the following enzymes lead to the formation of these sticky ends?

الشكل أدناه يوضح الحمض النووي الذي يحتوي على التسلسل **GAATTC**. أي إنزيم مما يلي يؤدي إلى تكوين تلك النهايات اللزجة؟



Reverse transcriptase

إنزيم نسخ عكسي

.a

DNA ligase

إنزيم ربط

.b

ECORI Cut

إنزيم قطع

.c

Polymerization enzyme

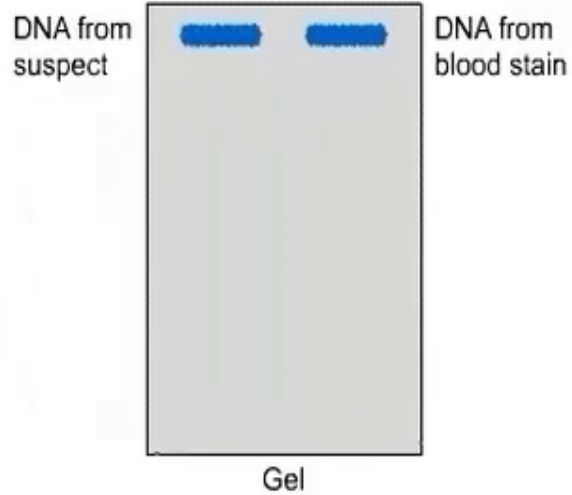
إنزيم بلمرة

.d

Gel Electrophoresis

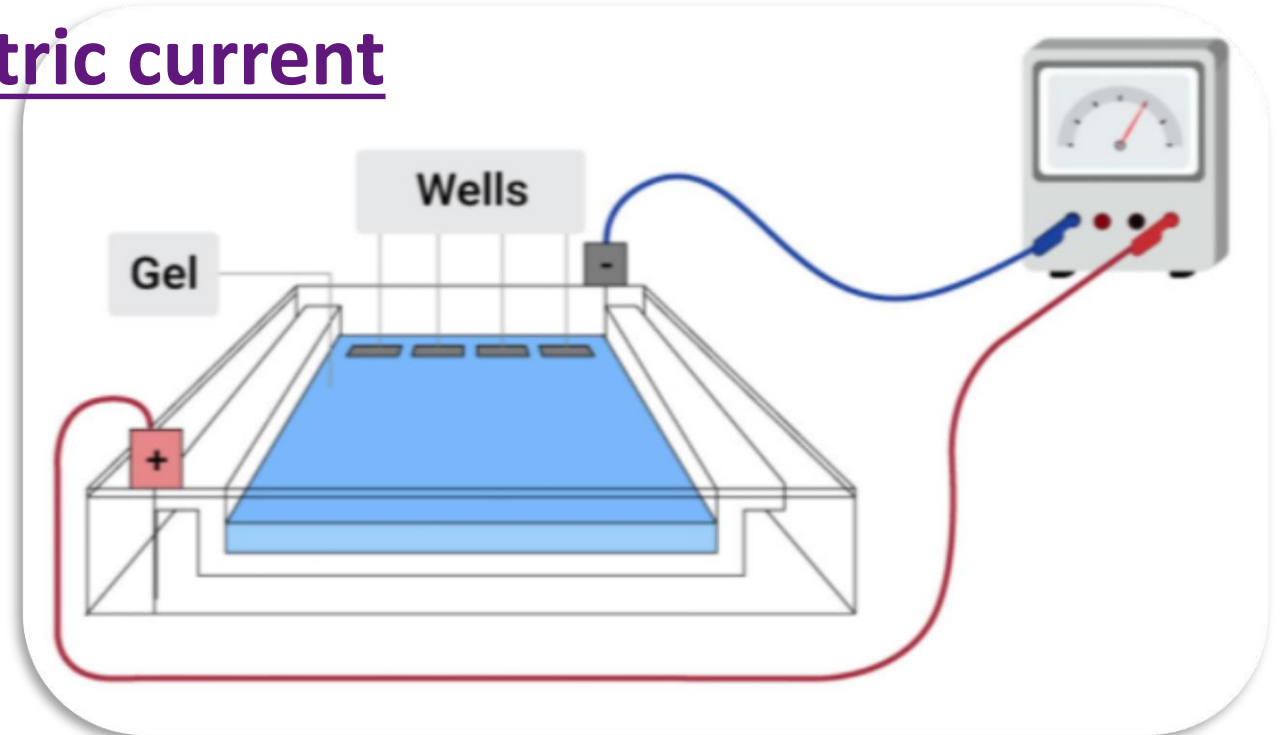
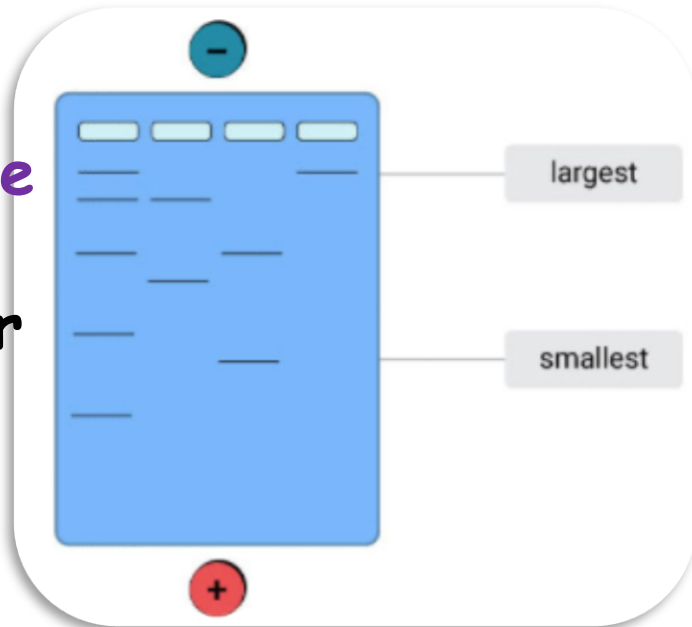
It is a process

DNA Tools



used to separate DNA fragments
according to the size of fragments
by an electric current

The **smaller** fragments **move faster** than the larger ones.



When an electric current is applied, the DNA fragments **move toward** the **positive** end of the gel

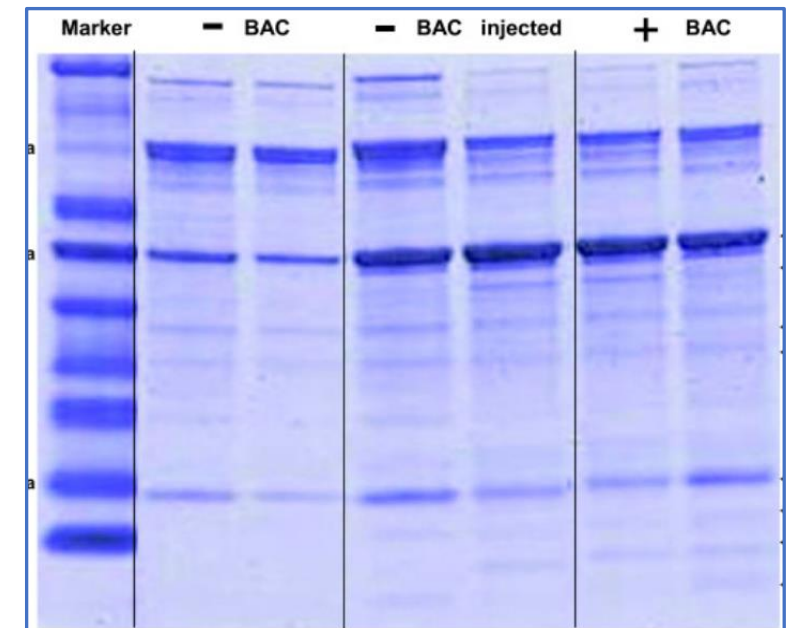
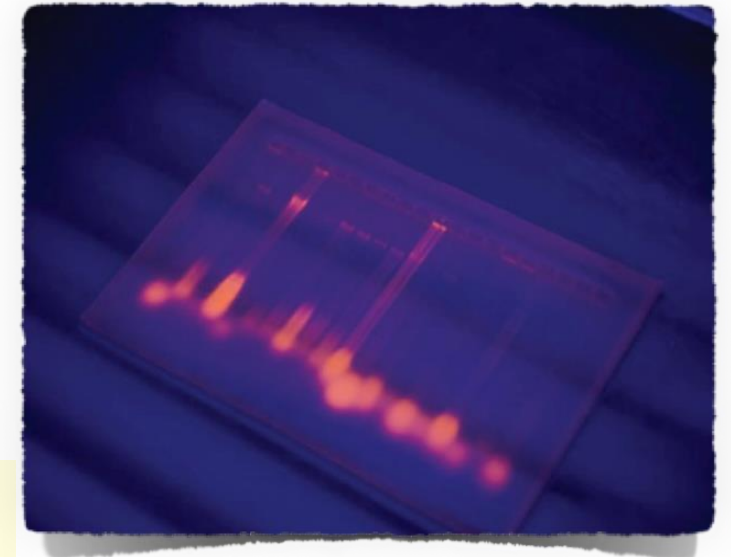
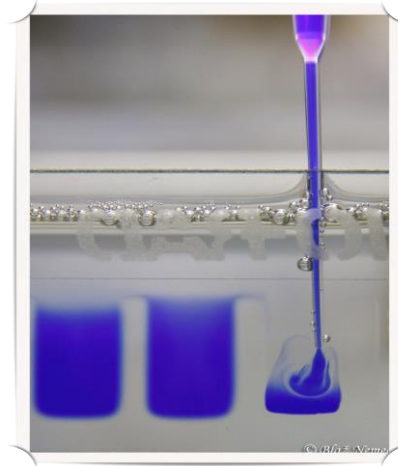
Solution containing DNA

is dropped on the gel by a pipette

A staining solution

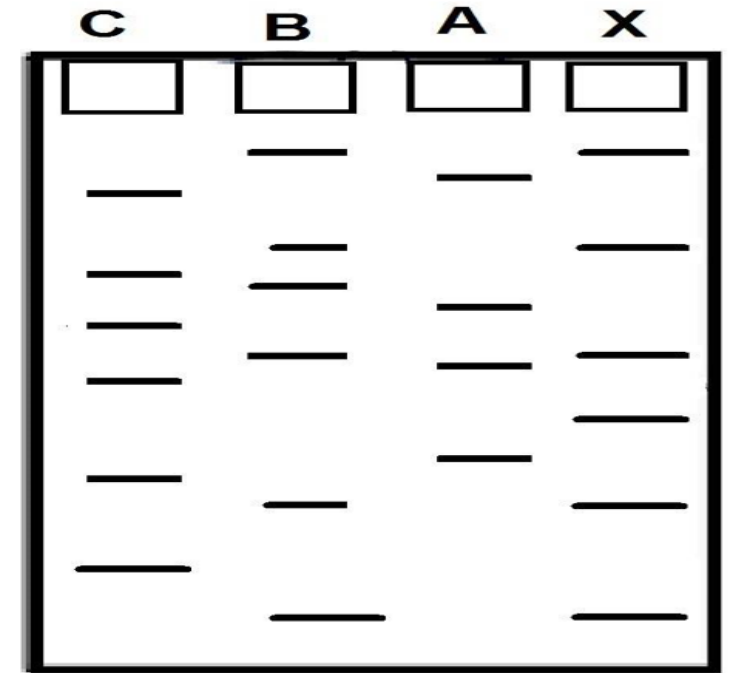
binds to the separated DNA fragments
in the gel making them visible under Ultraviolet light

- The unique pattern created based on the size of the DNA fragment can be compared to known DNA (marker) fragments for identification



- 13-The figure below shows the DNA fingerprints of four people. The fingerprint (X) was taken from a drop of blood at a crime scene belonging to the unknown criminal (X). *

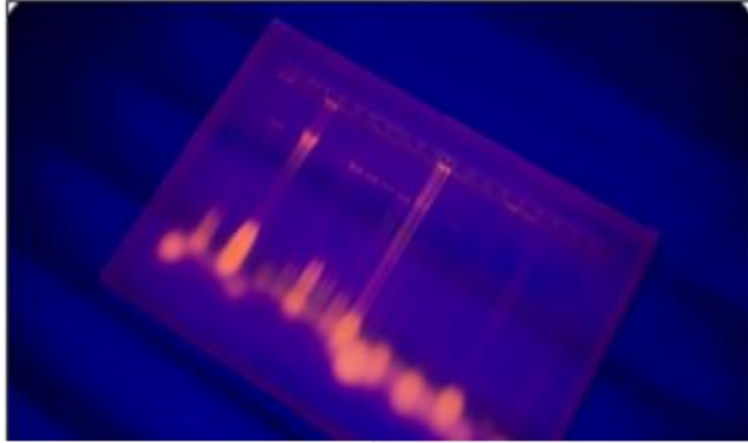
- A
- Both A, c
- C
- B



- Method by which DNA fragments are separated by size
- Open Reading Templates
- Genetic Engineering
- Gel electrophoresis

gel is placed in an electrophoresis
electric current are turned on, the DNA fragments
process does the figure below show?

عند وضع المادة الهلامية المعبأة في خزان الفصل الكهربائي
وتشغيل التيار الكهربائي، تنفصل أجزاء الحمض النووي.
ما العملية التي يوضحها الشكل أدناه؟



Cloning

الاستنساخ

.a

Polymerase chain reaction

تفاعل البلمرة المتسلسل

.b

Recombinant DNA technology

تقنية الحمض النووي معاد التركيب

.c

Gel electrophoresis

الفصل الهلامي الكهربائي

.d

Recombinant DNA Technology

What is?

Specific size of DNA fragments combined with DNA fragments from another source.

Recombinant DNA

Importance

Studying individual genes.

Quantities

Need large quantities of DNA molecules.

Materials used

Plasmids and viruses

Vector(Carrier)

bacterial cell

The host cell

Restriction enzyme

Joins DNA fragments

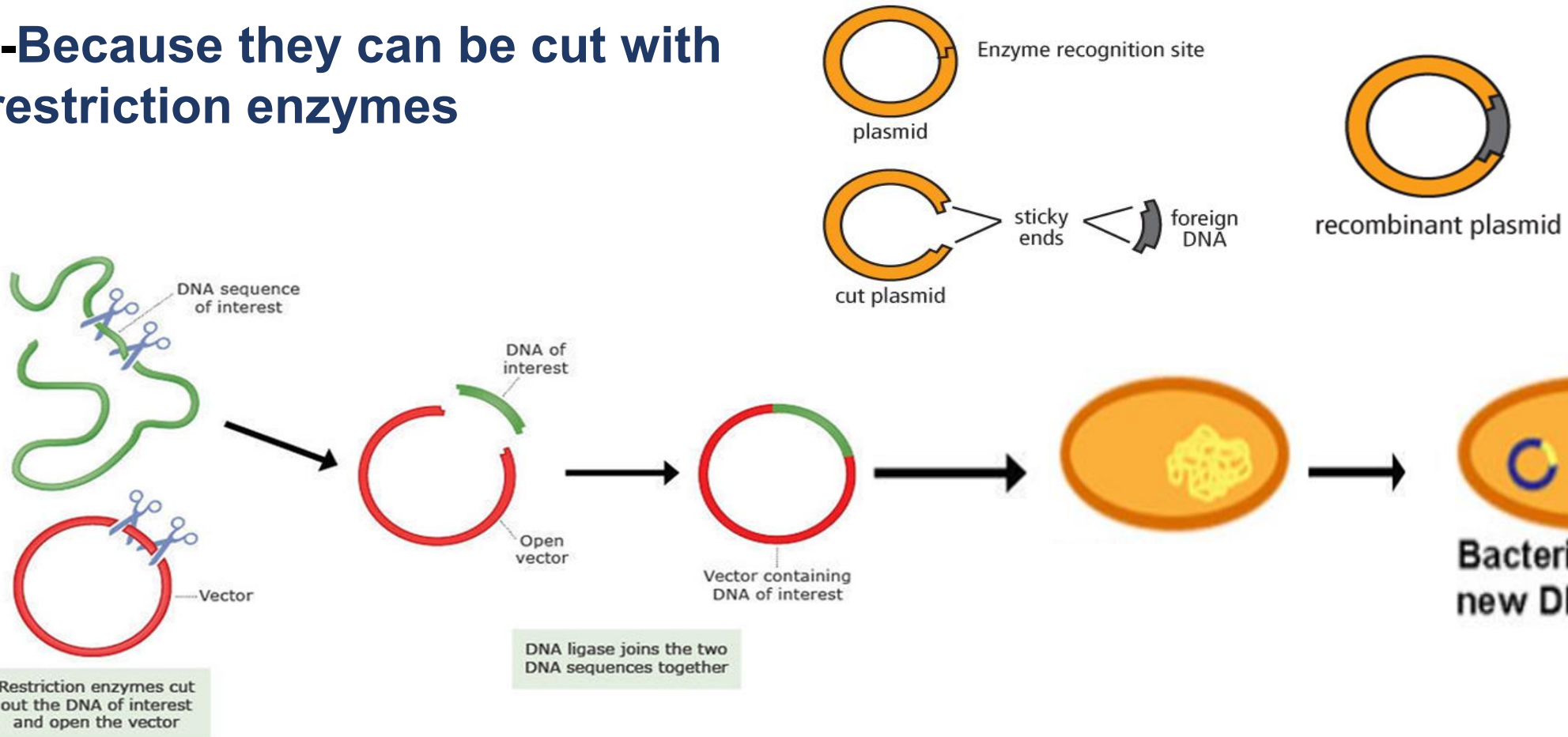
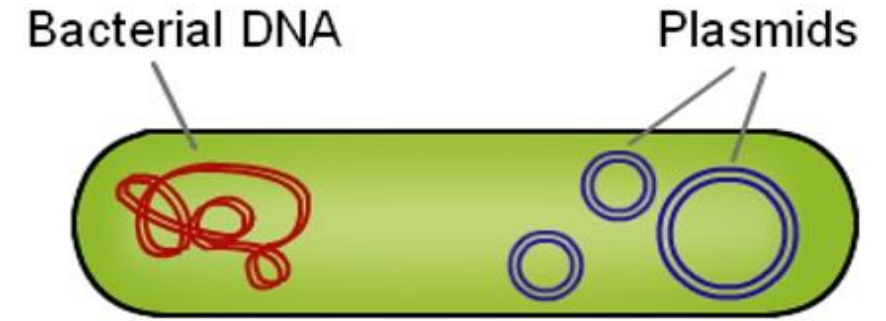
DNA ligase

What is a plasmid?

-Small, circular, double-stranded DNA molecules that occur naturally in bacteria and yeast cells

Why are the plasmids use as vectors?

-Because they can be cut with restriction enzymes



In figure below, what is the role of the vector in DNA cloning?

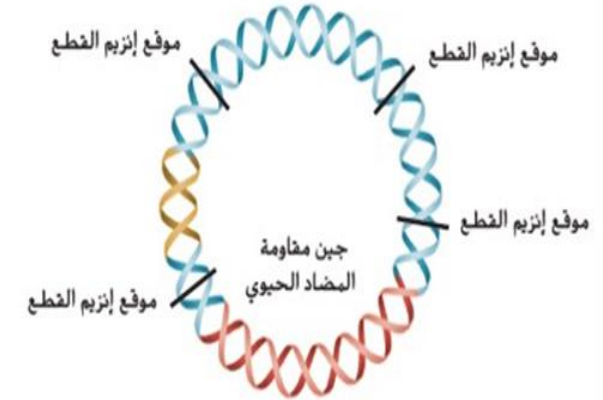
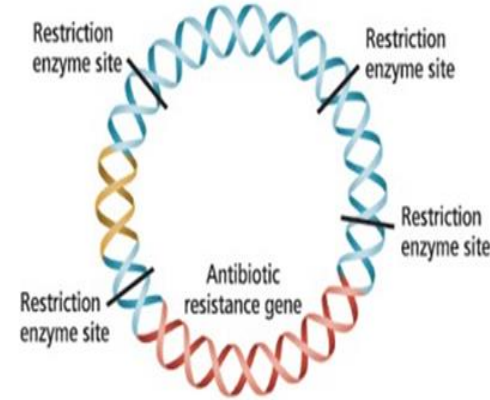


Plasmid DNA (vector)

الحمض النووي البلازميدي (متجه)

في الشكل أدناه، ما دور المتجه في استنساخ الـ DNA؟

What is the role of the molecule below in DNA cloning?



ما دور الجزيء الوارد أدناه في استنساخ الـ DNA؟

a.

نقل الـ DNA الدخيل إلى داخل الخلية المضيفة

To carry the foreign DNA into the host cell

b.

تحديد مصدر الـ DNA على أنه دخيل

To identify the source of DNA as foreign

c.

تحديد الخلية المضيفة التي استقبلت الجين المعني

To identify the host cell that has taken up the gene of interest

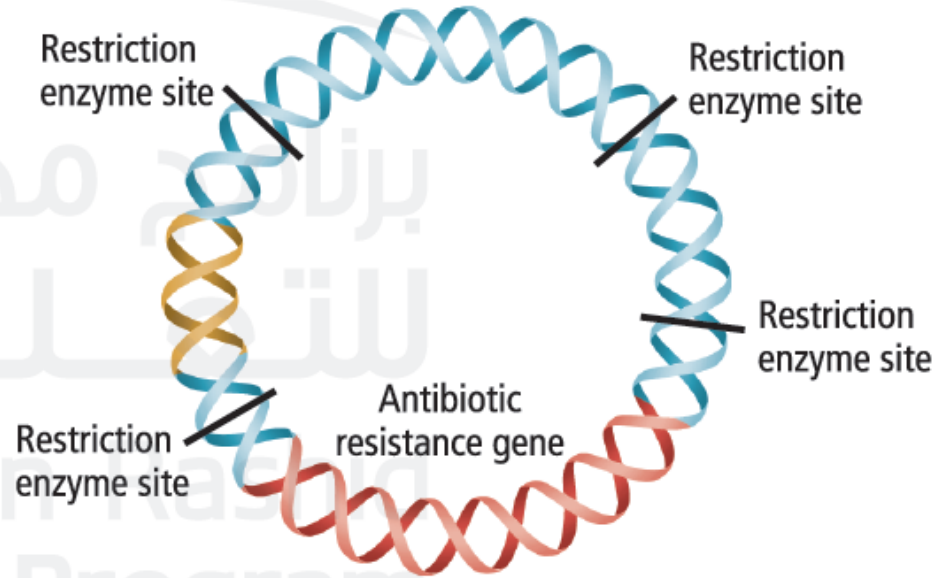
d.

جعل الـ DNA الدخيل قابلاً للهضم عن طريق الإنزيمات

To make the foreign DNA susceptible to digestion with enzymes

Understand Main Ideas

Use the illustration below to answer question 14.



14. What is the role of the molecule above in DNA cloning?
- A. to carry the foreign DNA into the host cell
 - B. to identify the source of DNA as foreign
 - C. to identify the host cell that has taken up the gene of interest
 - D. to make the foreign DNA susceptible to digestion with enzymes

Understand Main Ideas

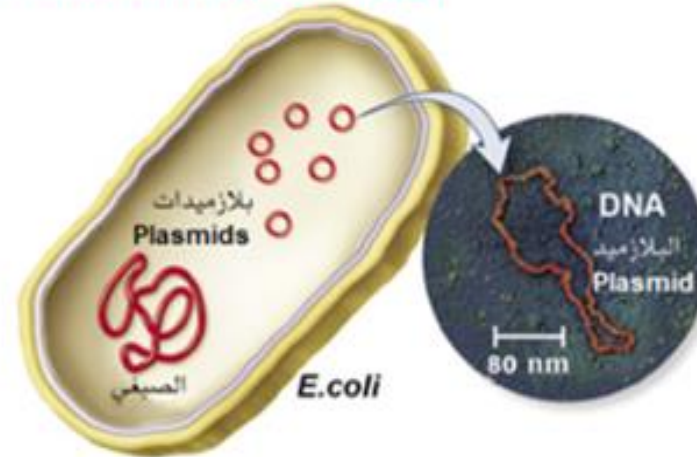
14. A

Recombinant DNA

- A. results from the ligation of an isolated gene and plasmid DNA.
- B. is inserted into a living cell in the transformation process.
- C. is screened for in the selection process.
- D. all of the above

The figure below shows a recombinant nucleic acid plasmid,
What is the role of the molecule below in DNA cloning?

الشكل أدناه يوضح بلازميد حمض نووي معاد التركيب.
ما دور هذا الجزيء في استنساخ الـ DNA؟



To make the foreign DNA susceptible to digestion with enzymes

جعل الـ DNA الدخيل قابلاً للهضم عن طريق الإنزيمات

.a



To identify the host cell that has taken up the gene of interest

تحديد الخلية المضيفة التي استقبلت الجين المعني

.b



To identify the source of DNA as foreign

تحديد مصدر الـ DNA على أنه دخيل

.c



To carry the foreign DNA into the host cell

نقل الـ DNA الدخيل إلى داخل الخلية المضيفة

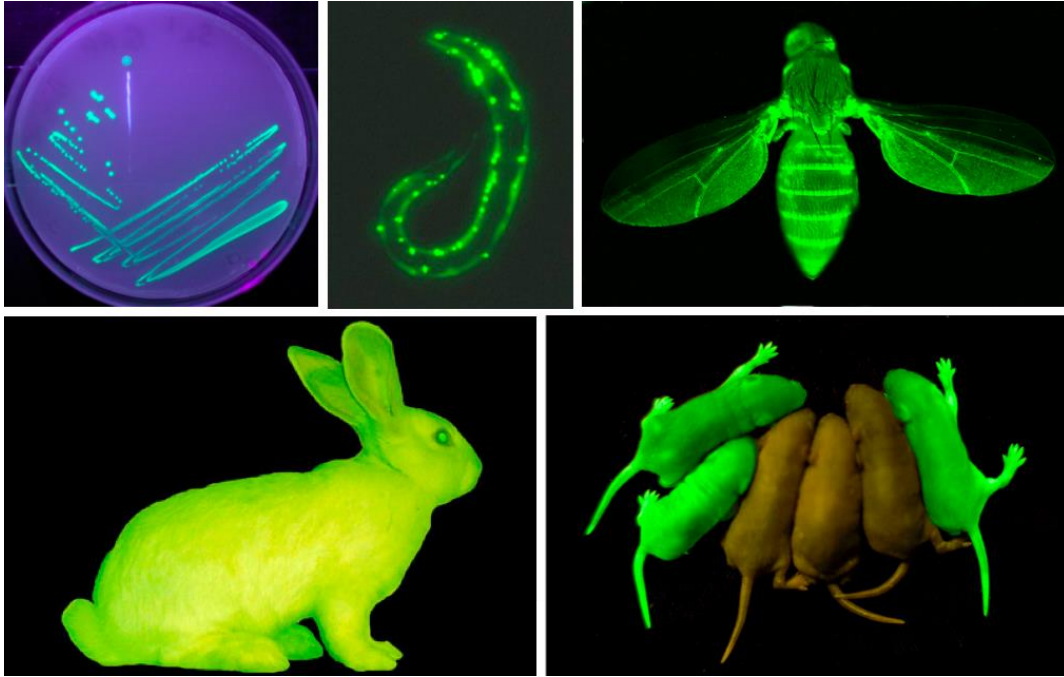
.d

Table 1**Genetic Engineering**

Tool/Process	Function	Applications
Restriction enzymes Ex: <i>EcoRI</i>	Cut DNA strands into fragments	Used to create DNA fragments with sticky ends or blunt ends that can join with other DNA fragments
Gel electrophoresis	Separates DNA fragments by size	Used to study DNA fragments of various sizes
Recombinant DNA technology	Combines a DNA fragment with DNA from another source (exogenous DNA)	Used to create recombinant DNA to be used to study individual genes and genetically engineered organisms, and in the treatment of certain diseases
Gene cloning	Produces large numbers of identical recombinant DNA molecules	Used to create large amounts of recombinant DNA to be used in genetically engineered organisms
DNA sequencing	Identifies the DNA sequence of cloned recombinant DNA molecules for further study	Used to identify errors in the DNA sequence, to predict the function of a particular gene, and to compare to other genes with similar sequences from different organisms
Polymerase chain reaction (PCR)	Makes copies of specific regions of sequenced DNA	Used to copy DNA for any scientific investigation, including forensic analysis and medical testing

Biotechnology

The use of **Genetic engineering** to find solution to problem



Genetically Engineered organisms

Organisms that have a gene from another organism

Transgenic organisms

-**For** medical and agriculture purposes
- **For** research

Transgenic **animals**

Transgenic **plants**

Transgenic **bacteria**

Transgenic **animals**

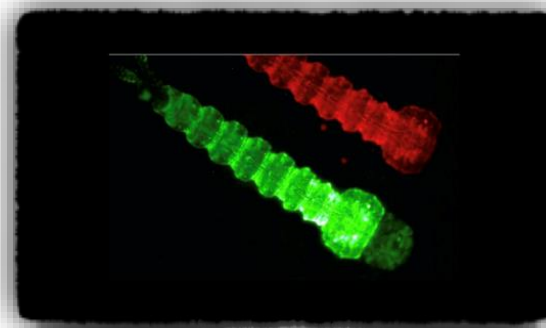
To study diseases, and
develop ways to treat them



Fruit flies



Mice



Mosquito Larva



Roundworm

Species of **fish**
Grow faster



Transgenic Growth-Enhanced Tilapia



Transgenic **Goats**

To secrete a protein called
antithrombin III
To prevent human blood
from forming clots
during surgery



Transgenic
Livestock

To resistant to disease



Transgenic
**Chicken and
Turkeys**



Transgenic organisms
might be used as a
source of **organs** for
organ transplants

To improve the
food supply and
human health

Transgenic **animals**

- Scientists produce most transgenic animals in laboratories for biological research.

Transgenic Animals	Genetic engineering
Mice, fruit flies, and the roundworm <i>Caenorhabditis elegans</i>	Study disease and develop ways to treat them
Transgenic livestock	Improve the food supply and human health.
Transgenic goats	Secrete blood from forming clots during surgery.
Transgenic chickens and turkeys	Resistant to diseases.
Fishes	Grow faster.
Transgenic animals	Might be used as a source of organ transplants.

Which is an example of a transgenic organism?

ما الذي يقدم مثالاً على الكائن الحي المعدل وراثيًا؟

- a. دجاجة تمت هندستها وراثيًا لتقاوم الأمراض
Chicken genetically engineered to resist diseases



- b. سلالة كلب الراعي الألماني الذي تم تدريبه على اكتشاف المتفجرات
German shepherd bred to identify explosives

- c. حبوب أرز هجينة تنتج محاصيل أكثر
Hybrid rice grain that produces higher yields

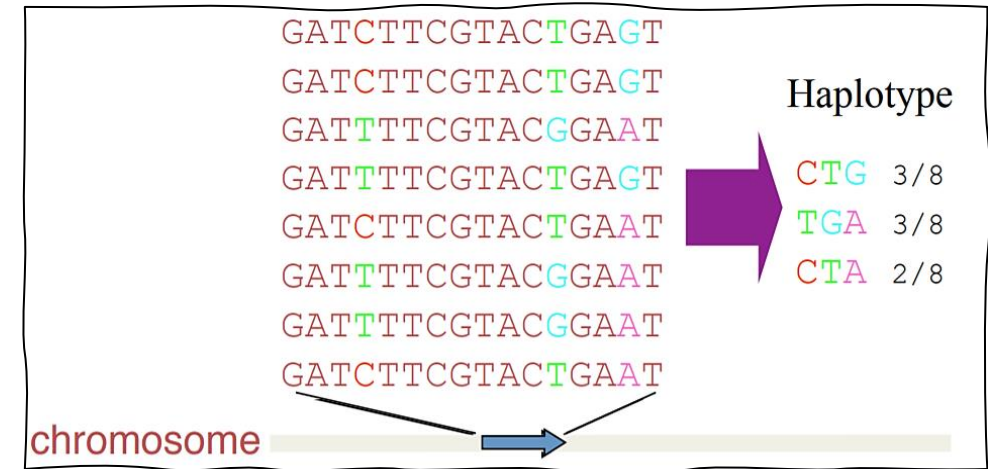
- d. تربية حشرات السرعوف لتقتل حشرات الحقائق
Praying mantises raised to kill garden pests

Biotechnology

- a. is the use of technology to change the genetic makeup of living things for human purposes. b. has raised many ethical questions.
- c. can make food taste better.
- d. all of the above

-Genetic variations (SNPs) located together tend to inherited together

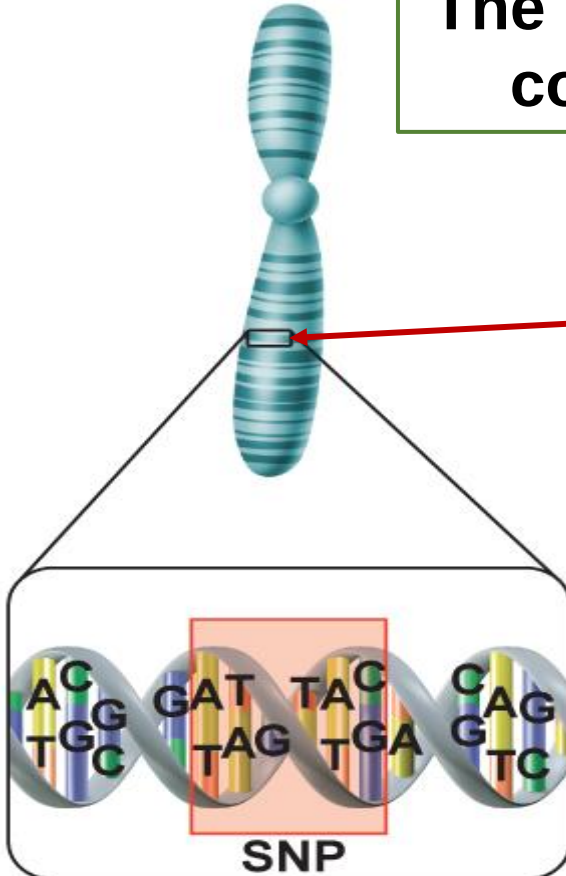
The region of linked variations in the human genome called haplotypes



The HapMap project

The project to create catalog of common genetic variation

- Assembling the HapMap involves identifying groups of SNPs in a **specific region** of DNA.
- The HapMap will enable geneticists to take advantage of how SNPs and other genetic variations are organized on chromosomes.



Help researchers to find genes that:

- 1-cause disease
- 2-and affect an individual's response to drugs

What are variations in specific nucleotides that are linked to human diseases called?

ماذا تسمى التنوعات الموجودة في النيوكليوتيدات المحددة وترتبط بالأمراض التي تصيب الإنسان؟

a. Proteomes علم المحتوى البروتيني

b. Haplotypes الأنماط الفردانية

c. Genomes الجينومات

d. Single nucleotide polymorphisms تعدد أشكال النيوكليوتيدات الفردية

-Project Identifying All Individual Patterns in the Human Genome

- Proteomics
- HapMap
- Genetic Pharmacology
- Gene therapy

The primary goal of the HapMap project is to:

يتمثل الهدف الرئيسي من مشروع Hap Map في:

- a.

وضع دليل للتسلسلات الجينية لحمض DNA منفرد

Catalog the genetic sequences of individual DNA
- b.

وضع قاعدة بيانات للمعلومات الجينية البيولوجية

Create a database for genetic biological information
- c.

وضع مخطط للنوكليوتيدات في DNA بشري

Map the sequence of nucleotides in human DNA
- d.

تحديد الجينات التي تؤدي إلى أمراض بشرية خطيرة

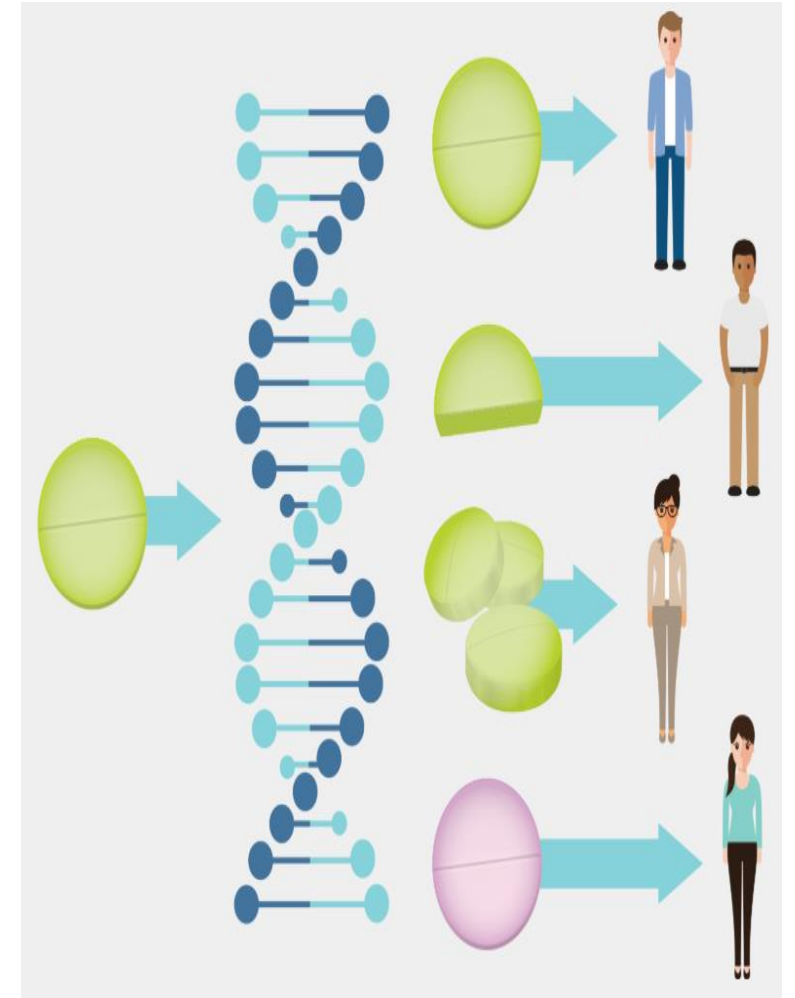
Identify genes that cause serious human diseases

What is pharmacogenomics?

- The study of how genetic inheritance affects the body's response to drugs .

Write the benefits of pharmacogenomics

- The benefits of pharmacogenomics include:
 - 1-more **accurate dosing** of drugs that are safer and more **specific**.
 - 2-will allow for drugs to be custom-made for individuals **based on their genetic** makeups.
 - 3-will increase **safety**, speed **recovery**, and reduced **side effects**.



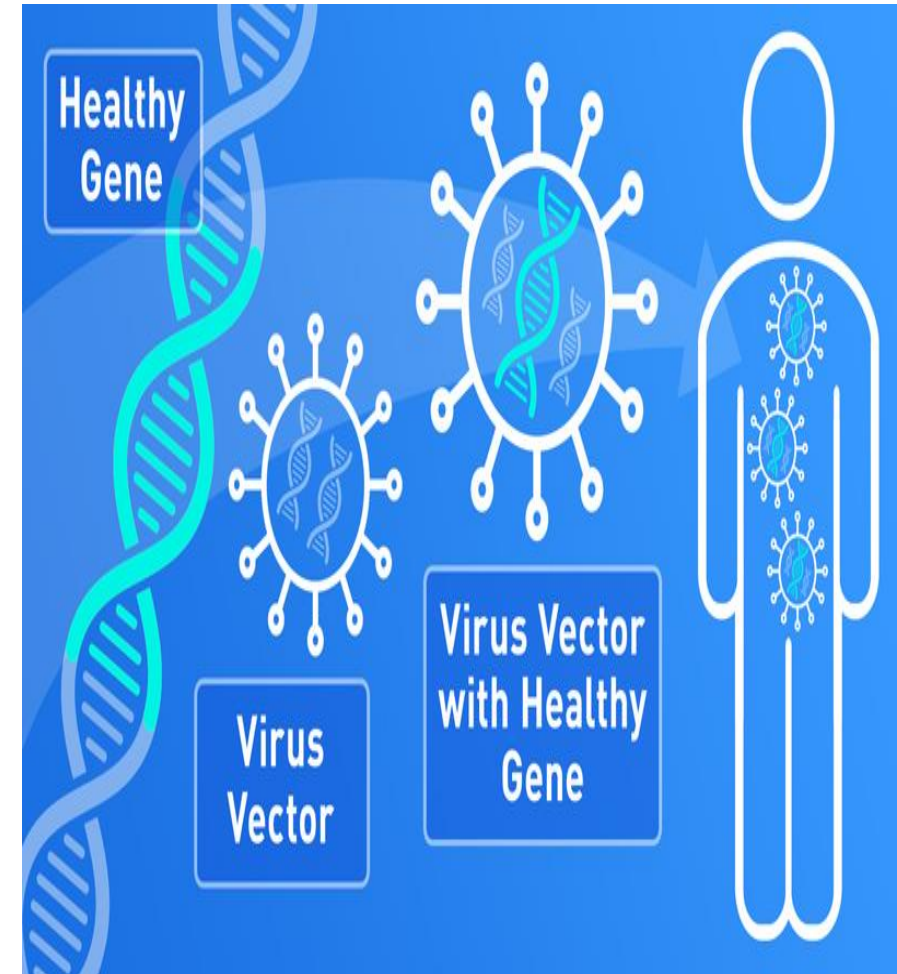
Gene therapy

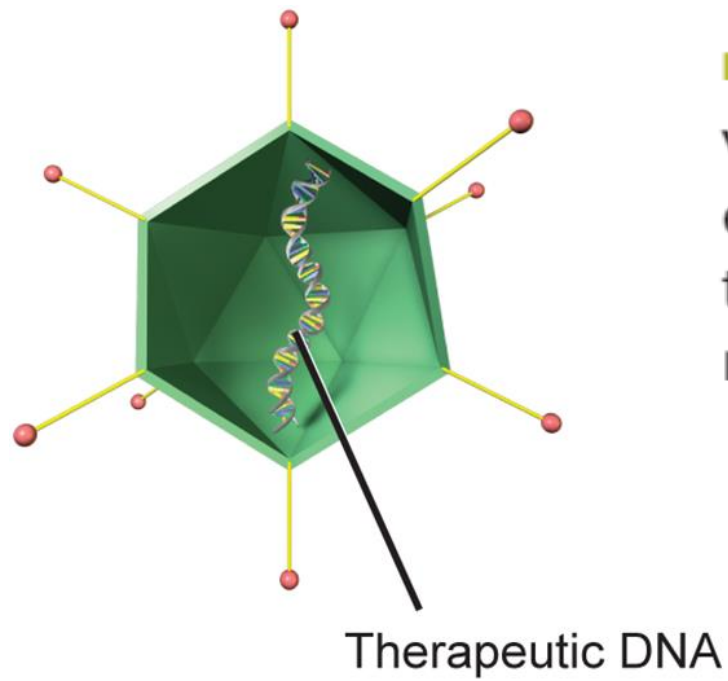
- A technique aimed at **correcting mutated** genes that cause human diseases .
- Scientists **insert a normal** gene into a chromosome to replace a dysfunctional gene.
- Scientist insert a normal gene into **a viral vector**.

Produces recombinant DNA

✓ **Reading Check** Compare and contrast pharmacogenomics to gene therapy.

✓ **Reading Check** Gene therapy is a technique that attempts to correct mutated genes. Pharmacogenomics is the study of how genetic inheritance affects the response to drugs.





■ **Figure 17** DNA can be encapsulated in a virus and delivered into a patient to replace a defective gene. Once the virus enters the cells, the genetic information is released into the nucleus and inserted into the genome.

The process of using a viral vector to insert a normal gene into a chromosome to replace a dysfunctional gene is called _____

Correct Answer

Blank 1: gene

Blank 2: therapy

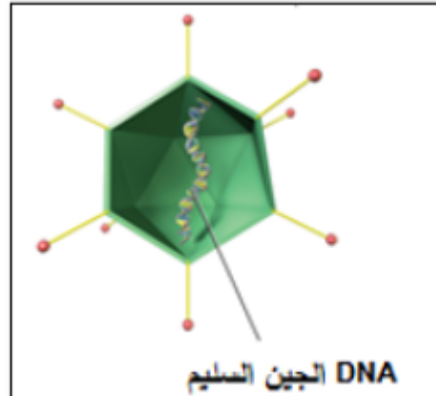
6-The process in which an incorrect gene is replaced by another healthy gene for the same genetic status *

- Gene therapy
- Recombinant DNA
- Production of plasmid
- Bioinformatics

The figure below shows DNA encapsulated in a virus and delivered into a patient to replace a defective gene.

Once the virus enters the cells, the genetic information is released into the nucleus and inserted into the genome.

What is this technique called?



يبين الشكل أدناه تضمين الـ DNA في فيروس وتوصيله بأحد المرضى لاستبدال جين معيب. وبمجرد أن يدخل الفيروس إلى الخلايا، تطلق المعلومات الجينية داخل النواة وتدخل في الجينوم. ماذا تسمى هذه التقنية؟

Pharmacogenomics

a. علم الصيدلة الجيني

Bioinformatics

b. المعلوماتية الأحيائية

DNA microarrays

c. مصفوفة DNA الدقيقة

Gene therapy

d. العلاج الجيني

From

Gene

To

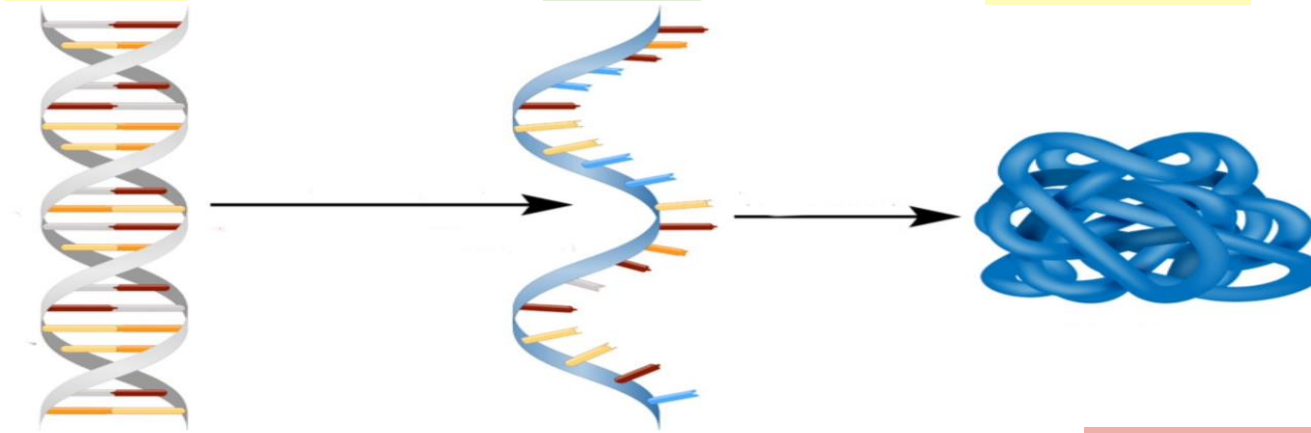
RNA

To

Protein

=

Central dogma



Study of human genes(structure and function) Genomic

What is the importance of Genomics?

Identifying human genes and interpreting their functions.

Investigating the mass of data obtained from sequencing the genomes of multiple organisms.

Investigating the proteins produced by the genes.

Genes are the primary information storage units, whereas **proteins** are the machines of a cell.

What is **Proteomics** ?

The large-scale study and cataloging of the structure and function of **proteins** in the human body is called **proteomics**.

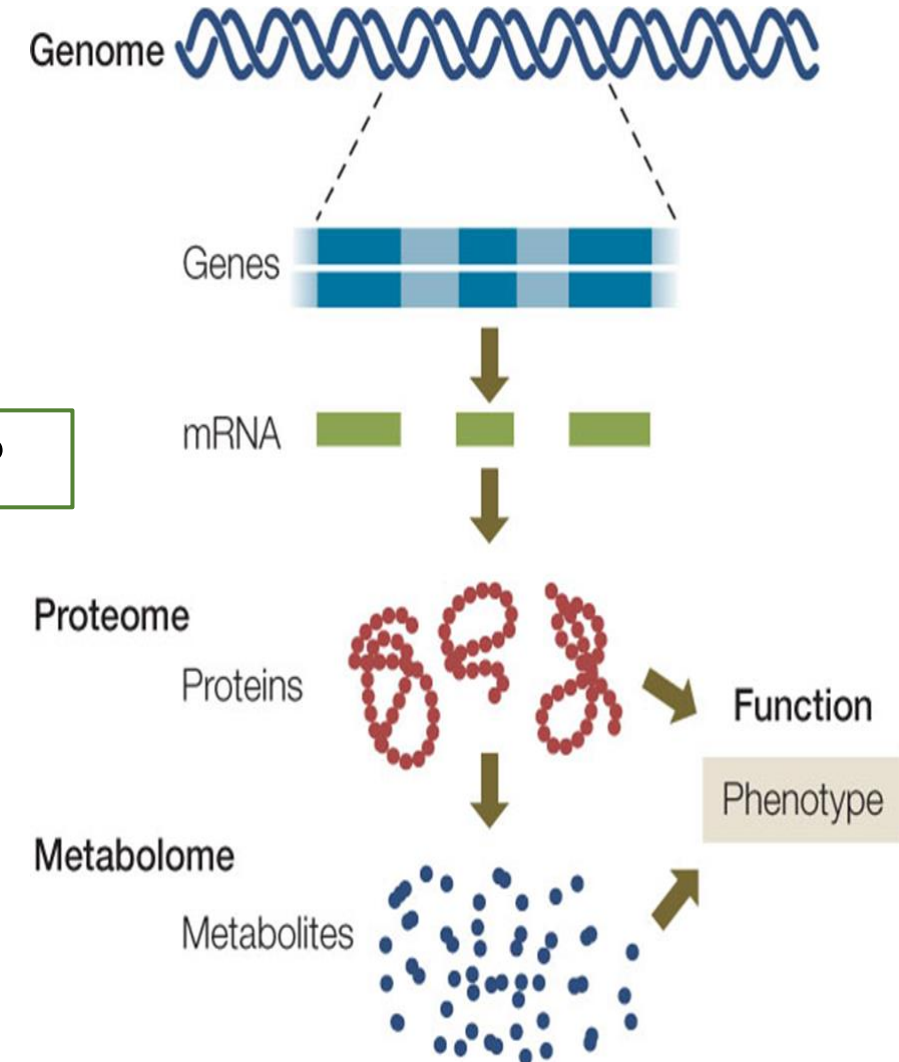
What is the importance of **Proteomics**?

Proteomics allows researchers to

Look at thousands of proteins at the same time.

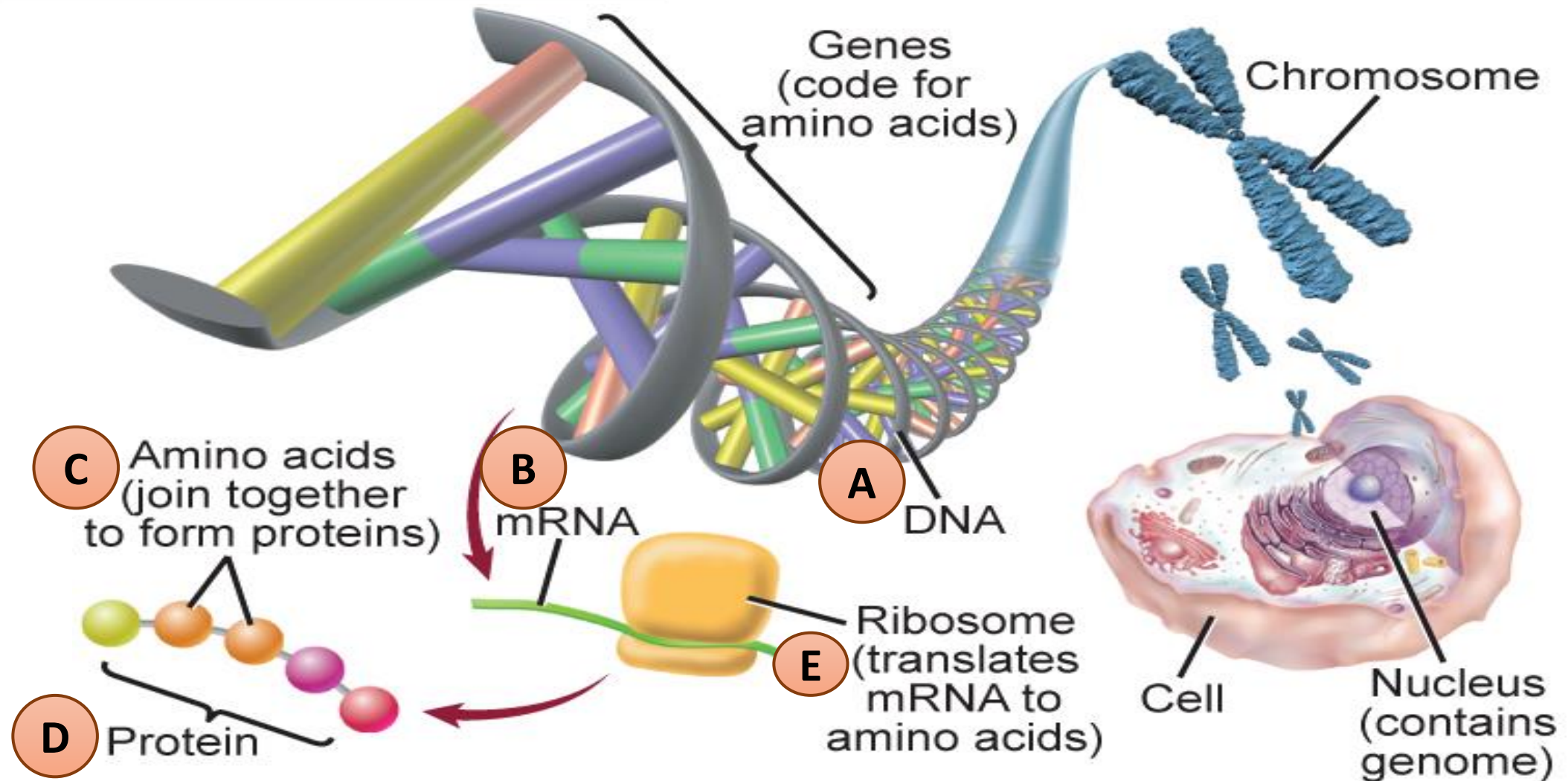
Analysis will better define both normal and disease states.

Revolutionize the development of new drugs to treat diseases such as Type II diabetes, obesity, and atherosclerosis.

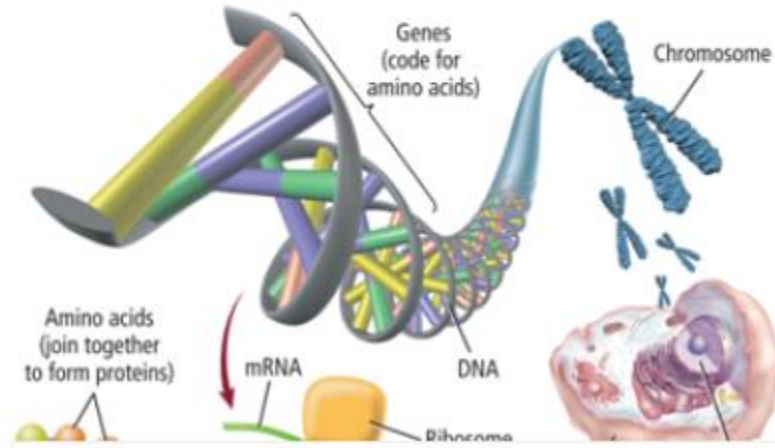


■ **Figure 18** The central dogma is that the information in genes flows from DNA to RNA and RNA to proteins.

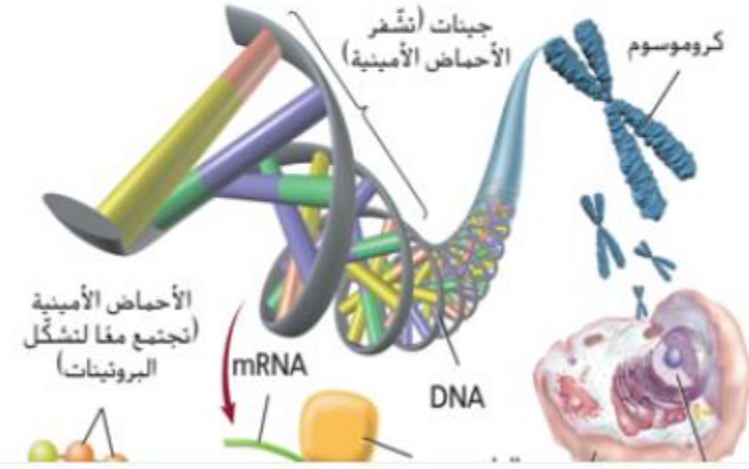
Which letter refer to



The information in genes flows from DNA to RNA and RNA to proteins. Which of the following is **the right concept** that applies to the figure below?



المعلومات الموجودة في الجينات تتدفق من الـ DNA إلى الحمض النووي الرايبوزي ومنه إلى البروتينات. أي مما يلي يعتبر **المفهوم الصحيح** الذي ينطبق على الشكل أدناه؟



Genomics

علم الجينوم

.a

The HapMap project

مشروع هاب ماب

.b

Sequencing the genome

ترتيب تسلسل الجينوم

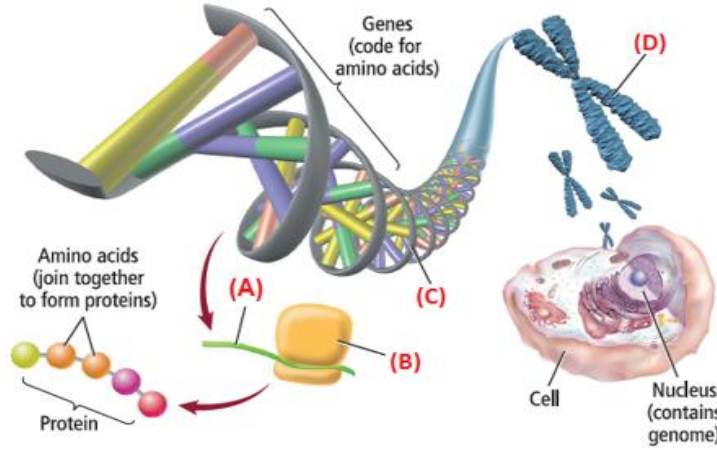
.c

The central dogma

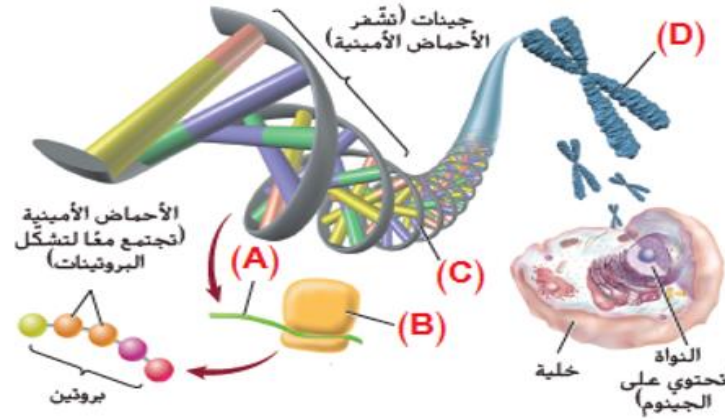
المبدأ المركزي

.d

The central dogma is that the information in genes flows from DNA to RNA and RNA to proteins. In the figure below, which letter refers to the mRNA?



يعني المبدأ المركزي أن المعلومات الموجودة في الجينات تتدفق من الـ DNA إلى الحمض النووي الرايبوزي ومنه إلى البروتينات. في الشكل أدناه، أي حرف يشير إلى الـ mRNA؟



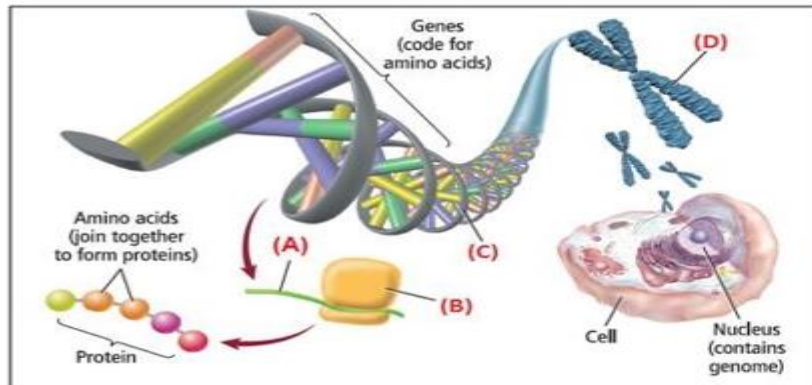
A .a

B .b

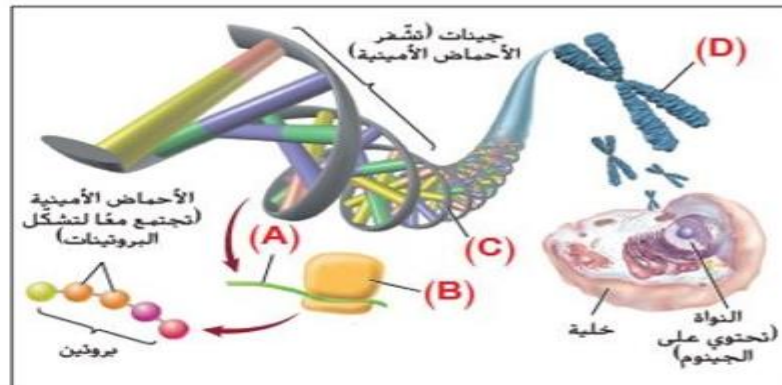
C .c

D .d

The central dogma is that the information in genes flows from DNA to RNA and RNA to proteins. In the figure below, which letter refers to the DNA?



يعني المبدأ المركزي أن المعلومات الموجودة في الجينات تتدفق من الـ DNA إلى الحمض النووي الرايبوزي ومنه إلى البروتينات. في الشكل أدناه، أي حرف يشير إلى الـ DNA؟



a. A

b. B

c. C

d. D

Which correctly lists the terms in order from smallest to largest?

أي مما يلي هو الترتيب الصحيح من الأصغر إلى الأكبر؟

- a. الكروماتين والكروموسومات والـ DNA والنيوكليوتيدات
Chromatin, chromosomes, DNA, nucleotides
- b. الكروموسومات والـ DNA والكروماتين والنيوكليوتيدات
Chromosomes, DNA, chromatin, nucleotides
- c. الـ DNA والنيوكليوتيدات والكروماتين والكروموسومات
DNA, nucleotides, chromatin, chromosomes
- d. النيوكليوتيدات والـ DNA والكروماتين والكروموسومات
Nucleotides, DNA, chromatin, chromosomes

Which statement about the human genome is false? أي من العبارات التالية المتعلقة بالجينوم البشري خاطئة؟

- a. يحتوي الجينوم البشري على ما يقرب من 25,000 جين
The human genome contains approximately 25,000 genes
- b. يحتوي الجينوم البشري على امتدادات طويلة للحمض النووي (DNA) من دون وظيفة معروفة
The human genome contains long stretches of DNA with no known function
- c. قام علماء من كل أنحاء العالم بترتيب تسلسل الجينوم البشري
The human genome was sequenced by scientists from around the world
- d. يحتوي الجينوم البشري على تسلسلات نيوكليوتيدات ترمز كلها إلى بروتينات
The human genome contains nucleotide sequences that all code for proteins

25. Which statement about the human genome is false?
- A. The human genome contains approximately 25,000 genes.
 - B. The human genome contains long stretches of DNA with no known function.
 - C. The human genome was sequenced by scientists from around the world.
 - D. The human genome contains nucleotide sequences that all code for proteins.
26. What are variations in specific nucleotides that are linked to human diseases called?
- A. proteomes
 - B. haplotypes
 - C. single nucleotide polymorphisms
 - D. genomes
27. For what purpose is DNA fingerprinting used?
- A. to sequence DNA from bacteria
 - B. to separate DNA fragments
 - C. to identify individuals who have committed crimes

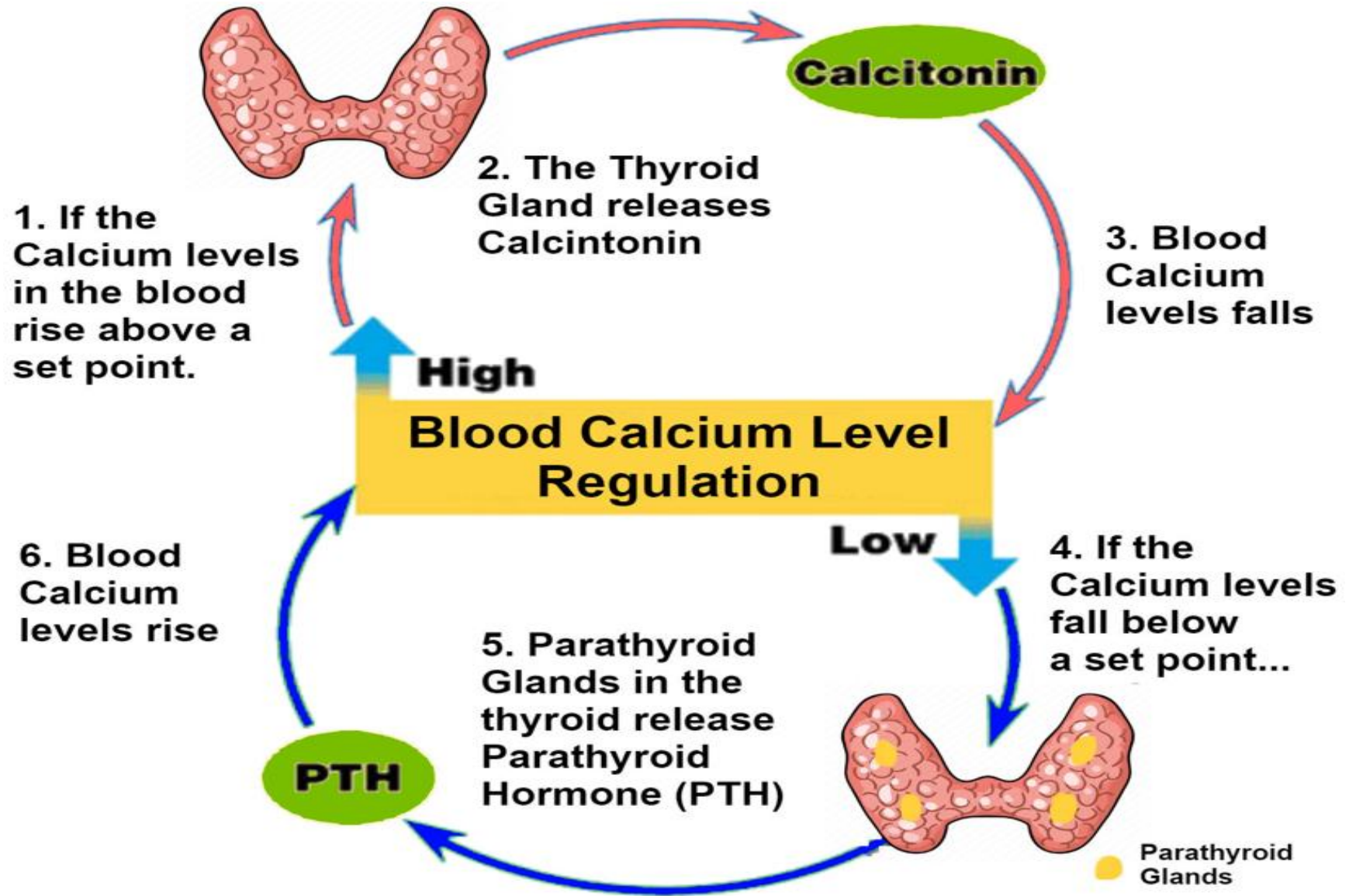
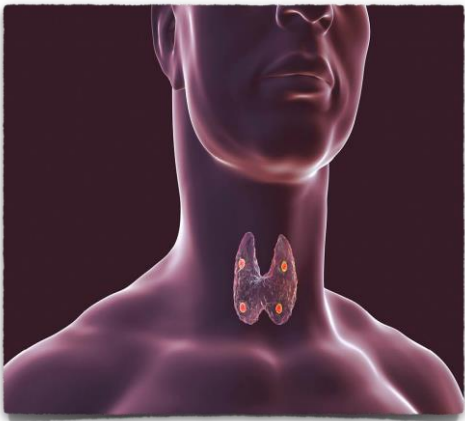
Understand Main Ideas

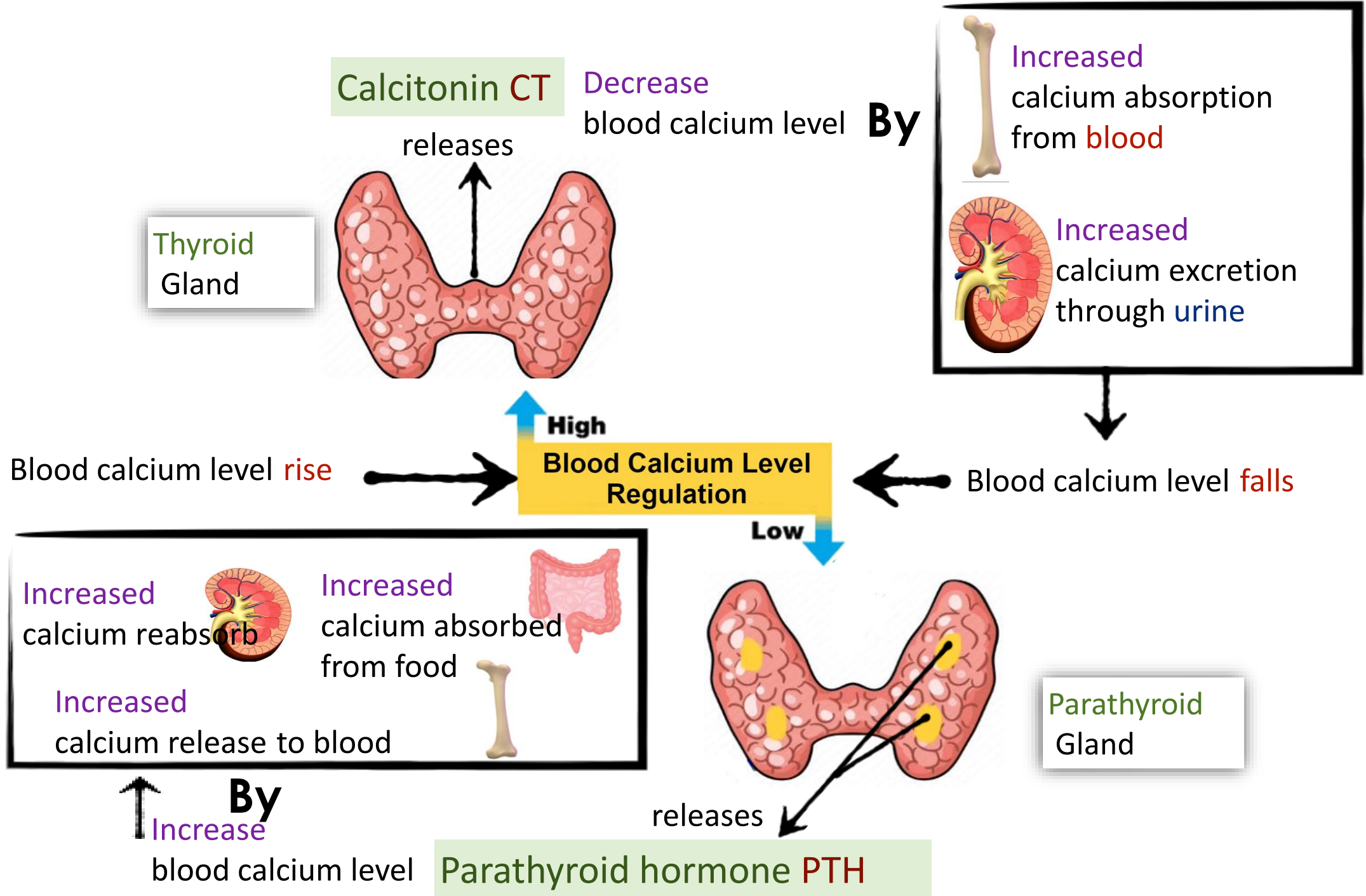
25. D

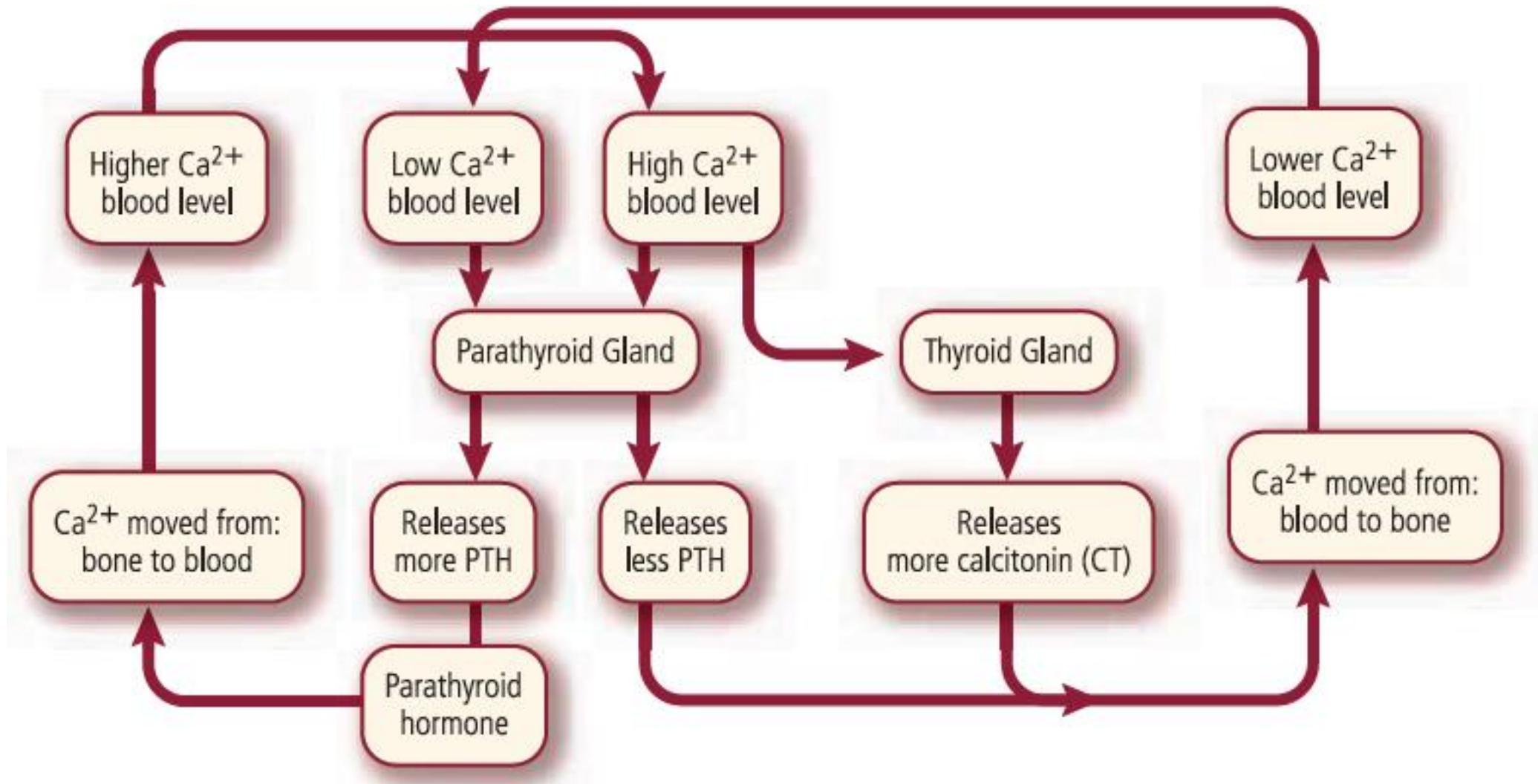
26. C

27. C

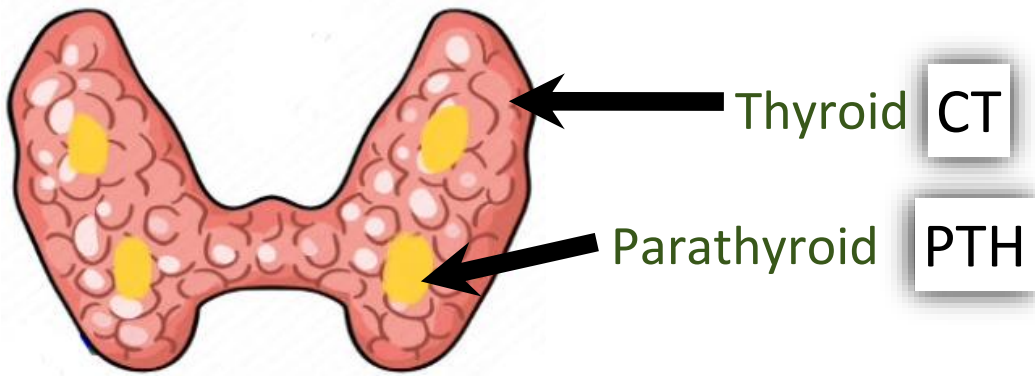
Thyroid and parathyroid Gland







Parathyroid hormone (PTH) and calcitonin (CT) regulate the level of calcium in the blood.



Homeostasis

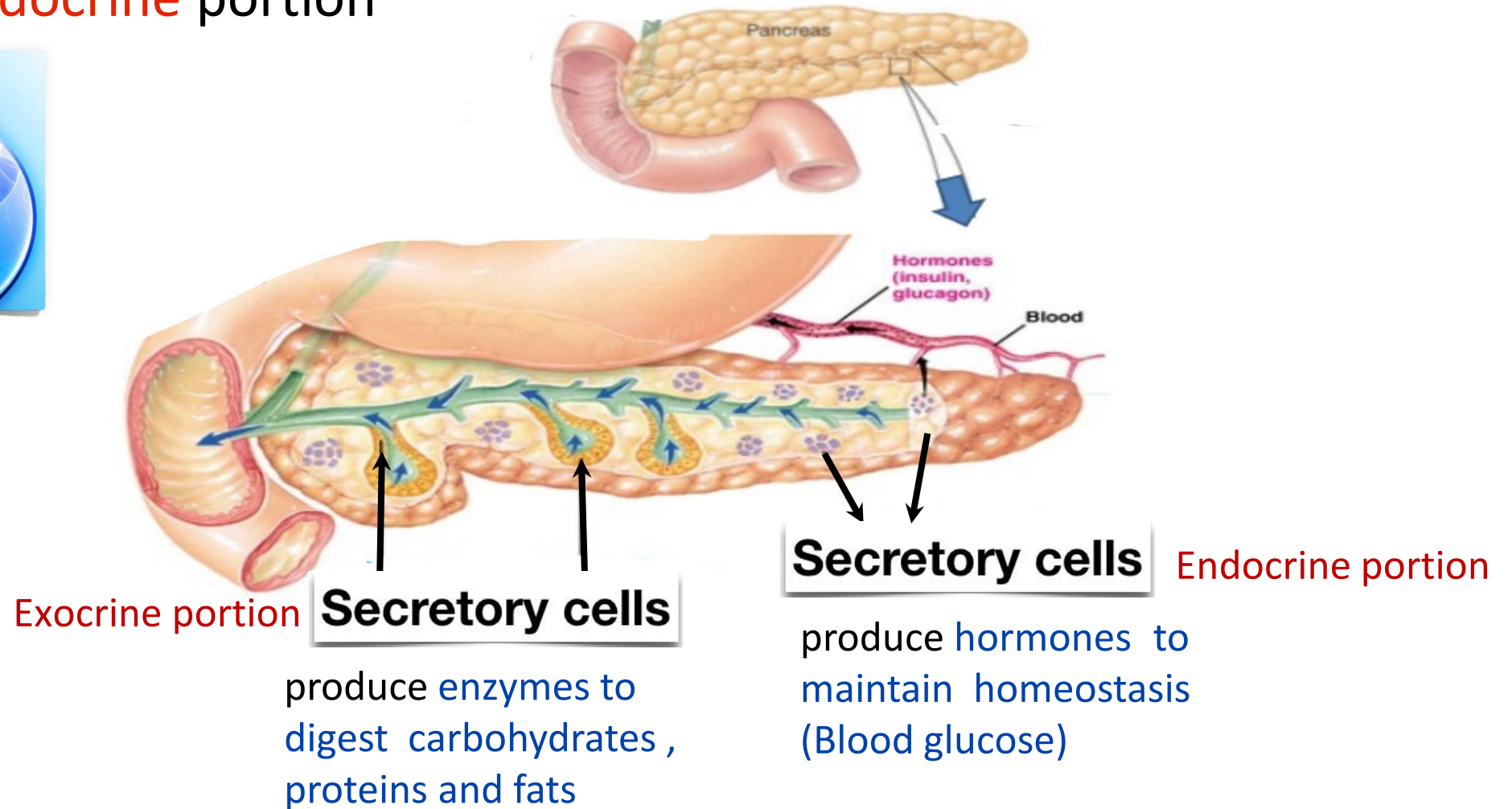
Maintain the level
of **calcium** in
blood

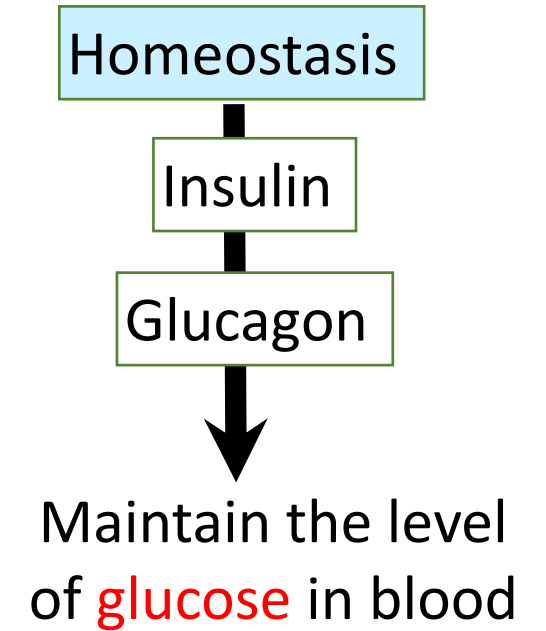
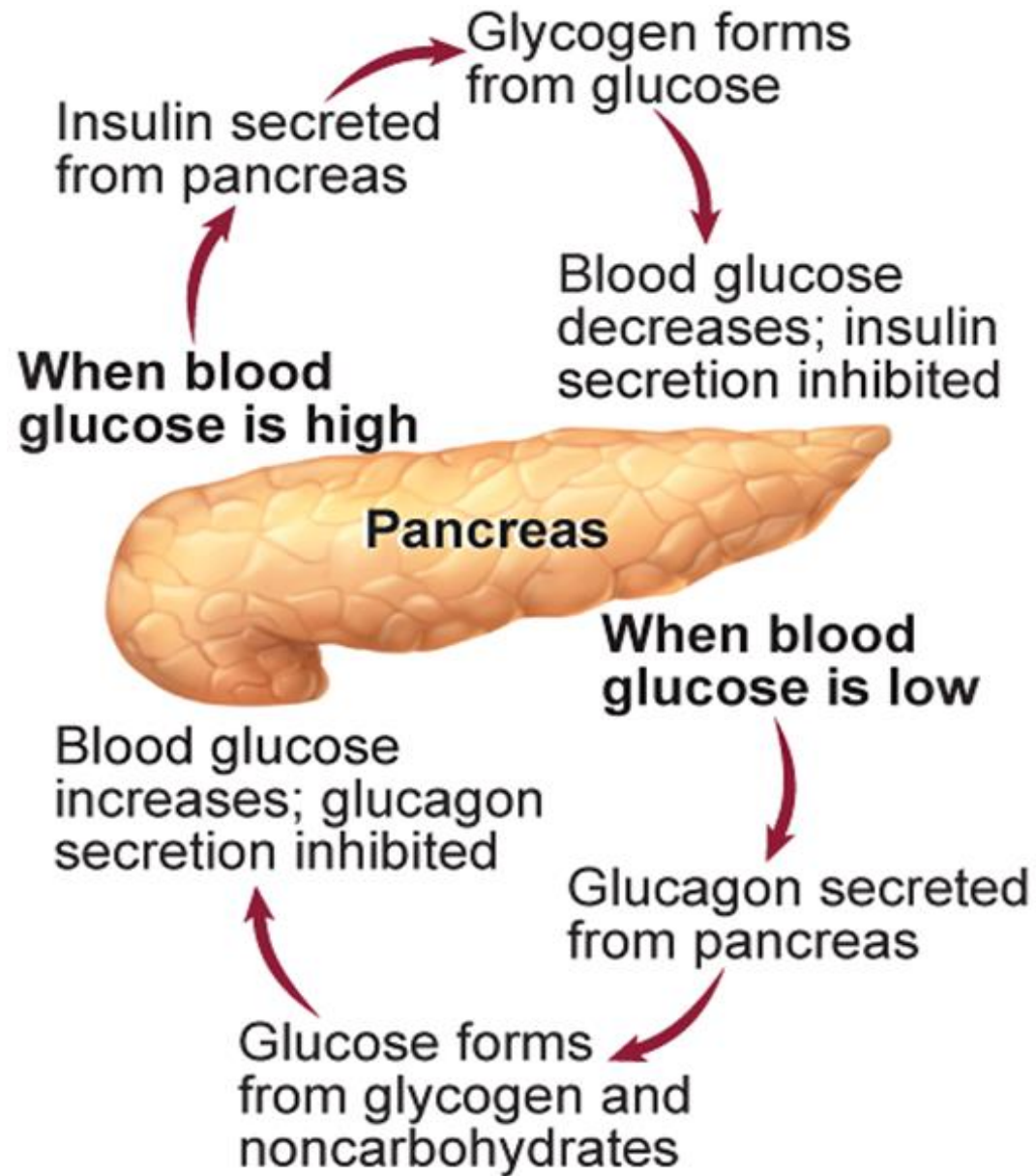
Complete the table

	CT	PTH
refer to	Calcitonin	Parathyroid hormone
The hormone producing glands	Thyroid gland	Parathyroid gland
When is the hormone secreted ?	When blood calcium levels rise	When blood calcium levels fall
It is function	Decrease blood calcium level	Increase blood calcium level
Organs which hormone stimulate it	Bone-kidney	Bone-kidney-intestine

Pancreas

Pancreas is a mixed gland, that mean it has an **exocrine** portion and an **endocrine** portion





■ **Figure 18** Glucagon and insulin work together to maintain the level of sugar in the blood.

Which pairs of hormones have opposite effects?

أي من المجموعات التالية من الهرمونات التالية لها تأثيرات متضادة؟

- a. **الكالسيتونين وهرمون الباراثورمون**
Calcitonin and parathyroid hormone
- b. **الإبينفرين والنورإبينفرين**
Epinephrine and norepinephrine
- c. **هرمون النمو والثيروكسين**
Growth hormone and thyroxine
- d. **الألدوستيرون والكورتيزول**
Aldosterone and cortisol

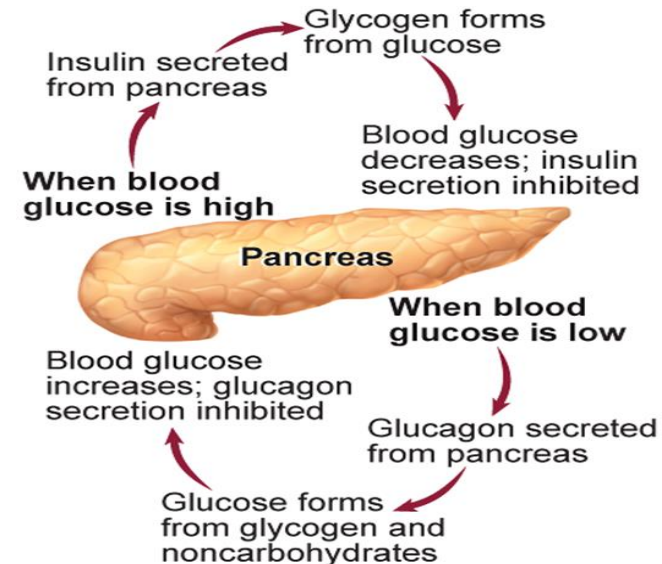
Which hormone is released by the pancreas?

ما الهرمون الذي يفرزه البنكرياس؟

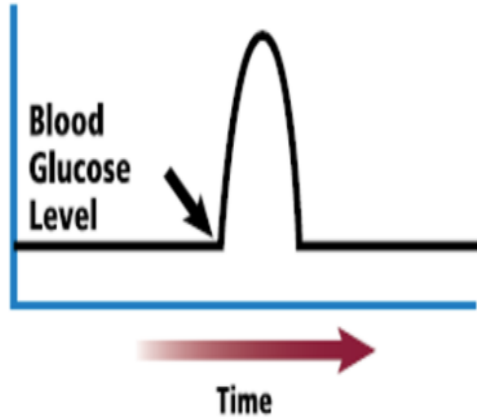
- a. **الكالسيتونين**
Calcitonin
- b. **الكورتيزول**
Cortisol
- c. **الثيروكسين**
Thyroxine
- d. **الأنسولين**
Insulin

Which hormone is more likely to be secreted by the pancreas during intense exercise?

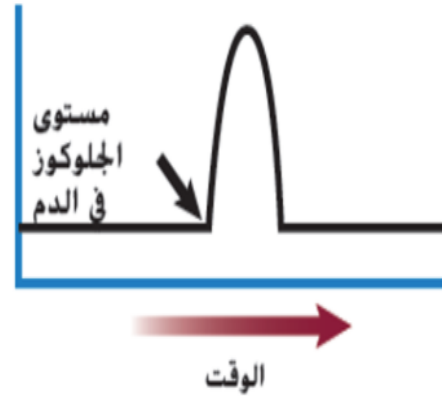
- A. glucagon**
- B. insulin**



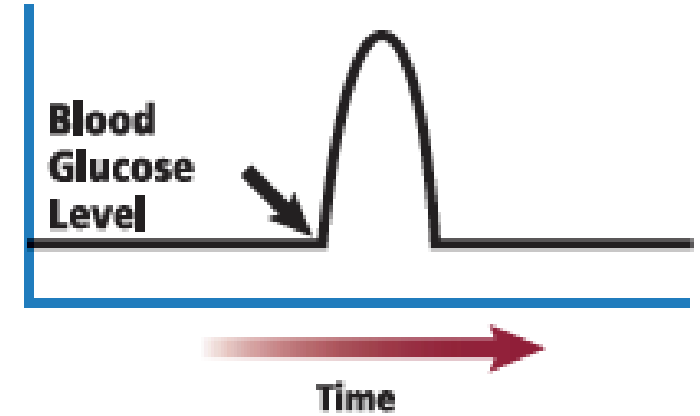
The graph below shows the blood glucose levels over a period of time. Which hormone might have caused a sudden surge as indicated by the arrow?



يوضح التمثيل البياني أدناه مستويات الجلوكوز في الدم على مدى فترة من الزمن. أي من الهرمونات التالية قد يكون السبب في الارتفاع المفاجئ المشار إليه بالسهم؟



The graph shows blood glucose levels over a period. Which hormone might have caused a sudden surge as indicated by the arrow?


☐

Growth hormone

هرمون النمو .a

☐

Insulin

الأنسولين .b

☐

Antidiuretic hormone

الهرمون المضاد لإدرار البول .c

☒

Glucagon

الجلوكاجون .d

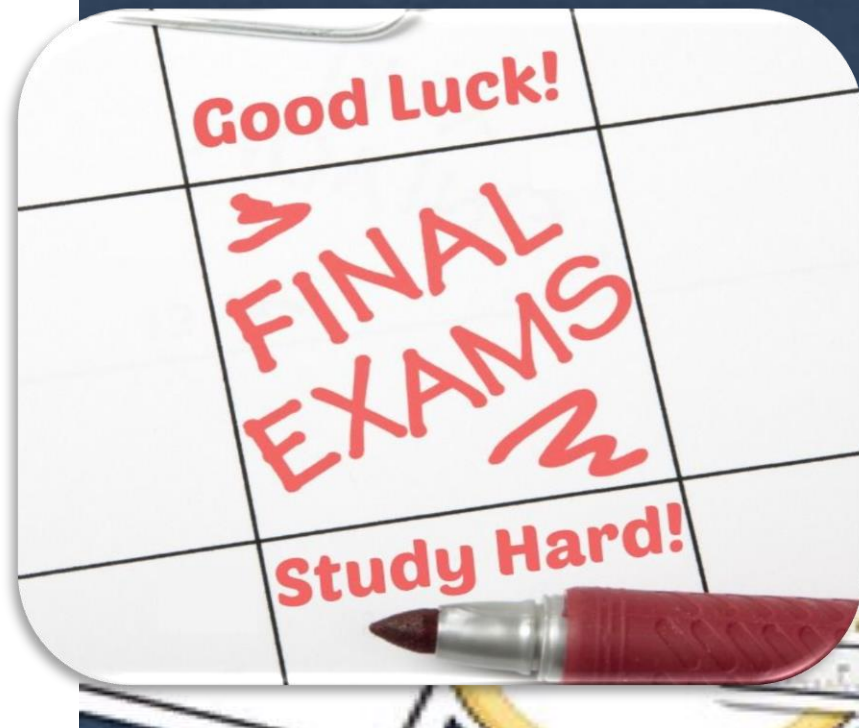
A. antidiuretic hormone

B. growth hormone

C. glucagon

D. insulin

تمنياتنا لجميع الطالبات بالتوفيق والنجاح في الاختبارات



MARYAM ALZAHIRANI
ALIA ALHARTHY