Chapter One

SKELETAL SYSTEM

Introduction:- مقدمة

The human body cannot keep its balance and harmony of its movement without having a hard support to which its soft parts are joined. This support is called **skeleton**.

لا يمكن لجسم الإنسان أن يحافظ على توازنه وانسجام حركته دون أن يكون لديه دعم قوي ترتبط به أجزائه الرخوة(اللينة).
هذا الدعم يسمى الهيكل العظمي.

*There is a strong link between the work of muscles and bones , which are together called as **movement system** .

هناك ارتباط قوي بين عمل العضلات والعظام ، ويطلق عليهما معًا جهاز الحركي.

Movement system= consist from muscles and bones

*muscles are responsible for generating power necessary for the movement, but bones usually support the muscles , and they change this power into a movement.

والعضلات مسؤولة عن توليد الطاقة اللازمة للحركة ، لكن العظام عادة ما تدعم العضلات ، وتحول هذه القوة إلى حركة.

How do muscles work with bones؟

muscles are responsible for generating power necessary for the movement, but bones usually support the muscles , and they change this power into a movement.

Importance of Skeletal : أهمية الهيكل العظمي

*** Skeletal system works as a rigid support**

*** gives the shape of body and straightness of body.**

***Parts of the skeletal system are connected with the movement organs and muscles.**

***Besides, some of its parts protect the significant organs from external effects. Thus, the skull protects the brain and the thoracic cage protects the lungs, heart and so on.**

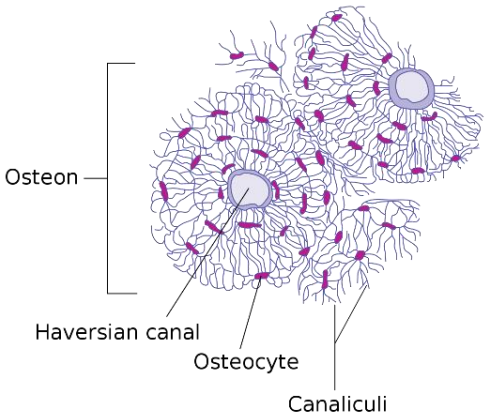
يعمل نظام الهيكل العظمي كدعم صلب ،
ويعطي شكل الجسم واستقامة الجسم.
ترتبط أجزاء من نظام الهيكل العظمي بأعضاء الحركة والعضلات.
إلى جانب ذلك ، فإن بعض أجزائه تحمي الأعضاء المهمة من التأثيرات الخارجية. وهكذا فإن الجمجمة تحمي الدماغ والقفص الصدري يحمي الرئتين والقلب وما إلى ذلك.

Bone structure

Q// what are the structure of bone?

The bone tissue is composed of star- like bone cells called osteocytes which are arranged in the form of circles around a central canal called as Haversian canal. This canal discovered by Clapton Havers (1657- 1702). Osteocytes secrete **Ossian** which is the solid substance of bones

يتكون النسيج العظمي من خلايا عظمية شبيهة بالنجوم تسمى الخلايا العظمية مرتبة في شكل دوائر حول قناة مركزية تسمى قناة هافرس. اكتشف كلابتون هافيرز هذه القناة (١٦٥٧-١٧٠٢). تفرز الخلايا العظمية **الصفائح العظمية** وهو المادة الصلبة للعظام.



Define osteocytes: star- like bone cells form the bone tissue , they which are arranged in the form of circles around a central canal called as Haversian canal. This canal discovered by Clapton Havers. Osteocytes secrete Ossein .

تشكل الخلايا العظمية النجمية النسيج العظمي، وهي مرتبة على شكل دوائر حول قناة مركزية تسمى قناة هافيرسين. اكتشف هذه القناة (كلابتون هافرس). تفرز الخلايا العظمية الصفائح العظمية.

(Define)Haversian canal:- a central canal in The bone tissue .(osteocytes) which are arranged in the form of circles around central canal them, This canal discovered by (Clapton Havers).

Ossein: which is the solid substance of bones secreted by osteocytes

test your self

Which is responsible :

*secrete Ossein=

* form the solid substance of bones=

Define: Ossein, Haversian canal, Osteocytes

What is function of Osteocytes- **Ossein**

Who is discovered Haversian canal**?**

Why is called Haversian canal this named?

Osteocytes= bone cells

The tissue formation of any bone dose not differ one from another except some bones of the head. For this reason, we shall take the femur as an example for studying the tissue formation of all bones.

لا يختلف تكوين أنسجة أي عظم عن الآخر باستثناء بعض عظام الرأس. لهذا السبب ، سنأخذ عظم الفخذ كمثال لدراسة تكوين أنسجة جميع العظام..

Parts of bone

Bones in human body are similar in structure but vary in shape and size.

عظام جسم الانسان تتشابه بالتركيب لكنها تختلف بالشكل والحجم

Q//What are the Parts of bone?

The femur bone is made up of a body and two ends. The body is covered by an external membrane which contains nerves and blood vessels to nourish the bone. This membrane is called as **periosteum** after this membrane, the compact bone comes. Compact bone is the hardest bone layer and contains bone marrow inside it.

يتكون عظم الفخذ من جسم ونهايتين. الجسم مغطى بغشاء خارجي يحتوي على أعصاب وأوعية دموية لتغذية العظام. يسمى هذا الغشاء باسم السمحاق بعد هذا الغشاء ، ويأتي العظم المضغوط. العظم المضغوط(المصمت) هو أصلب طبقة عظمية ويحتوي على نخاع العظم بداخله.

Define : The femur bone

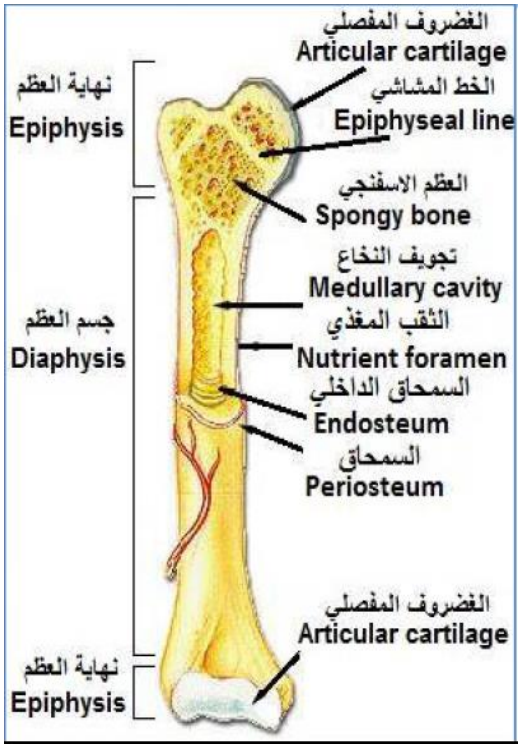
The two ends are distinguished from the body of bone by being spongy.

Spongy bone the two ends of bone is not surrounded by periosteum but instead of periosteum, a smooth half-solid layer called as **cartilage** covers it.

يتميز الطرفان(نهايتين) عن جسم العظم بكونهما إسفنجيًا. العظم الإسفنجي غير محاط بالسمحاق ولكن بدلاً من السمحاق ، تغطيه طبقة ناعمة نصف صلبة تسمى **الغضروف.**

Periosteum:-an external membrane covering the compact bone body which contains nerves and blood vessels to nourish the bone.

Compact bone: is the hardest bone layer and contains bone marrow inside it covered by external membrane called Periosteum.



Spongy bone	Compact bone
1-The two ends of bone 2-It's not surrounded by periosteum 3- but instead of periosteum, a smooth half-solid layer called as cartilage covers it.	1-Body of bone 2-covered by external membrane called Periosteum. 3-is the hardest bone layer

Chemical structure of bones

Q//what are the Chemical structure of bones?

Chemically, a bone consists of two major kinds of material:

1- Organic materials

2- Inorganic materials

Organic materials :The percentage of organic materials is %35, these organic materials are colloidal proteins known as **collagen** and mucous-like substance called as **mucole** .

النسبة المئوية للمواد العضوية هي ٣٥٪ ، وهذه المواد العضوية عبارة عن بروتينات غروانية تعرف باسم الكولاجين ومادة شبيهة بالأغشية المخاطية تسمى **الميكول** يشبه الألبومين (بياض البيض) وهو مهم لمرونة العظام.

Mucole : It is mucous-like substance resembles the albumin (white of egg) and it is important for bone flexibility , mucole part of Organic materials of bone.

Collagen: It is substance part of organic materials of bone and these materials are colloidal proteins.

Inorganic materials :The percentage of inorganic materials is %65, these inorganic materials are (phosphate, florid, chloride calcium), magnesium phosphate and sodium chloride (table salt), **they are responsible for the hardness of bones**.

نسبة المواد غير العضوية ٦٥٪ وهذه المواد غير العضوية هي (فوسفات ، فلوريد ، كلوريد الكالسيوم) ، فوسفات المغنسيوم وكلوريد الصوديوم (ملح الطعام) ، **فهي مسؤولة عن صلابة العظام**.

Organic materials	Inorganic materials
The percentage of organic materials is %35	The percentage of inorganic materials is %65
these organic materials are colloidal proteins known as **collagen** and mucous-like substance called as **mucole**	these inorganic materials are (phosphate, florid, chloride calcium), magnesium phosphate and sodium chloride (table salt),
it is important for bone flexibility	they are responsible for the hardness of bones

What are importance (benefit) of inorganic material? Function

they are responsible for the hardness of bones.

Test your self

What is location and function? Mucole – Collagen

Define : Mucole – Collagen- Organic materials- Inorganic materials

What is responsible ?

the hardness of bones- bone flexibility

Parts of human skeleton

Human skeleton has two main parts; they are axial skeleton and appendicular skeleton.

يتكون الهيكل العظمي البشري من جزأين رئيسيين؛ هم الهيكل العظمي المحوري والهيكل العظمي الزائدي.

Frist// Axial skeleton

1-Skull جمجمة

It includes **cranial bones**, **facial bones** and **tiny bones of middle ear**.

Skull is composed of 29 bones.

ويشمل عظام الجمجمة وعظام الوجه وعظام الأذن الوسطى الصغيرة .تتكون الجمجمة من ٢٩ عظمة

A- Cranial bones عظام القحف

They are eight bones which constitute a small box to **protect the brain**. Edges of cranial bones are serrated and interlocked into one another; therefore, they are called **immovable joints**. There is a relatively big hole at the bottom of **cranium** and this hole is called **foramen magnum** through which the spinal cord passes.

هم ثمانية عظام تشكل صندوقًا صغيرًا لحماية الدماغ. حواف عظام القحف مسننة ومتشابكة مع بعضها البعض. لذلك يطلق عليهم اسم المفاصل الثابتة. يوجد ثقب كبير نسبيًا في الجزء السفلي من **الجمجمة** ويسمى هذا الثقب **بالثقب العظمي(الاعظم)** التي يمر من خلالها الحبل الشوكي.

What is distinguish the edges of the bones of the cranium?

Edges of cranial bones are serrated and interlocked into one another

What is another called or named to cranial bones ?

they are called **immovable joints**.

Why is cranial bones called immovable joints?

Edges of cranial bones are serrated and interlocked into one another

foramen magnum : is a relatively big hole at the bottom of cranium through which the spinal cord passes.

A child's skull is distinguished from an adult's skull by being big in size according to other parts of skeleton **but** the child's face is relatively small.

Also in the child's skull there are spaces called as **fontanelle** which are located between the bones of head and they are covered with a fibrous cartilaginous tissue.

تتميز جمجمة الطفل عن جمجمة الشخص البالغ بأنها كبيرة الحجم وفقًا لأجزاء أخرى من الهيكل العظمي ولكن وجه الطفل صغير نسبيًا. يوجد أيضًا في جمجمة الطفل فراغات تسمى اليافوخ توجد بين عظام الرأس ومغطاة بنسيج غضروفي ليفي.

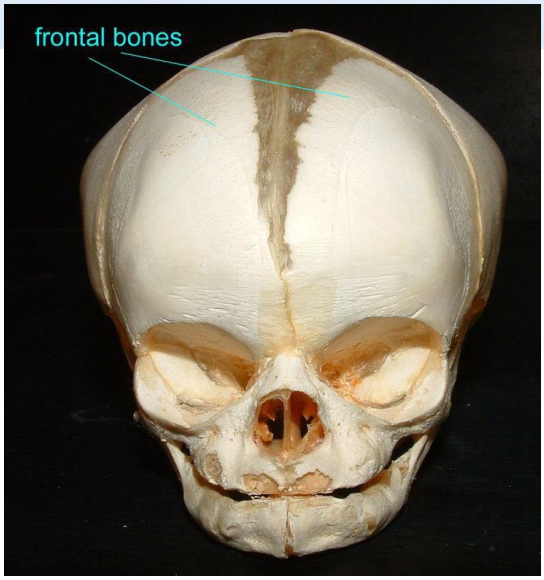
Q// what are the site (location) of fontanelle ?

Fontanelle is located between the bones of head in the child's skull.

Fontanelle:-are the spaces in the child's skull located between the bones of head and they are covered with a fibrous cartilaginous tissue.

What is distinguish between the bones of child cranium from the adult human cranium?

A child's skull is distinguished from an adult's skull by being big in size according to other parts of skeleton **but** the child's face is relatively small. due to found **fontanelle**



B- Facial bones عظام الوجه

They are 14 bones which surround the eyes (**eye sockets**), nasal cavity (**nasal bones**), mouth and also bones of ears,

these bones are not moveable except the **lower jaw** which can move laterally and vertically in **order to help** cutting, crushing and chewing the food , but the upper jaw is not moveable **because** it is joined to cranial bones.

تتكون من ١٤ عظمة تحيط بالعينين (تجويف العين) وتجويف الأنف (عظام الأنف) والفم وأيضًا عظام الأذنين ، وهذه العظام غير قابلة للحركة باستثناء الفك السفلي الذي يمكن أن يتحرك أفقيًا (جانبيا)وعموديًا للمساعدة في القطع والسحق و مضغ الطعام ولكن الفك العلوي غير متحرك **لأنه** مرتبط بعظام الجمجمة.

Number or list of facial bones ?

Why upper jaw is not movable?

Because it is joined to cranial bones.

Why lower jaw is movable?

lower jaw which can move laterally and vertically in **order to help** cutting, crushing and chewing the food.

C- Ear bones عظيمات الاذن الوسطى

They are three small bones located in middle ear named **as malleus** المطرقة **, incus** السندان **and stapes** والركاب.

***Skull include : 29 bones**

***Cranial bones 8 bones ,**

***Facial bones 14 bones**

*** Ear bones 3 bones (in each 3 bones) two of ear 6 bones**

Teeth الأسنان

They are conical or elongated white structures like bones, they **help us to cut, tear and grind the food.** The teeth are arranged on the jaws. There are 16 teeth on each jaw and the **total number** of teeth is 32 in an adult person.

They are transplanted in the jaws and covered partially with **the gums**.

وهي عبارة عن تراكيب بيضاء مخروطية أو مستطيلة مثل العظام ، فهي تساعدنا على قطع الطعام وتمزيقه وطحنه. الأسنان مرتبة على الفكين. يوجد ١٦ سنًا في كل فك ويبلغ إجمالي عدد الأسنان ٣٢ سنًا في الشخص البالغ. يتم غرسها في الفكين ومغطاة جزئيًا باللثة

Regions of a tooth مناطق السن

A tooth contains three regions: تحتوي السن على ثلاث مناطق

***crown** which represents the visible part of the tooth التاج الذي يمثل الجزء المرئي من السن

***root** which is transplanted in the jawbone الجذر الذي يتم غرسه في عظم الفك

* **neck** which is located between crown and root, also neck is surrounded by the gum.

العنق بين التاج والجذر، وكذلك العنق محاطة باللثة.

Structure of a tooth تركيب السن

A tooth is made up of

***Dentine** a basic substance which is a very solid substance because it contains calcic materials **of tooth**. عاج الأسنان مادة أساسية وهي مادة صلبة جدًا لاحتوائها على مواد كلسية

***Crown** is covered with a hard shining white external layer called **enamel,**

التاج مغطى بطبقة خارجية بيضاء صلبة لامعة تسمى المينا

Enamel: hard shining white external layer covered the crown **of tooth.**

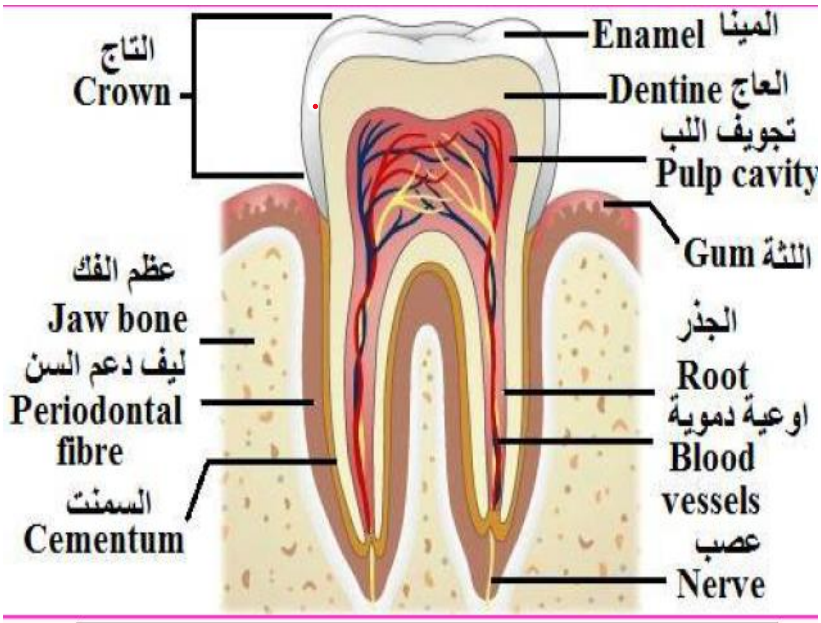
*** Cementum**: substance rough brown solid covered the regions of neck and root **of tooth.**

السمنت : مادة خشنة بنية صلبة تغطي مناطق العنق والجذر .

What is inside the tooth structure?

Inside the tooth, there is a cavity called **pulp** in which there are a branched dental nerve and branched blood vessels therefore we can **feel the pain, cold , heat and pressure** . They enter the tooth through a hole called **apical foramen** located at the bottom of the root.

يوجد داخل السن تجويف يسمى اللب يوجد فيه عصب أسنان متفرع وأوعية دموية متفرعة لذلك يمكننا الشعور بالألم والبرودة والحرارة والضغط.
يدخلون السن من خلال ثقب يسمى الثقب القمي الموجودة في أسفل الجذر.



human teeth structure تركيب أسنان الإنسان

Apical foramen: it is a hole located at the bottom of the root of tooth, through it branched dental nerve and branched blood vessels inter the tooth.

What is the location and function of the apical foramen?

located at the bottom of the root of tooth,

Function: through it branched dental nerve and branched blood vessels inter the tooth.

Why is the dentine very solid substance?

What is difference between foramen magnum and apical foramen?

foramen magnum	apical foramen
1- is a relatively big hole at the bottom of cranium 2- through it which the spinal cord passes.	1-a hole located at the bottom of the root in tooth. 2- through it dental nerve and branched blood vessels which enter the tooth

Types of teeth and their numbers انواع الاسنان واعدادها

1- Deciduous (milk) or Temporal teeth

They begin to appear after sixth month and are completed after first year : then they begin to fall after(sixth year - at 7th year). There are ten teeth in each jaw. Total number of temporal teeth is 20.

الاسنان اللبنية (المؤقتة)تبدأ بالظهور بعد الشهر السادس وتكتمل بعد السنة الاولى: بعدها تبدأ بالتساقط بعد السنه السادسة اي السنة السابعة من عمر الطفل عشرة اسنان ف كل فك أي مجموعها ٢١ سن

2- Permanent teeth الأسنان الدائمة

They usually begin to appear after the 7th years. Their number is completed after the puberty and the last teeth may delay appearing until age 25, total number of permanent teeth is 32.

عادة ما تبدأ في الظهور بعد ٧ سنوات. يكتمل عددهم بعد سن البلوغ وقد يتأخر ظهور الأسنان الأخيرة حتى سن ٢٥ ، العدد الإجمالي للأسنان الدائمة هو ٣٢.

Health of teeth صحة الاسنان

Q// How can take care of your teeth? كيف تعتني بأسنانك

1- Teeth must be brushed after eating (why) to remove the food remnants and prevent bacteria growth.

2- Visiting the physician periodically (why)to prevent rotten in teeth.

3- Prevent damage of teeth.

*يجب تنظيف الأسنان بالفرشاة بعد الأكل لإزالة بقايا الطعام ومنع نمو البكتيريا.

*زيارة الطبيب بشكل دوري للوقاية من تسوس الأسنان.

*منع تلف الأسنان.

Teeth implant زراعة الأسنان

It a process of implanting an artificial teeth instead of a decayed teeth. It is rare **(why)** because it is economically expensive and takes long time.

هي عملية زراعة أسنان صناعية بدلاً من الأسنان الفاسدة. إنه نادر لأنه مكلف اقتصاديًا ويستغرق وقتًا طويلاً.

Gums inflammation التهاب اللثة

It is a microbial infection that causes splitting in gums and bad smell breath.

smoking, drinking alcohol and bad nutrition increases the infection probability.

وهي عدوى جرثومية تسبب انشقاق اللثة ورائحة كريهة الرائحة. **يزيد التدخين وشرب الكحوليات والتغذية السيئة من احتمالية الإصابة.**

Deciduous (milk)or temporal teeth	Permanent teeth
1-They being to appear after sixth month	Being to appear after 7th years , till 32 years some time.
2-completed after first year they begin to fall after 6-7 year	their number completed after the puberty and last teeth may delay appearing until age of 32.
3-There are 10 teeth in each jaw total number of temporal teeth is 20	There are 16 teeth on each jaw and the total number of teeth is 32 in an adult person.

What is increase probability of Gum inflammation?

smoking, drinking alcohol and bad nutrition increases the infection.

What is the microbial infection that causes to teeth?

splitting in gums and bad smell breath.

Structure	Location	Fucation
Fontanelle	between the bones of head	
apical foramen	at the bottom of the root	The nerve and blood vessels enter the tooth
Mucole	Bone	it is important for bone flexibility.
Skull	Axial skeleton	to protect the brain
Foramen magnum	the bottom of cranium	through which the spinal cord passes.
Cranium	Skull	to protect the brain
Crown	the visible part of the tooth	
Neck	is located between crown and root	
Dentine	basic substance of tooth	Give to tooth solidity
Enamel	external layer of tooth	Covered of tooth with a hard shining white
Cementum	covered the regions of neck and root of tooth	substance rough brown solid to tooth
Pulp	cavity inside the tooth	

Give reason of the following: or write the cause

1- Teeth must be brushed after eating.

to remove the food remnants and prevent bacteria growth

2- we can feel the pain, cold , heat and pressure.

Inside the tooth, there is a cavity called pulp in which there are a branched dental nerve and branched blood vessels.

3- They (cranial bones) are called immovable joints.

Edges of cranial bones are serrated and interlocked into one another.

4- the lower jaw which can move laterally and vertically

to help cutting, crushing and chewing the food.

5- the upper jaw is not moveable.

because it is joined to cranial bones.

6- dentine which is a very solid substance.

because it contains calcic materials.

7- Presence apical foramen located at the bottom of the root.

Through which the dental nerve and blood vessels enter the tooth.

8- Visiting the physician periodically

to prevent rotten in teeth and prevent any damage to teeth.

9-Teeth implant is rare.

because it is economically expensive and takes long time.

10-we can feel the pain, cold , heat and pressure in tooth

because the tooth contain dental nerve and branched blood vessels

test your self

Q/Who is responsible for the following?

Secretes of ossein- protects of brian – nourish the bone- hardness of teeth- bone flexibility – protects the lungs and heart- generating power necessary for the movement- hardness of bone- the shape of body – straightness of body

Q/ Write the location (position)of the followings:

Haversian canal-dentine-crown-enamel-cementum

Vertebral Column

The length of vertebral column is 75 cm in an adult. It is composed of 33 bones and each one is called as vertebra. There is a cartilaginous disc between two vertebrae. These cartilages enable the vertebral column to bend to different sides, facilitate the movement of vertebrae and prevent the friction of vertebrae.

Characteristics of vertebral column:

*Their length of it is **75 cm** in adult ويبلغ طوله عند البالغين 75 سم

*Number of vertebrae is **33** in adult. عدد الفقرات عند البالغ 33 فقرة.

*There is cartilaginous disc between two vertebrae..يوجد قرص غضروفي بين فقرتين

*These cartilages enable the vertebral column **to bend to different sides** ,

facilitate the movement of vertebrae and prevent the friction of vertebrae.

* تمكن هذه الغضاريف العمود الفقري من الانحناء إلى جوانب مختلفة، مما يسهل عملية الحركة الفقرات ومنع احتكاك الفقرات.

Cartilaginous disc: They are discs located between two vertebrae. These cartilages enable the vertebral column to bend to different sides , facilitate the movement of vertebrae and prevent the friction of vertebrae.

What is location and function of cartilaginous disc?

Location: cartilaginous disc between two vertebrae.

Function: These cartilages

*enable the vertebral column to bend to different sides ,

*facilitate the movement of vertebrae

* prevent the friction of vertebrae.

Vertebra consists of :

1-Centrum:- is a disc- like flat portion tend to the front part according to the positions in the vertebral column. جسم الفقرة و جزء مسطح يشبه القرص ويميل إلى الجزء الأمامي وفقًا للمواضع الموجودة ف في العمود الفقري

2-Vertebral arch:-is located to the backside of the centrum.القوس الفقري يقع في مؤخرة جسم الفقرة

***Vertebral foramen** :-is a hole between arch and centrum form **Vertebral canal**

***Vertebral canal :-**is a tube formed from their ring when vertebrae arranged vertically. Spinal cord passes through this tube.

انبوب تكون من حلقاتها عندما تترتب حلقات العمود الفقري .الحبل الشوكي يمر من خلاله

3-Processes :- are osseous appendages emerging from the vertebral

النتواءات:- هي الزوائد العظمية الخارجة او الناشئة من العمود الفقري

There are three kind of processes

1-spinous process:-this process is in the middle and it stands in front of the centrum (body) and **connect with muscles**

النتوء الشوكي في الوسط وتمتد امام جسم الفقرة وتتصل بالعضلات

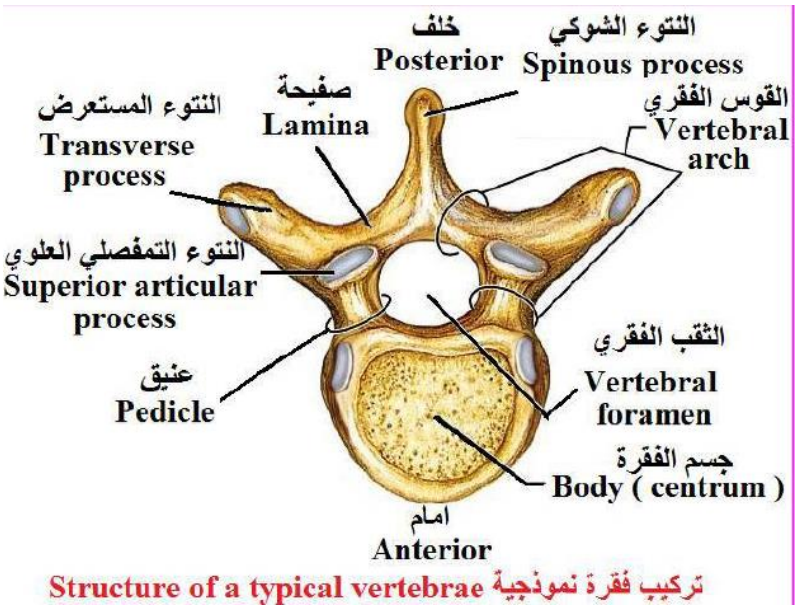
2-transverse processes:-there are two lateral processes for **connection of ribs**

النتوءان المستعرضان و تتصل بالاضلاع

3- articulated processes:

there are two pairs processes from vertebral arch **articulated the vertebrae one anther**

وهناك نتوءان تمفصليان يربط الفقرات بعضها ببعض



Structure of a typical vertebrae تركيب فقرة نموذجية

Type of process	Location	Function
spinous process	One process is in the middle and it stands in front of the centrum	connect with muscles
transverse processes	there are two lateral processes	for connection of ribs
articulated processes	there are two pairs processes from vertebral arch	articulated the vertebrae one anther

Regions of vertebral column مناطق العمود الفقري

1-Cervical Region:- it consists of seven vertebrae .

المنطقة العنقية:- وتتكون من سبع فقرات.

atlas:-The first cervical vertebra it is joined to the bottom of the skull

الأطلس:-الفقرة العنقية الأولى وهي متصلة بأسفل الجمجمة

axis:-the second cervical vertebra ،it is joined to atlas with a long process at the top of it . Through this connection **the head can easily turn and incline**

المحور:-الفقرة العنقية الثانية، وهي متصلة بالأطلس بعملية طويلة عند الجزء العلوي منه. من خلال هذا الاتصال يمكن للرأس أن يدور وينحدر بسهولة

Why :the head can easily turn and inclineيمكن للرأس أن يدور وينحني بسهولة

Through the connected between atlas and axis

من خلال الاتصال بين الأطلس والمحور

2-Thoracic Region:- it is made up of twelve vertebrae. Ribs are joined to this region.

2-المنطقة الصدرية:- تتكون من ١٢ فقرة الاضلاع تتصل بهذه المنطقة

3-Lumber Region:- it is composed of five broad vertebrae , their sides are flat.

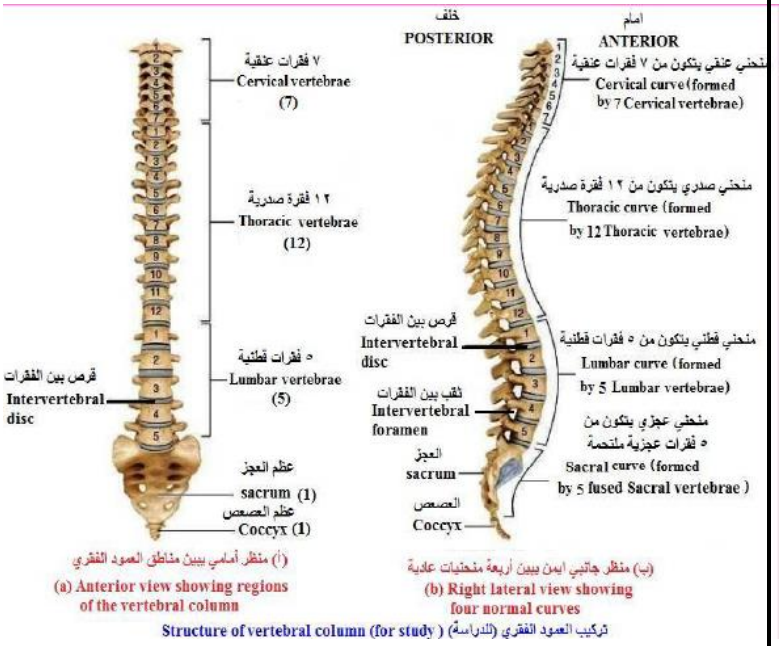
3-المنطقة القطنية: - تتالف من ٥ فقرات عريضة ومسطحة الجوانب

4-Sacral Region:- it consists of five cohesive vertebrae which constitute a single bone called **(sacrum)**.

4-المنطقة العجزية :- تتالف من ٥ فقرات ملتحمة التي تشكل عظم مفرد يدعى العجز

5-Coccygeal Region:- it is made up of four vertebrae which are cohesive with one another and the make a single bone called (**coccyx**)

5- المنطقة العصعصية:-تتكون من اربع فقرات ملتحمة مع بعضها البعض لتكون عظم مفرد يدعى **العصعص**



How can turn head easily? كيف تحرك الرأس بسهولة ؟

By joined between axis with atlas with a long process at the top of it ,through this connection the head can easily turn and incline .

بواسطة الاتصال بين المحور والاطلس ببروز طويل في مقدمتها خلال هذا الاتصال يستطيع الراس الحركة بسهولة.

Sacrum: single bone which constitute of five cohesive vertebrae of Sacral Region.

Coccyx: single bone made up of four vertebrae which are cohesive with one another of Coccygeal Region.

Sacrum	Coccyx
single bone which constitute of five cohesive vertebrae of.	single bone made up of four vertebrae which are cohesive with one another
In Sacral Region	In Coccygeal Region

Thoracic cage القفص الصدري

Thoracic cage contain from: Ribs and Sternum

يتكون القفص الصدري من الاضلاع والقص

1-ribs:-has 12 pairs of ribs **الأضلاع:-تحتوي على ١٢ زوجًا من الأضلاع**

the first 7 pairs of ribs are directly connected with the sternum by small cartilaginous pieces **called true ribs.**

اول ٧ ازواج من الاضلاع ترتبط مباشرة مع القص بواسطة قطعة غضروفية صغيرة تدعى **الاضلاع الحقيقية**

And 3 pairs of ribs not connected with sternum directly but connected with the cartilage of the seven rib of true ribs and **called false ribs.**

وثلاثة أزواج من الأضلاع غير متصلة بالقص مباشرة ولكنها متصلة مع غضروف الضلع السبعة من الأضلاع الحقيقية

وتسمى الأضلاع الكاذبة.

And **there is two pairs** of ribs not joined to anything at the front the called free ribs.

وهناك زوجان من الاضلاع لا تتصل بأي شي من الامام تدعى **الاضلاع السائبة.**

Cartilaginous pieces: are the cartilage –like structure which present in the front side of true and false ribs (in the thoracic cage). they are important in the process of respiration since they facilitate the movement of the thoracic cage

القطع الغضروفية: هي تراكيب تشبه الغضروف والتي توجد في الجانب الأمامي من الأضلاع الحقيقية والكاذبة (في القفص الصدري). وهي مهمة في عملية التنفس لأنها تسهل حركة القفص الصدري.

Why we are fined the cartilaginous pieces are the cartilage –like structure which present in the front side of true and false ribs?

لماذا نجد القطع الغضروفية ذات الهيكل الغضروفي التي تمثل الجانب الامامي للاضلاع الحقيقية والكاذبة ؟

Or

we are fined the cartilaginous pieces in the thoracic cage.

Because they are important in the process of respiration since they facilitate the movement of the thoracic cage.لأنها مهمة في عملية التنفس لتسهيل حركة القفص الصدري

Give the reason:

- **Some ribs are called true ribs.**

Because the first 7 pairs of ribs are directly connected with the sternum by small cartilaginous pieces.

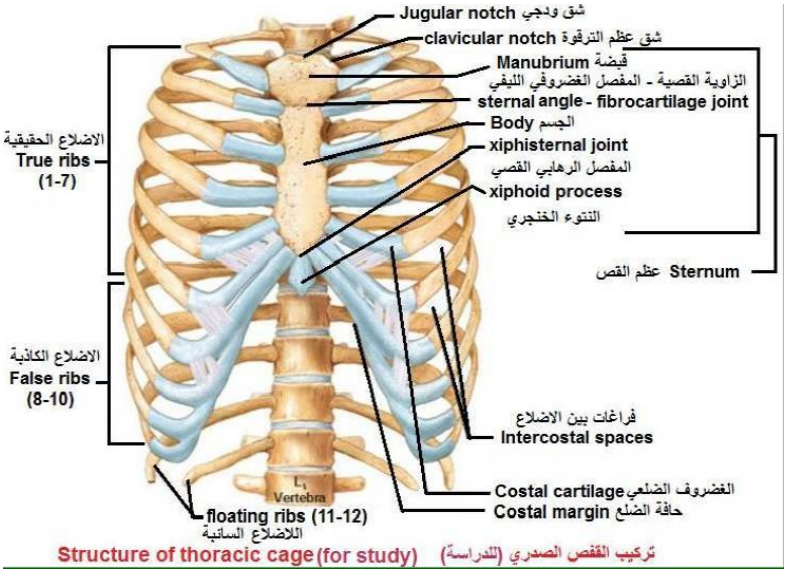
- **Some ribs are called false ribs.**

The three pairs of ribs not connected with sternum directly but connected with the cartilage of the seven rib of true ribs .

- **Some ribs are called free ribs.**

there is two pairs of ribs not joined to anything at the front .

True ribs	False ribs
1-the first 7 pairs of ribs	1-The three pairs of ribs
2- ribs are directly connected with the sternum by small cartilaginous pieces.SO called true ribs	2- ribs not connected with sternum directly but connected with the cartilage of the seven rib of true ribs . SO called false ribs



Structure of thoracic cage (for study) تركيب القفص الصدري (للدراسة)

2-sternum:-

It is a long level structure which consists of three cohesive bones and it is found in the front of the chest .Its lower end is pointed . From the sides , true ribs are joined to the sternum by cartilaginous pieces.

القص:- وهو هيكل طويل المستوى ويتكون من ثلاث عظام ملتحمة وتوجد في الجزء الامامي للصدر والنهاية السفلى تكون مدببة اقل من الجوانب والاضلاع الحقيقية تتصل بالقص بقطع غضروفية.

الانتباه لما يأتي لطفا

There is three holes in this chapter

Vertebral foramen:-it is a hole **between** arch and centrum when it arranged vertically contain tube called **vertebral canal**.

Apical foramen:-is a hole **located at the bottom of the root of tooth** . Inter **through it blood vessel and dental nerve to teeth.**

Foramen magnum:-there are a big hole **at the bottom of cranium** through which **the spinal cord passes**

Structure	Location	Function
Thoracic cage	Axial skeleton	Protects the lung and heart
vertebral foramen	Vertebra	Through which the spinal cord passes
Vertebral canal	Vertebra column	Through which the spinal cord passes
Cartilaginous disc	Between the vertebrae of the Vertebra column	*enable the vertebral column to bend to different sides , *facilitate the movement of vertebrae *prevent the friction of vertebrae
Spinous process	(in the Vertebra) in the middle and it stands in front of the centrum	muscles connect to it
Transverse processes	lateral processes from Vertebra	connection of ribs
Articular processes	two pairs processes from vertebral arch	articulated the vertebrae one anther
Cartilaginous pieces	present in the front side of true and false ribs (in the thoracic cage).	they are important in the process of respiration since they facilitate the movement of the thoracic cage

Q/ Write the location (position)of the followings:

Cementum- vertebral arch- processes – sternum- axis-atlas-sacrum-coccyx

Q/ Write the cause (reason) of the following:

1- There is cartilaginous disc between two vertebrae.

These cartilages enable the vertebral column to bend to different sides , facilitate the movement of vertebrae and prevent the friction of vertebrae.

2- the head can easily turn and incline

Through the connected between atlas and axis

3-presence of Spinous process in the vertebra.

For muscles connect to it

4-presence of transverse processes in the vertebra.

For connection of ribs

5- There are two pairs emerging from vertebral arch articulated

articulated the vertebrae one anther

6- Presence of the cartilaginous pieces at the front side of true and false ribs

Because they are important in the process of respiration since they facilitate the movement of the thoracic cage.

Q/Who is responsible formation for the following? sacrum-coccyx

Appendicular skeleton الهيكل الطرفي

*This skeleton is composed of double bones,
*which are located on both sides of body.
*Bones of the limbs are jointed to the axial skeleton by means of two girdles: **shoulder girdle** and **pelvic girdle** respectively.

*يتكون هذا الهيكل العظمي من عظام مزدوجة
*تقع على جانبي الجسم.
*ترتبط عظام الأطراف بالهيكل العظمي المحوري عن طريق حزامين: حزام الكتف وحزام الحوض على التوالي.

Pectoral Girdle and upper limbs:- حزام الصدر واطراف العليا

Pectoral Girdle

consist from: **Scapula** and **Clavicle**

What are consists of shoulder gridle?

consist from: **Scapula** and **Clavicle**

Shoulder girdle= Pectoral Girdle

Scapula:-is a level tringle –like bone . it is back surface forms a long process which extends but front surface is soft and somewhat concave. (located in the backside of the body outside the ribs and jointed to the ribs and jointed to the muscles of the shoulder)

عظم الكتف هو عظم مسطح يشبه المثلث سطحه الخلفي يتكون منه نتوء طويل ممتد (برز) ولكن جانبه الامام فانه املس و مقعر الى حد ما ، لوح الكتف يقع في الجهة الظهري من الأضلاع و ترتبط بعضلات الكتف.

What is location of the scapula in the body or in shoulder girdle?

located in the backside of the body outside the ribs and jointed to the ribs and jointed to the muscles of the shoulder

Clavicle:-is a thin arch –like bone and its position in the body can be left since it extends between the scapula and top of Sternum

الترقوة: عظم يشبه القوس رفيع وموضع في الجسم بين لوح الكتف وأعلى القص

What is location of the Clavicle bone in the body?

location in the body between the scapula and top of Sternum

Shoulder joint :-is a cavity which formed from the meeting of the bones of scapula and clavicle in the shoulder girdle ,the head of humerus settles the cavity and they constitute the shoulder joint.

مفصل الكتف :-

هو تجويف يتكون من التقاء عظام لوح الكتف والترقوة في حزام الكتف، ويستقر رأس العضد في التجويف ويشكلان مفصل الكتف.

What is formed of meeting of the bones of scapula and clavicle in the shoulder gridle?

How is the shoulder joint constituted?

Upper limbs:-

CONSIST : humerus, forearm (ulna and radius) and Hand(carpal bones, matacarpal bones and phalanges)

A-humerus:-it is long and strong bone .the upper end is round and form the head of the upper arm which is articulated with scapula by a joint form the top. The movement of this is approximately circular since the head of upper arm is big. from the other side articulated with forearm by the **elbow join**.

أ-عظم العضد:-هو عظم طويل وقوي. طرفه العلوي مستدير ويشكل رأس العضد الذي يتمفصل معه لوح الكتف بمفصل يشكل الجزء العلوي. وحركتها دائرية تقريباً لأن رأس العضد كبير. من الجانب الآخر تتمفصل بالساعد بواسطة مفصل المرفق.

B-forearm:-consists of two long bones: (ulna and radius)

الساعد تكون من عظمين طويلين (الزند و الكعبرة)

1-ulna:-is the longest bone in forearm and located in the direction of the little finger. الزند :-اطول عظم في الساعد يقع باتجاه الاصبع الصغير

2-radius:-the other bone in forearm located in the direction of the thumb.

2-الكعبرة :-العضم الاخر في الساعد يقع في اتجاه الابهام

forearm articulated with **humerus** by the **elbow join**

Wrist joint: which these two bones ulna and radius (**forearm**) are articulated from the bottom with the wrist.

مفصل المعصم الذي تمفصل معه عضمي الكعبرة والزند (عظام الساعد)من اسفل المعصم.

Elbow joint: Joint which formed from forearm (ulna and radius) articulated with humerus by it. **This type of joint** allows movement about one axis called **Hinge.**

مفصل الكوع: المفصل الذي يتمفصل به الساعد مع عظم العضد. هذا النوع من المفاصل يسمح بالحركة حوالي واحد محور يسمى المفصلي.

C-Hand:-Consists **from 27 bones** ,divided in to three parts (carpal bones, matacarpal bones and phalanges)

1-carpal bones (wrist):- الرسغ

Composed of 8 bones which are arranged into two rows and there are four bones in each row

يتكون من ٨ عظام تترتب في صفين هنالك ٤ عظام في كل صف.

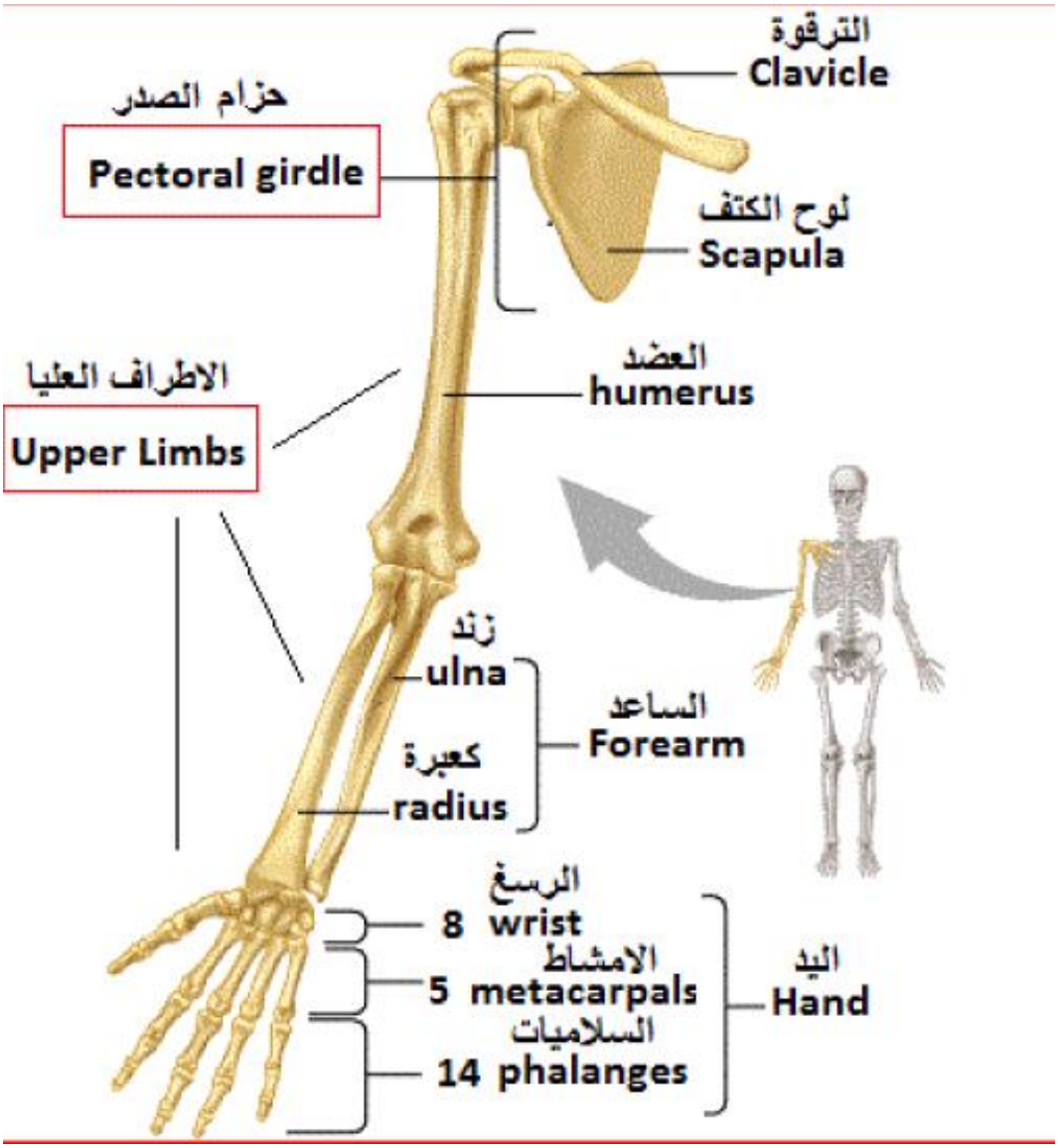
2-matacarpal bones :-(palm) عظام المشط

Made up of 5 bones which are relatively long تتكون من ٥ عظام التي تكون طويلة نسبيا

3- Fingers phalanges:- الاصابع السلاميات

Composed of 14 bones called phalanges .each finger contains 3 phalanges ,except the **thumb ,contains 2 phalanges**

تتكون من ١٤ عظم كل اصبع ٣ سلاميات عدا الابهام سلاميتين.



Pelvic Girdle:-

Consist of 2 symmetrical halves. each of them is composed 3 cohesive bones. **ilium ,ischium and pubis.**

حزام الحوض يتألف من نصفين متناظرين كل واحد منها يتألف من ثلاث عظام ملتحمة الحرقفة والورك والعانة.

*The pelvic is like a vessel on which the vertebral column rests.

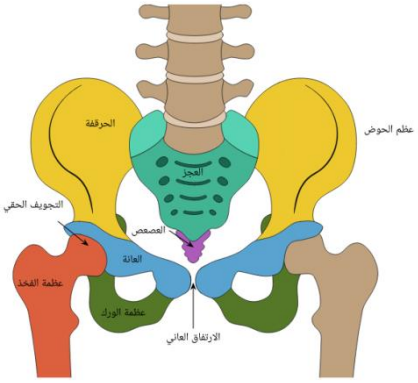
*The pelvis is articulated with the lower limbs,

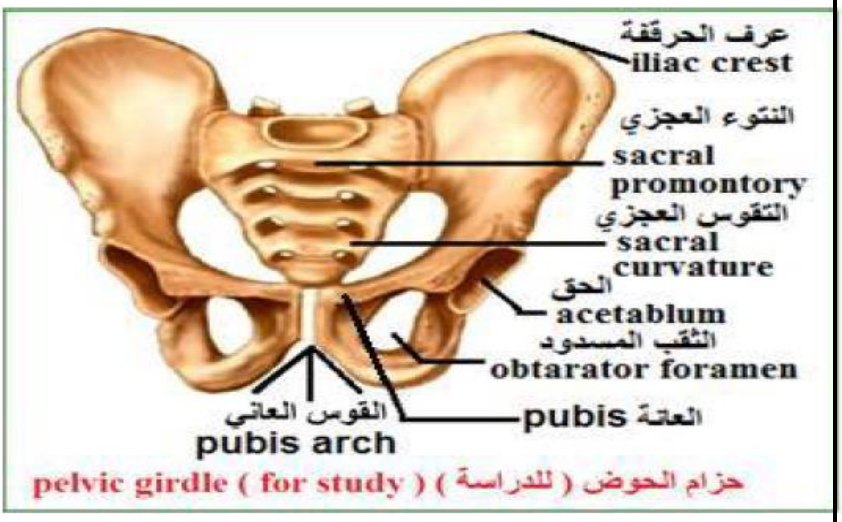
*Also a part of the intestines and some other internal organs are found in the pelvis.

*يشبه الحوض الوعاء الذي يرتكز عليه العمود الفقري.

* الحوض مفصلي بالأطراف السفلية ،

*كما يوجد جزء من الأمعاء وبعض الأعضاء الداخلية الأخرى في الحوض.





What is the differences between male pelvis and female pelvic

ما الفرق بين حوض الذكر وحوض الانثى-:

1-Bones of pubis in female are **lighter** than in male .

2-Pelvis **is wider** in female **(why)**to **facilitate the pregnancy period** .

3-Pelvis in female is **less deep** than in male.

1- عظام العانة عند الأنثى أخف من عظام الذكور.
٢-الحوض أوسع عند الأنثى لتسهيل فترة الحمل.
٣-الحوض عند الأنثى أقل عمقاً منه عند الذكور.

Pelvis is wider in female (why)

Lower limbs:-

Made up of **femur ,leg and foot**

1-femur :-

Is longest and strongest bones of the body corresponds to the humerus found in the upper limbs, from its upper side, this bone contains a spherical head which enters the **acetabular cavity** and forms ball and socket joint. From the bottom, femur is articulated with tibia by knee joint.

هي أطول وأقوى عظام الجسم تتوافق مع عظم العضد الموجود في الأطراف العلوية، من جانبها العلوي، تحتوي هذه العظمة على رأس كروي يدخل في التجويف الحقي ويشكل المفصل الكرة والتجويف. من الأسفل، يتم مفصل عظم الفخذ مع الساق بواسطة مفصل الركبة.

2-leg:- made up two bones (tibia and fibula)

الساق تتكون من عظمين هما**القصبة** و **الشظية**

a-tibia:-is one of the bones in legs corresponding the ulna in forearm tibia located in front of the leg under the skin.

ا-القصبة :-وهواحد عضام الساق يقابل الزند في الساعد تقع القصبة امام الساق تحت الجلد.

b-fibula:-is one of the bones in legs corresponding the radius in forearm. The fibula does not turn around tibia as the radius turn around the ulna. Because fibula is thinner than the tibia and two ends of fibula are connected to tibia.

الشظية: - إحدى عظام الساقين المقابلة لنصف قطر الساعد. لا تستدير الشظية حول القصبة بينما يدور الكعبرة حول عظم الزند. لأن الشظية أرق من القصبة ويتصل طرفا الشظية بالقصبة.

The fibula does not turn around tibia as the radius turn around the ulna. why

Because fibula is thinner than the tibia and two ends of fibula are connected to tibia

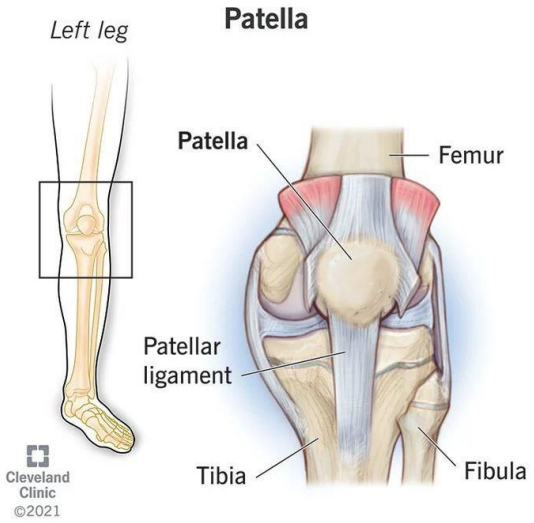
الشظية لاتدور حول القصبة مثل دوران الزند حول الكعبرة لان الشظية انحف من القصبة ونهايتي الشظية مرتبطة بالقصبة

Knee joint:-is the type of hinge between legs and femur

مفصل الركبة هذا النوع مفصلي بين الساق والفخذ

Patella :-is a flattened small bone in front of the knee joint to protecting the knee joint

الرضفة :-هي عظم مسطح صغير امام مفصل الركبة. يحمي مفصل الركبة.



Ankle joint:- joint connected between the foot and legs

مفصل الكاحل :-مفصل يربط بين القدم والساق

3-foot:- made up of **26 bones** ,which are distributed into three parts. Like in the palm

القدم:- تتكون من ٢٦ عظمة موزعة على ثلاثة أجزاء. كما هو الحال في كف اليد.

a-ankle (tarsals) :-the first bone in foot which corresponds to the wrist in hand ,it composed of 7 bones.

الكاحل :-اول عظم في القدم يقابل الرسغ باليد يتكون من ٧عظام

b-metatarsals :-the second part in foot ,contain 5 bones

المشط ثاني عظم من القدم يتكون من ٥ عظام

c-phalanges :-like finger composed of 14 bones ,each toes constitute 3 part except the hallux has two parts like thumb.

السلاميات تشبه الاصابع تتكون من ١٤ عظم كل اصبع ثلاث عظام عدا الابهام عظمين.

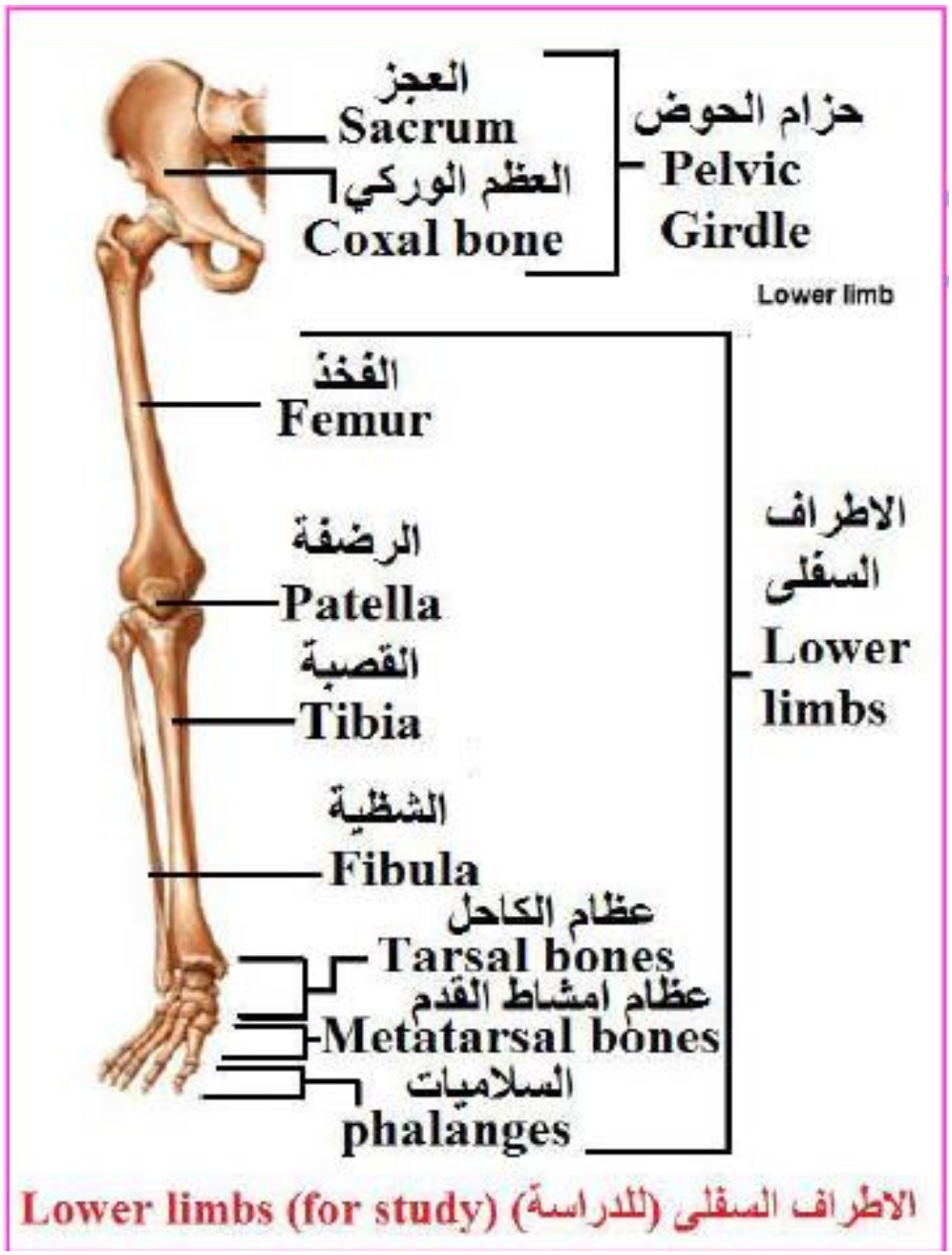
It is noticed that hallux (the big toe) does not move easily like the thumb. So function of foot is walking.

ويلاحظ أن إبهام القدم (إصبع القدم الكبير) لا يتحرك بسهولة مثل الإبهام اليد. فوظيفة القدم هي المشي.

Give the reason:

function of foot is walking.

hallux (the big toe) does not move easily like the thumb. So function of foot is walking.



Upper limbs	Lower limbs
1-Made up **of humerus , forearm and hand** (30 bones)	1-Made up of **femur ,leg and foot** (29 bones)
2-humerus:-it is long and strong bone .the upper end is round and form the head of the upper arm which is articulated with scapula by a joint form the top.from the other side articulated with forearm by the **elbow join**	**2-femur :-** Is longest and strongest bones of the body corresponds to the humerus ,this bone contains a spherical head which articulated with **acetabular cavity** from upper and articulated with knee joint from bottom
3-forearm:-consists of two long bones:- **1-ulna:-**is the longest bone in forearm and located in the direction of the little finger. **2-radius:-**the other bone in forearm located in the direction of the thumb. **forearm** articulated with **humerus** by the **elbow join and** articulated with the wrist by **Wrist joint**	**3-leg:-** made up two bones a-tibia:-is one of the bones in legs corresponding the ulna in forearm tibia located in front of the leg under the skin. b-fibula:-is one of the bones in legs corresponding the radius in forearm. **The leg** is articulated with femur by Knee joint and articulated with foot by Ankle joint
4-Hand:- Consists **from 27 bones** ,divided in to three parts 1-carpal bones (wrist) Composed of 8 bones which are arranged into two rows and there are four bones in each row 2-matacarpal bones :-(palm) Made up of 5 bones which are relatively long 3-phalanges:- Composed of 14 bones called phalanges .each finger contains 3 phalanges ,except the **thumb ,contains 2 phalanges**	**4-foot:-** made up of **26 bones** ,distributed into 3parts. a-ankle (tarsals) :-the first bone in foot which corresponds to the wrist in hand ,it composed of 7 bones. b-metatarsals :-the second part in foot ,contain 5 bones c-phalanges :-like finger composed of 14 bones ,each toes constitute 3 part except the hallux has two parts like thumb

Fracture:-is a split of bone (the division of it into two parts or more) happens as a result a strong sudden contraction of muscle like the fracture of patella in case of muscle contraction which is connected to patella.

الكسر: - هو انقسام في العظم (انقسامه إلى جزأين أو أكثر) يحدث نتيجة تقلص عضلي مفاجئ قوي مثل كسر الرضفة في حالة تقلص العضلات المرتبط بالرضفة.

How can fracture happens? كيف يحدث الكسر؟

1-It happens as a result of a **strong sudden contraction of muscles** like the **fracture of patella** in case of muscle contraction which is connected to patella .

١-يحدث نتيجة تقلص عضلي قوي ومفاجئ مثل الكسر الرضفة في حالة تقلص العضلات المرتبط بالرضفة.

2- it happens when the bones is **exposed to a direct external shock** such as when a hard body falls on the bone or when a bullet hits it .

٢- يحدث عندما تتعرض العظام لصدمة خارجية مباشرة مثل عندما تكون صلبة سقوط الجسم على العظم أو عند اصطدامه برصاصة.

3- Fracture also happens when o**ne of the bones faces a powerful shock.**

3-يحدث الكسر أيضًا عندما يتعرض أحد العظام لصدمة قوية

4- bone decaying because of a disease like bone tuberculosis , cancer etc.

Thus the bone breaks by itself immediately after a natural movement due to its weak resistance.

4 -أو تلف العظام بسبب مرض مثل السل العظمي أو السرطان وما إلى ذلك. وبالتالي ينكسر العظم من تلقاء نفسه مباشرة بعد حركته الطبيعية بسبب ضعف مقاومته.

The rapidity of treating the fracture depends on numerous factors like:

تعتمد سرعة علاج الكسر على عوامل عديدة مثل ؛

1-**Fracture type** which hits bone..نوع الكسر الذي يصيب العظام

2-**The age of the person** ; repair of the bone is quicker and better in younger person .

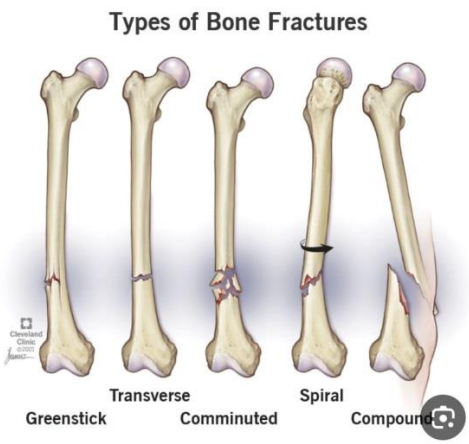
٢ - سن الشخص. إصلاح العظام أسرع وأفضل في الأشخاص الأصغر سنا و تَغذِيَة .

3-**Nutrition** ; Taking food rich in vitamins and calcium salts accelerate the treatment.

٣-التغذية؛ تناول الأطعمة الغنية بالفيتامينات وأملاح الكالسيوم يسرع العلاج.

4-**Treatment method;** the correct artistic orthopedics is performed by an expert doctor in case of fracture, he brings back the bone to its right position and then he places a splint of gypsum for a period of time. Then, he monitors the case by taking X-ray photographs of the fracture in order to find out what extent the case has progressed.

٤-طريقة العلاج. يتم إجراء جراحة العظام الفنية الصحيحة من قبل طبيب خبير في حالة الكسر ، يعيد العظم إلى موضعه الصحيح ثم يضع جبيرة الجبس لفترة من الزمن. ثم يراقب الحالة من خلال صور اشعة x من أجل معرفة إلى أي مدى تقدمت الحالة.



Which is responsible:

bone decaying: because of a disease like bone tuberculosis , cancer etc.Thus the bone breaks by itself immediately after a natural movement due to its weak resistance.

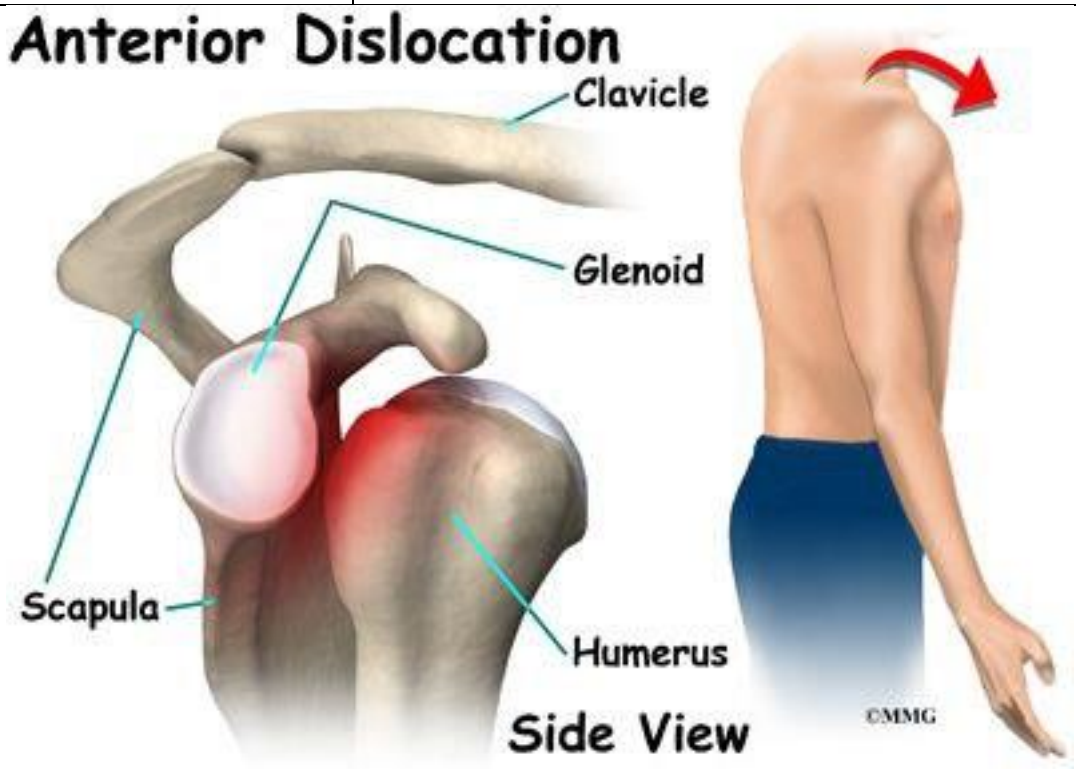
fracture of patella: It happens as a result of a **strong sudden contraction of muscles** which is connected to patella .

Dis-articulation:- خلع العظم

Is the separation of two bones at their joint, either naturally by way of injury or by a surgical operation . it is **different from fracture** because in disarticulation the bone is remain healthy but the fibers which connect two bones are damaged.

هو انفصال عظمين عن بعض في منطقة المفصل. اما بشكل طبيعي عن طريق الاصابة او بعملية جراحية .وهو يختلف عن الكسر بسبب لان خلع العظم يبقي العظم سالما ولكن الالياف التي تربط العظمين متضررة.

Dis-articulation	Fracture
Is the separation of two bones at their joint .	is a split of bone (the division of it into two parts or more)
either naturally by way of injury or by a surgical operation	happens as a result a strong sudden contraction of muscle ,or it happens when the bones is **exposed to a direct external shock** and **bone decaying** because of a disease
disarticulation the bone is remain healthy but the fibers which connect two bones are damaged .	**bone decaying** or the bone doesn't remain healthy



Structures Supporting the Skeletal System

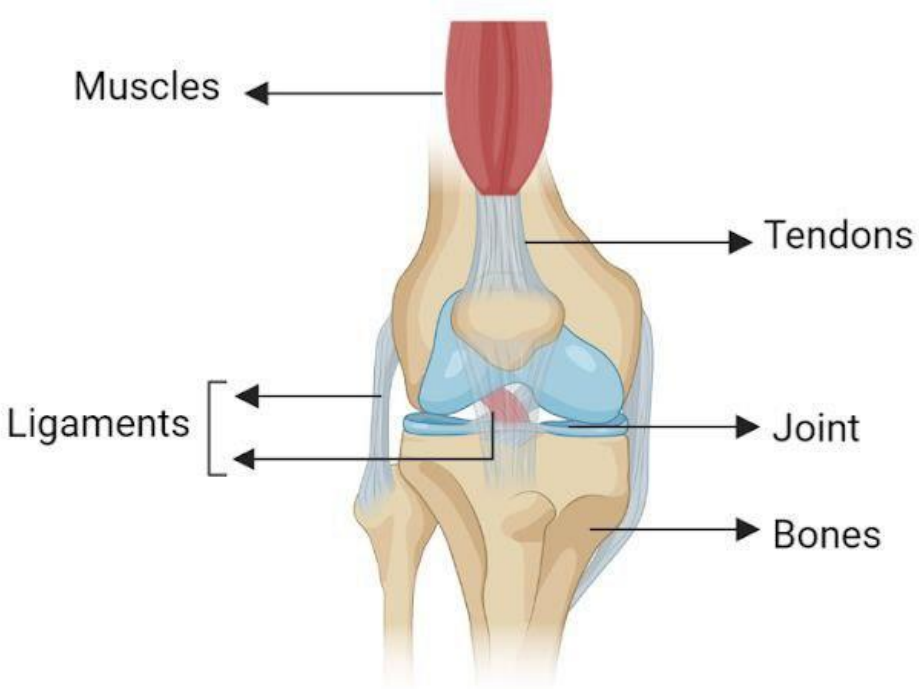
Ligament:-They are strong fibrous bands **which connect bones one another** . They are flexible . Thus ,**they allow the bones to move and the same time they protect the joints ,from disarticulation**

الاربطة اشرطة ليفية قوية تربط العظام بعضها ببعض مرنة لدرجة معينة .لذلك ، تسمح بحركة العظام وفي نفس الوقت تحمي المفصل ،من الخلع اوماشابه.

Tendon:-They are non- flexible firm fibrous cords which **connect muscles with bones**.

الاوتار:- حبال ليفية قوية غير مرنة التي تربط العضلات بالعظام.

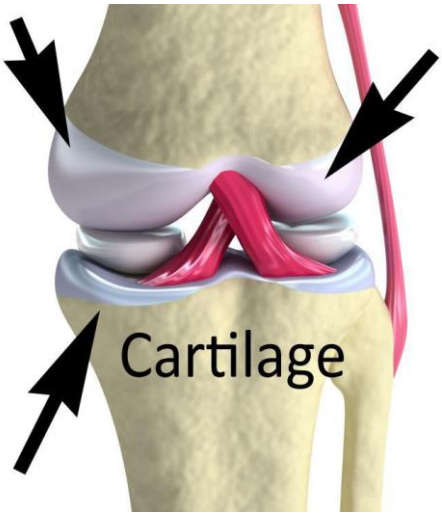
Ligament	Tendon
1-They are strong fibrous bands	1-They are firm fibrous cords
2-They are flexible	non- flexible
3-*which connect bones one another, *as result to flexible ,they allow the bones to move *and the same time they protect the joints from disarticulation	which **connect muscles with bones**.



Tendons and Ligaments

Cartilages:-They are white colored , transparent and strong structures . They can bend without breaking . **They cover the heads of bones**

الغضاريف:- لونها ابيض ،شفافة ذات تركيب قوي .يمكنها الانحناء دون كسر .تغلف نهايات العظام.



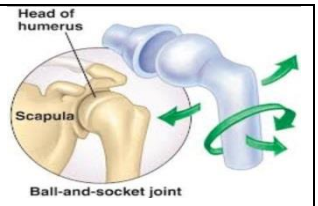
Joints :-The meeting points of the bones in the body are called as joints.Thus a joint is the connection place of two bones.

المفاصل:- نقاط التقاء العظام في الجسم وتدعى المفاصل. وهكذا المفصل منطقة ارتباط عضمين.

Types of Joints:-

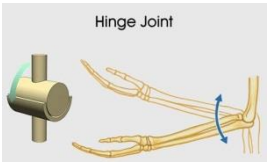
Ball and socket :-This type of joint **allows extensive movement** ,such as rotation in many direction**. Examples include the joint of the shoulder and hip**.

الكرة والتجويف:-وهذا النوع من المفصل يسمح بحركة واسعة. مثل دوران في عدة اتجاهات . الامثلة تتضمن مفصل الكتف و الورك



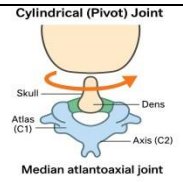
Hinge:-This forms the junction of two bones . This type of joint allows movement about one axis. **The elbow is an example of this type of joint . .**

المفصلي:-وهو يشكل ملتقى عظمين . هذا النوع من المفصل يسمح بحركة حول محور واحد . المرفق هو مثال على هذا النوع من المفاصل



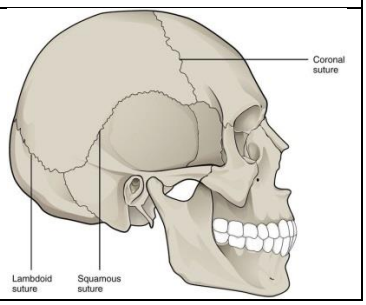
Cylindrical :-This also forms the joint of two bones , the junction of the atlas vertebra with **the occipital bone is an example of this type of joint.**

الاسطواني :-وهذا ايضا يمثل مفصل بين عظمين .التقاء فقرة الاطلس مع العظم القفوي هو مثال على هذا النوع من المفصل

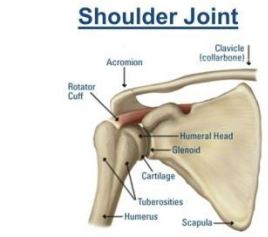
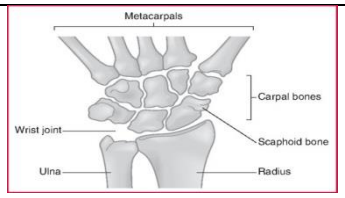
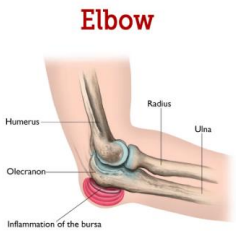
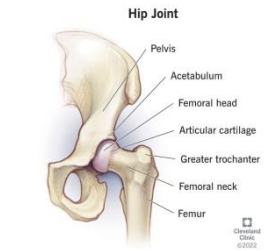
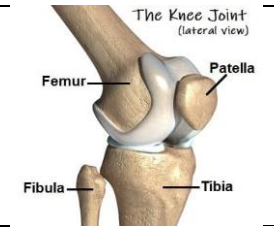


Immovable Joints :-They contain structures or interconnections which hold the closely positioned bone plates together. **All cranial and facial bones with the exception of the mandible are immovable.**

المفاصل الثابتة :- تحتوي عل تراكيب او ترابط التي تحمل موقع مغلق من صفيحة عظمية مترابطة معا . كل عظام الجمجمة والوجه باستثناء الفك السفلي مفاصل ثابتة.



أنواع المفاصل

Name of joint	Type of joint	Location	Function
Shoulder joint	**Ball and socket** 	cavity which formed from the meeting of the bones of scapula and clavicle in the shoulder girdle	the head of humerus settles the cavity and enable upper limbers move. This type of joint **allows extensive movement** ,such as rotation in many direction**.**
Wrist joint		these two bones ulna and radius (forearm) with hand bones (wrist)	articulated from the bottom with the wrist. enable hand move
Elbow joint	**Hinge** 	which formed from forearm (ulna and radius) articulated with humerus by it	This type of joint allows movement about one axis called Hinge
Hip joint	**Ball and socket** 	femur contains a spherical head which enters the acetabular cavity and forms ball and socket joint.	Enable the lower limbs move. This type of joint **allows extensive movement** ,such as rotation in many direction**.**
Knee joint		is the type of hinge between legs and femur	Enable the leg move
Ankle joint		joint connected between the foot and legs	Enable the foot move

Specialties of human skeleton مزايا الجهاز الهيكلي للإنسان

There are special characters, which belong to human skeleton and these special characters **help straighten the human body and also help move in upright state in walking without the aid of the hands.**

هناك مزايا خاصة ، والتي تنتمي إلى الهيكل العظمي وهذه المميزات الخاصة تساعد في استقامة جسم الإنسان وتساعد أيضًا على التحرك في وضع مستقيم في المشي دون مساعدة اليدين.

The most important characters are:

1-The balances of the skull over the vertebral column, enable to balance his skull over the vertebral column and make his head high. So human can see far objects.

١- توازن الجمجمة فوق العمود الفقري تمكن من موازنة جمجمته فوق العمود الفقري ورفع رأسه. حتى يتمكن الإنسان من رؤية الأشياء البعيدة.

2-The vertebral column is delicate at the neck region and wide at sacral region helps human in bearing the heavy head and the upper limbs

٢- العمود الفقري رفيع عند منطقة الرقبة وواسع في منطقة العجز يساعد الإنسان في حمل الرأس الثقيل والأطراف العلوية

3- **Width of pelvis in human**, facilitates the balance of the trunk on the lower limbs.

٣- عرض الحوض في الإنسان ، يسهل توازن الجذع في الأطراف السفلية.

4- **The lower limbs are longer than the upper ones**, helps human in walking with wide paces.

٤- الأطراف السفلية أطول من الأطراف العلوية مما يساعد الإنسان على المشي بخطى واسعة.

5- **Presence of bending at the hollow of the foot** helps human in walking in a comfortable way, jumping and running easily.

٥- وجود الانحناء في جوف القدم يساعد الإنسان في المشي بشكل مريح والقفز والجري بسهولة.

Write the causes of the followings

1-Human can see far objects

Because the balances of the skull over the vertebral column, enable to balance his skull over the vertebral column and make his head high.

2-Human head high.

Because the balances of the skull over the vertebral column, enable to balance his skull over the vertebral column and make his head high.

3-human in bearing the heavy head and the upper limbs.

The vertebral column is delicate at the neck region and wide at sacral region helps helps human in bearing the heavy head and the upper limbs.

4-Width of pelvis in human

facilitates the balance of the trunk on the lower limbs.

5- the balance of the trunk on the lower limbs.

Width of pelvis in human, facilitates the balance of the trunk on the lower limbs.

6- The lower limbs are longer than the upper ones

helps human in walking with wide paces.

7- Presence of bending at the hollow of the foot

helps human in walking in a comfortable way, jumping and running easily.

8- human in walking with wide paces.

The lower limbs are longer than the upper ones, helps human in walking with wide paces.

9-human in walking in a comfortable way, jumping and running easily.

Presence of bending at the hollow of the foot helps human in walking in a comfortable way, jumping and running easily.

Remember

*Bone growths in human **continue until age of twenty** by effect of hormones secreted by **pituitary gland** (in exception of some diseases).

* يستمر نمو العظام في الإنسان حتى سن العشرين بتأثير الهرمونات التي تفرزها الغدة النخامية (باستثناء بعض الأمراض).

*There are cartilaginous disks between vertebrates . توجد أقراص غضروفية بين الفقرات.

* There is **patella** in front of knee joint for its protection but there is no this type of bone in elbow joint.

توجد الرضفة أمام مفصل الركبة لحمايتها ولكن لا يوجد هذا النوع من العظام في مفصل المرفق.

* Vertebra starts to bended in aging. تبدأ الفقرة بالانحناء مع تقدم العمر.

*Using synthetic drugs cause the bone decay.

استخدام العقاقير الاصطناعية يسبب تسوس العظام.

* Bone marrow is used in tissue transplant.

* يستخدم النخاع العظمي في زراعة الأنسجة

Some diseases of skeleton system

Rickets الكساح

Rickets can be seen in children between 1-2 ages,

deficiency of vitamin D and not exposing sunlight are causes of this disease.

يصاب بهذا المرض الأطفال الذين تتراوح أعمارهم بين (١-٢) سنة ، نقص فيتامين D وعدم التعرض الكاف لأشعة الشمس سبب هذا المرض.

Symptoms الاعراض

1- Retardation in teeth grows, walking and ossification of cranial bones, also curved legs is one of the symptoms.

2- Patient become nervous and cries much more than other.

١ - تأخر نمو الأسنان ومشي وتعظم عظام الجمجمة وأيضاً تقوس الساقين من الأعراض.

٢- يصاب المريض بالتوتر ويبكي أكثر من غيره

Treatment or remedy العلاج

1- Visiting the physician and taking necessary drugs that offered.

2- Exposing child to the sunlight enough.

١ - زيارة الطبيب وتناول الأدوية اللازمة المعروضة عليه.

٢-تعريض الطفل لأشعة الشمس بشكل كاف.

Prevention الوقاية

1- Mother must breast feeding the child and if necessary supporting the nutrition with enough milk.

يجب على الأم إرضاع الطفل رضاعة طبيعية وإذا لزم الأمر دعم التغذية بكمية كافية من الحليب.

2- Exposing the child to enough sunlight especially in winter, But keep away from too much sunlight in summer.

2-تعريض الطفل لأشعة الشمس بشكل كاف خاصة في فصل الشتاء ، ولكن الابتعاد عن أشعة الشمس الزائدة في الصيف.

What are the reason of rickets disease?

1-deficiency of vitamin D

2- not exposing sunlight are causes of this disease.

Structure	Location	Function
Ligament	connect bones one another .	they allow the bones to move and the same time they protect the joints ,from disarticulation
Patella	small bone in front of the knee	to protecting the knee joint
Cartilages	the heads of bones	They cover the heads of bones
Tendon	Between muscles and bones	connect muscles with bones.

Write the location of the following;

Clavicle-scapula-humerus-forearm- ulna- radius- metacarpal-wrist- pubis- ilium-ischium-ankle-tarsal-fibula-tibia

Write the causes of the followings:

Function of foot is walking.

Because the hallux dose not move easily like the thumb.

Disarticulation different from fracture.

Give the corresponding name for the following:

Deciduous (milk) = Temporal teeth الاسنان اللبنية او الموقتة

Ankle= (tarsals)الكاحل

carpal = wrist الرسغ

metacarpal bone = palm المشط

lower jaw= mandible الفك الاسفل

Foremen = hole الثقب

Bone cell = osteocyte خلية عظمية

Review

Q1//Define the followings :-

Periosteum :- it's external membrane that covered the body of the bone which contains nerves and blood vessels to nourish the bone.

Fontanelle : it's spaces in the child's skull which are located between the bones of head and they are covered with a fibrous cartilaginous tissue.

Joint : it's the meeting points of the bones in the body are called as joints Thus, a joint is the connection place of two bones.

True ribs : it's , the first seven pairs of ribs are directly connected with the sternum by small cartilaginous pieces.

Sternum : it's It is a long level structure which consists of three cohesive bones and it is found in the front of the chest. Its lower end is pointed, From the sides, the true ribs are joined to the Sternum by cartilaginous pieces.

Cartilages: they are white colored, transparent and strong structure. They can bend without breaking. They cover the heads of bone.

Ligaments: they are strong fibrous bands which connect bones one another. They are flexible until a certain degree . Thus , they allow the bones to move and at the same time they protect the joints from Dis-articulation or like this.

Dentine: it's a basic substance that a tooth is made up of it which is a very solid substance because it contains calcic materials.

Fracture : :- is a split of bone (the division of it into two parts or more) happens as a result a strong sudden contraction of muscle like the fracture of patella in case of muscle contraction which is connected to patella.

Haversian canal : it's canal which is found in the bone tissue and it's formed when a bone cells called osteocytes which are arranged in the form of circles around a central canal called as Haversian canal. This canal discovered by Clapton Havers .

Q2// Write the causes of the followings:-

a- Presence of Cartilaginous discs between the vertebrae of the vertebral column

these cartilages enable the vertebral column to bend to different sides, facilitate the movement of vertebrae and prevent the frication of vertebrae.

b- Presence of the Cartilaginous pieces at the front side of the real ribs

Because they are important in the process of respiration since they facilitate the movement of the thoracic cage.

c- The lower limbs are longer than the upper limbs

To helps human in walking with wide paces .

d- Dentine is a very solid substance in the structure of teeth

Because it contains calcic materials

Q4//Answer the followings :-

a- What are the major parts of the skeletal system? What are the characteristic of each?

Human skeleton has two main parts, they are **axial skeleton and appendicular skeleton**

axial skeleton includes **cranial bones , facial bones and tiny bones of middle ear**. **Skull** is composed of **29 bones** and

appendicular skeleton:- is composed of double bones, which are located on both sides of body . bones of the limbs are jointed to the axial skeleton by means of two girdles : **shoulder girdle and pelvic girdle respectively**.

b- Numerate the regions of the vertebral column , write the number of vertebrae in each region?

Cervical region :- It consist of seven vertebrae

Thoracic region :- It is made up of twelve vertebrae.

Lumbar region: It is composed of five broad vertebrae

Sacral region :- It consist of five cohesive vertebrae

Coccygeal region:- It is made up of four vertebrae

c- What are the parts of the thoracic cage ?

It consists of ribs and sternum.

d- Numerate the components of the upper limbs and the shoulder girdle in human ?

The upper limbs are components of the upper arm, forearm and hand.

The shoulder girdle are components of the two bones in each side Scapula and Clavicle.

e- Numerate the components of the lower limbs and girdle pelvic in man ?

The lower limbs are components of the bones of femur, leg and foot.

The girdle pelvic are components of the two symmetrical halves, Each of them is composed of three cohesive bones: ilium , ischium and pubis.

f- What are the specialties of the skeleton in human ?

1- The balance of the skull over the vertebral column enable to balance his skull over the vertebral column and makes his head high. So human can see far objects.

2- The vertebral column is delicate at the neck region and wide at sacral region helps human in bearing the heavy head and the upper limbs

3- Wideness of pelvis in human, facilitates the balance of the trunk on the lower limbs.

4- The lower limbs are longer than the upper ones, helps human in walking with wide paces

5- Presence of bending at the hollow of the foot , helps human in walking in a comfortable way, jumping and running easily.

g- What is the fracture ? What are the causes of fracture? What factors affect the rapidity of repairing the fracture ?

Fracture is a split of bone (the division of it into two parts or more).

The causes of fracture are :-

1- it happens as a result of a strong sudden contraction of muscles like the fracture of patella in case of muscle contraction which is connected to patella

2- Or it happens when the bone is exposed to a direct external shock such as when a hard body falls on the bone

3- when a bullet hits

4- fracture also happens when one of the bones faces a powerful shock or bone decaying because of a disease like bone tuberculosis, cancer or syphilis etc .

5- Thus the bone breaks by itself immediately after a natural movement due to its weak resistance.

Factors affect the rapidity of repairing the fracture are :-

1- Fracture type which hits bone .

2- The age of the person : repair of the bone is quicker and better in younger person

3- Nutrition : Taking food rich in vitamins and calcium salt accelerate the treatment .

4- Treatment method: the correct artistic orthopedics is performed by an expert doctor in case of Fracture , he brings back the bone to its right position and then he places a splint of gypsum for a period of time, then he monitors the case by taking x-ray photographs of the Fracture in order to find out what extent the case has progressed.

h- Explain the chemical structure of bone :-

Chemically, a bone consist of two major kinds of material

Organic materials

Inorganic materials

The percentage of organic materials is %35 , these organic materials are colloidal proteins known as collagen and mucous-like substance called as mucol . mucol resembles the albumin (white of egg) and it is important for bone flexibility .

The percentage of inorganic materials is %65, these inorganic materials are (phosphate ,florid , chloride calcium),magnesium phosphate and sodium chloride (table salt) , they are responsible for the hardness of bones.

Q5//Complete the following sentences :-

a- Centrum

b- Ulna and radius the leg tibia and fibula

c- Immovable , movable

d- Twelve , ribs

e- Three phalanges , two phalanges

f- Axial skeleton and appendicular skeleton

g- Scapula and clavicle

h- Crown , root and neck

Q6//Write the location of the following :-

Patella :- is found in front of the knee joint

Scapula :- is located in the backside of the body outside the ribs

Haversian canal :-is found in bone tissue

Sacrum :- is found in sacral region of vertebral column

Q7// Give an example for each of the following :-

Immovable joint :- all cranial bones

Ball and socket joint :- the joint of the shoulder and hip

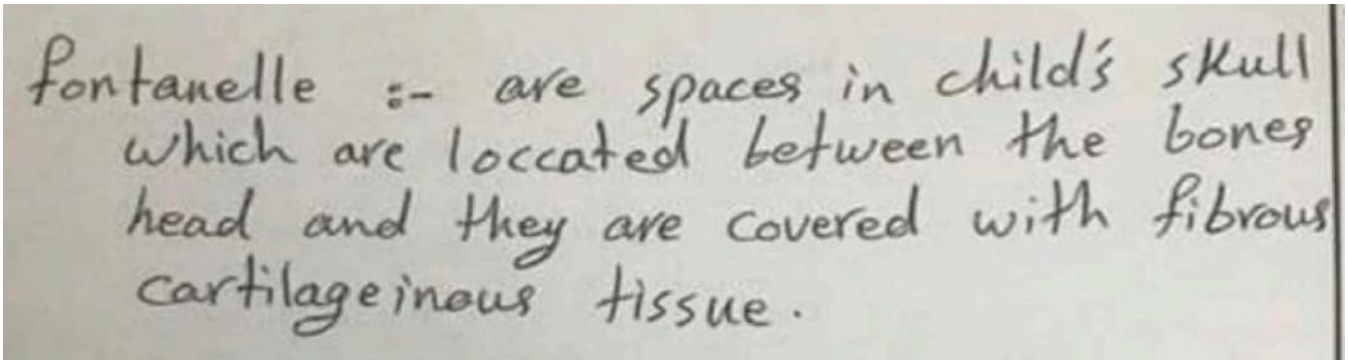
A bone disease :-rickets

Parts of human skeleton
Axial skeleton
Skull
Vertebral column
Cervical region
Thoracic region
Lumber region
Sacral region
Coccygeal region
Thoracic cage
Sternum
Ribs
True ribs
False ribs
Free ribs
Cranial bones
Facial bones
Tiny bones of middle ear
Appendicular skeleton
Pectoral girdle and upper limbs
Pectoral girdle
Clavicle
Scapula
Upper limbs
Humerus
Forearm
Radius
Ulna
Hand
Wrist (carpal)
Metacarpal
Phalanges (fingers)
Pelvic girdle and lower limbs
Pelvic girdle
Ischium
Ilium
Pubis
Lower limbs
Femur
Leg
Fibula
Tibia
Foot
Ankle (tarsal)
Metatarsal
Phalanges (toes)
د. سرى الجبوري

الاسئلة الوزارية واجوبتها منهج متميزين

2019 First Role

***Define : Fontanella**



***Write the cause**

***Fibula does not turn around tibia**

Because fibula is thinner than the tibia and two ends of fibula are connected to tibia

Who is responsible: Secrets of ossein = secreted by osteocytes

*It the basic substance made up a tooth (a- cementum b- dentine c- enamel)

*Thoracic cage is consist of Ribs and Sternum

***Numerate the factor which rapidity of treating the fracture depends on ?**

1-**Fracture type** which hits bone.

2-**The age of the person** ; repair of the bone is quicker and better in younger person.

3-**Nutrition** ; Taking food rich in vitamins and calcium salts accelerate the treatment.

4-**Treatment method;** the correct artistic orthopedics is performed by an expert doctor in case of fracture, he brings back the bone to its right position and then he places a splint of gypsum for a period of time. Then, he monitors the case by taking X-ray photographs of the fracture in order to find out what extent the case has progressed.

2019 Second Role

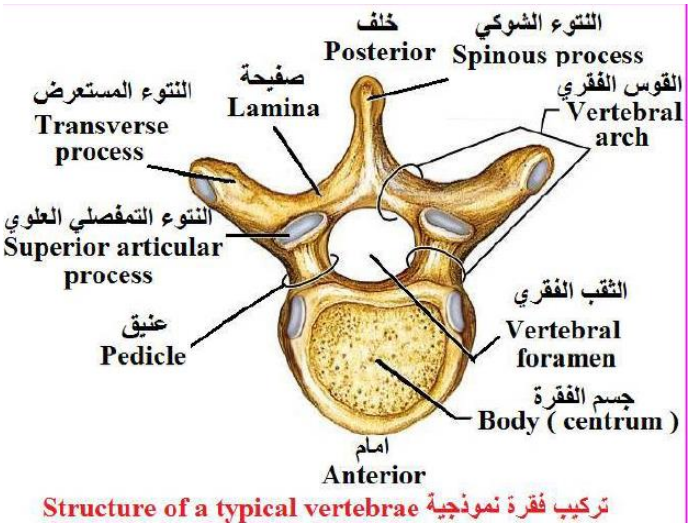
***Give the corresponding name: Carpal bones=** wrist

***Define: true ribs:** are the first seven pairs of ribs are directly connected with the sternum by small cartilaginous pieces .

***Who is responsible: Protects the brain=** cranial bones (Skull)

***What is location of : havesian canal =** center of osteocytes

Draw with labelling : Structure of a typical vertebrae .(only six labels)

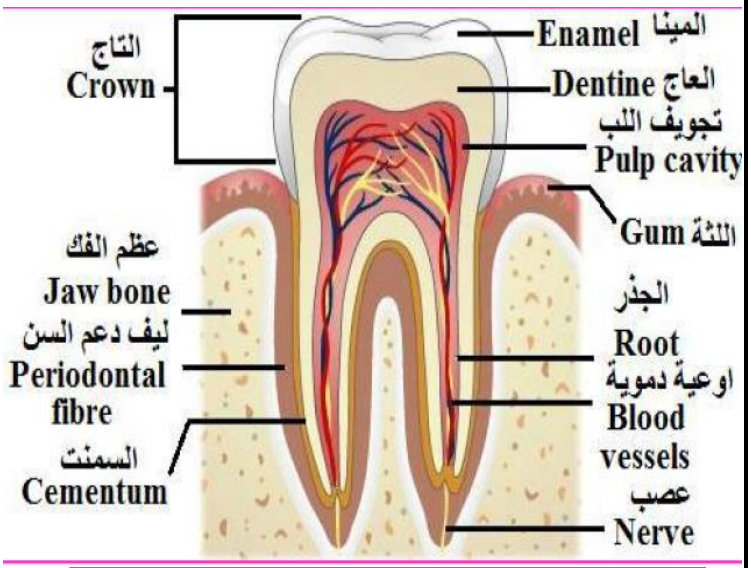


Structure of a typical vertebrae تركيب فقرة نموذجية

٢٠١٩ Third Role

*Pectoral girdle is consists of two bones in each side they are **Scapula** and **Clavicle**

***Draw with labelling** : Human teeth structure (only five labels)



human teeth structure تركيب أسنان الإنسان

***What are symptoms : Rickets**

1- Retardation in teeth grows, walking and ossification of cranial bones, also curved legs is one of the symptoms.

2- Patient become nervous and cries much more than other.

***Who is responsible: Bone flexibility :**Mucole

***Write the location : Foramen magnum** = bottom of cranial

***What are difference between :Ligament and Tendon**

Ligament	Tendon
1-They are strong fibrous bands	1-They are firm fibrous cords
2-They are flexible	non- flexible
3-*which connect bones one another, *as result to flexible ,they allow the bones to move *and the same time they protect the joints from disarticulation	which connect muscles with bones.

٢٠٢٢ First Role

Give the corresponding name: ankle= Tarsal

What are symptoms: Rickets

1- Retardation in teeth grows, walking and ossification of cranial bones, also curved legs is one of the symptoms.

2- Patient become nervous and cries much more than other.

Fill the blank:

*The number of cranial bones **8** while the number of facial bones**14**

Write the causes of the followings

Presence of bending at the hollow of the foot

helps human in walking in a comfortable way, jumping and running easily.

٢٠٢٢ Second Role

Define : Fontanella : are the spaces in the child's skull which are located between the bones of head and they are covered with a fibrous cartilaginous tissue

Give cause :

***Presence of the cartilaginous pieces at the front side of real ribs.**

Because they are important in the process of respiration since they facilitate the movement of the thoracic cage.

***List types of joints with examples.**

1-Ball and socket :-such as **shoulder and hip**.

2-Hinge:- such as **The elbow**

3-Cylindrical :- the junction of the atlas vertebra with **the occipital bone is an example of this type of joint.**

4-Immovable Joints :- All cranial and facial bones with the exception of the mandible are immovable.

Draw with labelling : Structure of a typical vertebrae .

Who is responsible:

Secrets of ossein	secreted by osteocytes
Protect knee joint	patella

Write the location : Foramen magnum = at the bottom of cranial

*** the basic substance made up a tooth (a- cementum b- dentine c- enamel)**

٢٠٢٣ First Role

Define: Fontanella: : are the spaces in the child's skull which are located between the bones of head and they are covered with a fibrous cartilaginous tissue

Choose the correct answer:

The length of vertebral column in an adult (a-75cm b-57cm c-70cm)

Give one example : Hing joint= The elbow joint

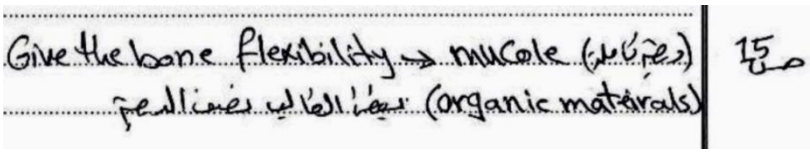
What are the location and function : Foramen magnum

location :at the bottom of cranial

function: the spinal cord passes.

Which is responsible:

Give the bone flexibility	Mucole
Protect knee joint	Patella



What are symptoms: Rickets

1- Retardation in teeth grows, walking and ossification of cranial bones, also curved legs is one of the symptoms.

2- Patient become nervous and cries much more than other.

What are the membrane that cover: Bone body: periosteum

2023 Second Role

***Define: Cartilage**

They are white colored , transparent and strong structures . They can bend without breaking . **They cover the heads of bones**

*Pectoral girdle is consists of two bones in each side they are **Scapula** and **Clavicle**

***Which is responsible: Protect knee joint:** patella

***List the differences between male pelvis and female pelvic**

*The pelvic is like a vessel on which the vertebral column rests.

*The pelvis is articulated with the lower limbs,

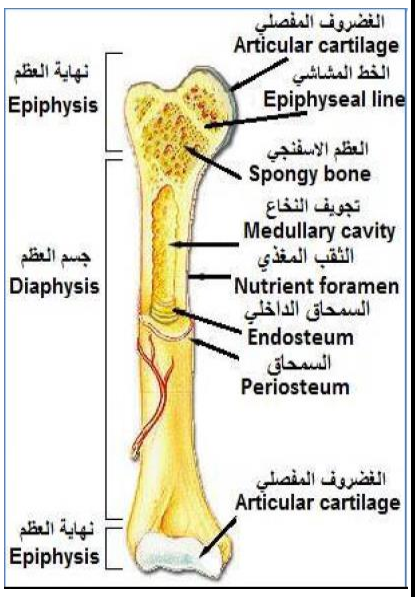
*Also a part of the intestines and some other internal organs are found in the pelvis.

2023 Third Role

Define: Sternum

It is a long level structure which consists of three cohesive bones and it is found in the front of the chest .Its lower end is pointed . From the sides , true ribs are joined to the sternum by cartilaginous pieces.

Draw with labelling : Structure of long of bone



***Write the cause :Dentine is a very solid substance** because it contains calcic materials **of tooth**.

***Who is responsible: Secrets of ossein :** osteocytes

***What is location : Thumb:** in hand

***What are symptoms: Rickets**

1- Retardation in teeth grows, walking and ossification of cranial bones, also curved legs is one of the symptoms.

2- Patient become nervous and cries much more than other.

***Give example : immovable joint:** cranial and facial bones with exception minable

2024 First Role

***Draw with labelling** : Human teeth structure

***Named the scientific term :**

thin arch –like bone and it extends between the scapula and top of Sternum.

Explain the chemical structure of bone. Clavicle

***Write the location of the following :** Foremen magnum**:** at bottom of cranium

***Fill in blanks :** The bone sacrum consists of **5 or five** cohesive vertebrae ,while the bone coccyx consist of **4 or four** cohesive vertebrae.

***Which is responsible:** Protect the knee: patella

***Explain the chemical structure of bone.**

Chemically, a bone consists of two major kinds of material:

1- **Organic materials** :The percentage of organic materials is %35, these organic materials are colloidal proteins known as **collagen** and mucous-like substance called as **mucole** .

2- **Inorganic materials** :The percentage of inorganic materials is %65, these inorganic materials are (phosphate, florid, chloride calcium), magnesium phosphate and sodium chloride (table salt), **they are responsible for the hardness of bones**.

2024 Second Role

Draw with labelling : Structure of a typical vertebrae

***Count only Structure support the skeletal system**

1-Ligament 2-Tendon 3-Cartilages 4-Joints

Which is responsible: Dis-articulation; naturally by way of injury or by a surgical operation .

Write the location of the following : Foremen magnum= at bottom of cranial

Write the cause :

Presence of cartilaginous disc between vertebrae of the vertebral column.

These cartilages enable the vertebral column to bend to different sides , facilitate the movement of vertebrae and prevent the friction of vertebrae.

2024 Third Role

***Draw with labeling :** Structure of long of bone

***Named the scientific term :**

*It includes cranial bones, facial bones and tiny bones of middle ear. It's composed of (29) bones. **Skull**

***Complete the following**

Each finger is composed of **3 phalanges** except the thumb which consists of **2 phalanges**

***Write the location of the followings: Spinal cord** passes Vertebral column

***Write the cause of the following**

The lower limbs are longer than the upper limbs.

helps human in walking with wide paces.

2025 First Role

Define Sternum : it's It is a long level structure which consists of three cohesive bones and it is found in the front of the chest. Its lower end is pointed, From the sides, the true ribs are joined to the Sternum by cartilaginous pieces.

What are the scientific concept:

A disc-like flat portion of the vertebra. **Centrum**

List the factors that affect the rapidity of treating a fracture. (Enumerate only)

1-Fracture type which hits bone.
2-The age of the person
3-Nutrition
4-Treatment method

Which is responsible :

Bone flexibility: Mucole

Write the location :

Periosteum : Cover the bone body

Explain the scientific facts

The function of foot is walking

hallux (the big toe) does not move easily like the thumb. So function of foot is walking.

Write the function or importance :

Cartilaginous disc

These cartilages enable the vertebral column to bend to different sides , facilitate the movement of vertebrae and prevent the friction of vertebrae.

إذا حصلت على فائدة من هذا العمل

فلا تبخل بقراءة سورة الفاتحة مهداة إلى أرواح

جميع المؤمنين وبالخصوص الشهداء القادة

وأخي المرحوم الشاب محمد رزاق

طبعًا مع عطر الصلاة على النبي وآله

Chapter Two

Muscular System

Introduction

Muscles are a part of movement system. العضلات جزء من الجهاز الحركي.

Rember

Movement system= consist from muscles and bones

Muscles and bones give **the body its specific shape**.

There are nearly **600** muscles in the human body.

The sizes and the shapes of muscles differ **according to their functions**.

تعطي العضلات والعظام الجسم شكله الخاص.

يوجد ما يقرب من ٦٠٠ عضلة في جسم الإنسان.

تختلف أحجام وأشكال العضلات حسب وظائفها.

Mention muscles function?

1-Muscles give the outer shape of the body

تعطي العضلات الشكل الخارجي للجسم

2-help to perform different movements.

تساعد على أداء حركات مختلفة

3-Also some of them are **responsible for internal body movement** such as stomach, intestine and heart muscles.

كما أن البعض منهم مسؤول عن حركة الجسم الداخلية مثل عضلات المعدة والأمعاء والقلب.

Muscles consist of a special tissue known as **muscular tissue**:

this tissue consists of specialized cells called as **muscle fiber** and they are characterized **by contraction and relaxation**.

تتكون العضلات من نسيج خاص يعرف باسم النسيج العضلي: يتكون هذا النسيج من خلايا متخصصة تسمى ألياف العضلات وتتميز بالتقلص والانقباض.

What is function of muscle fiber ? contraction and relaxation

Some muscles are connected to skeleton. **Because of** this connection, muscles help to perform total or partial body movements.

ترتبط بعض العضلات بالهيكل العظمي. **بسبب هذا** الارتباط، تساعد العضلات على أداء حركات الجسم الكلية أو الجزئية.

Which is responsible?

*** The outer shape of the body= movement system**

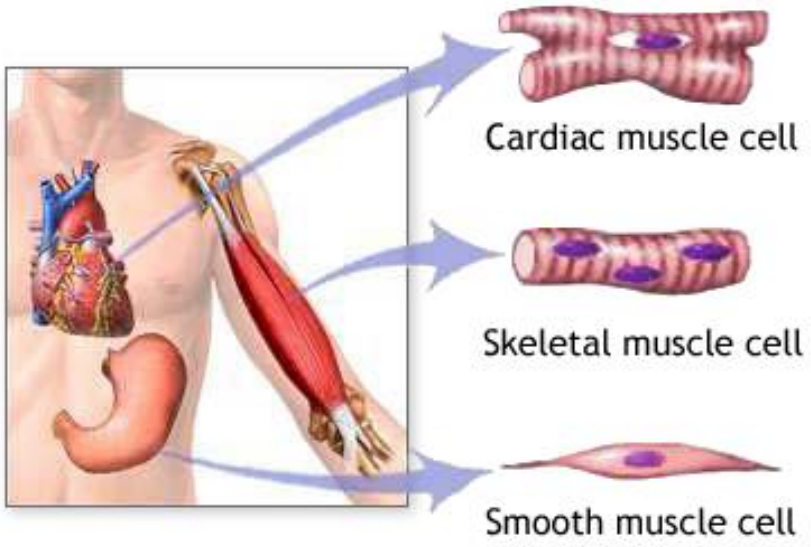
*** Internal body movement= muscles**

*** Contraction and relaxation in body human= muscle fiber**

Types of muscles

There are three types of muscles in the human body: هنالك ثلاثة أنواع للعضلات

1- Skeletal muscles 2- smooth muscles 3- heart muscles



1- Skeletal muscles

1-These muscles are connected with the bony skeleton and they are responsible for the body movements. ترتبط هذه العضلات بالهيكل العظمي وهي مسؤولة عن حركات الجسم.

للاطلاع

*When your arm is flexed from the elbow, you will feel a big muscle located on the front upper part of the arm. At this moment ,this muscle becomes enlarged and rounded because of its constriction.

عندما يتم ثني ذراعك من المرفق، ستشعر بوجود عضلة كبيرة في الجزء العلوي الأمامي من الذراع. في هذه اللحظة تصبح هذه العضلة متضخمة ومستديرة بسبب انقباضها.

When your arm is stretched, it becomes longitudinal and pointed.

عندما تمد(شد) ذراعك، تصبح طولية ومدببة.

These two conditions show that, this muscle is under your control.

يوضح هذان الشرطان أن هذه العضلة تحت سيطرتك.

2-this muscle is under the control of will. For this reason, this muscle and others which are similar to this muscle, are called as **voluntary muscles.**

هذه العضلة تحت سيطرة الإرادة. لهذا السبب ، تسمى هذه العضلات وغيرها التي تشبه هذه العضلة بالعضلات الإرادية

Voluntary muscles are under the control of the will and they are generally attached to the skeletal system.

العضلات الإرادية تخضع لسيطرة الإرادة وهي مرتبطة بشكل عام بالنظام الهيكلي

3-Skeletal muscles consist of many cells called as **muscle fibers.** They are elongated cells and they lie lengthways along the line of muscle contraction.

تتكون عضلات الهيكل العظمي من عدة خلايا تسمى **ألياف عضلية**. إنها خلايا مستطيلة وتقع على طول خط تقلص العضلات.

4-Each cell (fiber) contains bright and dark sections alternatively.
This structure gives the cell (and consequently the muscle) **striated form** when it is examined under the microscope. For this reason this type of muscle is called **striated muscle.**

تحتوي كل خلية (ألياف) على أقسام مشرقة (مضيئة)ومظلمة بدلاً من ذلك.
يعطي هذا الهيكل الخلية (وبالتالي العضلات) شكلًا مخططًا عندما يتم فحصها تحت المجهر. لهذا السبب هذا النوع من العضلات تسمى العضلة المخططة.

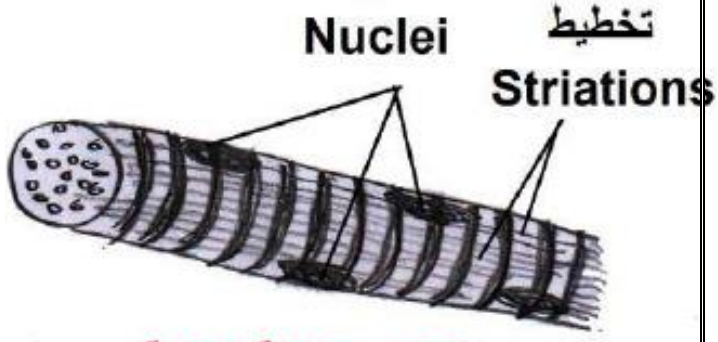
5-Skeletal muscle cells contain more than one nucleus, which is not located in the center of muscle cell.

تحتوي خلايا العضلات الهيكلية على أكثر من نواة واحدة لا تتواجد في وسط الخلية العضلية.

6-Ends of the each muscle are connected with a tough cord called **tendon.** These **tendons join the muscle to the parts of bony skeleton**. The connection of muscles in this form provides **the human to move the parts**, which are attached to these muscles.

ترتبط نهايات كل عضلة بحبل صلب يسمى الوتر. تربط هذه الأوتار العضلات بأجزاء الهيكل العظمي. يوفر اتصال العضلات في هذا الشكل للإنسان تحريك الأجزاء المرتبطة بهذه العضلات.

1- These muscles are connected with the bony skeleton so it called **skeletal muscles.**
2- this muscle is under the control of will. called as **voluntary muscles**. **(action) (why)**
3- They are elongated cells. **(Shape)**
4- **striated muscle**. **Why**
5- contain more than one nucleus, which is not located in the center of muscle cell.
6- -Ends of the Skeleton muscle are connected with **bony skeleton by tendon.**



تركيب عضلة هيكلية
Skeletal muscle structure

2-Smooth muscles

1-These muscles are found in the walls of the internal organs, such as in the muscular tissue **of the bladder, intestines, stomach and uterus**. Stomach works by contraction and relaxation of these muscles during food digestion.

توجد هذه العضلات في جدران الأعضاء الداخلية ، مثل الأنسجة العضلية للمثانة والأمعاء والمعدة والرحم.
تعمل المعدة عن طريق تقلص واسترخاء هذه العضلات أثناء هضم الطعام.

2-These muscles which are not controlled by us (we have no control on the movements). For this reason, these muscles and others which are similar to these muscles, are called **involuntary muscles**. Stomach walls contain a group of muscles which are not controlled by us (we have no control on their movements)

هذه العضلات التي لا نتحكم فيها (ليس لدينا سيطرة على حركاتها). ولهذا تسمى هذه العضلات وغيرها مما يشبه هذه العضلات **بالعضلات اللاإرادية**. تحتوي جدران المعدة على مجموعة من العضلات التي لا نتحكم فيها (ليس لدينا سيطرة على حركاتها)

3-This type of muscles is found in the structure of the internal organs, such as they are found in the structure of the circulatory system except heart.

يوجد هذا النوع من العضلات في بنية الأعضاء الداخلية ، مثل تلك الموجودة في بنية الدورة الدموية ماعدا القلب.

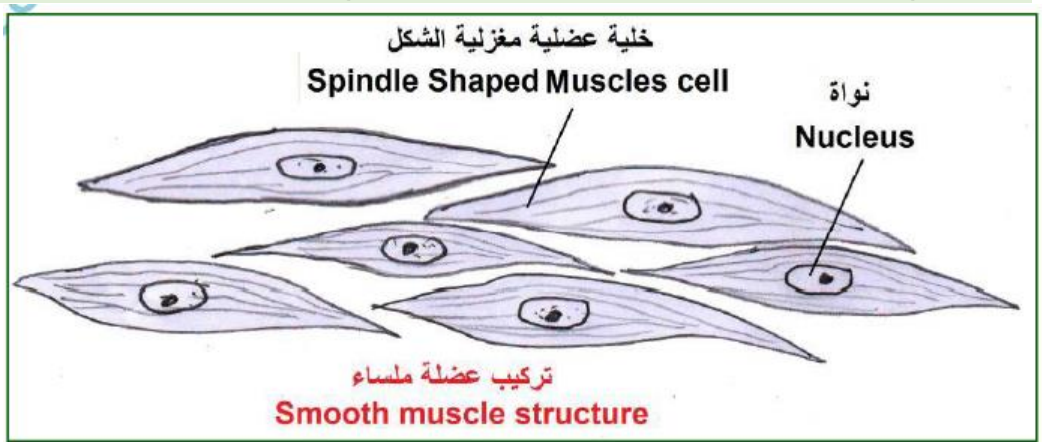
4- Smooth muscles consist of cells (muscle fibers) which are spindle shaped. These cells contain one nucleus located in the center of the muscle cell.

تتكون العضلات الملساء من خلايا (ألياف عضلية) على شكل مغزل. تحتوي هذه الخلايا على نواة واحدة تقع في وسط الخلية العضلية.

5- These cells have no bright and dark sections. For this reason, they are called **smooth muscles.**

لا تحتوي هذه الخلايا على أجزاء ساطعة (مضيئة) ومظلمة. لهذا السبب يطلق عليهم اسم العضلات الملساء.

1-These muscles are found in the walls of the internal organs, such as in the muscular tissue of the **bladder, intestines, stomach, uterus and found in the structure of the circulatory system except heart.**
2- involuntary muscles **(action) (why)**
3- spindle shaped.
4- cells contain one nucleus located in the center of the muscle cell.
5- These cells have no bright and dark sections **so called smooth muscles(why)**



3-Cardiac muscles

1-These muscles are found in the **walls of the heart** توجد هذه العضلات في جدران القلب

2-they are **involuntary muscles** that are not under the control.

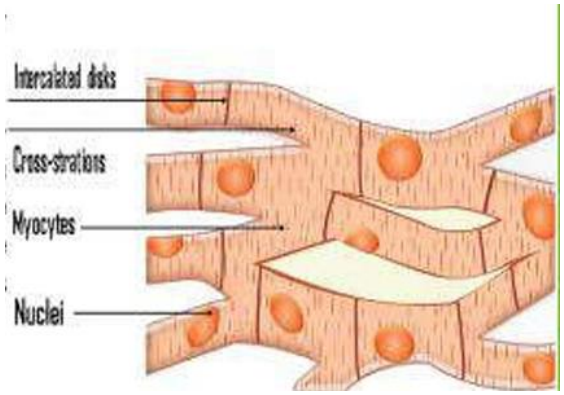
هي عضلات لا إرادية لا تخضع لسيطرة الإرادة.

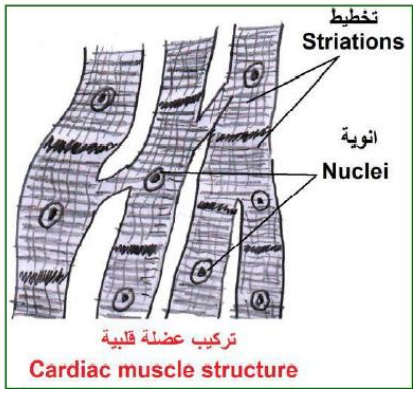
3-Their cells are striped, short and branched into other branches which are connected with each other.

خلاياهم مخططة وقصيرة ومتفرعة إلى فروع أخرى متصلة ببعضها البعض.

4-These cells contain one nucleus located in the center of muscle cell **but sometimes** two nuclei may be found.

تحتوي هذه الخلايا على نواة واحدة تقع في وسط الخلية العضلية ولكن في بعض الأحيان يمكن العثور على نواتين.





1- These muscles are found in the **walls of the heart. Location**
2- involuntary muscles **(action) (why)**
3- short and branched into other branches which are connected with each other.
4- These cells contain one nucleus located in the center of muscle cell **but sometimes** two nuclei may be found.
5- Their cells are striped **so called straited muscles(why)**

Q//compare among skeletal, smooth and heart muscles?

Skeletal muscles	smooth muscles	Cardiac muscles
These muscles are connected with the bony skeleton(and they are responsible for the body movements).	These muscles are **found in the walls of the internal organs, such as in the muscular tissue of the bladder, intestines, stomach , uterus and found in the structure of the circulatory system except heart.**	These muscles are **found in the walls of the heart**
Voluntary muscles are under the control of the will and they are generally attached to the skeletal system	these muscles which are not controlled by us (we have no control on their movements). For this reason these muscles and others which are similar to these muscles, are called **involuntary muscles.**	they are **involuntary muscles** that are not under the control of the will
Each cell (fiber) contains bright and dark sections alternatively. For this reason this type of muscle is called **striated muscle**.	These cells have no bright and dark sections. For this reason, they are called **smooth muscles**	Their cells are **striped**
Skeletal muscles consist of many cells called as muscle fibers. **They are elongated cells** and they lie lengthways along the line of muscle contraction.	Smooth muscles consist of cells (muscle fibers) which are **spindle shaped.**	**short and branched into other branches which are connected with each other**
Skeletal muscle cells contain more than one nucleus, which is not located in the center of muscle cell.	These cells contain one nucleus located in the center of the muscle cell	These cells contain one nucleus located in the center of muscle cell but sometimes two nuclei may be found

Striped= striated

①	skeletal muscles	smooth muscles
action	voluntary muscles	involuntary muscles
shape	cylindrical cells	spindle cells.
located	they connected to the bones.	found in wall of digestive tract.

Skeletal muscles	Cardiac muscles
(Location) these muscles are connected with the bony skeleton	These muscles are found in the wall of the heart
2- nucleus located which is not located in the centre of muscle cell	located in the center of muscle cell
3- action voluntary muscles	- involuntary muscles

Define:

Voluntary muscles: muscles that are under the control us by it when the movement and generally attached to skeletal system..

Striated muscle: It is cell (fiber) contains bright and dark sections alternatively, such as Skeletal and cardiac muscles.

Give the reason:

1-The skeletal muscles called as striated muscle.

Because each muscles cells (fiber) contain bright and dark sections alternatively.

This structure gives the cell (and consequently the muscle) **striated form** when it is examined under the microscope.

2-The skeletal muscles called as voluntary muscle.

Because this muscle is under our control.

3-The cardiac muscles called as striated muscle

Because each muscles cells (fiber) contain bright and dark sections alternatively.

4-The smooth muscle called involuntary muscles.

Because this muscle is not under our control.

Or because this muscle we have no control on their movements.

5-The smooth muscle called this name.

Because These cells have no bright and dark sections.

6-The heart muscle called this name.

Because these muscles are found in the walls of the heart only.

What is the function of tendon

tendons join the muscle to the parts of bony skeleton. The connection of muscles in this form provides **the human to move the parts**, which are attached to these muscles.

muscular contraction and relaxation تقلص العضلات وانبساطها

When the arm bends through the humerus, the biceps muscle contracts (it is located in the front of the humerus) and the arm moves towards the humerus. When the arm relaxes, the triceps muscle contracts, (it is located behind the humerus) and the arm goes-away from the humerus.

عندما ينحني الذراع عبر عظم العضد، تنقبض العضلة ذات الرأسين (تقع في مقدمة عظم العضد) وتتحرك الذراع نحو عظم العضد. عندما يرتاح الذراع، تنقبض العضلة ثلاثية الرؤوس (تقع خلف عظم العضد) وتبتعد الذراع عن عظم العضد

From this example, we can conclude that: **the biceps muscle is a contractor while the triceps muscle is a relaxer. The functions of these two muscles are antagonist** (when a muscle contracts, the other relaxes so that these muscles are called as **antagonistic).**

من هذا المثال ، يمكننا أن نستنتج أن: العضلة ذات الرأسين هي قابضة بينما العضلة ثلاثية الرؤوس هي مرخية. وظائف هاتين العضلتين هي خصم (عندما تنقبض العضلة ، ترتخي الأخرى بحيث تسمى هذه العضلات بأنها متضادة).

There is also a relaxer muscle when it contracts , the leg straightens in the same line of thigh. There are muscles called **adductor muscles** which are close to body mid line.

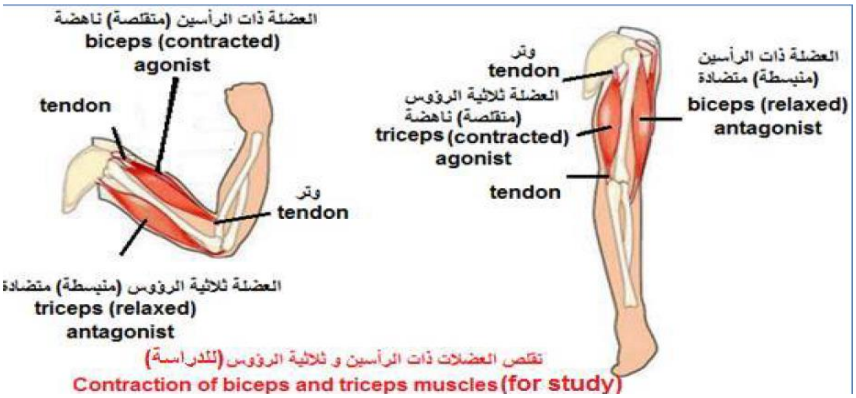
هناك أيضًا عضلة مسترخية عندما تنقبض، تستقيم الساق على نفس خط الفخذ. هناك عضلات تسمى العضلات المقربة وهي قريبة من منتصف الجسم.

When it contracts ,the arm becomes closer to the trunk There are **abductor muscle** which works opposite the closer muscles such as deltoid muscle which surrounds the shoulder. There are **round muscles** which lie obliquely on the neck.

وعندما تنقبض تصبح الذراع أقرب إلى الجذع وهناك عضلة مبعدة تعمل عكس العضلات الأقرب مثل العضلة الدالية المحيطة بالكتف. هناك عضلات مستديرة تقع بشكل غير مباشر على الرقبة.

The heartbeats and food movements through the digestive tract (stomach, intestine), are the examples of movement which is resulted by **the contraction and relaxation of muscles** which are found in the walls of these organs. This operation produces a pressure or a movement on the materials located inside these cavities and this movement pushes the materials into the other parts gradually.

نبضات القلب وحركات الطعام من خلال الجهاز الهضمي (المعدة والأمعاء) ، هي أمثلة على الحركة التي تنتج عن تقلص واسترخاء العضلات الموجودة في جدران هذه الأعضاء. تنتج هذه العملية ضغطًا أو حركة على المواد الموجودة داخل هذه التجاويف وهذه الحركة تدفع المواد إلى الأجزاء الأخرى تدريجياً.



Muscle	Type	Location	Function
the biceps muscle	Contractor	located in the front of the humerus	When it contracts the arm bends through the humerus. Or the arm moves toward the humerus
the triceps muscle	Relaxer	located behind the humerus	When it Relaxes the arm moves goes-way the humerus
Adductor **muscle**	Adductor	close to body mid line	When it contracts, the arm becomes closer to the trunk
deltoid muscle	Abductor muscle	surrounds the shoulder	When it Relaxes the arm becomes goes-way to the trunk
round muscles	Round	lie obliquely on the neck	turn a face

Q/what is the result of the operation of the contraction and relaxation of muscles which are found in the walls of stomach, intestine and heart?

This operation produce a pressure or a movement on the materials located inside these cavities and this movement pushes the materials into the other parts gradually

Q// How do muscles work?

Muscles receive impulses from **nervous system** in order to contract and relax. Brain sends electrical impulse to the muscles **via** spinal nerves and peripheral nervous system. Muscle starts to contract and relax depend on impulses from the **central nervous system**.

تستقبل العضلات نبضات من الجهاز العصبي من أجل الانقباض والاسترخاء. يرسل الدماغ نبضات كهربائية إلى العضلات عبر الأعصاب الشوكية والجهاز العصبي المحيطي. تبدأ العضلات في الانقباض والاسترخاء اعتمادًا على نبضات من الجهاز العصبي المركزي.

femur= Thigh الفخذ

Thigh الفخذ كامل بالعظم والعضلة والجلد
Femur عظم الفخذ

Q/what caused for the following?

1- the biceps muscle is a Contractor

Because When it contracts the arm bends through the humerus

2- the triceps muscle is a Relaxer

Because When it Relaxes the arm moves goes-way the humerus

3- the biceps muscle and the triceps muscle are called as antagonistic

Because the biceps muscle is a contractor while the triceps muscle is a relaxer. The functions of these two muscles are antagonist

4- the muscle close to body mid line are called Adductor muscle

Because When it contracts, the arm becomes closer to the trunk

Antagonistic muscles: these two muscles are antagonist when a muscle contracts, the other relaxes such as the biceps muscle is a contractor while the triceps muscle is a relaxer.

Q/Which is responsible for the following?

Body movements: skeletal muscles

Movement of the bladder, uterus, intestine and stomach: smooth muscles

Movement of the heart:cardic muuscles

move the arm towards the humerus: the biceps muscle

move the arm goes-way from the humerus: the triceps muscle

muscles fatigue

The muscles cannot work continuously without stopping, only for a limited period. But if it is forced, the muscle shows weakness in its ability to contraction and relaxation. So it becomes harder and this is called as **muscle fatigue**

Glucose + oxygen carbon dioxide + water + energy + lactic acid

لا تستطيع العضلات العمل بشكل مستمر دون توقف ، فقط لفترة محدودة. ولكن إذا تم الضغط عليها ، تظهر العضلة ضعفًا في قدرتها على الانقباض والاسترخاء. لذلك يصبح الأمر أكثر صعوبة وهذا ما يسمى بإجهاد العضلات(الاعياء العضلي)

Define

Muscle fatigue: the weakness of muscle for ability to contraction and relaxation so it becomes harder in case if it forced muscle to work continuously without stopping .

ضعف قدرة العضلة على الانقباض والارتخاء فتصبح أكثر صعوبة في حالة اضطرار العضلة إلى العمل بشكل متواصل دون توقف .

Causes:

Q//What are the causes of muscle fatigue ?

The muscle fatigue may be caused: قد يكون سبب التعب العضلي:

1- Because of nutritional deficiency in the muscle بسبب نقص التغذية في العضلات

2-Because of accumulation of toxic waste- materials in the muscles.

بسبب تراكم الفضلات- المواد السامة في العضلات.

3-Because of weakness of nervous system..بسبب ضعف الجهاز العصبي

4- Because of hunger, sleeplessness and poor ventilation.

بسبب الجوع والأرق وضعف التهوية.

Q// How to prevent yourself from muscle fatigue?

Prevention:

1- You should stop working. يجب التوقف عن العمل.

2- Provide enough time for relaxation.(why) This helps the body to discharge the accumulated toxic materials from the muscles, to repair the damaged cells and also store the nutrients which are necessary for working of muscles.

١-

2-توفير الوقت الكافي للاسترخاء. يساعد ذلك الجسم على إخراج المواد السامة المتراكمة من العضلات ، وإصلاح الخلايا التالفة ، وكذلك تخزين العناصر الغذائية الضرورية لعمل العضلات.

Why cannot the muscle work continuously?
Why do muscle need stopping for a limited period?
What happens if the muscls work continuously without stopping?

Why should we stop working and take enough time for relaxation?

This helps the body to discharge the accumulated toxic materials from muscles ,repair the damaged cells and store the nutrients which are necessary for working of muscles.

What dose a muscle need to do?

Muscles need (oxygen and glucose) to do work
the result of the equation or combosition process is carboned dioxide ,water ,energy and lactic acid.

QUESTION

Muscular fibers :- : they are specialized cells which Muscular tissues are consists of them and they are characterized by contraction and relaxation.

Muscle fatigue :- It is a weakness in the muscle's ability to contraction and relaxation. So it becomes harder and that **is hap pened when** the muscles work continuously without stopping, only for a limited period.

Tendon :- It is a tough cord which it is join the Ends of the each muscle to the parts of bony skeleton. The connection of muscles in this form provides the human to move the parts, which are attached to these muscles.

Involuntary muscle :- are a muscle which are not under in the control of the will, such as smooth muscles and heart muscle.

Voluntary muscle :- muscles that are under the control us by it when the movement and generally attached to skeletal system .

Q3// Explain the following ?

1- **The cardiac muscle and the skeletal muscle are called as striated muscle ?**

Because Each cell (fiber) contains bright and dark sections alternatively .
This structure gives the cell (and consequently the muscle) striated form when it is examined under the microscope.

2-The smooth muscle called involuntary muscles.

Because we have no control on their movements.

Q4// Complete the following ?

1- 600
2- The bony skeleton , the body movements.
3-Skeletal muscles , smooth muscles and heart muscles

Q5// Write the location of the following ?

Biceps muscle :- it is located in the front of the humerus

Triceps muscle :- it is located behind the humerus

Smooth muscles :- are found in the walls of the internal organs, such as in the bladder, intestines, stomach and uterus.

Round muscle :- lie obliquely on the neck.

Q6//Answer the following ?

1-What are the characteristics of cardiac (heart) muscle ?

1- These muscles are found in the walls of the heart

2- voluntary muscles

3- Their cells are striped

4- Their cells are striped, short and branched into other branches which are connected with each other.

5- These cells contain one nucleus located in the center of muscle cell but sometimes two nuclei may be found

6- The heart work by contraction and relaxation of these muscles

2-What are the methods for preventing the muscle fatigue occurrence?

1-You should stop working

2-Provide enough time for relaxation. This helps the body to discharge the accumulated toxic materials from the muscles, to repair the damaged

3-cells and also store the nutrients which are necessary for working of muscles.

3-What are the differences between skeletal muscle and smooth muscle? 4-Write the differences between the cardiac muscle and skeletal muscle

Skeletal muscles	Cardiac muscles
These muscles are connected with the bony skeleton(and they are responsible for the body movements).	These muscles are **found in the walls of the heart**
Voluntary muscles are under the control of the will and they are generally attached to the skeletal system	they are **involuntary muscles** that are not under the control of the will
Each cell (fiber) contains bright and dark sections alternatively. For this reason this type of muscle is called **striated muscle**.	Their cells are **striped**
Skeletal muscles consist of many cells called as muscle fibers. **They are elongated cells** and they lie lengthways along the line of muscle contraction.	**short and branched into other branches which are connected with each other**
Skeletal muscle cells contain more than one nucleus, which is not located in the center of muscle cell.	These cells contain one nucleus located in the center of muscle cell but sometimes two nuclei may be found

Skeletal muscles	smooth muscles
These muscles are connected with the bony skeleton(and they are responsible for the body movements).	These muscles are **found in the walls of the internal organs, such as in the muscular tissue of the bladder, intestines, stomach and uterus**
Voluntary muscles are under the control of the will and they are generally attached to the skeletal system	these muscles which are not controlled by us (we have no control on their movements). For this reason these muscles and others which are similar to these muscles, are called **involuntary muscles.**
Each cell (fiber) contains bright and dark sections alternatively. For this reason this type of muscle is called **striated muscle**.	These cells have no bright and dark sections. For this reason, they are called **smooth muscles**
Skeletal muscles consist of many cells called as muscle fibers. **They are elongated cells** and they lie lengthways along the line of muscle contraction.	Smooth muscles consist of cells (muscle fibers) which are **spindle shaped.**
Skeletal muscle cells contain more than one nucleus, which is not located in the center of muscle cell.	These cells contain one nucleus located in the centre of the muscle cell

5-Mention the muscle functions.

1-Muscles give the outer shape of the body

تعطي العضلات الشكل الخارجي للجسم

2-help to perform different movements.تساعد على أداء حركات مختلفة

3-Also some of them are **responsible for internal body movement** such as stomach, intestine and heart muscles.

كما أن البعض منهم مسؤول عن حركة الجسم الداخلية مثل عضلات المعدة والأمعاء والقلب.

6-Write the muscle types and mention the characteristics of each of them?

7- Give some example for voluntary and involuntary muscles.

Voluntary muscles : such as skeletal muscle

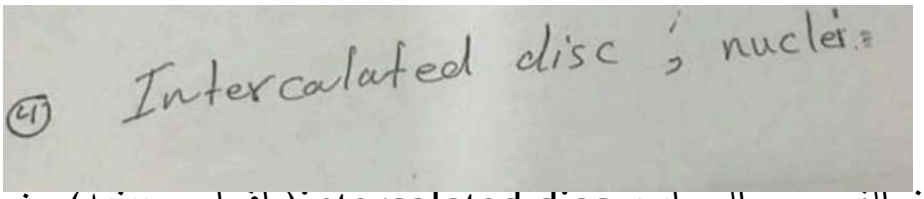
Involuntary muscles: such as Smooth muscle and cardiac muscle

الاسئلة الوزارية واجوبتها

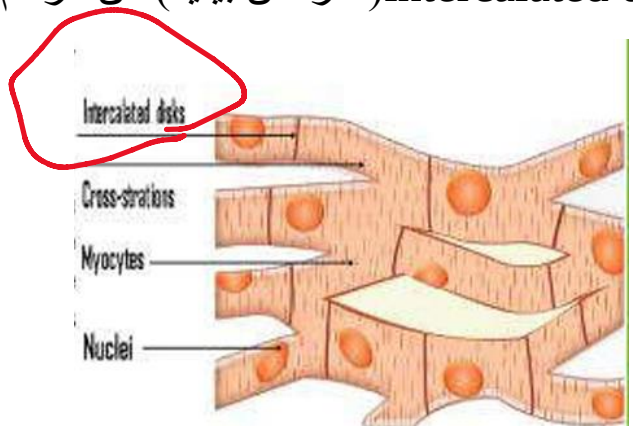
دور اول 2019

*The number of muscles in human body is: (a-500 b-700 c-600)

*Cardiac muscles are consist of …….. , …… and branched muscle fibers.



هذا جواب مركز الفحص والجواب intercalated disc(اقراص بينيه) من الرسم صفحة ٢٩

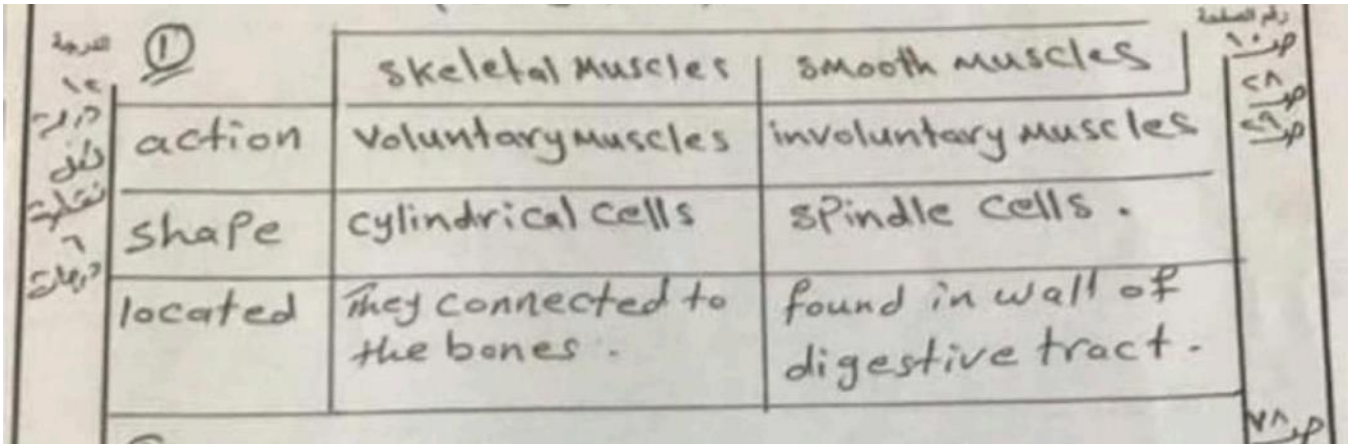


دور ثاني ٢٠١٩

What are the differences between each of the following ?

Skeletal muscles and Smooth muscles (action – shape of muscle fiber, located)

جواب الوزارة النموذجي



①	Skeletal Muscles	Smooth muscles
action	Voluntary muscles	involuntary muscles
shape	cylindrical cells	spindle cells .
located	they connected to the bones .	found in wall of digestive tract .

دور ثالث ٢٠١٩

Who is responsible for each of the following:

*Muscle when it contracts the arm becomes closer to the trunk

Adductor muscle

دور اول 2022

Define: Muscle fatigue:

Muscle fatigue: the weakness of muscle for ability to contraction and relaxation so it becomes harder in case of forced muscle to work continuously without stopping (only unlimited period)

ضعف قدرة العضلة على الانقباض والارتخاء فتصبح أكثر صعوبة في حالة اضطرار العضلة إلى العمل بشكل متواصل دون توقف (فقط لفترة غير محدودة)

***Which is responsible of the following:**

the arm moves towards the humerus. **The biceps muscle**

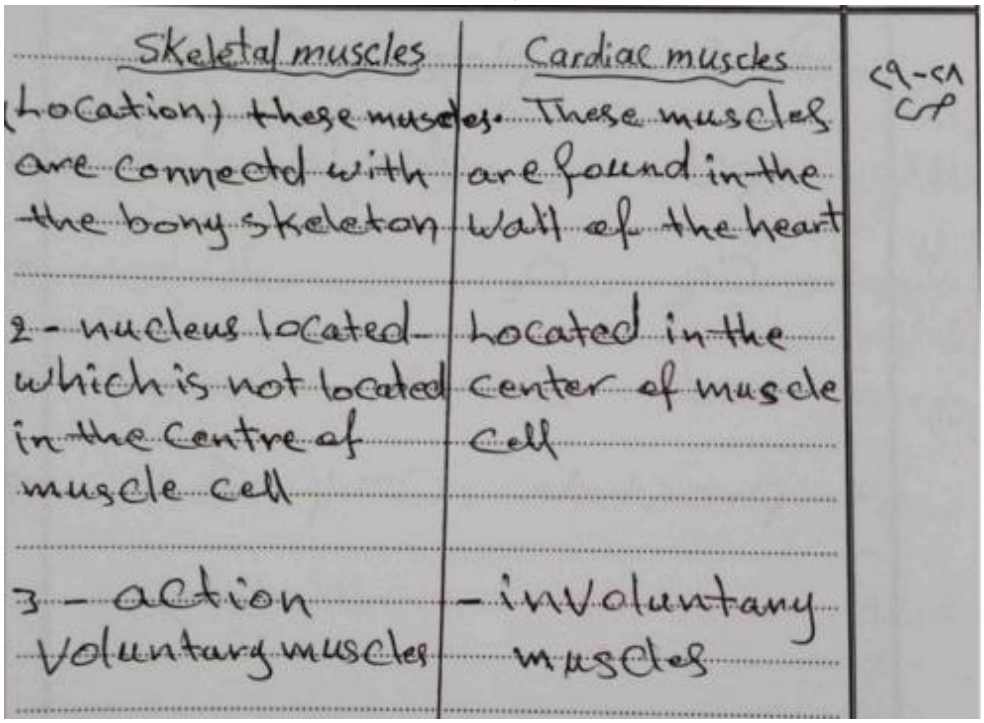
*Write the location : round muscle: lie obliquely on the neck

*The number of muscles in human body is: (a-500 b-700 c-600)

دور ثاني2022

Compare between:

Skeletal muscles and Cardiac muscles (location -nucleus location -action)



Skeletal muscles	Cardiac muscles
(Location) these muscles are connected with the bony skeleton	These muscles are found in the wall of the heart
2- nucleus located which is not located in the centre of muscle cell	Located in the center of muscle cell
3- action voluntary muscles	- involuntary muscles

٢٠٢٣ دور اول

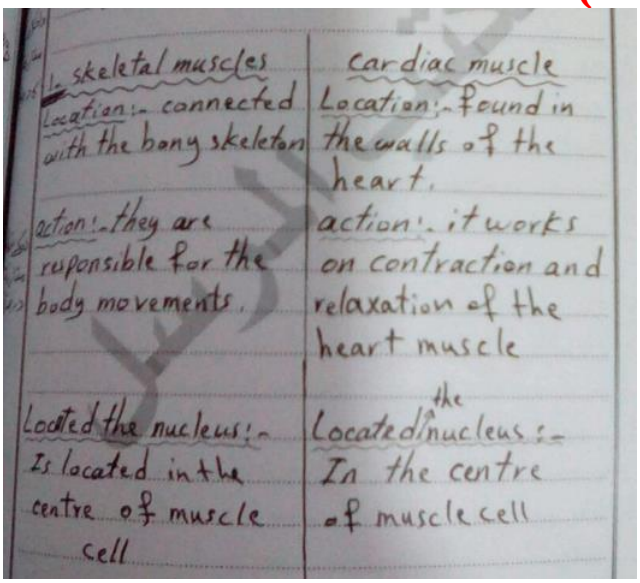
Give one example: contractor muscle: biceps muscle

٢٠٢٣ دور ثاني

*Write the location : round muscle: lie obliquely on the neck

What are the differences between each of:

Skeletal and cardiac muscles(location -action -located of nucleus)



1- skeletal muscles	cardiac muscle
Location:- connected with the bony skeleton	Location:- found in the walls of the heart.
action:- they are responsible for the body movements.	action:- it works on contraction and relaxation of the heart muscle
Located the nucleus:- Is located in the centre of muscle cell	Located the nucleus:- In the centre of muscle cell

2023 دور ثالث

***Write the causes :**

The cardiac muscles called as striated muscle

Because each muscles cells (fiber) contain bright and dark sections alternatively.

***Give example: abductor muscle:** **deltoid muscle**

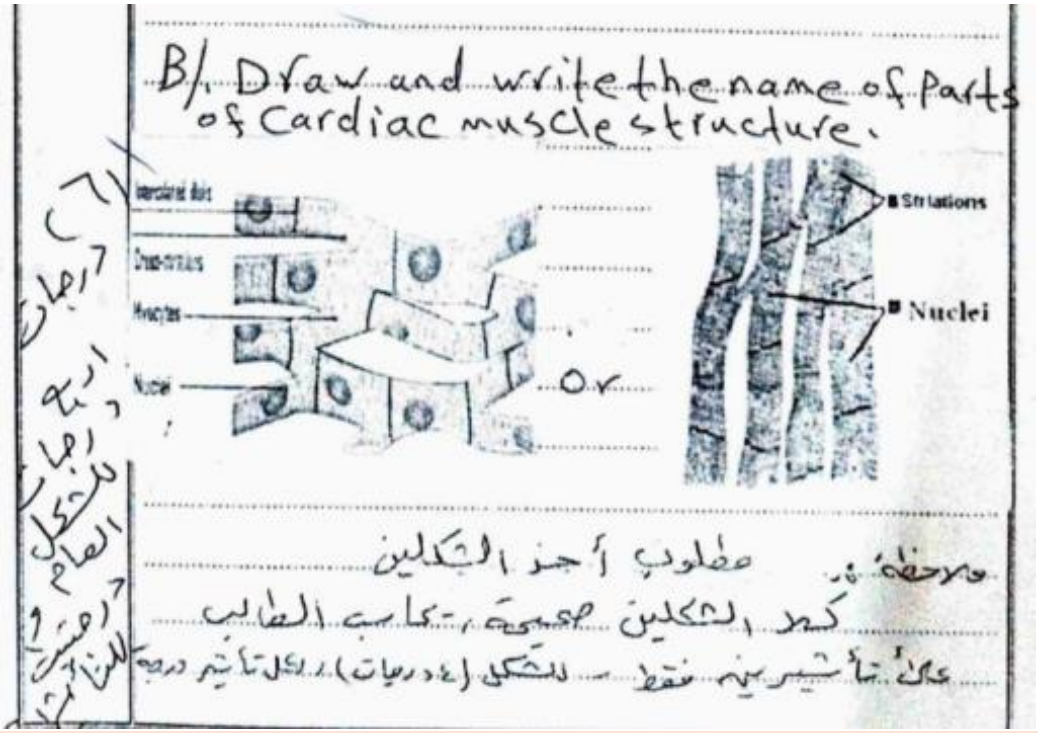
دور اول 2024

***Which is responsible of the following:**

Muscle when it contracts the arm becomes closer to the trunk.

Adductor muscles

*Draw and write the name of parts of cardiac muscle structure



دور ثاني 2024

Complete the following sentence:

The skeleton muscles are the muscles connected with ---------- and responsible for ----------.

الجواب:

the bony skeleton , the body movements

Write the location:

Smooth muscles:

These muscles are found in the walls of the internal organs, such as in the muscular tissue **of the bladder, intestines, stomach , uterus and the circulatory system**

What are function:

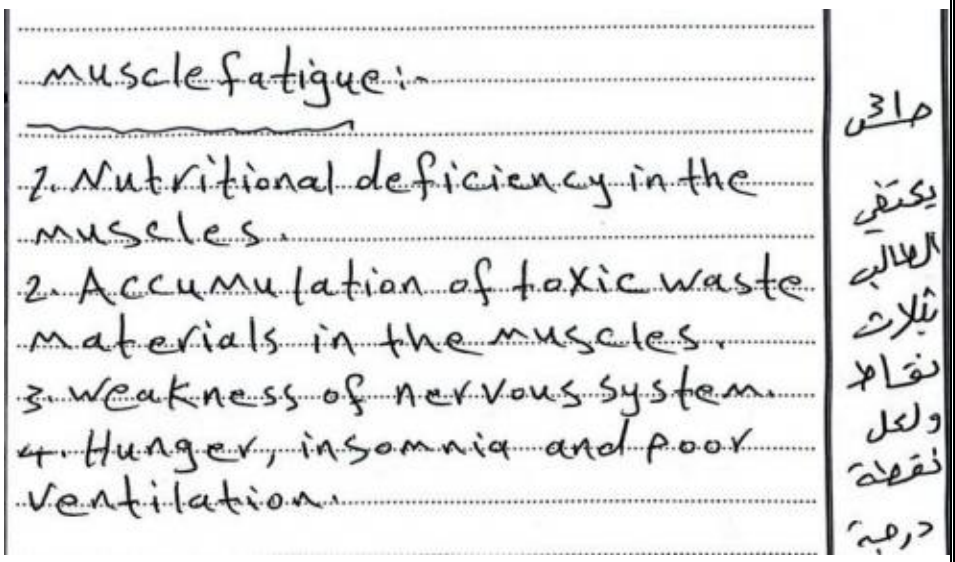
Biceps muscle

When it contracts the arm bends through the humerus

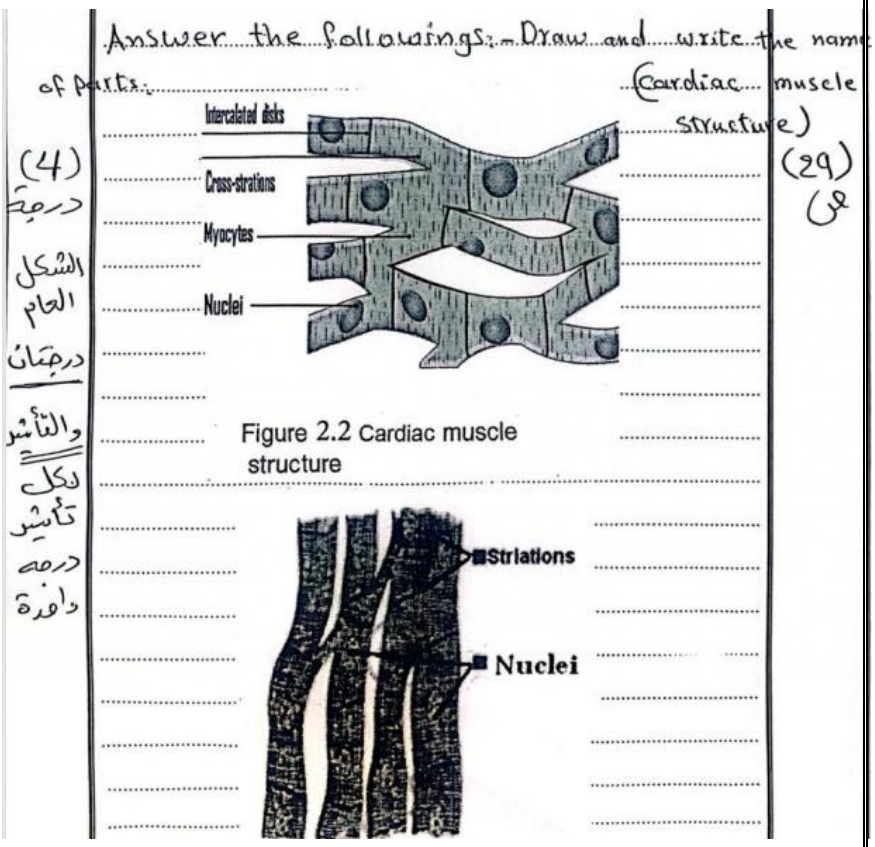
2024دور ثالث

which is responsible for the following:

Muscle fatigue



Draw with write the name of parts (cardiac muscle structure)



Define :

Muscle fatigue :- It is a weakness in the muscle's ability to contraction and relaxation. So it becomes harder and that is hap pened when the muscles work continuously without stopping, only for a limited period.

What are the scientific concepts :

The muscle which lie obliquely on the neck. **Round muscle**

Write the location : Smooth muscles

found in the walls of the internal organs such as in the muscular tissue of the bladder, intestines, stomach and uterus and the circulatory system

Digestive system

Introduction

The food is considered as a **source of energy** and this energy is used by human body to sustain life.

يعتبر الغذاء مصدرًا للطاقة ، ويستخدم جسم الإنسان هذه الطاقة للحفاظ على الحياة.

Most of the ingested food is in a complex form. So, they cannot be used for utilization of body if they are not digested into smaller units.

معظم الأطعمة التي يتم تناولها تكون في شكل معقد. لذلك ، لا يمكن استخدامها للاستفادة من الجسم إذا لم يتم هضمها إلى وحدات أصغر.

Digestive system consumes the food and breakdown the food into smaller units to be ready for absorption by **the villi** and eliminate undigested materials as **faces** through defecation process.

يستهلك الجهاز الهضمي الطعام ويقسم الطعام إلى وحدات أصغر ليكون جاهزًا للامتصاص بواسطة **الزغابات** والقضاء على المواد غير المهضومة كبراز من خلال عملية التغوط.

Q//What are the functions of digestive system?

***Digestive system consumes the food**

***breakdown the food into smaller units**

*to be ready for absorption by the villi

* eliminate undigested materials as **faces** through **defecation process.**

structure of digestive system

Q//What are the structure of digestive system?

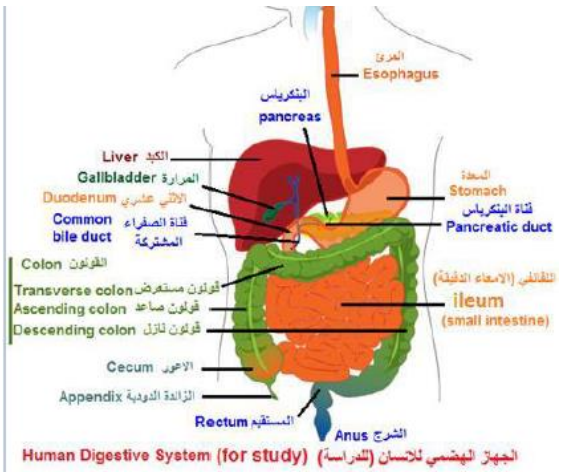
Digestive system is a long tube which starts with **mouth** and finishes **anus**.

*Its diameter becomes narrow or wide according to its position.

*There are associated glands on this tube such as **salivary glands, liver and pancreas**: these glands secrete enzymes and other materials into the digestive tract **to help the digestion**.

*Digestive system is composed of **mouth, pharynx, esophagus, stomach, small intestine and large intestine.**

الجهاز الهضمي عبارة عن أنبوب طويل يبدأ بالفم وينتهي بفتحة الشرج.
يصبح قطرها ضيقًا أو عريضًا حسب موضعها.
توجد غدد مرتبطة بهذا الأنبوب مثل الغدد اللعابية والكبد والبنكرياس: تفرز هذه الغدد الإنزيمات والمواد الأخرى في الجهاز الهضمي للمساعدة على الهضم.
يتكون الجهاز الهضمي من الفم والبلعوم والمريء والمعدة والأمعاء الدقيقة والأمعاء الغليظة



1 Mouth الفم

It is a cavity surrounded by muscles of cheek, muscles of lips and bony roof covered with mucosa. It ends with **pharynx.**

Mouth is composed of **tongue**, associated **salivary glands** and **teeth**.

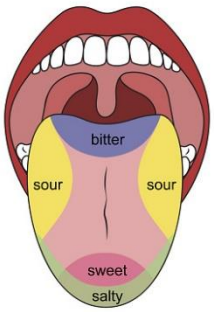
The teeth are embedded in the gum in the upper and lower jaws.

وهو تجويف تحيط به عضلات الخد وعضلات الشفتين وسقف عظمي مغطى بالغشاء المخاطي. ينتهي بالبلعوم.

يتكون الفم من اللسان والغدد اللعابية والأسنان المرتبطة به. يتم تثبيت الأسنان في اللثة في الفكين العلوي والسفلي.

What is the mouth containing?

1- Tongue اللسان



It consists of a group of muscles with nerve fibers.

The tongue **is helps speech**, **detects the tastes, helps chewing and swallowing of food .**

يتكون من مجموعة من العضلات ذات ألياف عصبية. يساعد اللسان على الكلام ويكشف الأذواق ويساعد على مضغ وابتلاع الطعام.

what is the function of tongue?

2-Teeth

Q// what are the function of teeth?

The main functions of teeth are to cut the food into small pieces and to grind the food. There are three types of teeth according to **their function and shape**.

تتمثل الوظائف الرئيسية للأسنان في تقطيع الطعام إلى قطع صغيرة وطحن الطعام. هناك ثلاثة أنواع من الأسنان حسب وظيفتها وشكلها.

Incisors: there **are four** incisors in each jaw. They are located in the middle of the jaw in the front part of the mouth. The function of incisors is **to cut the food**.

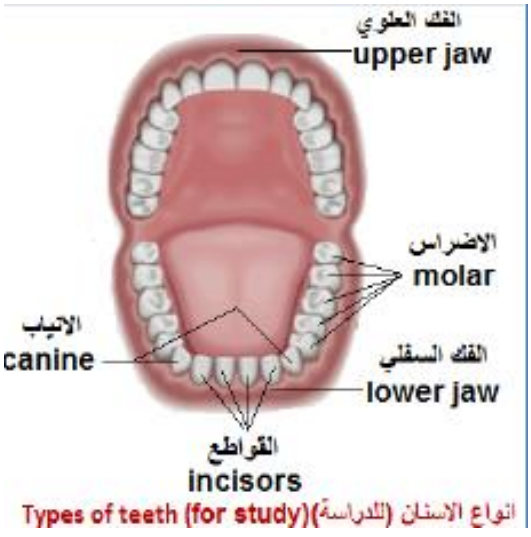
القواطع: يوجد أربعة قواطع في كل فك. تقع في منتصف الفك في الجزء الأمامي من الفم. وظيفة القواطع هي قطع الطعام.

Canine: there is a **pair** of canines in upper and lower jaw on the each side of the incisors. Canines are long and they have pointed ends (cusp). Their main function **is to tear the food**.

الانياب: يوجد زوج من الأنياب في الفك العلوي والسفلي على جانبي القواطع. الأنياب طويلة ولها نهايات مدببة (نتوء). وظيفتها الرئيسية **هي تمزيق الطعام.**

Molar: there **are ten** molar teeth in each jaw. Their main functions are to **chew and to grind the food.**

الاضراس: يوجد عشرة ضرس في كل فك. وتتمثل وظائفها الرئيسية في مضغ الطعام وطحنه.



Types of teeth (for study)(انواع الاسنان (للدراسة

Structure	Number	location	Function
Incisors	there **are four** incisors in each jaw.	They are located in the middle of the jaw in the front part of the mouth.	The function of incisors is **to cut the food**.
Canine: are long and they have pointed ends (cusp).	there is a **pair** of canines	in upper and lower jaw on each side of the incisors.	Their main function **is to tear the food**.
Molar	there **are ten** molar teeth in each jaw.	In mouth	Their main functions are to **chew and to grind the food.**

2 Pharynx البلعوم

It is a muscular cavity lined with mucosa. It is extended from the mouth to the **larynx** from the anterior and to the **esophagus** from the posterior. Pharynx is separated from the larynx by a soft cartilage tissue called **epiglottis**. **Epiglottis prevents the entering of food molecules into the trachea.**

إنه تجويف عضلي مبطن بالغشاء المخاطي. يمتد من الفم إلى الحنجرة من الأمام وإلى المريء من الخلف. يتم فصل البلعوم عن الحنجرة بواسطة نسيج غضروفي رقيق يسمى **لسان المزمار**. يمنع لسان المزمار دخول جزيئات الطعام **إلى القصبة الهوائية.**

There are two lymphatic glands on both sides of the pharynx. These glands are called **tonsils**. Also, there are two tubes (canals) which open to pharynx near the tonsils and these two tubes *connect the pharynx with the middle ear*. These tubes are called **Eustachian tubes**.

هناك نوعان من الغدد الليمفاوية على جانبي البلعوم. تسمى هذه **الغدد اللوزتين**. يوجد أيضًا أنبوبان (قناتان) يفتحان على البلعوم بالقرب من اللوزتين وهذان الأنبوبان يربطان البلعوم بالأذن الوسطى. تسمى هذه الأنابيب **بقناتي اوستاكي**.

Epiglottis : a soft cartilage tissue separated Pharynx from the larynx. Epiglottis prevents the entering of food molecules into the trachea.

ملاحظ التعريف كامل في الفصل السادس الجهاز التنفسي

3 Oesophagus المريء

It is a muscular tube which is extended from pharynx to stomach through the neck, chest and diaphragm and then, it enters the stomach through the **cardiac sphincter.**

وهو عبارة عن أنبوب عضلي يمتد من البلعوم إلى المعدة من خلال العنق والصدر والحجاب الحاجز ثم يدخل المعدة عبر العضلة العاصرة القلبية

It is about **25cm**. the esophagus is lined (covered) with mucosa. Its walls consist of muscular tissue. When these muscles contract and relax, the liquid and food molecules are pushed downward to stomach. This wave like motion is called **peristalsis** and it continues along the digestive tract.

فهو يقع في حوالي ٢٥ سم. المريء مبطن (مغطى) بالغشاء المخاطي. تتكون جدرانه من أنسجة عضلية. عندما تنقبض هذه العضلات وتسترخي ، يتم دفع جزيئات السائل والطعام إلى أسفل إلى المعدة. تسمى هذه الموجة مثل الحركة **التمعج** وتستمر على طول القناة الهضمية.

Peristalsis: wave like motion occur in muscular wall in along the digestive tract, When these muscles contract and relax, the liquid and food molecules are pushed downward to other parts from digestive tract.

4 Stomach المعدة

*The stomach is <u>located beneath the **diaphragm** in the left anterior region of the abdomen.</u>

تقع المعدة أسفل الحجاب الحاجز في المنطقة الأمامية اليسرى من البطن.

*It is a muscular organ which consists of many muscular layers lined with **crisped mucosa.**

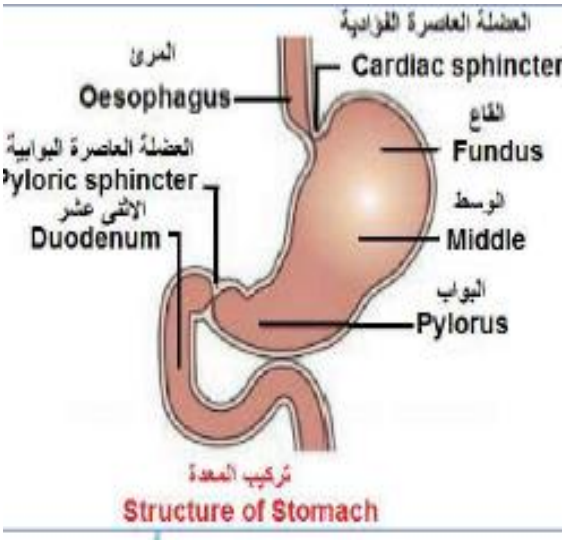
إنه عضو عضلي يتكون من العديد من الطبقات العضلية المبطنة بالغشاء المخاطي المتعرج.

*Crisped mucosa contains glands which secrete gastric juices to digest the food.

يحتوي الغشاء المخاطي المتعرج على غدد تفرز عصارات معدية لهضم الطعام.

*Stomach is covered with a thin membrane called **periton** from outside.

المعدة مغطاة بغشاء رقيق يسمى البريتون من الخارج.



It has two openings: the upper opening called **cardiac sphincter** and the lower opening called **pyloric sphincter**

لها فتحتان: الفتحة العلوية تسمى العضلة العاصرة القلبية والفتحة السفلية تسمى العضلة العاصرة البوابية

Cardiac sphincter **prevents** the food and gastric juice from returning to Oesophagus.

Pyloric sphincter:

1- **controls** the movement of the food into the duodenum
2- and **prevents** the duodenum contents from returning to stomach.

تمنع العضلة العاصرة القلبية الطعام وعصير المعدة من العودة إلى المريء.
تتحكم العضلة العاصرة البوابية في حركة الطعام في الاثني عشر وتمنع محتويات الاثني عشر من العودة إلى المعدة.

Cardiac sphincter : the upper opening of stomach between stomach and oesophagus , prevents the food and gastric juice from returning to Oesophagus.

Pyloric sphincter: the lower opening of stomach, between stomach and duodenum act to controls the movement of the food into the duodenum and prevents the duodenum contents from returning to stomach.

What is location of stomach?

The stomach is located beneath the **diaphragm** in the left anterior region of the abdomen.

What is the membrane that cover the Stomach? Periton

Functions of stomach

1- To mix the food by peristalsisلخلط الطعام عن طريق التمعج

2- Secretion of pepsin enzyme to digest the proteins..إفراز إنزيم الببسين لهضم البروتينات

3-Secretion of HCL (%0.2 concentration) to make stomach acidic.

إفراز حمض الهيدروكلوريك (تركيز ٠.٢٪) لجعل المعدة حمضية.

4- To absorb water, some minerals and vitamins through the walls of it.

امتصاص الماء وبعض المعادن والفيتامينات من خلال جدرانه.

Pepsin: an enzyme secreted by gastric juices in the stomach to digests proteins.

5 Small intestine

*It is along and coiled muscular tube which lies in the middle of the abdominal cavity.وهي عبارة عن أنبوب عضلي ممتد وملفوف يقع في منتصف تجويف البطن.

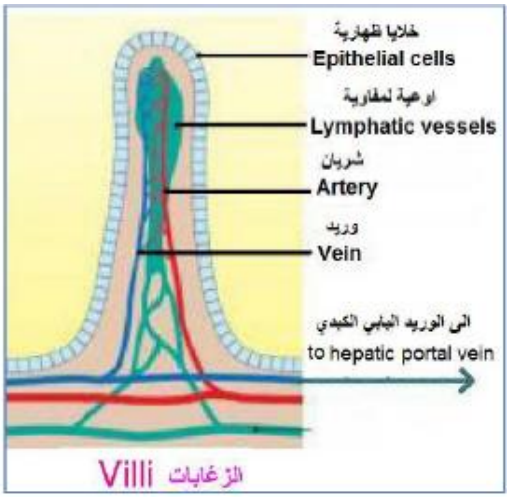
It is about 6-7 meters and is attached to a special membrane called **omentum**,

يبلغ طوله حوالي ٦-٧ أمتار ويتصل بغشاء خاص يسمى **المساريق**

the small intestine is covered by **mucosa** from inside and covered by **periton** from outside.

، الأمعاء الدقيقة مغطاة **بالغشاء المخاطي** من الداخل ومغطاة **بالبريتون** من الخارج.

Small intestine consists of muscular layers and the internal surface has tiny finger-like projections called **villi**. They resist the food movement to complete its digestion and increase the surface area for absorption. Villi contain blood vessels and lymph vessels.



تتكون الأمعاء الدقيقة من طبقات عضلية والسطح الداخلي به نتوءات صغيرة تشبه الأصابع تسمى الزغابات. تقاوم حركة الطعام لإتمام عملية الهضم وزيادة مساحة السطح للامتصاص. تحتوي الزغب على أوعية دموية وأوعية ليمفاوية.

Villi: tiny finger -like projections found on the internal surface of the Small intestine. They resist the food movement to complete its digestion and increase the surface area for absorption. Villi contain blood vessels and lymph vessels.

الزغب: بروزات صغيرة تشبه الأصابع توجد على السطح الداخلي للأمعاء الدقيقة. تقاوم حركة الطعام لإتمام عملية الهضم وزيادة مساحة السطح للامتصاص. تحتوي الزغب على أوعية دموية وأوعية ليمفاوية.

Write the causes of the following?

1-presence of villi in the inner surface of small intestine.

resist the food movement to complete its digestion and increase the surface area for absorption.

2- food absorption occurs in the villi(villus)

Because contain blood vessels and lymph vessels

Villi : Define- location - function

Fill the blank:

*Small intestine is attached to a special membrane called ---------- while the small intestine is covered by -------- from inside and covered by ------- from outside.

Parts of small intestine

Small intestine consists of three parts: duodenum, jejunum and ileum.

Duodenum: الاثني عشر

***it is the first part of the small intestine** .. وهو الجزء الأول من الأمعاء الدقيقة :

* it is about 30 cm. حوالي ٣٠ سم

*duodenum is a C shaped and surrounds the pancreas. ويحيط البنكرياسCالاثني عشر هو شكل

*The pancreatic duct and bile duct both drain into duodenum.

تصب كل من القناة البنكرياسية والقناة الصفراوية في الاثني عشر.

Jejunum: the section of the small intestine situated between the duodenum and the ileum, whose main function **is the absorption of nutrients from digested food.**

This part of the intestine is generally empty after death.

الصائم: قسم من الأمعاء الدقيقة يقع بين الاثني عشر والدقاق ، وتتمثل وظيفته الرئيسية في امتصاص العناصر الغذائية من الطعام المهضوم. يكون هذا الجزء من الأمعاء فارغًا بشكل عام بعد الموت.

Lleum: lleum is the final part of the small intestine.

اللفائفي: هو الجزء الأخير من الأمعاء الدقيقة.

Give the reason:

Jejunum called this name.

Because this part of intestine is generally empty after death.

Functions of small intestine

1- Neutralizing the food coming from the stomach to small intestine, by the effect of bile..تحييد (معادلة)الطعام القادم من المعدة إلى الأمعاء الدقيقة بتأثير الصفراء

2-Completing the digestion of the food which consists of carbohydrates, fats and proteins by the act digestive juices secreted by small intestine.

استكمال هضم الطعام المكون من الكربوهيدرات والدهون والبروتينات بفعل العصارات الهضمية التي تفرزها الأمعاء الدقيقة.

3- Absorbing the nutrients. امتصاص العناصر الغذائية.

4- Pushing the undigested materials into large intestine by its peristalsis.

دفع المواد غير المهضومة إلى الأمعاء الغليظة عن طريق تمعجها.

Periton:- Is a thin membrane which covered stomach, small intestine ,large intestine, liver and pancreas from outside.

6 Large intestine

It is the final part of the digestive tract: its length is about 1.5 meters. Its structure looks like small intestine but it does **not have villi in the inner surface**.

إنه الجزء الأخير من الجهاز الهضمي: يبلغ طوله حوالي ١.٥ متر. يشبه هيكلها الأمعاء الدقيقة ولكنها لا تحتوي على زغابات في السطح الداخلي.

Parts of large intestine

1- **cecum (appendix):** it is the first part of the large intestine located in the right-hand lower part of the abdominal cavity. And there is a small (about 7cm) finger like closed tube called **appendix** which connected with **cecum,** when the appendix is inflamed, **the person suffers from a very hard intestinal colic with coma and vomiting**. In this case, the doctor must be visited as soon as possible and appendix is removed by a surgical operation.

Large intestine الأمعاء الغليظة

- الأعور: - هو الجزء الأول من الأمعاء الغليظة الموجود في الجزء السفلي الأيمن من تجويف البطن. وهناك إصبع صغير (حوالي ٧ سم) يشبه أنبوب مغلق يسمى **الزائدة الدودية** والذي يتصل بالأعور ، عندما تلتهب الزائدة ، يعاني الشخص من مغص معوي شديد الصعوبة مع غيبوبة وقيء. في هذه الحالة يجب زيارة الطبيب في أسرع وقت ممكن وإزالة الزائدة الدودية بعملية جراحية.

when the appendix is inflamed suffers from many symptoms :

1- **the person suffers from a very hard intestinal colic 2- coma 3- vomiting**.

2- **Colon:** it is the second part of the large intestine comes after the cecum. Colon is divided into three parts according to its location inside the abdominal cavity.

القولون: وهو الجزء الثاني من الأمعاء الغليظة الذي يأتي بعد الأعور. ينقسم القولون إلى ثلاثة أجزاء حسب موقعه داخل تجويف البطن

a) **Ascending colon**: in the right-hand of the abdominal cavity.

أ) القولون الصاعد: في الجانب الايمن من تجويف البطن.

b) **Transverse colon**: from the right to the left in the abdominal cavity.

ب) القولون المستعرض: من اليمين إلى اليسار في تجويف البطن.

c) **Descending colon**: in the left part of the abdominal cavity. The descending colon is extended into pelvic cavity.

ج) القولون النازل: في الجزء الأيسر من تجويف البطن. يمتد القولون النازل إلى تجويف الحوض.

3- **Rectum**: it starts after descending colon and it is a straight tube, which is located behind the bladder..

المستقيم: يبدأ بعد نزول القولون وهو عبارة عن أنبوب مستقيم يقع خلف المثانة.

4- **Anus**: rectum continues with a short duct, which ends at anus opening.

فتحة الشرج: يستمر المستقيم بقناة قصيرة تنتهي عند فتحة الشرج.

Function of large intestine:-

1- Absorbing the water. امتصاص الماء.

2- Storing the undigested food materials for a limited time , until they are eliminated. تخزين المواد الغذائية غير المهضومة لفترة محدودة حتى التخلص منها.

3- Pushing the waste materials to outside of the body from the anus by means of contractions and relaxations of intestinal walls. There is no digestion process in the large intestine

٣- دفع الفضلات إلى خارج الجسم من فتحة الشرج عن طريق تقلصات وارتخاء جدران الأمعاء. لا توجد عملية هضم في الأمعاء الغليظة

Associated glands of digestive system الغدد الملحقة بالجهاز الهضم

1- Salivary glands الغدد اللعابية

There are three pairs of salivary glands located **on the both sides of the face**. They are called **parotid glands**, **submandibular glands** and **sub-lingual glands** according to their locations.

توجد ثلاثة أزواج من الغدد اللعابية على جانبي الوجه. وتسمى **الغدد النكفية** **والغدد تحت الفك السفلي** **والغدد تحت اللسان** وفقًا لمواقعها.

These glands secrete concentrated liquid called **saliva**. Saliva contains **ptyalin enzyme** which **acts on starch to digest it in the mouth** and **to convert it into disaccharides**. For this reason, the tastes of starchy food become sweet after chewing it.

تفرز هذه الغدد سائلًا مركّزًا يسمى اللعاب. يحتوي اللعاب على إنزيم التيالين الذي يعمل على النشا لهضمه في الفم وتحويله إلى ثنائي السكريات. لهذا السبب ، تصبح مذاق الأطعمة النشوية حلوة بعد مضغها.

Saliva: concentrated liquid secreted by salivary glands, Saliva contains ptyalin enzyme which acts on starch to digest it in the mouth and to convert it into disaccharides. For this reason, the tastes of starchy food become sweet after chewing it. the food is mixed with **saliva which moistens and softens the food.**

Liver

It is a dark red spongy –like organ. it is covered by periton membrane and is located **beneath the diaphragm in the right side of the abdomen**, next to stomach. Liver cells produce bile liquid. Liver consists of two lobes (left and right lobes**), the right one is bigger than the left one.** A small sac behind the right lobes called **gall bladder** stores the bile. It is connected to liver by a duct.

وهو عضو يشبه الإسفنج الأحمر الداكن. وهو مغطى بغشاء البريتون ويقع تحت الحجاب الحاجز في الجانب الأيمن من البطن بجوار المعدة. تنتج خلايا الكبد السائل الصفراوي. يتكون الكبد من فصين (فصين يمين ويسار) ، والفص الأيمن أكبر من الفص الأيسر. كيس صغير خلف الفص الأيمن يسمى المرارة يخزن الصفراء. وهو متصل بالكبد عن طريق قناة.

Gall bladder: small sac located under liver stores the bile. It is connected to liver by a duct.

Define – function –location of gallbladder

Functions of liver

The most important functions of liver:

1- Secreting the bile. Bile is a concentrated, dark-green near to yellowish liquid and its taste is bitter. It helps the digestion of fatty materials by breaking them into small pieces.

١- إفراز العصارة الصفراوية. الصفراء عبارة عن سائل مركز ، أخضر داكن بالقرب من سائل مصفر وطعمه مر. يساعد على هضم المواد الدهنية عن طريق تقسيمها إلى قطع صغيرة.

2-Storing the excess amount of carbohydrates as **glycogen**.

٢- تخزين كمية الكربوهيدرات الزائدة على هيئة جليكوجين.

3-Converting the excess amount of proteins into urea. The excess amount of protein is filtered from the blood by kidneys and excreted during urination.

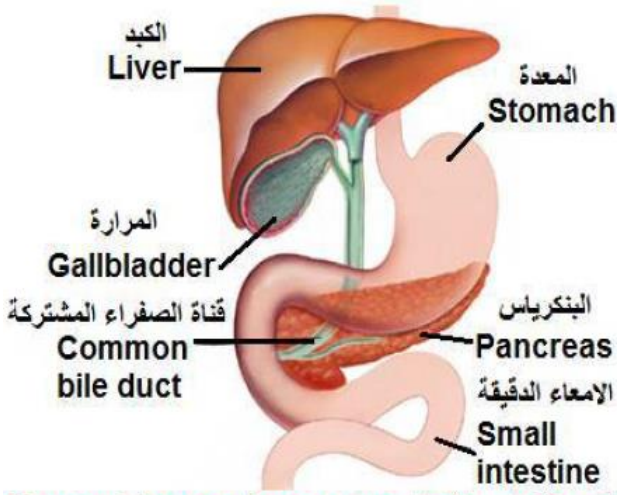
٣- تحويل الكمية الزائدة من البروتينات إلى يوريا. يتم تصفية الكمية الزائدة من البروتين من الدم عن طريق الكلى وتفرز أثناء التبول.

4-Manufacturing the heparin enzyme which **prevents the blood clotting in blood vessels.**

٤- تصنيع إنزيم الهيبارين الذي يمنع تخثر الدم في الأوعية الدموية.

5- Manufacturing the Prothrombin and fibrinogen, **which are important for blood clotting**.

٥- تصنيع البروثرومبين والفيبرينوجين الضروريين لتخثر الدم.



Human Liver and pancreas كبد وبنكرياس الانسان

Bile :is a concentrated, dark-green near to yellowish liquid and its taste is bitter. it Secrete by liver and store in gallbladder. It helps the digestion of fatty materials by breaking them into small pieces.

Define – function –location and origin of Bile

Pancreas البنكرياس

It is **located between the stomach and duodenum and connected with them by periton membrane.** It has a leaf-like shape. The right part of the pancreas is surrounded by duodenum. Inside pancreas. There are tiny ducts which are joined with each other to form the main pancreatic duct.

يقع بين المعدة والاثني عشر ويتصل بهما بواسطة غشاء البريتون. لها شكل يشبه الأوراق. الجزء الأيمن من البنكرياس محاط بالاثني عشر. داخل البنكرياس. هناك قنوات صغيرة متصلة ببعضها البعض لتشكل قناة البنكرياس الرئيسية.

Digestion الهضم

After consuming the food, food undergoes a number of **mechanical processes** (cutting the food and mixing it with juices) and **chemical processes** (breaking down the food into smaller units). These processes are necessary for the continuation of life.

بعد تناول الطعام ، يخضع الطعام لعدد من العمليات الميكانيكية (تقطيع الطعام وخلطه مع العصائر) والعمليات الكيميائية (تقسيم الطعام إلى وحدات أصغر). هذه العمليات ضرورية لاستمرار الحياة.

Digestion is the breaking down of big food molecules into smaller units to make them ready for absorption. After absorption these subunits are transported to all cells to be used.

الهضم هو تكسير جزيئات الطعام الكبيرة إلى وحدات أصغر لجعلها جاهزة للامتصاص. بعد الامتصاص ، يتم نقل هذه الوحدات الفرعية إلى جميع الخلايا لاستخدامها.

1. Digestion in mouth

The process of digestion begins in the mouth. Food molecules are cut and ground into smaller pieces by chewing. With the help of the tongue, the food is mixed with **saliva which moistens and softens the food.** The ground food mixed with saliva is called as **bolus**.

تبدأ عملية الهضم في الفم. يتم تقطيع جزيئات الطعام وطحنها إلى قطع أصغر عن طريق المضغ. بمساعدة اللسان يتم خلط الطعام باللعاب الذي يرطب ويلين الطعام. يُطلق على الطعام المطحون الممزوج باللعاب اسم **بلعة.**

In addition, the saliva contains **ptyalin enzyme** which acts on the starchy material and digests them into smaller sugars.

بالإضافة إلى ذلك ، يحتوي اللعاب على إنزيم بتالين الذي يعمل على المواد النشوية ويهضمها إلى سكريات أصغر.

By the contractions and relaxations of tongue and pharynx muscles, the food molecules are push into oesophagus and then into the stomach. No chemical digestion takes place in oesophagus.

من خلال تقلصات واسترخاء عضلات اللسان والبلعوم ، يتم دفع جزيئات الطعام إلى المريء ثم إلى المعدة. لا يحدث هضم كيميائي في المريء.

Bolus: which the ground food mixed with saliva in mouth result through food molecules ingested are cut and ground into smaller pieces by chewing. With the help of the tongue, the food is mixed with saliva which moistens and softens the food.

البلعة: وهي عبارة عن الطعام المطحون الممزوج باللعاب في الفم الناتج عن جزيئات الطعام المبتلعة، والتي يتم تقطيعها وطحنها إلى قطع أصغر عن طريق المضغ. وبمساعدة اللسان، يمتزج الطعام باللعاب الذي يرطب الطعام ويلينه.

2- Digestion in stomach

The food is mixed with gastric juice by the peristaltic movements of stomach. Gastric juice is secreted by gastric glands and contains **hydrochloric acid(HCL).** It also activates the pepsin enzyme which **converts the proteins into smaller units**.

يتم خلط الطعام مع عصير المعدة عن طريق الحركات التمعجية للمعدة. يفرز عصير المعدة عن طريق الغدد المعدية ويحتوي على حمض الهيدروكلوريك. كما أنه ينشط إنزيم البيبسين الذي يحول البروتينات إلى وحدات أصغر.

After the food molecules mix with gastric juice in the stomach, the food molecules form a concentrated mass. This concentrated mass is called as **chyme.** Chyme is

pushed through the pyloric sphincter into the duodenum.

بعد أن تمتزج جزيئات الطعام مع عصير المعدة في المعدة ، تشكل جزيئات الطعام كتلة مركزة. تسمى هذه الكتلة المركزة بالكيموس. يُدفع الكيموس عبر العضلة العاصرة البوابية إلى الاثني عشر.

Chyme :- is a concentrated mass of food molecules mix with gastric juice in the stomach, is pushed through the pyloric sphincter into the duodenum.

الكيموس :- عبارة عن كتلة مركزة من جزيئات الطعام الممزوجة بالعصارة المعدية في المعدة، يتم دفعها عبر العضلة العاصرة البوابية إلى الاثني عشر.

3 Digestion in small intestine

When the food molecules pass into the small intestine. Three types of secretions act on them.

عندما تمر جزيئات الطعام إلى الأمعاء الدقيقة. ثلاثة أنواع من الإفرازات تعمل عليها.

Absorption الامتصاص

1-the bile is secreted on chime, bile helps to digest fat.

١- تفرز العصارة الصفراوية على الرنين ، وتساعد الصفراء على هضم الدهون.

2-other pancreas enzymes are secreted to digest proteins and carbohydrates.

٢- أنزيمات البنكرياس الأخرى تفرز لهضم البروتينات والكربوهيدرات.

3-food converted to thick white mass called **Chyle**, which contains simple absorbed molecules.

٣-الغذاء يتحول إلى كتلة بيضاء سميكة تسمى شيل والتي تحتوي على جزيئات بسيطة ممتصة.

Chyle:- is a concentrated white liquid which found in the small intestine this concentrated white liquid contain smaller units ready for absorption by the wall of small intestine later.

الكيلوس:- هو سائل أبيض مركز يوجد في الأمعاء الدقيقة هذا السائل الأبيض المركز يحتوي على وحدات أصغر جاهزة للامتصاص بواسطة جدار الأمعاء الدقيقة فيما بعد.

Q/ Trace the food path in the digestive system تتبع مسار الطعام (اللقمة) في الجهاز الهضمي

Mouth ---Pharynx---Oesophagus----Stomach----Small intestine---Large intestine ---Anus

الفم ـ البلعوم ـ المريء ـ المعدة ـ الأمعاء الدقيقة ـ الأمعاء الغليظة ـ فتحة الشرج

Small intestine	Large intestine
1- It is length about 6-7 meters	1- It is length about 1.5 meters
2- It consists of three parts: duodenum, jejunum and ileum.	2- It consists of parts: cecum, colon, rectum and anus
3-there is digestion of food and absorbing the nutrients	3- there is no digestion of food Only absorbing the water
4- Pushing the undigested materials into large intestine	4- Pushing the waste materials to outside of the body
5- have villi	5- dose not have villi

Chyme	Chyle

concentrated mass of food molecules after the food molecules mixes with gastric juice in the stomach.	thick white mass from food converted which contains simple absorbed molecules in small intestine
pushed through the pyloric sphincter into the duodenum	Absorbed by villi

Appendix= ceacum(اسم مطابق)

appendix : is a small (about 7cm) finger like closed tube connected with caecum when the appendix is inflamed, the person suffers from a very hard intestinal colic with coma and vomiting. In this case, the doctor must be visited as soon as possible and appendix is removed by a surgical operation.

Ptyalin: **enzyme** found in the Saliva which acts on starch to digest it in the mouth and to convert it into disaccharides. For this reason, the tastes of starchy food become sweet after chewing it.

Heparin: an enzyme Manufacturing by the liver which prevents the blood clotting in blood vessels.

Prothrombin: Manufacturing by the liver which are important for blood clotting

Fibrinogen: Manufacturing by the liver which are important for blood clotting

Structure	Location	Function
Salivary glands	On the both sides of the face	Secrete saliva
Gall bladder	Under the live	Stores the bile
Bile	**In gall bladder** stores the bile. It is connected to liver by a duct.	It helps the digestion of fatty materials by breaking them into small pieces
Heparin	Liver	prevents the blood clotting in blood vessels.
Pepsin	Stomach	digests proteins
Pancreases	between the stomach and duodenum	Secretion of enzymes to digest proteins and carbohydrates
cardiac sphincter	upper opening of stomach	prevents the food and gastric juice from returning to esophagus
pyloric sphincter	lower opening of stomach	**controls** the movement of the food into the duodenum and **prevents** the duodenum contents from returning to stomach.

Q/Which is responsible for the following?

prevents the entering of food molecules into the trachea.	Epiglottis
Secretion of HCL	gastric glands in Stomach او الاكتفاء بكلمة Stomach
Secrete saliva	Salivary glands
Secreting the bile	Liver
Stores the bile	Gall bladder
Storing the glycogen	Liver
Converting the excess amount of proteins into urea	Liver
Formation of ptyalin	Salivary glands
helps the digestion of fatty materials	Bile
prevents the blood clotting in blood vessels	Heparin
moistens and softens the food	Saliva
prevents the food and gastric juice from returning to esophagus	Cardiac sphincter
prevents the duodenum contents from returning to stomach.	Pyloric sphincter
Formation HCL	gastric glands in Stomach او الاكتفاء بكلمة Stomach
Formation Pepsin	gastric glands in Stomach او الاكتفاء بكلمة Stomach
Formation Glycogen	Liver

Some diseases of digestive system

1. Cholera

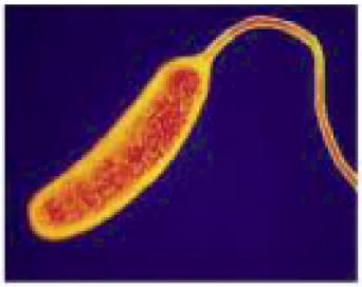


Figure 4.9 Vibrio Cholera

*It is a contagious disease **(Why)** which is spread quickly and causes epidemic cases.

وهو مرض معد ينتشر بسرعة ويسبب حالات وبائية.

*It is caused by special bacterium called Vibrio cholera.

تسببه بكتيريا خاصة تسمى ضمة الكوليرا.

*A German scientist Robert Koch (1883) discovered this disease in Egypt.

اكتشف العالم الألماني روبرت كوخ (١٨٨٣) هذا المرض في مصر.

*Cholera microbes which are found in food and drinks enter the digestive system through the mouth.

تدخل ميكروبات الكوليرا الموجودة في الأطعمة والمشروبات إلى الجهاز الهضمي عن طريق الفم.

What is the meaning (1883)?

In this year, A German scientist Robert Koch discovered this disease in Egypt.

What are the ways or methods which transporting (transmitting) Cholera microbes to human?

Cholera microbes which are food and drinks enter the digestive system through the mouth.

Symptoms:

*The signs of this disease appear after about two days. تظهر علامات هذا المرض بعد حوالي يومين.

***Patient has strong diarrhea and vomiting**. The faces of the patient look like the rice water.

يعاني المريض من إسهال شديد وقيء. براز المريض تشبه ماء الأرز.

*In cholera disease, the diarrhea causes the loss of a great amount of body liquid and the decreasing of body temperature.

Because of this the epidermis (skin) **of patient is crisped. why**

في مرض الكوليرا ، يتسبب الإسهال في فقدان كمية كبيرة من سوائل الجسم وانخفاض درجة حرارة الجسم.

وبسبب هذا فإن بشرة (جلد) المريض تصبح مكرمشة.

***Acute inflammation of intestine and food poisoning are distinguished from cholera by causing very strong intestinal colic in addition to diarrhea and vomiting.**

يتميز التهاب الأمعاء الحاد والتسمم الغذائي عن الكوليرا بتسببه في مغص معوي قوي للغاية بالإضافة إلى الإسهال والقيء.

How can distinguish between the symptoms of Acute inflammation of intestine and food poisoning and cholera?

Acute inflammation of intestine and food poisoning are distinguished from cholera by

***causing very strong intestinal colic**

***diarrhea**

*** vomiting.**

Treatment:

1-The patient is isolated from residential places **(Why)** to **prevent the infection and spreading of this disease.** عزل المريض عن الأماكن السكنية لمنع الإصابة بهذا المرض وانتشاره

2-Liquids must be given to the patient **(Why)** to replace the liquids which are lost from the body and

يجب إعطاء سوائل للمريض لتعويض السوائل التي فقدها من الجسم

3-special medicines must be given..وإعطائه أدوية خاصة

Prevention: -

The following steps are followed immediately when an infection with this disease occurs:

يتم اتباع الخطوات التالية فور حدوث الإصابة بهذا المرض:

1-Isolating the patients to isolated hospitals and the visiting must be prevented. **(Why)**

عزل المرضى في مستشفيات منعزلة ومنع الزيارة.

2- Confining the people who are in contact with the patient. **(Why)** حصر المخالطين للمريض.

3- Supervising the drinking water and its sterilization. **(Why)** الإشراف على مياه الشرب وتعقيمها.

4-Sterilization of wastes of patient with Lysol or phenol or chloride.

تعقيم فضلات المريض بمادة لايسول أو فينول أو كلوريد.

5-Using insecticides for controlling the insects' transporting microbes to prevent contamination.

استخدام المبيدات في مكافحة الميكروبات الناقلة للحشرات لمنع التلوث.

6- Sterilizing the fruits and vegetables with chloride solution before eating.

تعقيم الفاكهة والخضروات بمحلول الكلوريد قبل تناولها.

7- Informing the people about the hygiene. Also sterilization of water and food is announced before consuming these.

توعية الناس بالنظافة. كما يتم الإعلان عن تعقيم الماء والطعام قبل تناولهما.

One of the ways to prevent disease , escially cholera, is the using of insecticides. . (Why) for controlling the insects' transporting microbes to prevent contamination.

Symptoms of cholera:

*The signs of this disease appear after about two days. تظهر علامات هذا المرض بعد حوالي يومين.

1-Patient has strong diarrhea and vomiting. The faces of the patient look like the rice water.

2-In cholera disease, the diarrhea causes the loss of a great amount of body liquid

3- the decreasing of body temperature.

The epidermis is crisped in the person infected with cholera. why

Because the diarrhea causes the loss of a great amount of body liquid.

What are the differences between the symptoms of cholera and typhoid ?

2. Typhoid Fever

It is caused **by special bacterium** called ***salmonella typhi*** which infect human by ingestion of food and drinks.

تسببه بكتيريا خاصة تسمى السالمونيلا التيفية التي تصيب الإنسان عن طريق تناول الطعام والشراب.

Symptoms:

1- Increasing body temperature and strong headache زيادة حرارة الجسم وصداع شديد

2- In appetence and tiredness seen. في الشهية والتعب الملاحظ.

Treatment:

1- Visiting the **physician** and starting the necessary treatment as soon as symptoms are observed زيارة الطبيب وبدء العلاج اللازم فور ملاحظة الأعراض

2- Taking large amount of sterilized water and relaxation.. أخذ كمية كبيرة من الماء المعقم والاسترخاء

3- Balance the body temperature. موازنة درجة حرارة الجسم.

Prevention:-

1- Don't use the patient's tool and take unhealthy food.. لا تستخدم أداة المريض وتناول طعامًا غير صحي

٢- Killing the insects by insecticides because they are carrier.. قتل الحشرات بالمبيدات لأنها حاملة لها

3- Washing hands with soap after defecation process.. غسل اليدين بالصابون بعد التبرز

4- Keep the environment clean and taking healthy food.. الحفاظ على البيئة نظيفة وأخذ غذاء صحي

٥ - Sterilizing the fruits and vegetables before eating. تعقيم الفاكهة والخضروات قبل تناولها

3. Amoebic Dysentery الزحار الأميبي

*** parasitic amoeba causes this disease. الأميبا الطفيلية تسبب هذا المرض.**

***This parasite generally stays inside the large intestine**. Then, the parasite enters the intestinal wall. After that, the parasite is transported into the liver, lungs or any other organ.

يبقى هذا الطفيل بشكل عام داخل الأمعاء الغليظة. ثم يدخل الطفيل جدار الأمعاء. بعد ذلك ينتقل الطفيل إلى الكبد أو الرئتين أو أي عضو آخر.

*It is caused by drinking the contaminated liquids and eating the unwashed food such as lettuce, turnip, parsley which contain the cysts of parasite.

ينتج عن شرب السوائل الملوثة وتناول الأطعمة غير المغسولة مثل الخس واللفت والبقدونس التي تحتوي على أكياس الطفيليات.

What are the ways of transmitting amoebic dysentery to humans?

It is caused by

1- drinking the contaminated liquids

2- eating the unwashed food such as lettuce, turnip, parsley which contain the cysts of parasite.

Symptoms:

The symptoms of this disease starts to appear gradually,، تبدأ أعراض هذا المرض بالظهور تدريجياً

1-the patients feel intestinal colic and ويشعر المريض بمغص معوي

2 -light diarrhea occurs, the faeces of patients become soft or watery and smell bad.

ويحدث إسهال خفيف ، وتصبح براز المرضى طرية أو مائيّة ورائحة كريهة.

3-Also the patient feels emaciation كما يشعر المريض بالهزال

4- the body temperature increases slightly..وترتفع درجة حرارة الجسم بشكل طفيف

The diagnosis of amoebic dysentery is done by the examination of the faces.

يتم تشخيص الزحار الأميبي عن طريق فحص البراز

This disease changes into chronic amoebic dysentery if the patient is not treated or if the body is low resistant.

يتحول هذا المرض إلى زحار أميبي مزمن إذا لم يتم علاج المريض أو إذا كان الجسم منخفض المقاومة.

How is amoebic dysentery diagnosed?

The diagnosis of amoebic dysentery is done by the examination of the faces.

When does a person with amoebic dysentery change to chronic amoebic dysentery?

This disease changes into chronic amoebic dysentery

if the patient is not treated

or if the body is low resistant.

Treatment:

*The patient is treated by resting in the bed يتم علاج المريض بالراحة في السرير

*supplying the light diet (semi-liquid). .وإمداده بوجبة خفيفة (شبه سائلة)

*The patient is treated with drugs for reducing the abdominal colic visiting the physician.

يعالج المريض بأدوية لتقليل مغص البطن عند زيارة الطبيب.

Prevention:

Washing the fruits and vegetables before eating and sterilization of water.

غسل الفاكهة والخضروات قبل تناولها وتعقيمها بالماء.

4. Obesity السمنة المفرطة

Reasons or Responsible of Obesity

If the food taken into body is more than the body requirement, excess amount of food is stored in the body and cause obesity.
Especially fats, carbohydrates such as starch and sugars cause the obesity.
إذا كان الطعام الذي يتم تناوله في الجسم أكثر من احتياجات الجسم ، فإن كمية الطعام الزائدة يتم تخزينها في الجسم وتسبب السمنة. وخاصة الدهون والكربوهيدرات مثل النشا والسكريات تسبب السمنة.

Symptoms:

1-Obesity starts by increasing of the body weight تبدأ السمنة بزيادة وزن الجسم
2- thickening the skin layers. تثخين طبقات الجلد.
3-The obesity increases the blood pressure, and causes diabetes, heart diseases.
فالسمنة تزيد من ضغط الدم ، وتسبب مرض السكري وأمراض القلب.

Treatment:

*The obesity can be treated by regulating the diets, مكن علاج السمنة من خلال تنظيم النظام الغذائي
*reducing the fats and carbohydrates in the diets وتقليل الدهون والكربوهيدرات في الوجبات الغذائية
* performing the physical exercises regularly. أداء التمارين البدنية بانتظام.

Prevention:

When the body weight starts to increase,عندما يبدأ وزن الجسم في الزيادة
*the obesity can be prevented by reducing the food intake يمكن الوقاية من السمنة عن طريق تقليل تناول الطعام
*performing suitable sports..ممارسة الرياضة المناسبة

Q/Write the causes of the followings:

1- the epidermis (skin) is crisped in the person infected with Cholera.

Because the patient has strong diarrhea and vomiting causes the loss of a great amount of body liquid and the decreasing of body temperature.

2- Some persons infected Obesity.

If the food taken into body is more than the body requirement, excess amount of food is stored in the body and cause obesity. Especially fats, carbohydrates such as starch and sugars cause the obesity.

3-The patient of Cholera is isolated from residential places.

to prevent the infection and spreading of this disease.

4-Liquids must be given to the patient of Cholera

to replace the liquids which are lost from the body

5-Using insecticides to Kill the insects

Using insecticides for controlling the insects' transporting microbes to prevent contamination.

QUESTION

Q1 // Define the following?

Ptyalin :- Is enzyme which is secreted by salivary glands that concentrated liquid called saliva. Saliva contains ptyalin enzyme which acts on starch to digest it in the mouth and to convert it into disaccharides.

Pepsin :- is enzyme which is secreted by digestive glands (by gastric glands)in the stomach and it digest the proteins.

Gall bladder :- is a small sac under the liver stores the bile. It is connected to liver by a duct.

Ceacum :- :- is the first part of the large intestine located in the right-hand lower part of the abdominal cavity.

Chyle:- is a concentrated white liquid which found in the small intestine this concentrated white liquid contain smaller units ready for absorption by the wall of small intestine later.

Villi :-Is a tiny finger-like projections from the internal surface of small intestine, they resist the food movement to complete its digestion and increase the surface area for absorption. Villi contain blood vessels and lymph vessels.

Chyme :- is a concentrated mass of food molecules mix with gastric juice in the stomach, is pushed through the pyloric sphincter into the duodenum.

Tongue :- is a part of digestive system which found in the mouth, It is consists of a group of muscles with nerve fibers. The tongue is helps speech, detects the tastes, helps chewing and swallowing of food and helps bolus formation.

Epiglottis :- Is a soft cartilage tissue which separated Pharynx from the larynx . Epiglottis prevents the entering of food molecules into the trachea.

pharynx :- is a muscular cavity lined with mucosa. It is extended from the mouth to the larynx from the anterior and to the esophagus from the posterior.

Digestion :- is the breaking down of big food molecules into smaller units to make them ready for absorption. After absorption these subunits are transported to all cells to be used.

Q2//What are the pathological symptoms of the following diseases?

the pathological symptomsالأعراض المرضية

Obesity :-

1- Obesity starts by increasing of the body weight and thickening the skin layers.

2- The obesity increases the blood pressure, and causes diabetes, heart diseases.

Amoebic Dysentery :- The symptoms of this disease starts to appear gradually,

*the patients feel intestinal colic and light diarrhea occurs, the faces of patients become soft or watery and smell bad.

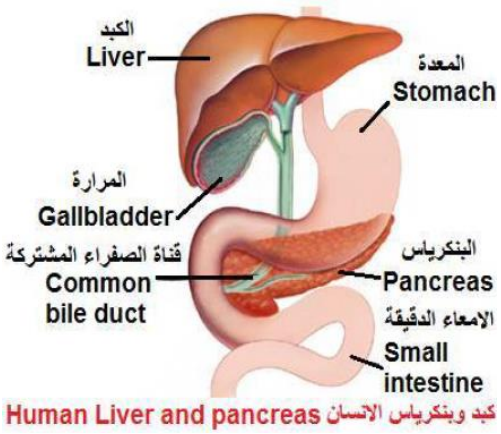
*Also the patient feels emaciation and the body temperature increases slightly.

Cholera :-

* the signs of this disease appear after about two days.
*Patient has strong diarrhea and vomiting. The faces of the patient look like the rice water.
*In cholera disease, the diarrhea causes the loss of a great amount of body liquid and the decreasing of body temperature.

Q3/ Draw the followings and write the names of the parts.

1-Liver and pancreas



Q4//Write the causes of the following :-

1- Food absorption occurs in the villi (villus)

Because they resist the food movement to complete its digestion and increase the surface area for absorption. Villi contain blood vessels and lymph vessels

2- The epidermis is crisped in the person infected with cholera

Because the diarrhea causes the loss of a great amount of body liquid.

4- The taste of bread becomes sweet after chewing it in the mouth

because saliva contains ptyalin enzyme which acts on starch to digest it in the mouth and to convert it into disaccharides. For this reason, the tastes of starchy food become sweet after chewing it.

Q5// Complete the following :-

1- Diaphragm.
2- Heparin enzyme
3- Ptyalin , Disaccharides
4- The carbohydrates , proteins
5- Duodenum , Jejunum and lleum
6- Salivary glands , Liver and pancreas
7- Cardiac sphincter and pyloric sphincter

Q6//Write the places (location) of the following :-

Villi ;- is located at the internal surface of small intestine

Liver :- Is located beneath the diaphragm in the right side of the abdomen, next to stomach

Gall bladder:- Is located behind the right lobes of the liver or under the liver.

Salivary glands:- is located on the both sides of the face.

Q7// Answer the following :-

1- Write the accessory glands of digestive canal?

Salivary glands , Liver and pancreas

2- Explain the digestion in the mouth briefly?

The process of digestion begins in the mouth. Food molecules are cut and ground into smaller pieces by chewing. With the help of the tongue, the food is mixed with saliva which moistens and softens the food. The ground food mixed with saliva is called as bolus

In addition, the saliva contains ptyalin enzyme which acts on the starchy material and digests them into smaller sugars. By the contractions and relaxations of tongue and pharynx muscles, the food molecules are push into esophagus and then into the stomach. No chemical digestion takes place in esophagus.

3-What are the differences between the symptoms of cholera and symptoms of typhoid ?

Symptoms of Cholera

*The signs of this disease appear after about two days.

***Patient has strong diarrhea and vomiting**. The faces of the patient look like the rice water.

*In cholera disease, the diarrhea causes the loss of a great amount of body liquid and the decreasing of body temperature.

Because of this the epidermis (skin) **of patient is crisped.**

Symptoms of Typhoid Fever

1- Increasing body temperature and strong headache

2-In appetence and tiredness seen.

4-How dose the digestion processes happens in the small intestine?

When the food molecules pass into the small intestine. Three types of secretions act on them Excreted bile on the food which helps digest fat and make the environment appropriate for the effect of other enzymes. Secretion of pancreatic enzymes and digestive gland in a small intestine to digest fat, proteins and carbohydrates. The food molecules form a concentrated white liquid. This concentrated white liquid is called as chyle contain smaller units ready for absorption by the wall of small intestine later

5- Count the parts of digestive tract?

Mouth, pharynx, oesophagus, stomach, small intestine and large intestine

6- What is the function of the liver?

1- Secreting the bile. Bile is a concentrated, dark-green near to yellowish liquid and its taste is bitter. It helps the digestion of fatty materials by breaking them into small pieces.

2- Storing the excess amount of carbohydrates as glycogen.

3- Converting the excess amount of proteins into urea. The excess amount of protein is filtered from the blood by kidneys and excreted during urination.

4- Manufacturing the heparin enzyme which prevents the blood clotting in blood vessels

4- Manufacturing the Prothrombin and fibrinogen, which are important for blood clotting.

الاسئلة الوزارية

٢٠١٩ دور اول

Write the causes:

Starchy food become sweet after chewing it in the mouth.

Because the acts of ptyalin enzyme in Saliva to digest starch and to convert it into disaccharides.

What is function: pepsin enzyme Digest to proteins

Who is responsible: Manufacturing the heparin enzyme Liver

What are the syptomes of Typhoid Fever

1- Increasing body temperature and strong headache
2- In appetence and tiredness seen.

٢٠١٩ دور ثاني

Write the causes:

this the epidermis is crisped in the person infected with cholera.

Because the loss of a great amount of body liquid as result to strong diarrhea and vomiting.

What is location: gall bladder: Under the liver

٢٠١٩ دور ثالث

Define: gall bladder : Is a small sac under the liver stores the bile it is connected to liver by a duct.

Saliva contains: a. pepsin enzyme b. ptyalin enzyme c. heparin enzyme

Who is responsible : Manufacturing the Prothrombin: Liver

Write the location: stomach

Beneath the diaphragm in the left anterior region of abdomen

دور اول 2022

Define: Pharynx

It is a muscular cavity lined with mucosa. It is extended from the mouth to the larynx from the anterior and to the esophagus from the posterior. Pharynx is separated from the larynx by a soft cartilage tissue called epiglottis. Epiglottis prevents the entering of food molecules into the trachea.

Give the corresponding name of the following :

Appendix= cecum

What are the symptoms :typhoid

1- Increasing body temperature and strong headache
2-In appetence and tiredness seen

Write the causes:

presence of villi in the inner surface of small intestine.

resist the food movement to complete its digestion and increase the surface area for absorption.

What is location: gall bladder Under the liver

دور ثاني 2022

1-Define cecum:

is the first part of the large intestine located in the right-hand lower part of the abdominal cavity.

الى هنا يعطى الطالب درجة كاملة ممكن يكمل الطالب ولا يؤثر على درجته

And there is a small (about 7cm) finger like closed tube called appendix which connected with cecum, when the appendix is inflamed, the person suffers from a very hard intestinal colic with coma and vomiting. In this case, the doctor must be visited as soon as possible and appendix is removed by a surgical operation.

2-Give the reason:

***The epidermis is crisped in the person infected with cholera**

Because patient has strong diarrhea and vomiting the diarrhea causes the loss of a great amount of body liquid.

***The taste of bread becomes sweat after chewing in mouth.**

Because the mouth contain salvia and salvia contains ptyalin enzyme which acts on starch to digest it in the mouth and to convert it into disaccharides.

3-Draw and write the name of parts: Human liver and pancreas

4-Who is responsible:

Prevents the entering of food molecules into trachea: epiglottis

5-What are the location of the following : Ascending colon:

in the right-hand of the abdominal cavity.

6-List function of stomach

1- To mix the food by peristalsis
2- Secretion of pepsin enzyme to digest the proteins.
3- Secretion of HCL (%0.2 concentration) to make stomach acidic.
4- To absorb water, some minerals and vitamins through the walls of it.

دور اول ٢٠٢٣

Define: gallbladder

Is a small sac under the liver stores the bile it is connected to liver by a duct.

Give the reason: Food absorption occur in the villi.

They resist the food movement to complete its digestion and increase the surface area for absorption. villi contain blood vessels and lymph vessels.

Choose the correct answer:

In stomach the food molecules form a concentrated mass called.

(a- chyle b-bolus c-chyme)

What are the symptoms for the following:

Typhoid fever

1- Increasing body temperature and strong headache

2- In appetence and tiredness seen.

What is the membrane that cover the following: Stomach : Periton

دور ثاني ٢٠٢٣

Draw with labelling

Human liver and pancreas

What is the location : inciors : in middle of the jaw in the front part of mouth.

Fill in the blanks:

*Ptyalin enzyme digests starch but pepsin enzyme digests the protein.

What are scientific terms

Tiny finger- like projections in the internal surface of small intestine and increase the surface area for absorption. villi

Write the causes :

***Jejunum called this name.** Because this part of intestine is generally empty after death.

Which is responsible? Cholera disease

Caused by special bacterium called *vibrio cholera.*

دور ثالث ٢٠٢٣

Define: Appendix(cecum)

it is a small (about 7cm) finger like closed tube called appendix which connected with cecum, when the appendix is inflamed, the person suffers from a very hard intestinal colic with coma and vomiting. In this case, the doctor must be visited as soon as possible and appendix is removed by a surgical operation. is the first part of the large intestine located in the right-hand lower part of the abdominal cavity.

Write the reason :

Proteins digest in a stomach.

Because a stomach contain glands which secretes and activates the pepsin enzyme which converts the proteins into smaller units.

What is location of gall bladder: under the liver

Choose the correct answer:

***Saliva contains:** a-pepsin enzyme b-ptyalin enzyme c-heparin enzyme

Fill in blanks:

Ascending colon in the right -hand **of the abdominal cavity while descending colon in** in the left -part

Drawing with labeling villi

دور اول ٢٠٢٤

Named the scientific term:

***thick white mass which contains simple absorbed molecules in small intestine.**

chyle

Give the cause of cholera disease:

Caused by special bacterium called *vibrio cholera.*

دور ثاني ٢٠٢٤

***Define: Oesophagus**

One of the components of the digestive system, It is a muscular tube which is extended from pharynx to stomach through the neck, chest and diaphragm and then, it enters the stomach through the **cardiac sphincter.**

It is about **25cm**. the esophagus is lined (covered) with mucosa. Its walls consist of muscular tissue. When these muscles contract and relax, the liquid and food molecules are pushed downward to stomach. This wave like motion is called **peristalsis** and it continues along the digestive tract.

***What are the preventive methods against the Amoebic Dysentery ?**

1- Don't use the patient's tool and take unhealthy food.
2- Killing the insects by insecticides because they are carrier.
3- Washing hands with soap after defecation process.
4- Keep the environment clean and taking healthy food.
5- Sterilizing the fruits and vegetables before eating.

***Named the scientific term :**

It is located between the stomach and duodenum and connected with them by periton membrane. It has a leaf-like shape. **pancreas**

***What is function of : the bile**

It helps the digestion of fatty materials by breaking them into small pieces.

***Write the cause of the**

The taste of bread becomes sweet after chewing it in mouth.

Because the acts of ptyalin enzyme in Saliva to digest starch and to convert it into disaccharides

دور ثالث ٢٠٢٤

***Define : Digestion:**

is the breaking down of big food molecules into smaller units to make them ready for absorption. After absorption these subunits are transported to all cells to be used.

***Named the scientific term :**

the biggest and final part of the small intestine. **Ileum**

***Which is responsible : Obesity**

If the food taken into body is more than the body requirement, excess amount of food is stored in the body and cause obesity.

Especially fats, carbohydrates such as starch and sugars cause the obesity.

***Write the location : liver**

located **beneath the diaphragm in the right side of the abdomen**, next to stomach.

***What are the function: Villi**

1-They resist the food movement to complete its digestion

2- increase the surface area for absorption. vessels.

***Write the cause :**

The epidermis is crisped in the person infected with cholera

Because the diarrhea causes the loss of a great amount of body liquid.

دور اول ٢٠٢٥

Define :

Gall bladder: small sac under liver stores the bile. It is connected to liver by a duct.

Draw with labeling the parts Villi

Which is responsible of the following?

Manufacturing heparin Liver

Secretion of HCI Stomach

Write the function or importance of the following:

Pyloric sphincter

1- controls the movement of the food into the duodenum
2- prevents the duodenum contents from returning to stomach.

Ptyalın enzyme

which acts on starch to digest it in the mouth and to convert it into disaccharides.

Chapter Four

Circulatory system

Introduction

The human circulatory system performs different **functions** such as:

يؤدي الجهاز الدوران للإنسان وظائف مختلفة مثل:

1- Transportation of oxygen, absorbed nutrients and hormones to the body tissues.

نقل الاوكسجين والعناصر الغذائية والهرمونات الممتصة إلى أنسجة الجسم.

2- Transportation of waste products to the excretory organs..نقل المخلفات إلى أعضاء الإخراج

3- Distribution of heat in the body by means of blood and lymph liquids circulating in reticular vessels which are diffused in the body.

توزيع الحرارة في الجسم عن طريق الدم والسوائل اللمفاوية المنتشرة في الأوعية الشبكية المنتشرة في الجسم.

Circulatory system consists of blood circulation system and lymphatic system.

يتكون الجهاز الدوران من نظام الدورة الدموية والجهاز اللمفاوي.

What is the function of circulatory system?

Blood circulation system

Blood constantly in the closed vessels. الدم باستمرار في الأوعية المغلقة.

Blood starts to circulate from the heart and returns to the heart again.

يبدأ الدم بالدوران من القلب ويعود إلى القلب مرة أخرى.

The heart pumps the blood into **the arteries**.

The end of the arteries are branched and composed of fine **capillaries** distributed between the body cells.

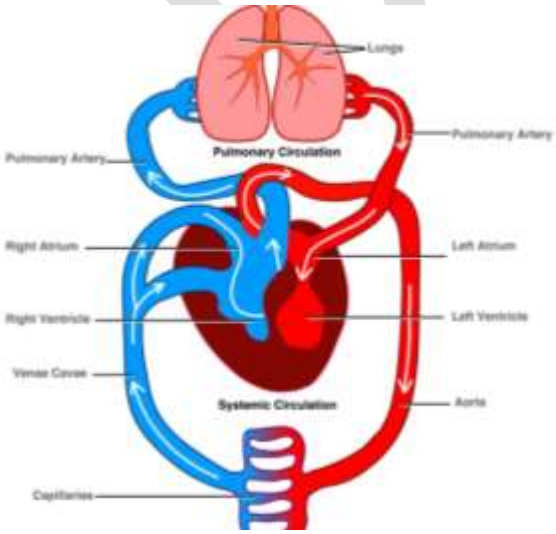
Then, **these blood capillaries** are accumulated in the **veins** that transport the blood to the heart. And this cycle repeats.

يضخ القلب الدم في **الشرايين**. تتفرع نهايات الشرايين وتتكون من **شعيرات دموية** دقيقة تتوزع بين خلايا الجسم.

ثم تتراكم هذه **الشعيرات الدموية** في **الأوردة** التي تنقل الدم إلى القلب. وتتكرر هذه الدورة.

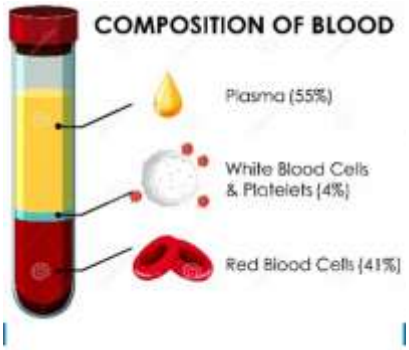
Blood circulation system consists of **blood, heart and blood vessels.**

يتكون نظام الدورة الدموية من **الدم والقلب والأوعية الدموية.**



Blood

It is a red colored, viscous liquid. It is composed of **plasma** and **blood cells**.
The blood forms about 7% of total body weight and its volume is 4-6 liters in an adult.



إنه سائل لزج أحمر اللون. يتكون من **البلازما وخلايا الدم**. يشكل الدم حوالي ٧٪ من إجمالي وزن الجسم ويبلغ حجمه ٤-٦ لترات في الشخص البالغ.

Structure of blood

1. Plasma

It is a clear yellow liquid, which makes up 55% of the total volume of blood. It consists of 90% water and 10% dissolved materials such as **absorbed nutrients, salts, antibodies, hormones and some waste materials, other blood contents** swim in the blood plasma.

وهو سائل أصفر صافٍ ، ويشكل ٥٥٪ من الحجم الكلي للدم. يتكون من ٩٠٪ ماء و ١٠٪ **مواد ذائبة مثل المواد الغذائية الممتصة والأملاح والأجسام المضادة والهرمونات وبعض الفضلات ومحتويات الدم الأخرى** تسبح في بلازما الدم.

2. Blood cells:

types of blood cells (**Erythrocytes, Leukocytes ad Blood Platelets)**

A. Red blood cells (RBCs) Erythrocytes

*They are disc shaped cells and thinner in center. إنها خلايا على شكل قرص وأرق في المركز.
*Red blood cells lose their nuclei after a short time of its formation.
تفقد خلايا الدم الحمراء نواتها بعد وقت قصير من تكوينها.
* Its diameter is about 8 micron (1micron = 1/1000 millimeters).
قطرها حوالي ٨ ميكرون (١ ميكرون = ١/١٠٠٠ مليمتر).
*There are about 5.2 million red cells in 1 mm^3 of **the male** blood and there are about 5 million red blood cells in 1mm^3 of **female** blood.
يوجد حوالي ٥.٢ مليون خلية حمراء في ١ ملم ٣ من دم الذكر ويوجد حوالي ٥ ملايين خلية دم حمراء في ١ ملم ٣ من دم الأنثى.
*The red blood cells contain red pigment called **hemoglobin** that carries O_2 and CO_2 in the body. The hemoglobin is a special protein and contains iron.
Lack of red blood cells or hemoglobin in the blood causes **anaemia**.
تحتوي خلايا الدم الحمراء على صبغة حمراء تسمى **الهيموجلوبين** تحمل O2 و CO2 في الجسم.
الهيموجلوبين هو بروتين خاص ويحتوي على الحديد. يسبب نقص خلايا الدم الحمراء أو الهيموجلوبين في الدم فقر الدم.

*They are formed **in the spleen and liver in children before birth** while they are formed in **the bone marrow after birth**.

تتشكل في الطحال والكبد عند الأطفال قبل الولادة وتتكون في نخاع العظام بعد الولادة.

*The life period of each red blood cell is about 120days. The new red blood cells are replaced instead of the old ones.

تبلغ فترة حياة كل خلية دم حمراء حوالي ١٢٠ يومًا. يتم استبدال خلايا الدم الحمراء الجديدة بدلاً من الخلايا القديمة.

* The iron of **worn out** red blood cells are stored in the liver and bone marrow to produce new red blood cells.

يتم تخزين الحديد الموجود في خلايا الدم الحمراء **المهترئة** في الكبد ونخاع العظام لإنتاج خلايا دم حمراء جديدة.

***They transport O_2 from lungs to body tissue and CO_2 from body tissues to lungs.**

ينقلون الاوكسجين من الرئتين إلى أنسجة الجسم وثاني أكسيد الكربون من أنسجة الجسم إلى الرئتين.

Hemoglobin: is a red pigment that special protein and contains iron found in red blood cells that carries O_2 and CO_2 in the body and Lack of hemoglobin in the blood causes anaemia

A-Red blood cells (RBCs) Erythrocytes

1-Shape	*They are disc shaped cells and thinner in center. إنها خلايا على شكل قرص وأرق في المركز
2-Nucleus النواة	*Red blood cells lose their nuclei after a short time of its formation. تفقد خلايا الدم الحمراء نواتها بعد وقت قصير من تكوينها.
3-Size	* Its diameter is about 8 micron قطرها حوالي ٨ ميكرون
4-Number العدد	***In the male** blood :في دم الذكر There are about 5.2 million red cells in 1 mm^3 يوجد حوالي ٥.٢ مليون خلية حمراء في ١ ملم ٣ * **In female** blood :في دم الأنثى there are about 5 million red blood cells in $1mm^3$ يوجد حوالي ٥ ملايين خلية دم حمراء في ١ ملم ٣.
5-Origin المنشأ	* **in children before birth: في الاطفال قبل الولادة** They are formed **in the spleen and liver** تتشكل في الطحال والكبد ***after birth**.بعد الولادة *while they are formed in **the bone marrow** تتكون في نخاع العظام.
6-The life	*The life period of each red blood cell is about 120days. The new

period فترة الحياة	red blood cells are replaced instead of the old ones. تبلغ فترة حياة كل خلية دم حمراء حوالي ١٢٠ يومًا. يتم استبدال خلايا الدم الحمراء الجديدة بدلاً من الخلايا القديمة.
7-Fate المصير	* The iron of **worn out** red blood cells are stored in the liver and bone marrow to produce new red blood cells. يتم تخزين الحديد الموجود في خلايا الدم الحمراء **المهترئة** في الكبد ونخاع العظام لإنتاج خلايا دم حمراء جديدة.
8-Function الوظيفة	***They transport O_2 from lungs to body tissue and CO_2 from body tissues to lungs.** ينقلون الاوكسجين من الرئتين إلى أنسجة الجسم وثاني أكسيد الكربون من أنسجة الجسم إلى الرئتين.
9-Decrease in number	Lack of red blood cells or hemoglobin in the blood causes **anaemia**. يسبب نقص خلايا الدم الحمراء أو الهيموجلوبين في الدم فقر الدم.
10- colour	Red because they contain red pigment (hemoglobin)

B. White blood cells: (WBCs)Leucocytes

*They are colorless فهي عديمة اللون
*and inconstant (amoeboid) shaped. وغير ثابتة الشكل (الأميبية).
*They have nuclei. لديهم انوية .
*Their diameter is about (6-15) micron. قطرها حوالي (٦-١٥) ميكرون.
*There are about 6000 cells in $1mm^3$ **of the female** blood and there are about 8000 cells in $1mm^3$ **of the male** blood.
يوجد حوالي ٦٠٠٠ خلية في ١ مم ٣ من دم الأنثى ويوجد حوالي ٨٠٠٠ خلية في ١ مم ٣ من دم الذكر.
*They defense body by attacking **invading microorganisms** or by producing antibodies.
إنها تدافع عن الجسم من خلال مهاجمة الكائنات الحية الدقيقة الغازية أو عن طريق إنتاج الأجسام المضادة.

The number of white blood cells increases in cases of يزداد عدد خلايا الدم البيضاء في حالات
* inflammation, الالتهاب
*infection with some microbes like bacteria والعدوى ببعض الميكروبات مثل البكتيريا
*blood cancer like **leukemia**..**اللوكيميا** وسرطان الدم مثل

White blood cells are formed both in **bone marrow and lymph nodes**.
تتشكل خلايا الدم البيضاء في كل من **نخاع العظام والعقد الليمفاوية**.

White blood cells found in second group have ability to penetrate the walls of blood capillaries. After its cells are elongated and forms **pseudopodia.**
خلايا الدم البيضاء الموجودة في المجموعة الثانية لديها القدرة على اختراق جدران الشعيرات الدموية. بعد استطالة خلاياه وتشكل **اقدام كاذبة.**

They act as **scavengers** and collect the last parts of dead cells and microorganisms found between the tissue cells.

They provide acquired immunity to the body against diseases.

إنهم يعملون (**زبالين**)ويجمعون الأجزاء الأخيرة من الخلايا الميتة والكائنات الدقيقة الموجودة بين خلايا الأنسجة.

أنها توفر مناعة مكتسبة للجسم ضد الأمراض.

B-White blood cells: (WBCs)Leucocytes

1-colour	They are colorless عديمة اللون
2-Shape	* inconstant (amoeboid) shaped. .(الأميبية) وغير ثابتة الشكلThey are disc
3-Nucleus	* They have nuclei. . لديهم انوية
4-Size	* Their diameter is about (6-15) micron. .ميكرون (٦-١٥) قطرها حوالي
5-Number	***In the female** blood: There are about 6000 cells in $1mm^3$ ***In the male** blood there are about 8000 cells in $1mm^3$.
6-Origin المنشأ	White blood cells are formed both in **bone marrow and lymph nodes**. تتشكل خلايا الدم البيضاء في كل من **نخاع العظام والعقد الليمفاوية**.
7-Function الوظيفة	* They defense body by attacking **invading microorganisms** or by producing antibodies. إنها تدافع عن الجسم من خلال مهاجمة الكائنات الحية الدقيقة الغازية أو عن طريق إنتاج الأجسام المضادة.
8-Increase in number	The number of white blood cells increases in cases : يزداد عدد خلايا الدم البيضاء في حالات * inflammation, الالتهاب *infection with some microbes like bacteria والعدوى ببعض الميكروبات مثل البكتيريا *blood cancer like **leukemia**..**اللوكيميا** وسرطان الدم مثل
9-Types	White blood cells found in second group: **Granulocytes and** Agranulocytes

White blood cells provide acquired immunity to the body against diseases. (How)

have ability to penetrate the walls of blood capillaries. After its cells are elongated and forms **pseudopodia.**

خلايا الدم البيضاء الموجودة في المجموعة الثانية لديها القدرة على اختراق جدران الشعيرات الدموية. بعد استطالة خلاياه وتشكل **اقدام كاذبة.**

They act as **scavengers** and collect the last parts of dead cells and microorganisms found between the tissue cells.

إنهم يعملون (**كناسين**)ويجمعون الأجزاء الأخيرة من الخلايا الميتة والكائنات الدقيقة الموجودة بين خلايا الأنسجة.

There are two groups of white blood cells:

1-Granulocytes: they have granular cytoplasm and lobulated nuclei. They are formed in bone marrow.

الخلايا الحبيبية: لها السيتوبلازم الحبيبي والنواة المفصصة. تتشكل في نخاع العظام.

2- A granulocytes: they have non-granular cytoplasm and unlobulated nuclei. They are formed in lymph nodes.

٢- الخلايا اللاحبيبية: لها السيتوبلازم غير حبيبي ونواة غير مفصصة. تتشكل في الغدد الليمفاوية.

C. blood platelets: Thrombocytes

*They are very tiny discs or oval shaped cells. إنها أقراص صغيرة جدًا أو خلايا بيضاوية الشكل.

*They have no nucleus..ليس لديهم نواة

* Its diameter is about 2 micron. قطرها حوالي ٢ ميكرون.

*There are about 250000 platelets in $1mm^3$ of blood.

يوجد حوالي ٢٥٠٠٠٠ صفيحة في ١ مم ٣ من الدم.

*Platelets are originated from platelet- producing cells found in **the bone marrow**.

تنشأ الصفائح الدموية من الخلايا المنتجة للصفائح الدموية الموجودة في نخاع العظام.

*They provide blood clotting after an injury or a bleeding. أنها توفر تخثر الدم بعد الإصابة أو النزيف.

The platelets come together and **form clumps** in the area of injury.

تتجمع الصفائح الدموية معًا **وتشكل كتلًا** في منطقة الإصابة

C. blood platelets: Thrombocytes

1-Shape	* They are very tiny discs or oval shaped cells. إنها أقراص صغيرة جدًا أو خلايا
2-Nucleus	*They have no nucleus..ليس لديهم نواة
3-Size	* Its diameter is about 2 micron. قطرها حوالي ٢ ميكرون.
4-Number	There are about 250000 platelets in $1mm^3$ of blood. يوجد حوالي ٢٥٠٠٠٠ صفيحة في ١ مم ٣ من الدم.
5-Origin المنشأ	*Platelets are originated from platelet- producing cells found in **the bone marrow**. تنشأ الصفائح الدموية من الخلايا المنتجة للصفائح الدموية الموجودة في نخاع العظام.
6-Function	*They provide blood clotting after an injury or a bleeding. أنها توفر تخثر الدم بعد الإصابة أو النزيف. The platelets come together and **form clumps** in the area of injury. تتجمع الصفائح الدموية معًا **وتشكل كتلًا** في منطقة الإصابة

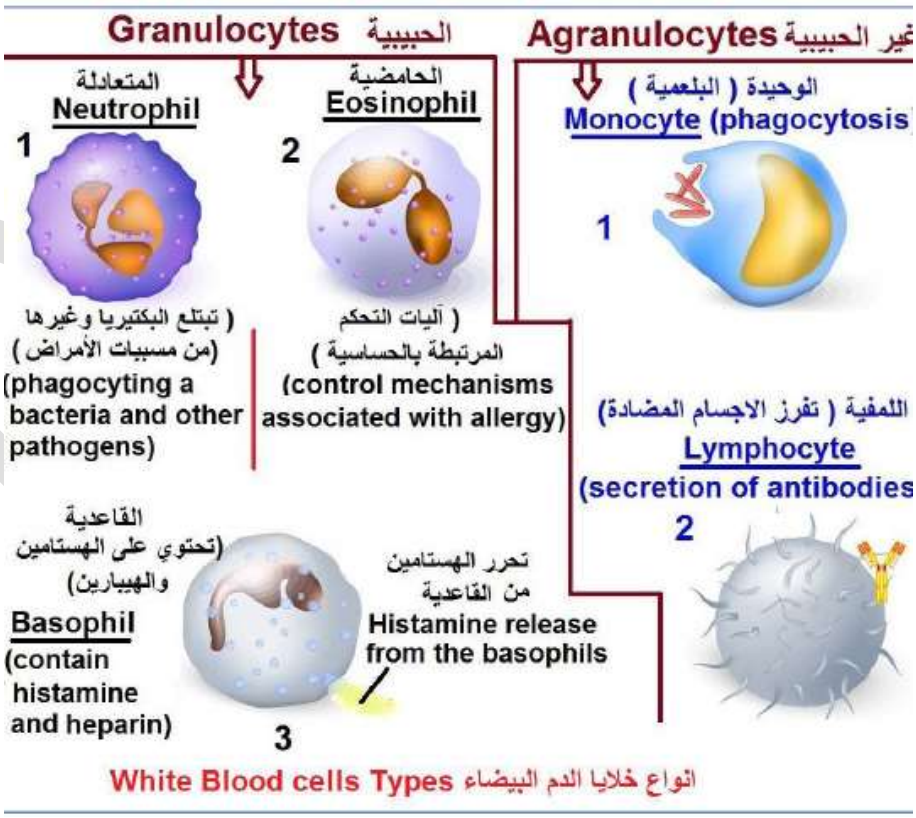
Erythrocytes	Leucocytes
1- disc shaped cells and thinner in center.	inconstant (amoeboid) shaped.
2-Red blood cells	They are colorless
3-lose their nuclei after a short time of its formation. So The life period of each red blood cell is about 120days	They have nuclei.
4-Its diameter is about 8 micron	Their diameter is about (6-15) micron.
5-There are about 5.2 million red cells in 1 mm^3 of the male blood and there are about 5 million red blood cells in $1mm^3$ of female blood.	There are about 6000 cells in $1mm^3$ of the female blood and there are about 8000 cells in $1mm^3$ of the male blood.
6-They transport O_2 from lungs to body tissue and CO_2 from body tissues to lungs.	*They defense body by attacking invading microorganisms or by producing antibodies. *They act as scavengers and collect the last parts of dead cells and microorganisms found between the tissue cells.
7- They are formed in the spleen and liver in children before birth while they are formed in the bone marrow after birth.	White blood cells are formed both in bone marrow and lymph nodes
8-Lack of red blood cells or hemoglobin in the blood causes **anaemia**	The number of white blood cells increases in cases of inflammation, infection with some microbes like bacteria and blood cancer like **leukemia.**
9-The red blood cells contain red pigment called hemoglobin that carries O_2 and CO_2 in the body	They not have hemoglobin

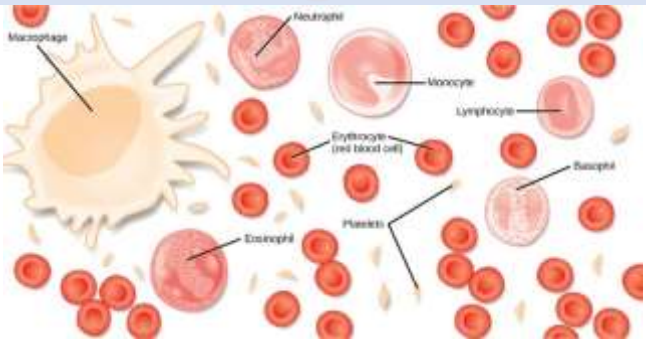
The main difference between red and white blood cells including:
Shape-color-number-dimeter-nucleus-function-present pigment-formation(origin)-change in number(increase ,decrease)- types

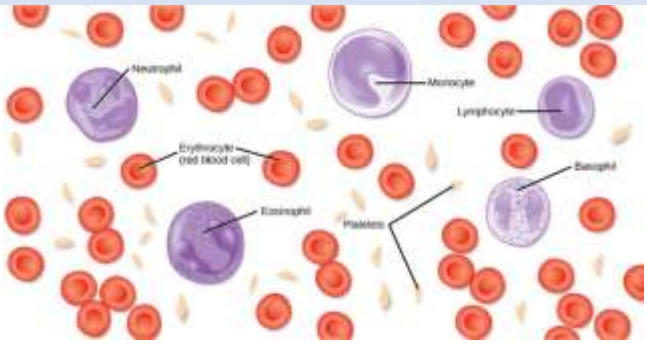
Granulocytes	A granulocytes
1-they have granular cytoplasm	they have non-granular cytoplasm
2-lobulated nuclei	unlobulated nuclei
3-They are formed in bone marrow.	They are formed in lymph nodes.
4- they have three types : Neutrophil , Eosinophil and Basophil	they have second types : Monocyte and Lymphocyte

Leukemia: increases the number of white blood cells called as blood cancer	**Anaemia:** Lack of red blood cells or hemoglobin in the blood

What is caused lack of red blood cels or hemoglobin?
Where are red and white blood cells formed?
When are the number of white blood cells formed?
Where are formed types white blood cells?
What is function of blood platelets- RBCs and WBCs?







Heart

Heart is a conical muscular organ found in the chest cavity between the lungs, slightly to the left of center. You can feel heart beats in the left region between **the fifth and sixth ribs.** From outside, heart is surrounded by a **double membrane called the pericardium.** There is a fluid between these membranes.

This fluid decreases the friction and provides the working of heart easily.

القلب هو عضو عضلي مخروطي موجود في التجويف الصدري بين الرئتين ، إلى يسار الوسط قليلاً. يمكنك أن تشعر بضربات القلب في المنطقة اليسرى بين الضلع الخامس والسادس. من الخارج ، يحيط القلب **بغشاء مزدوج يسمى التامور**. يوجد سائل بين هذه الأغشية. **يقلل هذا السائل من الاحتكاك ويسهل عمل القلب.**

What is cause found fluid between the membranes is surrounded the heart?

This fluid decreases the friction and provides the working of heart easily.

The pericardium: double membrane is surrounded heart there is a fluid between these membranes. this fluid decreases the friction and provides the working of heart easily.

التامور: غشاء المزدوج يحيط بالقلب يوجد سائل بين هذه الأغشية. يقلل هذا السائل من الاحتكاك ويوفر عمل القلب بسهولة.

Anatomically the heart consists of two sides. Right and left. These sides are separated by a muscular wall (septum) and each side is divided into two chambers **(atrium and ventricle)**.so the heart is composed of four chambers: 2 atria and 2 ventricles.

يتكون القلب من جانبين تشريحيًا. يمين و يسار. يتم فصل هذه الجوانب بجدار عضلي (الحاجز) وينقسم كل جانب إلى حجرتين (الأذين والبطين) ، لذلك يتكون القلب من أربع حجرات: أذينان وبطينان.

Q/Describe the heart

Septum: muscular wall separated the heart to two sides (Right and left).

Atria are small chambers found at the top of the heart and they have thin walls consist from right and left atrium.

الأذينان عبارة عن غرف صغيرة توجد في الجزء العلوي من القلب ولها جدران رقيقة.

Ventricles are bigger chamber found at the lower part of heart and they have thick walls consist from right and left ventricles.

البطينان هي حجرة أكبر توجد في الجزء السفلي من القلب ولها جدران سميكة.

***Atria and ventricles are separated from each other by valves.**

يتم فصل الأذينين والبطينين عن بعضهما البعض بواسطة الصمامات.

Tricuspid valve is found in the right side of the heart. It separates right atrium and right ventricle. It has three cusps. So that, it is known **as tricuspid valve**.

It **controls the flow of blood from atrium to ventricle**

وجد على **الصمام ثلاثي الصفائح** في الجانب الأيمن من القلب. يفصل الأذين الأيمن والبطين الأيمن. لديها ثلاث صفائح. لذلك ، يُعرف باسم الصمام ثلاثي الصفائح. **يتحكم في تدفق الدم من الأذين إلى البطين.**

Mitral valve (bicuspid) is found in the left side of the heart, it separates left atrium and right ventricle. It has only two cusps. So that, it is known as mitral valve (bicuspid). **It prevents the back flow of blood**.

تم العثور على الصمام التاجي (ثنائي الصفائح) في الجانب الأيسر من القلب ، ويفصل الأذين الأيسر والبطين الأيمن. لديها اثنين فقط من الصفائح. لذلك ، يُعرف باسم الصمام التاجي (ثنائي الصفائح). يمنع عودة تدفق الدم.

Semi lunar valves are two valves. One of them is found between the left ventricle and aorta (**aortic valve**). The other is found between the right ventricle and pulmonary artery (**pulmonary valve**). They prevent the back flow of blood into the right and left ventricle from the aorta and the pulmonary artery.

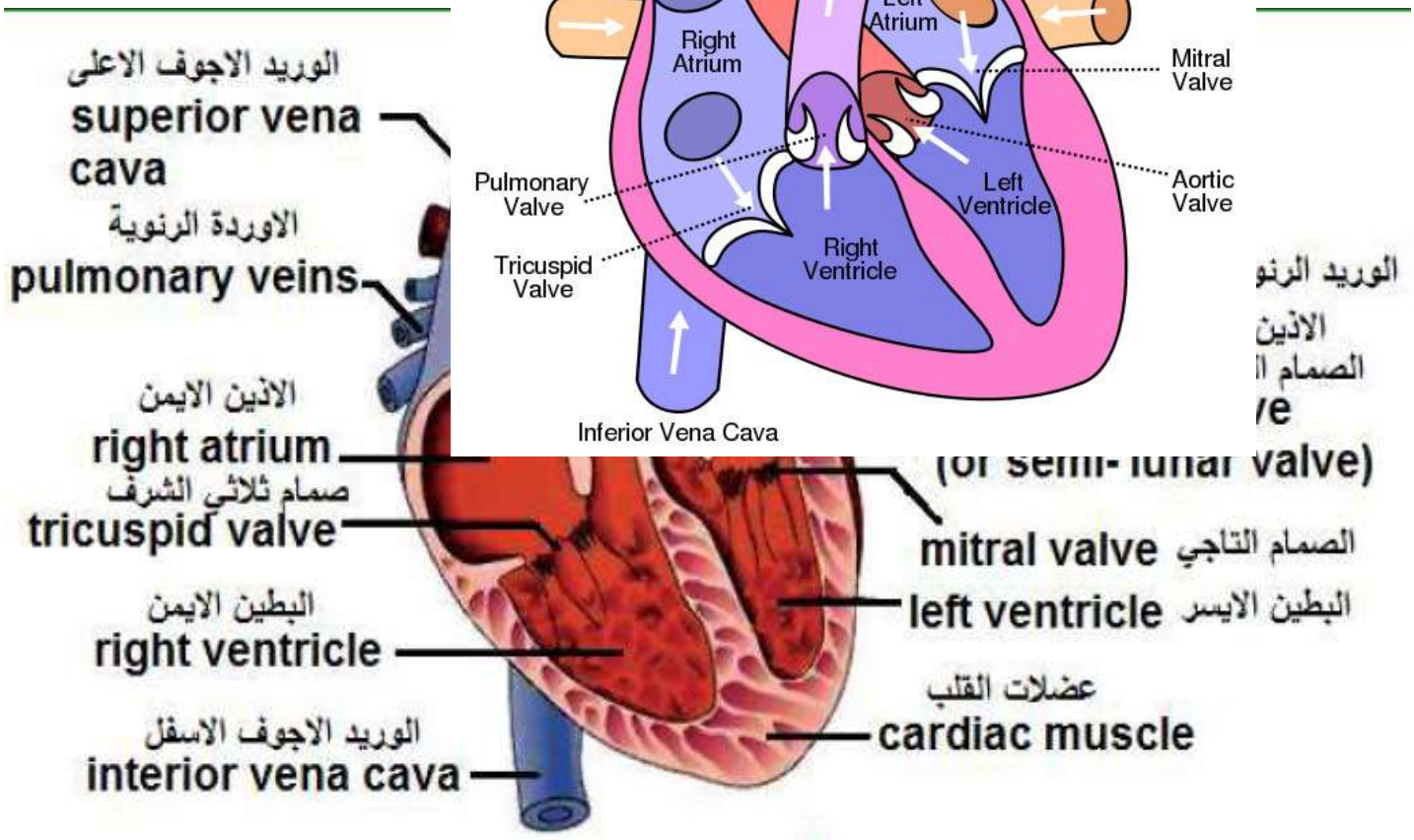
الصمامات شبه الهلالية عبارة عن صمامين. تم العثور على واحد منهم بين البطين الأيسر والشريان الأبهر (**الصمام الأبهري**). تم العثور على الآخر بين البطين الأيمن والشريان الرئوي (الصمام الرئوي). تمنع عودة تدفق الدم إلى البطين الأيمن والأيسر من الشريان الأبهري والشريان الرئوي.

Function of Semi lunar valves :

They prevent the back flow of blood into the right and left ventricle from the aorta and the pulmonary artery.

What are types of heart valves?

Tricuspid valve - Mitral valve -Semi lunar valves



سؤال منهج عربي وزاري مهم اكتب عن القلب من حيث (الوصف-الموقع- الردهات - الصمامات)

Atria	Ventricles
١ -small chambers	bigger chamber
٢-found at the top of the heart	found at the lower part of heart
٣- they have thin walls.	they have thick walls

Tricuspid valve	**Mitral valve**
1-is found in the right side of the heart.	1-is found in the left side of the heart
2- It separates right atrium and right ventricle.	2-it separates left atrium and right ventricle
3-It has three cusps. So that, it is known as tricuspid valve	3-It has only two cusps. So that, it is known as mitral valve (bicuspid).
4-It controls the flow of blood from atrium to ventricle	4-It prevents the back flow of blood.

Semi lunar valves are two valves(**aortic valve) and(pulmonary valve)**	
Aortic valve	**Pulmonary valve**
It is found between the left ventricle and aorta.	It is found between the right ventricle and pulmonary artery .
They prevent the back flow of blood into the left ventricle from the aorta	They prevent the back flow of blood into the right ventricle from the pulmonary artery.

Heart beat

The contractions and relaxations of the heart are called as **heart beats**. The number of heartbeat in a healthy person is about 72 beats in a minute in resting.

تسمى انقباضات واسترخاء القلب بضربات القلب. يبلغ عدد ضربات القلب في الشخص السليم حوالي ٧٢ نبضة في الدقيقة أثناء الراحة

Blood vessels

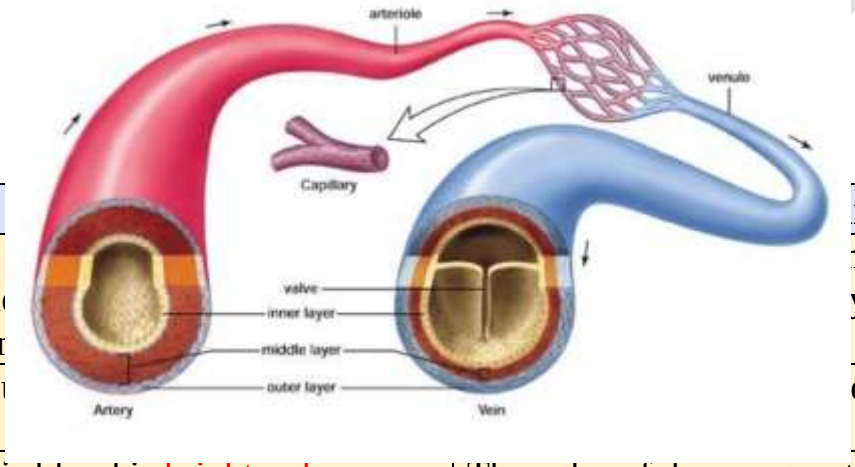
There are three types of blood vessels in human body.
These blood vessels are:
- Arteries
- Veins
- Capillaries

1. Arteries

*They transport blood from heart to body organs. ينقلون الدم من القلب إلى أعضاء الجسم.
*All arteries transport oxygenated blood except **pulmonary artery**.
تنقل جميع الشرايين الدم المؤكسج باستثناء **الشريان الرئوي**.
* The color of this blood is bright red. لون هذا الدم أحمر فاتح.
*They are fibrous muscular tubes and they have thick walls.
إنها أنابيب عضلية ليفية ولها جدران سميكة.
*They are located deeply in the body except **radial artery** located at carpus which is found under the skin (physician can feel the patient's pulse from radial artery).
تقع بعمق في الجسم ما عدا **الشريان الكعبري** الموجود في الرسغ الموجود تحت الجلد (يمكن للطبيب أن يشعر بنبض المريض من الشريان الكعبري).
*Blood flow is provided with the pressure formed by ventricular contractions in arteries.
يتم توفير تدفق الدم مع الضغط الناتج عن تقلصات البطين في الشرايين.
*Cutting of any artery causes loss of great amount of blood and stopping this bleeding is very difficult.
قطع أي شريان يسبب فقدان كمية كبيرة من الدم ووقف هذا النزيف صعب للغاية.

2. Veins

*They transport blood from body tissues to heart. ينقلون الدم من أنسجة الجسم إلى القلب.
*All veins transport de- oxygenated blood except **pulmonary veins**.
تنقل جميع الأوردة الدم غير المؤكسج باستثناء **الأوردة الرئوية**.
* Their walls are thinner and less elastic than the walls of arteries.
جدرانها أرق وأقل مرونة من جدران الشرايين.
*Veins are closer to the body surface. الأوردة أقرب إلى سطح الجسم.
*The color of de- oxygenated **blood is bluish-red**. لون الدم **منزوع الأكسجين أحمر مزرق**.
*There are small valves inside the veins to prevent back flow of blood because there is no pressure in veins which provide blood flowing.
توجد صمامات صغيرة داخل الأوردة لمنع عودة تدفق الدم لأنه لا يوجد ضغط في الأوردة التي توفر تدفق الدم.
* The flowing of blood in the veins is slowly..يتدفق الدم في الأوردة ببطء
So when it is cut, the bleeding can be stopped easily.
لذلك عندما يتم قطعه ، يمكن إيقاف النزيف بسهولة.



	ns
1-They transport organs. All arteri blood except pulr	n body tissues to heart. ygenated blood except
2- They are fibrou have thick walls.	d less elastic than the
3-The color of this blood is bright red	The color of de- oxygenated blood is bluish-red
4- They are located deeply in the body except radial artery located at carpus which is found under the skin	Veins are closer to the body surface.
5- Cutting of any artery causes loss of great amount of blood and stopping this bleeding is very difficult. Why	The flowing of blood in the veins is slowly. So, when it is cut, the bleeding can be stopped easily. Why

3. Blood capillaries

*They are microscope vessels وهي عبارة عن أوعية مجهرية
between **the ends of arteries and beginnings of veins**
بين نهايات الشرايين وبدايات الأوردة.
*Their walls are very thin and they have no muscles. جدرانها رفيعة جدًا وليس بها عضلات.
*Also their walls are consisting of by single layered epithelial cells.
كما تتكون جدرانها من خلايا طلائية ذات طبقة واحدة.
*The flowing of blood in the blood capillaries is slow
يتدفق الدم في الشعيرات الدموية ببطء

* their thin walls.(WHY)
help the material exchange between blood and body cells and white blood cells can move through the walls of capillaries easily.
وتساعد جدرانها الرقيقة على تبادل المواد بين الدم وخلايا الجسم ويمكن لخلايا الدم البيضاء التحرك عبر جدران الشعيرات الدموية بسهولة.

Writing caused the following?

*** Arteries are located deeply in the body.**
Because cutting of any artery causes loss of great amount of blood and stopping this bleeding is very difficult.

*** the bleeding can be stopped easily in veins. While bleeding in arteries is very difficult.**
Because The flowing of blood in the veins is slowly. While in artery of the blood flow is provided with the pressure formed by ventricular contractions in arteries.

*** The walls Blood capillaries are very thin.**
Because their thin walls help the material exchange between blood and body cells and white blood cells can move through the walls of capillaries easily.

***there are small valves inside the veins.**

Because the small valves prevent back flow of blood because there is no pressure in veins which provide blood flowing.

Cutting of any artery causes loss of great amount of blood and stopping this bleeding is very difficult.

Because the Blood flow is provided with the pressure formed by ventricular contractions in arteries.

*** The flowing of blood in the veins is slowly. So when it is cut, the bleeding can be stopped easily.**

There are small valves inside the veins to prevent back flow of blood because there is no pressure in veins which provide blood flowing.

Give a reason :

***the mitral valve is known as bicuspid.**

It has only two cusps.

***tricuspid valve is known as tricuspid valve.**

It has three cusps.

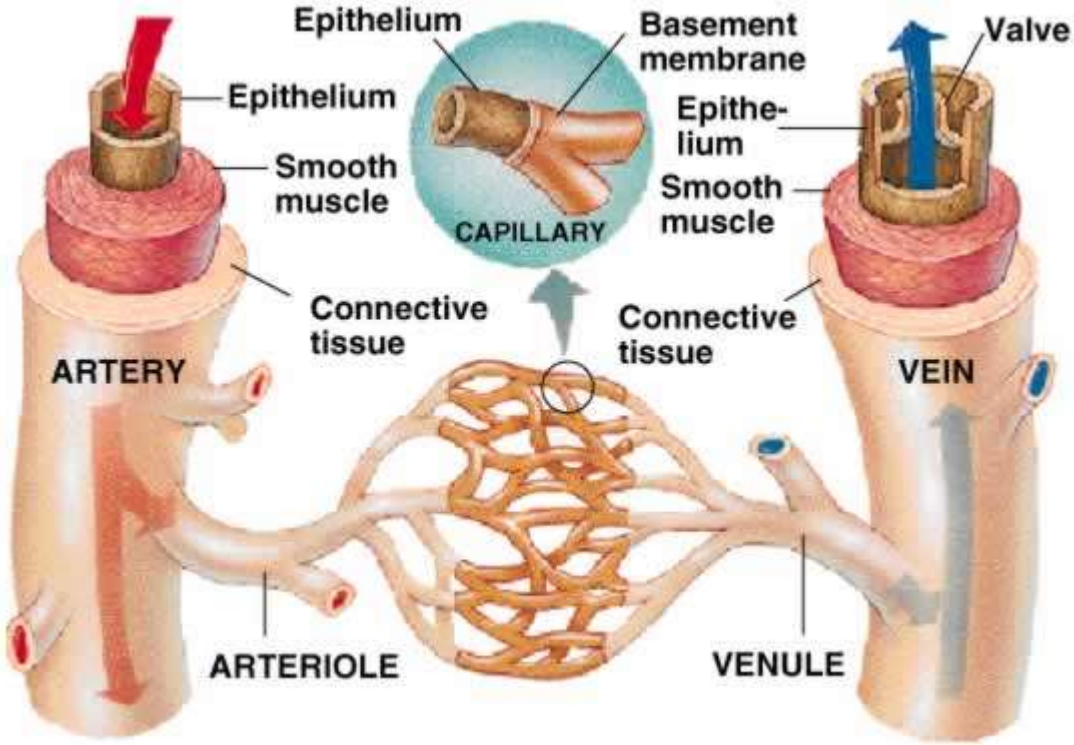
***the color of the arteries blood is bright red.**

Because arteries transport oxygenated blood.

*** physician can feel the patient's pulse from radial artery**

Because they are located deeply in the body except **radial artery** located at carpus which is found under the skin.

What is a function of the valves?



4. Blood vessels connected with hearth

A-Veins:

1- **Superior vena cava**: it collects de- oxygenated blood from the body parts to the right atrium and it located above the diaphragm.

الوريد الأجوف العلوي(الاعلى): يجمع الدم منزوع الأكسجين من أجزاء الجسم إلى الأذين الأيمن ويقع فوق الحجاب الحاجز.

2- Inferior vena cava: it collects de- oxygenated blood from the body parts located below the diaphragm and transports it into right atrium.

الوريد الأجوف السفلي(الاسفل): يجمع الدم منزوع الأكسجين من أجزاء الجسم الواقعة أسفل الحجاب الحاجز وينقله إلى الأذين الأيمن.

3- Pulmonary veins: there are four pulmonary veins. They collect oxygenated blood from lungs and transport it into left atrium.

الأوردة الرئوية: يوجد بها أربعة أوردة رئوية. يجمعون الدم المؤكسج من الرئتين وينقلونه إلى الأذين الأيسر.

4- Cardiac (coronary) veins: coronary veins (a group of small veins) collect the de-oxygenated blood from the heart muscles. These small veins are connected with each other and form a vein which ends at right atrium.

الأوردة القلبية: الأوردة التاجية (مجموعة من الأوردة الصغيرة) تجمع الدم منزوع الأكسجين من عضلات القلب. ترتبط هذه الأوردة الصغيرة ببعضها البعض وتشكل وريدًا ينتهي عند الأذين الأيمن.

B-Arteries

1- Pulmonary artery: it transports the de –oxygenated blood from right ventricle to lungs: it is branched into two parts and each branch goes to each lung.

الشريان الرئوي: ينقل الدم غير المؤكسد من البطين الأيمن إلى الرئتين: يتفرع إلى قسمين ويذهب كل فرع إلى كل رئة.

2- Aorta: it is the largest blood vessel and the most branched vessel. The aorta extends from left ventricle and it transports oxygenated blood from heart to all body tissues (except the lungs).

الشريان الابهري: وهو أكبر وعاء دموي وأكثر الأوعية تفرعا. يمتد الشريان الابهري من البطين الأيسر وينقل الدم المؤكسج من القلب إلى جميع أنسجة الجسم (باستثناء الرئتين).

3- Cardiac (coronary) arteries: coronary arteries (a pair of small arteries) branch from the aorta just as it emerges from the heart. They nourish the heart muscles.

الشرايين القلبية: تتفرع الشرايين التاجية (زوج من الشرايين الصغيرة) من الشريان الابهري تمامًا كما يخرج من القلب. تغذي عضلات القلب.

Pulmonary artery	Pulmonary veins
it transports it is branched into two parts and each branch goes to each lung. the de –oxygenated blood from right ventricle to lungs:	there are four pulmonary veins. They collect oxygenated blood from lungs and transport it into left atrium.

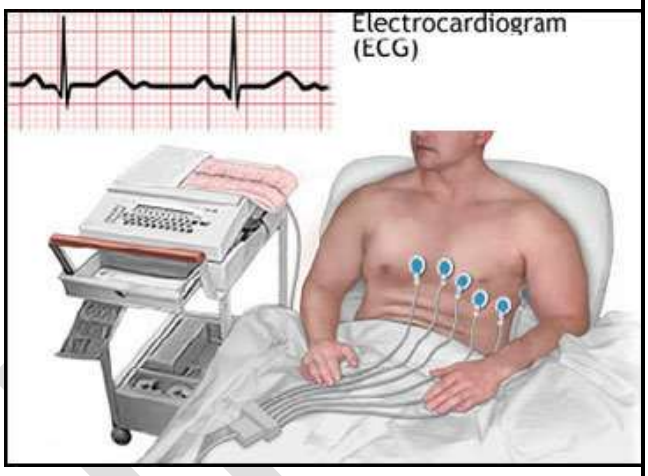
Cardiac (coronary) arteries	Cardiac (coronary) veins
(a pair of small arteries).	coronary veins (a group of small veins) These small veins
collect the oxygenated blood branch from the aorta just as it emerges from the heart	collect the de- oxygenated blood from the heart muscles.
They nourish the heart muscles.	They are connected with each other and form a vein which ends at right atrium.

ECG (Electrocardiogram)

It is a special machine that draws the contraction and relaxation of aria and ventricles. Contains electrical poles which are positioned on chest, arms and legs of the patient. Its importance is to give information about heart activities.

ECG(مخطط كهربائية القلب)

إنها آلة خاصة ترسم تقلص واسترخاء الأذنين والبطينين. تحتوي على أعمدة كهربائية موضوعة على صدر المريض وذراعيه وساقيه. أهميتها هي إعطاء معلومات عن أنشطة القلب.



Q/ How do the heart muscles nourish?

coronary arteries, They nourish the heart muscles

Types of Blood Circulation

These are three main types of circulation in body:

(Systemic circulation -Pulmonary circulation- Portal circulation)

1-Systemic circulation

1- It occurs between heart and other body parts. **The aim of this circulation is to transport oxygen to all body cells and remove poisonous carbon dioxide from these cells.**

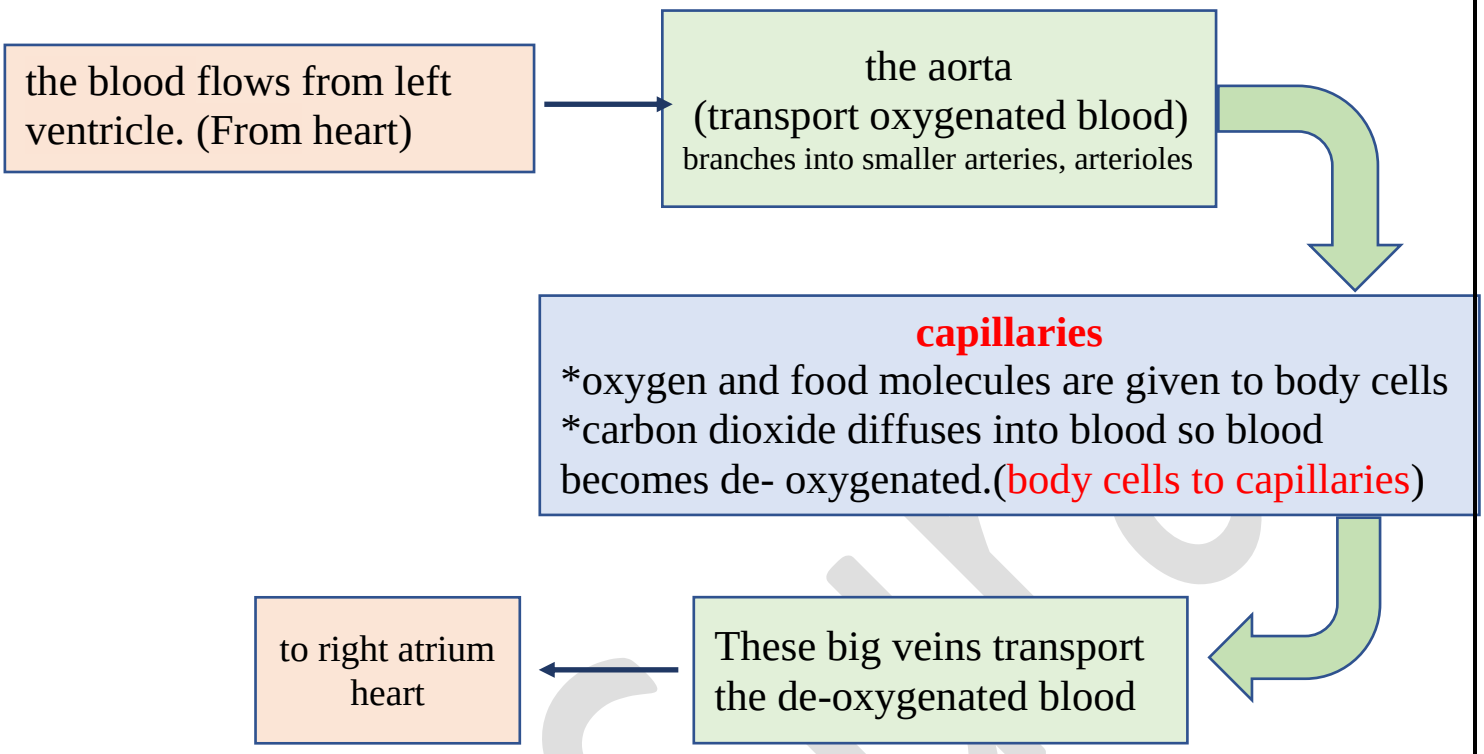
٢- ١- يحدث بين القلب وأجزاء الجسم الأخرى. **الهدف من هذه الدورة هو نقل الأكسجين إلى جميع خلايا الجسم وإزالة ثاني أكسيد الكربون السام من هذه الخلايا.**

2-the aorta branches into smaller arteries, arterioles and capillaries respectively. From capillaries , oxygen and food molecules are given to body cells . carbon dioxide diffuses into blood so blood becomes de- oxygenated.

٢-يتفرع الشريان الأبهري إلى شرايين أصغر وشرايين وشعيرات دموية على التوالي. من الشعيرات الدموية ، يتم إعطاء الأكسجين وجزيئات الطعام لخلايا الجسم. ينتشر ثاني أكسيد الكربون في الدم بحيث يصبح الدم منزوع الأكسجين.

3-the blood flows from capillaries to veins. These big veins transport the de-oxygenated blood to right atrium. Systemic circulation is completed here and pulmonary circulation follows it and these cycles are repeated again and again.

٣-الدم يتدفق من الشعيرات الدموية إلى الأوردة. تنقل هذه الأوردة الكبيرة الدم منزوع الأكسجين إلى الأذين الأيمن. يكتمل الدوران الجهازي هنا وتتبعه الدورة الدموية الرئوية وتتكرر هذه الدورات مرارًا وتكرارًا.



2-Pulmonary circulation (small blood circulation)

1-It occurs between heart and lungs. **The aim of pulmonary circulation is to change blood with oxygen and to remove the carbon dioxide from body**.
The de- oxygenated blood coming from all body cells is carried to right atrium through **the superior and inferior vena cava.**

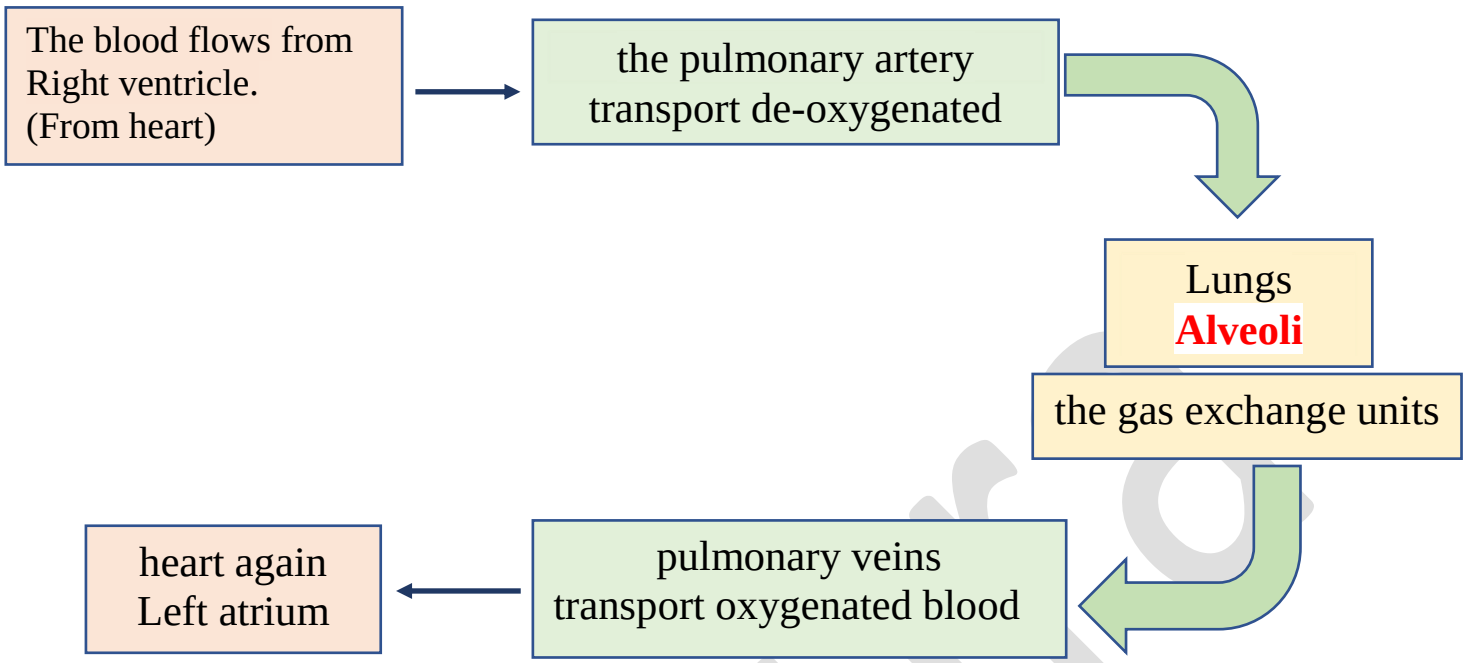
الدورة الرئوية (الدورة الدموية الصغيرة)
١- يحدث بين القلب والرئتين. الهدف من الدورة الرئوية هو تغيير الدم بالأكسجين وإزالة ثاني أكسيد الكربون من الجسم.
يتم نقل الدم منزوع الأكسجين القادم من جميع خلايا الجسم إلى الأذين الأيمن من خلال الوريد الأجوف العلوي والسفلي.

٢-the blood flows from Right ventricle. into the pulmonary artery , pulmonary artery divide into capillaries which surround the gas exchange units. These units are called **alveoli.**
air diffuses from alveoli into the capillaries and carbon dioxide in blood pass into alveoli to be exhaled.(O_2 enter , CO_2 outside)

-الدم يسري من البطين الأيمن. في الشريان الرئوي ، ينقسم الشريان الرئوي إلى شعيرات دموية تحيط بوحدات تبادل الغازات. تسمى هذه الوحدات **الحويصلات الهوائية.**
ينتشر الهواء من الحويصلات الهوائية إلى الشعيرات الدموية ويمر ثاني أكسيد الكربون في الدم إلى الحويصلات الهوائية ليتم إخراجها من الزفير .

3-in the lungs ,blood becomes oxygenated , pulmonary veins transport oxygenated blood to heart again.

٣-في الرئتين يصبح الدم مؤكسجاً ، وتقوم الأوردة الرئوية بنقل الدم المؤكسج إلى القلب مرة أخرى.



3- Portal circulation الدورة البوابية

1-Portal circulation **is a part of the systemic circulation**.

الدورة البوابية جزء من الدوران الجهازي.

2-the blood coming from the digestive organs (intestine) which contains absorbed nutrients does not go directly into the heart.

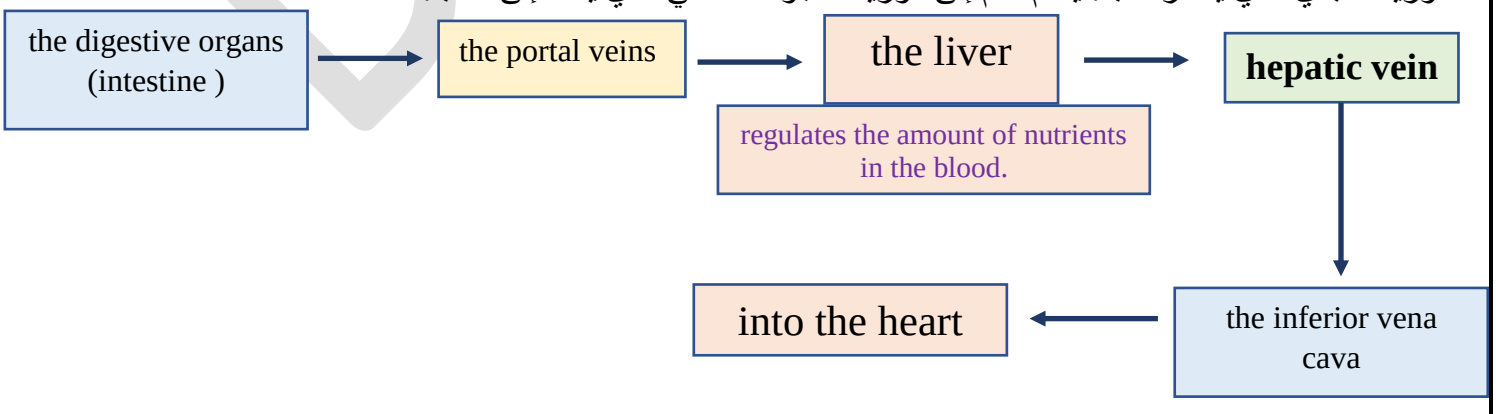
الدم الآتي من الجهاز الهضمي (الأمعاء) الذي يحتوي على مواد مغذية ممتصة لا يدخل القلب مباشرة.

3-Blood goes to the liver **by the portal vein**. Portal vein enters the liver. **Liver regulates the amount of nutrients in the blood.**

الدم يذهب إلى الكبد عن **طريق الوريد البابي**. يدخل الوريد البابي إلى الكبد. ينظم الكبد كمية العناصر الغذائية في الدم.

4-**hepatic vein** which leaves the liver. Delivered blood into the inferior vena cava which transports it into the heart.

الوريد الكبدي الذي يغادر الكبد. يسلم الدم إلى الوريد الأجوف السفلي الذي ينقله إلى القلب.



وزاري مكرر منهج عربي

رتب بالاسهم مسار الدم بالدورة البابية الكبدية خلال الاجزاء التالية:

القلب ، الامعاء ،الكبد، الوريد الكبدي، الوريد البابي الكبدي، الوريد الاجوف الاسفل

Systemic circulation	Pulmonary circulation
1- It occurs between heart and other body parts	1-It occurs between heart and lungs.
2-The aim of this circulation is to transport oxygen to all body cells and remove poisonous carbon dioxide from these cells.	2-The aim of pulmonary circulation is to change blood with oxygen and to remove the carbon dioxide from body

Writing cause : the blood coming from the digestive organs (intestine) which contains absorbed nutrients does not go directly into the heart.

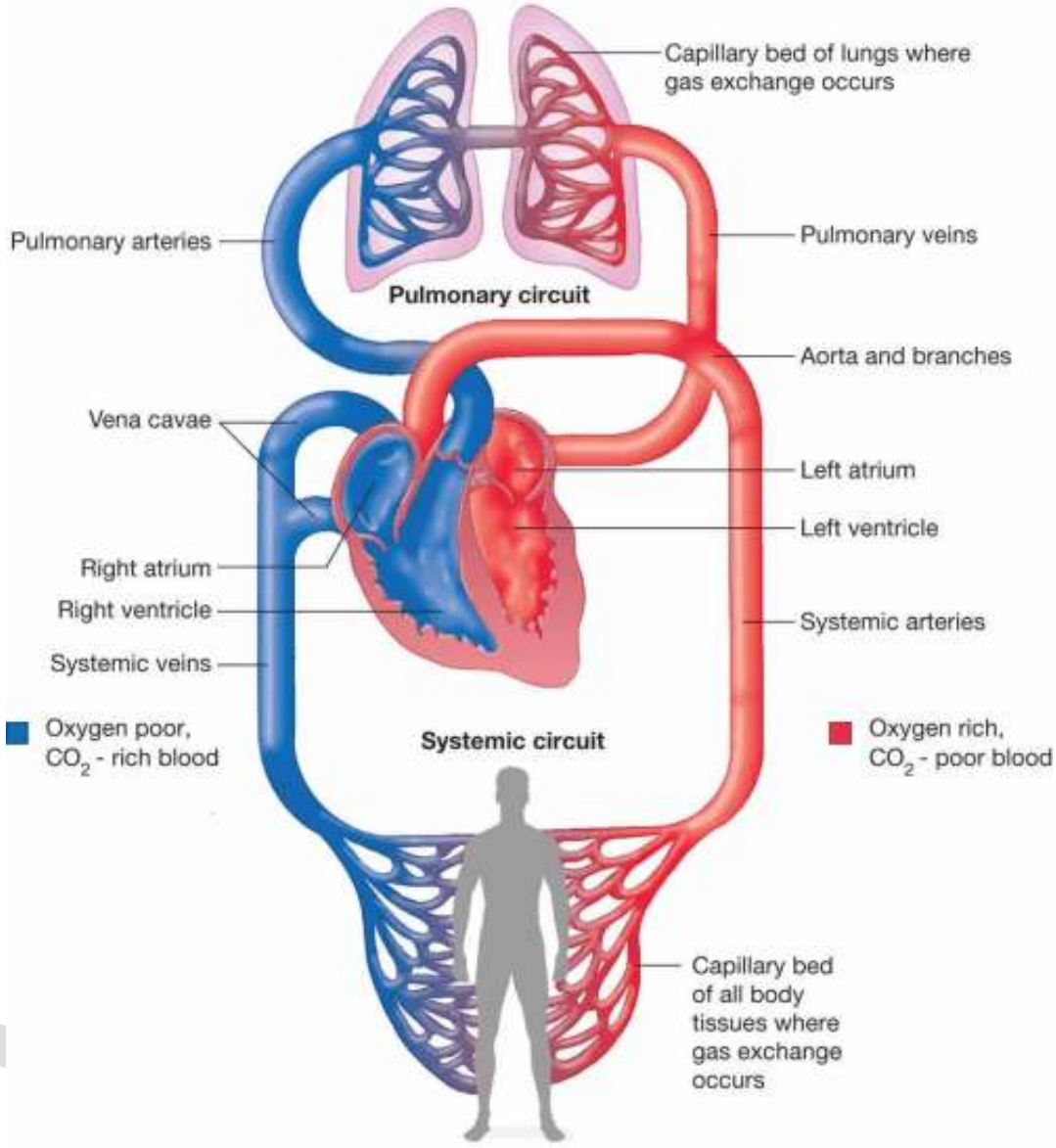
Blood goes to the liver by the portal vein. Portal vein enters the liver. Liver regulates the amount of nutrients in the blood.

hepatic vein which leaves the liver. Delivered blood into the inferior vena cava which transports it into the heart.

the portal veins: veins transport blood which contains absorbed nutrients from the digestive organs (intestine) to liver to regulate the amount of nutrients in the blood.

Function: transport blood which contains absorbed nutrients from the digestive organs (intestine) to liver.

hepatic vein: vein transport blood from liver to the inferior vena cava


Capillary bed of lungs where gas exchange occurs
Pulmonary arteries
Pulmonary veins
Pulmonary circuit
Aorta and branches
Vena cavae
Left atrium
Left ventricle
Right atrium
Right ventricle
Systemic arteries
Systemic veins
Oxygen poor, CO_2 - rich blood
Systemic circuit
Oxygen rich, CO_2 - poor blood
Capillary bed of all body tissues where gas exchange occurs

Blood groups

There are four different blood groups.هناك أربع فصائل دم مختلفة

Examining the blood groups is important during blood transfusion from one person to another.

يعد فحص فصائل الدم أمرًا مهمًا أثناء نقل الدم من شخص إلى آخر

If the blood of **donor** (who gives blood) does not fit the blood of **recipient** (who takes blood) red blood cells will be deposited in some organs or tissue.

إذا كان دم المتبرع (الذي يعطي الدم) لا يتناسب مع دم المتلقي (الذي يأخذ الدم) خلايا الدم الحمر سوف تترسب في بعض الاعضاء او الانسجة.

Why examining the blood groups is important?

If the blood of donor does not fit the blood of recipient, red blood cells will be deposited in some organs or tissue.

1- **Group (A)** : blood containing antigen A on red blood cells.

المجموعة (أ): دم يحتوي على مستضد أ على خلايا الدم الحمراء.

2- **Group (B):** blood containing B antigen A on red blood cells.

٢- المجموعة (ب): دم يحتوي على مستضد B على خلايا الدم الحمراء.

3- **Group (AB):** blood containing antigens A and B on red blood cells.

المجموعة (AB): الدم الذي يحتوي على مستضدي A و B على خلايا الدم الحمراء.

4- Group (O): blood containing no antigen on red blood cells.

٤- المجموعة (O): دم لا يحتوي على مستضد على خلايا الدم الحمراء.

(الشرح الذي يوضح موجود antigenللاطلاع للفهم فقط وليس للحفظ)

O blood group can give blood to all groups so it is called **general donor** and **AB blood group** can accept blood from all others so it is called **general recipient**.

يمكن لفصيلة الدم O أن تتبرع بالدم لجميع المجموعات ، لذلك يطلق عليها اسم **المتبرع العام** ويمكن لفصيلة الدم AB قبول الدم من جميع الفئات الأخرى ، لذلك يطلق عليها اسم **المتلقي العام.**

general donor: O blood group can give blood to all groups

general recipient :AB blood group can accept blood from all others

Give the reason:

Some people are called general donor

Because O blood group can give blood to all groups

Some people are called general recipient

Because AB blood group can accept blood from all others

ملاحظات مهمة للفهم

Blood group	Give	Take (receive)
O	can give to: O, A, B ,AB or give to all blood group	can take (receive) from O only
A	can give to: A, AB	can take (receive) from O ,A
B	can give to: B ,AB	can take (receive) from O ,B
AB	can give to: AB only	can take (receive) from O, A, B ,AB

Rh Factor

some people have another protein in their blood called **Rh factor**, or lyzen while some people do not have this factor. If the surfaces of the RBCs contain Rh factor, this blood is called as **Rh (+).** If there is no Rh factor on the surface of the RBCs, this blood is called as **Rh (-)**. 85% of people are Rh (+) and 15% of people is (Rh-).

بالإضافة إلى مستضدات A و B ، فإن بعض الأشخاص لديهم بروتين آخر في دمائهم يسمى عامل Rh أو lyzen بينما بعض الأشخاص لا يمتلكون هذا العامل. إذا كانت أسطح كرات الدم الحمراء تحتوي على عامل Rh ، فإن هذا الدم يسمى Rh (+). إذا لم يكن هناك عامل Rh على سطح كرات الدم الحمراء ، فإن هذا الدم يسمى Rh (-). 85٪ من الناس هم من Rh (+) و ١٥٪ من الناس (Rh-).

Define Rh Factor - Define lyzen

Blood Rh (+): who contain protein on the surfaces of the RBCs, 85% of people are Rh (+).

Blood Rh(-): who no Rh factor on the surfaces of the RBCs, 15% of people is (Rh-).

Some blood group is called as Rh (+). Why

If the surfaces of the RBCs contain Rh factor, 85% of people are Rh (+)

Some blood group is called as Rh (-). Why

If there is no Rh factor on the surface of the RBCs, and 15% of people is (Rh-).

Rh factor must be examined during blood transfusions. Why

Rh (+) bloods can accept from both Rh (+) and Rh (-)
but Rh (-) bloods can accept from only Rh (-).

يجب فحص هذا العامل أثناء عمليات نقل الدم.
دم Rh (+) يمكن أن تقبل من كل من Rh^+ و Rh^-
لكن دم Rh^- يمكن أن يقبل من Rh^- فقط.

Rh factor also affects the marriages. Why

If the blood group of mother is Rh (-) while father's is Rh (+), the Rh (+) fetus will be in danger. Because the mother's body can produce antibodies against the antigens of baby.

يؤثر هذا العامل أيضًا على الزيجات(الزواج).
(+) في خطر. لأن جسم الأم يستطيع إنتاج Rh (+) ، فسيكون الجنين Rh (-) بينما الأب هو Rhإذا كانت فصيلة دم الأم هي أجسام مضادة ضد مستضدات الطفل

the RBCs= **R**ed **B**lood **C**ells
Rh Factor = lyzen

Writing cause for following:

1-Rh factor must be examined during blood transfusions.
2-Rh factor affects the marriages
3-Some blood group is called as Rh (+).
4-Some blood group is called as Rh (-).

Blood clotting تخثر الدم

It is the solidification of the blood to stop bleeding to prevent blood loss from an injury. هو تصلب الدم لوقف النزيف لمنع فقدان الدم من الإصابة.

In some people, this process is not carried out properly depending on a genetic disease called **hemophilia**. In hemophilic people, a simple wound or an accident may cause death because of losing so much blood.

لدى بعض الأشخاص ، لا تتم هذه العملية بشكل صحيح اعتمادًا على مرض وراثي يسمى الهيموفيليا. في الأشخاص المصابين بالهيموفيليا ، قد يتسبب جرح بسيط أو حادث في الوفاة بسبب فقدان الكثير من الدم.

Hemophilia: genetic disease, In some people, blood clotting process is not carried out properly, so a simple wound or an accident may cause death because of losing so much blood.

In hemophilic people, a simple wound or an accident may cause death (why) because of losing so much blood.

How does blood clotting occur? كيف يحدث تخثر الدم؟

1-When a bleeding occurs, the blood platelets are broken and release a certain enzyme. This enzyme converts the **prothrombin** into **thrombin** by means of the calcium ions.

عند حدوث نزيف تنكسر الصفائح الدموية وتطلق إنزيم معين. هذا الإنزيم يحول البروثرومبين إلى ثرومبين عن طريق أيونات الكالسيوم.

1- Thrombin converts the **fibrinogen** into **fibrin** which is a sticky substance.
يقوم الثرومبين بتحويل الفيبرينوجين إلى الفيبرين وهو مادة لزجة.

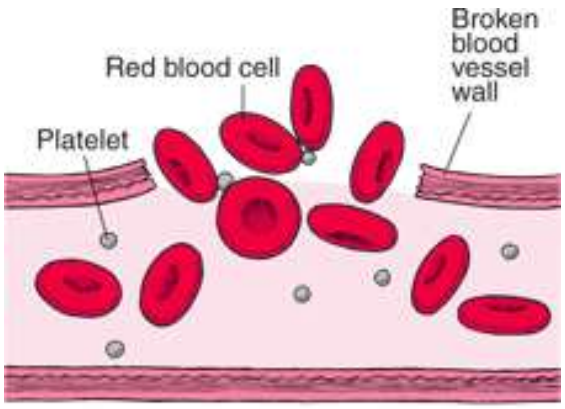
2- Fibrin collects the red blood cells and platelets and forms a solid mass. The blood clot closes the injured area, so bleeding stops.
يجمع الفيبرين خلايا الدم الحمراء والصفائح الدموية ويشكل كتلة صلبة. تقوم الجلطة الدموية بإغلاق المنطقة المصابة ، وبالتالي يتوقف النزيف

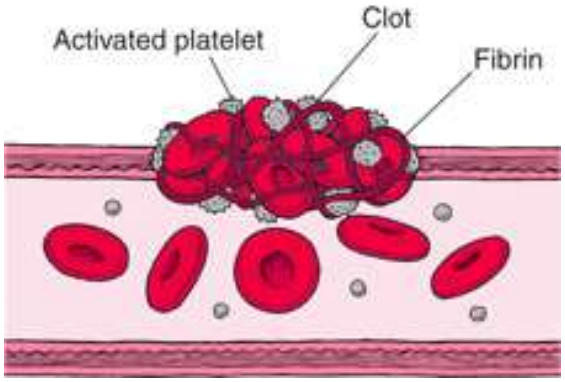
Prothrombin is a special protein found in the blood plasma Formed from liver contribute with blood clotting
البروثرومبين هو بروتين خاص موجود في بلازما الدم، يتم تصنيعه في الكبد ويساهم في تخثر الدم

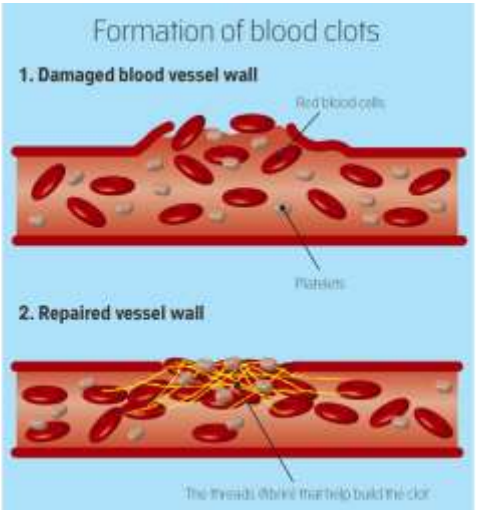
Fibrinogen is a special protein dissolved into the blood plasma. Formed from liver contribute with blood clotting
الفيبرينوجين هو بروتين خاص يذوب في بلازما الدميتم تصنيعه في الكبد ويساهم في تخثر الدم.

Blood clotting process diagram

blood platelets are broken → Release → **Thromboplastine** enzyme → Ca^{+} convert → Prothrombin → into → thrombin → convert → fibrinogen → into → fibrin → Stick substance collect the RBCs and platelates and Form solid mass to prevent blood loss







Blood transfusion النقل الدم

Blood manufacturing is not possible in factories or laboratories, because blood contains living cells.

لا يمكن تصنيع الدم في المصانع أو المعامل ، لأن الدم يحتوي على خلايا حية.

Also all trials are failed to use the animal's blood instead of the human blood or to substitute the loss of the blood.

كما فشلت جميع التجارب في استخدام دم الحيوان بدلاً من دم الإنسان أو تعويض فقدان الدم

For this reason the human can receive blood only from another human.

لهذا السبب يمكن للإنسان أن يتلقى الدم فقط من إنسان آخر

Blood donation is a national and humanitarian serves.

التبرع بالدم خدمة وطنية وإنسانية. ..

the human can receive blood only from another human. why

*all trials are failed to use the animal's blood instead of the human blood or to substitute the loss of the blood.

There are some conditions to give the blood: هناك بعض الشروط للتبرع بالدم:

1-The age of person who gives blood mustn't be younger than 17 and mustn't be older than 55.

يجب ألا يقل عمر الشخص الذي يتبرع بالدم عن ١٧ عامًا ولا يزيد عن ٥٥ عامًا.

2-Also woman who gives blood must not be pregnant or nurse the child.

كما يجب ألا تكون المرأة التي تبرعت بالدم حاملاً أو ترضع الطفل.

3-The hospitals store the blood in glass tubes or plastic containers which contain heparin. **Heparin** prevents the blood clotting during the blood storage

تقوم المستشفيات بتخزين الدم في أنابيب زجاجية أو عبوات بلاستيكية تحتوي على الهيبارين. يمنع الهيبارين تخثر الدم أثناء تخزين الدم

4-blood must be stored in special refrigerators. تخزين الدم في ثلاجات خاصة

5-Also each container must be labeled by writing the blood group and donation date.

كما يجب تمييز كل عبوة عن طريق كتابة فصيلة الدم وتاريخ التبرع.

6-If the blood is stored more than three weeks, this blood cannot be transfused to the patients.

إذا تم تخزين الدم أكثر من ثلاثة أسابيع ، فلا يمكن نقل هذا الدم إلى المرضى.

During blood donation the blood put in glass tubes or plastic containers which contain heparin. Why

Heparin prevents the blood clotting during the blood storage

Lymphatic system الجهاز اللمفاوي

The lymphatic system: composed of lymph, lymphatic vessels, lymph nodes (glands) and some organs.

وهو يتألف من الأوعية اللمفاوية والأوعية اللمفاوية والعقد الليمفاوية (الغدد) وبعض الأعضاء.

During the circulation in capillaries, the water, simple food nutrients and oxygen diffuses into the intercellular space.

أثناء الدورة الدموية في الشعيرات الدموية ، ينتشر الماء والمغذيات الغذائية البسيطة والأكسجين في الفراغات بين الخلايا.

Additionally, small quantity of blood plasma is filtered into the intercellular space. This plasma is called as **tissue fluid**, when this fluid is absorbed by the lymphatic vessels, it is called**: lymph**.

بالإضافة إلى ذلك ، يتم ترشيح كمية صغيرة من بلازما الدم في الفراغات بين الخلايا. تسمى هذه البلازما بسائل الأنسجة ، وعندما تمتص الأوعية اللمفاوية هذا السائل ، يطلق عليه: اللمف.

The structure of the lymph looks like the blood but it does not contain red blood cells. The lymph contains white blood cells which penetrates the walls of blood capillaries by means of amoebic motion.

يشبه تركيب اللمف الدم ولكنه لا يحتوي على خلايا الدم الحمراء. يحتوي الليمف على خلايا الدم البيضاء التي تخترق جدران الشعيرات الدموية عن طريق الحركة الأميبية..

Lymph: is a blood plasma tissue fluid that filtered into the intercellular space. and absorbed by the lymphatic vessels structure of the lymph looks like the blood but it does not contain red blood cells. The lymph contains white blood cells

Lymphatic vessels

Lymphatic vessels collect the lymph or tissue fluid and waste products from the intercellular space and transport them into the blood. The contraction of the skeletal muscles helps the lymph to flow through lymphatic vessels. Also there are valves in lymphatic vessels which provide the flowing of lymph in one direction.

. أوعية لمفاوية

تجمع الأوعية اللمفاوية السائل الليمفاوي أو الأنسجة وفضلاتها من الفراغ بين الخلايا وتنقلها إلى الدم. يساعد تقلص عضلات الهيكل العظمي الليمفاوية على التدفق عبر الأوعية اللمفاوية. كما توجد صمامات في الأوعية اللمفاوية توفر تدفق الليمفاوية في اتجاه واحد.

Lymphatic nodes

In the meeting points of lymph vessels, some swellings form. These swellings are called as lymph nodes, or lymph glands. These nodes contain a great amount of white blood cells. **They clear the lymph from bacteria and other harmful materials**.

The lymphatic nodes are distributed in different body parts such as limbs and neck (tonsils). **These nodes may swell and may be inflamed as a result of resistance against bacteria.**

الغدد(العقد)الليمفاوية

في نقاط التقاء الأوعية الليمفاوية ، تتشكل بعض التورمات. تسمى هذه التورمات بالعقد الليمفاوية أو الغدد الليمفاوية. تحتوي هذه العقد على كمية كبيرة من خلايا الدم البيضاء. يزيلون اللمف من البكتيريا والمواد الضارة الأخرى.

تتوزع الغدد الليمفاوية في أجزاء مختلفة من الجسم مثل الأطراف والرقبة (اللوزتين). قد تنتفخ هذه العقد وقد تلتهب نتيجة لمقاومة البكتيريا.

ملاحظة مهمة :

كل من اللمف والعقد اللمفاوي تؤدي نفس الوظيفة

الاوعية اللمفاوية وظيفتها يجري اللمف بداخلها

Lymphatic ducts القنوات اللمفاوية

Lymphatic ducts are distributed in different parts of the body. Their contents are secreted into two main ducts:

تتوزع القنوات اللمفاوية في أجزاء مختلفة من الجسم. يتم إفراز محتوياتها في قناتين رئيسيتين:

1- **Right lymphatic duct**: it collects the lymph from upper right parts of the body, head, neck, trachea and some parts of the liver and transports it into the right subclavian vein near the heart.

1- الجسم والرأس والرقبة والقصبة الهوائية وبعض أجزاء الكبد وينقلها إلى الوريد الأيمن تحت الترقوة بالقرب من القلب.

2- **Left lymphatic duct**, or thoracic duct: it is the largest lymphatic duct in the body. It collects the lymph from the other parts of body and transports into the left subclavian vein.

٢-القناة اللمفاوية اليسرى أو القناة الصدرية: وهي أكبر قناة لمفاوية في الجسم. يجمع الليمف من أجزاء أخرى من الجسم وينتقل إلى الوريد تحت الترقوة الأيسر.

Spleen

Spleen is the largest organ of the lymphatic system; it is a bright red organ located beneath the stomach, it looks like the lymphatic nodes but it is connected with blood instead of lymph.

الطحال هو أكبر عضو في الجهاز اللمفاوي. هو عضو أحمر لامع يقع تحت المعدة ، يشبه العقد الليمفاوية ولكنه مرتبط بالدم بدلاً من الليمفاوية.

1-The spleen stores a great amount of the blood and يخزن الطحال كمية كبيرة من الدم
2-contributes the maintaining the blood percentage in the blood vessels.
ويساهم في الحفاظ على نسبة الدم في الأوعية الدموية.

3-The spleen produces red blood cells when the bone marrow is not produced.
ينتج الطحال خلايا الدم الحمراء عندما لا يتم إنتاج نخاع العظام.

4-It breaks down and decomposes the protein parts old red blood cells, thus iron returns into the blood.
يتفكك ويتحلل أجزاء البروتين من خلايا الدم الحمراء القديمة ، وبالتالي يعود الحديد إلى الدم.
5-the spleen clears the blood from debris inside it.
يقوم الطحال بإزالة الدم من الحطام الموجود بداخله.

* The spleen becomes enlarged when it is infected with some diseases such as **malaria** and **anaemia**
يتضخم الطحال عندما يصاب ببعض الأمراض مثل الملاريا وفقر الدم

What dose the spleen produce red blood cells?
When dose the spleen produce red blood cells?
How dose the spleen return Iron into the blood?
What dose the spleen stored? And what dose it contribute?
What are functions of spleen?
What is location of spleen?
When is the spleen enlarged?

Stethoscope سماعة الطبيب
It is an instrument used by doctors to listen to someone's heart or breaking.
إنها أداة يستخدمها الأطباء للاستماع إلى قلب شخص ما أو تنفسه.

Some diseases of the circulation system

The circulatory system is affected with number of diseases, such as arteriosclerosis, high and low blood pressure, hemorrhage and heart diseases.
بعض أمراض الدورة الدموية
يتأثر جهاز الدورة الدموية بعدد من الأمراض مثل تصلب الشرايين وارتفاع وانخفاض ضغط الدم والنزيف وأمراض القلب.

1. Blood pressure

Some people suffer from high blood pressure whereas others suffer from low blood pressure. Both cases are dangerous for human.

يعاني بعض الأشخاص من ارتفاع ضغط الدم بينما يعاني البعض الآخر من انخفاض ضغط الدم. كلتا الحالتين خطيرة على الإنسان.

Blood pressure is the force of the blood on the walls of arteries due to contractions of ventricles. ضغط الدم هو قوة الدم على جدران الشرايين بسبب تقلصات البطينين

The blood pressure is measured by special apparatus called **sphygmomanometer** which is put on the radius artery.

يتم قياس ضغط الدم بواسطة جهاز خاص يسمى مقياس ضغط الدم يوضع على الشريان الكعبري

When the ventricles contract, the blood pressure increases and when *the ventricles relax*, the blood pressure decreases.

. عندما ينقبض البطينان ، يزداد ضغط الدم وعندما يرتخي البطينان ، ينخفض ضغط الدم.

The blood pressure varies according to:يختلف ضغط الدم باختلاف

*people

* also it varies in the same person depending on the situation mood.

ويختلف أيضًا في نفس الشخص حسب الحالة المزاجية

*The blood pressure in children is less than adults

يكون ضغط الدم عند الأطفال أقل من البالغين

* it is less in woman than in men. وهو أقل عند النساء منه عند الرجال

*The blood pressure reduces during sleeping and it increases during awakening.

ينخفض ضغط الدم أثناء النوم ويزداد أثناء الاستيقاظ.

*When working and performing sports.عند العمل وأداء الرياضة .

.

The average high blood pressure is between (12-15) cm Hg but the average low blood pressure is between (8-9) cm Hg.

يتراوح متوسط ضغط الدم المرتفع بين (١٢-١٥) سم زئبق ولكن متوسط ضغط الدم المنخفض يتراوح بين (٨-٩) سم زئبق

The continuous high blood pressure **(hypertension)** causes damage on the walls of the fine arteries. So it may cause heart attack or explosion of some brain arteries which is called **apoplectic stroke.**

يتسبب ارتفاع ضغط الدم المستمر (ارتفاع ضغط الدم) في تلف جدران الشرايين الدقيقة. لذلك قد يسبب نوبة قلبية أو انفجار بعض شرايين الدماغ وهو ما يسمى **السكتة الدماغية**.

Factors affecting blood pressure

Increasing the percentage of fats and salts in the diets causes the hypertension.
زيادة نسبة الدهون والأملاح في النظام الغذائي يسبب ارتفاع ضغط الدم.

Also nervousness, أيضا العصبية
overeat;وجبة دسمة
kidney inflammation and arteriosclerosis التهاب الكلى وتصلب الشرايين
have a great effect on the high blood pressure.
لهما تأثير كبير على ارتفاع ضغط الدم.

Prevention:

*The person must have body and Mental health , يجب أن يحصل الشخص على صحة الجسم والعقل
*regulate the eating times, وتنظيم أوقات الأكل
*reduce the fat level in the meals وتقليل نسبة الدهون في الوجبات الغذائية
*and eat more fruits and vegetables.وتناول المزيد من الفاكهة والخضروات .

2. Heart attack النوبة القلبية

It is a physiological heart disease. Several heart diseases and irregular heartbeats can cause a strong pain in the chest and sometimes the heart stops completely.
This condition causes sudden death and it is called **heart attack.**
Arteriosclerosis and high blood pressure increase the risk of heart attack.
إنه مرض قلبي فسيولوجي. يمكن للعديد من أمراض القلب وعدم انتظام ضربات القلب أن تسبب ألمًا شديدًا في الصدر وأحيانًا يتوقف القلب تمامًا. تسبب هذه الحالة الموت المفاجئ وتسمى النوبة القلبية.
يزيد تصلب الشرايين وارتفاع ضغط الدم من خطر الإصابة بالنوبات القلبية.

Prevention;

*We must keep ourselves away from the causes such as smoking, drinking alcohol and hard psychical actions.
يجب أن نبقي أنفسنا بعيدين عن الأسباب مثل التدخين وشرب الكحوليات والإجراءات النفسية القاسية.
*Visiting the physician is important when you feel any pain in the chest or any other symptoms mentioned before.
زيارة الطبيب مهمة عندما تشعر بأي ألم في الصدر أو أي أعراض أخرى مذكورة سابقًا.

3. haemophilia

* haemophilia is a genetic disease. الهيموفيليا مرض وراثي.
*The bleeding does not stop in hemophilic people in normal period
لا يتوقف النزيف عند الأشخاص المصابين بالهيموفيليا في الفترة الطبيعية
* genetic structure of the blood is different.
Also breaking the blood platelets is difficult when an injury occurs.
وتختلف التركيبة الجينية للدم. كما أن كسر الصفائح الدموية أمر صعب عند حدوث إصابة.
This disease is generally seen in males also it can be seen in females but hemophilic female can live until puberty.
يظهر هذا المرض بشكل عام عند الذكور كما يمكن رؤيته عند الإناث ولكن يمكن أن تعيش الأنثى المصابة بالهيموفيليا حتى سن البلوغ.

This disease is generally seen in males . why
also it can be seen in females but hemophilic female can live until puberty.
Which is responsible or reason of haemophilia
genetic structure of the blood is different.
Also breaking the blood platelets is difficult when an injury occurs.

4. Anemia فقر الدم

*Deficiency of the iron in the blood causes the anaemia;
* also the deficiency of vitamin B_{12} causes the anaemia.
These deficiencies reduce the formation of the hemoglobin.
*Different parasites such as the Englostoma worms and malaria cause the anaemia.
In addition,
chronic bleeding causes the anaemia.
نقص الحديد في الدم يسبب فقر الدم. كما أن نقص فيتامين ب ١٢ يسبب فقر الدم. تقلل أوجه القصور هذه من تكوين الهيموجلوبين. الطفيليات المختلفة مثل الديدان الإنكلستوما والملاريا تسبب فقر الدم. بالإضافة إلى أن النزيف المزمن يسبب فقر الدم.

Symptoms and treatment:
Pale face and eyes, general weakness, in appetence and indigestion are seen.
The diagnosis of anemia is done by the examination of hemoglobin percentage in the blood. The patient is treated by removing the causing factors and consuming diets which are rich in vitamins, protein and iron.
Also the pills which are given to the patient must contain iron compounds (pills, liquid or intramuscular injection).
شحوب الوجه والعينين ، ضعف عام ، في الشهية وعسر الهضم. يتم تشخيص فقر الدم عن طريق فحص نسبة الهيموجلوبين في الدم. يعالج المريض بإزالة العوامل المسببة وتناول وجبات غنية بالفيتامينات والبروتينات والحديد. أيضا الحبوب التي تعطى للمريض يجب أن تحتوي على مركبات الحديد (حبوب ، سائل أو حقن عضلي).

Give cause;

***some people have Hemophilia.**

Because It is genetic disease and breaking the blood platelets is difficult when an injury occurs

***some people have anaemia.**

1-Deficiency of the iron in the blood

2-the deficiency of vitamin B12 causes the anaemia.

3-Different parasites such as the Englostoma worms and malaria

4-chronic bleeding.

*** some people have a heart attack.**

Several heart diseases and irregular heartbeats

***High blood pressure (hypertension)in some people.**

Increasing the percentage of fats and salts in the diets . Also nervousness, overeat ,kidney inflammation and arteriosclerosis.

Corresponding name

Rh= Lyzen
Red Blood Cells= Erythrocytes
White Blood Cells= Leucocytes
blood platelets =Thrombocytes
Mitral valve = bicuspid
Pulmonary circulation (small blood circulation)
Systemic circulation= large blood circulation
Cardiac veins:= coronary veins
Cardiac arteries =coronary arteries

Write the functions of the following:

Circulatory system-superior vena cava-inferior vena cava- Pulmonary artery-Aorta Spleen-cardiac arteries- cardiac veins-blood capillaries- veins- arteries.

Structure	Location	Function
Hemoglobin	Erythrocytes	that carries O_2 and CO_2 in the body
Erythrocytes	Blood plasma	They transport O2 from lungs to body tissue and CO2 from body tissues to lungs.
Leucocytes	Blood plasma	They defense body by attacking invading microorganisms or by producing antibodies
Thrombocytes	Blood plasma	They provide blood clotting after an injury or a bleeding. The platelets come together and form clumps in the area of injury
Tricuspid valve	found in the right side of the heart Or (separates right atrium and right ventricle)	It controls the flow of blood from atrium to ventricle
Mitral valve	found in the left side of the heart Or (separates left atrium and right ventricle)	It prevents the back flow of blood
Pulmonary valve	found between the right ventricle and pulmonary artery	They prevent the back flow of blood into the right ventricle from the pulmonary artery.
Aortic valve	is found between the left ventricle and aorta	They prevent the back flow of blood into the left ventricle from the aorta.
Lymphatic nodes	In the meeting points of lymph vessels	. They clear the lymph from bacteria and other harmful materials

Review

Q1// Define the following:

Lymph node: - are some swellings formed in the meeting points of lymph vessels and they contain a great amount of white blood cells, they clear the lymph from bacteria and other harmful materials.

Hemoglobin:- is a red pigment which found in the red blood cells and is special protein and contains iron that carries O_2 and CO_2 in the body. The hemoglobin. Lack of red blood cells or hemoglobin in the blood causes anemia

Tricuspid valve:- is found in the right side of the heart. It separates right atrium and right ventricle. It has three cusps. So that, it is known as tricuspid valve. It prevents the back flow of blood.

Heart attack: - is a physiological heart disease. Several heart diseases and irregular heartbeats can cause a strong pain in the chest and sometimes the heart stops completely.

Blood platelets: are very tiny discs or oval shaped cells. They have no nucleus. Its diameter is about 2 micron. There are about 250000 platelets in 1mm3 of blood. Platelets are originated from platelet- producing cells found in the bone Marrow. They provide blood clotting after an injury or a bleeding. The platelets come together and form clumps in the area of injury.

Hemophilia: - is a genetic disease. The bleeding does not stop in hemophilic people in normal period and genetic structure of the blood is different. Also breaking the blood platelets is difficult when an injury occurs. This disease is generally seen in males also it can be seen in females but hemophilic female can live until puberty.

Heart beats:- are contractions and relaxations of the heart are called as. The number of heartbeat in a healthy person is about 72 beats in a minute in resting.

Blood pressure is the force of the blood on the walls of arteries due to contractions of ventricles

Blood Plasma: - is a clear yellow liquid, which makes up 55% of the total volume of blood. It consists of 90% water and 10% dissolved materials such as absorbed nutrients, salts, antibodies, hormones and some waste materials, other blood contents swim in the blood plasma

Q3// Write the places (location of the following)

structure	Location
Heart	-found in the chest cavity between the lungs, slightly to the left of center
Spleen	is located beneath the stomach
Bicuspid	is found in the left side of the heart, it separates left atrium and right ventricle
Rh factor	on the surfaces of the RBCS

Q4// Write the symptoms of the following diseases:-

Heart attack: - can cause a strong pain in the chest and sometimes the heart stops completely. This condition causes sudden death

Anemia: - Pale face and eyes, general weakness, in appetence and indigestion are seen

Q5// Write the function of the following:-

Structure	Function
Small blood circulation	The aim of pulmonary circulation is to change blood with oxygen and to remove the carbon dioxide from body
Lymph node	They clear the lymph from bacteria and other harmful materials
Heparin	prevents the blood clotting in blood vessels
Aorta	transports oxygenated blood from heart to all body tissues (except the lungs).

Q6// الاختلافات موجوده في الصفحات السابقة

Q7//Answer the following:-

1- How does blood clotting occur?

*When a bleeding occurs, the blood platelets are broken and release a certain enzyme.
*This enzyme converts the prothrombin into thrombin by means of the calcium ions.
*Thrombin converts the fibrinogen into fibrin which is a sticky substance.
*Fibrin collects the red blood cells and platelets and forms a solid mass.
*The blood clot closes the injured area, so bleeding stops.

2- What is the important of spleen for the body ?

1-The spleen stores a great amount of the blood
2- contributes the maintaining the blood percentage in the blood vessels.
3-The spleen produces red blood cells when the bone marrow is not produced.

4-It breaks down and decomposes the protein parts old red blood cells, thus iron returns into the blood.
5-Also the spleen clears the blood from debris inside it.

3- What are the conditions of blood transfusion?

1-The age of person who gives blood mustn't be younger than 17 and mustn't be older than 55.
2-Also woman who gives blood must not be pregnant or nurse the child.
3-The hospitals store the blood in glass tubes or plastic containers which contain heparin. **Heparin** prevents the blood clotting during the blood storage
4-blood must be stored in special refrigerators.
5-Also each container must be labeled by writing the blood group and donation date.
6-If the blood is stored more than three weeks, this blood cannot be transfused to the patients..

Q8//Give the reasons of the following:-

1- The oxygenated blood does not mix with de- oxygenated blood in heart.

Because the heart consists of two sides right and left. These sides are separated by muscular wall (septum)

2-The walls of blood capillaries are very thin.

Their thin walls help the material exchange between blood and body cells and white blood cells can move through the walls of capillaries easily.

3-A person who carries the blood group O is called as general donor.

Because (O) blood group can give blood to all groups

4-Blood clotting does not occur in blood vessels.

Because heparin enzyme which prevents the blood clotting in blood vessels

5-Sometimes the death occur, when the blood is transferred to person.

If the blood of donor (who gives blood) does not fit the blood of recipient (who takes blood) red blood cells will be deposited in some organs or tissue.

Q9//

1- AB, O
2- O_2 and CO_2
3- right Ventricle , lungs
4- Pulmonary circulation
5- in Limbs and neck tonsils

Arteries	Veins
1-They transport Oxygenated blood from heart to body organs.	They transport de- oxygenated blood from body tissues to heart.
3-The color of this blood is bright red	The color of blood is bluish-red
4- They are located deeply in the body except radial artery located at carpus which is found under the skin	Veins are closer to the body surface.

الاسئلة الوزارية الخاصة بالفصل الرابع (الدوران)

2019 first role

***Define: lymph nodes**

lymph nodes : Also called lymph glands the meeting points of lymph vessels, some swellings form. These nodes contain a great amount of white blood cells. They clear the lymph from bacteria and other harmful materials.
The lymphatic nodes are distributed in different body parts such as limbs and neck (tonsils). These nodes may swell and may be inflamed as a result of resistance against bacteria.

***Write the causes: (AB) blood group is called (general recipient)**

Because (AB) blood group can accept blood from all other and can only give to the same group.

*** Who is responsible :Formed red blood cells in children before birth.**

Liver and spleen

***List the arteries connected with heart.**

1-Pulmonary artery 2- Aorta 3- Cardiac (coronary) arteries

***Draw with labelling: Pulmonary blood circulation**

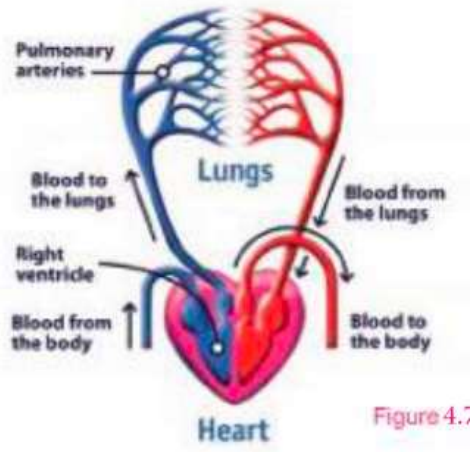


Figure 4.7

2019 second role

***Write the causes: The walls of blood capillaries are very thin.**

They walls are very thin and they have no muscles Also their walls are cover from single layered epithelial cells. This help the material exchange between blood and body cells and white blood cells can move through the walls of capillaries easily.

Give the corresponding: Rh factor = **Lyzen**

Define: Blood pressure: is the force of the blood on the walls of arteries due to contractions of ventricles.

What are symptoms: Anemia

Symptoms

1-Pale face and eyes,
2-general weakness,
3-inappetence
4- indigestion are seen.

Who is responsible: release thromboplastin enzyme
Blood platelate

What are difference between:

Red blood cell and white blood cell

Erythrocytes	Leucocytes	
1- disc shaped cells and thinner in center.	inconstant (amoeboid) shaped.	**Shape**
2-Its diameter is about 8 micron	Their diameter is about (6-15) micron.	**Diameter**
3-They transport O_2 from lungs to body tissue and CO_2 from body tissues to lungs.	*They defense body by attacking invading microorganisms or by producing antibodies. *They act as scavengers and collect the last parts of dead cells and microorganisms found between the tissue cells.	**Function**

2019 third role

Fill in blanks:

*The hemoglobin responsible for transporting O_2 and CO_2.

***What are the function:** Cardiac (coronary) veins

*** The average high pressure is between:**

a.(8-9) mm Hg b. .(16-18) mm Hg c.(12-15) mm Hg

***What are different between:** Granulocytes and Agranulocytes.

Granulocytes	A granulocytes
1-they have granular cytoplasm	they have non-granular cytoplasm
2-lobulated nuclei	unlobulated nuclei
3-They are formed in bone marrow.	They are formed in lymph nodes.

***Write the causes:** spleen stores a great amount of the blood.
contributes the maintaining the blood percentage in the blood vessels.

2022 first role

Define : Aorta

Aorta: it is the largest blood vessel and the most branched vessel. The aorta extends from left ventricle and it transports oxygenated blood from heart to all body tissues (except the lungs).

What are the differences between :

Arteries	Veins	
1-They transport blood from heart to body organs.	They transport blood from body tissues to heart.	function
3-The color of this blood is bright red	The color of de- oxygenated blood is bluish-red	colour of blood
4- They are located deeply in the body except radial artery located at carpus which is found under the skin	Veins are closer to the body surface.	location

Give the corresponding name: Rh Factor= Lyzen

Which is responsible:

The flowing of lymph is one direction in the lymphatic vessels.

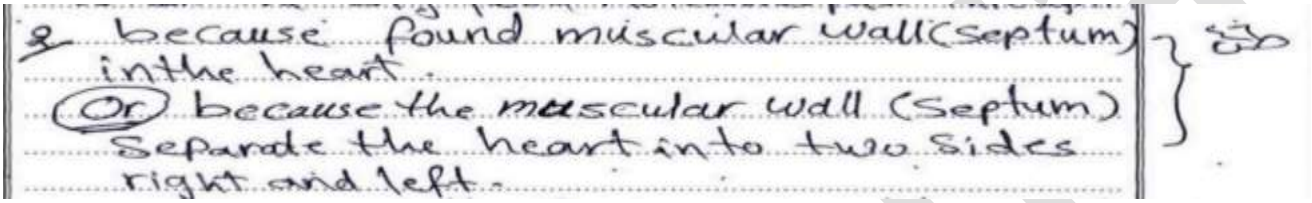
there are valves in lymphatic vessels which provide the flowing of lymph in one direction. OR Valves

Fill in blanks:

Right atrium separate from right ventricle by **Tricuspid** valve, but left atrium separate from left ventricle by **Bicuspid** valve.

Write the cause :

***the oxygenated blood dose not mix with de-oxygenated blood in heart.**



***Lymph nodes contain a great amount of white blood cells.**

They clear the lymph from bacteria and other harmful materials.

Explain the portal circulation

1-Portal circulation is a part of the systemic circulation.

2-the blood coming from the digestive organs (intestine) which contains absorbed nutrients does not go directly into the heart.

3-Blood goes to the liver by the portal vein. Portal vein enters the liver. Liver regulates the amount of nutrients in the blood.

4-hepatic vein which leaves the liver. Delivered blood into the inferior vena cava which transports it into the heart.

* The average high pressure is between :

a.(8-9) mm Hg b. .(16-18) mm Hg c.(12-15) mm Hg

*The organ that becomes enlarged when it is infected with some diseases such as malaria and anemia : a. liver b. spleen c. stomach

2022 second role

Define : blood platelets

Blood platelets :They are very tiny discs or oval shaped cells. They have no nucleus. Its diameter is about 2 micron. There are about 250000 platelets in $1mm^3$ of blood. Platelets are originated from platelet- producing cells found in the bone marrow. They provide blood clotting after an injury or a bleeding. The platelets come together and form clumps in the area of injury.

Fill in blanks:

*the hemoglobin responsible for transporting O_2 and CO_2.

***How does blood clotting occur?**

1-When a bleeding occurs, the blood platelets are broken and release a certain enzyme. This enzyme converts the **prothrombin** into **thrombin** by means of the calcium ions.

2-Thrombin converts the **fibrinogen** into **fibrin** which is a sticky substance.

3-Fibrin collects the red blood cells and platelets and forms a solid mass. The blood clot closes the injured area, so bleeding stops.

2023 first role

Give the reason:

Rh factor affects the marriage.

If the blood group of mother is Rh (-) while father's is Rh (+), the Rh (+) fetus will be in danger.Because the mother's body can produce antibodies against the antigens of baby.

The walls of blood capillaries are very thin.

They walls are very thin and they have no muscles Also their walls are cover from single layered epithelial cells. This help the material exchange between blood and body cells and white blood cells can move through the walls of capillaries easily.

What are the membrane that cover of heart : Pericaridum

Fill in blanks:

*thrombin converts the **fibrinogen** into **fibrin**.

*the two semilunar valves are **oartic valves** and **polumanry valve**.

Give example:

Disease causes enlargement in spleen: **Malaria and anemia**

Respiratory pigment : **Hemoglobin respritory**

Explain : portal circulation

1-Portal circulation is a part of the systemic circulation.

2-the blood coming from the digestive organs (intestine) which contains absorbed nutrients does not go directly into the heart.

3-Blood goes to the liver by the portal vein. Portal vein enters the liver. Liver regulates the amount of nutrients in the blood.

4-hepatic vein which leaves the liver. Delivered blood into the inferior vena cava which transports it into the heart.

2023 second role

Define : blood platelets

Blood platelets :They are very tiny discs or oval shaped cells. They have no nucleus. Its diameter is about 2 micron. There are about 250000 platelets in $1mm^3$ of blood. Platelets are originated from platelet- producing cells found in the bone marrow. They provide blood clotting after an injury or a bleeding. The platelets come together and form clumps in the area of injury.

What are symptoms: Anemia

Symptoms

1-Pale face and eyes,
2-general weakness,
3-inappetence
4- indigestion are seen.

*** Who is responsible**: **nourish the heart muscles with blood:** Cardiac (coronary) arteries

What are the conditions of blood transfusion?

1-The age of person who gives blood mustn't be younger than 17 and mustn't be older than 55..
2-Also woman who gives blood must not be pregnant or nurse the child.
3-The hospitals store the blood in glass tubes or plastic containers which contain heparin. Heparin prevents the blood clotting during the blood storage
4-blood must be stored in special refrigerators. Also each container must be labeled by writing the blood group and donation date.
5-If the blood is stored more than three weeks, this blood cannot be transfused to the patients.

2023 third role

Draw with labelling Pulmonary blood circulation

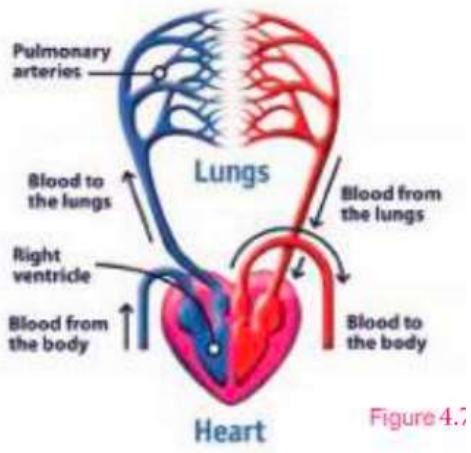


Figure 4.7

Write the causes : Lymph nodes contain a great amount of white blood cells.

They clear the lymph from bacteria and other harmful materials.

What are differences between :

Arteries and veins (function, location and color)

Arteries	Veins	
1-They transport blood from heart to body organs.	They transport blood from body tissues to heart.	function
2- They are located deeply in the body except radial artery located at carpus which is found under the skin	Veins are closer to the body surface.	location
3-The color of this blood is bright red	The color of de- oxygenated blood is bluish-red	colour of blood

Give example :organ becomes enlarged when it is infected with some diseases such as **malaria** and **anaemia**

Fill in blanks:

There are two groups of white blood cells **Granulocytes** and **Agranulocytes.**

2024 first role

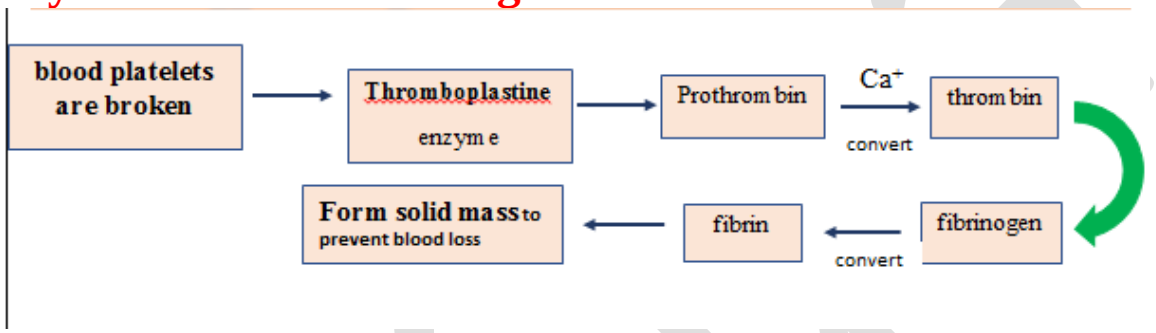
Define : Rh Factor

some people have another protein in their blood called **Rh factor**, or lyzen while some people do not have this factor. If the surfaces of the RBCs contain Rh factor, this blood is called as **Rh (+).** If there is no Rh factor on the surface of the RBCs, this blood is called as **Rh (-)**. 85% of people are Rh (+) and 15% of people is (Rh-).

Named scientific terms

*Found between the left ventricle and aorta, it prevents the back flow of blood into left ventricle. aortic valves

Traked by arrows blood clotting.



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Arteries and veins (function, location and color)

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3-The color of this blood is bright red	The color of de- oxygenated blood is bluish-red	colour of blood

What are the symptoms : Anemia

Symptoms

1-Pale face and eyes,
2-general weakness,
3-inappetence
4- indigestion are seen.

Fill in blanks:

Granulocytes formed in **bone narrow** , while A granulocytes formed in **Lymphatic nodes**.

Which is responsible :

Collect of the oxygenated blood from lungs and transport it into left atrium.

Pulmonary veins

2024 Second role

Define: Plasma

It is a clear yellow liquid, which makes up 55% of the total volume of blood. It consists of 90% water and 10% dissolved materials such as **absorbed nutrients, salts, antibodies, hormones and some waste materials, other blood contents** swim in the blood plasma.

Named the scientific term

A group of small veins collect the de- Oxygenated blood from the heart muscles. These small veins are connected with each other and form a vein which ends at right atrium **Cardiac (coronary) veins**

Which is responsible : enlargement in spleen

when it is infected with some diseases such as **malaria** and **anaemia**

Write the loaction: Heart

found in the chest cavity between the lungs, slightly to the left of center.

Write the cause : The walls of blood capillaries are very thin

They walls are very thin and they have no muscles Also their walls are cover from single layered epithelial cells. This help the material exchange between blood and body cells and white blood cells can move through the walls of capillaries easily.

Write is the function: Blood platelets

They provide blood clotting after an injury or a bleeding. The platelets come together and form clumps in the area of injury.

2024 Third role

Define : Blood pressure

Named the scientific term

They are microscopic vessels between the ends of arteries and beginning of veins.

Capillaries

Write the location: Spleen located beneath the stomach,

Write the cause : Blood clotting does not occur in blood vessels.

Because heparin enzyme which prevents the blood clotting in blood vessels

What the differences between (Red and White blood cells)

Erythrocytes	Leucocytes
1- disc shaped cells and thinner in center.	inconstant (amoeboid) shaped.
2-Red blood cells	They are colorless
3-lose their nuclei after a short time of its formation. So The life period of each red blood cell is about 120days	They have nuclei.
4-Its diameter is about 8 micron	Their diameter is about (6-15) micron.
5-There are about 5.2 million red cells in 1 mm^3 of the male blood and there are about 5 million red blood cells in 1mm^3 of female blood.	There are about 6000 cells in 1mm^3 of the female blood and there are about 8000 cells in 1mm^3 of the male blood.
6-They transport O_2 from lungs to body tissue and CO_2 from body tissues to lungs.	*They defense body by attacking invading microorganisms or by producing antibodies. *They act as scavengers and collect the last parts of dead cells and microorganisms found between the tissue cells.
7- They are formed in the spleen and liver in children before birth while they are formed in the bone marrow after birth.	White blood cells are formed both in bone marrow and lymph nodes
8-Lack of red blood cells or hemoglobin in the blood causes anaemia	The number of white blood cells increases in cases of inflammation, infection with some microbes like bacteria and blood cancer like leukemia.
9-The red blood cells contain red pigment called hemoglobin that carries O_2 and CO_2 in the ody	They not have hemoglobin

2025 first role

What are the scientific concepts of of the following?

Small arteries branch from the aorta to nourish the heart muscles.

Cardiac (coronary arteries)

Which is responsible of the following?

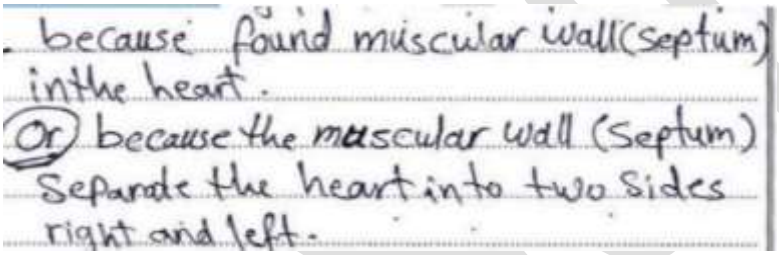
Anaemia

*Deficiency of the iron in the blood causes the anaemia;

* also the deficiency of vitamin B12 causes the anaemia. These deficiencies reduce the formation of the hemoglobin.

*Different parasites such as the Englostoma worms and malaria cause the anaemia. *In addition, chronic bleeding causes the anaemia.

Explain of the scientific facts



1-The oxygenated blood does not mix with de-oxygenated blood in heart.

2-The necessity of making a medical examination before marriage.

If the blood group of mother is Rh (-) while father's is Rh (+), the Rh (+) fetus will be in danger. Because the mother's body can produce antibodies against the antigens of baby.

Write the function or importance:

Lymph nodes

They clear the lymph from bacteria and other harmful materials

الانتباه لهذه المقارنة وردت في منهج عربي

Blood	Lymph
1- It is a red liquid composed of red blood cells, white blood cells, platelets, and plasma.	A fluid that filters through capillaries and consists of plasma and some white blood cells.
2- A fluid containing different components, each with a function. Red blood cells perform a respiratory function, white blood cells are defensive, and platelets contribute to blood clotting.	It is a vital fluid that surrounds body cells and facilitates exchange with their surroundings.
3- It travels through blood vessels (arteries, veins, and capillaries).	The flowing of lymph is one direction in the lymphatic vessels. there are valves in lymphatic vessels which provide the flowing of lymph in one direction.