



Enzymes

- **Amylase** – Breaks down carbohydrate to starch
- **Lipase** – Breaks down lipids to glycerol and fatty acids
- **Proteases** – Break down protein to amino acids
- **Bile** – Made in the liver. Emulsifies fats to provide larger surface area for enzyme action

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Enzyme action

Active site – Where substrate binds.

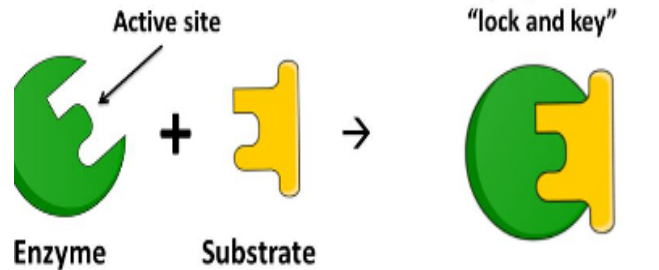
Complimentary shape

When denatured bonds holding active site break – **changes shape**

Substrate can longer bind

Substrate can longer bind

(Lock and key model)



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Food tests – RP

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- **Test for sugars** – Benedict's solution – **Blue** → **orange/red**
- **Test for protein** – Biuret – **Blue** → **purple**
- **Test for starch** – Iodine – **Yellow** → **blue/black**

Required practical – Effect of pH on amylase



Step 1) Place 2 drops of iodine in each dimple within the spotting tile.

Step 2) Select a starch solution to test, and add three drops of amylase to the starch solution. Whilst doing this, start a stop watch.

Step 3) Using a new pipette, collect one drop of starch and amylase solution every 30 seconds and place it in one of the dripping trays.

Step 4) Does the solution turn black or not? If the iodine turns black then amylase hasn't completely broken up the starch, if the iodine stays the same colour then the amylase has completed its reaction.

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Health issues – risk factors

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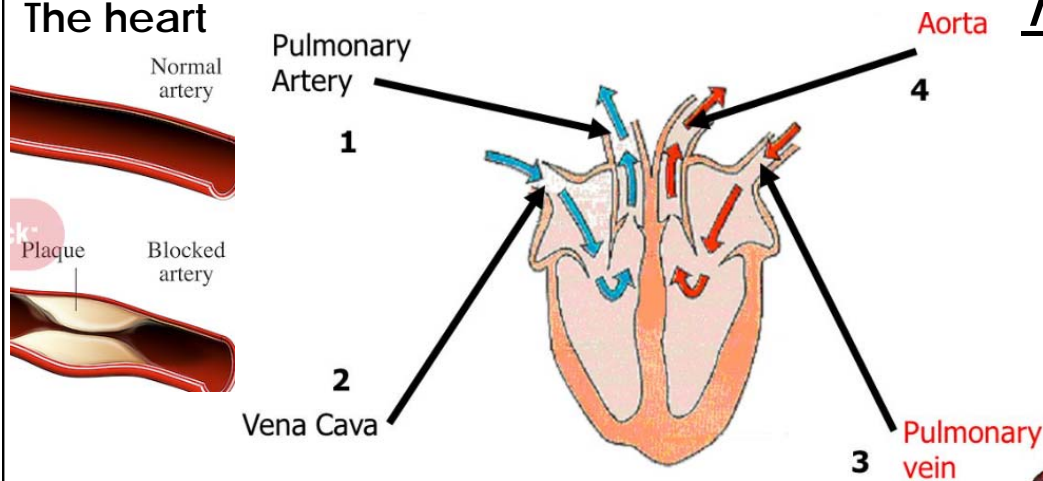
- Diet
- Smoking
- Lack of exercise
- Obesity
- Alcohol
- Carcinogens – cause cancer
- **Cancer** – changes in cells that cause uncontrollable growth and division

Coronary Heart Disease

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- Build of fatty material in artery leads to **narrowing**
- **Reduces blood flow** to heart
- **Lack of oxygen** for heart muscles to respire
- **Treatment** –
- **Statins** – lower cholesterol
- **Stents** – keep artery open

The heart



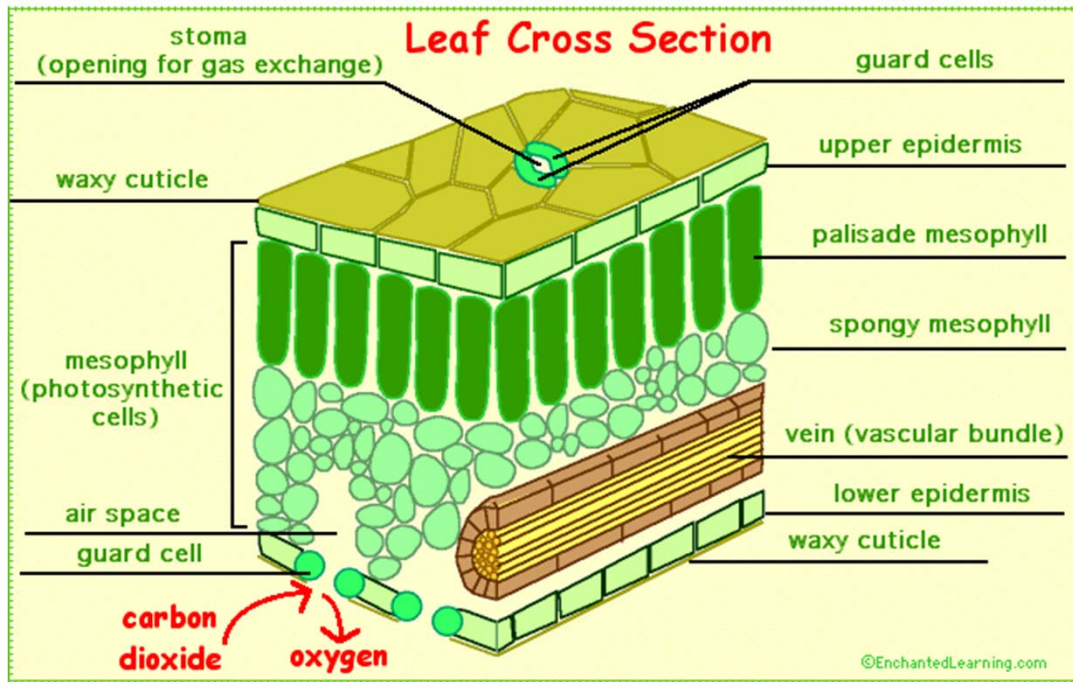
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Blood vessel	Artery	Vein	Capillary
Direction of blood flow	Away from heart	To the heart	
Lumen size	Small lumen	Large lumen	Very small
Muscle thickness	Thick layer of muscle – high pressure	Thin layer of muscle – low pressure	No muscle layer
Outer wall	Thick outer wall	Thin outer wall	Single layer of cells

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Plant tissues



- **Xylem** – transports water and minerals up the plant stem – strengthened by lignin
- **Phloem** – transports sugars (sucrose) produced by photosynthesis around the plant for growth
- **Meristem tissue** – Found at root and shoot tips for growth

Transpiration

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- Water diffuses out of the leaf via the stomata
- Water is drawn from the xylem to replace this water, this is the **Transpiration stream**
- Xylem are hollow tubes strengthened by lignin
- Rate decreased by humidity
- Rate increased by temperature, air movement and light intensity

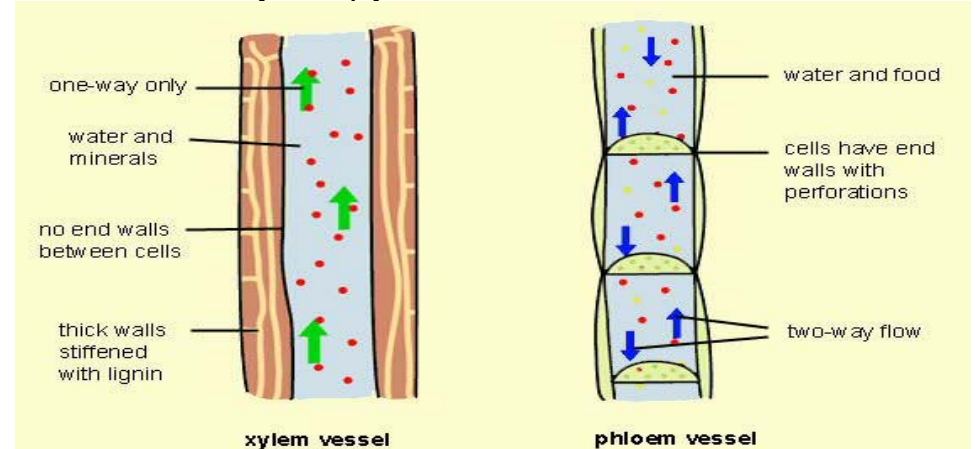
Translocation

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- Glucose produced from photosynthesis is **converted to sucrose**
- Transported in phloem vessels
- **Transported to leaves and roots for growth**
- Sucrose moves through elongated cells through holes in the end walls

Structure of xylem, phloem and stomata

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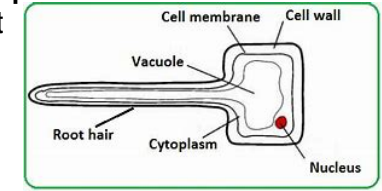
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- **Epidermal tissue** – Waxy cuticle – prevents water loss
- **Palisade mesophyll** – Adapted to absorb light – lots of chloroplasts containing chlorophyll, cells packed tightly together
- **Spongy mesophyll** – Cells packed loosely for efficient gas exchange, cells covered in thin layer of water for gases to dissolve in and they move into and out of cells

Root hair cells

2

- Large surface area - absorb more water via osmosis
- Thin cell wall – short diffusion pathway
- No chloroplasts
- Mineral uptake via active transport



SA:Vol ratio

3

- Larger organisms have a smaller SA:Vol ratio
- Requires a transportation system

