

OCR (B) Biology A-level

2.2.3 - Gas exchange in mammals and plants

Flashcards

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Using examples from the respiratory system, discuss the relationship between cells, tissues, and organs.



Using examples from the respiratory system, discuss the relationship between cells, tissues, and organs.

- Cells make up tissues, which in turn make up organs.
- Epithelial cells of the alveoli make up ciliated epithelial tissue.
- Smooth muscle and cartilage also make up the whole organ (lungs).



Explain the process of inspiration and the changes that occur throughout the thorax.



Explain the process of inspiration and the changes that occur throughout the thorax.

- External intercostal muscles contract (while internal relax), pulling the ribs up and out.
- Diaphragm contracts and flattens.
- Volume of the thorax increases.
- Air pressure outside the lungs is therefore higher than the air pressure inside, so air moves in to rebalance.



Explain the process of expiration and the changes that occur throughout the thorax.



Explain the process of expiration and the changes that occur throughout the thorax.

- External intercostal muscles relax (while internal contract), bringing the ribs down and in.
- Diaphragm relaxes and domes upwards.
- Volume of the thorax decreases.
- Air pressure inside the lungs is therefore higher than the air pressure outside, so air moves out to rebalance.



Describe the trachea and its function in the mammalian gaseous exchange system.



Describe the trachea and its function in the mammalian gaseous exchange system.

- Wide tube supported by C-shaped cartilage to keep the air passage open during pressure changes.
- Lined by ciliated epithelial cells which move mucus, (produced by goblet cells) up to the back of the throat to be swallowed, preventing lung infections.
- Carries air to the bronchi.



Describe the bronchi and their function in the mammalian gaseous exchange system.



Describe the bronchi and their function in the mammalian gaseous exchange system.

- Supported by rings of cartilage and lined by ciliated epithelial and goblet cells.
- Narrower than the trachea.
- Allow passage of air into the bronchioles.



Describe the bronchioles and their function in the mammalian gaseous exchange system.



Describe the bronchioles and their function in the mammalian gaseous exchange system.

- Narrower than the bronchi.
- No cartilage.
- Contain elastic fibres and smooth muscle which allows constriction to restrict air flow (protective mechanism)
- Allow passage of air into the alveoli.



Describe the alveoli and their function in the mammalian gaseous exchange system.



Describe the alveoli and their function in the mammalian gaseous exchange system.

- Mini air sacs, lined with epithelial cells
- Site of gaseous exchange
- Walls one cell thick
- Good blood supply to maintain a concentration gradient
- 300 million in each lung



Name and define parameters that affect pulmonary ventilation.



Name and define parameters that affect pulmonary ventilation.

- **Tidal volume** = volume of air moved in and out of the lungs in a resting breath
- **Breathing rate** = number of breaths per minute.
- **Vital capacity** = greatest volume of air that can be moved into and out of the lungs in one breath
- **Residual volume** = volume of air remaining in the lungs after exhaling.
- **PEFR**= maximum rate of forced exhalation.
- **FEV1**= volume of air that can be forcefully exhaled in the first second of exhalation.



What treatment is given to a person in respiratory arrest?



What treatment is given to a person in respiratory arrest?

- Expired air resuscitation. This involves blowing air into the lungs of the patient (known as mouth-to-mouth resuscitation).
- Alternatively, there are devices that can perform this technique.



Describe the process of gaseous exchange in plants.



Describe the process of gaseous exchange in plants.

- Air spaces in the mesophyll layer allow gases to diffuse throughout the leaf.
- Stomata in the leaf and lenticels in the stem allow gaseous exchange to take place.



How is the opening of the stomata regulated?



How is the opening of the stomata regulated?

Presence of potassium ions in the surrounding guard cells reduces the water potential. Water moves into the guard cells by osmosis and they become turgid, opening the stomata.

