What is Gas Exchange in the Alveoli?

Worksheet

Gas exchange in the alveoli is diffusion of oxygen into the blood and carbon dioxide out of the blood, driven by differences in gas concentration across the thin alveolar-capillary membrane.

Questions

1. Where does gas exchange happen?

A) Trachea
B) Alveoli
C) Larynx
D) Bronchi

2. Oxygen moves from alveoli to blood because

A) blood pressure pumps it
B) of diffusion from high to low concentration
C) of active transport using energy
D) the heart pulls it in

3. What surrounds each alveolus to allow gas exchange?

A) Muscle fibers
B) Capillaries
C) Nerve cells
D) Bone

4. Why is a large alveolar surface area important?

A) It stores more air
B) It increases area for faster diffusion
C) It makes lungs heavier
D) It slows down breathing

5. The air in the alveoli has about 104 mmHg of oxygen pressure, while blood arriving has about 40 mmHg. Which way does oxygen diffuse?

6. Blood arriving at the alveoli carries CO_2 at about 45 mmHg, while alveolar air has about 40 mmHg CO_2. Which way does CO_2 diffuse?

7. An adult has about 300 million alveoli with a total surface area of roughly 70 m. Why does this matter for gas exchange?

8. Define: Where does gas exchange occur in the lungs?

9. Define: Which way does oxygen move during gas exchange?

10. Define: Which way does carbon dioxide move?

Answer Key

1. B) Alveoli - The alveoli have thin walls surrounded by capillaries, ideal for diffusion.

2. B) of diffusion from high to low concentration - Gas exchange is passive diffusion driven by concentration gradients, not active transport.

3. B) Capillaries - A dense capillary network surrounds each alveolus to carry blood for gas exchange.

4. B) It increases area for faster diffusion - More surface area allows more gas molecules to diffuse simultaneously.

5. Gases diffuse from high to low concentration/pressure 104 mmHg (alveoli) > 40 mmHg (blood) O2 diffuses INTO the blood

6. 45 mmHg (blood) > 40 mmHg (alveoli) CO2 diffuses INTO the alveoli to be exhaled

7. Larger surface area = more room for diffusion to happen at once 70 m is roughly the size of a tennis court - packed into the chest for fast, efficient gas exchange

8. In the alveoli, tiny air sacs surrounded by capillaries.

9. From the alveoli (high O2) into the blood (low O2) by diffusion.

10. From the blood (high CO2) into the alveoli (low CO2) to be exhaled.