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GCSE Biology – The Human Gas Exchange - Transcript

The human gas exchange system trades the oxygen we breathe in, for the carbon dioxide we produce through respiration. Let's see how it works.

Air enters the body through the mouth and nose. It passes down the trachea which contains rings of cartilage to keep it open. The trachea splits into two bronchi, one going to each of our lungs.

These are protected by our ribcage. Inside the lungs, each bronchus divides into smaller and smaller tubes called bronchioles, which finally end in tiny microscopic air sacs called alveoli, this is where gas exchange happens.

The alveoli are surrounded by a network of blood capillaries. Oxygen from the air inside the alveoli diffuses into the blood, while carbon dioxide diffuses out of the blood and into the

alveoli. Ready to be breathed out.

This diffusion happens because there is a higher concentration of oxygen in the air inside the alveoli than in the blood, and a higher concentration of carbon dioxide in the blood than in the alveoli.

Alveoli have some specific adaptations to maximise diffusion. Firstly, there are millions of them. This provides a large surface area for diffusion. Their moist lining helps gases dissolve for diffusion.

There's also a short diffusion distance as their thin lining is only one cell thick, and a good blood supply which maintains the concentration gradients to maximise diffusion. When we inhale, the diaphragm contracts and flattens while the ribcage moves up and out, increasing chest volume.

This draws oxygen-rich air into the alveoli. When we exhale, the diaphragm relaxes and moves up, the ribs move down and in and the chest volume decreases.

This forces the air back out, now containing 100x more carbon dioxide. So that’s the human gas exchange system. It is a breath of fresh air!