

## How do lungs work? - Emma Bryce

(0:06 - 0:19)

Many of us have hundreds of things on our minds at any moment, often struggling to keep track of everything we need to do. But fortunately, there's one important thing we don't have to worry about remembering. Breathing.

(0:19 - 0:39)

When you breathe, you transport oxygen to the body's cells to keep them working, and clear your system of the carbon dioxide that this work generates. Breathing, in other words, keeps the body alive. So how do we accomplish this crucial and complex task without even thinking about it? The answer lies in our body's respiratory system.

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Like any machinery, it consists of specialised components and requires a trigger to start functioning. Here, the components are the structures and tissues making up the lungs, as well as the various other respiratory organs connected to them. And to get this machine moving, we need the autonomic nervous system, our brain's unconscious control centre for the vital functions.

(1:02 - 1:31)

As the body prepares to take in oxygen-rich air, this system sends a signal to the muscles around your lungs, flattening the diaphragm and contracting the intercostal muscles between your ribs to create more space for the lungs to expand. Air then whooshes into your nose and mouth, through your trachea, and into the bronchi that split at the trachea's base, with one entering each lung. Like tree branches, these small tubes divide into thousands of tinier passages, called bronchioles.

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It's tempting to think of the lungs as huge balloons, but instead of being hollow, they're actually spongy inside, with the bronchioles running throughout the parenchyma tissue. At the end of each bronchiole is a little air sac called an alveolus, wrapped in capillaries full of red blood cells containing special proteins called haemoglobin. The air you've breathed in fills these sacs, causing the lungs to inflate.

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Here is where the vital exchange occurs. At this point, the capillaries are packed with carbon dioxide, and the air sacs are full of oxygen. But due to the basic process of diffusion, the molecules of each gas want to move to a place where there is a lower concentration of their

kind.

(2:14 - 2:31)

So as oxygen crosses over to the capillaries, the haemoglobin grabs it up while the carbon dioxide is unloaded into the lungs. The oxygen-rich haemoglobin is then transported throughout the body via the bloodstream. But what do our lungs do with all that carbon dioxide? Exhale it, of course.

(2:31 - 2:51)

The autonomic nervous system kicks in again, causing the diaphragm to ball up and the intercostal muscles to relax, making the chest cavity smaller and forcing the lungs to compress. The carbon dioxide-rich air is expelled, and the cycle begins again. So that's how these spongy organs keep our bodies efficiently supplied with air.

(2:51 - 3:05)

Lungs inhale and exhale between 15 and 25 times a minute, which amounts to an incredible 10,000 litres of air each day. That's a lot of work, but don't sweat it. Your lungs and your autonomic nervous system have got it covered.