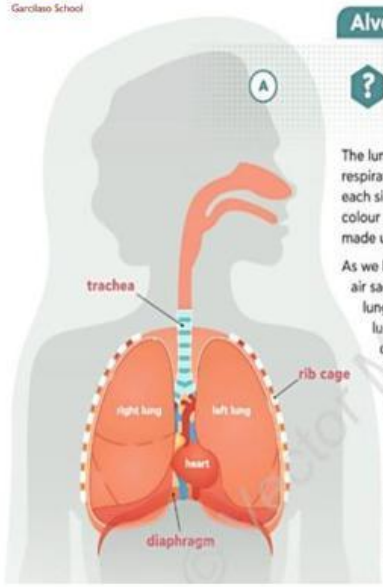
Garcilaso School

GAS EXCHANGE IN THE LUNGS

Alveoli in our lungs

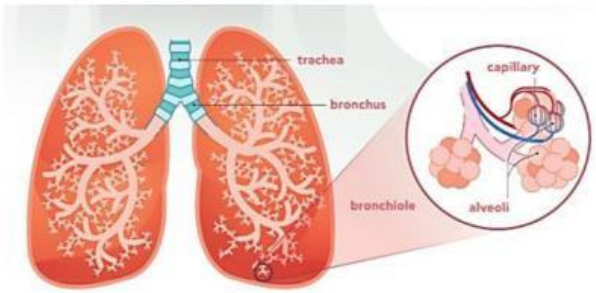


What organs does the air pass through as it moves into our body?

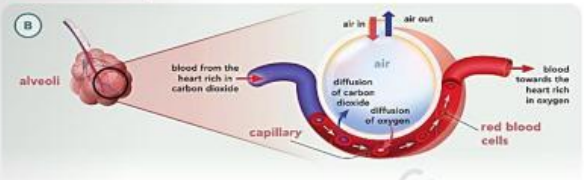
The lungs are the main organs of the respiratory system. We have two lungs, one on each side of our chest. The lungs have a pink colour and look like a sponge because they are made up of millions of alveoli filled with air.

As we have already learnt, the alveoli are tiny air sacs at the end of each bronchiole in the lungs. There are so many alveoli in our lungs that if we stretch them out, they will cover the surface area of a tennis court. Each alveolus is surrounded by very small blood vessels called capillaries. Both the alveoli and the capillaries have thin walls, made of one layer of cells, to allow gas exchange.

How do the alveoli change the surface area of the lungs?



Gas exchange



The air in the atmosphere is a mixture of different gases, most of which is nitrogen, 21% is oxygen and less than 1% is carbon dioxide. As you breathe in, air moves from the atmosphere into your lungs and fills up the alveoli. The concentration of oxygen is greater in the alveoli than in the blood in the capillaries coming from the heart all the way through the organs of your body. So, the oxygen diffuses into the blood through the thin walls of the alveoli and the capillaries. The blood that is now rich in oxygen moves towards the heart, which sends it out to all the cells in the body. At the same time, the concentration of carbon dioxide is greater in the blood in the capillaries coming from the heart than in the alveoli. So, the carbon dioxide diffuses into the air in the alveoli. The air in the alveoli is now rich in carbon dioxide and is exhaled.

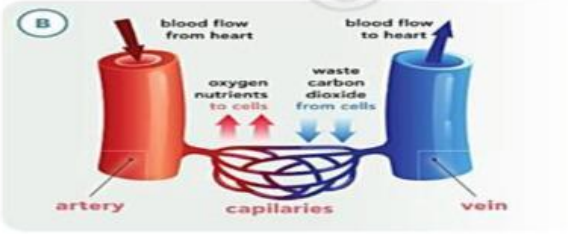
4.4 Blood

Circulatory system

The circulatory system is made of the heart, the blood vessels and the blood. The heart is a muscle that contracts then relaxes all the time and we cannot control it. The heart pumps blood throughout the body. The movement of the blood around the body is called circulation. The blood carries substances from food and oxygen from the air to different parts of the body and removes carbon dioxide and other waste products from the different parts of the body.

Blood vessels

The blood flows around the body in blood vessels, which are the arteries and the veins. Arteries carry blood away from the heart to other parts of the body, and veins carry blood from the different parts of the body back to the heart. The arteries divide into smaller and smaller blood vessels, capillaries, which spread out in every organ, so that all the cells have blood supply. After passing through an organ, the capillaries form larger and larger blood vessels until they meet veins.



The components of blood

Blood is a heterogeneous mixture of a liquid called plasma and solid parts that are suspended in the liquid. The solid parts are blood cells, which are red blood cells, white blood cells and platelets.

Plasma

Plasma is a pale-yellow liquid component of blood that carries red and white blood cells, platelets and other substances around the body, like glucose, proteins and carbon dioxide. Plasma is made up mostly of water.

Red blood cells

The red blood cells are the most common blood cells in the blood. They contain a protein called haemoglobin, that gives blood its red colour. Red blood cells are adapted to carry as much oxygen as possible. They do not have a nucleus so that there is more space to carry oxygen.

Red blood cells look like a disc which is thinner in the middle and thicker around the edges to increase their surface area so that oxygen can enter and leave the cell faster. Red blood cells are also small and flexible to pass through narrow capillaries.

White blood cells

The white blood cells are much less common than red blood cells. They are usually larger than red blood cells, and unlike red blood cells they have a nucleus and they do not contain haemoglobin, so they are almost colourless.

White blood cells defend the body against bacteria, viruses and other pathogens.

Some types of white blood cells surround and cover the pathogens until they destroy them mostly by using chemicals, while others produce antibodies which attach to the pathogens. The antibodies can either kill the pathogens or stick many of them together so that other white blood cells enclose them more easily.

Platelets

Platelets are very small pieces of cells. They form clots together with red blood cells on a cut area. The clot stops more blood from leaving the body and also stops microorganisms from entering the body.