جامعة الفرات الاوسط التقنية /المعهد التقني سماوة

قسم تقنيات صحة مجتمع

المحاضرة الثامنة

اسم المادة / وظائف اعضاء 1.

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Respiratory system

The primary function of the respiratory system is the supply of oxygen to the blood so this in turn delivers oxygen to all parts of the body. The respiratory system does this while breathing is taking place. During the process of breathing we inhale oxygen and exhale carbon dioxide. This exchange of gases takes place at the alveoli. The average adult's lungs contain about 600 million of these spongy, air-filled sacs that are surrounded by capillaries. The inhaled oxygen passes into the alveoli and then diffuses through the capillaries into the arterial blood. Meanwhile, the waste-rich blood from the veins releases its carbon dioxide into the alveoli. The carbon dioxide follows the same path out of the lungs when you exhale.

1-9 the principle functions of the respiratory system are:

- Ventilate the lungs
- Extract oxygen from the air and transfer it to the bloodstream
- Excrete carbon dioxide and water vapour
- Maintain the acid base of the blood

inspired Air

This contains approx:

- 79% nitrogen
- 20% O_2
- 0.04% CO_2
- Water vapour/Trace Gases

Expired Air

This contains approx:

- 79% nitrogen
- 16% O_2
- 4% CO_2
- Water vapour/Trace Gases

2-9 Structure of the respiratory System

Respiration takes place with the aid of the mouth, nose, trachea, lungs, diaphragm and intercostal muscles . Oxygen enters the respiratory system through the mouth and the nose. The oxygen then passes through the larynx and the trachea. In the chest cavity, the trachea splits into two bronchi. Each bronchus then divides again forming the bronchial tubes. The bronchial tubes lead directly into the lungs where they divide into many smaller tubes which connect to tiny sacs called alveoli.

1- The lungs

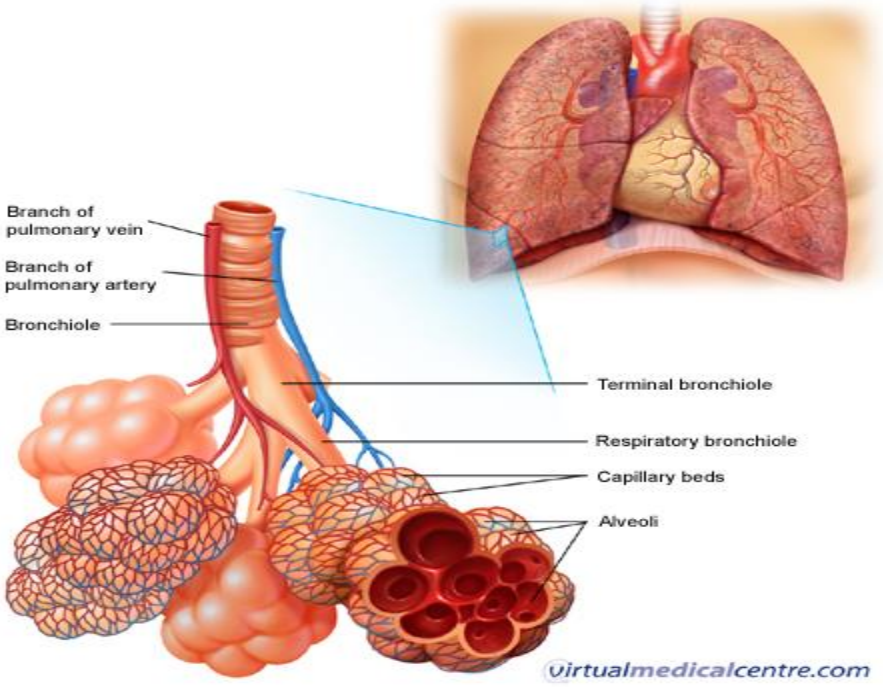
Structure

The lungs are paired, cone-shaped organs which take up most of the space in our chests, along with the heart. Their role is to take oxygen into the body, which we need for our cells to live and function properly, and to help us get rid of carbon dioxide, which is a waste product. We each have two lungs, a left lung and a right lung. These are divided up into 'lobes', or big sections of tissue separated by 'fissures' or dividers. The right lung has three lobes but the left lung has only two, because the heart takes up some of the space in the left side of our chest. The lungs can also be divided up into even smaller portions, called 'bronchopulmonary segments'.

These are pyramidal-shaped areas which are also separated from each other by membranes. There are about 10 of them in each lung. Each segment receives its own blood supply and air supply.

3-9 How they work

Air enters your lungs through a system of pipes called the bronchi. These pipes start from the bottom of the trachea as the left and right bronchi and branch many times throughout the lungs, until they eventually form little thin-walled air sacs or bubbles, known as the alveoli. The alveoli are where the important work of gas exchange takes place between the air and your blood. Covering each alveolus is a whole network of little blood vessel called capillaries, which are very small branches of the pulmonary arteries. It is important that the air in the alveoli and the blood in the capillaries are very close together, so that oxygen and carbon dioxide can move (or diffuse) between them. So, when you breathe in, air comes down the trachea and through the bronchi into the alveoli. This fresh air has lots of oxygen in it, and some of this oxygen will travel across the walls of the alveoli into your bloodstream. Travelling in the opposite direction is carbon dioxide, which crosses from the blood in the capillaries into the air in the alveoli and is then breathed out. In this way, you bring in to your body the oxygen that you need to live, and get rid of the waste product carbon dioxide.



4-9 Blood Supply

The lungs are very vascular organs, meaning they receive a very large blood supply. This is because the pulmonary arteries, which supply the lungs, come directly from the right side of your heart. They carry blood which is low in oxygen and high in carbon dioxide into your lungs so that the carbon dioxide can be blown off, and more oxygen can be absorbed into the bloodstream. The newly oxygen-rich blood then travels back through the paired pulmonary veins into the left side of your heart. From there, it is pumped all around your body to supply oxygen to cells and organs.

5-9 Functions of the lungs

In addition to their function in respiration, the lungs also:

- alter the pH of blood by facilitating alterations in the partial pressure of carbon dioxide
- filter out small blood clots formed in veins
- filter out gas micro-bubbles occurring in the venous blood stream such as those created after scuba diving during decompression. influence the concentration of some biologic substances and drugs used in medicine in blood
- convert angiotensin I to angiotensin II by the action of angiotensin-converting enzyme
- may serve as a layer of soft, shock-absorbent protection for the heart, which the lungs flank and nearly enclose.
- Media: Immunoglobulin-A is secreted in the bronchial secretion and protects against respiratory infections.
- maintain sterility by producing mucus containing antimicrobial compounds.[1] Mucus contains glycoproteins, eg mucins, lactoferrin lysozyme, lactoperoxidase. We find also on the epithelium Dual oxidase proteins generating hydrogen peroxidde, useful for hypothiocyanite endogenous antimicrobial synthesis. Function not in place in cystic fibrosis patient lungs.
- Ciliary escalator action is an important defence system against air-borne infection. The dust particles and bacteria in the inhaled air are caught in the mucous layer present at the mucosal surface of respiratory passages and are moved up towards pharynx by the rhythmic upward beating action of the cilia

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