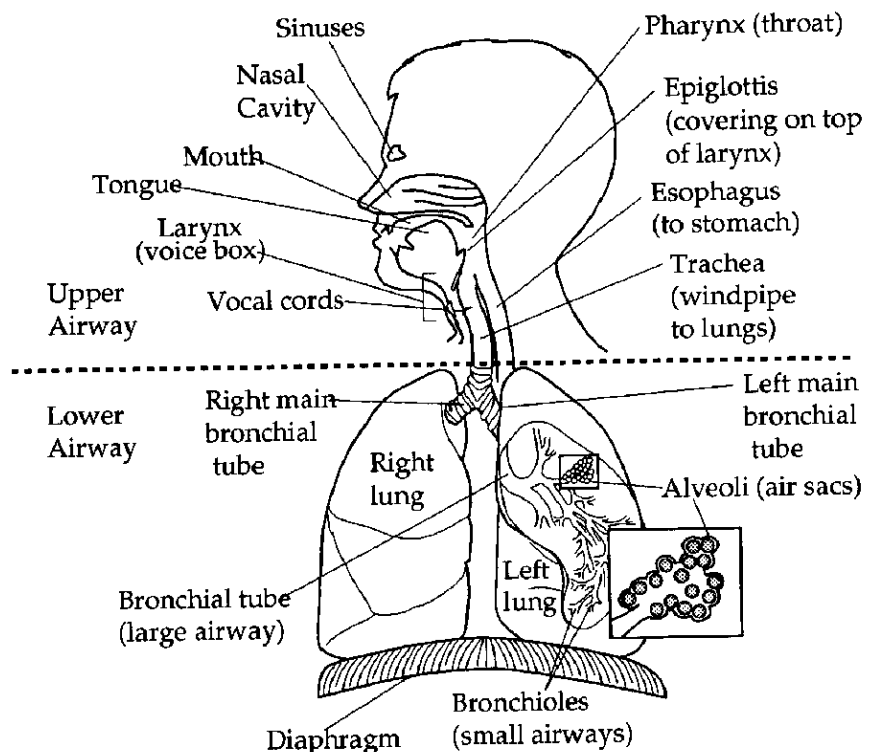


Understanding the Respiratory System

Structure

The **respiratory system** is separated into two major parts: the **upper airway** and the lower airway, or **bronchial tree**. The upper airway consists of the **nasal cavity, sinuses, oral cavity** (mouth) and **pharynx** (throat). The **larynx** (voice box) is the connection between the upper airway and lower airway.

The entrance to the bronchial tree is the **trachea**. It is a four inch windpipe that divides at its lower end into two main **bronchial tubes**. The bronchial tubes are the airways that spread through the lungs like branches of a tree. The airways branch into smaller and smaller airways. There are smooth muscles around these airways that cause them to expand when you breathe in and relax when you breathe out.



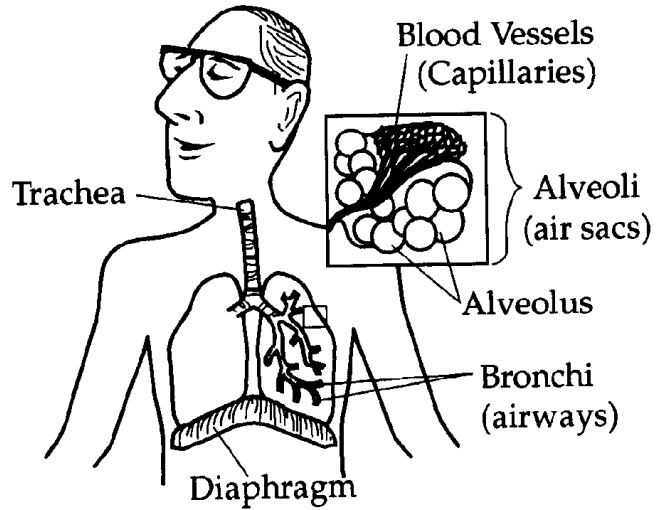
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The **right main bronchial tube** is the airway passage to the right lung. The right lung has three main lobes. The **left main bronchial tube** is the passage to the left lung. The left lung has two main lobes. The lobes of the lung are sponge-like in texture.

At the end of these airway passages in the lungs are the **alveoli**. Alveoli are bunches of air sacs that look like clusters of grapes. Each **alveolus**, or sac, is surrounded by small blood vessels, called **capillaries**. The walls of the alveoli are very elastic, like balloons. They have the ability to stretch and contract as air enters and leaves.

The bronchial tree is in the chest cavity. The ribs and a muscle called the **diaphragm** enclose your chest cavity. There are special linings that cover the lungs called **pleura**.



Function of the Respiratory system

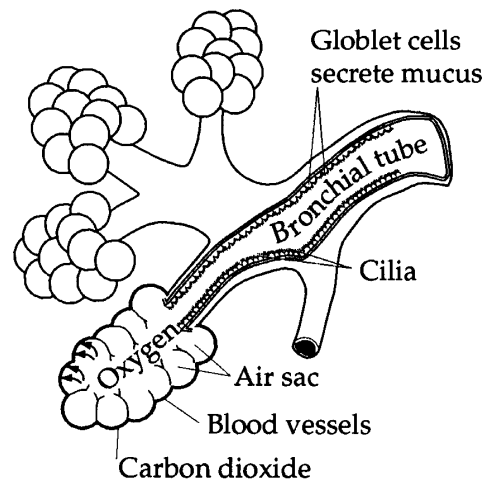
Upper Airway

When air is warmed and moistened as it enters the nose and dust particles are filtered out. This is why the nose is the body's natural filtering system. It is good to breathe in through your nose for these reasons. The upper airway works to move air to the lower airway.

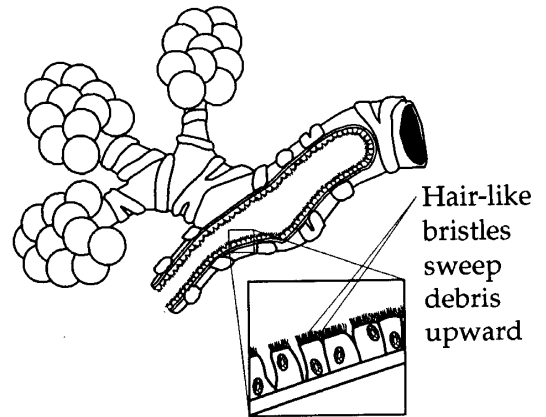
Lower Airway

Special cells, called **goblet cells**, line the airways and lungs and secrete sticky mucus to trap dust or other particles. Other cells, called **cilia**, have hair-like bristles that sweep debris and mucus upward that is then swallowed or coughed out. This consistent sweeping motion filters out debris so when oxygen finally reaches the tiny alveoli, it is clean.

All body cells need oxygen. The purpose of the lungs is to get oxygen into the body and get carbon dioxide, a waste gas, out.

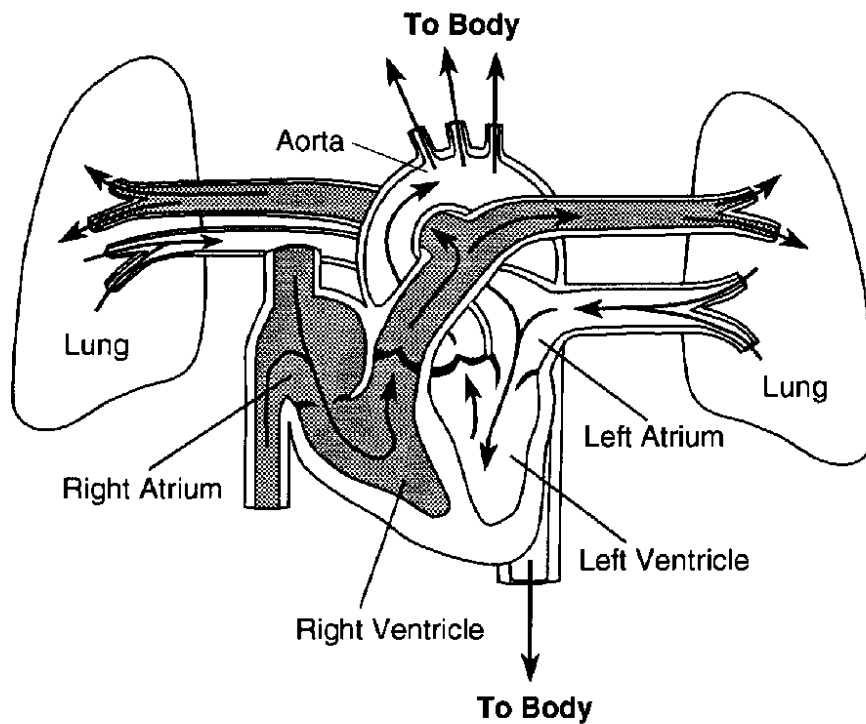


A network of blood vessels surround each air sac like a hair net laid over a balloon. This is where the exchange of gases takes place between the outside air and the bloodstream. In these capillaries the blood gives up carbon dioxide and receives oxygen. The oxygen is then carried to all body parts. The carbon dioxide is breathed out.



The Heart and the Lungs: the Partnership

The heart and the lungs work together. Blood from the body returns to the right side of the heart. It then flows from the right side of the heart to the lungs. In the lungs, the blood enters the respiratory system through the capillaries that surround the alveoli. At this time the blood picks up oxygen to take back to the heart, in exchange for carbon dioxide. The carbon dioxide is exhaled out of the lungs. The oxygen-rich blood returns from the lungs to the left side of the heart and is then pumped to the rest of the body.



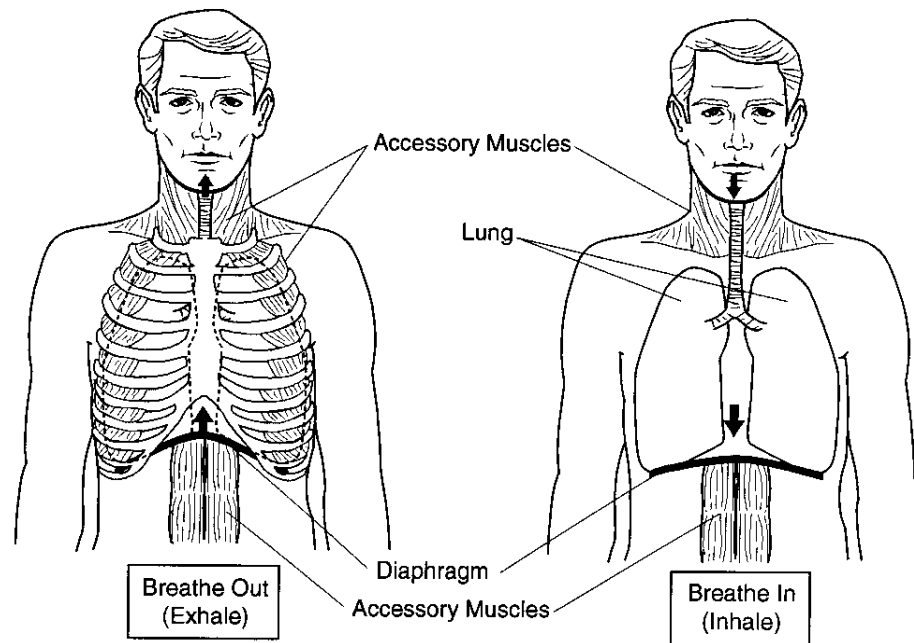
Control of Breathing

The process of moving air into and out of the lungs is called ventilation. Since the lungs are not made of muscle tissue, the muscles surrounding them expand and squeeze to pump air in and out. The diaphragm, a dome-shaped muscle located below the lungs, is the major muscle of respiration. Other muscles that surround the lungs and help with breathing are the **accessory muscles**. They are in the abdomen, neck, shoulders and spaces between the ribs.

When the diaphragm is weak or not used properly, accessory muscles do extra work to help pump air in and out of the lungs.

When you inhale, your diaphragm contracts and moves down toward your abdomen drawing air into your lungs. As your diaphragm relaxes, it moves upward, pushing air out of your lungs.

If the muscles surrounding your lungs are weak, breathing will be more difficult. Strengthening these breathing muscles makes breathing easier.



- **Talk to your doctor or others on your health care team if you have questions. You may request more written information from the Library for Health Information at (614) 293-3707 or email: health-info@osu.edu.**