



## Physiology of Asthma

Basic facts about the structure of lungs and airway

Asthma is a chronic lung disease that makes breathing difficult. With asthma, it is difficult to get air in and out of your lungs. A brief description of the structure and function of the lungs and air passages may help you understand your disease.

The lungs are two large, soft organs of sponge-like consistency located within the chest. The lungs surround the heart except for just behind the breastbone (sternum). The ribs, attached to the upper backbone (vertebrae) and to the breastbone by cartilage, form a firm but flexible “cage” for the chest contents. The chest cage changes in size and shape during inhalation (breathing in) and exhalation (breathing out).

The lungs and other contents of the chest are separated from the contents of the abdomen by a strong dome-shaped muscle, the diaphragm. The diaphragm moves down when you breathe in and moves up when you breathe out. During normal breathing, the lungs also change shape, expanding as you breathe in and contracting as you breathe out.

The main function of the lungs is to supply adequate oxygen to the blood and to remove carbon dioxide from the blood. The proper exchange of these gases between outside air and the air in the depths of the lungs depends on clear (unobstructed) air passages. Air enters the body through the nose and mouth and travels down the windpipe (trachea) into the smaller airways (bronchi and bronchioles). The smallest airways are microscopic in size and end in clusters of tiny air sacs called alveoli. There are some 300 million of these small balloon-like air sacs in the adult lung. Each is surrounded by a network of very fine blood vessels called capillaries. The walls of these capillaries and those of the air sacs are thin which permits the passage of gases between the airway system and the blood. During inhalation (breathing in) the lungs fill with air containing oxygen which can then enrich the blood. During exhalation (breathing out), carbon dioxide which has been removed from the blood is expelled by the lungs. When excessive mucous or secretions or inflammation of the airways causes swelling and tightening of the smooth muscle around the airways, air flow is restricted and the normal functions of the lung are affected and breathing becomes more difficult.

As mentioned above, the lungs are two organs. One lung is in the right chest cavity and one lung is in the left. The right lung is composed of three lobes: the right upper lobe (RUL), the right middle lobe (RML) and the right lower lobe (RLL). The left lung is made up of only two lobes: the left upper lobe (LUL) and the left lower lobe (LLL). The lobes are divided into smaller divisions called segments.

