

ANATOMICAL AND PHYSIOLOGICAL FEATURES OF THE RESPIRATORY TRACT

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The respiratory system extends from the respiratory zone just outside the nose and mouth through the conducting airways in the head and chest to the alveoli, where respiratory gas exchange occurs between the alveoli and the capillary blood flowing around them. Its primary function is to deliver oxygen (O₂) to the gas exchange region of the lungs, where it can diffuse to and through the alveolar walls to oxygenate the blood passing through the alveolar capillaries as needed during a wide range of work or activities. In addition, the system must: (1) remove carbon dioxide from the alveolar capillaries into the lungs in equal amounts; (2) maintain body temperature and water vapor saturation in the airways of the lungs (to maintain the viability and functionality of surface fluids and cells); (3) maintain sterility (to prevent infections and their negative consequences); and (4) eliminate excess surface fluids and debris, such as

respiratory particles and senescent phagocytic and epithelial cells. It must perform all of these demanding tasks continuously throughout life and do so with high efficiency in terms of performance and energy use. The system can be abused and overwhelmed by serious insults, such as high concentrations of cigarette smoke and industrial dust, or by low concentrations of specific pathogens that attack or destroy its defense mechanisms or cause them to fail. As usual, the ability to overcome or compensate for such insults is evidence of an elegant combination of structure and function. The complex structure and many functions of the human respiratory tract were briefly described by the Task Force of the International Commission on Radiological Protection (ICRP) in 1994, as shown in Figure 1. approximately 0.2 liters. They regulate the inhaled air and distribute it to the approximately 65,000 respiratory tracts, which carry it by convective (multiple) flow to the terminal bronchioles. As the volume of the waves increases, convective flow dominates gas exchange deeper into the respiratory bronchioles. In any case, the distance from the convective front of the respiratory tract to the alveolar surfaces is short enough that effective CO₂-O₂ exchange occurs by molecular diffusion. In contrast, airborne particles with diffusion coefficients smaller than those of gases tend to be suspended in the air of the waves, which can be expelled without settling.

Bronchial asthma is a chronic inflammation of the human respiratory system. The disease can develop in childhood (up to ten years), but with the use of appropriate treatment methods, it is possible to completely recover.

Asthma occurs in four stages: intermittent, i.e. periodic (exacerbations of the disease and asthmatic attacks may occur once or twice a month); mild persistent (exacerbations of the disease and asthmatic attacks occur weekly); moderate persistent (exacerbations of the disease occur daily, and attacks occur several times a night); severe persistent (the disease worsens during the day, attacks occur constantly at night).

The disease occurs when the bronchi narrow due to inflammation, swelling or sputum clots. Asthma can occur for various reasons: hereditary predisposition; allergies (to dust and pollen, animal hair, food and chemicals); unfavorable environment (tobacco smoke, irritating gases); bacterial and viral infections (bronchitis,); medications (anti-inflammatory, antipyretic, analgesic); stress, fear, other emotional experiences; excessive physical activity. Chronic obstructive pulmonary disease is the name for a group of lung diseases that cause difficulty breathing.

These include:

- — damage to the air sacs (alveoli) of the lungs
- chronic bronchitis — long-term inflammation of the airways

COPD is a common condition that mainly affects middle-aged or older people who smoke. Many people don't realize they have it.

Breathing problems gradually get worse over time and can limit your normal activities, but treatment can help keep the condition under control.

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