

I. Respiration

A. Components of the respiratory system

Nasal Cavity: To keep lung tissue healthy, air entering the respiratory system must be filtered, moistened and warmed. Hairs lining the entrance to the nasal cavity start the filtering process by trapping large particles. Incoming air is warmed in the inner nasal cavity and sinuses. These areas produce mucus that moistens the air and catches even more dust particles.

Trachea: Air moves from the pharynx into the trachea, or windpipe.

Pleura: The lungs are sealed in two sacs, pleural membranes, inside the chest cavity.

Lung: No muscles in the lungs directly controls breathing. The force that drives air into the lungs comes from air pressure, the diaphragm and muscles associated with the ribs. Movements of the diaphragm and rib cage change air pressure in the chest cavity during inhalation and exhalation.

Alveoli: Tiny air sacs that are grouped in clusters. A delicate network of capillaries surrounds each alveolus. Each healthy lung contains about 150 million alveoli, which provide an enormous surface area for gas exchange.

Bronchi: Two large tubes in the chest cavity. Each bronchus leads to one lung. Within each lung, the large bronchus divides into smaller bronchi, which leads to even smaller passageways called bronchioles.

Bronchioles: Bronchi and bronchioles are surrounded by smooth muscles controlled by the autonomic nervous system. As muscles contract and relax, they regulate the size of air passageway.

Diaphragm: At the bottom of the chest cavity. A large dome-shaped muscle.

Pharynx: Air moves through the nose to the pharynx at the back of the mouth

Larynx: Contains two highly elastic folds of tissues, the vocal cords. When muscles pull vocal cords together, the air moving between them causes the cords to vibrate and produce sounds

Epiglottis: A flap of tissue that covers the entrance to the trachea, ensuring that the food or liquid goes into the esophagus.

B. Path of airflow in the respiratory system- Air moves through the nose, pharynx, larynx, trachea and bronchi into the lungs

1. **Nose:** Air enters the body
2. **Pharynx, Larynx and Trachea:** From the nose, air moves into the pharynx. Then it passes through the larynx and through the trachea.
3. **Lungs:** From the trachea, air moves into the bronchi. Each bronchus leads to one lung. The bronchi divides into bronchioles which eventually end at alveoli

C. Why materials are swapped between the blood in the capillaries and the air in the alveoli? When air enters alveoli, oxygen dissolves in the moisture on their inner surface and diffuses across thin capillary walls into the blood. Oxygen diffuses in this direction because the oxygen concentration is greater in the air within the alveoli than it is in the blood within the capillaries.

D. Factors that influence the rate of carbon dioxide and oxygen exchange in the lungs

1. **Tobacco:** Three of the most dangerous substances in tobacco are nicotine, carbon monoxide and tar. **Nicotine:** Increases heart rate and blood pressure, is an addictive stimulant. **Carbon**

monoxide: A poisonous gas that block hemoglobin from binding with oxygen, thus interfering with oxygen transport in blood. Tar: Contains at least 60 compounds known to cause cancer.

2. Tobacco smoke also paralyzes cilia in the trachea. Without the cilia, inhaled particles stick to the walls of the respiratory tract or enters the lungs, and smoke laden mucus is trapped along the airways. Irritation from accumulated particles and mucus triggers a smoker's cough to clear the airways.
3. Smoking also causes the lining of the respiratory tract to swell, which reduces airflow to the alveoli.

E/F. Relationship between pressure and airflow/volume inside and outside the body

When you inhale the diaphragm contracts and flattens. Muscles between the ribs also contract, raising the rib cage. Because the chest cavity is tightly sealed, this creates a partial vacuum inside the cavity. Atmospheric pressure does the rest, filling the lungs as air rushes into the breathing passageways. Both the rib cage and diaphragm relax during exhalation. This decreases the volume of the chest cavity and makes air pressure in the chest cavity greater than atmospheric pressure. Air rushes back out of the lungs. When more force than passive exhalation is needed, the extra force is provided by muscles between the ribs and abdominal muscles, which contract vigorously as the diaphragm relaxes.

G.Lung Cancer:Is deadly because by the time it is detected, it usually has spread to other areas of the body.Few people with lung cancer live more than 5 years

Emphysema: Results from long term smoking. Is the loss of elasticity and eventual breakdown of lung tissues. This condition makes breathing difficult. People with emphasis cannot get enough oxygen to the body tissues or rid the body of excess carbon dioxide. No cure, can be treated with medication

Chronic Bronchitis: The bronchi become inflamed and clogged with mucus. People can find simple activities like climbing stairs difficult, Treatments can control it, but not cure

Cystic Fibrosis: Affects the exocrine glands. Causes the production of abnormally thick mucus, leading to the blockage of the pancreatic ducts, intestines and bronchi and often resulting in respiratory infection