Vocabulary

Respiratory Airways - tubes that carry air between the atmosphere and the alveoli.

Conducting zone - top of the trachea to the respiratory bronchioles, provides a low-resistance pathway for airflow.

Respiratory Zone - where the gas exchange occurs.

Total Alveolar Surface - large surface that enables rapid exchange of large quantities of O2 and CO2 by DIFFUSION.

Type I cells - form the walls of the aveoli

Type II cells - secrete a pulmonary surfactant that acts to reduce surface tension of water INSIDE the alveoli.

Surfactant - reduces cohesive forces between water molecules on alveolar surface. This lowers the surface tension -> increases lung compliance and makes it easier to expand lungs.

Surface Tension - tendency of liquid surfaces at rest to shrink into the minimum surface area possible.

Pleural Sacs - pair of thin, fluid-filled, membranes that enclose the lungs. Parietal pleura and Visceral pleura make up the sacs.

Pleural Cavity - space between the pleural sacs, is filled with intrapleural fluid.

Pressure Gradient - Air tends to move from an area of higher pressure to an area of lower pressure

Atmospheric Pressure - pressure exerted by the weight of the gas in the atmosphere on objects on Earth's surface (760 mm Hg at sea level).

Vocabulary (cont)

Intra-alveolar Pressure - pressure within the alveoli

Intrapleural Pressure - pressure within the pleural sac

Boyle's Law - at a constant temperature, the pressure of gas varies INVERSELY with its volume.

Transmural Pressure Gradient = intra-alveolar pressure - intrapleural pressure

Pneumothorax - air enters the pleural cavity, transmural pressure gradient is lost and lungs collapse.

Passive Expiration - ribs, sternum, and diaphragm return to resting position upon relaxation of inspiratory muscles.

Active Expiration - CONTRACTION of abdominal muscles. Diaphragm is pushed upwards. Contraction of internal intercostal muscles flatten the ribs and sternum. REDUCES the size of the thoracic cavity.

Elastin - protein which facilitates the stretching and recoiling of structures.

Pulmonary Ventilation - volume of air breathed in/out per minute.

Alveolar Ventilation - volume of air exchange between the atmosphere and the alveoli per minute.

Gas Transport - process by which O2 and CO2 are transported between the systemic tissues and the lungs

Respiratory Mechanics

During INSPIRATION, Palv < Patm

During EXPIRATION, Palv > Patm

Remember BOYLE'S LAW: pressure and volume are inversely related so as the volume decreases the pressure will increase

Example: Inspiration: 1. the thoracic wall expands 2. the lungs expand 3. Boyle's law: Palv decreases

4 Pressures Important for Ventilation

1. Atmospheric Pressure - serves as a reference point for pressure changes

2. Intra-alveolar Pressure - changes during breathing, is a factor that drives air movement

3. Intrapleural Pressure - helps prevent lung collapse

4. Transmural Pressure Gradient - pushes out on lungs and stretches them to fill the larger thoracic cavity

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