




ST. CATHERINE
UNIVERSITY

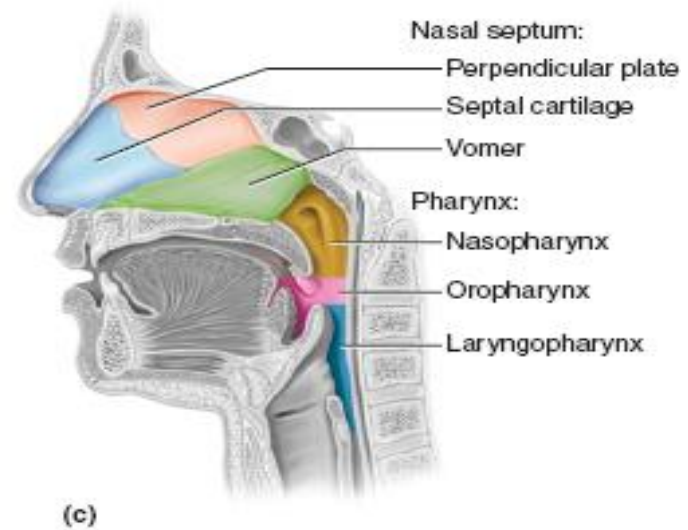
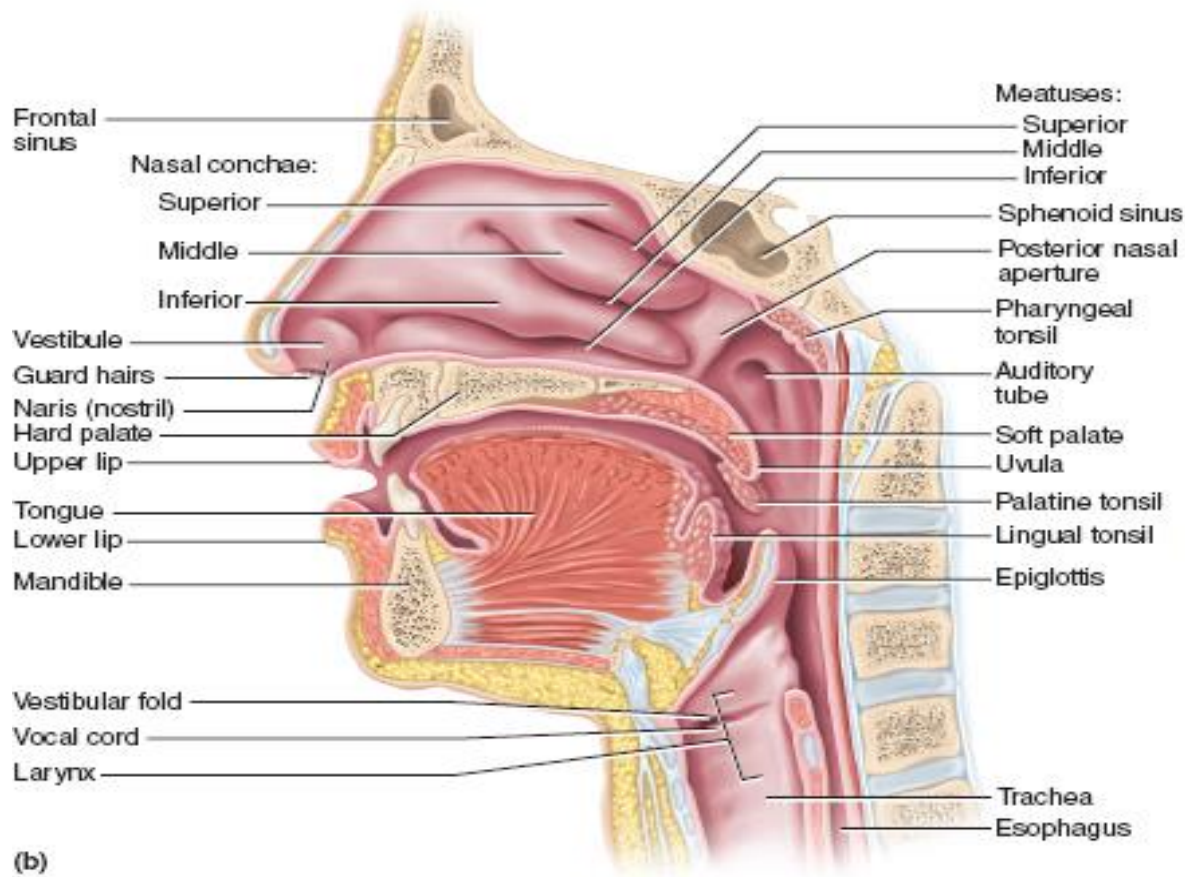
Respiratory System

Functions



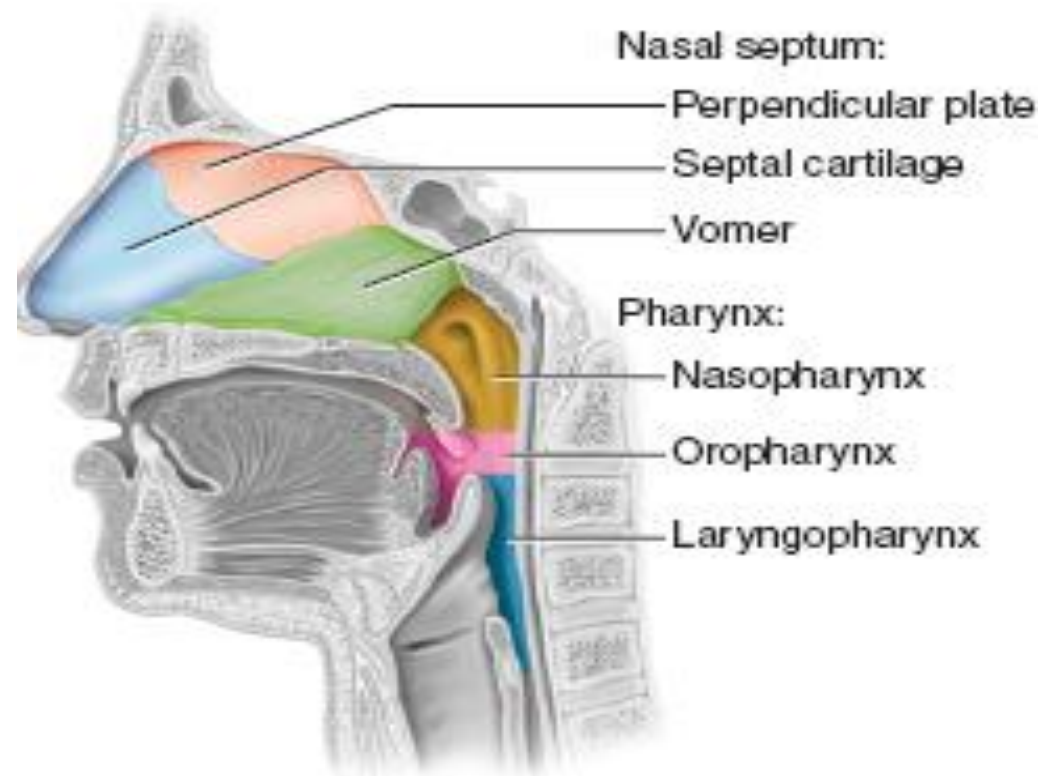
- Gas Exchange
 - Communication
 - Olfaction
 - pH regulation
- 

Nose and Nasal Cavity



Pharynx

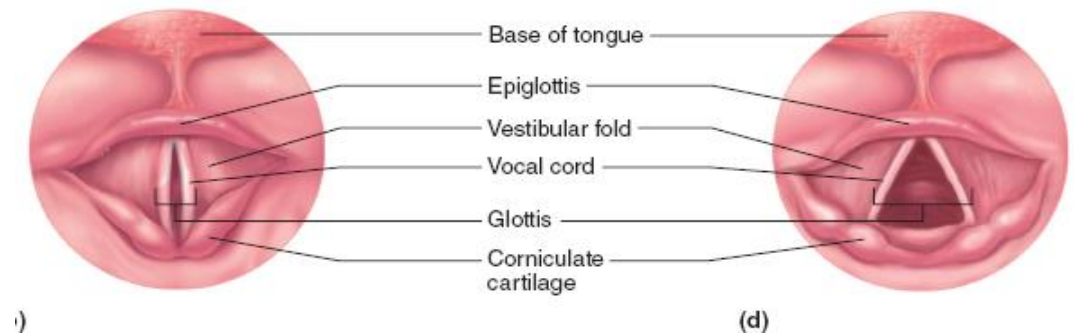
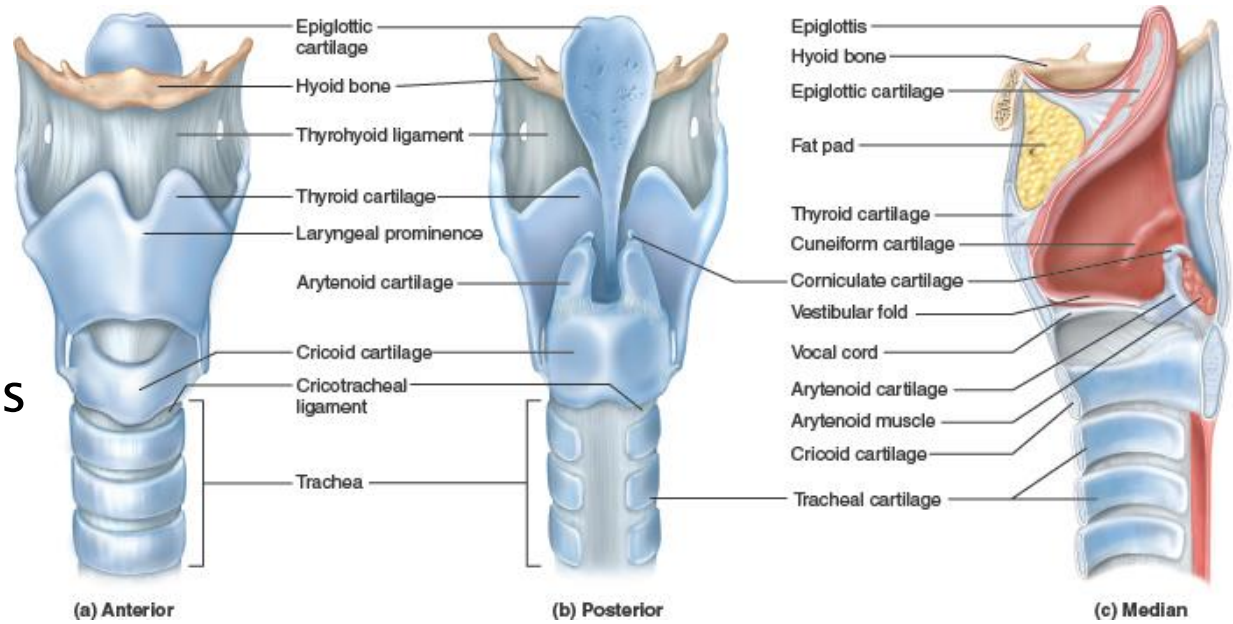
- Function
- Structure
 - Nasopharynx
 - Oropharynx
 - Laryngopharynx



(c)

Larynx “Voice Box”

- Functions
- Anatomy
 - Glottis
 - Vestibular folds
 - Vocal cords
 - Cartilages



Trachea “Windpipe”

- C-shaped cartilage rings
- Ciliated Pseudostratified Columnar Epithelial
- Connection between Larynx and Bronchial Tree

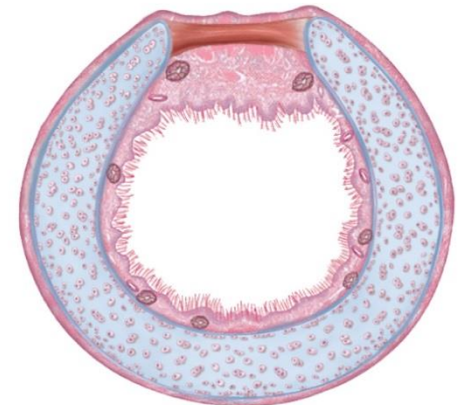
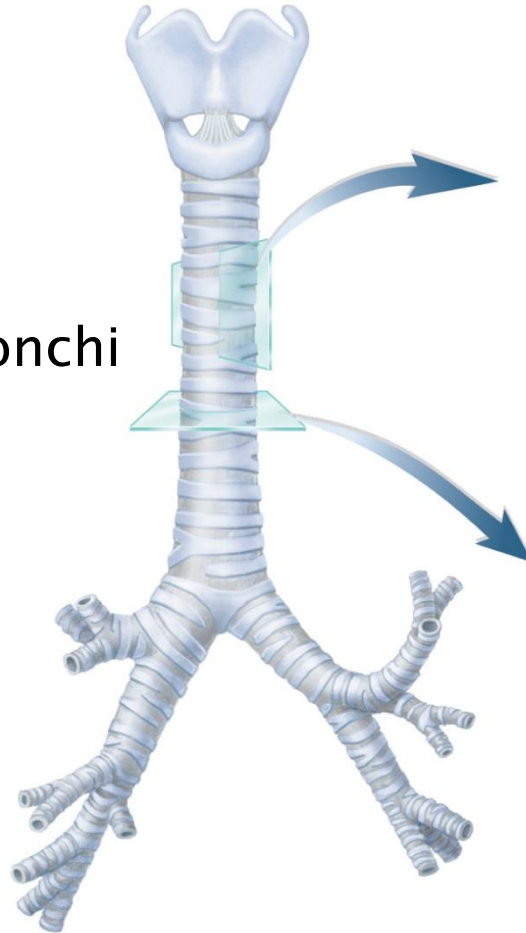


Bronchial Tree

▶ Network of highly branched air tubes

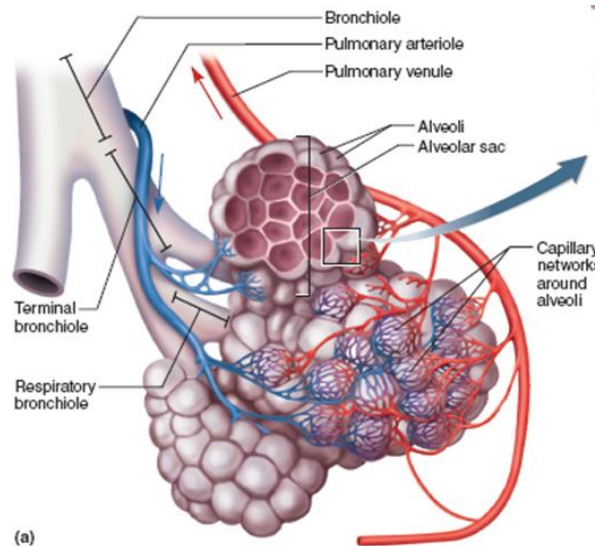
▶ Structures

- Main Bronchi
- Lobar Bronchi
- Segmental Bronchi

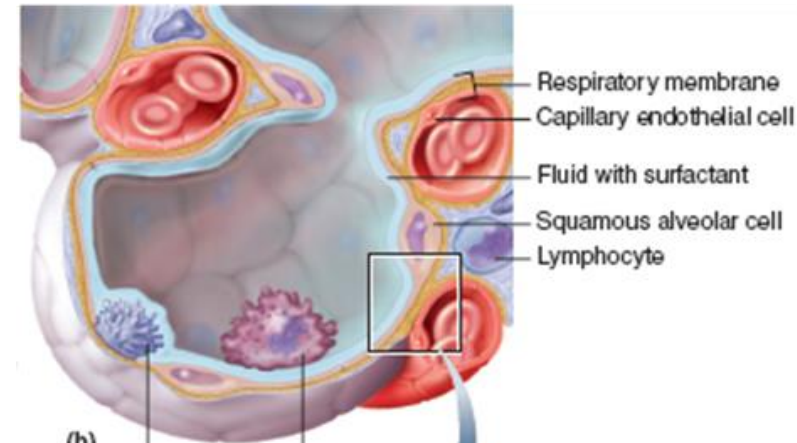


Bronchial Tree cont'd

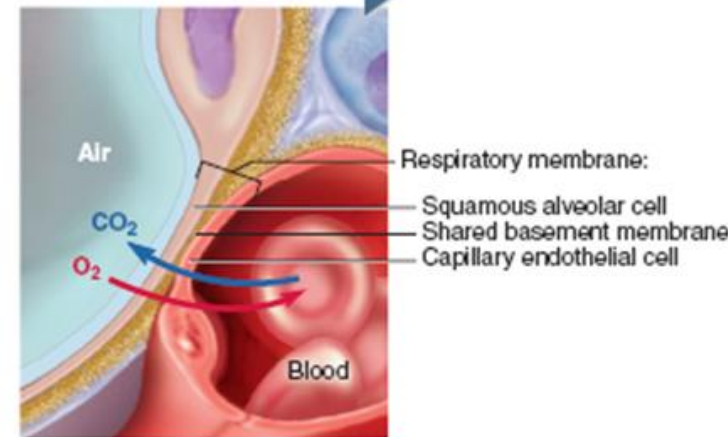
- Terminal Bronchioles
- Respiratory Bronchioles
- Alveolar Ducts
- Alveoli



(a)



(b)

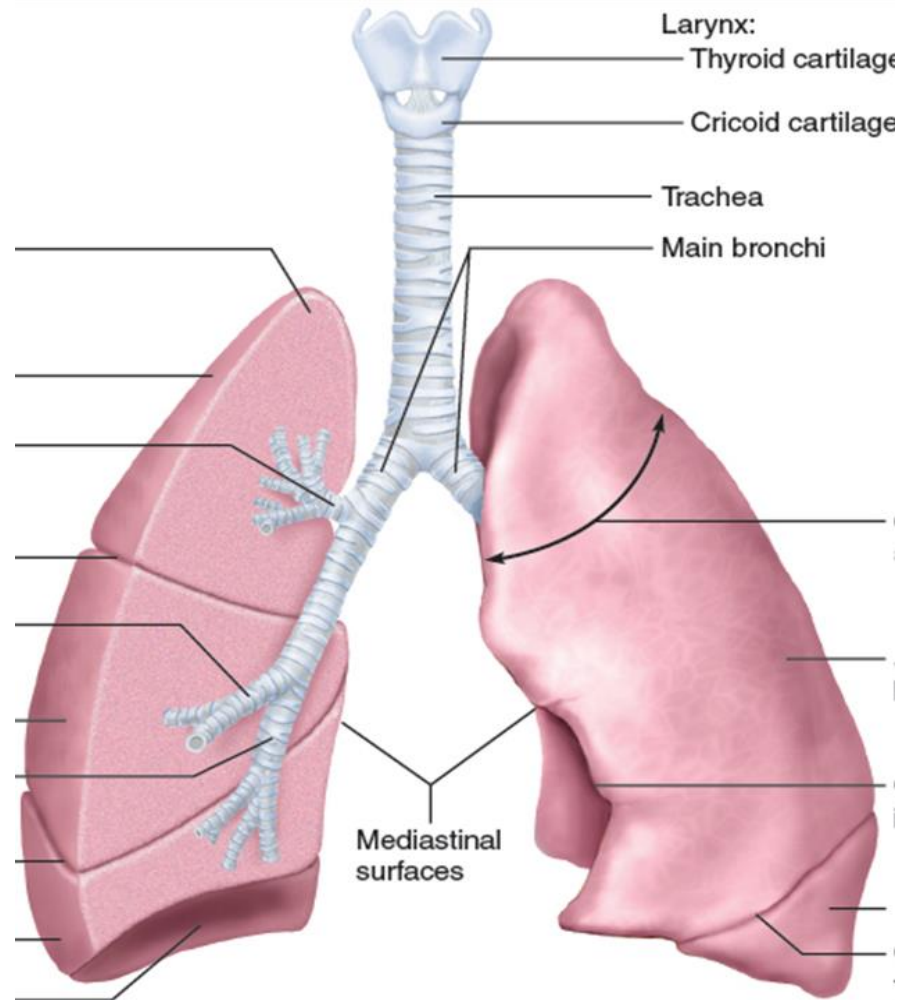


(c)



Lungs

- Lobes
 - Right lung: 3
 - Left Lung: 2



Plurae

- Visceral Pleura
- Parietal Pleura
- Pleural Cavity

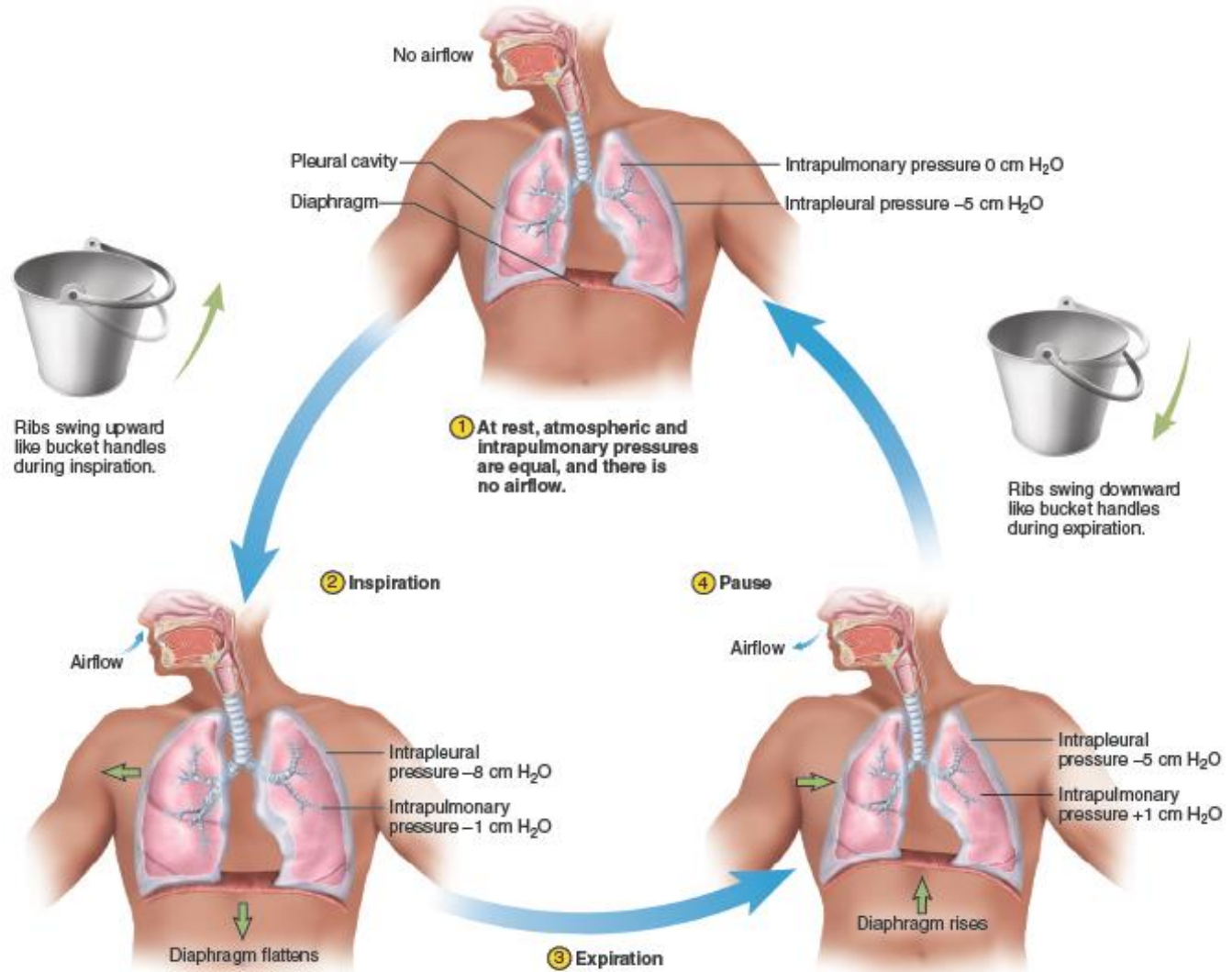
Types of Pressure

- Composition of air
- Atmospheric Pressure
- Partial Pressure

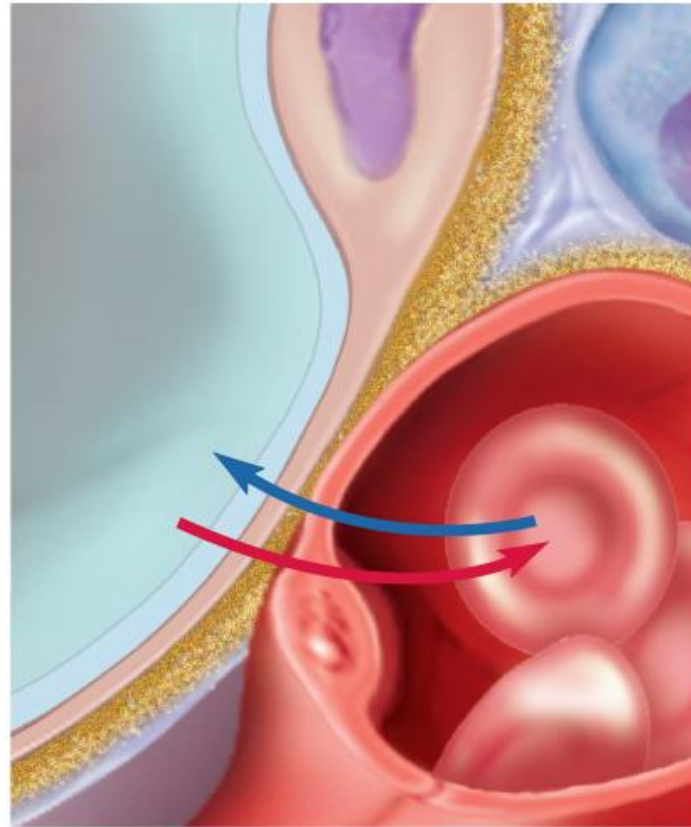
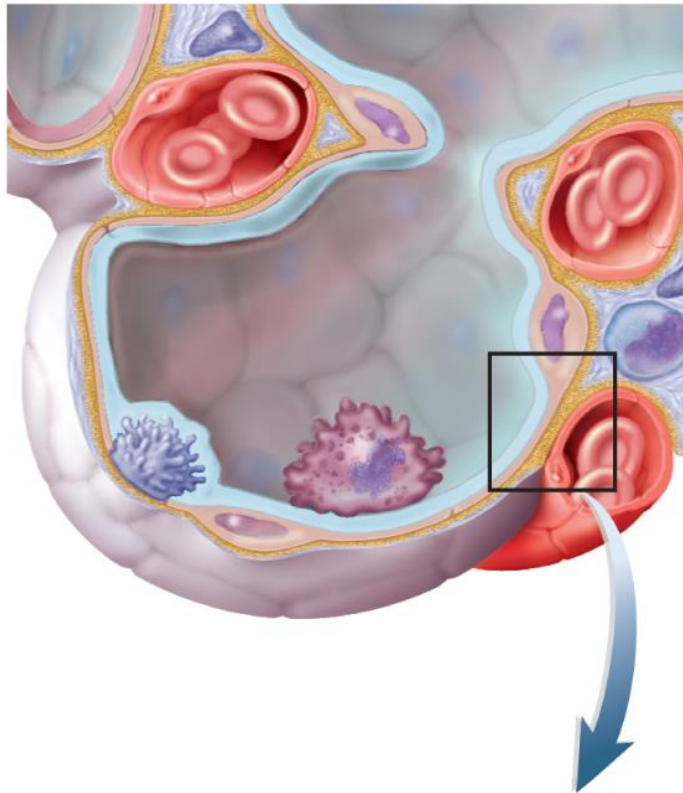


Ventilation

- Inspiration
- Expiration



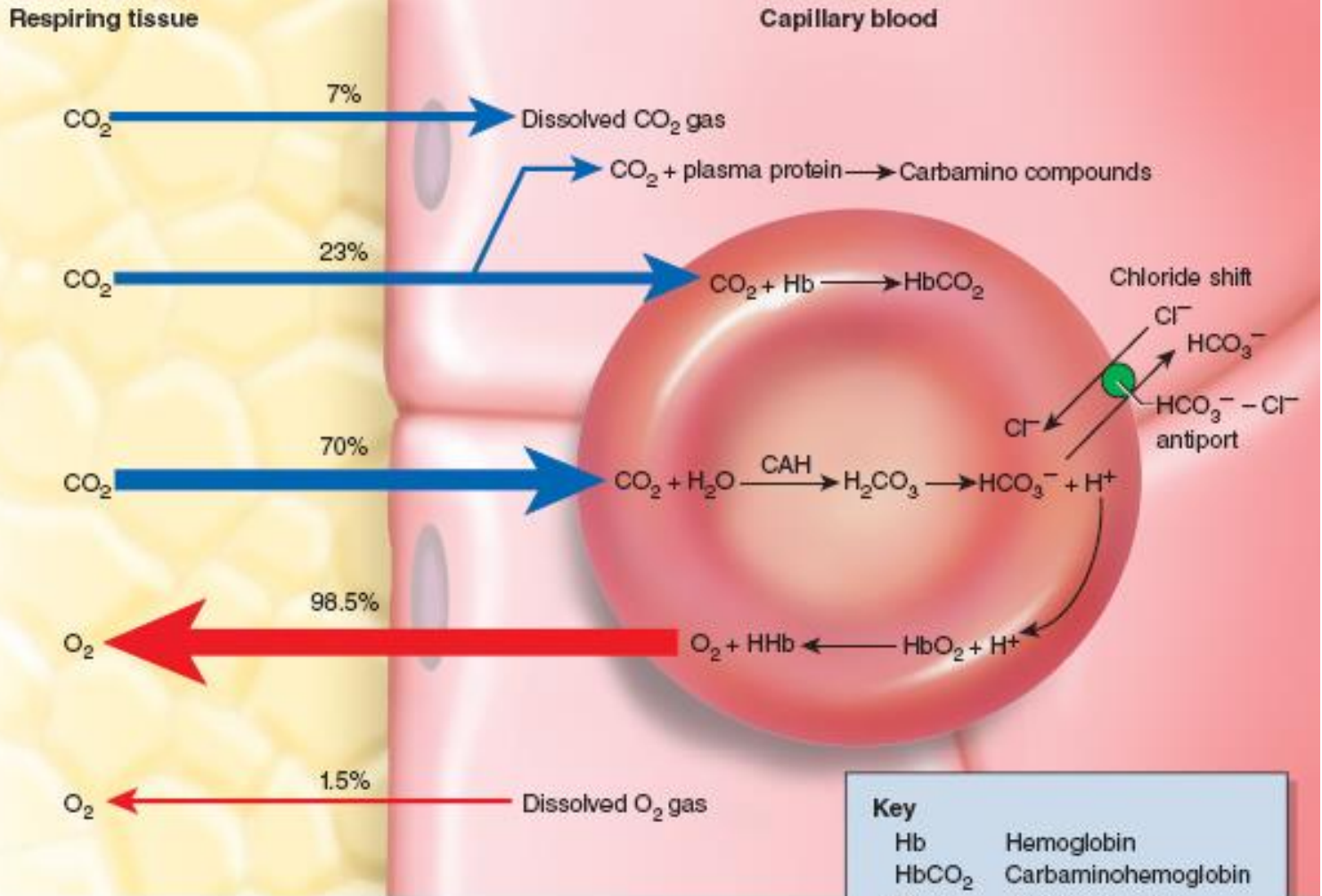
Gas Exchange: Alveolar



<http://www.dnatube.com/video/2905/What-Happens-Inside-Lungs>



Gas Exchange: Systemic



Gas Transport

- Oxygen
 - Hemoglobin
 - Dissolved in plasma
- Carbon Dioxide
 - Bicarbonate ion (HCO_3^-)
 - $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{HCO}_3^- + \text{H}^+$
 - Hemoglobin
 - Dissolved in plasma



V. Neural Control of Breathing

- exact mechanism for setting the rhythm of respiration remains unknown
- breathing depends on repetitive stimulation of skeletal muscles from brain
- neurons in medulla oblongata and pons control unconscious breathing
- voluntary control provided by motor cortex



Brainstem Respiratory Centers

- Automatic, unconscious cycle of breathing is controlled by three pairs of respiratory centers in the reticular formation of the medulla oblongata and the pons
- Respiratory center in medulla
 - ventral respiratory group (VRG)
 - dorsal respiratory group (DRG)
- Respiratory center in pons
 - Pneumotaxic Center

