

L5- Respiratory System

Slide 1: The Respiratory System

Slide 2: Functions and Structures of the respiratory System

- The Function:
 - o Gas exchanges between the blood and external environment: occurs in the alveoli of the lungs
 - o Passageways to the lungs purify, humidify, and warm the incoming air
 - o Maintain blood plasma pH
- Structures of the Respiratory System:
 - o Nose
 - o Pharynx
 - o Larynx
 - o Trachea
 - o Bronchi
 - o Lungs
 - Alveolar ducts
 - Alveolar sacs
 - Alveoli
- Why do we need oxygen?
 - o Electron Transport Chain (ETC) → ATP
 - o Oxygen is the final electron receptor
- Interaction with other systems:
 - o Needs glucose to generate ATP which is facilitated by the digestive system
 - Glucose + oxygen → ATP
 - o Transport- RBC in cardiovascular system
 - o Excretion- urinary system

Slide 3: Anatomy of the Respiratory System

- **Upper Airways** air passages of the head and neck
- **Respiratory Tract** from larynx throughout the lung
 - o Composed of the:
 - 1) Conducting zone: conducts air from larynx through lungs
 - 2) Respiratory zone: site fo gas exchange: Respiratory bronchioles, alveolar ducts, alveolar sacs, Alveoli

Slide 4: functions of the Conducting Zone

- Air Passageway 150 mL volume= dead space volume
- Increase air temperature to body temperature
 - o Heat air to body temp for has exchange to occur
- Humidify air
- Removes some particles
- Contains:
 - o Goblet cells → secretes mucus
 - Traps foreign particles then swept away by ciliated cells

- o Ciliated cells → cilia move particles toward mouth to be expelled
- * NOT INVOLVED WITH GAS EXCHANGE *
- ISSUE:
 - o Dead space volume (not involved with gas exchange)
 - o Its just air in a passage way

Slide 5: Anatomy of the Nasal Cavity

- Olfactory (smell) receptors are located in the mucosa on the superior surface
- The rest of the cavity is lined with respiratory mucousa that
 - o Moisten air
 - o Trap incoming foreign particles
- Olfaction: the sent for survival
 - o Bad smells teach avoidance
 - o Means that particles have been in your nose which means your were too close to a potentially dangerous substances
 - o Usually bad smelling things (such as fecal matter) carry diseases and pathogens that can be harmful to humans
 - o 90% of recognizable smells are disgusting smells to teach avoidance
- Lateral walls have projections called conchae
 - o Increase surface area
 - o Increase air turbulence within the nasal cavity
- The nasal cavity is separated form the oral cavity by the palate
 - o Anterior hard palate (bone)
 - o Posterior soft palate (muscle)

Slide 6: Paranasal Sinuses

- Cavities within bones surrounding the nasal cavity are called sinuses
- Function of the sinuses:
 - o Lighten the skull
 - Give it more structural integrity so it wont crush itself
 - Think of this: cinder blocks and bricks have holes in them so they don't collapse under their own weight
 - o Act as resonance chambers for speech
 - So you can hear your own voice
 - o Produce mucus that drains into the nasal cavity
- Sinuses are located in the following bones:
 - o Frontal bone
 - o Sphenoid bone
 - o Ethmoid bone
 - o Maxillary bone

Slide 7: Pharynx (Throat)

- Muscular passage form nasal cavity to larynx
- Three regions of the pharynx
 - o Nasopharynx- superior region behind nasal cavity
 - o Oropharynx- middle region being mouth
 - o Laryngopharynx- inferior region attached to larynx

- The oropharynx and laryngopharynx are common passageways for air and food
- ISSUE: “common passage ways for air and food”
 - o Cant breathe and eat or drink at the same time
 - o Choking results form shared structures
 - o However it conserves space → therefore need to take in less food → forage less

Slide 8: Larynx

- Routes air and food into proper channels
- Plays a role in speech
- Made of eight rigid hyaline cartilages and spoon shaped flap of elastic cartilage (epiglottis)

Slide 9: Structures of the Larynx

- Thyroid cartilage
 - o Largest of the hyaline cartilages
 - o Protrudes anteriorly (Adam’s apple)
- Epiglottis
 - o Protects the superior opening of the larynx
 - o Routes food to the esophagus and air toward the trachea
 - o When swallowing, the epiglottis forms a lid over the opening of the larynx
- Vocal folds (true vocal cords): vibrate with expelled air to create sound (speech)
- Glottis: opening between vocal cords

Slide 10: Trachea (Windpipe)

- Four inch long tube that connects larynx with bronchi
- Walls are reinforced with C- shaped hyaline cartilage
- Lined with ciliated mucosa
 - o Beat continuously in the opposite direction of incoming air
 - o Expel mucus loaded with dust and other debris away from lungs
 - Repells out because it goes the opposite way and its ciliated (form = function)

Slide 11: Structures of the Thoracic Cavity

- Chest wall is air tight and protects the lungs
 - o Rib cage, sternum
 - o Thoracic vertebrae
 - o Muscles- internal/external intercostals, diaphragm
 - o Pleura is a membrane lining of lungs and chest wall
 - Pleural sac around each lung
 - Intrapleural space filled with intrapleural fluid, volume = 15 mL
 - Fluid to reduce friction

Slide 12: Lungs

- Occupy most of the thoracic cavity
 - o Heart occupies central portion called mediastinum
- Apex is near the clavicle (superior portion)