Respiratory System

Conducting Portion: includes airways that carry air to and from the exchange surface of the lungs. The respiratory mucosa lines the conducting zone. Series of filtration mechanisms constitute the *respiratory defense system.*

Structure	Location		Respiratory mucosa	General Characteristics
Nose and nasal cavity	Upper respiratory system		- Nasal mucosa: contains goblets cells (epithelium) & mucous glands (lamina propria). - Warms and humidifies the incoming air (cools and dehumidifies the outgoing air).	- Coarse hair filters large particles. - Cilia from the epithelia sweep mucus and trapped particles toward the pharynx.
		Nasopharynx	Pseudostratified columnar epithelium.	Contains the pharyngeal tonsil (for defence). Connects with the nasal cavity.
		Oropharynx	Stratified squamous epithelium that resists to pathogens, chemical and physical "attack."	Connects with the oral cavity.
		Laryngopharynx (inferior portion)	same as above	Extends to the larynx and esophagus.
Larynx	Lower respiratory system		- Usually pseudostratified columnar epithelium. - The vocal cords are covered with stratified squamous epithelium.	- Cartilaginous structure surrounds and protects the glottis - Houses the vocal cords. - Epiglottis (forms a "lid" over the glottis preventing entry of liquids and solids into the respiratory tract).
Trachea	Lower respiratory system		Pseudostratified columnar epithelium.	- Tough and flexible tube. - Each tracheal cartilage is C-shaped. Its ends are connected by a band of smooth muscle that faces the esophagus. This structure permits tracheal distortion when

			swallowing large masses through the esophagus.
Bronchi	Lower respiratory system		
Smaller branches of bronchi	Lower respiratory system		

Respiratory Portion

Structure	Location	Morphology		General Characteristics
Respiratory bronchioles	Lower respiratory system	Cuboidal epithelium with sparse cilia and no mucus-producing cells		Deliver air to the gas exchange surfaces of the respiratory system.
			Type I cells	Thin and delicate squamous epithelial cells.
			Type II cells = Septal cells	- Scattered among Type I cells. - Cuboidal, large - Produce surfactant (mixture of phospholipids and proteins that reduces surface tension and keeps alveoli open). - Surrounded by fine elastic fibres

Alveoli:

1. Connected to adjacent alveoli by open **alveolar pores.** These pores allow air flow between alveoli maintaining the air pressure equalized throughout the lung.
2. **Alveolar macrophages** engulf any particles that reach the respiratory portion of the system.

Respiratory membrane:

1. 3 parts: Squamous epithelial cells lining the alveolus, endothelial cells lining an adjacent capillary, and fused basal laminae (between the endothelial cells and the squamous epithelium).
2. Average distance between alveolar air and blood: 0.5µm. Diffusion is very fast because: the distance is very small, O_2 and CO_2 are lipid soluble and pass easily through the membrane.