Respiration

The main function of the lung is gas exchange (external respiration)

4 processes

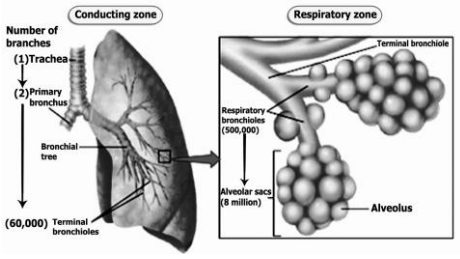
- ***pulmonary ventilation***
- ***exchange of O_2 & CO_2 between lung & blood***
- ***transport of O_2 & CO_2 by blood***
- ***exchange of O_2 & CO_2 between blood & tissues***

The airways
- ***upper airways:*** (nose (or mouth) ⇨ pharynx ⇨ larynx)
- ***lower airways:*** (larynx ⇨ trachea ⇨ 2 bronchi ⇨ bronchioles) ⇨ ***alveoli*** (grape-like clusters)

The airways below the larynx are divided into:

	(1) Conducting zone	(2) Respiratory zone
Site	From the top of trachea ⇨ beginning of respiratory bronchioles. ***no alveoli*** (***no gas exchange*** with blood)	From the respiratory bronchioles on down contains alveoli (the area of gas exchange)
Functions	1 – Warming & humidifying inspired air 2 – Distributing air to the gas exchange areas of the lung. 3 – A part of the body defense system: (as it has a mucociliary system) ***All 3 functions = air conditioning***	It is the site of gas exchange with blood. arrangement of structures of respiratory zone; respiratory bronchioles ⇨ alveolar ducts ⇨ alveoli (gas exchange) this ↑↑ rate of gases diffusion.

The epithelial surfaces of the airways contain:
(1) Cilia ⇨ beat towards the pharynx.
(2) Glands & Goblet cells ⇨ secrete mucus.
(3) Macrophages ⇨ engulf inhaled particles & bacteria.



Alveolar wall consists of

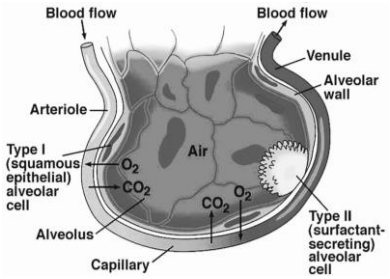
Type I cells
(Type I pneumocytes)
A single layer of flat epithelial cells laying on a basement membrane.

Type II cells
(Type II pneumocytes)
secrete pulmonary surfactant.

The alveolar walls are surrounded by capillaries (their walls consist of one layer of endothelial cells & underlying B.M.)

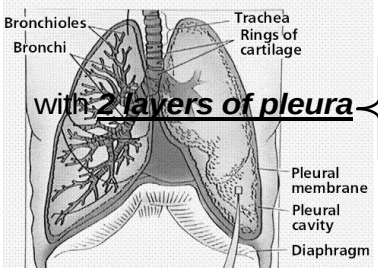
The respiratory membrane: (0.2 microns thick)
Fused alveolar & capillary walls that separate air from blood.

- ❒ **In the lungs:** 300 million alveoli (total surface area 100 mm^2) ⇨ rapid & great gas exchange.
- ❒ **Alveolar macrophages:** engulf inhaled foreign particles..



The pleural sac

Each lung is surrounded by a completely closed sac,



with ***2 layers of pleura***
- 1- **Visceral pleura** attached to the ***lung***
- 2- **Parietal pleura** attached to the ***interior thoracic wall & diaphragm***

Intrapleural space: between 2 layers of pleura filled with "15ml." water