

LUNGS

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Structure

Lungs consist of a branching network of air passages, starting with the **trachea**, which splits into **bronchi**, which further subdivide into **bronchioles**. The bronchioles terminate in clusters of tiny air sacs called **alveoli**. The entire lung structure is enveloped by a double-layered membrane called the **pleura**. The **diaphragm** is a dome-shaped muscle located beneath the lungs that contracts and flattens during expiration and inspiration respectively. Additionally, each lung is divided into **lobes**, with the right lung having three lobes and the left lung having two, to accommodate the heart (Hunt, 2007).

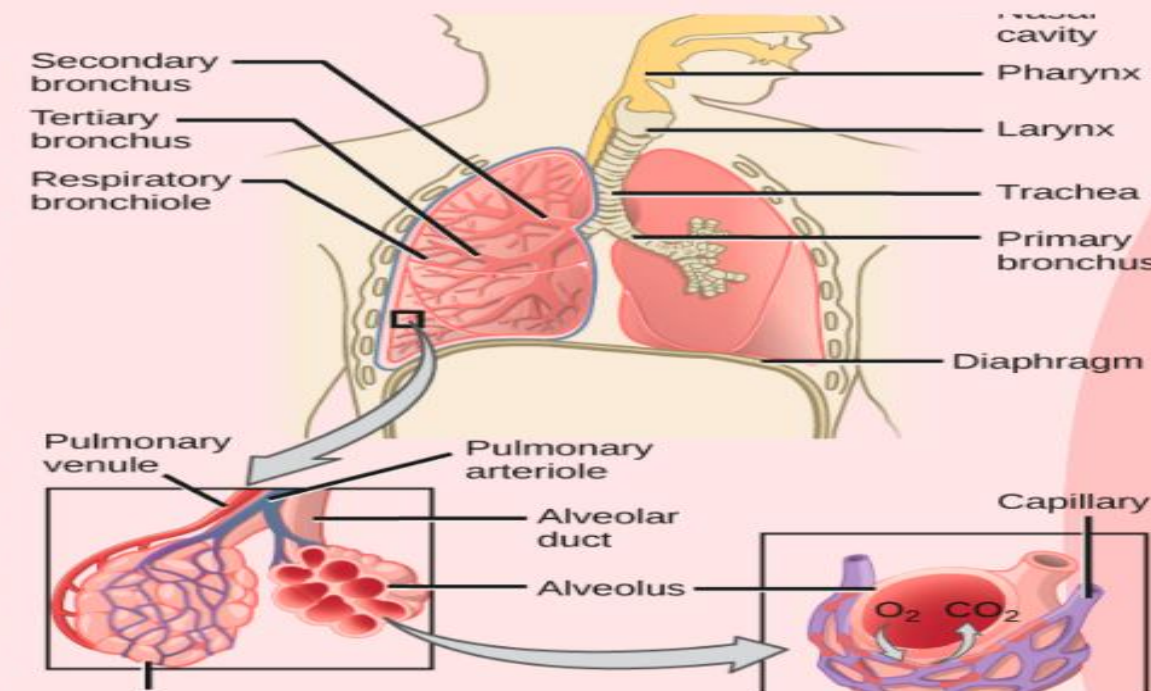


Figure 1: Air enters the respiratory system through the nasal cavity and pharynx, and then passes through the trachea and into the bronchi, which bring air into the lungs (Molnar and Gair, 2015).

Specialised Cells (Micro-Scale)

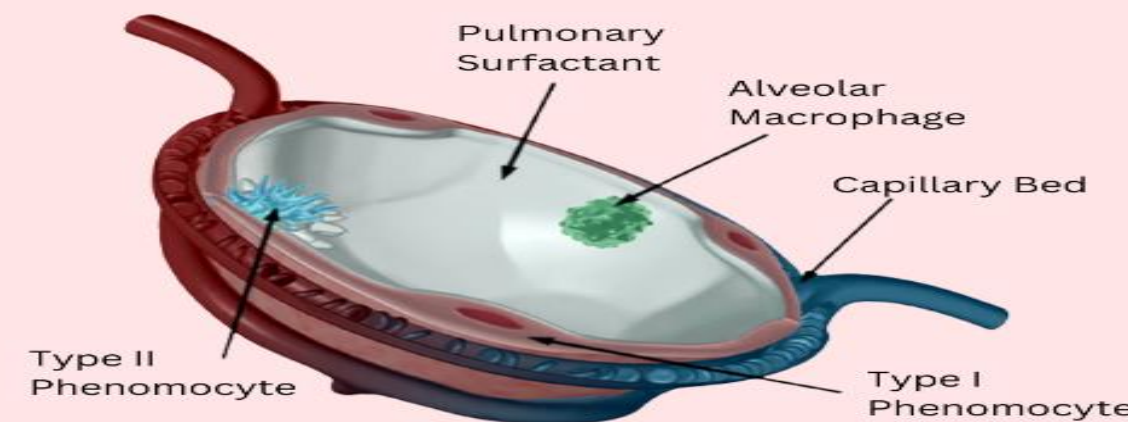


Figure 4: Diagram of an alveolus showing alveolar cells (Smith, 2013)

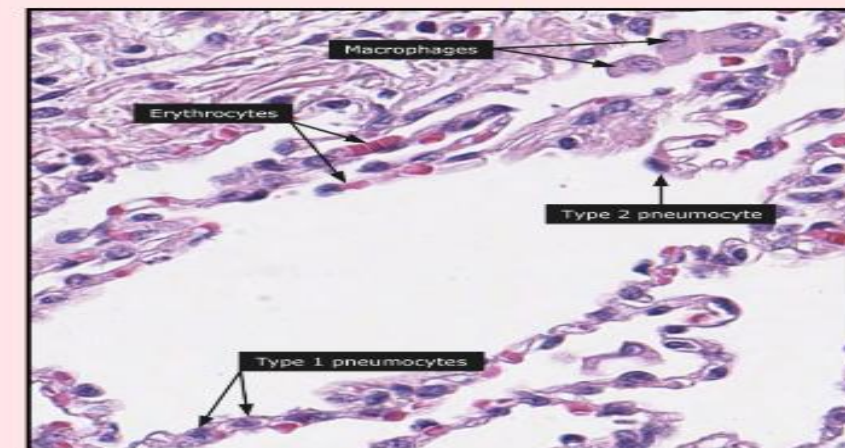


Figure 5: Microscopic image of an alveolus showing alveolar cells (Uhlén et al., 2015)

Type 1 Alveoli	Type 2 Alveoli
Function: <ul style="list-style-type: none"> Gas exchange ion and fluid balance maintenance 	Function: <ul style="list-style-type: none"> Surfactant synthesis Water movement
Structure: <ul style="list-style-type: none"> Thin squamous epithelium Shares basement membrane with pulmonary capillary endothelium Forms the air-blood barrier 	Structure: <ul style="list-style-type: none"> Cuboidal Connected by intracellular and tight junctions
Location: <ul style="list-style-type: none"> Covers 70% of alveolar internal surface 	Location: <ul style="list-style-type: none"> Alveolar septum Covers 7% of alveolar internal surface

Alveolar Macrophage

Function: <ul style="list-style-type: none"> Engulf bacteria Secrete mediators
Structure: <ul style="list-style-type: none"> 10-30 µm in diameter Contains actin filament
Location: <ul style="list-style-type: none"> Inside alveoli

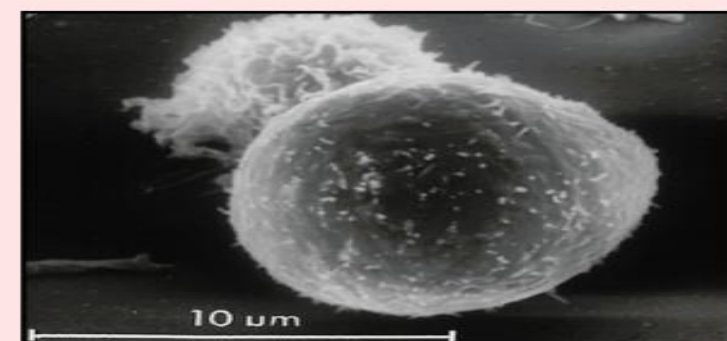


Figure 6: SEM picture of Alveolar Macrophages in lung lavage of a rat (Borm, Cassee, and Oberdörster, 2015)

Function

The primary function of the lungs is to **absorb oxygen from the air you breathe into your bloodstream** so that it can spread around the body via the cardiovascular system.

As depicted, Oxygen goes through multiple types of tubes to get into the bloodstream. The bronchi are the two large tubes that carry air from the **trachea** to the lungs. The two main bronchi branch out into smaller tubes called **bronchioles**, at the ends of which are small air sacs where the **exchange** of oxygen and carbon dioxide takes place.

Blood passes through the capillaries, entering through the pulmonary artery. In the capillaries, the blood gives off carbon dioxide through the capillary wall into the alveoli and instead exchanges it for oxygen (Comroe and Julius, 1966).

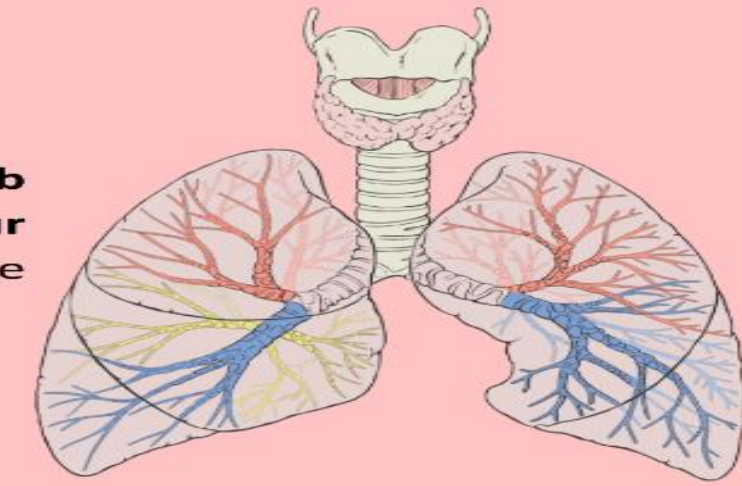


Figure 2: Tree-like branching of the passages of the lower respiratory tract within the lungs (Miller, n.d).



Figure 3: An illustration of alveoli found within the lungs (Oto, 2023).

Disease: Emphysema

An irreversible enlargement of the alveoli. The alveoli lose their ability to relax and contract, which lets air in and out of the lungs. This disease is Emphysema and it causes about 5% of deaths globally (Martini and Frauenfelder, 2020).

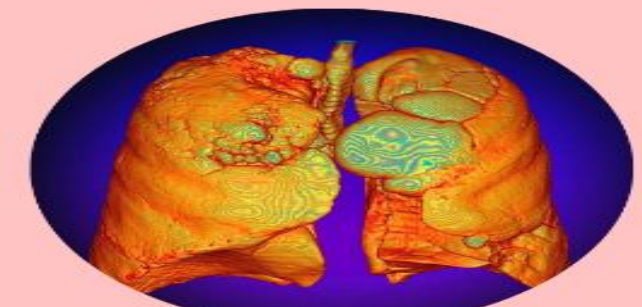


Figure 7: Smokers' Lung's emphysema (Fung, 2020)

Main Causes

Smoking: Stimulates alveolar neutrophils to produce tissue-damaging elastase (Martini and Frauenfelder, 2020)

α -1- Antitrypsin Deficiency: α -1-antitrypsin inhibits elastase. Emphysema progress quickly in smokers with α -1-antitrypsin deficiency (Martini and Frauenfelder, 2020)

Diagnosis

Imaging with chest X-ray and CT (computerised tomography)

Treatment

In the early stages; therapeutic methods such as oxygen therapy and rehabilitators, bronchodilators, and glucocorticosteroids.

If severe; surgical techniques, such as a lung transplant or lung volume reduction surgery (Martini and Frauenfelder, 2020).

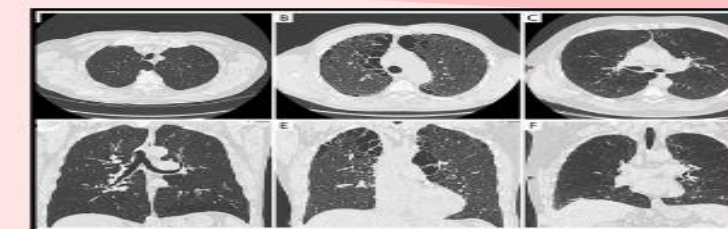


Figure 8: Types of emphysema. Centrilobular emphysema (A, D), paraseptal emphysema (B, E) and panlobular emphysema (C, F) (Martini and Frauenfelder, 2020).

SID	Peer Assessment
1. 2318831	He demonstrated commendable engagement throughout the group poster project. His active listening skills were evident, and he proved proficient in proofreading, in-text citation, and referencing. Additionally, He excels in summarising text effectively. He not only completed his tasks but also contributed to the success of others. His consistent attendance at all meetings and his punctual work submission further underscored his commitment to the project. He displayed exemplary leadership skills.
2. 2203721	As the initial leader, she played a crucial role in setting the group on a path to success. With a keen sense of leadership, she actively listened, completed assigned tasks, and assisted others in the group. Her consistent attendance at all meetings and timely submissions of work demonstrated reliability and dedication to the project. She suggested the use of the model template, which is resourceful
3. 2301397 (me)	I missed one meeting due to a schedule change in my learning timetable, I contributed significantly by taking clear and detailed minutes during meetings. I Recognised my limitations in artistic abilities and sought help when needed, showing a proactive approach to problem-solving. Timely submission of work and a willingness to take on new tasks during member shortages highlighted a solid commitment to the group