

# Lungs

Respiratory system

## What does this tissue do?

Allows you to breathe! The lungs exchange waste carbon dioxide in your blood for oxygen, allowing all your other organs to work (this is gas exchange).

## Main parts:

**Trachea (airway)** – the pipe that connects your nose / mouth to your lungs

**Bronchi** – The branches (tubes) of the lungs

**Alveoli** – the air sacs at the end of the bronchi branches that do the gas exchange

**Diaphragm** – not actually part of the lungs themselves, but this muscle is essential for their function – drawing air (and oxygen) in and pushing carbon dioxide out

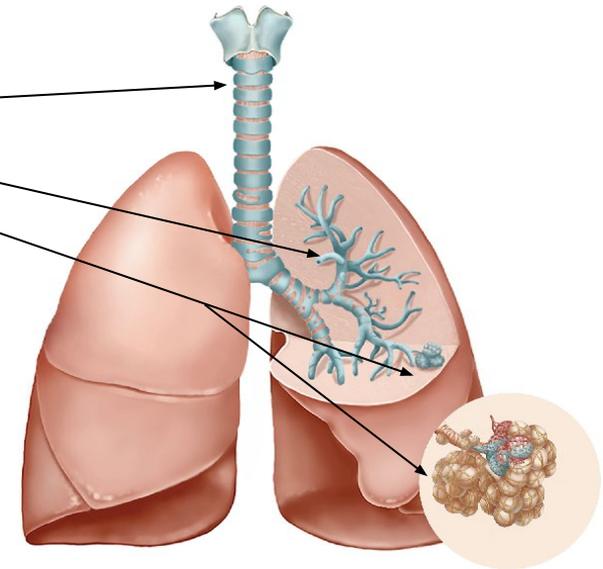


Illustration	Key cell types	Abundance	Function	Special features	Super powers
	Basal	Rare	Tissue repair and regeneration	Turns into other lung cell types	Super <u>stem cell</u>
	Ciliated	Common	Protect against infection	Has tiny hairs that wave mucous (snot) & bacteria out of your lungs	Infection protection
	Goblet	Rare	Makes mucous (snot) to catch bacteria	Mucous (snot) production	
	Club	Rare	Make <u>surfactant</u> , break down bad chemicals and turn in to ciliated cells.	Can turn in to ciliated cells	Multi-tasking
	Submucosal gland	Rare	Make fluid, mucous (snot) and bacteria-killing factors	Mucous (snot) production	Multi-tasking
	Alveolar type I	Very common	<u>Gas exchange</u>	Thin, flat shape	
	Alveolar type II	Common	Make <u>surfactant</u>		
	Ionocyte	Very rare	<u>Osmotic balance</u>	Expresses <u>CFTR</u>	

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	Neuroendocrine cells	Very rare	Turns nerve signals into hormonal signals	Hormone secretion	
	Tuft or brush cells	Very rare	Danger sensing cells	Short sensing hairs (villi) on surface	
	Alveolar macrophages	rare	clearing the airways of particles	Able to digest bacteria	Infection protection
	Aerocyte	rare	Gas exchange	Large surface area	cell with the most holes in it!

# DEFINITIONS

SCIENTIFIC TERM	DESCRIPTION
<b>Stem cell</b>	<p>Cells that can both make more of themselves and turn in to other cells.</p> <p>Pluripotent stem cells can make any other cell type in the body, (not placenta) and are found in embryos (totipotent stem cells also make placenta).</p> <p>Multipotent stem cells can make multiple cell types within one tissue, but not every cell type in the organism. They often replace damaged or aged cells.</p>
<b>Surfactant</b>	<p>A substance that reduces the surface tension of a liquid; in the lungs this prevents the alveoli (air sacs) from collapsing when you breathe.</p>
<b>Gas exchange</b>	<p>The movement of oxygen and carbon dioxide between the air and blood in the lungs.</p>
<b>Osmotic balance</b>	<p>The balance of salt and water in and around your cells. If this is not balanced your cells will either swell and explode (as water enters) or shrivel up (as water leaves).</p>
<b>CFTR</b>	<p>Cystic fibrosis transmembrane conductance regulator. This gene / protein helps maintain <u>osmotic balance</u> in the lungs. If it is mutated / damaged then the cells contain too much chloride (salt), meaning not enough water moves to the cell surface. This makes the mucous in the lungs and other organs become very thick and sticky, causing cystic fibrosis.</p>