

CAIE Biology A-level

Topic 9 - Gas Exchange and Smoking

Definitions and Concepts

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Alveolus (pl alveoli) - Tiny air sacs that serve as the primary gaseous exchange surface. They consist of a thin epithelial cell layer, collagen and elastic fibres.

Bronchioles - Many small divisions of the bronchi. They contain smooth muscle to restrict airflow to the lungs but do not have cartilage. They are lined with a thin layer of ciliated epithelial cells.

Bronchus (pl bronchi) - Divisions of the trachea that lead into the lungs. They are small tubes supported by incomplete rings of cartilage.

Cartilage - Strong, flexible connective tissue that supports the walls of the trachea and bronchi, preventing collapse.

Cilia - Small, hair-like organelles that extend from the surface of eukaryotic cells. They have motile and sensory functions.

Ciliated epithelium - Specialised cells found lining the trachea which have tiny hair-like cilia that waft mucus up to the back of the throat, where it is swallowed.

Elastic fibres - Fibres of elastin that allow the alveoli to stretch as air is drawn in and recoil to expel air. They are also found in the trachea, bronchi and bronchioles.

Exchange surface - A surface over which materials are exchanged from one region to another. An effective exchange surface has a large surface area, thin layers, a good blood supply, and ventilation to maintain a steep diffusion gradient.

Goblet cells - Specialised cells that secrete mucus onto the trachea lining. The mucus traps harmful substances and microorganisms, preventing their entry into the lungs.

Lungs - The primary organs of the mammalian respiratory system.

Mammalian gas exchange system - A complex system found in mammals in which oxygen and carbon dioxide gases are exchanged.

Mucous glands - Glands which contain clusters of mucous-secreting cells.

Smooth muscle - Involuntary muscle found in the walls of the trachea and bronchi. It constricts the lumen of the bronchi by contracting, reducing airflow to the lungs.

Squamous epithelium - A single layer of flattened epithelial cells.

Trachea (mammals) - The main airway that acts as a passage for air to pass to and from the bronchi. It is a tube supported by incomplete rings of cartilage.

