Gas Exchange in Humans

Basic Summary

The respiratory system in humans facilitates gas exchange, delivering oxygen from the lungs to the bloodstream and removing carbon dioxide from the bloodstream to the lungs. Air enters through the nasal cavity, travels down the trachea, which branches into bronchi and bronchioles, and finally reaches the alveoli, where gas exchange occurs. The trachea is supported by cartilage, and the rib cage protects the lungs.

Inhalation and Exhalation:

- Inhalation: Thoracic volume increases as the external intercostal muscles and diaphragm contract, decreasing air pressure and drawing air into the lungs.
- Exhalation*: Thoracic volume decreases as the intercostal muscles and diaphragm relax, increasing air pressure and pushing air out.

Air Composition:

Inhaled air has more oxygen, while exhaled air has more carbon dioxide. The limewater test can confirm higher carbon dioxide levels in exhaled air.

- **Inhaled:** 21% oxygen, 0.04% carbon dioxide, variable moisture
- **Exhaled:** 16% oxygen, 4% carbon dioxide, high moisture

Effect of Physical Activity:

During exercise, breathing rate and depth increase due to higher carbon dioxide levels, which makes blood more acidic. The brain detects this change, leading to faster breathing to remove carbon dioxide and supply more oxygen to cells.