

5.1.1

Respiratory System Function

The main function of the respiratory system is to provide cells with sufficient oxygen and to remove carbon dioxide from the body. This process is referred to as **respiration** and can be divided into four processes. 1) **ventilation** or breathing: moving air in and out of lungs; 2) **external respiration**: oxygen going from the lungs into the blood and carbon dioxide going from the blood into the lungs; 3) **gas transport**: oxygen traveling to the cells and carbon dioxide traveling to the lungs both by way of the circulatory system; 4) **internal respiration**: oxygen leaving the blood and entering the cells and carbon dioxide leaving the cells and entering the blood.

Additionally, the respiratory system plays a role in other important areas including:

1) **Maintaining blood pH homeostasis.** Recall the reversible reaction $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{H}^+ + \text{HCO}_3^-$. By altering ventilation rate, the respiratory system can change blood pH

2) **Blood pressure regulation.** The lungs produce the majority of an enzyme called angiotensin converting enzyme (ACE) which when produced, leads to increased blood pressure.

3) **Sound production.** Air is forced past the vocal cords and folds causing them to vibrate and produce sound waves. Oral and nasal cavities and the tongue, teeth, and lips affect the final sound product.

4) **Sense of smell.** Chemoreceptors for olfaction are located in the superior region of the nasal cavity.

5) **Defense.** Foreign materials such as dust and bacteria are filtered and trapped by hair and mucus and also are removed by the mucociliary escalator system and phagocytes.



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