Gas Transport

To complete this worksheet, select:

Module: Respiratory System
Activity: Animations
Title: Gas Transport

Introduction

1. Summarize blood’s role with regard to transporting oxygen and carbon dioxide.

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Oxygen Transport

2. Contrast the two ways oxygen is transported in blood.

Dissolved in Blood Plasma ____________________________________________

_____________________________________________________________________________

Bonded to Hemoglobin ________________________________________________

_____________________________________________________________________________

3. Describe the important role of the heme groups within each hemoglobin molecule.

_____________________________________________________________________________

_____________________________________________________________________________

4. Define each of the following:

deoxygenated hemoglobin ________________________________________________

_____________________________________________________________________________

oxygenated hemoglobin _________________________________________________

_____________________________________________________________________________

5. What is the oxygen association reaction that occurs in the lungs?

_____________________________________________________________________________

6. What is the oxygen dissociation reaction that occurs at the tissue cells?
Factors That Affect Hemoglobin’s Saturation With Oxygen

7. Name the factors that affect hemoglobin’s saturation with oxygen. Once completely saturated, the molecule is called **oxyhemoglobin**.

Oxygen-Hemoglobin Dissociation Curve

8. **P_{O2}** is a primary factor influencing the degree of hemoglobin saturation. Explain how **P_{O2}** in the lungs and tissue cells determines whether oxygen binding or dissociation occurs with hemoglobin.

Hemoglobin’s Affinity for Oxygen

9. a. Describe the **Bohr Effect**.

b. In contrast to the Bohr Effect, how does elevated pH affect hemoglobin’s oxygen affinity?

10. a. Actively metabolizing cells aerobically use oxygen and produce carbon dioxide. Describe how increasing levels of blood **carbon dioxide** affect hemoglobin’s oxygen affinity? Where (in the body) does this occur?

b. Explain **CO₂**’s affect on oxygen loading in the alveolar spaces.

11. Describe how body temperature affects O₂ association with hemoglobin.
12. Explain the affect of BPG on O₂ association with hemoglobin.

Carbon Dioxide Transport

13. Name the three ways CO₂ can be transported by the blood and the percentage for each mechanism.

14. Explain carboxyhemoglobin formation and function.

15. a. Explain bicarbonate ion formation and how it is used to transport carbon dioxide.

b. Define the chloride shift and explain why it occurs.