2.1.5

Hemoglobin



Hemoglobin Structure.

Image by Becky T. S20

Hemoglobin is composed of 8 subunits: 4 polypeptide chains known as **globins** (2a and 2b) and 4 iron-containing **heme**-groups. Each heme group contains a single iron atom, which lends erythrocytes their distinctive red crimson color. Each heme group can transport one molecule of oxygen. In addition, a very small amount of carbon dioxide can bind to the globin polypeptide chain rather than to the heme groups.

When oxygen is bound to hemoglobin, the complex (can also be referred to as a pigment) is known as **oxyhemoglobin**, which possesses a bright red color. Hemoglobin without oxygen is known as **deoxyhemoglobin**, which possesses a dark red color. When transporting carbon dioxide bound to the globin subunits, hemoglobin is known as **carbaminohemoglobin**.

Hemoglobin differs in form throughout human development. Initially, embryonic hemoglobin is produced and will be replaced by fetal hemoglobin by the end of the first trimester of pregnancy. Thereafter, adult hemoglobin will replace the fetal hemoglobin. Essentially, the differences lie in the ability of hemoglobin to bind oxygen. Specialized fetal hemoglobin has a greater affinity for oxygen than adult hemoglobin. This allows a more efficient absorption of oxygen

from the placenta where the mother's blood is transporting oxygen on adult hemoglobin. Essentially, the higher affinity of the fetal hemoglobin allows the baby to "steal" oxygen from the mother's lower affinity adult hemoglobin.



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