Hemoglobin Encyclopedia Article

Hemoglobin

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Contents

Hemoglobin Encyclopedia Article.....1

Contents.....2

Hemoglobin.....3

Hemoglobin

Hemoglobin is the protein responsible for red blood cell's ability to bind oxygen and carbon dioxide. It is distributed throughout the red cell cytoplasm and allows the cells to transport oxygen from the lungs to the tissues where it exchanges the oxygen for carbon dioxide. The cells then carry the carbon dioxide from the blood stream to the lungs where it is released as part of the process of respiration.

Hemoglobin production occurs in bone marrow and requires iron, folic acid, and vitamin B12. Absorption of the latter requires a substance known as Intrinsic Factor, which is produced by the stomach. Hemoglobin actually consists of two parts: a helical protein chain, known as globin, and a carbon ring complex, called heme, which contains iron. This carbon ring, also called a porphyrin ring, is made up of many carbon atoms connected to four nitrogen atoms facing a central hole. The nitrogen atoms trap an iron atom in this hole where it bonds to an oxygen or carbon dioxide molecule or to part of the globin chain.

When hemoglobin production is reduced or when its oxygen transferring ability is impaired, anemia can result. Minor symptoms of anemia include pale skin, weakness, fatigue, and dizziness. Severe symptoms include breathing difficulty and abnormal heart rhythm. Iron deficiency anemia is the most common type and it results from either chronic blood loss, lack of iron in the diet, impaired absorption of iron from the intestine, or increased need for iron, as in pregnancy and birth. Pernicious anemia occurs when the Intrinsic Factor is lacking and the body can not process vitamin B12. Abnormal production of hemoglobin can cause a hereditary condition known as sickle-cell anemia.