Hemoglobin and Iron Requirements Related to Donating Blood

The primary function of iron in the body is to transport oxygen. About 67% of body iron is present as hemoglobin and myoglobin. Hemoglobin, which is present in red blood cells, is essential for transferring oxygen from the lungs, via the blood, to the tissues; myoglobin is present in muscle cells and accepts, stores, transports and releases oxygen in the muscles. About 6% of body iron is used as a component of certain proteins (it forms part of the cytochromes, which are essential for respiration and energy metabolism), and as a component of certain enzymes it is involved in the synthesis of collagen and various neurotransmitters. In addition, iron is needed for proper immune function.

About 25% of the iron in the body is stored as ferritin, which is found in cells and circulates in the blood. The average adult male has about 1,000 mg of stored iron (enough for about 3 years), whereas women on average have only about 300 mg (enough for about 6 months). When iron intake is chronically low, stores can eventually become depleted, decreasing hemoglobin levels.

Iron deficiency designates conditions in which the body’s iron requirements exceed iron supply. Iron is needed to restore physiologic loss, which is just under 1 mg/day in men and is about 1.5 mg/day in menstruating women; iron is also needed for growth and pregnancy and to replace pathologic losses. Sequential stages of decreases in body iron can be identified. A decrease in iron stores without a change in the amounts of functional iron compounds is designated as reduced iron stores. When iron stores are exhausted, patients may be described as having iron depletion. Further decrements in the level of body iron result in limited production of hemoglobin and other iron-containing functional compounds; this stage is termed iron-deficient erythropoiesis. Still further decreases in body iron produce iron deficiency anemia.

Iron deficiency can result from inadequate iron supply. Blood loss is the most common cause of increased iron requirements that lead to iron deficiency. In men and postmenopausal women, iron deficiency is almost always the result of gastrointestinal blood loss. In menstruating women, genitourinary blood loss often accounts for increased iron requirements. Oral contraceptives tend to decrease menstrual blood loss, whereas intrauterine devices tend to increase menstrual bleeding. Other causes of genitourinary bleeding and respiratory tract bleeding can also increase iron requirements. During periods of growth in infancy, childhood, and adolescence, iron requirements may outstrip the supply of iron available from diet and stores. Iron loss from tissue growth during pregnancy and from bleeding during delivery and post partum averages 740 mg. Breastfeeding increases iron requirements by about 0.5 to 1 mg /day.

For blood donors, each donation results in the loss of 200 to 250 mg of iron.

Iron Requirements

- Iron is an essential element for blood production. Approximately 70 percent of your body's iron is found in the red blood cells of your blood. These cells carry oxygen from the lungs to all parts of your body.
- Your "iron level" is checked each time before your blood donation to determine if it is safe for you to give blood. Iron is not made in the body and must be absorbed from what you eat. The adult minimum daily requirement of iron is 18 mg. Only about 10 to 30 percent of the iron you take in is absorbed and used by the body.
- This can be accomplished by by eating foods high in iron and if recommended by your primary care provider, taking iron supplements. Foods high in vitamin C are also recommended because vitamin C helps your body to absorb iron. Also, cooking in iron pots can add up to 80 percent more iron to your foods. Consult with your primary care provider before taking iron supplements.
- Some foods rich in iron include meat/poultry such as lean beef, veal, pork, lamb, chicken, turkey; seafood such as fish, mussels and shellfish and the following vegetables:
  - Greens, all kinds
  - Broccoli
  - Brussels Sprouts
  - Bean Sprouts
  - Lima Beans
  - Green Beans
  - Beets
  - Tofu
  - Sweet Peas
  - Kale
  - Tomatoes
  - Potatoes
  - Corn
  - Cabbage

http://www.uhs.berkeley.edu/home/blooddrives/hemoglobiniron.shtml