Ferrous Sulfate 300 mg Tablets

Product Summary:

Iron is required in the body as a constituent of hemoglobin and for the production of red blood cells, for production of iron-sulfur complexes, and for a number of enzymes. When dietary intake is insufficient to keep up with demand, iron deficiency and anemia can result. Iron deficiency is common in individuals with chronic disease, in geriatric patients, and during pregnancy. Deficiency may cause reduced cognitive function, impaired immunity, and reductions in endurance, physical capacity, and work productivity.

Properties/Uses:

The claim as approved by the *Natural Health Products Directorate* (NHPD): A factor in the maintenance of good health. Helps form red blood cells and prevents iron deficiency anemia

BLOOD

Pharmacology:

Iron has been used for many centuries to treat a myriad of conditions (Wood and Ronnenberg, 2006). The ancient Egyptians used iron oxide to treat baldness and ancient Greeks used iron, together with wine, to restore male potency. Iron was later used in the seventeenth century to treat chlorosis, a disease later in 1932 found to be related to iron deficiency.

Iron is essential in the body for a number of cellular processes including the transport of oxygen in the blood and for energy production in the mitochondria (Anderson and McLaren, 2012). The human body requires an abundant and regular dietary supply of iron to meet cellular demand. Iron deficiency is one of the world's most common nutrient deficiencies, with as many as one-third of the world's population suffering from deficiency.

Iron is required in the body for generation of iron-sulfur complexes, heme, and for numerous iron metalloenzymes (Wood and Ronnenberg, 2006). Iron sulfur complexes are important for production of cellular energy through oxidative phosphorlyation reactions involving carbohydrate and lipids. Heme iron is critically important as it is the oxygen-carrying constituent of hemoglobin in red blood cells and myoglobin in muscle tissues. Enzymes such as the peroxidase enzyme contain heme and are useful to protect the cell from oxidative damage by inactivating peroxides into water. Heme iron is also important as the active site of cytochromes, which are required in the electron transport chain. The metalloenzymes, such as amino acid hydroxylase, and dioxygenases such as 5-lipoxygenase, are important for the synthesis of tyrosine, dopamine, 5-hydroxy-tryptophan, serotonin, and leukotrienes. The synthesis of these important transmitters is critical since they maintain homeostasis and numerous cellular processes.

The average human body has about 3 or 4 grams of iron, of which about half is in the blood as hemoglobin iron (Wood and Ronnenberg, 2006). Storage iron in the form of ferritin and hemosiderin is found in other areas, such as the liver. Normally the amount of storage iron in the body is approximately 300 to 1000 mg in females and 500 to 1500 mg in males. However, in iron overload disorders, iron is deposited in liver, spleen, and bone marrow and total body iron can reach 40,000 to 50,000 mg. body. Iron is found in the myoglobin in muscle tissue (about 130 mg), and smaller amounts (about 11 mg) is found in iron metalloenzymes and transferrins.

Dietary iron is absorbed in the intestine by a two step process. Uptake of iron into the mucosa occurs first, and then iron is transported from the mucosa to the blood by way of carrier proteins called transferrin. About 3 to 4 mg of iron circulates in the plasma bound to transferrin (Anderson and McLaren, 2012). Although only a small amount of iron is directly bound to transferrin, about 30 mg is needed to cycle through the transferrin iron compartment to the bone marrow for the process of erythropoiesis (production of erythrocytes or red blood cells). Serum transferrin is a member of a group of superfamily transferrins that includes other transferrins such as lactotransferrin, ovotransferrin, and melanotransferrin. While the function of transferrin is clearly defined, being the transport of iron to sites of utilization and storage in the body, the roles of the other transferrins are not yet known.

Transferrin carries a significant amount of iron (about 24 mg) to the bone marrow for hemoglobin synthesis in red blood cell precursors to replace worn out red blood cells. The rest of the iron is used by other tissues to synthesize iron-containing compounds such as myoglobin and metalloenzymes. During pregnancy, the need for iron increases as transferrin must deliver iron to the placenta to meet the need for iron during fetal growth.

Iron is required by virtually all living organisms, and as such is required by pathogens present in the body (Anderson and McLaren, 2012). The human body attempts to withhold iron, and pathogens continue to try to acquire it, resulting in a complex interplay of how iron is critically involved in innate immunity.

Iron is also required for many metabolic processes in the brain (Anderson and McLaren, 2012) such as ATP production, myelinogenesis, and neurotransmitter synthesis. The demand for iron in the brain is dependent on age and iron status. Despite highly regulated processes, the brain is vulnerable to iron deficiency, which can be seen in neurodegenerative and neurological disorders.

Iron is stored in the form of ferritins in certain organs in the body, such as the liver and spleen (Anderson and McLaren, 2012). Synthesis of ferritin occurs rapidly after iron administration. While the mechanism by which ferritin sequesters iron is not entirely known, recent evidence suggests that mitochondria may sequester iron to prevent the pro-oxidant effects of iron from occurring. While free iron can be dangerous because it is involved in production of reactive oxygen species, most iron is bound to proteins and not associated with damaging oxidative processes.

Under conditions of excess iron, some of the ferritin iron can be converted into another storage form of iron called hemosiderin (Anderson and McLaren, 2012). Hemosiderin is found in typical areas of the body that store iron, including the liver, spleen, and bone marrow.

Iron homeostasis is highly regulated in response to intracellular levels of iron involving cytosolic iron regulatory proteins and iron responsive elements (Anderson and McLaren, 2012). To ensure iron supplies are sufficient to support cellular processes, including protein synthesis and growth, cells coordinate uptake, storage, and export of iron by regulating levels of proteins responsible for this activity. Hepcidin is the major regulatory of iron homeostasis and works by controlled iron efflux through transporters.

Iron is mainly lost through the intestine (in the urine and feces), in the shedding of skin cells, when donating blood or during hemorrhage, and in women during menstruation and during blood loss and fetal development in pregnancy.

Release of iron from liver cells and other storage sites occurs when additional iron is needed by the body. Unfortunately iron storage sites may become depleted, resulting first in iron deficiency, and subsequently causing anemia.

Infants, children, and adolescents require large amounts of iron for rapid growth (Anderson and McLaren, 2012). During adolescence iron is also required for the higher blood volume and red blood cell mass, and in girls to replace iron lost during menstruation. In adult men iron needs decrease somewhat after adolescence, and as the need for iron decreases, more iron is found in storage forms. In women, the need for iron continues to be high even after adolescence, in order to cover iron losses which occur during menstruation. Until the age of menopause, women are at high risk of iron deficiency.

During pregnancy the need for iron greatly increases due to fetal growth and placental tissue development, as well as increased blood volume and hemoglobin mass (Anderson and McLaren, 2012). Extra iron is also required to compensate for blood loss during delivery. As pregnancy progresses, iron stores typically decrease, and iron needs of fetus are met at the expense of the iron needs of the mother. Iron needs during pregnancy are not typically met through diet alone. Most often iron supplementation is required in order to adequately meet increased needs during pregnancy.

Iron deficiency is relatively common in the elderly (Wood and Ronnenberg, 2006). This may be due to increased, increased gastrointestinal blood loss caused by chronic disease or by medications, poor absorption of iron due to hypochlorhydria, or poor diet.

Ferrous sulfate is one of the preferred forms for dietary iron supplementation because of its high bioavailability (Anderson and McLaren, 2012). Absorption is enhanced when it is taken on an empty stomach or with juice, compared to tea, coffee, or milk. Supplementation should be targeted to individuals with iron deficiency or at risk of developing iron deficiency.

Manufactured product information:

Manufacturer:
WN Pharmaceuticals® Ltd.

Size / UPC:
100's 7 77747 10294 5

NPN:
80012039

Expiry Date:
6 months from date of manufacture

Active Ingredient:
Each tablet contains:

Iron (ferrous sulfate) . . . . . 60 mg
300 mg ferrous sulfate providing 60 mg elemental iron

Non-Medicinal Ingredients (in descending order):
Microcrystalline cellulose, dibasic calcium phosphate dihydrate, croscarmellose sodium, red coating (polydextrose, carbohydrate gum, FD&C red #40, titanium dioxide, glycerin), clear coating (carbohydrate gum, glycerin), magnesium stearate.

Appearance:
Red round shaped coated tablet.

Packaging:
175 cc white round bottle with safety seal under a 38 mm white child resistant cap and a label applied to the bottle. Lot number and expiry date are printed on the label applied to the exterior of the bottle.

Storage:
Store at room temperature in a dark, dry place.

Dose:

The estimated average requirement and recommended dietary intake (RDI) of iron are calculated by the Food and Nutrition Board of the Institute of Medicine and based on the need to maintain normal, functional iron concentration and a minimal store of body iron (Wood and Ronnenberg, 2006). The RDI for adults range from 8 to 18 mg/day and 27 mg/day during pregnancy.

The upper limit is the highest level of daily intake that is likely to have no adverse health effects. The upper limit for iron for individuals 14 years old and older, including pregnant women, is 45 mg daily, and for individuals less than 14 years old is 40 mg daily (Wood and Ronnenberg, 2006).

Directions:

(Adults): 1 tablet daily preferably with a meal or as recommended by a physician. Take a few hours before or after taking other medications.

Caution:

The caution as approved by the *Natural Health Products Directorate* (NHPD): KEEP OUT OF THE REACH OF CHILDREN. There is enough iron in this packaged to seriously harm a child. Some people may experience constipation, diarrhea, and/or vomiting. STORE AT ROOM TEMPERATURE IN A DARK, DRY PLACE. DO NOT USE IF SEAL UNDER CAP IS BROKEN OR MISSING.

Deficiency Symptoms:

The depletion of iron occurs in stages, starting with iron deficiency and eventually progressing to anemia. (Hawes and Brownlee, 2001). Iron deficiency and anemia is diagnosed by means of blood tests. Iron deficiency occurs when dietary intake is low, or when requirements are high. When iron requirements are high biochemical processes cannot keep up with demands or with the amount of iron that is lost, especially when iron is lost through blood loss.

Anemia is a disorder characterized by a decrease in the number of red blood cells or a lower than normal quantity of hemoglobin in the blood. Anemia is a common disorder, and may range from mild to severe. Anemia associated with chronic disease often occurs after 1 or 2 months in patients suffering from infectious or inflammatory diseases or cancer (Wood and Ronnenberg, 2006). Anemia is also commonly found in the geriatric population. Anemia often occurs during pregnancy due to increased need for iron from increase in blood volume as well as transfer of iron to the fetus.

Certain populations have an increased need for dietary iron. In postmenopausal women, hormone replacement therapy (HRT) can cause uterine bleeding which increases iron needs compared to women not taking HRT. Individuals consuming plant-based diets have lower availability of iron than individuals consuming Western-style diets that contain meat. The requirement of iron for vegetarians is increased by about 1.8 times compared to meat eaters. Intestinal parasites, such as hookworms, can cause significant blood loss and increase the need for dietary iron. Athletes who exercise frequently or intensely and blood donors have an increased need for iron (30 to 70% higher).

Even mild forms of iron deficiency anemia are associated with impairments in functional status, including cognitive function, immunity, regulation of body temperature, and reduced work capacity (Hawes and Brownlee, 2001; Wood and Ronnenberg, 2006). Reduced work capacity is associated with reduction in oxygen transport and other cellular processes leading to reduced endurance and aerobic capacity, and deficiency of energy, voluntary physical activity and work productivity.

Helicobacter pylori infections have been found to be associated with iron deficiency and anemia. The mechanism for this association is not known, though it may be related to elevated levels of intragastric pH.

Deficiency of iron may be a risk factor for increased levels of heavy metals, such as lead. While the exact cause is not known, it may be related to an increase in metal transporters which occurs in response to iron deficiencies.

Drug Interactions/Contraindications:

Women taking oral contraceptives have a lower amount of blood loss during menstruation and a reduced need of iron, lowering their recommended daily amount to 11 mg/ day.

Individuals with iron disorders which increase the amount of iron in the body should not take dietary iron supplements. This includes individuals with hereditary hemochromatosis who absorb inappropriately high amounts of dietary iron. Increased amount of iron in the body, called iron overload, can also occur along with other conditions, such as in patients with alcoholic cirrhosis.

Excessive iron consumption should be avoided in patients who are not iron deficient and not bleeding since iron can accumulate in the body. The intestine is able to block a significant amount of iron absorption if patients consume more iron than they require.

Toxicity/Adverse Reactions:

Iron supplementation may cause minor gastrointestinal side effects, including constipation, diarrhea, nausea and vomiting. These effects may be minimized by taking supplements with or after meals.

Individuals who are not iron deficient may be at risk of high iron stores if they chronically consume dietary iron supplements. No serious adverse health effects of moderately elevated iron stores have been reported.

High doses of iron supplementation (50 mg daily) have an increased risk of gastrointestinal side effects including constipation, diarrhea, nausea, and vomiting. (Frykman, Bystrom, Jansson, Edberg, and Hansen, 1994). Iron doses between 20 to 60 mg/kg can cause symptoms of acute iron poisoning. Iron poisoning causes gastrointestinal irritation at low doses and systemic poisoning at high doses.

Allergen Content/Ingredient Sensitivity:

NO	YES
Artificial Colors	Corn Products
Artificial Flavors	Tartrazine
Artificial Sweeteners	
Egg Products	
Fish	
Gluten	
Hydrolyzed Plant Protein	
Lecithin	
Milk Products	
Peanuts	
Preservatives	
Sesame Products	
Shellfish	
Soy Products	
Starch/Modified Starch	
Sulphites	
Tree Nuts	
Wheat Products	
Yeast	

ACCEPTABLE FOR THE FOLLOWING DIETARY RESTRICTION:

Free of animal products

NOT ACCEPTABLE FOR THE FOLLOWING DIETARY RESTRICTIONS:

Kosher

References:

1. Wood, R.J., and Ronnenberg, A.G. Iron. In. M.E. Shils (Editor), Modern Nutrition in Health and Disease, 2006; pp. 193-222. Baltimore, Md. : Williams & Wilkins.

1. Hawes, J.D., and Brownlee, T. Iron Deficiency and Reduced Work Capacity: A Critical Review of the Research to Determine a Causal Relationship. The Journal of Nutrition, 2001; 131(2):6765-6905.

1. Frykman, E., Bystrom, M., Jansson, U., Edberg, A., and Hansen, T. Side effects of iron supplements in blood donors: superior tolerance of heme iron. The Journal of Laboratory and Clinical Medicine, 1994;123;561-564.

1. Anderson, G.J., and McLaren G.D. (Editors). Iron physiology and pathophysiology in humans. 2012, pp. 1-98. New York, NY: Humana Press.

Revision #: 00