The Iron Complex

By Dr. Zoltan P. Rona, M.D., M.Sc.

All cells require iron, which works primarily by carrying oxygen in the body as a part of hemoglobin in the red blood cells and as myoglobin in muscle cells. Anemia results when there is not enough iron in the red blood cells and is a common problem seen after pregnancy, blood loss and a diet either low in iron or poor absorption of iron by the body.

Iron deficiency is still considered to be the most common single nutrient deficiency in the world affecting approximately 15 percent of the world's population. New research on vitamin D maintains that vitamin D deficiency is at least 5 times more common but this fact has yet to be accepted by most government agencies.

Possible Symptoms Of Iron Deficiency:

- Severe fatigue
- Weakness
- Light headedness
- Poor exercise tolerance
- Headache
- Pale skin (pallor)
- Pallor on the lining of the eyes
- Pallor on the inner mouth and the nails
- Rapid heartbeat
- Heart murmur
- Low blood pressure with position change from sitting to standing up
- Brittle finger nails
- Thin and white finger nails
- Nails with a spoon-shaped appearance
- Sore, smooth and reddened tongue
- Decrease in appetite
- Abdominal pain
- Shortness of breath during exercise
- Brittle hair
- Hair loss
- Decreased immunity
- A strong desire to eat items such as ice, paint or dirt (known as Pica)

All these symptoms can be caused by numerous health conditions other than iron deficiency so a blood test must be done in order to make the right diagnosis. A complete blood count and a serum ferritin level is what you should be asking your doctor to order to see if you need to improve your iron status.

If your serum ferritin runs below 80 nanograms/ml (normal is 80 – 300), you will need to improve your iron intake through either eating more iron-rich foods or taking an iron supplement.

The absorption of iron from foods varies significantly from person to person. In general, iron is not readily absorbed from non-heme sources (fruits, vegetables, dried beans, nuts and whole grains). The absorption of iron is significantly better from heme sources such as meat, fish and poultry.

Regardless of source, iron absorption is enhanced by vitamin C from oranges, lemons, grapefruits, tomatoes, broccoli or strawberries. If a non-heme source is eaten with a heme source of iron, absorption is also enhanced. If one cooks any non-heme source in a cast iron pot, iron absorption is similarly improved.

Inhibitors of iron absorption include large amounts of coffee or tea, an excess intake of high fibre foods such as bran as well as a high intake of calcium either from dairy products or calcium supplements. Taking iron and calcium supplements at a different time would be the right thing to do here in order to absorb more iron from foods.

The body somehow increases iron absorption on its own whenever iron stores are depleted but this is usually not enough to correct most cases of iron deficiency.

The Recommended Dietary Allowance (RDA) for iron for non-vegetarian pre-menopausal women is 18 mg/day. The RDA for non-vegetarian men and post-menopausal women is 8 mg/day.

Due to absorption issues in a healthful, high-fibre vegetarian diet, the RDAs for vegetarians are higher - 14 mg/day for vegetarian men and 33 mg/day for vegetarian women. Iron absorption should be twice as much for vegans who exclude all animal products.

HEME Iron Food Source

HEME Iron Food Source	Serving Size (oz.)	Iron (mg)	HEME Iron Food Source	Serving Size (oz.)	Iron (mg)	HEME Iron Food Source	Serving Size (oz.)	Iron (mg)
*Beef, chuck, lean	3.0	3.2	Beef, corned	3.5	1.9	Beef, eye of round, roasted	3.0	2.2
*Beef, flank	3.5	3.3	Beef, lean ground; 10% fat	3.0	3.9	Beef, liver	3.0	7.5
*Beef, round	3.5	3.1	Beef, tenderloin, roasted	3.0	3.0	Chicken, breast, roasted	3.0	1.1
Chicken, leg, meat only, roasted	3.5	1.3	Chicken, liver	3.5	12.8	Chicken, thigh w/ bone	2.3	1.2
Clams, breaded, fried	¾ cup	3.0	Cod, broiled	3.0	0.4	Flounder, baked	3.0	0.3
Oysters, breaded and fried	6 pieces	4.5	*Pork, lean ham	3.5	1.5	*Pork, loin chop	3.0	1.2
Salmon, pink canned	3.0	0.7	Shrimp, mixed species, cooked	4 large	0.7	Tuna, canned in water	3.0	0.8
Turkey, dark meat	3.5	2.3	Turkey, white meat	3.5	1.6	** Lean, trimmed of separable fat.*		

NON-HEME Iron Food Source

NON-HEME Iron Food Source	Serving Size	Iron (mg)	NON-HEME Iron Food Source	Serving Size	Iron (mg)	NON-HEME Iron Food Source	Serving Size	Iron (mg)
Almonds, raw, whole	10 - 12	0.7	Grits, quick enriched white, cooked	1 cup	1.5	Raisins, seedless packed	½ cup	1.5
Apricots, dried, med.-size	10	1.7	Kidney beans, boiled	1 cup	5.2	Rice, brown, cooked	1 cup	1.0
Bagel	1 whole	1.5	Lentils, boiled	1 cup	6.6	Rice, white enriched, cooked	1 cup	1.8
Baked beans, canned	½ cup	2.0	Lima beans, boiled	1 cup	4.5	Soybeans, boiled	1 cup	8.8
Black beans, boiled	1 cup	3.6	Macaroni, enriched, cooked	1 cup	1.9	Spaghetti, enriched, cooked	1 cup	1.6
Black-eyed peas (cowpeas), boiled	1 cup	1.8	Molasses, blackstrap	1 tbsp.	3.5	Spinach, cooked (boiled, drained)	½ cup	3.2
Bread, white, enriched	2 slices	1.8	Navy beans, boiled	1 cup	4.5	Spinach, canned, drained	½ cup	2.5
Bread, whole wheat	2 slices	1.8	Oatmeal, fortified instant, prepared	1 cup	10.0	Spinach, frozen, boiled, drained	½ cup	1.9
Broccoli, cooked	½ cup	0.6	Peas, frozen and prepared	½ cup	1.3	Tofu, raw, firm	½ cup	3.4
Broccoli, raw	1 stalk	1.1	Pinto beans, boiled	1 cup	3.6	Vitamin supplements	varies	varies
Dates	10 each	1.6	Prune juice	½ cup	1.5			

Iron Excess

Iron excess can be just as bad for your health as iron deficiency. If you store too much or are not able to metabolize or get rid of it, iron can build up in many of your organs causing significant damage and many unexpected illnesses. Excess iron causes oxidation (free radical damage) that can injure the inner lining of your blood vessels leading to heart disease, cancer, hepatitis and diabetes. There are some inherited diseases of excessive iron storage in the liver and other organs known as hemochromatosis and hemosiderosis. Blood and other types of testing will be able to diagnose these. The best way to tell whether or not excess iron is an issue is to check the serum ferritin levels before supplementing with any form of iron. An optimal level would be 80 – 300 mg/ml. Levels significantly higher than that may well be toxic and require medical intervention.

The Ideal Iron Supplement

Once it's been established that you are iron deficient by blood tests, what is the best type of supplement to take? In my opinion, any iron supplement should also contain adequate amounts of vitamin C and most of the B complex vitamins. Vitamin C enhances iron absorption and prevents constipation, a frequent side effect of any iron supplement.

B complex vitamins, especially vitamin B12 and folic acid, are often also deficient in people who suffer from anemia or chronic fatigue. The mild acid characteristics of vitamin C and the B complex vitamins will enhance iron absorption as well as provide other health benefits.

The B-complex vitamins are a group of similarly structured water-soluble compounds that are not stored in the body and must be supplied on a daily basis from the diet or through supplementation. They consist of B1 (thiamine), B2 (riboflavin), B3 (niacin, niacinamide), B5 (pantothenic acid), B6 (pyridoxine), B7 (biotin), B12 (cobalamin), and folic acid (B9, folate or folacin). PABA, inositol and choline are often included as part of the B complex. The B-complex of vitamins are used in the proper formation of every cell in your body – particularly the heart, liver and nerve cells.

B-complex vitamin deficiencies occur far more easily and frequently than has been generally assumed, especially in people on weight loss diets, fasts, high daily intakes of sugar, refined and processed foods, as well as caffeine, saccharine and alcohol. People under stress or on a long list of medications, especially antibiotics, diuretics, chemotherapy, the birth control pill, hormone replacement therapy, etc, may be at high risk to develop B vitamin deficiencies.

B-complex vitamins are commonly found together in foods and have similar coenzyme (catalysts for enzyme reactions) functions, often needing each other to perform specific metabolic tasks. Some of the B vitamins (B12 and biotin) can also be made in the body by friendly microbes (bacteria, yeast, fungi, molds) in the large intestine. The majority of B vitamins, however, are obtained from food and then absorbed into the blood, mainly from the small intestine. If we consume too many B vitamins, the excess is excreted through the urine and the skin (perspiration). These excesses, with rare exceptions like B3 (niacin), are harmless and often helpful, especially for those suffering from various suboptimal mental processes.

B Vitamins Are Vital For:

- Health of the skin, bones, hair and muscle
- Intestinal health and bowel function
- Relief of moodiness, restlessness, irritability, insomnia, fatigue
- Brain cell function and health
- Relief from PMS, nausea, muscular weakness and sore or dry mouth and tongue.
- Health of mucosal membranes, particularly around the mouth
- Optimal blood sugar control
- Improved liver and cardiovascular system health
- Relief from skin problems, dry and itchy skin and rashes

The B vitamins are found in many foods, occurring together, never in isolation. While the richest natural source of B vitamins is brewer's yeast or nutritional yeast, this is not an ideal food for many hypersensitive people. Other good sources of the B vitamins are the germ and bran of cereal grains, green vegetables, beans, peas, liver, most animal foods and nuts.

The B vitamins function primarily as coenzymes that catalyze many biochemical reactions in just about every cell in the body. They create energy by converting carbohydrates to glucose and also are important in fat and protein/amino acid metabolism. The B complex vitamins are very important for the normal functioning of the nervous system, via their anti-stress effects and energy boosting properties. The B vitamins are also vital for the general muscle tone of the gastrointestinal tract, which allows the bowels to function at their best.

Single B vitamin supplementation is not recommended because the functions of the B vitamins are so interrelated. In therapeutic dosages, they are best taken as a B-complex to relieve stress, fatigue, anxiety, nervousness, insomnia, and hyperactivity. Isolated B vitamin supplements may be therapeutically useful for conditions such as vitiligo, which can be helped by higher dosages of PABA (3000 mg or more daily) in addition to a balanced B-complex supplement. Similarly, high doses of B6 for PMS and B1 for alcohol-induced organ damage are therapeutically helpful.

B Vitamins For Anxiety And Depression

Practically all the B-complex vitamins are involved in treatment of anxiety and depression. The most important of these are B1, B3, B6, B12 and inositol. When using high doses of individual B vitamins, they must always be in conjunction with all the other B vitamins in relatively high doses to prevent or reduce side effects as well as deficiencies in those B vitamins not supplemented. For example, if using vitamin B1 in doses of 1000 mg daily, take a B complex of at least 100 mg of most of the other Bs at the same time.

- **B1 (Thiamine):** (500 – 3000 mg daily) reduces or eliminates irritability, disordered thinking and mental confusion in otherwise healthy people. Clinically indicated in Alzheimer's disease, depression, insomnia, memory loss, alcoholism and all anxiety disorders.
- **B3 (Niacin):** (500 – 3000 mg daily) is recommended for circulatory problems and lowering triglycerides and cholesterol. Niacinamide does not work in this fashion and is more applicable to anxiety, nervousness and irritability. Niacinamide is effective treatment for anxiety, insomnia, depression and other nervous system problems commonly seen in people who suffer from hypoglycemia and/or diabetes. Dementia, irritability, headaches, mental confusion, attention deficit disorder, hallucinations, amnesia, certain forms of schizophrenia and severe depression can all be signs or symptoms of B3 deficiency.

  Adverse Effects and Toxicity: hepatitis has been observed with the time released form of niacin; Inositol hexa-nicotinate (contains 6 molecules of niacin and 1 molecule of inositol) does not cause flushing or hepatitis. Use Caution when taking more than 1000 mg of niacin per day as it may elevate liver enzymes, which should be monitored during niacin therapy – if elevated, cut back on dosage.

  Nausea is first sign of toxicity with both niacin and niacinamide. Flushing occurs with niacin, so it's best taken with food. Other adverse effects of high dose niacin are gastritis, elevated uric acid levels and reactivated peptic ulcers, the latter of which can be prevented by taking L-glutamine (4000 mg with each dose) to repair any gastrointestinal damage.
- **B6 (Pyridoxine):** (100 – 1000 mg daily) is clinically effective in practically all anxiety and depression related psychiatric illnesses including anorexia nervosa, attention deficit disorder, autism, bipolar disorder, PMS, chronic fatigue syndrome, fibromyalgia, hyperactivity and dementia. Caution should be taken as some reports of peripheral neuropathy (numbness, tingling, loss of sensation) have been reported with large doses of vitamin B6. This can be reversed by either lowering the dose of B6 or increasing relative doses of the other B-complex vitamins.
- **B12 (Cobalamin):** (1000 – 3000 mcg daily). B12 goes by many names: Cyanocobalamin – oral, sublingual, or intranasal administration of B12 is only rarely effective; Hydroxycobalamin (injectable) is longer acting and achieves higher B12 levels than cyanocobalamin; Methylcobalamin (oral lozenges) - brain active form especially useful for mercury toxicity and other neurological problems (M.S., chronic pain syndromes). The most spectacular benefits of B12 are seen with depression, chronic fatigue, memory loss, neuropathy and bipolar disorder. Although effective against anxiety, other B vitamins, especially B3 in high doses, appears to be most effective. Inositol: (1000 – 6000 mg daily) has been reported in recent psychiatric journals to be as effective as prescription anti-depressant and anti-anxiety drugs without the side effects. The powdered form is most effective but also the costliest (equivalent in price to most commonly prescribed anti-depressants). One side benefit in large doses is that it helps remove fat from the liver.

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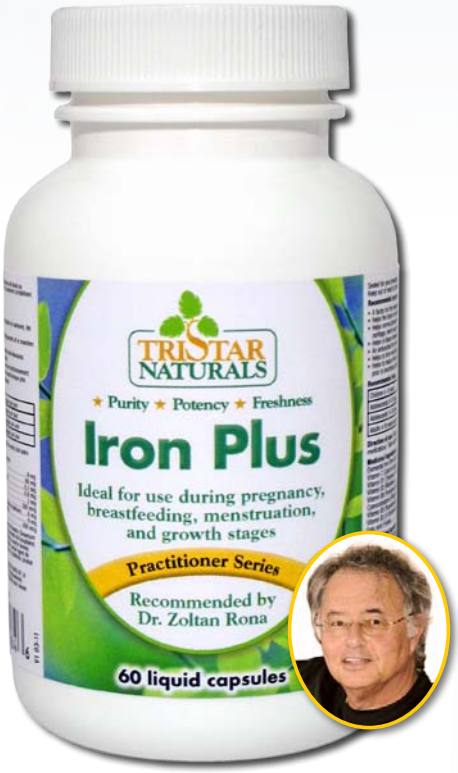

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