

# Pumping and Eating Iron: What are the Concerns for Active Individuals?

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**T**hough the health benefits of physical activity are many, the impact of physical activity on iron as well as other nutrient needs is much less well established. Iron is a critical nutrient for both men and women as it plays a key role in a number of cellular processes including DNA synthesis, oxygen transportation, and the electron transport system (9).

Without enough iron, an athlete may experience, not only decreased exercise performance and lowered VO<sub>2</sub> max, but also changes in metabolic rate, psychomotor development, intellectual performance, immune function and thermoregulation (2, 3, 10). According to a recent study, as many as 25 – 35% of athletes have been found to have low iron stores as compared to 1 and 8% of

young men and women, respectively (3). See table 1 for iron RDAs.

## How do I know if my iron is low?

Measurement of serum levels of soluble transferrin receptor (sTfR) is now the gold standard for identifying iron deficiency in its earliest stage. This marker has been found to be the most accurate indicator of iron stores and more sensitive to iron deficiency than serum ferritin (1). Speak to your physician to have your iron levels tested.

## Where can I find iron?

Healthy adults absorb about 10% to 15% of dietary iron from food, but individual absorption is influenced by several factors. Storage levels of iron have

the greatest influence on iron absorption which increases when body stores are low. When iron stores are high, on the other hand, absorption decreases to help protect against toxic effects of iron overload (3). Iron absorption is also influenced by the type of dietary iron consumed. Meat and other animal products are high in heme iron which has an absorption range of 15% to 35%. In contrast, only 2% to 20% of non-heme iron in plant foods such as rice, maize, black beans, soybeans and wheat is absorbed. See table 2 for food sources containing iron.

## Who is at risk?

Certain individuals are at an increased risk for iron deficiency, including adolescents experiencing a growth spurt (especially once they begin menstruating). Athletes, in general, are at an increased risk due to possible poor nutritional

**Table 1. Iron Recommended Dietary Allowances (5)**

Age	Males (mg / day)	Females (mg / day)	Pregnant (mg / day)	Lactating (mg / day)	Upper Level (mg)
19 – 50 years	8	18	27	9	45
51+ years	8	8	N/A	N/A	45

intake, increased losses in sweat, hemolysis (destruction of red blood cells) caused by repeated foot strike as well as impaired absorption for those with low gastric acid secretion (1, 3, 6).

Inadequate energy intake has been identified from numerous surveys of female athletes, which increases the likelihood of inadequate iron intake. Individuals adhering to a strict vegetarian diet are consuming iron with diminished bio-availability and are likely consuming food substances that impair absorption such as tea, legumes, whole grains, wine, grapes, calcium and phosphate salts, and soy protein, placing them at further risk. The good news for vegetarians or for those not eating a lot of meat is that nonheme iron absorption is significantly improved by various food components. See Inset 1 for more information about iron absorption.

Note that vegetarians who exclude all animal products from their diet may need almost twice as much dietary iron each day as non-vegetarians because of the lower intestinal absorption of nonheme iron in plant foods (8).

### Should you supplement?

Those who supplement need to be aware that the body does not have a mechanism by which to excrete excess iron, and that excess iron will act as a pro-oxidant, carrying with it a risk of liver cancer and cardiovascular disease. Additionally, dietary iron intake has been positively associated with the incidence of type 2 diabetes in postmenopausal women (1, 12). Therefore, before taking iron supplements, you need to have your iron levels measured to determine whether your levels are low.

**Table 2. Food Sources Containing Iron (7,8)**

Vegetarian Sources of Iron (Non-Heme Iron)	Non-Vegetarian Sources of Iron (Heme Iron)
Spinach	Beef
Nuts	Pork
Seeds	Fish
Dried Beans	Shrimp
Soy Foods	Oysters
Tofu	Clams
Soybeans	Crab
Textured Vegetable Protein	Tuna
Meat alternative	Halibut
Bread	Chicken (liver is the best source)
Legumes	Egg yolks
Dried fruit (raisins, cranberries, cherries)	Turkey
Fortified breakfast cereals	
Oatmeal	
Molasses	
Green leafy vegetables	
Peas	
Asparagus	
Strawberries	

### Bottom line

Based on the available research, it is difficult to arrive at conclusions regarding the impact of exercise on iron requirements. If there is an increase in requirements, it will most likely be for those engaged in long distance running due to gastrointestinal losses and footstrike hemolysis. It is clear that iron supplementation should never be initiated without prior determination of iron status and regular monitoring by a physician, as iron overload presents serious health issues. As always, food first seems to be an appropriate recommendation when it comes to taking in adequate iron.

### References

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## Inset 1. Interesting Facts about iron absorption

- About 60% of iron in meat is non-heme (although meat itself helps absorb non-heme iron).
- The absorption of non-heme iron often depends on the food balance in meals.
- Meat and fish not only contain heme iron—the best form for maintaining stores—but they also help absorb non-heme iron.
- Vitamin-C rich foods will enhance absorption of non-heme iron
- Foods containing riboflavin (vitamin B2) may help enhance the response of hemoglobin to iron.
- Normal gastric acid secretion is necessary to help absorb iron

### Factors which impede the body's absorption of dietary iron:

- Tannins (tea)
- Polyphenols (wine and grapes)
- Phytates (legumes and whole grains)
- Calcium
- Soybeans

Sources: (3,11)

## About the Author

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