

IRON

HANDOUT

Iron is an essential mineral which plays a role in a variety of body functions. Iron's primary role is to carry oxygen in the hemoglobin of red blood cells from one body tissue to another, where it is used to produce energy. In turn, iron takes the carbon dioxide resulting from energy production away from body tissues. At the end of the four-month lifespan of red blood cells, the remaining iron is stored or is used to make new red blood cells. Through this process, iron supports the immune system, brain development and the growth of new body tissues.

HOW MUCH IRON DO YOU NEED?

Table 1. Recommended Dietary Allowances for Iron

	0-6 months	7-12 months	1-3 years	4-8 years	9-13 years	14-18 years	19-30 years	31-50 years	51-69 years	70+ years
Male	0.27*mg	11 mg	7 mg	10 mg	8 mg	11 mg	8 mg	8 mg	8 mg	8 mg
Female	0.27*mg	11 mg	7 mg	10 mg	8 mg	15 mg	18 mg	18 mg	8 mg	8 mg
Pregnancy						27 mg	27 mg	27 mg		
Lactation						10 mg	9 mg	9 mg		

*Adequate Intake

Institute of Medicine, Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitamin K, Boron, Chromium, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington, D.C.: National Academy Press, 2001.

Dietary iron needs vary depending on gender, life stages, and activity level (**Table 1**). Since sufficient iron is most important during periods of growth, people with the greatest need include:

- growing children and adolescents
- breastfed infants after 6 months of age because of the low iron content in human milk
- teen girls and women during childbearing years to compensate for iron losses during menstruation
- pregnant women to support an expanding blood supply

For adult men and post-menopausal women, enough iron is needed daily to replace the daily loss in feces, sweat, skin, and urine.

IRON ABSORPTION

1. To Boost Iron Absorption, Include Heme Iron Sources

Much of the iron consumed in food is not absorbed into the bloodstream. Several factors influence absorption, including kind of iron, other nutrients consumed at the same time, and the body's iron stores. On average, absorption from an animal- and plant-based U.S. diet is about 18 percent, though only about 10 percent from a vegetarian diet. The iron in meat, poultry, and fish is 25 – 65 percent heme iron (**Table 2**), which is more absorbable than the nonheme iron found in other food sources (**Table 3**).

2. Remember the Meat Factor

Meat, poultry, and fish contain a special quality called the Meat Factor which helps the body absorb more nonheme iron. For example, the body absorbs more of the nonheme iron in vegetables when meat is eaten at the same meal.

3. Include Vitamin C Sources

Foods that contain Vitamin C such as fruits and vegetables help the body absorb more nonheme iron (**Table 4**). For example, citrus eaten with cereal will improve the absorption of the nonheme iron in the cereal.

4. Iron Absorption Blockers

Some foods block iron absorption such as coffee and tea, whole grains, bran, legumes, spinach, soy, and other high-fiber foods. Though these foods may contain iron, it's not easily absorbed, and are best eaten with meat and/or Vitamin C sources.

Table 2. Iron Content of Selected Sources of Heme Iron

3-ounces, cooked, lean only	Iron (mg)
Beef	
Calves Liver	5.6
Strip Steak	3.0
Top Round Steak	2.8
Chuck Center Roast	2.7
Ground, 93% Lean	2.4
Top Sirloin Steak	1.7
Pork	
Tenderloin Roast	1.0
Ham, boneless	0.7
Lamb	
Loin Chop	1.7
Veal	
Loin Chop	0.7
Chicken	
Breast, meat only	0.9
Fish	
Tuna, light	1.4
Flounder/Sole	1.4
Shellfish	
Oysters, moist heat	7.8
Shrimp, moist heat	0.3

IRON-FORTIFIED FOODS

Mineral fortification was introduced in food manufacturing during the first half of the 20th century. Since then, many foods have been fortified to prevent micronutrient-deficiency diseases. See **Table 5** for examples of nonheme iron-enriched foods.

SOURCES

Duyff, R. (2012) *American Dietetic Association Complete Food & Nutrition Guide*, 4th Edition. Hoboken, NJ: John Wiley & Sons, Inc.

Beef Checkoff (1998) *Iron in Human Nutrition*, 2nd Edition. Chicago, IL: National Cattlemen's Beef Association.

All nutrient data: Nutrient Database for Standard Reference, Release 28. Version Current: September 2015, slightly revised May 2016. Internet: <https://ndb.nal.usda.gov/ndb/>

Table 3. Iron Content of Selected Sources of Nonheme Iron

Food	Iron (mg)
Spinach, boiled, ½ cup	3.2
Russet Potatoes, flesh and skin, baked, 1 large	3.0
Pumpkin & Squash Seed Kernels, dried, ½ cup	2.8
Cashew Nuts, dry-roasted, ½ cup	2.1
Lima Beans, cooked, ½ cup	2.1
Apricot, dried halves, ½ cup	1.7
Russet Potatoes, flesh and skin, baked, ½ large	1.6
Turnip Greens, frozen, cooked, ½ cup	1.6
Egg, large hard-boiled	0.6
Kiwifruit, 1 cup sliced	0.6
Cherries, 1 cup raw	0.5

Table 4. Vitamin C Content of Selected Common Foods

Food	Vitamin C (mg)
Red Pepper, sweet, ½ cup chopped	95
Strawberries, 1 cup	85
Orange, 1 medium	70
Orange Juice, ½ cup	62
Green Pepper, ½ cup	60
Cantaloupe, 1 cup	58
Grapefruit Juice, ½ cup	47
Broccoli, ½ cup	41
Grapefruit, ½ medium	40
Cauliflower, ½ cup	26
Tomato, 1 medium	17
Potato, baked, 1 medium	17
Cabbage, ½ cup	16

Table 5. Examples of Nonheme-Iron-Enriched Foods

Food	Nonheme Iron (mg)
General Mills Total Raisin Bran Cereal, 1 cup	18.0
Quaker Oatmeal Squares, 1 cup	16.4
Post Grape Nuts, ½ cup	16.2
Enriched White Pita, 1 large	1.6
Raisin Bread, enriched, 1 slice	0.9

