USOC SPORTS NUTRITION

IRON FACTSHEET

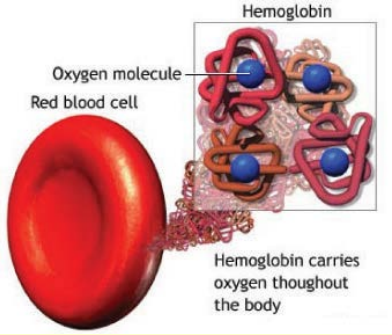
THE UNITED STATES OLYMPIC COMMITTEE

Iron and the Body

Iron is an important mineral involved in the transportation of oxygen throughout the body and it helps produce red blood cells (RBC). Iron is part of the protein contained in RBCs, known as hemoglobin. Hemoglobin carries oxygen from the lungs to tissues, allowing muscles to stores and use oxygen efficiently.

Insufficient iron levels can result from:

- Low overall calorie consumption
- Low animal protein consumption
- Losing iron from blood loss (menstruation, injury/disease, or gastrointestinal trauma)
- Poor absorption of iron due to interactions with food or medication
- Losses through sweat, feces, and urine during periods of heavy training



Iron Stores

Poor iron status (storage and circulating iron) exists across several levels.

- Athletes may experience mild symptoms when they are iron-depleted

Symptoms of Deficient Iron Stores

- Breathless or early fatigue during training
- Decreased motivation to train
- Increased rate of perceived exertion (RPE)
- Decreased aerobic capacity and adaptations
- Decreased time to exhaustion

Importance of Iron to Performance

The hard physical demand of training by elite athletes increases their physiological need for oxygen.

Without adequate iron in the body, oxygen is not delivered effectively to muscles, which impairs muscle function and aerobic capacity.

Altitude and Iron

When training at altitude, athletes typically experience an increase in production of RBCs which increases the need for iron.

- If training is planned at altitude, test iron status 6-8 weeks prior to travel to ensure there is time to achieve optimal levels prior to departure
- If living at altitude monitor iron status regularly

How much iron is enough?

The Daily Recommended Intake (DRI):
Females (18-50 years old) = 18 mg/d
Males (18-50 years old) = 8 mg/d
Vegetarians (all ages) = 1.8 x DRI
**Needs are much higher to restore status if blood results are low*

Two types of iron found in food:

Heme iron is found in animal foods like meat, fish, and poultry. This type of iron is highly absorbed by the body.
Non-heme iron is found in plant foods like legumes, dark leafy vegetables, dried fruit, enriched grains, fortified cereals and sport bars. This type of iron is poorly absorbed by the body.

Considerations for Iron Absorption

- Calcium rich foods, tea, coffee and cocoa can inhibit heme iron absorption
- Certain types of fiber (e.g. phytates and oxalates) found in spinach, kale, walnuts, and almonds can inhibit the absorption of non-heme iron
- To increase absorption of non-heme iron containing foods, combine with foods rich in vitamin C (e.g. pineapple, orange, grapefruit and their juices; strawberries, peppers, broccoli, tomato, kiwis) or heme iron food sources

Iron in Training Meals and Snacks

Food sources of heme iron	**Iron (mg)**
Oysters – 3 oz.	7.8
Lean beef steak – 3.5 oz.	3.8
Egg, whole	1.7
Lean pork/ham – 3.5 oz.	1.5
Tuna, cooked – 3.5 oz.	1.1
Salmon or chicken breast – 3.5 oz.	0.9 - 0.8
White fish – 3.5 oz.	0.4
Sources of non-heme iron	**Iron (mg)**
Fortified cereal – 1 cup	4.5 - 18
Tofu, raw – ½ cup	6.65
Lentils – 1 cup	6.59
Oatmeal, instant (1 pkg); Sport Bar (1)	6.30
Kidney or garbanzo beans – 1 cup	5.20 - 4.75
Black beans – 1 cup	3.61
Spinach, cooked – ½ cup	3.21
White pasta or rice, cooked – 1 cup	1.90
Dried figs (4) or dried apricots (10 halves)	1.67
Raisins – ⅓ cup	1.04

Iron-rich Meal and Snack Suggestions

- *Include iron rich foods like meat, fish, poultry, tofu in 2 meals per day to meet recommendations*
- *Pair dried fruits like figs and apricots with hard boiled eggs for an iron rich snack*
- *Boost iron at breakfast by topping oatmeal with $^{1}/_{3}$ c of raisins*
- *Make a vegetarian iron rich brown rice bowl by combining black beans, tofu and veggies*
- *Whip up a batch of tuna salad for sandwiches throughout the week to ensure daily iron intake*
- *Choose the highest % iron fortified cereal (most Kellogg brands) – check labels*

Athlete Recommendations: