IRON & ATHLETES

What is iron?

Iron is an essential mineral needed in transport of oxygen, creating red blood cells, and in energy metabolism.

How does iron affect performance?

Athletes need sufficient iron to bring oxygen to working muscles during exercise and help produce energy to fuel activity.

Too little iron impairs performance, especially in activities which are aerobic, or require oxygen.

Athletes with low iron may experience:
- Decreased endurance performance
- Decreased energy efficiency
- Decreased physiological adaptations to training
- Greater difficulty adapting to altitude training

What are symptoms of low iron?

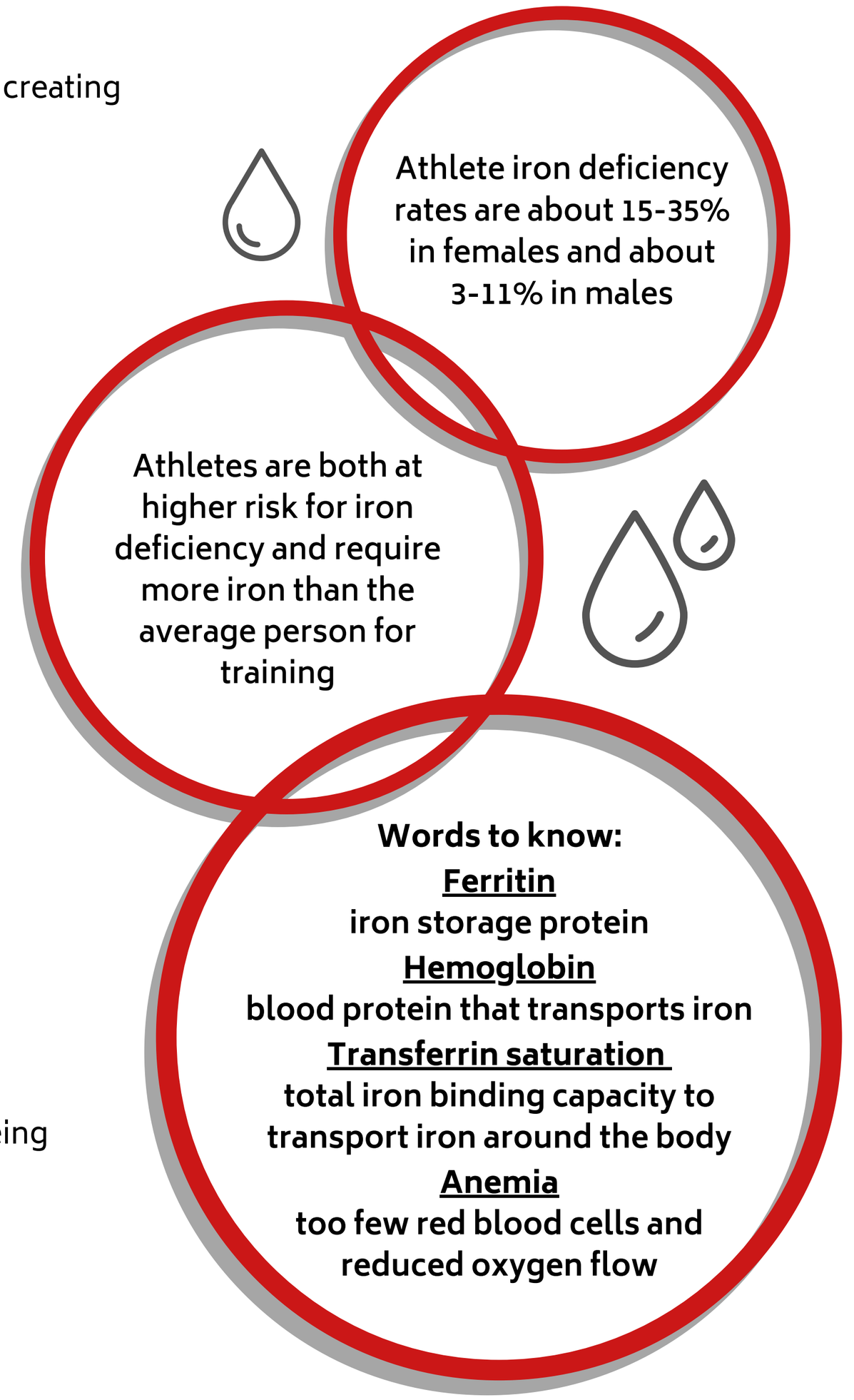
Low iron, or iron deficiency, can cause symptoms like:

- Fatigue
- Weakness
- Negative mood states
- Increase in perceived effort when exercising

What increases risk of iron deficiency?

People in the following categories are at greater risk for being iron deficient:

- Females
- Endurance athletes
- Vegans or vegetarians
- Not consuming enough energy



Certain blood markers and their levels are used to diagnose the presence and severity of iron deficiency:
(proposed for athletes by Peeling et al. 2007)

Iron Deficiency Stage	Physiology	Ferritin	Hemoglobin	Transferrin saturation
Stage 1 Iron Deficiency	Depleted overall body iron stores	<35 ug/L	>115 g/L	>16%
Stage 2 Iron Deficiency Non-Anemia	Reduced red blood cell production	<20 ug/L	>115 g/L	<16%
Stage 3 Iron Deficiency Anemia	Hemoglobin production falls, resulting in anemia from too few red blood cells	<12 ug/L	<115 g/L	<16%

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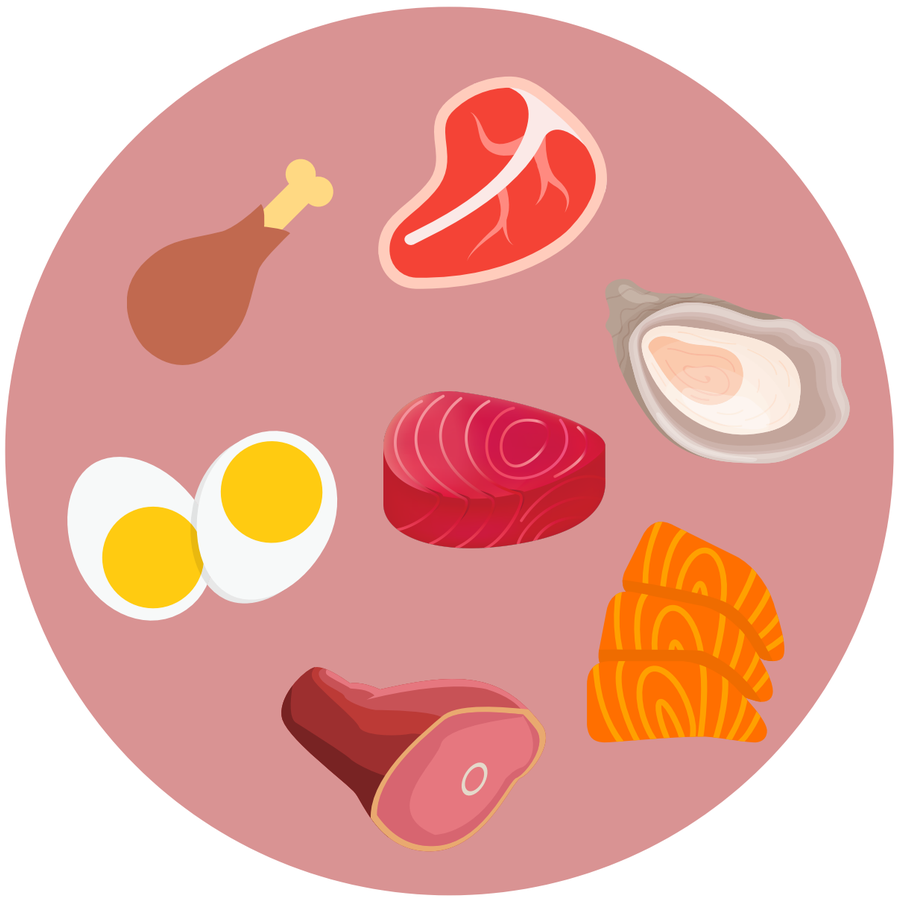
How to get iron through foods

While many foods contain iron, they don't provide it equally. There are 2 types of iron found in food and understanding their differences is important to adequately meeting iron needs.

HEME IRON

Found in animal based foods
Well absorbed in body
Heme iron foods include:



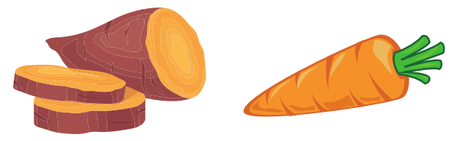
NON-HEME IRON

Found in plant based foods
Usually poorly absorbed in body
Non-heme iron foods include:

What foods help or inhibit iron absorption?

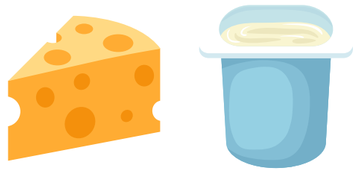
✓ Include these foods/nutrients with iron rich foods to help increase iron absorption:

Vitamin C foods

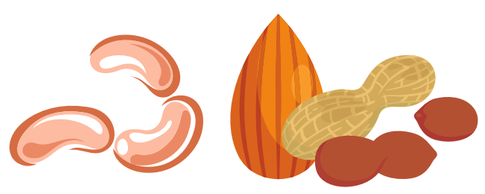


Beta-carotene foods

✗ Avoid these foods/nutrients with iron rich foods as they decrease iron absorption:



Calcium foods



Phytate foods

Coffee & tea

Athlete iron needs

Males: 8 mg iron per day
Females: 18 mg iron per day
(both ages 18-50)

Athletes may need an additional 1-2 mg iron per day to meet their increased needs.

Vegetarians and vegans need 1.8x more iron:
Males: 14.5 mg iron per day
Females: 32.4 mg iron per day

Iron supplements

Food should be the primary way iron needs are met. In some situations, foods alone may not be sufficient though. This may be the case if avoiding meat, if iron stores are very low, or if quick iron replenishment is needed.

To make sure you choose the best type of iron supplement and plan for your iron needs, speak with a Sports Dietitian.

Other considerations

The hormone hepcidin increases 3-24 hours after exercise, and decreases iron absorption. Maximize meals and supplements providing iron by consuming them outside this window of time.

High altitude training requires more iron to meet oxygen needs. Assess iron status at least 3-6 weeks before altitude training and make a diet plan with a Sports Dietitian.

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