Iron
Summary

- Iron is an important dietary mineral that is involved in various bodily functions, including the transport of oxygen in the blood.
- The most significant influence on iron absorption is the amount of iron already stored in the body.

Iron is an important mineral that is involved in various bodily functions, including the transport of oxygen in the blood. This is essential for providing energy for daily life. Good sources of iron include red meat, offal and iron-fortified breakfast cereals.

Iron is lost from the body through shedding intestinal cells, sweat and blood loss. About one third of the world’s population is iron deficient. Menstruating women are at greater risk than men and postmenopausal women for iron deficiency. It is thought that up to five per cent of the Australian population has iron deficiency anaemia.

Recommended dietary iron intakes

The average person needs to absorb just a small amount of iron each day to stay healthy (around 1 mg for adult males and 1.5 mg for menstruating females). To achieve this, however, we need to consume several times that amount. This is because our bodies absorb only a fraction of the iron contained in the foods we eat.

The Australian Recommended Dietary Intake (RDI) for iron is the amount of dietary iron required to meet the needs of most of the population. This amount is different for different age groups and life stages.

Recommended dietary intakes (per day)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Dietary Iron Intake (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants 0–6 months</td>
<td>0.2 mg for breastfed infants (the iron in formula is less well absorbed, so the intake in formula-fed infants is significantly higher)</td>
</tr>
<tr>
<td>Infants aged 7–12 months</td>
<td>11 mg</td>
</tr>
<tr>
<td>Girls and boys aged 1–3 years</td>
<td>9 mg</td>
</tr>
<tr>
<td>Girls and boys aged 4–8 years</td>
<td>10 mg</td>
</tr>
<tr>
<td>Girls and boys aged 9–13 years</td>
<td>8 mg</td>
</tr>
<tr>
<td>Boys aged 14–18 years</td>
<td>11 mg</td>
</tr>
<tr>
<td>Girls aged 14–18 years</td>
<td>15 mg</td>
</tr>
<tr>
<td>Women aged 19–50 years</td>
<td>18 mg</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>27 mg</td>
</tr>
<tr>
<td>Lactating women</td>
<td>9 mg (10 mg for 14–18 year old adolescents who are breastfeeding)</td>
</tr>
<tr>
<td>Women aged 51 years and over</td>
<td>8 mg</td>
</tr>
<tr>
<td>Men aged 19 years and over</td>
<td>8 mg</td>
</tr>
</tbody>
</table>

Roles of iron

Some of the many roles of iron include:

- **Oxygen transport** – red blood cells contain haemoglobin, a complex protein that carries oxygen from the lungs to the rest of the body. Haemoglobin is partly made from iron, and accounts for about two thirds of the body’s iron.
- **Myoglobin** – a special protein that helps store oxygen in muscle cells. Myoglobin contains iron and is responsible for the red colour of muscle.
- **Enzymes** – many enzymes throughout the body contain iron, including those involved in energy production. Enzymes are catalysts (increase rate of chemical reaction) that drive many cell functions.
- **Immune system** – proper functioning of the immune system relies, in part, on sufficient iron. The immune system helps us fight infection.

High-risk groups for iron deficiency
Certain people are at increased risk of iron deficiency, including:

- babies given cow’s or other milk instead of breastmilk or infant formula
- toddlers, particularly if they drink too much cow’s milk
- menstruating women, especially those who have heavy periods
- women using an IUD (because they generally have heavier periods), pregnant or breastfeeding women
- people with poor diets such as alcoholics, ‘fad dieters’ or people with eating disorders
- vegetarians or vegans
- athletes in training
- people with intestinal worms
- Aboriginal Australians
- regular blood donors
- people with conditions that predispose them to bleeding, such as gum disease or stomach ulcers, polyps or cancers of the bowel
- people with chronic diseases such as cancer, auto-immune diseases, heart failure or renal (kidney) disease
- people taking aspirin as a regular medication
- people who have a lower than normal ability to absorb or use iron, such as someone with coeliac disease.

Types of iron

The two types of iron include:

- **haem iron** – found in animal tissue such as beef, lamb, chicken and fish. Offal products such as liver and kidney are particularly rich in haem iron. Pregnant women should avoid eating too much offal as it contains large amounts of vitamin A, which can cause birth defects. The body absorbs just under one quarter of the iron contained in animal foods.
- **non-haem iron** – found in animal tissue, animal-based products and plant foods such as dried beans and lentils. Good vegetarian sources of non-haem iron include iron-fortified breakfast cereals and wholegrains.

Iron stores affect absorption

The healthy body absorbs around 18 per cent of the available iron from a typical western diet (which includes animal foods) and about ten per cent from a vegetarian diet. However, you may be absorbing much less than that, even if your diet includes iron-rich foods.

The most significant influence on iron absorption is the amount of iron already stored in your body. The body stores iron in various places, including the liver. If your stores are high, your body absorbs less iron from the foods you eat. Conversely, low iron stores increase your ability to absorb iron.

Dietary factors that boost iron absorption

Certain foods and drinks help your body to absorb greater amounts of iron, including:

- Vitamin C (found in fruits and vegetables) increases iron absorption.
- Animal protein boosts iron absorption from plant sources.
- In most cases, cooking increases the amount of available non-haem iron in vegetables. For example, the body absorbs six per cent of the iron from raw broccoli, compared to 30 per cent from cooked broccoli.

Dietary factors that reduce iron absorption

Certain foods and drinks reduce your body’s ability to absorb iron, including:

- Soy proteins can reduce absorption from plant sources.
- Tannins from tea, coffee and wine reduce iron absorption by binding to the iron and carrying it out of the body.
- The phytates and fibres in wholegrains such as bran can reduce the absorption of iron and other minerals.
- Vitamin A helps to release stored iron, so not enough vitamin A in the diet could lead to iron deficiency.
- Calcium and phosphorus reduce the absorption of plant-sourced iron.

Iron supplements

Iron deficiency anaemia is diagnosed with a blood test. You may be advised by your doctor to take iron supplements. Remember:

- The most common side effect of iron supplements is dark coloured or black stools (poo), so don’t be alarmed by this change to your bowel habits.
- Other common side effects include nausea, vomiting, constipation and diarrhoea. See your doctor for advice but, generally speaking, treatment involves lowering the recommended dose for a short time to give the body time to adjust.
- If possible, iron supplements should be taken on an empty stomach.
- Take the supplements as advised by your doctor. The human body isn’t very good at excreting iron and you could poison yourself if you take more than the recommended dose.

Too much iron can be harmful

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The body stores iron very efficiently and too much iron can be toxic. Haemochromatosis is a condition characterised by excessive iron stores. Excessive iron stores can lead to organ damage especially of the liver, heart and pancreas. Some symptoms include fatigue and weakness, joint pain, weight loss and loss of body hair.

Some studies suggest that haemochromatosis increases the risk of heart disease and some cancers, such as colorectal cancer. Treatment includes limiting the amount of iron in the diet and regularly removing blood until iron levels normalise.

Where to get help

- Your doctor
- Dietitians Association of Australia Tel. 1800 812 942.

Things to remember

- Iron is an important dietary mineral that is involved in various bodily functions, including the transport of oxygen in the blood.
- The most significant influence on iron absorption is the amount of iron already stored in the body.

References

- Nutrient Reference Values (NRVs) for Australia and New Zealand (Including Recommended Dietary Intakes), 2006, Australian National Health and Medical Research Council. More information here.
- Dietary Guidelines for all Australians, National Health and Medical Research Council, Commonwealth of Australia. More information here.
- Nutrient Reference Values (NRVs), Dietitians Association of Australia. More information here.
More information

Blood and blood vessels

The following content is displayed as Tabs. Once you have activated a link navigate to the end of the list to view its associated content. The activated link is defined as Active Tab

- Blood and blood vessels explained
- Cholesterol
- Iron anaemia and blood disorders
- Bleeding, clotting and infections
- Blood pressure
- Blood vessel and bone marrow conditions
- Blood donation and transfusion

Blood and blood vessels explained

- Blood count
  The full blood count (FBC) test looks for abnormalities in the blood, such as unusually high or low numbers of blood cells...
- Blood groups
  A person's blood group is determined by a pair of genes, one each inherited from their mother and father...
- Bone marrow
  Bone marrow is the spongy tissue in the hollow centres of a person's long bones and is the blood cell 'factory'..
- Circulatory system
  The heart, blood and blood vessels work together to service the cells of the body..
- Heart explained
  The heart is about the size of a clenched fist and lies in the middle of your chest, behind and slightly to the left of your breastbone..
- Lipoedema
  Lipoedema is a painful, chronic, symmetrical swelling in the legs, thighs, buttocks and sometimes arms due to the accumulation of fat in the subcutaneous tissues.
The onset often occurs during puberty.

- **Lymphatic system**
  The lymphatic manages fluid levels in the body, filters out bacteria and houses types of white blood cells.

**Cholesterol**

- **Cholesterol**
  Your body needs cholesterol, but it can make its own. You don't need cholesterol in your diet.

- **Cholesterol - healthy eating tips**
  Replacing foods that contain saturated fats with foods that contain polyunsaturated and monounsaturated fats will help to lower your cholesterol.

- **Genetic factors and cholesterol**
  Familial hypercholesterolaemia is an inherited condition characterised by higher than normal levels of blood cholesterol.

- **Triglycerides**
  If a person habitually eats more kilojoules than they burn, they will have raised triglyceride levels in the blood.

**Iron anaemia and blood disorders**

- **Anaemia**
  When a person is anaemic, the red blood cells have to work harder to get oxygen around the body.

- **Haemochromatosis**
  Haemochromatosis (iron overload disorder) tends to be under-diagnosed, partly because its symptoms are similar to those caused by a range of other illnesses.

- **Hughes syndrome**
  Hughes syndrome is thickening of the blood caused by abnormal immune system cells.

- **Iron**
  Iron is important for transporting oxygen in the blood.

- **Iron deficiency - adults**
  Don't take iron supplements unless advised by your doctor.

- **Iron deficiency - children**
  Keep iron supplements away from children - as little as one to three grams can kill a child under six years.

- **Porphyria**
  Porphyria can affect the skin, nervous system, gastrointestinal system or all of these, depending on the specific type.

- **Thalassaemia**
  Thalassaemia is an inherited blood disorder that can cause anaemia or death if not treated.

**Bleeding clotting and infections**

- **Bleeding**
  Bleeding may be minor or it may be a life-threatening medical emergency.

- **Haemophilia**
  All children with severe haemophilia are given preventative treatment with infusions of blood products before they have a bleed.

- **Needlestick injury**
  A needlestick injury means the skin is accidentally punctured by a used needle. Diseases that could be transmitted by a needle or needlestick injury include human immunodeficiency virus (HIV).

- **Nosebleeds**
  Bleeding from the nose is common in children and is usually not severe or serious.

- **Septicaemia**
  Bacteria in the bowels, urinary tract, mouth and skin can cause disease if they get into the bloodstream.
• **Subarachnoid haemorrhage**
  A subarachnoid haemorrhage is any bleed located underneath one of the protective layers of the brain known as the arachnoid layer.

• **Subdural haematomas**
  Subdural haematomas are blood clots formed underneath one of the protective layers of the brain.

• **Travel tips for seniors**
  All travellers should plan carefully, but older people have a few extra concerns when travelling.

• **Von Willebrand disease**
  A person with von Willebrand disease may have frequent nosebleeds, heavy menstruation or excessive bleeding from the mouth.

**Blood pressure**

• **Blood pressure**
  Healthy eating and lifestyle changes can help to manage high blood pressure.

• **Blood pressure (high) - hypertension**
  Hypertension, or high blood pressure, can increase your risk of heart attack, kidney failure and stroke.

• **Blood pressure - keep your blood pressure down (video)**
  Heart Foundation of Australia warns of the risk of high blood pressure and tells you what you can do to keep your blood pressure down.

• **Blood pressure (low) - hypotension**
  Low blood pressure is only a problem if it has a negative impact on the body.

• **Dizziness - orthostatic hypotension**
  Postural hypotension is the lightheaded feeling you may get if you leap out of bed very quickly.

• **Fainting**
  Common causes of fainting include heat, pain, distress, the sight of blood, anxiety and hyperventilating.

• **Pulmonary hypertension**
  Pulmonary hypertension is high blood pressure on the lungs.

• **Shock**
  Shock is when there is not enough blood circulating in the body. It is a life-threatening medical emergency.

• **Stroke explained**
  A stroke interrupts blood flow to an area of the brain and is a medical emergency.

**Blood vessel and bone marrow conditions**

• **Amyloidosis**
  A person with amyloidosis produces aggregates of insoluble protein that cannot be eliminated from the body.

• **Aneurysm**
  An aneurysm may have no symptoms until it is either very large or it ruptures.

• **Granulomatosis with polyangiitis**
  Granulomatosis with polyangiitis (GPA), formerly known as Wegener granulomatosis is a rare condition that targets the arteries, veins and capillaries of the kidneys and the respiratory system.

• **Henoch-Schölein purpura**
  Henoch-Schölein purpura causes a purple spotted skin rash which lasts around one to four weeks, and is often marked by relapses.

• **Leukaemia**
  Most children and many adults with acute leukaemia can expect to be cured, while chronic leukaemia can be successfully managed.

• **Peripheral vascular disease**
  Peripheral vascular disease is the reduced circulation of blood to a body part (other than the brain or heart).

• **Polycythaemia vera**

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Polycythaemia vera is characterised by the production of too many red blood cells, caused by abnormal function of the bone marrow.

- Raynaud's phenomenon
  Raynaud's phenomenon can be a sign of a more serious underlying condition, so see your doctor if you experience it.

- Thalassaemia
  Thalassaemia is an inherited blood disorder that can cause anaemia or death if not treated.

- Varicose veins and spider veins
  Smaller varicose veins are usually treated by sclerotherapy ? the injection of irritant chemicals into the affected vein.

Blood-donation-and-transfusion

- Blood donation
  Donated blood is used to help people who are sick or injured, or for medical research.

- Blood transfusion
  Donated blood is screened for blood-borne diseases such as hepatitis, syphilis and HIV.

- Organ and tissue donation
  Discover the facts about organ and tissue donation, decide about becoming a donor and discuss your decision with the people close to you.

Related Information

- Nutrition Week
  Nutrition Week...

- Blood and blood vessels
  Bleeding, blood pressure, conditions, risks and blood products.

- Iron deficiency - adults
  Don't take iron supplements unless advised by your doctor.

- Iron deficiency - children
  Keep iron supplements away from children - as little as one to three grams can kill a child under six years.

- Vitamins - common misconceptions
  There is no evidence that any one vitamin can slow ageing, restore sex drive or cure infertility.

Heart

Related information on other websites

- British Nutrition Foundation,
- Dietitians Association of Australia - Anaemia,
- MedlinePlus, National Institutes of Health US,

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