Why iron and haemoglobin are important

Meet Kylie
Kylie is a blood donor. Kylie knows that having a healthy iron enriched diet will help restore the iron removed with blood donation.
Why iron and haemoglobin are important

The Blood Service would like to thank you for making the decision to become a blood donor. This brochure explains the purpose of the haemoglobin screening test and why iron and haemoglobin are important.
What is HAEMOGLOBIN?
Haemoglobin is an iron-containing protein in red blood cells. Haemoglobin carries oxygen around the body and without enough of it your muscles and organs don’t get all the oxygen they need.

What is a normal haemoglobin level?
Each testing laboratory provides a reference range. This is generally considered to be the normal range for healthy adults.

<table>
<thead>
<tr>
<th>Blood Service haemoglobin reference range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Females</strong></td>
</tr>
<tr>
<td>115–165 g/L</td>
</tr>
</tbody>
</table>

Why is my haemoglobin measured before each donation?
At the Blood Service, the health of our donors and recipients is a priority. The haemoglobin screening test is performed to ensure that it is safe for you to donate and that there are sufficient red cells for the person receiving your blood.

What haemoglobin level do I need to donate?
Red cells (containing haemoglobin) are removed with blood donation causing a temporary drop in the haemoglobin level. The acceptable levels for the different donation types take into account this expected loss.

<table>
<thead>
<tr>
<th>Acceptable Blood Service haemoglobin for donation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole blood</strong></td>
</tr>
<tr>
<td><strong>Plasma and platelets</strong></td>
</tr>
</tbody>
</table>
How does the Blood Service measure my haemoglobin?

Haemoglobin is measured using a few blood drops collected from a finger prick. If the level is below the acceptable range for donation, donors are offered a more precise blood test, taken from a vein.

What causes low haemoglobin?

There are a number of possible reasons, including:

- normal variation - for some individuals a slightly low haemoglobin level is normal and not the result of any health problem
- occasionally the test may under or over-estimate the amount of haemoglobin
- lack of iron which is required to make new red cells
- a deficiency in vitamin B12 or folate
- conditions causing blood loss, including blood donation
- other health problems

Iron deficiency is a common cause of low haemoglobin
What is IRON and where do I get it from?

Iron is a mineral nutrient that your body needs to function normally. It is a vital part of haemoglobin.

Your body obtains iron from the diet, absorbing about 1-2 mg per day. The body is also very efficient at recycling the iron released from broken-down red cells.

Iron is mainly used for making new red cells. The remaining iron is stored and used at times when there is an increased need for iron such as with growth, in pregnancy or blood loss. The term iron deficiency is used when these stores have been used up.

Is it possible to have normal haemoglobin but low iron?

Yes. This is because in early iron deficiency there is often enough iron circulating in your red cells to keep your haemoglobin level normal.

What are the effects of low iron levels?

Iron deficiency does not always cause symptoms. In some individuals, it may be associated with tiredness, impaired concentration or poor work performance. If you feel you may be low in iron, you should consult your general practitioner.

Continued iron loss will affect the production of haemoglobin. If haemoglobin levels fall below the normal range, this is called anaemia.
Does the Blood Service measure my iron levels?
Testing is offered to donors who have a haemoglobin level below the acceptable range for donation.

How does blood donation affect iron and haemoglobin?
Blood donation removes red cells which contain haemoglobin and iron. With good iron stores and dietary iron absorption, haemoglobin and iron can be restored before the next donation in most cases.

Donors who have reduced dietary iron absorption, increased needs or other iron losses such as non-donation blood loss (e.g. heavy menstruation in females), may take longer to restore their levels.

The haemoglobin screening test performed at the next donation ensures the haemoglobin is within the acceptable range for donation.
Who is at risk of iron deficiency?

The chance of developing iron deficiency is higher in donors who:

- have low iron stores before donation – stores are generally lower in women of child bearing age and youth donors
- have a diet low in iron
- have medical conditions or surgery which reduce the amount of iron the body can absorb
- have non-donation related blood loss
- make frequent donations

Iron deficiency is often the result of more than one cause.

What should I do if I have had a low haemoglobin or low iron in the past?

You are encouraged to discuss your ongoing suitability for regular donation with your doctor. You may wish to consider donating whole blood less often or transferring to plasma or platelet donations which have a much smaller red cell loss.

Haem iron foods

<table>
<thead>
<tr>
<th>Food Description</th>
<th>Iron Content (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100g lean rump steak, grilled</td>
<td>3.3</td>
</tr>
<tr>
<td>100g leg of lamb, roasted</td>
<td>2.2</td>
</tr>
<tr>
<td>100g lean beef mince, dry fried</td>
<td>1.5</td>
</tr>
<tr>
<td>100g frenched lamb cutlet, grilled</td>
<td>2.5</td>
</tr>
<tr>
<td>100g lean pork leg steak, grilled</td>
<td>3.7</td>
</tr>
<tr>
<td>100g canned tuna</td>
<td>0.6</td>
</tr>
<tr>
<td>100g bream fillet, steamed</td>
<td>0.2</td>
</tr>
<tr>
<td>2 wholemeal bread slices</td>
<td>0.7</td>
</tr>
<tr>
<td>2 hard boiled eggs</td>
<td>0.7</td>
</tr>
<tr>
<td>1/2 cup baked beans, or lentils</td>
<td>0.5</td>
</tr>
<tr>
<td>1/2 cup English spinach, boiled</td>
<td>0.4</td>
</tr>
<tr>
<td>1 iron-fortified breakfast cereal</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Total iron (mg) Absorbed iron (mg)
How can I improve my iron absorption?

A healthy, iron enriched diet is important for all donors, especially those who have an increased risk of iron deficiency.

Although iron is found in many of the foods we eat, some sources of iron are better absorbed by the body than others.

There are two main types of iron in food:

- haem iron which is found in animal foods such as red meat, seafood and poultry
- non-haem iron which is found mainly in plant foods such as vegetables, legumes, wholegrain cereals, nuts and dried fruits

About 20% of haem iron is absorbed compared with around 5% of non-haem iron.

Haem iron is much more easily absorbed than non-haem iron and is the best source of iron.
How can combinations of food improve iron absorption?

The absorption of the non-haem iron in a meal can be improved by consuming with:

- vitamin C (ascorbic acid) - found in oranges, berries, kiwi fruit, grapefruit, tomato, broccoli, and capsicum. Sources of vitamin C are often at their iron-richest when raw, lightly cooked or steamed.
- organic acids - found in grapes, tomato, citrus fruits and pineapple
- foods containing haem iron

Are there foods that reduce iron absorption?

Substances which reduce iron absorption if consumed with or within an hour following a meal, include:

- calcium found in dairy and soy products
- polyphenols found in tea, coffee, cocoa and red wine (inhibit absorption of non-haem iron only)
- oxalic acid found in spinach, rhubarb and sweet potato
- phytates found in cereals and legumes

Is spinach a good source of iron?

Spinach is a source of non-haem iron which is not as easily absorbed as haem iron. It also contains oxalic acid which reduces iron absorption. It is therefore especially important to combine spinach with vitamin C-rich foods and haem sources of iron, and avoid consuming with other inhibitors such as milk or caffeine drinks.
3 steps to an iron-rich diet:

1. Choose foods high in absorbable iron at each meal and create food combinations to enhance absorption:
   - the best source of iron is lean red meat
   - for non-meat meals, choose iron-rich foods such as legumes (lentils, baked beans or 3-bean mix)
   - combine non-haem sources of iron with good sources of vitamin C
   - consider commercially available foods with added iron (fortified) such as breakfast cereals

2. Drink tea, coffee and milk between meals, not with meals

3. Consider iron rich snacks such as raisins, nuts, dates, prunes and figs

For some iron rich recipes please visit our website: donateblood.com.au/iron-rich-recipes

For further information call 13 14 95 or visit donateblood.com.au