



# The Iron Myth

## Why Plant Iron is Best

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One of the oldest nutritional myths is that people who follow a vegetarian or vegan diet are at greater risk of iron deficiency anaemia! The reason? Because they don't eat red meat, believed by many to be the best and only source of this vital mineral. This is simply not true and all the major health organisations agree - the British Medical Association, the World Health Organisation and the American Dietetic Association. Despite this, some minor health bodies, health professionals and health writers persist in recommending red meat as the best source of iron. Invariably they fail to mention the possible health risks that go with iron from meat and never mention the benefits of plant iron. The old myth has developed deep roots - but it is still a myth. This fact sheet explains all.

### What is Iron and Why Do We Need It?

Iron is a mineral and is an essential component of haemoglobin, found in all red blood cells. It is vital for the health of cells and for the transport of oxygen to all parts of the body.

### Sources and Types of Iron

There are two types of iron - haem, primarily from meat sources, and non-haem from plant sources. Most of the iron in all our diets, including meat eaters, comes not from meat but from plant sources (1, 2). Legumes, such as kidney beans, lentils and chickpeas, soya bean curd (tofu), nuts, seeds, wholegrains and dried fruits, such as raisins, prunes, apricots and figs, are all excellent sources of iron. For example, lentils contain 3.5mg iron per 100g, almonds 3mg, sesame seeds 10.4mg and figs 4.2mg. Many breakfast cereals are fortified with iron, providing another regular non-meat source (3). The Government's Food Standards Agency (FSA) looked at sources of iron in the latest UK National Diet and Nutrition Survey and found that only 17 per cent comes from meat, three per cent from fish and a staggering 80 per cent from vegan foods. Cereals make the single biggest contribution at 44 per cent (1).

The UK recommended nutrient intake (RNI) for iron in adult males is 8.7 mg/day and for women up to the age of 50 it is 14.8 mg/day (4). Iron is shed from the body in sloughed-off skin cells, from the interior surfaces of the body such as the airway, urinary tract and intestine. In women, iron is lost during menstruation and as a consequence they have slightly higher requirements. Despite these losses, the body is a very efficient recycler and manages to keep losses to a minimum at just 1- 1.5mg a day (2, 5, 6).

### Utilisation and Absorption of Iron by the Body

Both types of iron are different and the body handles each slightly differently. Iron from meat is rapidly absorbed and continues to be absorbed and stored whether the body needs it or not. Plant iron tends to be 'bound' to other nutrients in food and needs to be broken down in the body before it can be absorbed. This not only slows down the process of absorption but enables the body to limit its overall intake. As a consequence, stores of non-haem iron are low in comparison to haem iron as the body takes only what it needs, absorption decreasing as iron stores increase (2, 5).

The lower rates of absorption of non-haem iron and the higher body stores of haem iron are often presented by the meat industry and some health professionals as a disadvantage. This is not the case as iron from plants has some distinct advantages over iron from meat. High stores of haem iron are a known risk factor for heart disease and diabetes (13). Absorption of plant iron can be greatly improved simply by including vitamin C with the same meal, such as fresh orange juice (2, 7, 8). Absorption of non-haem iron can be quadrupled if 75mg of vitamin C, about 200ml of fresh orange juice, is consumed with it (9). However, absorption can also be slowed down by tannins in tea and coffee, phytates in bran and other wholegrains, oxalic acid in spinach, chard, berries, chocolate and tea and so these are best avoided when eating iron-rich

foods (2, 10). Dairy and calcium can have a similar negative effect (4, 11).

### Measuring Iron and Iron Status

Haemoglobin found in red blood cells holds most of the body's iron. Haem iron from meat (and to a lesser degree non-haem iron) is bound to haemoglobin and stored in proteins known as ferritins (4, 12). As veggie consumers only non-haem iron, their iron stores naturally tend to be lower than meat eaters but this isn't necessarily an indication of anaemia. There are different ways of measuring the body's iron and determining whether a person has iron deficiency disorders such as anaemia and more severe conditions such as chronic inflammation, infection or malignant diseases (14). The most common measures both haemoglobin and serum ferritin (14).

Ferritin levels determine whether an individual is getting too much, too little or just the right amount of iron. Haemoglobin levels can indicate whether iron deficiency anaemia is present as a low ferritin count is a key feature of it (14).

### Iron Deficiencies

When iron levels are too low, a number of symptoms can occur, including fatigue, pale skin, a weakened immune system and a reduced ability to concentrate. This is iron-deficiency anaemia and for children it can result in poor performance at school. (2, 15).

Iron deficiency is one of the biggest nutritional deficiencies in the world, although only slightly less common in industrialised countries than in the third world. It affects meat eaters and vegetarians alike in similar proportions. Although veggie tend to have lower iron stores (serum ferritin) than meat eaters there is no difference in their rates of iron deficiency anaemia (16). Two of the world's most prestigious health organisations - the American Dietetic Association and the British Medical Association - support this view. The American Dietetic Association state: "Incidence of iron deficiency anaemia among vegetarians and vegans are similar to non-vegetarians therefore vegans and vegetarians are not at greater risk from this condition. Vegetarians and vegans have lower iron stores compared to non-vegetarians however their serum ferritin levels are usually within the normal healthy range" (16).

### Death by Iron - Haem Iron and Heart Disease

People with a high level of iron - usually caused by meat eating although there can also be a genetic link - are more likely to die from heart disease (17, 18, 19, 20, 21, 22). Another negative effect is its tendency to damage (oxidize) the 'bad' form of cholesterol that clogs arteries (low density lipoproteins, or LDL). When LDL cholesterol is damaged it becomes even more dangerous than normal as the chemical reaction involved is thought to directly damage heart cells, making this a two-pronged attack (20).

The evidence against haem iron is growing and it has been shown that high iron stores from red meat increase the risk of heart disease, particularly in older men and women (21). Another study

has shown an increased risk of heart attacks among meat-eating males generally and came to the conclusion that there was a direct association between meat intake, high haem iron stores and heart disease (22). Yet more research has shown that high iron stores and a high dietary iron intake are strongly linked to heart disease (20).

### Haem Iron and Diabetes

Excessive iron stores can also affect the body's ability to regulate insulin production, which is the first warning sign of diabetes. This 'insulin resistance' can go on to cause full-blown adult onset diabetes mellitus (type 2 - non-insulin dependent diabetes). There is now a large body of research to show that insulin resistance is directly related to iron stores - the lower the stores, the less the risk of insulin resistance and the less chance of developing diabetes. It's also clear that vegetarians and vegans have lower insulin resistance than meat eaters and a lower risk of diabetes. The higher diabetes risk for meat eaters is primarily due to their diet. Not surprisingly, the conclusion of these studies is that there would be fewer cases of adult-onset diabetes in meat eaters if they lowered their iron stores. It's a scientific way of saying 'give up meat' (23, 24, 25, 26).

### Baby Blues

Anaemia in infants is surprisingly common and poses a major problem in the UK. At six months old, an infant's requirements for certain nutrients increase, therefore advice from professional bodies such as the British Dietetic Association and the Department of Health is that they should have started weaning by this age. One reason is that the volume of milk required to meet a baby's energy and nutrient needs, such as iron, is too great for breast milk alone to supply. From six months old, an infant's iron requirements increase from 4.3mg (4-6 months) to 7.8mg (6 months). Body stores of iron in a baby are depleted by this age and additional iron is required. Research and real-life practice show this to be true for infants who have been fed breast milk or cow's milk formulas. The primary cause of anaemia in infants is therefore inappropriate weaning - too early, too late or an unbalanced diet.

Feeding babies whole cow's milk is part of the problem because of its low iron content and the fact that what iron there is, is poorly absorbed. Milk also inhibits the absorption of iron from other foods. Even worse, allergy to

cow's milk is widespread and frequently results in unseen intestinal bleeding, with considerable quantities of iron being lost in the blood (2, 27, 28, 29). It is a major problem and in the USA, for example, 15 to 20 per cent of infants have anaemia, about one half of which is caused by cow's milk.

### Summary

- Iron is a mineral found in the haemoglobin molecules of all red blood cells and is essential for healthy cells and oxygen transport around the body.
- There is no difference in the incidence of iron deficiency anaemia between vegetarians/vegans and meat-eaters.
- Rich plant sources of iron include legumes (peas, beans and lentils), soya bean curd (tofu), nuts, seeds, wholegrains and dried fruits. Many breakfast cereals are fortified with iron.
- The daily recommended intake for iron in the UK is 8.7mg/day for men and 14.8mg/day for women up to age 50 years.
- There are two types of iron - haem from meat sources and non-haem from plants.
- Haem iron is rapidly absorbed and continues to be absorbed and stored whether the body needs it or not. Plant iron is more slowly absorbed.
- The body regulates the amount of non-haem iron it absorbs, taking only what it needs for healthy levels to be maintained.
- Absorption of plant iron is improved by including vitamin C with the same meal.
- High iron stores as a result of eating meat are a known risk factor for heart disease and diabetes.
- Anaemia in infants is a major problem in the UK and much of it is linked to cow's milk and cow's milk formulas as dairy is low in iron and inhibits iron absorption from other foods. Allergies to cow's milk are common worldwide and can cause intestinal bleeding in infants - another cause of anaemia in young children.

It is not necessary to eat meat in order to obtain iron - in fact, iron from meat can be bad for us. Plant-based diets which include iron-rich foods, backed up with fruits and vegetables rich in vitamin C, will ensure enough - but not too much - iron and is one of the reasons that vegetarians have a clear health advantage over meat eaters.

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