Are You Getting Enough Iron?

Iron is important

Iron is an essential mineral in foods which is required to keep the body healthy. It is vital for good health and peak performance.

The body uses iron to form an important part of *red blood cells* called *haemoglobin* (which carries oxygen all around the body). Iron is also an essential part of the muscle protein, known as *myoglobin* (which provides oxygen to the *muscles* during strenuous physical activity). In addition, iron is involved in the body's chemical reactions which produce *energy*[1].

Given the important role that iron plays in maintaining health, the fact that iron deficiency is the *most common nutrient deficiency in the developed world* is a serious issue[2].

What happens if you don't get enough iron?

Symptoms of *iron deficiency* can include weakness, tiredness, reduced ability to maintain a constant body temperature and a decreased ability for physical activity[3].

If an iron deficiency is prolonged, it can lead to *anaemia.* In this condition, there are reduced levels of haemoglobin in the blood and a lower amount of oxygen reaching the body's tissues - which results in the body being unable to function normally[3].

Who is at risk of iron deficiency?

People need extra iron during periods of rapid growth. So, in *infancy*, *adolescence* and during *pregnancy* the body needs more iron than usual to help increase the number of red blood cells and provide blood for new body tissue[1].

Red blood cells have a life cycle of 120 days. When they die, their iron is re-used. This efficient mechanism means that *men* lose only small amounts of iron from the body each day[3]. On the other hand, *women* lose much more iron due to menstrual blood loss. In fact, women who have heavy periods can lose substantial quantities of iron[3].

If you suspect that you lack iron, ask your doctor for a blood test to determine your iron levels. Your doctor will then be able to tell you whether your symptoms are caused by iron deficiency or some other factor.

More iron during pregnancy

During pregnancy the daily requirement of iron almost *doubles* in order to supply the growing baby and placenta with new red blood cells. This increase in iron requirements during pregnancy occurs mainly in the last trimester (three months) of the pregnancy when the baby is growing at its most rapid rate[4].

During pregnancy it is important to include more iron-rich foods in the diet. A supplement may also be necessary in order to ensure that sufficient iron is obtained. Consult a doctor about your iron needs if you are pregnant or planning a pregnancy.

How much iron do you need?

Daily Iron Requirements[5]:

Children (1-8 years): 9-10mg/day
Children (9-13 years): 8mg/day
Boys (14-18yrs): 11mg/day
Girls (14-18yrs): 15mg/day
Adult men: 8mg/day
Adult women: 18mg/day
Pregnant women[#]: 27mg/day
Breastfeeding women: 9mg/day
Postmenopausal women: 8mg/day
[#] many pregnant women will require a supplement to achieve this level of intake.

Food sources of iron

Obtaining adequate iron from foods is achievable once you know *which foods are good sources of iron*, and understand *how your body absorbs iron from foods*.

There are two major types of iron in foods.

- *Haem iron* is found in foods such as liver, kidney, meat, seafood and poultry. Haem iron is well absorbed by the body[3].
- *Non-haem iron* is found in legumes, wholemeal breads and wholegrain cereals, green leafy vegetables, nuts, seeds and eggs[3]. Non-haem iron is not as well absorbed by the body as haem iron. However, with a little planning, vegetarians and people who don't eat large amounts of meat can maximise the amount of iron absorbed from their diet.

Non-meat Sources of Iron[6,7]

Food Source	**Iron** (mg)
Lentils, dried peas or beans, 1 cup cooked	3.2
Breakfast cereal, with added iron (eg Sanitarium *Weet-Bix*®), average serve	3.0
Tofu, 1 block (9 x 5 x 3cm)	2.8
Cashews, 25 nuts (50g)	2.5
Sanitarium *Marmite*®, 1 tsp (5g)	1.8
Dried apricots, 10 halves (50g)	1.6
Peas, fresh or frozen, 1/2 cup (80g)	1.3
Rolled oats, dry, 1/3 cup (30g)	1.1
Raisins, 2 Tbsp (25g)	1.1
Wheatgerm, 1 Tbsp (10g)	1.0
Almonds, 20-25 nuts (25g)	1.0
Egg, poached (50g)	1.0
Broccoli, cooked 2/3 cup (100g)	1.0
Mixed vegetables, 1 serve (100g)	0.8
Sunflower seeds, 1 Tbsp (15g)	0.7
Wholemeal bread, 1 slice (30g)	0.7
Walnuts, 15-17 nuts (25g)	0.6
Peanuts, 30 nuts (25g)	0.6
Sesame seeds, 1Tbsp (10g)	0.5
Grape juice, 1 glass (250mL)	0.5
Banana, 1 (100g)	0.5
White bread, 1 slice (28g)	0.3

Maximise non-haem iron absorption

The amount of *non-haem iron* that is absorbed from a food is influenced by other dietary factors that may be present in a meal. These factors may either *enhance* or *inhibit* the absorption of non-haem iron.

Enhancers

- *Vitamin C*: The addition of vitamin C at the same meal as foods containing iron can increase the absorption of non-haem iron by 2 to 3 times[8]. The enhancing effect of vitamin C increases as the amount of the vitamin present in a meal increases[8]. Vitamin C is found in a wide range of fruits and vegetables, including citrus fruits, berries, capsicum, broccoli and cabbage. As a general rule, there is more vitamin C in fresh fruits and vegetables than in those which have been cooked[3].
- *Vitamin A and beta-carotene*: There is some research evidence to suggest that vitamin A and beta-carotene (a precursor of the vitamin) can enhance the absorption of non-haem iron from rice, wheat and corn[9]. More research needs to confirm this effect and to examine the effect of vitamin A on the absorption of non-haem iron from other foods. In the meantime, trying to include a good source of beta-carotene at each meal is probably a good idea. Good sources of beta-carotene are most yellow, orange and green fruits and vegetables.
- *Animal meats*: Meats such as beef, chicken and fish can all enhance the absorption of non-haem iron from a meal. Unlike vitamin C, there is only a modest increase in absorption as more meat is added to a meal[10].

Inhibitors

- *Phytates*: These compounds are naturally present in foods such as wholemeal cereals, bran and legumes. Vitamin C and, to a lesser extent meat, can counteract the inhibiting effects of phytates[8].
- *Polyphenols*: These compounds are found in significant amounts in tea (called tannin), coffee and some grains (eg barley and millet), vegetables and herbs (eg onions and parsley)[11].
- *Calcium*: Calcium reduces both haem and non-haem iron absorption from a meal[2]. However, the inhibitory effect of calcium is complex and researchers are still working to determine whether there is any benefits in consuming *foods rich in iron* at *different times during the day* to *foods rich in calcium*[8]

Tips for increasing iron absorption

1. Top iron-fortified breakfast cereal with a fruit rich in vitamin C (such as strawberries or blueberries) or drink a glass of orange juice with breakfast.
2. Add vitamin C-rich foods, such as tomato or red capsicum, to sandwiches, bean or lentil dishes, wholemeal pasta or rice dishes.
3. Add brightly coloured fruits or vegetables to meals containing rice, corn or wheat.
4. If you drink tea or coffee, limit consumption to between meal times.

Recommended reading for further information on iron: Healthy Vegetarian Eating by Rosemary Stanton, Allen & Unwin, 1997.

Summing up

For optimum health and vitality, it is important to regularly eat a variety of foods that supply iron. As well, it is a good idea to include a rich source of vitamin C and beta-carotene at each meal and limit tea and coffee consumption to between meals.

The following meat-free meal plan contains around 16mg of iron and contains a good source of vitamin C with each main meal:

Meal plan

Breakfast	Sanitarium *Weet-Bix*® with dairy milk or fortified soy drink (eg *Sanitarium So Good*®) Wholemeal toast with margarine and Sanitarium *Marmite*® Orange juice
Snack	Several dried apricots
Lunch	Rice salad including kidney beans, tomato and capsicum Piece of fruit
Snack	Fruit yoghurt
Dinner	1 serve of Doner Tempeh Kebab (see Recipe)
Snack	Banana with custard

Total daily intake: 7460 Kilojoules (1775 Calories). Protein 74g. Fat 45g[#]. Carbohydrate 316g. Sodium 1640mg. Potassium 4260mg. Calcium 730mg. Iron 18.3mg. Fibre 43.5g.

[#] The recommended daily fat intake for women of a healthy weight is 30-50 grams[12].

Recipe

Doner Tempeh Kebab

2 teaspoons oil
300g packet tempeh, finely sliced
400g packet kebab bread
8 tablespoons hommus
2 cups tabbouli salad
2 medium tomato, diced
1 cup shredded lettuce
4 tablespoons favourite sauce eg. tomato or B.B.Q.

1. Heat oil in a frypan. Add tempeh and lightly fry on both sides.
2. Spread each kebab bread with 2 tablespoons hommus. Top with tempeh, tabbouli salad, tomato, lettuce and favourite sauce.
3. Roll up and serve. Serves 4.

N.B. Hommus and tabbouli salad can be prepared at home or purchased in a pre-prepared form from the fresh salad deli section of the supermarket.

Per Serve[*]: 2260 kilojoules (540 calories). Protein 27g. Fat 17g. Carbohydrate 87g. Sodium 780mg. Potassium 810mg. Calcium 120mg. Iron 6.8mg. Fibre 13.5g.

For more inspirational plant-based recipes, please visit:
www.sanitarium.com.au or www.sanitarium.co.nz

References

1. Wahlqvist M, Food & Nutrition: Australasia, Asia & The Pacific. Allen & Unwin, St. Leonards, 1997.
2. Patterson A J, Brown W J, Roberts D C K, Development, prevention and treatment of iron deficiency in women. Nutr Res 1998;18:489-502.
3. Stanton R, Complete Book of Food & Nutrition. Simon & Schuster, Australia, 1995.
4. Public Healh Commission, Guidelines for Healthy Pregnant Women. Public Health Commission, Wellingtion, 1995.

5. NHMRC, Nutrient Reference Values for Australia and New Zealand – Executive Summary, Canberra, 2006.
6. Department of Community Services & Health, Nutritional Values of Australian Foods. AGPS, Australia, 1992.
7. Nuttab, Australian Government Publishing Service, Canberra, 1990.
8. Australian Iron Status Advisory Panel, Bioavailability: A Summary. June 1998.
9. Garcia-Casal M N, Layrisse M, Solano L, Baron M A, Arguello F, Llovera D, Ramirez J, Leets I, Tropper E, Vitamin A and beta-carotene can improve nonheme iron absorption from rice, wheat and corn by humans. J Nutr 1998;128:646-50.
10. Lynch S R, Interaction of iron with other nutrients. Nutrition Reviews 1997;55:102-10.
11. Bravo, L, Polyphenols: Chemistry, dietary sources, metabolism, and nutritional significance. Nutr Rev 1998; 56(11):317-33.
12. Stanton R, Fat and Fibre Counter. Wilkinson Books, 1993.

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Update to Recommended Dietary Intakes to reflect Nutrient Reference Values (2006), July 2009.

The information contained in this fact sheet is correct at the time of publication with every effort being made to ensure it follows the latest nutrition research and guidelines. Please consult your dietitian or doctor for advice on your personal dietary requirements.

Energy values rounded to the nearest 20 kilojoules and to the nearest 5 calories.