

## Red meat and B vitamins

B vitamins are essential for health. They are important for the release of energy from food. They also contribute to the health of the blood and nervous system.

Red meat contains a number of B vitamins: thiamin (vitamin B<sub>1</sub>), riboflavin (vitamin B<sub>2</sub>), pantothenic acid, folate, niacin (vitamin B<sub>3</sub>), vitamin B<sub>6</sub> and B<sub>12</sub>. Meat, fish and animal-derived foods, such as milk, are the only foods that naturally provide vitamin B<sub>12</sub>. For this reason, excluding these foods from the diet and not consuming B<sub>12</sub> supplements or foods fortified with B<sub>12</sub>, can result in inadequate B vitamin intakes.

Red meat is a *rich source* of vitamin B<sub>12</sub> which means that 100 g of red meat contains more than a third of the recommended amount of B<sub>12</sub>. Indeed, in the British diet, about 29% of vitamin B<sub>12</sub> comes from meat and meat products<sup>1</sup>. Dietary intakes of vitamin B<sub>12</sub> are lower from vegetarian diets, and are particularly low in vegan diets<sup>2</sup> (which contain no animal foods), thus highlighting the important contribution of meat and animal-derived products to B<sub>12</sub> intakes.

### Thiamin (vitamin B<sub>1</sub>)

Thiamin is necessary for release of energy from food. Thiamin is also required for normal functioning of the nervous system.

As a water-soluble vitamin, thiamin is not stored in the body so must be replenished regularly. In the UK, 17% of the average daily intake of this vitamin is derived from red meat<sup>3</sup>. Pork, and products made from pig meat, are a *rich source* of thiamin.

### Riboflavin (vitamin B<sub>2</sub>)

Riboflavin helps to release energy from food and helps maintain the integrity of mucous membranes (e.g. nose lining), skin, eyes and nervous system. Riboflavin is found in red meat and 16% of average daily intake is derived from meat and meat products<sup>4</sup>.

---

<sup>1</sup> Bates B et al. National Diet and Nutrition Survey. Results from Years 1-4 (combined) of the Rolling Programme (2008/2009 – 2011/2012), Public Health England, 2014.

<sup>2</sup> Pawlak R (2014) The prevalence of cobalamin deficiency among vegetarians assessed by serum vitamin B12: a review of literature. Eur J Clin Nutr. 68(5):541-8.

<sup>3</sup> Bates B et al. National Diet and Nutrition Survey. Results from Years 1-4 (combined) of the Rolling Programme (2008/2009 – 2011/2012), Public Health England, 2014.

### Niacin (vitamin B<sub>3</sub>)

Niacin is the collective name for nicotinic acid and nicotinamide, involved in the release of energy from food and maintenance of normal mucous membranes (e.g. nose lining), skin and nervous system. Beef, lamb and pork are all *rich sources* of niacin and red meat provides around 20% of the average daily intake of this vitamin<sup>4</sup>.

### Vitamin B<sub>6</sub> (pyridoxine)

Vitamin B<sub>6</sub> helps to release energy from food. Vitamin B<sub>6</sub> is also necessary for the formation of red blood cells. In the UK diet, meat and meat products are key contributors to vitamin B<sub>6</sub> intake, supplying 24% of average daily intake<sup>5</sup>.

### Vitamin B<sub>12</sub> (cyanocobalamin)

Vitamin B<sub>12</sub> is involved in cell division (growth of cells) and helps with the formation of red blood cells. It is involved in amino acid (protein) metabolism, including the production of the amino acid, methionine, from homocysteine. Maintaining appropriate levels of homocysteine in the blood is important for cardiovascular (heart and blood vessel) health.

Vitamin B<sub>12</sub> occurs only in foods of animal origin, fish, yeast extracts and certain edible seaweeds. Liver is the richest source, but useful amounts also occur in all red meat, fish, cheese, eggs and vitamin B<sub>12</sub>-fortified foods (including some breakfast cereals and yeast extracts). Meat and meat products provide 29% of average daily intake of vitamin B<sub>12</sub><sup>6</sup>.

### Folate

The term folate (a B vitamin) covers naturally occurring folates that are present in foods and the synthetic form, folic acid, which is used for food fortification and in supplements. Folate has several functions, including normal blood formation, cell division and homocysteine metabolism.

Deficiency can result not only from a poor diet, but also from health conditions which affect the absorption of folate from the gut.

---

<sup>4</sup> Bates B et al. National Diet and Nutrition Survey. Results from Years 5-6 (combined) of the Rolling Programme (2012/13 – 2013/14), Public Health England, 2016.

<sup>5</sup> Bates B et al. National Diet and Nutrition Survey. Results from Years 1-4 (combined) of the Rolling Programme (2008/2009 – 2011/2012), Public Health England, 2014.

<sup>6</sup> Bates B et al. National Diet and Nutrition Survey. Results from Years 5-6 (combined) of the Rolling Programme (2012/13 – 2013/14), Public Health England, 2016.

All pregnant women and women planning a pregnancy are advised to take a daily dietary supplement of 0.4mg folic acid and eat plenty of folate-rich foods prior to conception and up to the twelfth week of pregnancy, to reduce the risk of a neural tube defect (e.g. spina bifida) developing in the unborn baby. Lean beef braising steak and offal are a source of folate. Although liver is a concentrated source, pregnant women are advised to avoid eating liver and liver-containing products due to the high levels of vitamin A they contain.

### **Pantothenic acid and biotin**

These two vitamins play a key role in energy metabolism. Pork and lamb are a source of pantothenic acid and liver and kidney are *rich sources* of both pantothenic acid and biotin.

### **In conclusion**

Red meat contains useful amounts of a number of B vitamins. In particular, it is a rich source of Vitamin B<sub>12</sub>, with about 29% of daily intake coming from meat and meat products.

For more information please visit: [www.meatandhealth.com](http://www.meatandhealth.com)