

Red meat and B vitamins

B vitamins are components of a number of different enzyme systems in the body, including those responsible for the release of energy from food. They also contribute to the health of the blood and nervous system.

In developed countries, intake of B Vitamins is such that for the majority of the population deficiency is unlikely. However, meat, fish and animal-derived foods, such as milk, are the only foods that naturally provide vitamin B 12. For this reason, people who exclude such foods from their diet are at risk of having inadequate intakes. Dietary intakes of vitamin B 12 are consistently reported as being lower from vegetarian diets, and are particularly low in vegan diets¹, thus indicating the important contribution of meat and animal-derived products to B 12 intake.

Red meat contains a number of B vitamins: thiamin (vitamin B1), riboflavin (vitamin B2), pantothenic acid, folate, niacin (vitamin B3), vitamin B6 and B12. Red meat can be termed a *rich source* of vitamin B12 and also makes an important contribution to B12 intake. About 30% of vitamin B12 intake comes from meat and meat products².

Thiamin (vitamin B1)

Thiamin is necessary for the steady and continuous release of energy from carbohydrate. Thiamin requirements are therefore related to the amount of carbohydrate and more or less to the amount of energy in the diet. It 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 often. In the UK, 21 per cent of the average daily intake of this vitamin is derived from red meat³. Pork and products made from pig meat are a *rich source* of thiamin.

¹ Phillips F (2005). "Vegetarian nutrition." Nutrition Bulletin 30: 132-167.

² Henderson et al 2003. National Diet and Nutrition Survey. Adults aged 19 to 64 years. Volume 3. London: The Stationery Office, 2003

³ Henderson L, Irving K, et al. (2003). The National Diet and Nutrition Survey: Adults Aged 19-64 Years. Volume 3 Vitamin and mineral intake and urinary analytes. London, The Stationery Office.

Riboflavin (vitamin B2)

Riboflavin is a component of several enzymes involved in metabolic pathways, including oxidation-reduction reactions. This vitamin is necessary for normal growth and helps maintain the integrity of mucous membranes, skin, eyes and nervous system. Riboflavin is found in red meat and 15 per cent of average daily intake is derived from meat and meat products.

Niacin (vitamin B3)

Niacin is the collective name for nicotinic acid and nicotinamide, involved in the utilisation of food energy. Beef, lamb and pork are all *rich sources* of niacin and provide 34 per cent of the average daily intake of this vitamin⁴.

Vitamin B6 (pyridoxine)

Vitamin B6 is involved in the metabolism of amino acids, including the conversion of tryptophan to niacin; requirements are therefore related to the protein content of the diet. B6 is also necessary for the formation of haemoglobin. In the UK diet, meat and meat products are key contributors to vitamin B6 intake, supplying 21 per cent of average intake⁵.

Vitamin B12 (cyanocobalamin)

Vitamin B12, together with folate, is required by rapidly dividing cells such as those in the bone marrow which form blood cells. As a cofactor for enzymes involved in amino acid (protein) metabolism, B12 aids the synthesis of the amino acid, methionine, from homocysteine. Maintaining appropriate levels of homocysteine in the blood is important for heart health.

Vitamin B12 occurs only in foods of animal origin, microorganisms including yeasts and certain algae such as seaweed. Liver is the richest source, but useful amounts also occur in all red meat, fish, cheese and some fortified breakfast cereals. Meat and meat products provide 30 per cent of the daily UK intake of vitamin B12⁶.

Folate

⁴ Henderson L, Gregory J, et al. (2003). The National Diet and Nutrition Survey: Adults Aged 19-64 Years. Volume 2 Energy, protein, carbohydrate, fat and alcohol intake. London, The Stationery Office.

⁵ Henderson L, Gregory J, et al. (2003). The National Diet and Nutrition Survey: Adults Aged 19-64 Years. Volume 2 Energy, protein, carbohydrate, fat and alcohol intake. London, The Stationery Office.

⁶ Henderson L, Gregory J, et al. (2003). The National Diet and Nutrition Survey: Adults Aged 19-64 Years. Volume 2 Energy, protein, carbohydrate, fat and alcohol intake. London, The Stationery Office.

The term folate covers folates that are present in foods and the synthetic form, folic acid, which is not naturally present in significant amounts in foods. Folic acid is used for food fortification and in supplements. Folate has several functions, including its action with vitamin B 12 to support DNA synthesis in rapidly dividing cells.

Deficiency can result not only from a poor diet, but also from increased needs for the synthesis of red blood cells in, for example, pregnant women. Women who increase their folic acid / folate intake before and during the early stages of pregnancy can help reduce the risk of having a baby with a neural tube defect such as spina bifida.

All women planning a pregnancy are advised to take 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. Red meat contains some folate and liver is a particularly concentrated source.

Pantothenic acid and biotin

These two vitamins play a key role in energy metabolism. Both are widely distributed in foods, but red meat is a particularly good 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 B12, about 30% of intake coming from meat and meat products.

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