

Red meat and protein

Dietary protein is essential for growth, maintenance and repair of the body, and can also provide energy. Protein from foods consists of chains of hundreds to thousands of nitrogen-containing amino acids. Some amino acids can be synthesised in the body, whilst others – essential amino acids – cannot. Therefore, essential amino acids need to be consumed in the diet to maintain good health.

Because the pattern of amino acids in other mammal cells is comparable to the pattern in human cells, red meat (and in some cases meat products) is an excellent source of high biological value protein and an important source of the eight essential amino acids for adults (lysine, threonine, methionine, phenylalanine, tryptophan, leucine, isoleucine and valine) and histidine which is considered to be an additional essential amino acid for children.

Red meat contains, on average, 20-24g of protein per 100g (when raw) and cooked red meat contains 27-35g of protein per 100g (cooked weight). As meat is cooked, the water content decreases and the nutrients become more concentrated, therefore the protein content increases. Lean red meat contains a higher proportion of protein than fattier cuts.

Energy, fat and protein content of lean and untrimmed cuts of red meat (per 100g; UK figures)

Meat (barbequed or grilled)	Energy kJ (kcal)	Fat (g)	Protein (g)
Rump steak - lean and fat	849 (203)	9.4	29.5
Rump steak - lean	741 (176)	5.7	31.2
Leg joint of lamb – lean and fat	986 (236)	13.0	29.7
Leg joint of lamb - lean	879 (210)	9.6	30.8
Pork leg joint – lean and fat	885 (213)	15.2	19.0
Loin chops of pork – lean	450 (107)	2.2	21.7

Source: Chan *et al.* (1995)¹

¹ Chan W, Brown J, et al. (1995). Meat, Poultry and Game. Supplement to McCance and Widdowson's The Composition of Foods. London, MAFF

How Much Protein?

In the UK the protein Reference Nutrient Intake (RNI), (which is the amount of a nutrient that is enough for almost every individual, even those with high needs) for adults aged 19 or over is 0.75g per kg per day. Extra protein is allowed for growth in children, growth of the foetus and maternal tissue in pregnant women and producing breast milk during lactation (see table below). The figures given are based on protein providing 14.7% of the Estimated Average Requirement (EAR) for energy.

UK Dietary reference values for Protein

Age range	Weight Kg	Estimated Average Requirements (EAR) g per day	Reference Nutrient Intake (RNI) g per day
0-3 months (formula fed)	5.9		12.5
4-6 months	7.7	10.6	12.7
7-9 months	8.8	11.0	13.7
10-12 months	9.7	11.2	14.9
1-3 years	12.5	11.7	14.5
4-6 years	17.8	14.8	19.7
7-10 years	28.3	22.8	28.3
Males			
11-14 years	43.0	33.8	42.1
15-18 years	64.5	46.1	55.2
19.50 years	74.0	44.4	55.5
50+ years	71.0	42.6	53.3
Females			
11-14 years	43.8	33.1	41.2
15-18 years	55.5	37.1	45.0
19.50 years	60.0	36.0	45.0
50+ years	62.0	37.2	46.5
Pregnant			+6.0
Lactating:			
0-4 months			+11.0
Over 4 months			+8.0

Source: Dietary Reference Values for Food Energy and Nutrients for the UK, COMA DH²

In the UK the current average adult protein intake is about 17% of food energy, which is above the RNI but not likely to have an adverse effect on health. It is

² COMA (1991) Report on Health and Social Subjects 41: Dietary Reference Values for Food Energy and Nutrients for the UK; DH, HMSO London

recommended that protein intake should not exceed twice the RNI (i.e. 1.5g per kg per day). These Dietary Reference Values (DRVs) and supporting recommendations were published in 1991 and pre-date much of the accumulating evidence that higher protein diets are effective for weight management.

Protein and Weight Loss and Maintenance

Macronutrients exert different effects on satiety, which is defined as the state of feeling full after a meal. Evidence suggests that protein has a higher satiety value than carbohydrate, which in turn is more satiating than fat (Eisenstein 2002)³. The energy density of food, that is the calories per gram of food, determines how full we feel after eating. Lower energy density foods have been shown to make people feel fuller (Benelam 2009)⁴. Many red meats and red meat dishes have a low energy density, when liquid and vegetables are added during cooking the calories per gram of food are reduced further.

Increasing protein intake from 15% to 30% of energy has been shown to increase satiety and spontaneously decrease calorie intake (Weigle 2005)⁵. When compared with a diet of similar energy content but low in protein, higher protein diets have been shown to greatly assist with hunger management, which is often cited as the main reason why people do not comply with a weight loss regime (Johnstone 2009)⁶.

Evidence suggests that in dietary practice, it may now be beneficial to replace refined carbohydrate with protein sources that are low in saturated fat such as red meat

³ Eisenstein J, Roberts SB, et al. (2002). "High- protein weight-loss diets: are they safe and do they work? A review of the experimental and epidemiologic data." Nutrition Reviews 60(7): 189-200.

⁴ Benelam B (2009). "Satiety, satiety and their effects on eating behaviour." Nutrition Bulletin 34(2): 126-173.

⁵ Weigle, D S *et al.*, (2005). A high protein diet induces sustained reductions in appetite, *ad libitum* caloric intake, and body weight despite compensatory changes in diurnal plasma leptin and ghrelin concentrations. *Am. J. Clin. Nutr.*, 82, 41-8

⁶ Johnstone, A. M. (2009). High-protein diets for appetite control and weight loss – the 'holy grail' of dieting? *Brit. J Nutr.*, B101, 1729-1730.

(Halton and Hu 2004)⁷. Incorporating additional lean protein into a calorie-reduced moderate fat diet may improve satiety and palatability of the diet, thereby improving long-term compliance (Wilkinson 2004)⁸.

In addition, modest increases in protein intakes from red meat have also been shown to lower blood pressure in hypertensive people without increasing blood lipids. The researchers concluded that modest substitution of carbohydrate-rich foods with protein from red meat may lower blood pressure in hypertensive people.

High-protein diet for weight loss – DiOGense (Diet, Obesity and Genes)

EU-funded researchers investigating weight loss recommend that people should maintain a high-protein diet with plenty of lean meat, low-fat dairy products and beans, while eating fewer finely refined starch calories, such as white bread and white rice. The study examined the effectiveness of different diets for losing weight and maintaining weight loss. The scientists concluded that current dietary recommendations are not optimal for preventing weight gain among overweight people and that a diet consisting of slightly higher protein content and low –glycaemic index (GI) foods appears to be easier to observe (www.diogenes-eu.org)⁹.

In conclusion

Lean red meat supplies the essential amino acids required for growth and maintenance. The leaner the meat, after cooking, the more concentrated the source of protein. Eating protein rich foods such as lean red meat with meals and snacks may help to curb hunger between meals and may help to facilitate weight loss and weight maintenance.

Please visit www.meatandhealth.com for more information.

⁷ Halton T.L and F. B. Hu (2004). "The effects of high protein diets on thermogenesis, satiety and weight loss: a critical review." *Journal of the American College of Nutrition* 23(5): 373-385.

⁸ Wilkinson DL and McCargar L. *Best Practice & Clinical Gastroenterology*, 2004; 18(6): 1031-47.

⁹ Saris WHM, Harper A. DiOGenes: A multidisciplinary offensive focused on the obesity epidemic. *Obes Rev* 2005;6:175-6.

