Protein Recommendation – Evidence Base and Justification

Introduction

Protein is derived from the Greek word for "primary," meaning "in the lead“ or "standing in front" because it is vital for survival. It is the second most abundant compound in the body, around 43% is in muscle, 16% in the blood and 15% in the skin. Dietary protein provides energy for the body at 4 kcal/g and it is a good source of micronutrients such as iron, zinc and B vitamins in meat and calcium and iodine in dairy foods.

Protein has many functions:

1. It is a core component of muscle and bone tissue and is therefore needed to support the body, tissue repair and growth, and for muscle contractions and movement.
2. Haemoglobin is a protein that carries essential molecules around the body.
3. It is required for the synthesis of hormones such as insulin, testosterone and oestrogen.
4. It is needed to make enzymes to facilitate chemical reactions such as digestion.
5. The immune system wouldn’t be able to operate without protein.
6. It supports the regulation and expression of genes (DNA).

When protein is consumed it is metabolised into amino acids and the body contains a pool of 20 amino acids which are used to synthesise any proteins which are needed. Proteins are constantly being built and degraded in a dynamic process known as protein turnover. There are nine essential amino acids, that must be consumed because the body cannot make them. There are six conditionally essential amino acids that are essential only under specific circumstances such as insufficient protein intake or increased need during illness or stress. The remaining five amino acids are non-essential because they can be made in the body.

Each amino acid has specific functions. For example, the amino acid tryptophan is needed to produce serotonin, a chemical that acts as a neurotransmitter in the body.

Protein intake guidance per day

	Men	Women
UK Reference Nutrient Intake (RNI) (Department of Health 1991) 19-50 year olds 50+ year olds	 55.5g 53.3g	 45g 46.5g
Food labelling Reference Intake (RI) (based on healthy women eating 2000 kcal)		50g
FAO/WHO/UNU (WHO 1985) not less than 0.75g good quality protein/kg body weight/d (average 74kg man and 60kg women)	55.5g	45g

However, this is based on an ***average minimum requirement*** needed to maintain bodily function and avoid deficiency. Current evidence suggests that a higher protein diet of up to 1.2-1.6g/kg bodyweight is ideal for health outcomes [1-3].

2022 updates – what has changed with X-PERT guidance?

Previous portion guidance in the Nutrition for Health model would not enable everyone to obtain 1.2 to 1.6g/kg bodyweight of protein by consuming two to four portions of protein per day. Although is it accepted that people can

also obtain protein from eating foods from other food groups, this is unlikely to compensate for the shortfall and provide all the essential amino acids.

Based on the latest published evidence base it was therefore decided to increase the protein range to three to six portions per day. In addition to this, portion sizes have been updated to ensure each portion provides 20-25g protein, to help ensure absolute protein requirements are met through consuming the recommended number of portions each day.

The increase in protein portions has also been made in association with the removal of the milk & dairy group; so, if people are eating a dairy food as their primary protein source for a meal (for example, cheese), they would include it in their protein portion count.

Evidence base to support these changes

A growing body of research indicates that protein intakes above the current Recommended Dietary Allowance help with:

- Appetite regulation: protein has the greatest satiety value out of all the macronutrients, and it has also been shown that people carry on eating (carbs and fat) until they have obtained their protein requirement for the day. This is called "Protein Leverage" [4, 5].
- Weight management: higher protein diets improve satiety and lead to greater reductions in body weight and fat mass compared with standard protein diets and may therefore serve as a successful strategy to help prevent and/or treat obesity [6, 7]. Protein leverage has been hypothesised as driving the obesity pandemic [8].
- Promoting healthy aging and preventing age-related sarcopenia, hip fractures and bone loss: the loss of muscle mass and strength predisposes older adults to frailty, disability, and loss of autonomy [9].
- Protecting against protein deficiency in people with insulin resistance of the liver i.e., people with the metabolic syndrome, prediabetes and Type 2 diabetes. In these conditions, the hormone glucagon dominates over insulin, resulting in increased gluconeogenesis and fewer amino acids being available for protein synthesis [10, 11].

Although there has been concern regarding a possible detrimental impact of higher protein diets on renal function, there is no evidence that shows that high protein intake leads to declines in renal function in healthy persons or in populations with greater risk for declines in renal function such as those with Type 2 diabetes [12]. The authors conclude that "given the proposed advantages of consuming high protein diets to promote muscle hypertrophy during resistance training, high-quality weight loss during energy restriction, and maintenance of muscle mass with aging, the finding that a high protein diet does not negatively affect kidney function is of relevance".

Practical implications

Amount: the protein portions all provide approximately 20-25g protein per portion so if people desire, they can track their protein intake as well as count number of portions, to ensure they are consuming enough. A general rule of thumb is that they should aim for a minimum of 30g protein per meal. Meats, poultry and seafood lose approximately 25% water weight when cooked, thus 100g raw weight becomes ~75g cooked weight.

Quality: The protein quality of individual foods can be assessed by the Digestibility Indispensable Amino Acid Score (DIAAS). This scoring system is thought to be more accurate than previous ones as it takes into consideration the presence of inhibitory factors such as phytates and trypsin when assessing digestibility. A protein source reaching a DIAAS of 100 or above indicates that all essential amino acids are present and able to meet physiological requirements. This is generally the case for animal based proteins [13].

Variety: These recommendations may seem like a lot of protein for some initially, so a gradual increase may be required. As always, the focus is on consuming a variety of real foods and omitting ultra-processed foods where

possible. A day example would be: a three-egg cheese omelette at breakfast (1½ portions) [egg-based breakfasts have been shown to reduce energy intake throughout the rest of the day compared to a cereal breakfast [14]]; 100g oily fish and three-bean salad at lunchtime (1½ portions), and 170g meat at evening meal (2 portions). Total 5 portions.

Plant-based proteins: Plant-based foods usually contain less protein and are also limiting in one or more essential amino acids (DIAAS score <100). However, it is still possible to obtain sufficient protein/essential amino acids when adopting a vegetarian or vegan dietary approach; it just takes more planning. The following strategies can help:

1. Increase the portion size so that at least 20g of protein is consumed per portion. If this is not possible, then try number 2 below.
2. Combine protein sources and ensure complementarity of their amino acids. For example, cereal-based proteins, scoring low in Lysine but high in Methionine + Cysteine, can to some extent complement leguminous proteins, scoring high in Lysine but low in Methionine + Cysteine. It may therefore be beneficial to have half portions of several protein sources, aiming for 30g protein per meal.

A day example for a vegetarian dietary approach: Breakfast - three-egg cheese omelette (1½ portions); Lunch – chickpea burger (130g cooked chickpeas) with yoghurt topping (1 portion); Evening meal – halloumi (125g) and spinach curry (1½ portions). Total 4 portions.

A day example for a vegan dietary approach: Breakfast - Chia seed (60g) porridge and 60g nuts (1 portion); Lunch – garlic, sesame seed (30g) and tofu (200g firm tofu) stir-fry (2 portions)**;** Evening meal – bolognaise made with 150g Quorn mince (1 portion). Total 4 portions.

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