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It's one of the most common questions directed at vegans: "Where do you get your protein?" Even though plants have plenty of protein, the myth that animal protein is somehow superior is extremely pervasive.

Why do we need protein?

Protein is a vital part of every single one of our cells, which means it's needed for the growth, maintenance and repair of our muscles, organs, nervous tissue, skin and immune system. It is essential for thousands of everyday reactions in the body, plays a crucial role in oxygen transport by the blood and hormone formation and is needed to make our nervous system messengers (neurotransmitters).

Every molecule of protein consists of different amino acids; they are the building blocks of protein. Our bodies can manufacture some of them but there are some that we cannot make – they are called essential amino acids and we need them in our diet. When we eat protein, it's broken down in the digestive system and its amino acids are used wherever they are needed in the body. If we eat more protein than we need, excess amino acids may be made into glucose for energy or turned into fat stored in the body.

How much protein do we need?

Although protein is vital for our survival, we don't need as much as many people think. The average adult needs 0.8 grams of protein per kilogram of their bodyweight, or 0.4 grams per pound. That means that most of us only need between 45 and 55 grams of protein daily. Yet the average UK intake is 76 grams (PHE, 2020).

These are the recommended daily intakes by age:

0-12 months:	12.5-14.5 grams
1-3 years:	14.5 grams
4-6 years:	20 grams
7-10 years:	28 grams
11-14 years:	41 grams (females), 42 grams (males)
Over 15 years:	45 grams (females), 55 grams (males)
Pregnancy:	+ 6 grams
Breastfeeding:	+ 8-11 grams



If you are an athlete, you may need to slightly increase your protein intake. Endurance athletes need between 1.2 and 1.4 grams per kilogram of body weight (0.5-0.7 g/lb of body weight), while serious strength athletes and bodybuilders need between 1.6 and 2 grams per kilogram of bodyweight (0.7-1 g/lb of body weight).



Protein quality and sources

To make protein, plants combine sugars (which they make from sunlight, carbon dioxide and water) with nitrogen from the soil. The end products are protein building blocks called amino acids. There are 21 different amino acids in your body, of which your body can make 12 just from the nutrients in your diet.

Nine of the amino acids are called essential amino acids and they must be supplied by your diet as your body can't make them. Foods that contain all nine essential amino acids in perfect proportions are often viewed as better protein sources and you may have heard them being referred to as 'complete protein'. Animal products are often labelled as such and plant examples include soya, buckwheat, quinoa, cashew nuts, chia seeds and pistachios. However, all plants contain protein and all of the essential amino acids (McDougall, 2002; Hever and Cronise, 2017). Some plant foods contain less of one or two amino acids but that doesn't make them incomplete.

Modern nutrition science considers categorising foods as complete sources of protein outdated thinking because if your diet includes a variety of foods and you eat enough calories in a day, you will automatically get all the amino acids you need (Mariotti and Gardner, 2019). It sounds too easy but it's true.

Certain foods contain more protein – pulses (soya, chickpeas, beans and lentils), wholegrains (oats, wholemeal bread and pasta, quinoa), nuts and seeds – but all plant-based foods have some protein, unless they are extracts such as oil or sugar. Here are some examples and comparisons with animal-based foods:

Food – a typical serving	Protein content (grams)
Plant-based foods	
Kidney beans, 177 g (cup)	14
Baked beans, ½ can	9.7
Lentils, 198 g (cup)	17.9
Chickpeas, 164 g (cup)	14.5
Hummus, 100 g	7.2
Tofu, 100 g	12-21
Edamame beans (shelled), ½ cup	10
Tempeh, 100 g	20
Linda McCartney sausages, 2 pieces Garden Gourmet, Sensational	15.5
Burger, 1 patty	15.8
Muesli, 85 g (cup)	8-10
Oats, dry, 81 g (cup)	11
Wholemeal bread, 2 slices	8-11
Wholemeal pitta bread, medium size	5-6
Whole wheat pasta, cooked, 220 g (2 cups)	12-16
Brown rice, cooked, 220 g (1 cup)	4.8
Almonds, 30 g (a handful)	6.3
Peanuts, 30 g (a handful)	7.3
Animal products	
Bacon, pork, 3 slices	8
Ham, 3 slices	6.9
Hot dog, regular	4.6-5.5
Hamburger, beef, 62 g	15.8
Pork chop	22.8
Chicken breast, 105 g	32
Boiled egg, medium size	5.5
Yoghurt, plain, 150 g	7.9
Cheddar cheese, 2 slices	9.6
Salmon, 100 g	22



Plant protein usually comes as a package deal along with some healthy carbohydrates, vitamins and minerals – that means plant sources of protein are great for your health and also support your physical activities, healthy growth in childhood and tissue repair in older age in the best possible way (Ahnen *et al.*, 2019; Gazzani *et al.* 2019).

A varied vegan diet provides more than enough protein and all the essential amino acids in sufficient amounts (Marsh *et al.*, 2013; Clarys *et al.*, 2014; Karlsen *et al.*, 2019; Mariotti and Gardner, 2019). In fact, most of us get too much without even trying (Rizzo *et al.*, 2013)!

Only if you're an enthusiastic athlete or bodybuilder, should you consciously increase your protein intake from foods like beans, lentils, tofu, nuts, seeds, peanut butter, meat alternatives, wholegrains and protein bars. Protein shakes and powders are a good solution if you need something quick post-workout.



The origins of the protein myth

The myth that we should eat more protein dates back to the beginning of the last century. The majority view back then was that health – and especially fitness – depended on eating generous amounts of protein, particularly meat (Millward, 2004). It was even reckoned that animal protein was the solution to wiping out child malnutrition in developing countries (Autret, 1969; Stillings, 1973).

The myth reached epic heights in the 1960s. A UN report was published which identified worldwide protein deficiency. It called for a ‘global strategy to avert the impending protein crisis’. International aid began to focus on projects to address the so-called protein gap. The US government, for example, subsidised the production of dried milk powder to provide protein for the world’s poor (Campbell and Campbell, 2005).

But not everyone accepted that protein deficiency was the main or even a real problem. Eventually, what was called the protein gap disappeared when researchers concluded that almost all staple foods contain enough protein for our needs. In 1975, John Waterlow, the scientist who led most of the efforts on protein malnutrition, admitted that a ‘protein gap’ did not exist and that young children in developing countries only needed sufficient energy intake (Semba, 2016).

Is protein deficiency a common problem?

In short, no. In Western countries, it’s virtually unheard of. The only exceptions are people who extremely restrict their food intake, have an eating disorder, or elderly people who eat too little or have trouble with daily tasks, including feeding themselves. In the general population, protein deficiency is a nonexistent problem. As long as you eat enough food in a day, you will get enough protein.

The situation is different in places where people suffer from hunger, mainly in developing countries, and have a severe lack of energy and nutrients. Of course, they don’t have enough protein but they also don’t have enough of most other essential nutrients. When a person has enough food to cover their energy needs, and their diet is at least a little varied, they will get enough protein.

Can you get too much protein?

If you eat too much protein from any source, it can turn into storage fat – simply because your body cannot utilise all of it. However, protein sources are many and varied, so the question is more about eating too much protein from a certain source.

Animal protein sources – meat, fish, dairy and eggs – also supply saturated fats and no fibre, which is a troublesome combination. Excessive animal protein intake has been linked with increased cholesterol levels and the risk of heart disease (Campbell and Campbell, 2005; Bernstein *et al.*, 2010; Li *et al.*, 2017; Budhathoki *et al.*, 2019), higher risk of stroke (Bernstein *et al.*, 2012), type 2 diabetes (Feskens *et al.*, 2013), obesity (You and Henneberg, 2016), bone loss (Dargent-Molina *et al.*, 2008; Isanejad *et al.*, 2017) and kidney disease (Carrero *et al.*, 2020).

On the other hand, these studies showed that plant protein lowers the risk. It’s likely because plant foods that are rich in protein also offer fibre, healthy carbohydrates, vitamins, minerals and small amounts of healthy fats.

By eating a range of wholesome plant-based foods you will get all the different amino acids you need – and in the right proportions. There is no need to go out of your way to get protein or specific amino acids or amino acid combinations. Rest assured that plant proteins can do a better job of meeting your protein needs than animal products, while also protecting your health and fuelling even the most intense types of physical training.



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