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EVERYTHING YOU NEED TO KNOW ABOUT PROTEIN

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Everything You Need To Know About Protein

Protein is not just for fitness enthusiasts looking to build muscle or recover from exercise. Protein has so many other functions in the body, such as transporting red blood cells through the protein haemoglobin, enzyme production (all enzymes are proteins), hormone production and immunity.

Most of us should be eating more protein than the NHS guidelines recommend, especially those looking to build muscle or lose body fat.

Dietary protein is essential to make regulatory T-cells in the body, which act as a patrol guard in the body looking for potential pathogens, particularly the amino acid arginine, which can enhance a number of cellular immune mechanisms. Immunoglobulins are the main antibody used to engulf pathogens, these are also made from glycoproteins.

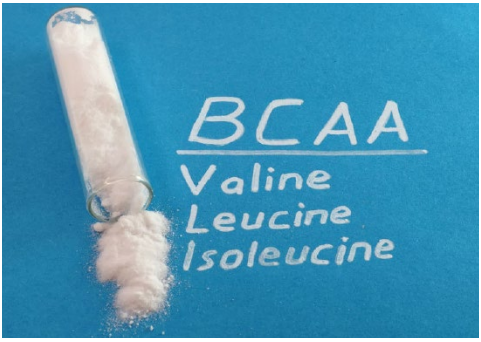
Muscle gain

Perhaps protein's most well-known function is the growth and repair of cells within the body. Protein initiates muscle protein synthesis (MPS) by stimulating the mTOR pathway, which is a fundamental growth pathway within the body. As protein is the only macronutrient that contains nitrogen, protein is actually the only essential component if you are looking to gain muscle.

Studies have shown that you can actually build muscle in a caloric deficit. However just because you can do something doesn't always mean you should. When you are in a caloric surplus, the protein may not be necessary for gaining muscle, but by having a positive energy status means you reduce the rate of muscle protein breakdown (MPB). The body is always in a constant state of MPS and MPB, so when you are in a calorie surplus the body is in a more anabolic environment. However, eating more food does not increase MPS.

BCAAs

The branched chain amino acids are three amino acids with a branched structure that make up about 35% of muscle protein. They are called **leucine**, **isoleucine** and **valine**.



Muscle protein synthesis is triggered by leucine, an optimal amount of leucine being between 2-3 grams per meal approximately 4 times a day.

While leucine triggers the process, you need all the other amino acids to finish it. This is why BCAA supplementation on its own may actually inhibit maximal muscle protein synthesis, as your body does not have all the relevant amino acids to finish the process.

Is more protein better?

A common misconception is that by eating more protein, you will gain more muscle. This is not the case, as muscle gain is a signalling dependent process, not a food dependent one. Once the leucine threshold of a meal has been reached and all other amino acids are present, the amino acid pool is full. The body then enters a stage called the **refractory period**. During this period, eating more protein will not enhance muscle protein synthesis, it will still be absorbed so the "you can only absorb 20g of protein" myth is just that.

The sweet spot for most people is approximately 0.5g per kg of protein per meal 3-5 times per day, so for a 70kg male, it would be 35g of high biological value protein, such as whey, meat and dairy 3-5 times per day.

Body composition

In terms of muscle gain, more protein is not necessarily better, but when it comes to body composition, a strong argument can be made for increasing protein intake. Protein is by far the most satiating macronutrient, with many studies showing an increased protein intake leading to reduced caloric intake and greater success in dieting.

Protein is also the most thermogenic macronutrient, which means that your body uses a greater amount of energy to digest it than it does for carbohydrate or fat. This is known as the **thermic effect of feeding** or **TEF**.

Thermic effect of feeding (TEF) for macronutrients:
Protein: 20-35% of the energy required to digest, so 400 kcal of pure protein would require approx 100 kcals of energy to digest it

Carbohydrate: 5-15% of the energy required to digest

Fat: Up to 5% of the energy required to digest

Protein intake is especially relevant when it comes to hypocaloric diets (eating fewer calories than you burn), due to its ability to maintain lean body mass, increase satiety, and to a small degree, metabolism. When dieting, the main goal should be fat loss, not weight loss, as you want to hold on to as much muscle tissue as possible. Higher protein intakes have consistently shown to retain lean muscle during phases of caloric restriction.

Important take home – Protein frequency should be the main concern regarding muscle gain. If you adhere to the guidance of 4-5 feedings of 30g per day, protein intake will fall into place. Since the research on protein intake is fairly conclusive that more daily protein does not mean more muscle gain, focusing on stimulating muscle protein synthesis as many times as possible throughout the day would be optimal to focus on for the best results.

https://bjsm.bmj.com/content/52/6/376.abstract

Sources of protein and protein types

It's not just about getting enough protein that matters. The type of protein, just like the type of carbohydrate and fat, matters too.

Is your protein animal or plant derived?

Animal protein tends to be higher in essential amino acids or "complete", whereas plant proteins tend to be "incomplete", or lacking certain essential amino acids. However, there is no need to view foods as complete or incomplete as all the protein you eat will contribute to your amino acid pool. So there is no need to combine protein sources at every meal (e.g. rice and beans). If you are looking to build the most amount of muscle, however, it would be prudent to include 2-3g of leucine per meal.

Typical protein content of animal and plant derived foods:
(content may vary depending on the retailer or if frozen)

Animal proteins

Chicken breast: 23g per 100g

Chicken thighs:18g per 100g

Tuna: 27g per 100g

Whey protein: 77g per 100g

Beef mince (5%): 21g per 100g

Beef mince (20%):18g per 100g

0% fat Greek yoghurt:10g per 100g

Semi-skimmed milk: 3.5g per 100ml

Eggs: 6g per medium-sized egg

Salmon: 22g per 100g

White fish: 24g per 100g

Plant proteins

Soya beans: 36g per 100g (dry weight)

Lentils: 25g per 100g (dry weight)

Chickpeas: 6g per 100g (canned weight)

Tofu: 10g per 100g

Soya milk: 2.4g per 100g

Hemp seeds: 30g per 100g (dry weight)

Sunflower seeds: 21g per 100g (dry weight)

Quinoa: 14g per 100g (dry weight)

An important thing to remember about plant proteins is the amount of calories you need to consume to meet the same amount of protein from an animal source.

Chicken breast:
110 calories for 23g of protein

Sunflower seeds:
575 calories for 21g of protein

Some easy ways to increase your protein intake...

- **0% fat Greek yoghurt**: Approximately 25g protein per 250g / 100 kcal
- **30g whey protein:** 20-25g protein / 120 kcal
- **1 small tin tuna:** Approximately 30g protein / 140 kcal
- **Beef jerky:** Approximately 56g protein per 100g
- **Protein bar**: Approximately 20g protein / 200 kcal.

Be wary of "protein" products in the supermarket.
They often contain fractionally more protein and are double the price.

5 common protein myths...

1. A higher protein intake can damage your kidneys

False. Contrary to popular belief, protein is not damaging to your kidneys and studies actually correlate higher protein intakes to reduced mortality. The only exception is in people with existing renal disease or certain blood disorders like PKU.

2. You can only absorb 20g protein in one sitting

False. By definition this statement is incorrect. Since your body will absorb pretty much everything you eat, there is a limit to how much protein will stimulate MPS. If the protein was not absorbed, we would be able to eat unlimited protein over 20g and not gain any weight.

3. You can't consume enough protein on a vegan diet

False. It may be more challenging to find high biological value protein sources, but plenty of vegan foods are high in protein. You just have to be more conscious of your intake.

4. Protein makes you bulky and muscular

False. Some females believe that lifting weights and eating protein will make them bulky, but this is not the case. Females do not have adequate endogenous testosterone production to appear bulky. To look bulky would require years of training for that specific goal.

5. Protein causes cancer

False. While protein will increase IGF-1 and stimulate the mTOR pathway, chronic high levels of both are linked with cancer in rodent models. This has not been shown in humans. Exercise allows IGF-1 to cross the blood-brain barrier and be used for neurogenesis. It's also vital to build new muscle tissue. Both of these are associated with increased longevity.

The research on mTor and longevity/anti-ageing is all in rodents, worms and flies. When you restrict energy intake from an organism with a faster metabolism or shorter lifespan, the effects of dietary restrictions are more pronounced. So it's a leap of faith to apply this research to humans. More research is needed to establish causation.