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PROTEIN

Bio-Synergys comprehensive guide to protein. In this short guide we explain what protein is and how to use it to your advantage to take your training and recovery to the next level.



PROTEIN



Everyone knows that protein is important for building and repairing muscle fibres after exercise, but proteins in the body have thousands of other essential roles, including:

- Producing antibodies for the immune system
- Manufacturing hormones and enzymes that are involved in most reactions in your body
- Aiding in the digestion and absorption of food
- Maximising the transport of oxygen to tissues
- Providing structure for muscles, tendons, ligaments, organs, bones, hair, skin and all other tissues.



PROTEIN DIGESTION AND ABSORPTION

The protein molecule is broken down in the mouth and small intestine.

You need to eat protein-containing foods daily to obtain your daily requirements for essential amino acids.

About 90% of the protein you eat is broken down into amino acids and becomes part of the amino acid "pool" that the body draws upon when it needs to build or repair muscles or other tissues or do any of the other roles that the amino acids play (The body excretes the other 10%).

Unlike carbohydrates and fat, which the body can store as glycogen or triglycerides respectively for use later, amino acids have no form of storage in the body, so it's important to have some protein every day.

When you eat foods containing protein, the protein molecule is broken down in the mouth and small intestine into its amino acids. Once broken into amino acids, three things can happen.

The amino acids can be:

- Converted into glucose
- Converted into triglycerides and stored as body fat
- Released into the blood stream as the plasma protein or free amino acids to be used as energy

When you eat enough protein to cover your body's amino acids needs, your body is considered to be in protein equilibrium;

However, if you don't eat enough, protein (usually from the muscles) is broken down to fulfil the amino acids "pool." If you consume more protein than your

body needs, the excess amino acids are broken down further and the nitrogen, ammonia, uric acid and z are secreted in urine, and part of the amino acid remaining can either be stored as body fat or muscle.



AMINO ACIDS

Amino Acids are the building blocks of protein and are necessary to support muscle growth. Amino Acids are usually categorised as essential and nonessential.

There are eight essential amino acids, these amino acids are those that your body cannot manufacture to create what it needs for countless functions on its own and must be obtained from foods and/or supplementation. A non-essential amino acid can be produced in the body by re-configuring other amino acids to create what it needs for countless functions.

This process (re-configuring amino acids) in layman's terms may be something like taking a piece of clay and reforming it into something else so that the body can use it in a different way.

Table of Essential & Non-Essential Amino Acids⁸

- Nine Essential Amino Acids
- Non-Essential Amino Acids
- Histidine Alanine*
- Isoleucine (BCAA) Arginine
- Leucine (BCAA) Asparagine
- Lysine Aspartic acid
- Methionine Cystine
- Phenylalanine Glutamic acid
- Threonine Glutamine
- Tryptophan Glycine
- Valine (BCAA) Proline
- Serine
- Tyrosine

*Histidine is an essential amino acid in childhood and in a small percentage of adults. As it is not essential to all adults, it is commonly classed as non essential. For the purposes of this training material, neither classification is incorrect.

There are two general types of proteins: complete and incomplete. A complete protein offers all of the essential amino acids.

All animal proteins are complete proteins. An incomplete protein is missing one or more of the essential amino acids. Plant-based proteins are generally incomplete.

Some of the proteins that we select should be high in branched chain amino acids (BCAAs). BCAAs are called 'branched' because of their molecular structure.

These amino acids are leucine, isoLeucine and valine. BCAAs are important because a third of muscle tissue is comprised of BCAAs. BCAAs are depleted from muscle tissue during strenuous exercise, being used as an energy source by the body.

Essentially, this means that we are losing muscle size during strenuous exercise. That being the case, it makes sense to use a protein that is high in BCAAs to replenish this lost tissue as quickly as possible.

One type of protein may offer specific benefits that another protein may not. Since your body uses the different attributes of proteins for a wide variety of functions, it is best to consume several types of protein each day. For this reason Bio-Synergy uses a blend of several proteins in its formulas.



SYNERGY
BCAA 2:1:1
MUSCLE RECOVERY
DIETARY SUPPLEMENT WITH VITAMIN B6
Give your muscles energy for tough workouts
120 capsules



WHEY PROTEIN

Protein is an essential part of recovery post exercise. Check out the video below for an example of how protein is used after the gym. There are two types of proteins that come from milk; these are whey and casein proteins. Whey protein is derived from milk specifically from the process of making cheese.

During this process, the milk is curdled, separating the curd from the whey. The whey is the syrupy liquid that you sometimes see on top of cottage cheese. The curd (cottage cheese) is pure casein protein.

For many years, whey was discarded as a waste product from cheese manufacturers. Eventually, it was decided that the cheese industry find alternate means of disposal or uses for whey.

As a result, whey was tested for what it contained. It was found that whey was actually loaded with a variety of proteins that were extremely high in quality and contained better amino acid profiles (for humans) than beef.

Whey protein contains a high amount of the specific amino acids that are most needed by humans. In addition, it was found that whey was not only extremely digestible, it dissolved well in water (a convenient attribute for making whey in nutritional supplements).

To make whey practical for use as a nutritional supplement, methods were developed to separate the unwanted components out, specifically lactose, cholesterol and sodium.

One process that has proven effective but expensive, is cold ultra filtration – microfiltration. This process works by physically passing the whey through a micro-filter, leaving some of the impurities behind.

The other method is through ion exchange (also expensive) in which the proteins are extracted by taking advantage of their specific electronic charges (kind of like using a magnet).

Whey protein contains the highest concentration of branched chain amino acids (BCAAs) of any single protein source. It is also rapidly absorbed into the body. This makes whey protein an excellent source of protein to use after a strenuous workout to replenish the BCAAs in muscle tissue quickly. Whey protein also has properties that may help to support immune function, offer anti-oxidant protection, stimulate growth hormone production and assist in the production of glutathione (the body's natural anti-oxidant).

However, whey protein is low in phenylalanine (an essential amino acid), glutamine and arginine (two 'conditionally essential' amino acids). These three amino acids are said to be the 'limiting factors' of whey.

CHOOSING THE RIGHT PROTEIN PRODUCT FOR YOUR GOALS

Understanding the individual health and fitness goals of each user, we have developed a range of different products to help you maximise your training. Bio-Synergy Whey Better whether your goal is packing on lean muscle, supporting your diet, improving recovery or taking your training to the next level then Whey Better is the ideal protein. Each serving contains up to 92% protein (over 27g per 30g serving) per 100g and 6.7g BCAA's (over 27g protein per 30g serving) and is manufactured right here in the UK from the highest quality whey protein isolate and is gluten & lactose free. Whey Better is the perfect partner whatever your goals, so if you want the UK's most powerful protein, as voted by Men's Health then choose from 7 delicious flavours and join the revolution.

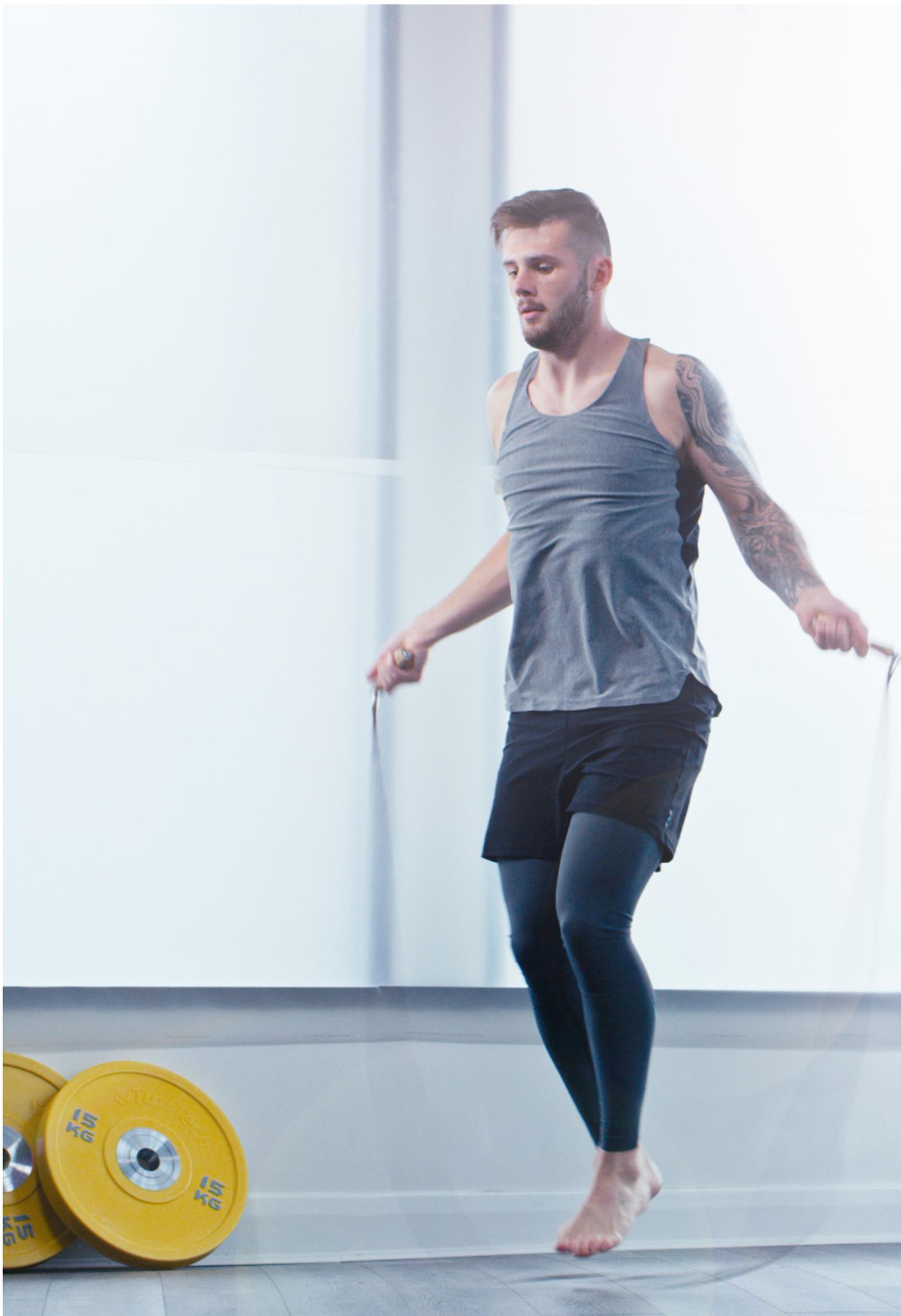
For those who want a kickstart in the morning, we recommend ActiVeman Oatein. Not only does Oatein contain over 20 grams of whey protein per serving, but also a blend of complex carbohydrates that helps sustain slow releasing energy all the way up until lunchtime.

For women, we have Active Woman Activate. With Vitamin D, B5, B6, calcium, zinc, and folic acid, Activate is primed to push you into the best shape of your life. These vitamins play vital roles in efficient energy metabolism, and also help safeguard bones and sensitive muscle tissues. Play smart and play safe with Activate so you'll never have to stop.

For the young and more gym focussed, Super7® Super Max whey protein concentrate, is a protein that contains a unique blend of 7 key ingredients created by experts to power you through your workout and pack on lean pounds of muscle.

High-quality protein is an integral part of the diet and serves as the foundation upon which sound nutritional protocols

are built. Super7® Super Max whey protein concentrate is rich in high-quality multi-source protein and contains 18.4 grams of protein, 3 grams of fat and 12 grams of carbohydrates per 30 gram serving.



ISOLATE

There are many ways in which a protein source can be extracted from raw materials; some of these have been explained earlier in this article. Under some extraction processes a certain amount of other by-products remain alongside the protein, for example carbohydrates, fats, etc. With a protein isolate minimal by-product is left, meaning isolates are a purer protein source.

CASEIN

As mentioned earlier, there are two types of protein contained in milk. These proteins are separated during the process of making cheese. During this process, the milk is curdled, separating the curd from the whey. As previously discussed, whey is the syrupy liquid that you sometimes see on top of cottage cheese. The curd (cottage cheese) is a pure casein protein.

Two of the primary benefits of casein are that it is slow digesting and is also very high in the amino acid glutamine. Casein tends to form a gel in the stomach, causing it to digest slowly, which may release amino acids over a period of time into the system. This makes casein an excellent protein source to use right before bed as it may help to prevent tissue breakdown while you sleep.

Also, protein sources with added casein may help to suppress the appetite between meals, which is a key benefit for those on a restricted calorie diet.

Casein contains the highest concentration of glutamine of any single protein source. Glutamine is a 'conditionally' essential amino acid necessary for tissue repair, volumisation,

immune support and overall muscle growth.

Casein is typically seen in protein blends in the form of calcium caseinate, or sodium caseinate. The sodium or calcium simply comes from the milk as it is naturally rich in these two minerals. Casein is also seen as micellar casein which is sometimes called 'native milk protein'. This form of casein has been unaltered from its natural state as it is found in milk.

MILK PROTEIN ISOLATE

Milk protein isolate is a combination of the proteins found in milk, namely, whey and casein. For this reason, milk protein isolate will offer some of the inherent benefits of each of these proteins. However, milk protein isolate is not as concentrated a protein source as whey protein isolate or many casein proteins by themselves.

EGG ALBUMIN

Egg albumin (egg white protein) is one of the best wholefood sources of protein. Egg protein was formerly the 'gold standard' of protein quality before whey isolates and soy isolate came along. Egg albumin is still a very good source of protein and helps to round out the amino acid profile in protein blends.

SOY PROTEIN

Even though up to 38% of the bean is protein, soy has never been considered to be a quality source of protein, especially in its unrefined form such as tofu. Because it is derived from a plant source, soy has been looked upon as an inferior or incomplete protein and in its usual form, may very well be.

Whole soy-meal products were used as food additives for years before finding their way into the nutritional supplement industry.

When it first entered the supplement market, soy came in the form of a crude soy-protein concentrate, which lacked a quality amino acid profile and was full of

carbohydrates and sodium.

Soy-protein isolate contains the highest concentration of what is referred to as the 'Critical Cluster'. This combination of main amino acids contains the BCAAs plus the amino acids glutamine and arginine.

Soy-protein isolate may also assist a healthy metabolism due to its ability to support thyroid function. The thyroid is an organ that helps to regulate the metabolism. This is one reason why soy-protein isolate may be effective for people who are trying to lose body fat.



HOW MUCH PROTEIN IS IN A POUND OF MUSCLE?

Your muscle is primarily water and contains up to 20% protein by weight. Here's how a pound of muscle breaks down into components:

- Water: 70 – 75%
- Protein: 15 – 20%
- Fat, glycogen, minerals: 5 – 7%

Work out exactly how much protein you need based on your gender, age, weight and with our protein calculator [Protein Requirements for Active Individuals](#)

The dietary recommendations for protein for physically active individuals have been hotly debated for years. The protein requirements appear to be affected by a variety of factors, including age, sex, exercise type, intensity and duration, training history, total calorie intake and timing of meals.

The protein requirements for athletes are based on the requirements for specific essential amino acids; for example, the branched chain amino acid leucine is used as fuel during exercise. One study found that during two hours of exercising at 50% VO₂ max nearly 90% of the total daily requirements of leucine was burned as fuel.

Both intensity and duration will increase protein requirements. Resistance exercise and endurance exercise both affect protein utilisation. When beginning a training program, the body uses a lot of additional protein until the body adapts to the exercise program, usually happening in two or three weeks.

If you're trying to lose weight, protein needs per pound of body weight are also increased. This happens because as you lose weight muscle protein is broken down as an energy source.

Research has shown that consuming 1.6 grams of protein per pound of body weight while dieting enabled subjects to maintain more muscle mass compared to those who followed a traditional diet with .8 grams per pound of body weight. In order to make the most of calories, high-quality

protein sources are important when dieting to help maintain muscle mass to keep metabolic rate high. Despite increased protein requirements for active athletes, there is no need to believe that more is better. The maximum protein the body can utilise daily is about 1 gram of protein per pound of body weight or 2.2 grams of protein per kilogram of bodyweight.

Too much protein can lead to weight gain (as fat), interfere with other nutrients and increase the load on the kidneys to excrete additional nitrogen. Both intensity and duration will increase protein requirements. Resistance exercise and endurance exercise both affect protein utilisation. When beginning a training program, the body uses a lot of additional protein until the body adapts to the exercise program, usually happening in two or three weeks.

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