

Protein for Vegetarians



Why is it important to eat protein?

Because protein is absolutely necessary for the growth, development, maintenance and repair of all body tissues. If you want your muscles, tendons, ligaments, organs, blood, hair, skin, nails, hormones, enzymes, body fluids, glands and immune system to be in good health, you need protein in your diet daily.

Where do I get protein from?

Animal foods, such as meat, fish, dairy and eggs are all rich in complete proteins and low in carbohydrates. They also contain various fats, some good, some bad. But there are also plant proteins. These are incomplete proteins.

What do you mean by complete and incomplete?

The final products when proteins are digested are called amino acids. There are 22 naturally occurring amino acids in foods, and we can think of these as essential (8 or 9 of them) and inessential, which means that your body can make these internally from the other amino acids. Animal products contain all of the essential amino acids, which is why we call them complete. Plant products can not. This is why understanding how proteins work is of importance to vegetarians.



People call themselves vegetarians, but can include or exclude certain foods according to their own ideas. Vegans eat absolutely no animal products whatsoever. Vegetarians may exclude meat, but eat eggs and/or dairy (lacto-ovo vegetarians) or include fish. Some people even class themselves as vegetarian by just excluding red meat. It doesn't really matter. What matters is that person's health.

How do we digest protein?

Most protein is digested in the stomach. We have stomach cells called Chief cells. They produce pepsinogen, which is a precursor to an enzyme called pepsin. Other cells are the Parietal cells. They activate the pepsinogen to pepsin, as well as producing hydrochloric acid (HCl) which helps to denature protein by unravelling it, just as you could pull a hairy piece of string into smaller strands and break them. We also have mucus in our stomach. This protects the lining of the stomach from being digested by HCl.



Pepsin works on the protein as the acid breaks it down, and makes them into smaller molecules called polypeptides, and some amino acids. These are then pumped into the small intestine, along with fats and carbohydrates. In the first part of the small intestine, which is the duodenum, at least four major enzymes get to work to finally break all the protein products down into amino acids which are usable by the body.

Your small intestine is covered in little finger-like projections called villi. These increase the surface area of your gut to maximise absorption of nutrients. Amino acids are absorbed through the villi into your bloodstream, and they end up in your liver which begins to use them or transports them to other sites of your body.



Which are the essential amino acids?

Isoleucine, Lysine, Leucine, Methionine, Phenylalanine, Threonine, Tryptophan and Valine. Under certain circumstances others such as Histidine, Tyrosine and Selenocysteine may also be considered essential. For example, in the disease phenylketonuria, phenylalanine must be kept low, but it is needed to synthesise tyrosine, so tyrosine is an essential amino acid in this instance.

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What happens when I eat plant food with incomplete proteins?

You will only absorb the protein to the level of the lowest amino acid. For example if you eat something that only has 2% methionine content but all the other amino acid levels are high, you will only absorb about 2% overall of the protein content of that particular food.

If I'm a vegetarian that eats little/no animal products, how do I get my protein?

It's not hard if you know about protein combining, and what plant foods contain protein.

What's protein combining?

This is where you intentionally combine foods in roughly equal amounts to maximise the availability of proteins. Examples are:

- * nuts + seeds
- * legumes + grains + veg
- * grains + seeds
- * legumes + nuts
- * seaweeds + grains + veg

Or if you eat eggs and dairy foods:

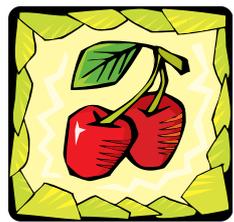
- * cheese + grain or fruit
- * eggs + beans



A great example is hommous. It contains chic peas and sesame seeds (tahini paste). The legumes plus seeds give a full protein profile. Many traditional diets have already learned the art of protein combining and do it beautifully.

How do I know what foods are good sources of protein?

Nearly all foods have some, but the levels in most fruit and vegetables are very low - below 5%, and some down to 1% (carrots).



Nuts and seeds can contain anything from 15-35% protein, and they make a great snack food. Chia seeds are high in protein as well as other great nutrients. Sunflower and sesame seeds have good levels. Among the nuts, look for pistachios, cashews, almonds and brazil nuts.

Legumes include most dry beans, peas and peanuts. These can contain from 15-35% protein. Soybeans and black beans are good examples. Soybeans have 35% protein.

Grains are generally lower, but still a valuable source when combined with other sources. Quinoa (pronounced keen-wah) is an excellent protein source, as is whole wheat. Oats have about 13% protein, but are good when you use milk on your porridge to combine the proteins. Amaranth has about 16%, and there are lower levels in rice, barley, corn, rye, millet and buckwheat.



Chlorella and Spirulina are great protein sources, and if you put them into a milk or soymilk based smoothie you will get the full benefit. Soy products such as miso, tofu and tempeh are also good to add to legumes or grain dishes to bump up the protein levels.

See Frances Moore Lappe's book *Diet for a Small Planet* for lots more info and recipes.