

# PROTEIN & AMINO ACIDS

The chief nutrients known to be essential for humans are: -

- Amino acids (proteins)
- Carbohydrates
- Essential fatty acids
- Vitamins
- Minerals
- Other (fibre, oxygen, water)

Proteins are made up of long chains of amino acids, linked together by what are called peptide bonds, which are wound up like a ball of wool. Hydrochloric acid in the stomach has the effect of unravelling, or denaturing, these balls, exposing the amino acids so that digestive enzymes can break them down.

Protein-digesting enzymes that are secreted by the stomach, the walls of the small intestines and the pancreas can then split the peptide bonds, freeing the amino acids for absorption. How do you know if the stomach is secreting insufficient hydrochloric acid (HCl)? Symptoms may include burping after a meal, indigestion, reflux, a feeling of fullness after eating, a sensation like a heavy weight in the stomach, nausea. Although there are other digestive processes to consider, low HCl could also be a contributory factor to abdominal bloating, flatulence, diarrhoea, constipation. A low intake of protein can contribute to low secretion of HCl. Zinc and Vitamins B12 and B6 are needed to produce stomach acid, as well as water.

Protein is broken down by the enzyme protease (also known as a proteolytic enzyme, peptidase or proteinase). Proteases are a category of enzymes; some are produced by the body, some are found in foods, and some are produced by bacteria and other microbes.

Protein is broken down into **amino acids**. By the time food reaches the end of the small intestine, most nutrients have been absorbed.

There are 9 amino acids that are essential for life which are called **Essential Amino Acids**. Amino acids are essential for the production of: -

- Enzymes
- Hormones
- Neurotransmitters
- Immune Cells
- Liver detoxification

It has been observed that in some, particularly those with adrenal insufficiency (low levels of the stress hormone cortisol) from stress or over-exercise, cortisol levels increased back to appropriate levels again in accordance with protein intake. **Protein stabilises the adrenals.**

# PROTEIN & AMINO ACIDS

The following are considered to be **Essential Amino Acids**: -

1. Isoleucine
2. Leucine
3. Lysine
4. Methionine
5. Phenylalanine
6. Threonine
7. Tryptophan
8. Valine
9. Arginine (semi-essential)
10. Histidine (semi-essential)

**The Recommended Daily Allowance (RDA): -**

The RDA for protein is 0.8gm of protein / kg body weight daily

The RDA is defined to be the minimum amount that should be eaten to maintain body protein

The RDA is NOT an optimal amount of protein, just the amount needed to keep you alive

If the body is healing or under stress, more protein is required.

**Protein helps support: -**

- Boosting muscle mass
- Improved mood
- Blood sugar balance
- Weight management by filling you up
- Healthy brain function and learning
- Maintain strong bones
- Heart health
- Slow ageing and promote longevity

# PROTEIN & AMINO ACIDS

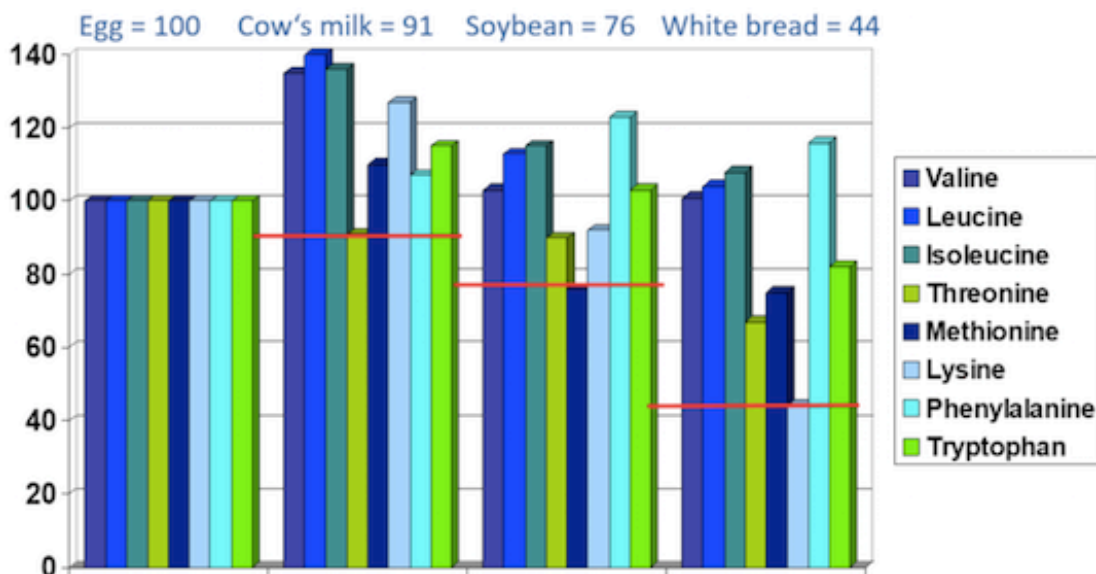
## Teamwork

Different foods contain different amounts of amino acids. For those who eat a vegan or vegetarian diet it is essential to understand that these amino acids **all work together**. However, because they all work as a team, they are limited by the smallest “player”. The utilization capacity of dietary proteins depends on the smallest fraction of essential amino acids.

Any amino acids present in foods over the amounts of the least available amino acid (over the red line) are literally excreted out of the body and wasted. This is called a *Rate Limiting Amino Acid*. Have a look at the chart below.

Have a look at soya beans. Look at the navy-blue line, this is the amino acid methionine. All amino acids above the red line, above methionine, are literally wasted. The amount of protein that you will see listed on a packet of food will include these wasted proteins above the red line. A marketing ploy, which is extremely misleading. Compare this to an egg, and you will see that all essential amino acids are equal and will therefore be bioavailable.

## Biological value of dietary proteins



The utilisation capacity of dietary proteins depends on the smallest fraction of essential amino acids

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Some people, however, may have genetic requirements for more, or less of these amino acids. Below is a chart of the biological value (BV) of proteins of some foods. Cod may contain 18 %, but the bioavailability is a huge 92%. Then look at gelatine, which has a huge protein value of 84%, but its biological value is only 1%, as it has virtually none of the essential amino acid tryptophan.

This limiting amino acid renders the rest of the protein useless. However, on a shop packet, the content would be 84% and you would be led to (incorrectly) believe, that if you ate it, you would be absorbing 84% protein, when in fact you would only be absorbing 1%. Beware of labels, they mean nothing, unless you really understand the ingredients and their amino acid contents. **It is vital if you are a vegan or vegetarian to understand rate limiting proteins.**

Food	Protein rate in %	Biological value in %
Green beans	2	63
White beans	21	46
Cod	18	92
Pasta	13	30
Emmental cheese	28	85
Gelatine	84	1
Oat flakes	14	62
Hazelnuts	14	50
Hens` egg	13	81
Roast chicken	21	83
Carp	18	84
Potatoes	2	67
Milk	3,5	91
Carrots	1	36
Rice	7	64
Lean beef	19	87
Rye wholegrain	12	67
Escalope	21	84
Lean pork	14	84
Soybeans	37	76
Cottage cheese	13	98
White bread	8	44

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According to amino acid expert, Anthony Haynes (previously a vegan and vegetarian athlete, who advocates a plant based diet, but with adequate protein), “the only way that vegans and vegetarians will be able to get the amount of amino acids they need, protein powders are the way forward, otherwise it is literally impossible to get all of the amino acids you need”

## Important Reminder

**If you see the protein content on a product, remember that this may be the protein content, but not the bioavailable content, it is a very misleading marketing ploy. The amount of protein does not determine how much will be absorbed by your body. It is all about the amounts of the essential amino acids.**

**When purchasing a protein powder if you are a vegan or vegetarian, look for the bioavailability % of the protein. For instance, with Vital Pea Protein the bioavailability is 88%. You can purchase this in different flavours via The Natural Dispensary with your discount code. Add it to smoothies, muffin, the gluten-free loaf recipe etc.**

**Soya** is the best source of protein for a vegan; however much is genetically modified and it also contains goitrogens, which reduces the absorption of iodine. This can be low in those with low thyroid hormones, and in addition, iodine is generally low in a vegan / vegetarian diet. Good quality, non-GMO soy, is OK in small amounts, occasionally.

**Pea protein** does contain all 9 of the amino acids, but one would need more peas than one could eat to get the amount of protein needed if on a vegan diet. A good quality protein powder will have condensed all of this into a powder.

**Hemp powder** contains less than 11-12% protein and has rate limiting amino acids, this is why double the number of scoops are needed than other protein powders. This can be a great addition to the diet but should not be relied upon as a protein source.

Protein availability of animal protein v vegetable sources of protein: -

Animal – 100%

Vegetables – 20%

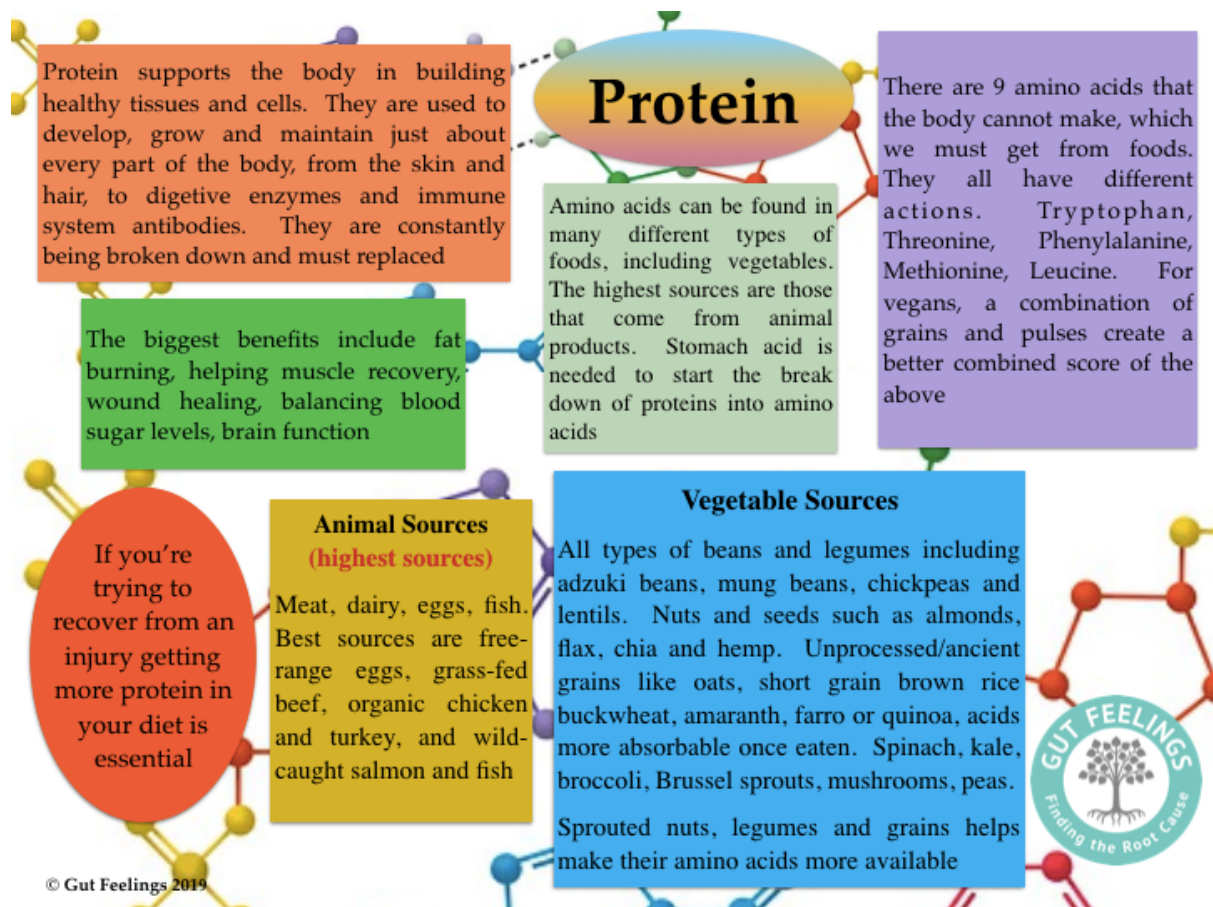
One would therefore need to consume 5 times the amount of vegetable protein to have the same amount as animal sources.

Muscle is the only tissue in the body that nourishes the body with amino acids. If someone has a good muscle mass, this can be an indicator of health.

Not all protein powders are equal though, for instance,

THERE IS NO TEST, EITHER BLOOD OR URINE THAT WILL GIVE YOU THE AMOUNT OF PROTEIN YOU ARE CONSUMING.

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Foods for vegetarians and vegans that contain protein

- tempeh
- lentils
- beans (black beans, lima beans, pinto beans, chickpeas)
- nuts (almonds, peanuts, pistachios, cashews)
- nut butter (almond butter, cashew butter, sunflower seed butter)
- brown rice
- oats
- quinoa
- seeds (chia seeds, flaxseeds, pumpkin seeds, hemp seeds)
- leafy greens (spinach, kale)
- Non-GMO soya (in small amounts)