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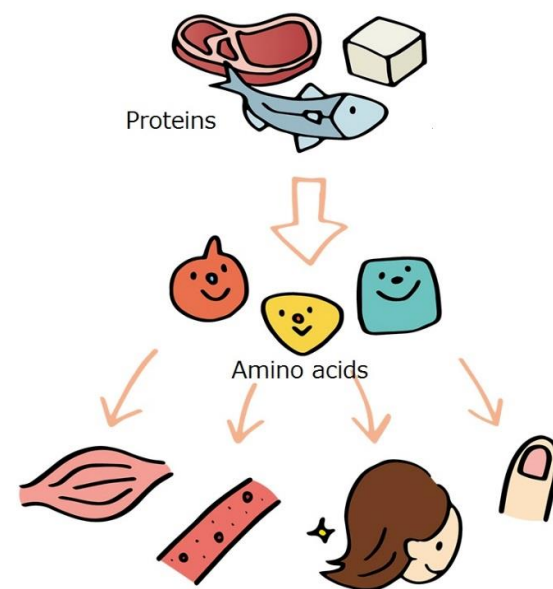
## The functions of proteins are surprisingly little known!

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**T**aking proteins is the quickest way to obtain beautiful skin and hair. This issue will include explanations with practical examples of proteins in common foods.

### ◆◆ Summary of proteins

Proteins are one of the three major nutrients (proteins, fats and carbohydrates). Proteins are an essential nutrient because they are responsible for being the base compounds of our muscles, skin, hairs, nails, organs, hormones, etc. Some proteins continue a cycle of synthesizing and resolution in the body and some are egested. Therefore, we have to continuously take proteins from our regular meals.



Proteins become the base compounds of the body

As shown in the following chart, proteins are responsible for many functions in the body. If our bodies do not have enough proteins, there will be adverse effects to our health such as developing anemia, depression of the immune system, swelling of the body (extremities, face, etc.) and a feeling of fatigue. Once the body loses its flexibility due to the lack of proteins, arteriosclerosis or hypertension is possibly caused.

The collagen that many women love is one type of proteins and it is a compound of our skin, hairs, nails, bones and blood vessels. Once the level of protein in the body becomes insufficient, collagen will not be synthesized properly which will result in depriving firmness or elasticity to our skin and hair or causing wrinkles and sagging skin.

### Main functions of proteins in our bodies

Keep the shape and flexibility of the body (skin and hair)	Collagen, Elastin, Keratin
Digest foods (enzymes)	Amylase, Pepsin
Deliver nutrients throughout the body	Hemoglobin, Albumin, Lipoprotein
Make the muscles contract	Actin, Myosin
Regulate immunity	Globulin, Fibrinogen
Act as hormones	Insulin, Growth hormones

### ◆◇ Recommendation to have essential amino acids

Proteins are digested and decomposed to amino acids in order to be assimilated in the body. There are many types of amino acids, but the food and materials that make our bodies are composed of 20 amino acids. 9 out of these 20 amino acids are called “essential amino acids” that cannot be synthesized in the body and have to be taken from daily meals. The 9 essential amino acids are threonine, methionine, valine, leucine, isoleucine, lysine, histidine, phenylalanine and tryptophan.

When we want to know the balance of essential amino acids in foods, protein digestibility-corrected amino acid score (PDCAAS) is useful. It is a method of evaluating the protein quality based on both the amino acid requirements of humans and their ability to digest it. The maximum of this score is 100 and the higher score is the better balanced protein. Generally, animal protein has a higher score than vegetable protein and many of them often score 100. However, animal protein also contains a lot of fat and an excessive fat intake will be possibly caused. When you take proteins from food, it is important to combine animal and vegetable proteins in balance.

White rice which Japanese people eat as a principal food scores only 65 of the PDCAAS and it is not really high. Once we add soy beans together with white rice, we can supplement the deficiency of essential amino acids. The combination of white rice and soybeans can reach to 100 score and contains lesser fats than animal proteins. For the Japanese meal, we often set white rice, natto (soybeans fermented with *Bacillus subtilis* var. natto) and miso soup with tofu (bean curd). This can be an ideal menu to have sufficient essential amino acids without much fats.

In the vegetable protein, soy products contain abundant quality proteins. Soy products include natto and tofu which are easily added without requiring much cooking time and soy-milk which is with a variety of accent flavors and easy to add to regular meals.

There are products containing animal proteins that can be added to regular meals without requiring much cooking time like canned fish, fish sausage, cheese and yogurt. If you do not have time to cook, we suggest to add one of these practical protein products to your meals when you eat out or buy prepared foods and you feel that the protein balance in the meal is inappropriate.

### ◆◇ How much proteins do we need to take?

The required daily intake of protein varies between countries. The Japanese Ministry of Health, Labour and Welfare set the required daily intake of protein as 60g for men and 50g for women. People who often do sports and women who are pregnant or breast-feed their babies need more proteins. Perhaps surprisingly, the amount of required daily intake of proteins increases for the people who do little physical activity or elderly individuals. This is because their bodies decompose more protein than what they synthesize due to the lack of energy intake and exercise.

You may think that 50~60g of proteins are not much in volume. However, the weight of protein does not equal to the weight of actual meat or fish. For example, 50g of proteins are equivalent to about 130g of pork meat. The following chart contains some examples of food ingredients that are abundant in proteins. You can refer to it and combine these ingredients in order to achieve the required daily intake amount and balance animal and vegetable proteins.

**Food ingredients that are abundant in proteins**

	Food ingredients	Amount (g)	Proteins contained (g)
1	Pork (fillet)	100	39.3
2	Chicken breast (without skin)	100	38.8
3	Fish (salmon)	100	28.5
4	Beef (thigh)	100	28.4
5	Momen tofu (firm tofu)	150 (half)	9.9
6	Natto	50 (1 pack)	8.25
7	Processed cheese	36 (2 slices)	8.17
8	Milk (regular)	200 (a glass)	6.6
9	Whole egg	50 (medium size)	6.15
10	Soybean curd refuse (uncooked)	50	3.05

◆◇ **An important vitamin to take with proteins**

Vitamin B6 is deeply associated with proteins. It is essential when proteins are synthesized in the body and converted to energy for the body. Once the body does not have enough vitamin B6, protein-use efficiency decreases even if you eat food containing abundant proteins. Vitamin B6 is rich in meat, fish, banana, garlic, brown rice, etc. People, who do heavy exercises or take a large amount of amino acids and proteins from supplements or sports drinks, are also required to take larger volumes of vitamin B6.

Proteins always change their forms in the body by going through the decomposition and synthesis cycles. They are absolutely essential nutrients to be the basic foundation of the body like muscles, skin, blood, etc. Eating too much animal proteins may cause problems later for your health. We suggest to take a good amount of proteins from every meal in the appropriate balance of animal and vegetable proteins.