

THE BUILDING BLOCKS PROTEIN , HORMONES AND OTHER NUTRIENTS.

WHAT ARE BUILDING BLOCKS OF BODY?

The human body can be considered to be a combination of very complex groups of systems which function smoothly. When this organization is examined from the constituent molecules upward toward the systems, the lowest layer is amino acids, nucleotides, saccharides, and lipids. Upon their combination, proteins and enzymes, polynucleotides, polysaccharides, and lipoid structures are formed. These, in return, form the cells, tissues, organs, organ systems, and finally, the living organism, the human body.

Proteins are described as building blocks of life. The body needs protein for growth and development to make new cells, repair the damaged tissue and cells. Proteins are made up of thousands of smaller units called amino acids. Amino acids are attached to each other to form long chains of proteins.

PROTEIN

Protein is a macronutrient that is essential to building muscle mass. It is commonly found in animal products, though is also present in other sources, such as nuts and legumes. There are three macronutrients: **protein**, fats and carbohydrates. Macronutrients provide calories, or energy.

How much protein does the body need?

The daily maximum amount the body can use for protein synthesis is said to be around 2 grams per 1 kilogram of body weight. Consuming more protein will not increase synthesis, but increase the amount consumed as energy, and lead to an increase in body fat. Too much protein can also burden the liver and kidneys.

Recommended daily protein intake

Recommended quantity (g/day)

| Age | Male | Female |
|-------|------|--------|
| 10~11 | 50 | 50 |
| 12~14 | 60 | 55 |
| 15~17 | 65 | 55 |
| 18~29 | 60 | 50 |

*Junior high and high school students require the most protein, and this amount will increase when they exercise.

From Dietary Reference Intake for Japanese (2015 edition)

Approximate amount of protein required by athletes

For endurance sports **1.2-1.4g per day / 1kg weight**

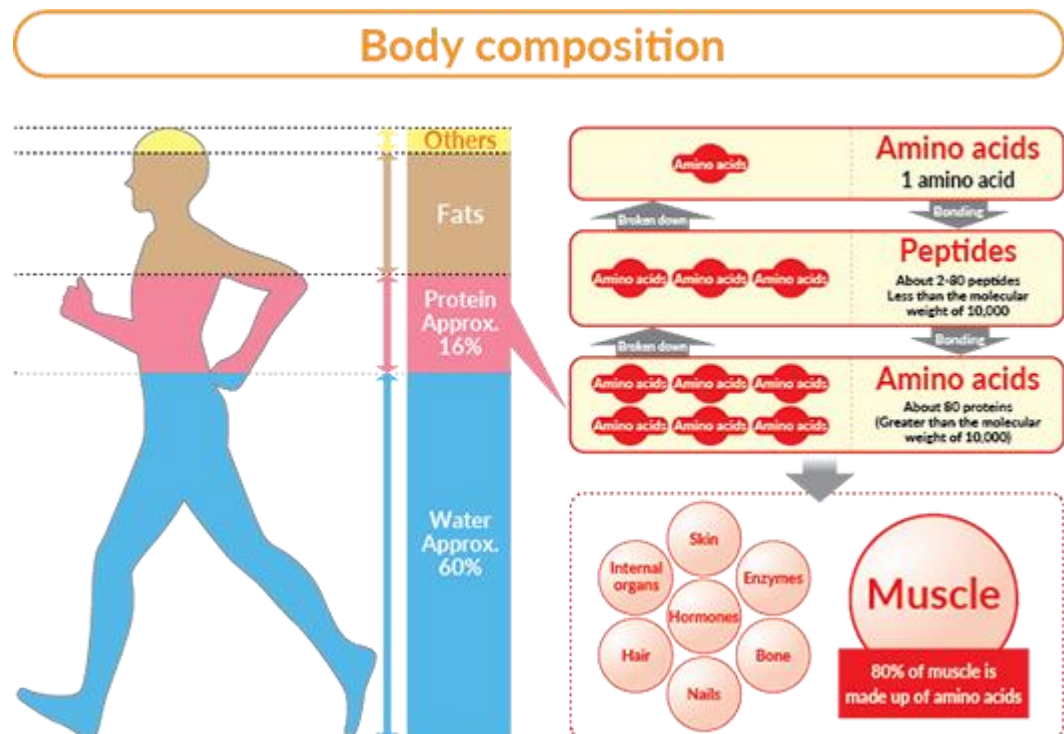
For muscle work / fast-paced sports **1.7-1.8g per day / 1kg weight**

Reference: the Japan Amateur Sports Association (Nutrient intake and meals for athletes)

Proteins are involved in every aspect of cellular life. Proteins function to transport materials across membranes, catalyze chemical reactions, organize DNA, support the movement of materials within a cell, and even drive movement of the entire cell. The technique of [sodium dodecyl sulfate polyacrylamide gel electrophoresis](#) or **SDS-PAGE** is a standard technique for

the analysis of the protein composition of a sample. The nature of the sample will vary depending on the specific experiment.

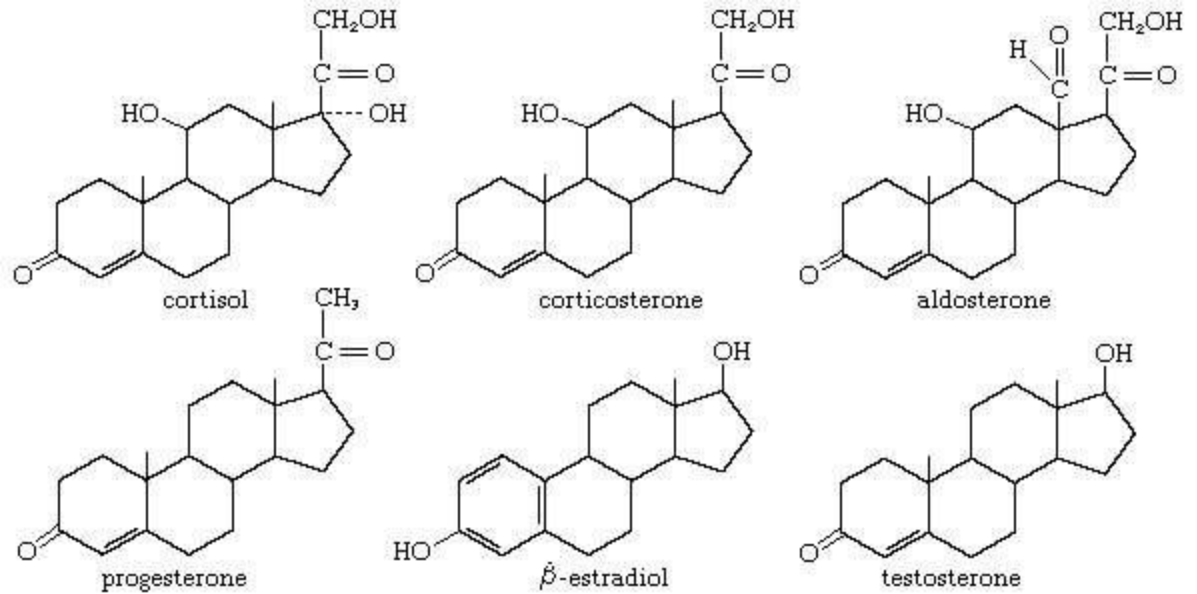
Protein are the ultimate players in the processes that allow an organism to function and reproduce. Their use in medical therapy requires their isolation in pure form. This chapter addresses the calculations needed to quantify protein and, for the cases of several examples, to assess protein activity. How to calculate a protein's molecular weight by its [amino acid sequence](#), by sodium dodecyl sulfate [polyacrylamide gel electrophoresis](#), and by [gel filtration](#) are shown. How to quantify protein amount by absorbance using its extinction coefficient and by colorimetric assay, how to use the mathematics involved in labeling proteins with fluorescent dyes, and how to assess a protein's purity by thin-layer chromatography are discussed. Methods for calculating the activity of [\$\beta\$ -galactosidase](#), [chloramphenicol acetyltransferase](#), [luciferase](#), and DNA polymerase are shown. The calculations used for monitoring in vitro translation and for determining a protein's [isoelectric point](#) are revealed.



HORMONES

Hormones are your body's chemical messengers. They travel in your bloodstream to tissues or organs. They work slowly, over time, and affect many different processes, including. Growth and development. Metabolism - how your body gets energy from the foods you eat

Hormone, organic substance secreted by plants and animals that functions in the regulation of physiological activities and in maintaining homeostasis. Hormones carry out their functions by evoking responses from specific organs or tissues that are adapted to react to minute quantities of them. The classical view of hormones is that they are transmitted to their targets in the bloodstream after discharge from the glands that secrete them. This mode of discharge (directly into the bloodstream) is called endocrine secretion. The meaning of the term *hormone* has been extended beyond the original definition of a blood-borne secretion, however, to include similar regulatory substances that are distributed by diffusion across cell membranes instead of by a blood system.



Hormone Imbalance Can Cause Health Problems

Hormones secreted by glands and organs work together to control your body. If one or more is slightly imbalanced, it can cause major health problems, such as:

- Trouble sleeping
- Sudden weight gain
- Bloating, gas, indigestion
- Female hormone imbalances
- Confusion or forgetfulness
- Getting sick too often

Any long-term activation of your stress-response system that allows for the overexposure to stress.

Essential hormones can disrupt many of the body's processes putting you at increased risk of chronic health conditions