

# Threonine - description, benefits, effect on the body and the best sources

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**Abstract.** The cells of our body are constantly renewed. And for their full formation, many nutrients are simply necessary. One of the important nutritional components necessary for the construction of body cells and the formation of strong immunity is threonine.

**Keywords:** threonine, general characteristics, daily requirement, digestibility, beneficial properties, signs of deficiency, signs of excess

## Threonine-rich foods:

- Beef
- Mutton
- horsemeat
- Chicken eggs [1]
- Quail eggs
- Chicken meat
- Black grouse meat
- Turkey
- Hard cheese
- Brynza
- Sea fish of fatty varieties (herring, sturgeon, sardine)
- Mushrooms
- Barley
- Buckwheat [2]
- Rye

## General characteristics of threonine

Threonine is an essential amino acid that, together with nineteen other amino acids, is involved in the natural synthesis of proteins [3] and enzymes. The monoaminocarboxylic amino acid threonine is part of almost all proteins existing in nature. Exceptions are low molecular weight protamine proteins present in the body of fish and birds.

Threonine is not produced in the human body on its own, so it must be supplied in sufficient quantities through food. This essential amino acid is especially necessary for children during rapid growth and development of their body [4]. As a rule, a person rarely experiences a deficiency of this amino acid. However, there are exceptions.

In order for our body to function normally, it needs to form proteins every moment, from which the entire organism is built. And for this it is necessary to establish the supply of the amino acid threonine in sufficient quantities.

## Daily requirement for threonine

For an adult, the daily norm of threonine is 0.5 grams. Children should consume threonine in the amount of 3 grams per day. This is due to the fact that a growing organism needs building material more than an already formed one.

#### **The need for threonine increases:**

- with increased physical activity [ 5];
- during active growth and development of the body;
- when playing sports (weightlifting, running, swimming);
- with vegetarianism [6], when little or no animal proteins are consumed;
- for depression [7], because threonine coordinates the transmission of nerve impulses in the brain.

#### **The need for threonine decreases:**

With age, when the body ceases to need a large amount of building material.

#### **Threonine absorption**

For complete absorption of threonine by the body, B vitamins are required [8] (B3 and B6). Of the microelements, magnesium has a significant effect on the absorption of amino acids [9].

Since threonine is an essential amino acid, its absorption is directly related to the consumption of foods containing this amino acid. At the same time, there are cases when threonine is not absorbed by the body at all. In this case, the amino acids glycine and serine are prescribed, which are formed from threonine as a result of chemical reactions in the body.

#### **Beneficial properties of threonine and its effect on the body**

Threonine is necessary to maintain normal protein balance. The amino acid improves liver function, helps strengthen the immune system [10], and is involved in the formation of antibodies. Threonine is necessary to maintain the cardiovascular and nervous systems. Participates in the biosynthesis of the amino acids glycine and serine, and takes part in the formation of collagen [11].

In addition, threonine perfectly fights fatty liver and has a positive effect on the functioning of the gastrointestinal tract. Threonine actively copes with depression [12] and helps with intolerance to certain substances (for example, wheat gluten).

#### **Interaction with other elements**

In order to provide skeletal muscles with high-quality protein, and protect the heart muscles [13] from premature wear, it is necessary to consume threonine together with methionine and aspartic acid. Thanks to this combination of substances, the appearance of the skin [14] and the functioning of the liver lobules improves. Vitamins B3, B6 and magnesium increase the activity of threonine.

#### **Signs of excess threonine:**

Increased levels of uric acid in the body.

### **Signs of threonine deficiency:**

As mentioned above, a person rarely experiences a deficiency of threonine. The only sign of threonine deficiency is muscle weakness accompanied by protein destruction. Most often, those who avoid eating meat, fish, and mushrooms suffer from this - that is, they eat protein foods in insufficient quantities.

### **Factors influencing threonine content in the body**

Rational nutrition is the determining factor in the abundance or lack of threonine in the body. The second factor is ecology.

Environmental pollution, soil depletion, the use of animal feed, and raising livestock outside pastures lead to the fact that the foods we eat are poorly saturated with the amino acid threonine.

Therefore, in order to feel good, it is better to purchase products from a trusted manufacturer, from whom they are more natural than those purchased in stores.

### **Threonine for beauty and health**

Since threonine plays an important role in the synthesis of collagen and elastin, sufficient levels of it in the body are an essential component of healthy skin. Without the presence of the above substances, the skin loses its tone and becomes like parchment. Therefore, to ensure the beauty and health of your skin, you should definitely consume foods rich in threonine.

In addition, threonine is necessary for the formation of strong tooth enamel, being a structural component of its protein; actively fights fatty deposits in the liver, speeds up metabolism, and therefore helps maintain your figure.

The essential amino acid threonine helps improve mood [15], preventing the development of depression caused by a lack of this substance. As you know, a positive mood and poise are an important indicator of physical attractiveness.

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