

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

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**Abstract.** Today, many people suffer from excess nervous tension, fatigue, melancholy and depression. What will help support the body in stressful situations and increase resistance to nervous overload?

Modern medicine offers a new, unconventional approach to treating these types of problems. A dependence has been established on the amount of tyrosine in the human body and the frequency of neurodepressive disorders.

*Key words:* tyrosine, general characteristics, daily requirement, digestibility, beneficial properties, signs of deficiency, signs of excess

## **Tyrosine-rich foods:**

- Meat
- Fish
- Avocado [1]
- Soya beans
- Bananas [2]
- Peanut
- Eggs [3]
- Seeds
- Almond
- Wheat
- Seafood
- Cottage cheese [4]
- Cheese
- Oatmeal [5]
- Dairy

## **General characteristics of tyrosine**

Tyrosine is a substance of biological origin that is classified as a non-essential amino acid.

Tyrosine can be formed independently in the human body from phenylalanine. It is important to note that the transformation of the substance in the opposite direction is completely excluded.

Tyrosine is present in more than a hundred food components. However, we use almost all of them.

Tyrosine is obtained from plant and animal raw materials, and it is also isolated industrially.

There are L-tyrosine, D-tyrosine and DL-tyrosine, which have some differences.

Each of these compounds is synthesized from phenylalanine and associated with two other substances. Therefore they are considered as a single compound.

- **L-tyrosine** is an amino acid that is part of the proteins of all living organisms;
- **D-tyrosine** is a neurotransmitter that is part of many enzymes.
- **DL-tyrosine** is a form of tyrosine that has no optical energy.

### **Daily requirement for tyrosine**

It has been experimentally established that in different situations, the dosage of tyrosine will vary. For severe neuropsychiatric conditions, tyrosine is recommended to be taken in amounts of 600 to 2000 mg per day. To improve thyroid function and reduce pain during PMS, a dosage of 100 to 150 mg per day is recommended.

To maintain a number of functions in a healthy body: synthesis of proteins and hormones, stress resistance, to avoid depression and chronic fatigue, to significantly reduce fat reserves, stable functioning of the adrenal glands and maintain thyroid function, the recommended dosage is 16 mg per 1 kg of body weight.

A balanced diet also helps you get the required amount of this substance from food.

### **The need for tyrosine increases with:**

- frequent depressive states [6];
- overweight;
- active physical activity;
- deviation from normal functioning of the thyroid gland;
- poor memory;
- deterioration of brain activity;
- manifestation of symptoms of Parkinson's disease [7];
- hyperactivity;
- to reduce pain during PMS.

### **The need for tyrosine decreases:**

- with high blood pressure (BP);
- at low body temperature;
- in case of disruption of the gastrointestinal tract;
- in old age (over 65 years);
- while using chemical antidepressants;
- in the presence of Felling's disease.

### **Tyrosine absorption**

The absorption of tyrosine directly depends on compliance with the rules of administration. The presence of certain other amino acids interferes with the transport of tyrosine to brain cells. As a result, it is recommended to take the substance on an empty stomach, dissolved with orange juice, that is,

consumed in combination with vitamin C, tyrosine hydroxylase (an enzyme that allows the body to use tyrosine) and vitamins: B1, B2 and niacin.

As a result of numerous experiments, it has become clear that in order to achieve a quick effect in treating stress and severe forms of depression, it is very important to use tyrosine with well-known herbs, such as: St. John's wort and herbal mixture of valerian [8], chamomile [9], lemon balm [10], mint [11], which are also believed to relieve depression.

Moreover, the absorption of the substance depends not only on the body itself, but also on its correct intake. The best option would be to consume it with vitamin B6 and vitamin C [12], on an empty stomach.

### **Interaction with other elements**

When using the components of the substance tyrosine, you must be careful about combining it with other substances. If we consider the state of presence of other components in cells, for example, amino acids, then this fact prevents the coordinated work of the tyrosine components. In addition, tyrosine interacts with hydroxytryptophan and chlorine [13], forming complex compounds with them.

It must be remembered that the constituent components of tyrosine have the function of being easily incorporated only before eating, dissolved in orange juice [14] with the addition of vitamin C, tyrosine hydroxylase (a fermenting component that gives human cells the ability to accept and absorb tyrosine elements), with the addition of B vitamins [15] and niacin.

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

Repeated clinical experiments have proven that the best natural antidepressant is tyrosine. Scientists have noted a certain pattern according to which the higher the level of tyrosine in the blood, the higher its ability to withstand stress.

It is important to note that the production of adrenaline and norepinephrine components is related to the amount of tyrosine in the body.

This amino acid, without the need for additional use of chemicals, controls the amount of tyrosine in the human body and, therefore, reduces the likelihood of depressive disorders, stress, anxiety and irritability.

It is generally accepted that it has a significant effect on the functioning of the peripheral and central nervous systems. Tyrosine components have a significant impact on improving the quality and intensity of training in athletes, reduce the time factor of periods of rest and work, reduce fatigue, and are responsible for the prevention of overtraining.

It has been noted that tyrosine molecules are included in the process of production of the thyroid hormonal component, which provides an opportunity to increase the hormonal action of the thyroid gland [16].

The effects of tyrosine components have been observed to reduce the painful effects of the premenstrual period.

When the required level of tyrosine is found in human cells, an improvement in the functioning of the blood-brain barrier is observed.

It is a barrier between blood flow areas and brain cells. They form membranes, allowing only molecules of certain types of substances to pass through and creating a barrier for other types (bacteria, viruses, proteins, low-molecular toxins). The ability of unwanted elements to penetrate the brain is determined by the strength of the protective barrier of the EBC. Protection of the amino group by chemical elements allows the beneficial amino acid to pass through the barrier protection and protects it from unnecessary substances.

The enormous beneficial effects of tyrosine have been identified in the fight against addiction to caffeine [17], narcotic drugs, and in the fight against uncontrolled drug use.

Tyrosine is the starting material for the production of certain hormones, such as dopamine, thyroxine, epinephrine and some others.

In addition, as a result of the transformation of tyrosine, the production of melanin pigment is noted.

### **Signs of tyrosine deficiency in the body**

- obesity [1 8];
- fast fatiguability;
- state of depression [1 9];
- poor resistance to stress;
- sudden mood swings;
- premenstrual pain;
- decreased appetite;
- decreased brain activity;
- manifestations of Parkinson's disease [ 20];
- dysfunction of the thyroid gland;
- hyperactivity;
- interruptions in the functioning of the adrenal glands [2 1].

### **Signs of excess tyrosine in the body**

- loss of muscle mass;
- manifestation of hypertension [2 2];
- decreased body temperature;
- increased heart rate.

### **Factors influencing the content of the substance in the body**

With a healthy, nutritious diet that includes components containing tyrosine, it is possible to maintain the required level of this substance in cells with the help of nutritious food. The recommended dose for a healthy person is 16 mg per 1 kg of body weight.

The second way the body obtains tyrosine is through the conversion of phenylalanine, which occurs in the liver.

## Tyrosine for beauty and health

Interest in tyrosine has increased in the beauty industry. This amino acid helps to achieve a deep, dark tan by regulating melanin production. The list of components of lotions and creams for tanning always contains tyrosine components. Although, scientists' opinions on this matter differ.

Recent studies have revealed the positive effects of tyrosine on reducing human fat reserves and healthy weight loss.

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