

FOOD ALLERGY AND FOOD INTOLERANCE

NUTRITIONAL CORRECTION OF ALLERGY

Food allergy is a food hypersensitivity associated with abnormal immunological responses, which in most cases develop in violation of immunoglobulin synthesis of IgE.

The mechanism of the development of food allergies

Usually, the first symptoms of food allergies develop in childhood. During this period, particularly important to recognize the cause of its appearance, to formulate prevention and treatment of the disease state. Medical observations suggest that food allergy occurs in 6-8% of children up to 2 years (60-94% of cases occur in the first year of life), followed by a decrease in its prevalence to 2% in the adult population.

Normally, a large number of agents including allergens come in the gastrointestinal tract. But thanks to the special properties of the mucosa of the alimentary tract in the intestine forms a "barrier" which prevents the penetration of allergens in the blood, as well as the hazardous microorganisms and viruses. Low acidity (pH) of the gastric juice as well as abdominal, parietal and intracellular proteolytic enzymes contribute to the destruction of the protein allergen resulting in the loss of their dangerous properties.

Immune cells protect the body from foreign agents and increase barrier properties of the intestines. Program failure immunological protection, including malfunction of the immune system of small intestine (Peyer's patches) leads to the development of food allergy . Often failure is expressed in overproduction of **IgE** antibodies and failure of some repositories on the intestinal mucosa and guarding the body against invading antigens (IgA). Thus the permeability of the mucous membrane of the gastrointestinal tract is increased to allergens.

Moving through the body, the antigen causes an alternating sequence of reactions: burning in the mouth, vomiting, abdominal pain, diarrhea, etc., when entering into the bloodstream - the pressure drop, skin - rash or eczema, lungs - bronchospasm.

Important role in the formation of food allergies in children plays a functional immaturity of the immune system and digestive system, lack of development of enzymes in the gastrointestinal tract, the deficit of beneficial microflora and intestinal infections.

At the risk of food allergies in children affect STI during pregnancy (toxemia , allergic diseases) , unbalanced nutrition for pregnant and lactating women use their rations high-allergy food products (through breast milk allergens come into the body and cause allergies for baby) , the nature of feeding (natural or artificial) , types and timing of introduction of complementary foods , drug therapy in pregnant women, lactating women and children, the effects on pregnant allergens that occur during the execution of a trade or enter the body of pregnant, lactating women or child from the environment.

Of great importance is a genetic predisposition to food allergies. If the parents do not, then it can occur in 4-10 % of children, and if allergy one of the parents - that 25-50 % of children, if both parents - that in 40-80 % of children.

Food allergens

At present time, approximately 160 known food allergens that cause IgE-mediated allergic reactions.

Most food allergens are **proteins**. The majority of children (76%) found for allergies 3 or more proteins of foodstuff.

Fats and carbohydrates by themselves are not allergens, but in compound with the protein (eg, glycoproteids) may cause allergic reactions. Mineral salts including microelements are not allergens.

To high-allergic food products which often cause sensitizing effect and allergies belong:

- whole milk;
- eggs;
- fish (fresh, salted, smoked, eel);
- seafood (shrimp, crab, shellfish), caviar;
- wheat, rye;
- strawberry, mango, persimmon, melon, bananas;
- carrots, tomatoes, celery, bell pepper;
- chocolate;
- coffee, cocoa;
- nuts (forest, almonds, walnuts, etc.);
- honey;
- mushrooms.

Allergies can occur in all kinds of milk or fish or just one kind (eg, cow's milk or herring).

Allergy to egg whites increases when combined in the diet with chicken and broth. Allergenic properties of the protein expressed in chicken eggs to a greater extent than yolk. Allergy to marine fish is more common than to the river, but in most cases, children react to all kinds of fish.

Wheat flour has more than 40 allergens, so it is - a frequent source of allergies in children. Allergy to barley, oats develops rarer, than to rice, according to some experts - up to 50% of surveyed children.

Products with moderate allergenicity:

- beef, chicken, chicken broth, and other poultry;
- buckwheat, oats, rice;
- peas, beans, soybeans;
- potatoes, beets, turnips;
- apricots, peaches;
- cranberry, blueberry;
- cherry, black currant, wild rose.

Products with low allergenicity:

- dairy products;
- rabbit meat, turkey, lean pork, lean lamb;
- barley, corn, millet;
- cauliflower and cabbage, broccoli;
- zucchini, squash, cucumbers;

- parsley, dill;
- white and green varieties of apples and pears;
- yellow varieties of plums ;
- white currants;
- white and yellow cherries.

It should be remembered that allergic reactions can cause a beer, smoked sausage, mayonnaise, horseradish, mustard, pepper, various marinades. Food allergy is often 2-3 and more products at the same time.

Allergic reactions may cause foods containing dietary supplements, antibiotics, container's components, allergens of molds etc.

Features of Diet with food allergies

Essential components of the treatment of food allergy are:

- 1) elimination diet ;
- 2) the use of hypoallergenic mixtures and weaning foods for children under one year, hypoallergenic products for children older than one year ;
- 3) including in the diet food components antisense (PUFA, dietary fiber, prebiotics) ;
- 4) the use of fermented milk products and mixtures, preparations and food supplements containing probiotics and symbiotics .

It is important to stress that increases with age resistance (tolerance) of an organism to most food allergens. It is believed that if a food allergy is not gone to five years, it will occur in the future. After that date the hope for the development of tolerance is no longer necessary.

To prevent the development of allergic reactions in children, it is important to eliminate from the diet of pregnant and lactating women, from the early stages of pregnancy and during breastfeeding, products with a high sensitizing activity. Requires a suitable replacement of one product to another, similar in its composition, but not allergenic or low-allergenic. For example, whole milk may be replaced by fermented milk products or other farm animals (e.g., goats). Need to limit foods rich in extractable matters (broth), essential oils (onion, garlic), spices, herbs, foods with lots of food additives (artificial colors, flavors, stabilizers, preservatives , etc.). Should be excluded not only cow's milk, but also wheat flour, reduced by 20-25 % consumption of sugar, pasta and cereals, vegetables, brightly colored , butter (with a corresponding increase in the consumption of vegetable oil). It is also necessary to reduce salt intake by 30%. During the whole period of pregnancy should take a specially designed for pregnant women multivitamin preparations.

Feed the children with food allergies, it is recommended only by natural products with a minimum content of various food additives . When transferring the child to artificial feeding is the main allergen cow's milk, which contains up to 40 allergens that most commonly cause the formation of specific antibodies.

Artificial feeding of children in comparison with breast associated with a higher incidence of food allergies they have. In the case of artificial feeding of infants during the first year of life, history (including family) that there are cases of food allergy, you should use a hypoallergenic diet mixture adapted to human milk.

In general, given the lure of individual tolerance products in children predisposed to allergies, it is recommended to enter later than children without a history. Complementary feeding should include foods with low allergenicity: white and green varieties of apples and pears, cherries, white and yellow, white and red currants, green and yellow varieties of plums, cauliflower, collard, brussels sprouts, broccoli, zucchini, squash, light-colored pumpkin corn and buckwheat, rabbit meat, horse meat, turkey, lean pork, dairy products.

From the diet of infants suffering from food allergies are excluded eggs, fish, cheese. Children with food allergies should not be given whole cow's milk before 1 year of age, eggs - earlier than 2 years, fish, nuts - minimum 3 years.

An important role in reducing the risk of food allergies play dairy products, including useful for intestinal flora - Bifidobacterium, Lactobacillus, Streptococcus thermophilus, propionic bacteria. It is proved that the level of bifidobacteria in intestines more than 10^6 CFU/g during the first year of life reduces the prevalence of food allergy in 2-3 times.

Among the products and substances that reduce sensitization to food allergens is fish oil and its constituent parts - fatty acids, vitamins A and D.

Culinary heat treatment, especially long-term, can change the allergenic properties of the product and prevent the development of allergies. Thus, when some of its boiling milk proteins lose their allergenic properties; double digestion of meat broth with removal significantly reduces its allergenicity, hard-boiled eggs less likely to cause an allergic reaction than raw or boiled.

Whole milk often leads to the development of allergic reactions than the condensed milk, subjected to prolonged heat treatment, butter more than melted.

Elimination diet is characterized by excluding significant allergen-food and replacement high-allergic product on low-allergenic or non-allergenic product.

Elimination diet proposes to exclude products from the diet, even with small amounts of food allergens. For example, in case of intolerance to eggs excluded sweet products, creams, mayonnaise, puddings, soufflés and other dishes which contain as eggs recipe.

Elimination applies to all “obligate allergens” ie those foods which most often cause allergic reactions, even when consumed in its small amounts (fish, eggs, citrus fruits, honey and nuts, etc.).

It should be excluded and those foods and dishes that can increase the allergenicity of food by increasing the permeability of the mucous membranes of the gastrointestinal tract for allergens, increasing delays and increased tissue water inflammatory processes taking place in allergy (to the number of such products include, for example, sugar, salt, strong broth, spices).

In an elimination diet recommended increasing the proportion of vegetable fats due to various oils, especially those which are rich in polyunsaturated fatty acids omega-3 (flaxseed, rapeseed, soybean, wheat germ, etc.) and decrease in the proportion of animal fats.

Very important to use nutritional allergy sufferers enterosorbents, which are accessible sources of dietary fiber of vegetables and fruits, bran, whole grains, etc.

It is recommended to cook boiled dishes, baked dishes, stewed, but not fried. Salt intake should be reduced to 6 g in the diet of adults and up to **1-2 g** in the diet of young children. For better digestion and digestion of food allergens is advisable to increase the number of meals while reducing their single volume.

When using elimination diets, especially dairy-free, you need to ensure that the daily needs of children, pregnant women, nursing mothers and those suffering from allergies, essential nutrients, energy and micronutrients (vitamins, minerals) are fully satisfied.

Important therapeutic measures in food allergy is a ***natural desensitization to allergenic foods***. It improves adaptation and increases the body's resistance to that product by daily use it, but in small quantity, does not cause allergies. As the portability of allergen product, its dosage may be increased. You can start with the product dilution 1:1000, and then transferred to a 1:100 dilution, etc. Rate this treatment 3-6 months or more.

Food intolerance

Food intolerance is a widespread. **Food intolerance** or **non-allergic food hypersensitivity** is a term used widely for varied physiological responses associated with a particular food, or compound found in a range of foods. The basis of food intolerance are various mechanisms, including changes in the immune system (but without the participation of IgE, which is the prerogative of food allergies). Feature food intolerance is usually slow development of symptoms and the direct relationship between their expression and the amount consumed guilty product.

There are the following types of food intolerance:

1. Enzymopathy associated with congenital or acquired deficiency of enzymes involved in digestion and absorption of nutrients.
2. Symptoms of food intolerance associated with acute and chronic diseases of the digestive system.
3. Intolerance to the product due to the negative psychological disposition.
4. Intolerance due to the physiological activity of the food's components.

Enzymopathy and its types

Pathological conditions associated with the failure of individual enzymes (or fermentopathy or enzymopathy), are one of the most common types of food intolerance.

The greatest danger they pose to the first years of life, when the body and child's intelligence is formed. Without timely diagnosis and treatment can lead to fermentopathy stunted growth and mental development, neurological symptoms (epilepsy, paralysis, etc.), frequent colds and other adverse health consequences.

Phenylketonuria (PKU) - a serious hereditary disease, most often associated with deficiency of the enzyme phenylalanine hydroxylase, which converts phenylalanine to tyrosine.

PKU occurs in about one child in 7,000 newborns.

Sick child getting phenylalanine-containing food, it is not able to be processed into tyrosine, so there is an accumulation of phenylalanine in the blood,

as well as its transformation into toxic compounds (phenylpyruvic , phenylacetic acid and phenyllactic acid), resulting in *severe damage to the nervous system*, followed by a delay mental development, which is not treatable.

Timely diagnosis and exclusion of phenylalanine -containing foods from the diet to avoid such serious complications.

Foods to avoid to persons with PKU. Because the amount of phenylalanine adults can safely eat is so low, it's crucial they avoid all high-protein foods, including:

- Milk
- Eggs
- Cheese
- Nuts
- Soybeans
- Beans
- Chicken
- Steak and other beef products
- Pork
- Fish
- Chocolate candy
- Peas
- Beer

Children and adults should also avoid foods, including many diet sodas, and medications made with aspartame (NutraSweet, Equal). Aspartame, found in many artificial sweeteners, releases phenylalanine when digested.

Adults and children with PKU also have to limit portions of lower protein foods, such as: Fruit, Vegetables, Desserts.

Low-protein rice, pasta noodles and crackers are often fine to eat without calculating the phenylalanine content.

It's key to remember that too much of a good thing can sometimes be harmful. Even if you're eating approved foods, eating too many at one time can be dangerous. Consider the total amount of phenylalanine in all the foods you eat when planning your diet.

Galactosemia – is an genetic metabolic disorder that affects an individual's ability to metabolize the sugar galactose properly. Although the sugar, lactose, metabolizes to galactose, galactosemia is not related to and should not be confused with lactose intolerance. Galactosemia follows an autosomal recessive mode of inheritance that confers a deficiency in an enzyme responsible for adequate galactose degradation.

Its incidence is about 1 per 60,000 births for people of European ancestry.

In the body of the child enters galactose, usually consisting of lactose - milk sugar . In the intestine splits lactose into glucose and galactose which have more healthy children using the enzyme galactose- 1 -phosphate is converted into glucose uridiltransferazy and included in the metabolism . Sick children of this transformation does not occur, and galactose and its toxic metabolites accumulate

in the body , causing vomiting, diarrhea , growth retardation , fatty infiltration and cirrhosis of the liver , jaundice , cataract .

The main treatment is classic galactosemia diet therapy, providing lifelong exclusion from the diet of foods containing galactose or lactose. Must be completely excluded from the diet of the patient any kind of milk (including women's, cow's, goat's, infant formula, etc.) and all dairy products, as well as carefully avoid eating those foods to which they are added (bread, pastries, candies, sweets, margarine, etc.). Prohibited the use of low-lactose milk and mixtures.

A number of products of plant origin contain oligosaccharides - galactosides (raffinose, stachyose), animal origin - nucleoproteins, which may be potential sources of galactose.

Food-Products containing galactosides and rich in nucleoprotein

Galactosides	<ul style="list-style-type: none">• Legumes: peas, beans, beans, lentils, mung, chickpea, etc.• Soy (not soy protein isolate)• Spinach• Cocoa, chocolate• Nuts
Nucleoproteins	<ul style="list-style-type: none">• Liver, kidneys, brains and other offal• Liver pate, liverwurst• Eggs

In some cases there is bleeding in the skin and mucous membranes. Early enough to develop psychomotor retardation, leading eventually to mental retardation (but less pronounced than with phenylketonuria). Along with this, perhaps joining infection followed by blood poisoning is a real danger to the life of the child.

Prevention of complications of galactosemia intended to exclude from the diet foods containing galactose. Besides milk, galactose can be included in drinks (coffee, watermelon , apple, orange juice , etc.) , fruits (figs, grapes , papaya , etc.), nuts (hazelnuts) and some other foods.

Lactase deficiency (hypolaktaia) occurs in approximately one out of ten. To the greatest extent, it is typical for people of Asian, Mediterranean and African descent, as well as American Indians.

Normally lactase break lactose in the intestine into glucose and galactose which are further included in the overall metabolism. However, many people with age due to diseases of the gastrointestinal tract and other factors, there is a decrease of the lactase activity that results in the inability of the organism to digest all incoming lactose, and then becomes paramount lactose metabolism colonic bacteria. As a result, develops the typical *clinical symptoms of lactase deficiency*: flatulence, diarrhea, abdominal pain.

In order to prevent adverse effects in lactase deficiency is recommended to reduce the daily consumption of milk (*no more than half a glass*) , replace it with dairy products, goat milk, lactose-free dairy products (especially dairy products made with pre- splitting lactose), ice cream, cheeses.

Along with this possible medication containing lactase. In addition, it may be advisable to use milk with other products (eg bread or porridge), which will increase the time of its presence in small intestine and the likelihood of splitting lactose enzyme lactase.

Celiac disease is gluten intolerance of food proteins (gluten). Gluten is a natural component of wheat, rye, barley and products based on them.

Clinical symptoms of celiac disease occurs in about one person out of two hundred. Women suffer about twice as often as men.

The basis of celiac disease pathology is cellular and humoral immunity in response to the presence of gluten proteins (prolamins and glutenins) in genetically predisposed individuals. The result is inflammation of the intestinal mucosa and malabsorption of dietary compounds.

This form fermentopathy of children appears by nausea, vomiting, diarrhea, abdominal pain, irritability and discomfort, delay weight and growth indicators.

In adults, gluten intolerance is accompanied by chronic diarrhea, weight loss, bloating, fatigue and malaise.

Along with this likely to develop iron-deficiency anemia and folic acid deficiency. In some cases, celiac disease appears as dermatitis herpetiformis, which represent a severe skin disease with the development of severe itchy rash and blisters. The rash is usually localized to the elbows, knees and buttocks. Along with the foreign clinical picture of these patients present and the defeat of the intestinal mucosa (even in the absence of patient complaints).

Unrecognized celiac disease increases the risk of developing several cancers of the gastrointestinal tract (small intestine and adenocarcinoma esophageal or oropharyngeal squamous cell carcinoma and non-Hodgkin's lymphoma), autoimmune disorders (type 1 diabetes, thyroid abnormalities, cardiomyopathy, etc.), osteoporosis, infertility female (delayed menstruation, premature menopause, amenorrhea) and male.

In order to prevent undesirable consequences of celiac patients is recommended to exclude from the diet foods containing wheat, rye, barley and oats. In order to fill the gap vegetable protein, dietary fiber and iron and folic acid to the diet should include rice, maize, potatoes, sufficient amount of vegetables.

There are other types of food intolerance. Thus, for example, hypersensitivity reactions can be observed in the presence of histamine in the diet (in cheese, wine, fish - tuna, bonito), pharmacologically active substances (caffeine).

Widely used in the food industry food additives necessitates special attention to their ability to cause food intolerance reactions.

There is **psychological food intolerance** caused when the reaction occurs on the product, which was once (maybe even in early childhood) was associated adverse event. In this case you need advice from mental health professionals.

In addition, it should be mentioned that there is a food intolerance of alcohol - related **deficiency of acetaldehyde dehydrogenase** enzyme that converts the decay product of ethanol - acetaldehyde to acetate. In case of insufficiency of the

enzyme acetaldehyde accumulates in the body, leading to the development of nasal congestion, increased frequency of breathing and heartbeat, redness, pressure drop, headache, abdominal discomfort. The most common is the variety of food intolerance in Asia (China, Japan, Korea, etc.), where the number of susceptible individuals is 50 %.