



TYPES OF BIOLOGICAL ACTIVE SUPPLEMENTARY PRODUCTS AND PRINCIPLES OF THEIR USE IN SPORT

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Humans are a part of nature, and these two are tightly connected to each other. We get the energy, water and other supplements which are necessary for our cells from nature.

So, firstly, we need oxygen or air because oxygen generates energy in cells. Secondly, we need water, because water is a universal biological environment for our cells to survive. Lastly, human body need to be provided with nutrients continuously for the formation of energy, hormones and enzymes, growth of cells, the formation of bones, joints, skin, nails and hair.

We, first, need to understand why humans need food in order to know why we use biologically active supplements on our diets.

1. For power. Carbohydrates and fats, and in some cases proteins, produce energy in the body or, as a result of their digestion, glucose which provides energy for cells is produced.

2. As a building block. With protein, fat and cholesterol, the body builds cells and repairs damaged ones. For example, calcium and phosphorus builds bone

tissues, and cholesterol originates hormones.

3. To manage life processes. Food contains thousands of substances that control and help to regulate all vital processes in the body. For example, when free radicals made up of an oxygen atom initiate a cell-killing reaction, antioxidants preserve those cells. Also, when the activity of immune cells decreases due to fermentopathy and metabolism slows down, vitamins, minerals and plant enzymes help to restore these processes.

4. To enjoy. When we satisfy our hunger, the hormones of pleasure in the blood will increase automatically as well as our mood. However, in addition to this, the modern food industry has found ways to artificially interfere in the process of finding pleasure. Unfortunately, most people eat for only this purpose.

The words of Hippocrates told about 3,000 years ago, have not lost their value until today: "Let your food be your medicine, let your medicine be your food."

There have recently been the cases of doping in sports related to the



consumption of biologically active substances.

The use of biologically active supplements in sports began in the mid-1990s and has become a large-scale business. Initially, their use among bodybuilders increased, and gradually shifted to other sports. At present, it is impossible to list all the products produced in the market of biologically active additives.

The problem with biologically active supplements is that their production is not as carefully managed as drugs. Theoretically, they should be used infrequently and as a supplement to a nutritious diet, unfortunately, some people try to replace them with the most nutritious diet. Why they should rarely be used? We can get enough energy and nutrients to the body through a good diet and only in some cases (athletes with an energy expenditure of more than 5000 kcal per day) through biologically active supplements.

The second turning point in the food supplement industry was the test results of several tennis players at Wimbledon at Nandrolone (a long-acting anabolic steroid). When nandrolone was simultaneously detected in the analytical responses of several athletes, they found out what happened. The investigation revealed that athletes were given biologically active supplements consisting of nandrolone, by the tournament organizers themselves.

In 2001, a guide to the International Olympic Committee was published, which the researches of the staff of the University of Cologne (Germany) are included.

More than 600 different biologically active supplements ordered online from more

than 25 countries were studied in this research. 25% of all biologically active test supplements ordered from the Netherlands, and about 20 % of test supplements ordered from the United Kingdom, the United States and Austria contained compounds of banned substances in sports. These results have led to an increase in doping scandals as a result of the consumption of biologically active additives, which has forced us to pay more attention to the problem.

How did developed countries start solving the problem?

In the late 90's, a deep study of the effectiveness of biologically active additives and their effects began. Professor Luis Burke of the Australian Sports Institute and Professor Roland Moghan of the University of Loughborough have made significant contributions to this study.

According to current research, all biologically active supplements can be divided into **3 categories**:

Group 1 - biologically active additives with proven effectiveness;

Group 2 - biologically active additives that require additional evidence;

Group 3 - biologically active additives that have proven to be completely ineffective in research.

The first group includes biologically active supplements that are effective, including creatine, bicarbonate and caffeine. However, there is not enough information about the remaining groups.

Misconceptions about the effectiveness of biologically active supplements are sometimes surprising. For example, when taking samples for doping, athletes fill out a questionnaire, which must include biologically active substances used in



addition to drugs. It turned out that in such a survey, one athlete showed 18 biologically active supplements! Of course, this is not something we can learn from.

So how was this problem solved? An example is Britain. There is currently a WADA-accredited laboratory in London, UK. In 2006, when the United Kingdom had got the right to host the Olympic Games, the management of the laboratory began testing biologically active additives. As the problem of contamination of food additives with banned substances has become a serious problem in sports clubs, laboratory leaders found it expedient to test biologically active additives and develop a certificate confirming their safety.

The BFQs safety has been guaranteed and athletes also guaranteed their safety. At the same time, all tested drugs receive a similar certificate and are placed in a database on the laboratory website. Thus, every athlete who buys safe biologically active supplements can visit the site and make sure that this supplement has been tested and that it does not contain banned compounds.

Biological by-products in the diet of athletes can be used for the **following purposes:**

- regulations of nutrition, rapid replacement of nutrient deficiencies in the body with food, as well as the introduction of rational nutrition in accordance with the concept of nutrients and energy;
- Satisfaction of the body's physiological need for nutrients during illness, as well as the restoration of metabolically damaged organs in the pathological process.

BFQs are divided into the following groups in terms of their effectiveness and impact

on the athlete's body; nucleotides, antioxidants, adaptogens and nootropics.

Nucleotides are drugs that have a plastic effect, promote cell regeneration and regenerative processes inside those cells; they also have anabolic properties and anti-dystrophic properties. Nucleotides affect carbohydrate metabolism, helps to replenish enzyme and coenzyme deficiencies, improves metabolism in the heart and skeletal muscle. This group of drugs plays an important role in the prevention and treatment of myocardial dystrophy, which develops as a result of physical exertion. This group includes potassium orotate, riboxin, ATF, protein compounds and nutritional supplements. They preserve the necessary energy, quickly reacts the metabolic reactions and is rapidly absorbed and consumed in the Krebs cycle, increases the activity of enzymes and coenzymes, reduces the amount of harmful radicals formed in the body at high loads. This group of drugs includes carnitine chloride, picamilon, succinic acid, panangin, nootropil.

Antioxidants (vitamin E, tocopherols, etc.) decreases the effect of harmful substances formed in excess of lipids during long-term exercises.

Adaptogens are mainly plant-derived biostimulants (ginseng, Chinese lemon, levziya (deer root)). These include complex drugs, too. They increase the body's resistance to various extreme effects and help to restore functional changes in the load. It is used effectively in fast and strong loads, with tension, and in sports that require extreme attention and complex coordination.

Nootropics are drugs that have a direct activating effect on the integrative mechanisms of the brain, improve memory,



stimulate thinking, increase brain's resistance to stress. Nootropics not only improve coordination, but also accelerate the recovery of lost skills and techniques in sports.

Because nootropic drugs affect the metabolic process, they are included in the list of "metabolic therapy" drugs. These drugs should not be taken in the evening and during psychomotor agitation.

Today, biologically active supplements are divided into three groups. These include: **eubiotics, nutraceuticals, and parapharmaceuticals.**

Eubiotics are biological food supplements, the components of which are products of the vital activity of microorganisms and bacteria, the beneficial effect of Eubiotics is the management of the micro-flora of the gastrointestinal tract.

In turn, they are divided into 3 groups: probiotics, synbiotics, prebiotics.

Probiotics are microbial drugs, and prebiotics are not bacterial. Synbiotics are drugs that are obtained as a result of a reasonable combination of pro and prebiotics. The most common probiotics are bifidobacteria and lactobacilli. They are used to make yogurt, kefir, bifidok, ice cream or various food products. Probiotics are used to prevent microbial imbalance in the body, as well as for inflammation of the intestine, gastritis, acute intestinal infections and others.

Various carbohydrates are called prebiotics. For example, inulin, lactosul, galacto-, fructo-, oligosaccharides. Although prebiotics are not digested or absorbed in the upper parts of the digestive tract, they can cause active growth and proliferation of bifidobacteria and lactobacilli.

The next group of food supplements is **nutraceuticals** which are used to replenish important nutrients in the human body, such as vitamins, macro- and micronutrients, amino acids, nutritional supplements, and vitamin-like substances. Biologically active supplements of this group have no contraindications, side effects and are used for prophylactic purposes. They have a general healing effect.

Unlike other BFQs, they are obtained not through a pharmaceutical route but through food technology. They improve the absorption of nutrients, provide homeostasis, enhance the processes of removal of toxins from the body, improve the regenerative ability of tissues and metabolism.

Nutritional drugs are divided into the following groups:

- Sources of amino acids;
- sources of fatty acids, fat-soluble lipids and lipids;
- sources of carbohydrates;
- Sources of dietary fiber;
- sources of minerals;
- Sources of water-soluble vitamins.

Sources of amino acids: in most cases they are produced in the form of easily digestible, ready-made dry carbohydrate-protein-fat-mineral-vitamin mixtures, which contain 97% digestible milk, egg, soy proteins. Their main function is to supplement the traditional diet with essential amino acids (methionine, lysine). They are often used by athletes for rapid growth of muscle mass, as well as in diseases of the liver and blood vessels.

Parapharmaceuticals are a group of substances similar to naturally prepared drugs that have a philological rather than a



pharmacological effect on the functioning of organs and organ systems.

Parapharmaceuticals differ from medicines in terms of low doses, but they are taken only under a doctor's prescription.

These include polysaccharides, bioflavonoids, glycosides, saponins, organic acids, alkaloids, essential oils, namely, drugs derived from plant and animal sources or their synthetic analogues.

They have a positive effect on the activity of the central nervous system and the microbiocenosis of the gastrointestinal tract.

In summary, the ambiguity of the content of many biologically active supplements (in many cases, the fact that the content is not

specified by the manufacturer) and the effect of these biologically active supplements on athletes as doping, adversely affects will prevent us from using these supplements.

Many medicines have a great effect on the body. Misuse of these drugs, malnutrition, overdose can lead to negative effects on the health of athletes and worsen their ability to work. Therefore, while applying them, it is necessary to take into account the individual condition of athletes, age, gender, health, physical development, the specific condition of the body, the stage and nature of training or competition. These supplements should be used with the doctor's prescription.

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