

1. NUTRITION AND SPORT

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Sports activity exerts a specific effect on human organism, and particular nutritional approaches and norms have to be used in sports practice. The nutritional strategies depend mainly on three factors:

The specificity of the metabolic processes during physical training and sports activity. In some sports these metabolic processes take place almost exclusively in conditions of anaerobic metabolism, and in a third group of sports - by a mixed form of metabolism.

The intensity and the duration of the physical effort during the sports activity or the sports competition.

The goals set to be achieved by the different sports training programs.

When training programs applied generally in high level sport are fulfilled, energy balance is ensured to a lesser degree on the ground of energy expenditure for the kind of the effort during the competition, than on the basis of the energy expenditure due to the character of training load applied in order to achieve good sports performances. The energy expenditure in athletes, as a result of the amount, intensity and sports specificity of the physical load, can be 3.5 times greater (25-75 %) than the average energy expenditure of untrained individuals.

Carbohydrates are important energy sources during physical activity, regardless of its intensity, duration and kind. In high level sport the carbohydrates cover 40-60 energetic per cents (E%) or 8.0 to 13.0 g/kg body weight daily, depending on the character of the sports activity. The total intake within 24 hours should however not exceed 600-700 g.

In high level sport fats cover 25-30 E% of the total energy loss within 24 hours. Only in sports having a very high energy cost, their proportion can be increased up to 32-35 E%. Animal fats in the total fat intake should be reduced to 10%.

Proteins in the food are the basic elements of nutrition of athletes involved in strenuous physical training or sports activities not only because of their contribution

to the energy balance, but also because they take part in the building of the human body and its vital function. They enhance tissue growth and regeneration, the enzyme and some hormone activity too.

The protein intake used in the sports practice for the different groups of sport is 3.0-3.5 times greater than the recommended amount for untrained individuals. The total intake within 24 hours should not be greater than 200-220 g because of the unfavorable effect on the liver.

A regular supplement of vitamins and mineral salts should be given because of the increased needs of the organism (high energy expenditure, training and sports activity at high altitude or air temperature etc.). A rational supplement contributes to the general health of athletes involved in strenuous or extreme physical training, and indirectly to an improvement of their physical capacity.

The maintenance of the water and electrolyte equilibrium is a priority in nutrition of athletes. The water in the organism, besides its other functions, preserves the blood volume, ensures the transport of the nutrients to the tissues and supports termoregulation.

On a number of questions concerning nutrition in sport exist different opinions and different norms are recommended. Sharing of own experience and presentation of positions of the different schools will help to clear the controversial problems in this field.

2. ERGOGENIC AIDS IN ELITE ATHLETES

Prof. V. Stroescu, Ph.M.D.

The use of some drugs which don't belong to doping classes in top athletes has the scope to avoid "the energoprive syndrome", the prevention of functional troubles on stressed and systems, it means to avoid the contra-performance, under conditions of the efforts which overpass the physiological limits.

Ergogenetic aids have a low incidence of the adverse reactions.

The nutritional factors and analogues used as drugs in order to support the exercise and facilitate the recovery, contribute to assure the energetic substratum, to avoid the excessive consumption of valuable biochemical materials and accelerate the purge of different catabolites, excessively accumulated.

The main nutritional and metabolic factors used for ergogenic reasons are: creatine, inosine, L-carnitine, glucose, proteins, some aminoacids, some vitamins and minerals and oligodynamic metals.

The purge of the excess of catabolites induced by strenuous exercise could be obtained by sodium bicarbonate (in order to buffer the lactate), some aminoacids (which neutralize ammonium and other proteic catabolites); antioxidants factors (selenium, glutathion, cistein, vitamin E etc.) in order to neutralize free radicals induced by the free fatty acids peroxidation.

Except nutritional and metabolic factors there are used some psychostimulants (caffeine, Ginseng, etc.) or neurotrope and neurodynamic substances, as piracetam and piritinol.

In the last years, in the Romanian Sports Medicine Institute and Pharmacological Department of the University of Medicine and Pharmacy from Bucharest, there have been studied and finally originated different pharmaceutical formula for top athletes as follows: association of aminoacids (EFORTEX, ALGLUTOL, VITASPOL); association of vitamins and mineral (POLIVITAMINIZANT-S, POLIMINERALIZANT-S); association of glucose and vitamins, minerals (COMPRIMATE ENERGIZANTE, ELEUTAL); association between tirozin and metabolic factors which intervine in the synthesis of catecolamine (FORTAVIT V, FORTAVIT M); association of selenium, cistein, glutathion and E vitamin (GLUTACISTE - SELENIU-E); association of piracetam, magnesium aspartate at B1, B6 vitamins (PIRAVITAN); association of piritinol, vincamine, B1, B6 vitamins (PIRIVIN) for cerebral vasodilatation and neurotrophic effects.

The nutritional factors and other ergogenic aids must be used individually and depends on the sport discipline, type, duration and metabolic characteristic of the exercise, on the physiological systems stressed by exercise (trainings or competitions,

on the nutritional conditions and of course the microclimate in which the exercise takes place.

Other aminoacids formula, like ANABOL, AMINOMASS, SUPER-AMINO 2000, SUPERAMINO 3000; VITAMINS AND MINERAL LIKE CANTAMEGA 1000, CANTAMEGA 2000, SUPERCOMPLEX FORMULA; ANTIOXIDANT FORMULA, REHYDRATION SOLUTION (ISOSTAR, ISO DRINK GOAL) OR POWER LEAN, PHOSPHOCREATINE AND OTHERS ARE DISCUSSED.

3. NATURALLY ANTIOXIDANTS IN ALIMENTARY PRODUCTS AND THEIR ROLE IN SUSTAINING PHYSICAL EFFORT

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Many studies in the last years have indicated the unfavorable effects of free radicals accumulation in organism. They result from metabolism or are brought from outside by food and polluted air. As example of free radicals there are the peroxides resulted from unsaturated fat acid's oxidation, hydrogen peroxide (H₂O₂) and other overactive and with oxidant power products, due to the presence, in their molecule of "unpaired" (bachelor) electrons.

Over specified limits, the free radicals may produce: fragmentation of DNA chains, denaturation of proteins containing easy to oxidise radicals (such as - SH from cysteine), glutathione and some enzymes oxidation, peroxidation of unsaturated fat acids from cellular membranes and subcell body structure (mitochondria, microsomes and others).

In normal circumstances, the body has enzymatic and nonenzymatic systems for adjusting the formation and inactivation of free radicals and for protection against their harmful action.

In these protection systems, an important role is played by the antioxidants, native components of food: vitamins E, C and A, flavonoids and selenium.

Vitamin E: consists of tocopherols (alpha, beta, gamma and delta). The antioxidant effect is granted by hydroxyl in its formula. It protects unsaturated fat acids, vitamin A and other liposolubly products oxygen sensitive at oxygen.

Vitamin E is also called antidystrophic vitamin, because it assures a normal structure of muscular system, nervous system, reproductive glands (especially in males) and of platelets. Together with selenium and sulphur-containing amino acids (cysteine, methionine) it constitutes "factor III", with liver protecting effects.

In vitamin E deficiency occurs degenerative injuries in muscular fibres, brain, spinal cord, reproductive glands, platelets and a yellow-brown cerous pigment develop by lipid peroxide's polymerization.

The adult daily intake of vitamin E is of 10-20 mg, related to the quantity and the nature of fats in menu. In sportsmen's case, for which the muscular mass and force are important, larger quantities are recommended.

The main food sources are the vegetable oils (but in the rafinated ones, part of vitamin is inactivated), black bread, pea, bean, liver, fat meat, nuts.

Vitamin C is a powerful antioxidant because it smoothly cedes hydrogen ions that maintain in reductive stage some nitrients (gluthation, cysteine, iron and others) and enzymatic systems and interferes with the oxidant effect of peroxides and of other free radicals. It has, also, an important task in energy release, in collagen synthesis (therefore in the structure of connective tissue, in ossification, in capillary resistance and others).

The recommended intake is 20 mg vitamin C for 1000 calories. Practical, the only source of vitamin C is constituted by fruits and vegetables and among these, an increase content have the citrus fruits, peaches, currants, cranberry, the leaf-vegetables (green salad, spinach, orach, stinging nettle and others), tomatoes, cabbage, cauliflower and fresh potatoes. Heat treatments partially destroy it.

Flavonoids: under this name is enclosed some polyphenols synthesized by plants, which have antioxidant effects due to hydroxyl radicals (-OH). They are found in form of glycosides by different names: rutin, hesperidin, quercetin and others. They are also known by the generic name of vitamin P and play an important role in the

maintenance of capillary and whole circulatory system integrity. There is a synergism between flavonoids and ascorbic acids, which result in mutual augmenting.

Flavonoids accumulate mainly in fruit's, seeds and vegetable peel. Large quantities are present in citrus fruits, grapes, garlic, onion, peaches, apricot, tomatoes, cranberries, raspberry, blackberries and green vegetables.

It was not yet established an optimum intake.

Selenium: as selenocysteine, is coferment of glutathione peroxidase and of other enzymes that catalyze the hydrogen peroxide (H₂O₂) and other peroxides and lipidperoxide's reduction. By this way and by other mechanisms it takes part in preventing muscle disorders (including heart muscle), atherosclerosis, and it's complications (high blood pressure, coronary and brain irrigation disorders), hemolytic anemia, rheumatoid arthritis, cirrhosis generating hepatitis and others.

The selenium deficiency determines Keshan disease (which occur in areas with selenium deficiency in China), a cardiomyopathy manifested by cardiac insufficiency, arrhythmia and ECG changes.

The selenium necessity has not been established yet. It is estimated an intake of 50-200 µg in adults.

The main alimentary sources are integral cereal's derivates (flour and black bread, oat flakes and others), bean, garlic, mushrooms, carrots, cabbage, radish, fish, oysters, crawfishes, eggs, liver and kidneys.

Vitamin A: has an inferior antioxidant action and it, itself needs protection from oxidation by other oxidants. It has a contribution in the maintenance of normal integrity of tegument, mucosa, in the protein synthesis, in the visual acuity and in other metabolic processes.

The adult need of vitamin A is 4000-5000 U.I. daily.

As retinol it is found only in animal source products (especially in liver, fat fish, yolk, fat milky products).

The human body also uses carotene as provitamin A. They are found especially in coloured fruits and vegetables.

4.THE EFFECT OF IRON DEFICIENCY ON ADOLESCENT FEMALE ATHLETES EXERCISES CAPACITIES

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To investigate the effect of iron deficiency on athletes exercise capacities, hemoglobin and ferritin levels of 73 adolescent female athletes were measured. Iron deficiency (ID) and iron deficiency anemy (IDA) were found in 17 and 7 athletes, respectively.

These athletes were given iron treatment for twenty eight days and their pretreatment exercise performances were measured using Bruce Protocol's Exercise test.

The increase in average duration tests after iron treatment was statistically significant both in IDA ($p<0.01$) and ID ($p<0.001$) groups.

We suggest that iron replacement treatment should be used in ID persons as well as IDA persons.

5.TEAM WORK IN ATHLETES NUTRITION

The study pointed out the necessity of mutuel efforts of all specialists, who are working with one of the supreme-sportsmen to insure his regular nutrition and thus also the necessary psychophysical condition of his organism for obtaining of the awaited supreme sport results. On the basis of the experience are cited the main groups of mistakes, which are made in this sense: generally at the end are given recommendations for the most effective insurance of the regular nutrition of the supreme sportsmen during and in competition, but only on the basis of team efforts of all respective specialists.

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6. PHYSICAL REHABILITATION IN SPORTS TRAUMATOLOGY

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Rehabilitation in sports must start from the time of the injury and finish when the athlete is fully recovered and ready to undertake, as before, all the stresses and demands of his particular sport.

We must define three faces of rehabilitation:

- *injury period*
- *treatment period*
- *before returning to play*

With the injury all the reflex mechanism of movement is inhibited and the function of the muscles around an injury joint or in the injured muscles is arrested.

At this stage our effort is to avoid the creation of this inhibition.

During the treatment face, because of possible pain and restrictions from plaster or because of non-weight bearing, the normal function of the limb is upset.

Effort must be made to give stimulus, to the structures of the limb as close to the normal as possible, without creating danger for the treatment or recovery of the athlete.

With the removal of the plaster or healing of the injury, we must try and overcome, the general wasting and mal function of the muscles, the stiffness of the joints and the loss of the reflex ability of the muscles and joints to the stimulus of the movement and stress.

Before returning to play we must be sure that the athlete is 100 % recovered. That he has regained the muscle power, the flexibility of the joints, the reflex reaction and the technical skill of his sport.