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RESEARCH ON THE SUBJECT OF NUTRITION IN PHYSICAL EFFORT DETERMINATION

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Abstract: Living organisms are in close dependence with the environment.

There is also a permanent exchange of substance, energy and information between the human body and the environment, an exchange that underlies the development of all biological processes. In the normal biological processes, the essential environmental factors compete, among which we mention the air, water and food. The importance of food (lat. alimentum - aliment)consists of the intake of nutrients necessary for all life processes.

The substances from food are generically described by the term "nutrient principles" or "food principles", often being used the term "nutrients". Among nutrients, depending on their amount in the food products and the physiological and biochemical role, there are the macronutrients (carbohydrates, lipids and protides), micronutrients (mineral compounds of biological interest and vitamins) as well as other nutrients (water, fibres, biologically-active substances).

Keywords: nutrition, bodybuilding, nutrient, metabolism

1. Introduction

First and foremost, not all calories are created equal [1].

Nutrient principles (nutrients) vary in terms of composition and amount from one aliment to another. For this reason, ensuring the necessary nutrients is done by a balanced and complex diet.

Food is processed or unprocessed substances intended for human nutrition and designed to satisfy the food needs and the energy needs to maintain the vital functions, ensure growth and development, maintain capacities for physical and psychical activities. Nonetheless, food consumption involves only oral administration.

2. Nutrition

Food groups include vegetables and fruit, grain products, milk and alternatives, meat and alternatives, plus a small amount of added fats and oils. Together healthy eating and physical activity can help reduce the risk of obesity and prevent chronic diseases such as type 2 diabetes, heart disease, certain types of cancer and osteoporosis[2]. Medication - refers to products used for diagnosis, with prophylactic or therapeutic purposes in relation to various physical or psychical disorders. Drug administration may be done on the enteral (digestive) or parenteral routes. Drug administration seeks specific goals which target the change of certain physical or behavioural activities. Dietary supplements, sometimes called "nutritional supplements" are concentrated sources of nutrients or of other substances. with nutritional or physiological effect, being found separately or in combination, which complete a diet. Commercially, they can be found as tablets, drops, capsules or other similar forms which contain vitamins, minerals, bioactive substances (from plant extracts).

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Carbohydrates are natural chemical compounds, present in the plant and animal world. In their composition there are the so-"ternary bioelements"; carbon: called hydrogen and oxygen, which structurally define simple carbohydrates, such as -ose (monosaccharide); e.g.: type glucose. fructose, galactose and riboseetc. There are carbohydrate compounds with a more complex structure called oxides, of which, in larger quantities in nature, there are the polyholosides (poliglucides), e.g.: complex carbohydrates (starch, cellulose), fructants and so on. High carbohydrate diets are typically thought to be the athletic performance standard. However, like protein, carbohydrate intake needs to be customized to the individual [3]. The class of oxides also includes the heterosides(glycosides) in which nitrogen, phosphorus and sulfur were detected. The compounds from the class of carbohydrates known "sugars" also as are or "carbohydrates" (with the choices of names such as: carbohydrates or hydrocarbons).

Lipids are compounds with a heterogeneous structure and various chemical properties, having two essential characteristics: hydrophobicity and insolubility in water. This class of compounds includes: simple lipids, acylglycerols, sterides, e.g.: etholides: complex lipids. e.g.: glycerophospholipids.

Lipids can be found in the various plant and animal food products and, of course, in the human body.

Protides are a large class of bioconstituents which have a ubiquitous distribution in the living world. In the plant and animal food products there are protide nutrients, entering thehuman body through nutrition. These nutrients, after metabolism, turn into bioconstituents of the human body.

In terms of their chemical composition, proteins constitute into two groups of compounds: simple proteins and complex proteins.

Proteins, are compounds of amino-acids. Amino-acids are the bricks of muscle construction. The lack of amino-acids materializes in a minimal or non-existing muscle growth. Amino-acids, once ingested, do not need digestion since they are directly sent in the blood flow for immediate use by the muscle cells. Aminoacids ensure 70% of the body's need for nitrogen.

Amino-acids are divided in two categories: essential amino-acids and non-essential amino-acids. Essential amino-acids are those that cannot be produced by the human body, being necessary to be ensured from proteins with complete amino-acid profile (animal protein) or from combinations of incomplete protein profile (usually vegetable proteins). There are 9 essential amino-acids and 13 non-essential aminoacids. Non-essential amino-acids can be produced by our own body from vitamins and other amino-acids.

Essential branched-chain amino acids-BCCAA's have a particular importance for athletes because they are metabolized in the muscles and not in the liver. After digestion, once the proteins have been "broken" into amino acids, they are used either to form new proteins, or to be consumed as energetic support.

Minerals are basic nutrients, which are essential for the proper functioning of all metabolic processes that occur in the body. We present some data referring to the necessary of some mineral elements for an adult organism, for example: sodium – 2,4-3,6 g/day; potassium 2-4 g/day; calcium 700-800 mg/day; magnesium 300-350 mg/day etc.

For adult body, the daily recommended input varies greatly from one vitamin to another. For the lipo-soluble vitamins, the values are presented in international units (UI), e.g. for vitamin A there is 4000-5000 UI/day; for vitamin D 200UI/day. For the water-soluble vitamins, the values are given in mg, e.g.: vitamin B, from 1,1-1,5 mg/day; vitamin B7 (biotin) – 30-300 micrograms etc.

Water requirement of an adult body is 2500-3000 ml/day, of which approximately 300 ml comes from the burning in the

organism of the food ingested by exogenous inputs.

A large percentage of muscle tissue mass is water and dehydration results in decreases in muscle water content [4].

The energy released by the amounts of nutrients are numbered as follows: carbohydrates -4,1 cal / g; lipids 9,3 cal / g; proteins 4,1 cal / g.

Assessing the role of food in energetic genesis and the amount of energy released by various nutrients is considering their expression in calories or joules. For interconversion, the following relations are used: 1 cal = 4,184 joules; 1 joule = 0,239 calories.

Similar to other root vegetables, turnips, carrots, beetroot, and parsnips have a high water content and contain both simple and complex carbohydrates. They are a poor source of protein, but also contain important micronutrients and non-nutritive components. The antioxidant, β – carotene, is found in deep yellow/orange vegetables and fruits and dark green leafy vegetables. β -carotene is readily converted to Vitamin A, which plays any important role normal growth and development, immune system function, and vision [5].

In physiology, it is recognized that there is a certain minimum energy requirements, essential for vital functions, an opinion which led to the concept of basic energy requirements. This basic energy needs ensures the energetic status of the so-called basic metabolism. The basic energy requirements, conditioned by the basic metabolism, can be defined as the energy required by an individual who is in standby - in physical and mental rest - 24 hours after the last ingestion of food and under conditions of constant temperature (20-21°C) of the ambient. For an adult, the necessary energy for a basic metabolism is of approximately 1 calorie / 1 kilogram of body weight and hour. Therefore, for a person weighting 70 kg, the energy requirement is of about 1.680 calories / 24 hours. It is true that resistance training utilizes glycogen as its main fuel source [6].

3. Food requirements

The definition of food requirements requires the establishment of the amount of nutrients required by human consumption. Its relation is made to the individual body weight and to time. It is usually expressed in g / body kg / day. Thus, it is considered that, for an adult individual, the food requirements (daily energetic - caloric given by the basic energy needs) requirements through basic metabolism, together with the energy requirements of relationship, described by the energy surplus required in the thermoregulation, food incorporation and muscle effort process.

The food requirements of **protides** for an adult is considered to be 1,0-1,5 g/ body weight / day. This represents approximately 11-13% of the caloric value of the daily ration. From the total amount of proteins, essential amino acids are basic nutrients. Therefore, for an adult, the essential amino acids intake should be 1/2 of the total of proteins, and for a young organism (children) approximately 2/3.

The food requirements of **lipids**. These are known especially as "calorie-dense substances". The requirements of lipids for an adult body is recommended to be of 1,0-2,0 g/ body kg/day, representing 25-30% of the caloric value of daily ration.

The food requirements of **carbohydrates**, based on the ideal weight of an adult is estimated at 4,0-8,0 g/body kg/day, which is considered to be approximately 55-62% of the total caloric value of a daily ration.

Aliment		Proteins	Carbohydrates	Lipids	Energy
		(g%)	(g%)	(g%)	value
Veg	Potatoes	1,6	18,3	-	314
	Beans	4,1	7.1	-	180
	Carrots	0,9	4,5	-	88
	Spinach	5,1	1,4	-	109
	Tomatoes	0,9	2,8	-	59
	Cabbage	1,1	1,8	-	46
Fruit	Apples	0,3	12,2	-	197
	Bananas	1,1	19,2	-	332
	Oranges	0,8	8,5	-	146
	Plums	2,4	40,3	-	674
Cereal	White bread	8,0	51,7	1,4	1004
products	Black bread	8,7	49,9	2,1	1013
	Wheat flour	13,6	74,0	1,7	1464
	Pearl barley	7,7	83,6	1,7	1506
Milk and	Cow milk	3,4	4,8	3,7	276
diary					
products					
	Cheese	25,4	-	34,5	1778
	Butter	0,4	-	85,1	3318
Meat and	Cattle meat /	26,8	-	12,3	937
meat	beef				
products					
	Mutton	25,8		16,6	1088
	Pork	24,6		53,4	2498
Fish	Cod	27,0		5,3	669
	Herring	21,8		15,1	938
	Salmon	19,7		6,0	537
Chicken eggs		11,9		12,3	682
Honey		0,4	76,4	-	1205

Table 1 Nutritional value of certain food

Conclusions: Undoubtedly, all nutrients are important for nutrition and a correct nutritional plan should include them all, but, as far as proteins are concerned, in terms of practicing bodybuilding and fitness, a more comprehensive discussion is required.

We consider that one of the terms most frequently used in bodybuilding is the term "protein". It is obvious that most of the people practicing bodybuilding, either of performance or as a way to relax, recognize that their diet should include that nutrient called protein, in larger quantities than those necessary to an individual who does not go to the gym and is not interested in muscle hypertrophy.

Proteins are more important for athletes in general and for bodybuilders in particular, because they are designed to prevent muscle catabolism and they stimulate muscle growth.

Beyond these basic information about "proteins", there are various questions that raise when you enter a shop for supplements and you ask yourself "which is the best protein that meets my needs and goals?" In order to have an answer to this question, you must definitely have some information that, once pieced out, will lead to the right answer.

The question whether high amounts of proteins are necessary to optimize body protein synthesis and to increase muscle strength and hypertrophy has been discussed for decades now; a debate that is also fueled by the increasingly higher number of manufacturing companies and the publicity that they do to their products.

Proteins are the cornerstone of life and the main structural components of the body. Proteins contain 15%nitrogen and they can be found in food. Proteins cannot be absorbed as such through the intestine into the blood. Therefore, during digestion, the body "breaks" the proteins into smaller pieces, which can be absorbed, called amino-acids. Thev have а plastic (construction) role in the body and they are not used as a source of energy. Over time, 22 types of amino-acids have been discovered, of which 8 are considered essential and the remaining 14 nonessential. Essential amino-acids are those that the human body cannot produce and therefore they must be supplied by food. All nutrients are important, but only proteins are the ones responsible for building muscles through the supply of nitrogen, much needed for growth, recovery and tissue repair. Muscle growth can be achieved through a correct planning of the number of daily meals and keeping a high quality of the meals. A number of 6-7 meals a day that contain proteins will ensure a constant flow of amino-acids to the blood and will help rebuild muscle tissue. When the amount of amino-acids is not enough, the body catabolizes the muscle tissue to ensure the amino-acids reserves. Studies have shown that a person's body that does activity physical do such not as bodybuilding needs approximately 0,8g of protein for each kilogram of body weight (kg body weight). Moreover, studies revealed that for a person who practices bodybuilding, the need for recovery and muscle growth is much higher; therefore, the burn-up of 1,9-2 proteins/kg body weight will ensure the optimal muscle recovery and hypertrophy.

However, it is caution is recommended when the protein burn-up is over 1g/kg body weight. High protein diets, without a proper electrolyte balance, namely a proper infusion of minerals into the blood, as well as good hydration may cause harmful metabolic products (uric acid) as a result of incomplete conversion of proteins into amino-acids.

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