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## Food Preference Reflects Adaptation to the Living Conditions in the North

### ABSTRACT

The article presents the materials of the leading researchers on the issue of the traditional food of indigenous residents of Yakutia in the extreme conditions of the North.

**Keywords:** nutrition, tradition, the North, adaptation, indigenous population.

### INTRODUCTION

The tradition of eating is one of the markers of national identity in the eyes of members of the ethnic group and the fellows. People, whose eating habits are largely urbanized and "westernized", are at increased risk of serious imbalance of eating [38]. As it shows from the experience of other countries and regions, underestimating the influence of traditionalism in food would be a serious mistake [27] and it's increasingly becoming a significant force [19, 35].

In the scientific literature, there are explanations of the different prevalence of cardiovascular disease, including hypertension and atherosclerosis (as the most important risk factors for stroke) among representatives of different ethnic groups influenced by the nature of eating, and above all the salt regime, employment, indigenous traditional activities, migration, urbanization [43, 44].

In the literature there are researches of a wide range and high content in food of people from regions with high longevity, whose ration includes high amount of antioxidants, well known "geroprotectors" [47].

Note that some features of the eating of the Arctic and Subarctic Aboriginals depends not only on social and cultural, but genetic factors. In particular, it was shown by us high prevalence of hypolactasia in different subsets of the Saami in Finland and Russia [38]. According to our observations, people with high longevity, have a distinct way of life, which features moderation in eating, varied diet with the inclusion of a sufficient amount of fish, dairy products, which helps to survive in rough environment, and it therefore has geroprotective properties [9].

Particular importance for the health, performance and longevity in the North is full and regular meals, high in micronutrients, vitamins and minerals [6]. M.V.Lomonosov (1761), observing the life of aborigines, noted the exceptional role of meat in their diet [12]. Arctic explorers Fridtjof Nansen (1895, 1896), Stefansson (1913-1919), Soviet polar A.I.Mikheev (1924 - 1934) who experienced life in the conditions of North, noted that the diet of only meat is not

associated with substantial harm to health [13]. According to Lvov, who studied high longevity of inhabitants of North, a crucial role in the prevention of diseases among Northerners played by correct (efficient) nutrition [14].

It is generally accepted, that good nutrition is the foundation of health, which means a set of processes associated with the consumption of nutrients and their digestion, thus ensuring the normal functioning of the body and maintain health [5, 26, 45].

The indigenous people of the North have consumption of proteins and fats in the daily more than the inhabitants of the European part of Russia, Siberia and the Central highlands of Kyrgyzstan [38]. A large intake of dietary cholesterol in indigenous population is not accompanied by a significant hypercholesterolemia [39]. Patients with coronary heart disease consume high amount of fats and carbohydrates more than the healthy inhabitants of the North [3]. Daily consumption of proteins and fats of the indigenous people of Chukotka is more than the residents of Novosibirsk, but less carbohydrates [32]. In Buryatia ethnic eating habits are identified: Buryat population consumes the same energy value rations, but high in total fat, more than non-Buryat indigenous and alien population [18]. Indigenous rural population of Yakutia is characterized by a high intake of protein; the residents of Novosibirsk and Buryatia consume it less. The consumption of proteins in the indigenous rural population of the Republic of Sakha (Yakutia) is higher than the inhabitants of Novosibirsk, Buryatia, Chukotka, [17, 18].

According to Gabyshev M.F., the fundamental importance of balanced diet is Yakut horse milk [38]. Some studies have shown the healing properties of the Yakut breed young horse [27]. Young Yakut horse meat has higher content of essential amino acids than in meat of other cultural meat breeds, including cattle. Specialists of the Nutrition Institute of the Russian Academy of Medical Sciences conducted the study in which they made the following conclusion: "Yakut horse meat has high content of polyunsaturated fatty acid (18: 2, 18: 3, 20: 5, 22: 6) and especially the omega-3 family, as well as vitamin E "[8,9]. Omega-3 lowers triglycerides, reduces the risk of blood clots, prostaglandins helps to control and influence the immune system and is essential for normal functioning of the endocrine glands, for the prevention of cancer [27]. The high content of fatty acids, especially omega-3, omega-6 fat in the meat of Yakut horses and cattle is a biochemical adaptive trait acquired during the evolution [40]. Thus, for the residents of Yakutia is their staple food, which stood for centuries in barren diet - meat and dairy products aboriginal Yakut cattle and horse, is a determining factor in the longevity of northerners [32].

Protein-fat type of food of indigenous population of the North has a clear difference [38].

If the base product of traditional Yakut cuisine is meat, especially young horsemeat, then for the minorities of the North is the venison [40]. When comparing the emission spectrum of fatty acids contained in the young horsemeat with beef there was a significant difference in the composition of saturated and unsaturated fatty acids [27]. Thus, young horse had most valuable and mobile fractions, such as linolenic and linoleic acids [20]. The beef fat had only 1% linoleic acid [27]. Saturated fat was predominant in beef, which prevented it from detaching from the vessel wall, gradually clogging the lumen of vital organs [30].

The most typical Arctic diet is characteristic for coastal sea hunters (Inuit, Eskimos and Aleuts) [39]. The level of fat in their diet is 50% dietary energy, whereas the carbohydrate fraction may be less than 10%. According to Kaznacheev V.P., Panin G.E., food of the Far North, which is mostly protein-lipid, is a balanced or nearly balanced diet [39]. The proportion of carbohydrates in the diet of living in the coastal villages of the Chukchi and Eskimos lower than that of the alien population that can be attributed primarily to differences in the consumption of refined sugar [Stepanov, Babin, Klochkova, 1987]. In reindeer herders - Nenets - carbohydrates account for about one third of the total caloric intake [Atsushi Yoshida, 1997] [21, 35].

According to some authors, the main diet of Evens is meat and fish, which is due to their traditional occupations - reindeer herding, hunting and fishing [27]. Consumption of these products, which is high in calories, is very essential for the human body living in harsh climatic conditions of the North and the hard work of reindeer herders and hunters [27]. The energy supply of northern indigenous peoples, including Evens, is closely linked with the outside world - nature [41]. Eating foods taken from nature, they nevertheless tried to keep the balance between man and nature [36, 37]. Despite the extremely difficult conditions of life, nine month arctic cold and low varied food with the basic ration of meat and milk, the Yakut people are famous for their longevity [8, 9].

Some authors point out that the type of food the Arctic has emerged as an adaptive response to seasonal hunting. High fat intake allowed storing energy in fat "depot", based on its expenditure in the period of the decline of fishing and the emergence of malnutrition [42]. However, the protein-lipid type of food is appropriate for populations engaged in traditional industries with a long stay in the cold [35]. Thus, the organization of proper nutrition in the North must take into account the evolution of human diet [1, 2.4, 10].

As result of continuous adaptation to specific food, human body creates a stable system of exchange processes [35]. There is speculation that individuals who had departed from the

traditional way of life and consuming mostly western food products has a lower rate of metabolism [22, 35]. This was confirmed by the results of studies conducted in recent years in North America [7, 16]. Natives of the North are experiencing increased demand for fat-soluble vitamins (Panin, 1987), but in the northern communities, preserving traditional protein-lipid diet, hypovitaminosis is rare [30].

Some studies have revealed differences in the diet depending on the climatic and geographical conditions of residence and to establish the so called types of eating [11, 15, 25, 31, 34]. A significant use of dairy products, fish, and less sugar, vegetable oil, low salt researchers explain the mechanism of heat at a high temperature and high humidity, since in this case the inclusion of heat transfer is difficult, so the primary load heat decreases [27]. If a high level of energy consumption of the organism of northerners, particularly long-lived, can be explained by a significant consumption of protein and fat [28]. Thus, the nutrition of the indigenous population in high longevity populations can be regarded as an active factor involved in the formation of an adequate adaptation to the environment [30]. National type of food, spontaneously formed for centuries long process and the necessary adaptation to the climatic conditions of residence, characterized by favorites of meat and fatty foods and foods with a high temperature, it is described by a number of researchers of the North [27]. They noted the high proportion of protein in the diet and fat at relatively low carbohydrate content [27].

Some authors support the preferential use of hot dishes and especially the hot tea in cold regions [27]. It should be noted that the hot meal is one of the most effective methods of warming the body by convective heat transferred from blood to other organs and tissues [27]. It is known that small vessels such as arterioles, capillaries and venules are ideal coils [27]. Nutrition features and diet of the northern type are biologically caused, as over time the population of visitors gradually within 20 years of living in the region, goes to Arctic feeding behavior [27]. These reactions help to survive in conditions of low temperatures and maintaining the functions of the body in extreme climatic conditions [27].

It is believed that basal metabolic rate is increased in northern people when compared to populations of tropical and temperate zones of the twentieth century in Canada and Alaska [46]. Other researchers have found similar relationships of basal metabolism with the region of residence [47].

Current literature suggests that people who came to the North, activated lipid metabolism steadily increased the content of free fatty acids and total cholesterol levels, energy

metabolism switches from the "carbohydrate" to "fat" type [48]. According to some reports, nutrition of inhabitants of northern regions of Russia also has certain features and characterized by over-eating, the prevalence of protein-fat food, along with a lack of vitamins and some trace elements that may contribute to lipid metabolism disorders, enhanced deposition of cholesterol and  $\beta$ -lipoproteins in the intima of vessels, followed by the development of atherosclerosis [49]. Other authors who have studied mainly the actual nutrition of older people, say that there is a relationship of food with longevity, depending on the ambient temperature [27].

### CONCLUSION

Thus, today usage of the traditional food of the North is very important in the sense that the ethnic food of these people (ecologically clean) is closely related to human health and the nation's gene pool. All this leads to the preservation of traditional food and culture of the ethnic group as a whole.

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