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Nutrigenetics Bases in the North

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ABSTRACT

In studying of influence of food on a genome of the person is engaged nutrigenetics science which is extremely demanded, investigating how different nutrients are capable to modify human genes and as it in turn influences health of the person.

The scientific research institute of health of SVFU for decades carries out studying of nature of food of the population, living in an extreme and severe zone. Results the researches conducted in various medico-economic zones of the republic showed that there is a distinction in the daily caloric content of a diet among respondents depending on a floor and an ethnic origin.

Low consumption of the main micronutrients connected with insufficient consumption of the main food is established.

Despite the occurred changes, food of the population is unbalanced on all main components, including on essentsialny for health – to mineral substances and vitamins and doesn't correspond to recommended Russian physiological requirements of adult population.

Conditions of environment and increase in incidence of people of all age caused the necessity of creation of functional food, i.e. products with the additional functions, useful nutritious and physiological characteristics.

Using in production of foodstuff of new generation unique Yakut herbs and wild-growing berries, it is possible to improve adaptation and immune opportunities of the person.

At population catering services in the conditions of the North it is necessary to consider and food habits of nationalities living here.

Keywords: nutrigenetics, nature food population, food optimization, food in the north, biotechnology, functional products.

In studying of influence of food on a genome of the person nutrigenetics is engaged - the science which has arisen in the USA about ten years ago. Despite relative "youth" of the geneticist of food it is extremely demanded, first of all, of course, abroad. Nutrigenetics investigates how different nutrients are capable to modify human genes and as it in turn influences health [3, 9].

The knowledge of interaction between environment and our genes laid the foundation to a new era in dietology and medicine. Practically it means that we can force to work by means of food the genes for us so that to remain healthy much more long (healthy nutrition, according to the last scientific researches, is capable to prolong life for a period of up to 14 years) [8].

Optimization of food is daily use of products which influence activity of the revealed polymorphic genes, help with prevention of diseases of individual group of risk and with achievement of a goal, for example, with weight correction. After all volumes of our body is a result of a combination of such factors, as interaction of genes, metabolic processes, a way of life, an environment, the general culture and socially economic status of the person [1].

It is established that more than 100 gene combinations influence weight changes. Some alternative combinations of genes play a key role in energy consumption, appetite control, a lipid exchange, emergence of a syndrome of an insulin resistance. Each individual genetic variation has rather small influence on excessive weight and not necessarily causes obesity, but "awards" a susceptibility to obesity and changes balance of control of weight if the person chooses the wrong way of life. That is has impact on, whether the person to gain weight is inclined and to keep it, how fast its organism reacts to physical activity, and also to which exercises and what type of a diet it reacts.

Such approach is called as "individual prevention" or preventive individual medicine and helps to protect effectively each person from various multifactorial violations connected with influence of environment (oncological diseases, cardiovascular risk, the return reaction to medicines, allergies, etc.), and also it is essential to slow down processes of aging [9].

To limit animal fats in a diet, to diversify it with sea fish and vegetables, there is no need to do the expensive genetic analysis. But there are nuances. For example, the person owing to genetics acquires polynonsaturated fats, than monononsaturated better. Or weaker perceives sweet taste – then it will sweeten more strongly tea and to sugar strawberry that, certainly, it isn't useful [8].

Ability to digestion of vitamins too genetically happens different: one people have a need for vitamins A, D, E, groups B are higher, than at others. If it is accompanied also genetically by hypersensibility to bitter taste when for anything won't take people in a mouth, for example, broccoli, it is necessary to pick up an individual complex of vitamins [3].

According to bioclimatic division into districts the region of the Republic of Sakha (Yakutia) belongs to an extreme and severe zone. The scientific research institute of health of SVFU for decades carries out studying of nature of food of the population, living in an extreme

and severe zone. Early researches were conducted in 2001 in 6 areas and 2 cities. Results researches of food the population conducted in 6 areas of the republic showed that there is a distinction in the daily caloric content of a diet among respondents depending on a floor and an ethnic origin [4, 6].

So, the average daily power value of a diet of men made 2308, women have 1801,3 kcal ($p < 0,05$). Caloric content of a diet of indigenous people was statistically significantly higher (1787,1 and 2129,2 kcal, respectively, $p < 0,05$)than at not indigenous people. The highest caloric content of a diet was noted in Verkhoyansk, Suntarsk uluses and in Yakutsk. The lowest – in Neryungri. Comparing the power value of a diet 2001 and 2012 it is possible to note that by 2012 the power value of a diet decreased by 11%, and averaged 1885,7 kcal. The greatest decrease in power value happened in an industrial zone (1797 kcal), the smallest in the Arctic zone (2020 kcal).

According to "Norms of physiological requirements for energy and feedstuffs for various groups of the population of the Russian Federation" the average daily physiological need for proteins averages 75 g. By results of research, in 2001 the population of the republic consumed 63 g of protein per day, in 2012 - 67 g per day that also doesn't correspond to physiological requirements. In comparison with 2001 consumption of fats with 71 g per day decreased to 67 g (norm of 83 g per day) and carbohydrates from 289 g per day to 242 g per day (norm of 365 g per day) [4, 6].

Low consumption of the main microfeed stuffs is undoubtedly connected with insufficient consumption of the main food. The carried-out comparative characteristic of food of the population in 2001 and 2012 showed that food sets of inhabitants of RS (Ya) were characterized by decrease in quantity of products of an animal origin, fruit and increase in a quota grain and potatoes in 2001.

The comparative characteristic of consumption of the main products on bioclimatic zones showed that in all climatic zones there were changes consumption of products. So, in the Arctic zone, consumption of fish by 3 times with (from 9,2 g increased to 25 g per day), milk by 4 times (from 161 g to 647 g), eggs by 6 times (from 2,9 g to 12,6 g), bread twice (from 108 g to 252 g). Considerably consumption of fruit (from 2 g increased to 63 g). By 4 times consumption of vegetable oil (51,1 g and 13,4) and potatoes (453 g and 86 g) decreased. Consumption of vegetables remains same low (69 g and 79,6 g according to).

Thus, the power value of a diet for a 10-year interval decreased by 2012 by 11%, and averaged 1885,7 kcal. Thus the greatest decrease in power value happened in an industrial zone

(1797 kcal), the smallest in the Arctic zone (2020 kcal). Average daily consumption of proteins, fats and carbohydrates for a 10-year interval significantly didn't change, remaining is much lower than recommended physiological norms. Considerable deficiency of potassium, magnesium, calcium, iron, B1, B2, C, PP vitamins, Retinolum remains.

Despite the occurred changes, food of the population is unbalanced on all main components, including on essentially for health – to mineral substances and vitamins and doesn't correspond to recommended Russian physiological requirements of adult population.

Metabolism studying at the children living in northern regions of the country, both local, and the alien population, showed that specific climatic conditions (long severe winter, sharp temperature drops of air and atmospheric pressure, magnetic influences) cause increase of requirement of a children's organism in some feedstuffs (protein, fat, group B vitamins, C) and energy.

For children of regions of the North the increase in caloric content of a diet at 10% in comparison with norm for a midland of the country and increase in the contents in protein diets for 8 - 10% and fat for 5 - 10% is recommended[6, 7].

It must be kept in mind that the specified increase in protein, fat and diet caloric content approximately and depends on conditions of accommodation in each certain region. The more severe climate and is sharper weather change, the increase is higher. Seasonality matters also, so in a cold season the need for proteins, fats and caloric content will be higher, than in summertime [6, 2].

In this regard for the region of the Far North, with long winter, higher norms of consumption are recommended.

Feature of catering services of the population of northern regions of RS (Ya), especially Far North, difficulties in providing with their natural products in a winter and spring season and at the beginning of summer are.

The high need of the person for some biologically active agents at adaptation to North conditions, and also can lead wide use of dry, frozen and unenriched tinned products to insufficient receipt with food of some vitamins (C, P, B, etc.).

It is necessary to encourage development of the enterprises with subsidiary farm for population supply by fresh vegetables, and also to use products of a local source of raw materials more widely [7].

The flora of Far North and the Areas of Siberia gives the chance to use a large number of wild-growing cultures in food - in the forest-tundra and a tundra zone there are trade stocks of

black and red currant, a dogrose, cloudberries, blueberry, a honeysuckle, cowberry, and the region of the Far North - a kislichnik of a two-column, Arctic sorrel [5]. It is expedient to include these products in diets of children not only in an aestivo-autumnal season, but also to make preparations them for the winter and spring.

To number of products of a local source of raw materials of the North, containing a large number water - and fat-soluble vitamins, enough of mineral salts and microcells, belong a venison, river and lake breeds of fishes, meat of sea animals.

At population catering services in the conditions of the North it is necessary to consider and food habits of nationalities living here.

Conditions of environment and increase in incidence of people of all age caused the necessity of creation of functional food, i.e. products with the additional functions, useful nutritious and physiological characteristics [1].

Main goal of our scientific team is development of innovative biotechnologies of specialized food of a functional purpose from local raw materials taking into account medicobiological features of their health and the actual food, really helping the North population in preservation of health is "future food", completely corresponding to idea of transition to preventive biocorrection and the medicine which main objectives are protection of the genetic device of cages, prevention of emergence of diseases and delay of processes of aging.

Using in production of foodstuff of new generation unique Yakut herbs and berries, it is possible to improve adaptation and immune opportunities of the person.

Also development of the new technologies providing rational complex processing of raw materials is necessary for ensuring competitiveness of production of the food industry and public catering. It is connected with use of secondary material resources. Application of new technologies of deep processing of raw materials will allow to create quality safe domestic food [7].

The knowledge of an individual genetic profile allows: to make an optimum power supply circuit for the prevention of genetic risks;

• to choose food additives according to individual requirements;

• to choose an optimum diet for weight correction.

Nutrigenetic recommendations have nothing in common with the general councils. They represent development of individual food behavior and lifestyle according to knowledge that healthy food is a food which corresponds to a specific genetic profile [8]. Recommendations

about the food, based on genetic tests will never order a rigid diet. They only give new understanding of that is optimum food for each specific person.

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