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NUTRITIONAL ASPECTS OF HUMAN NUTRITION

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The flow of chemical reactions in the stomach with different content causes a sharp change in the chemical composition of compounds that are formed during the digestion of food in the stomach under the influence of gastric juice. Some compounds reinforce each other, their concentration increases with elements of influence on the human body as a whole. Human genetic material adapts to the food consumed by a person and tries to somehow smooth out the adverse effects of some food components on the body, but this is the biggest problem of human existence on planet Earth.

The purpose of the work was to identify and give a scientific explain the nutritional features of human nutrition.

As is known hydrochloric acid is released in sufficient quantity when the body no longer needs it. As a result of the violation of the ratio of the output of hydrochloric acid or bile acids to the phases of food digestion, the peptic ulcer disease occurs. That is why it is recommended to use an "aperitif" before eating to "warm up" the stomach, to stimulate the secretion of gastric juice, although this method of nutrition does not always save a person from violations of the phase secretion of the gastrointestinal tract's secret for digesting food components. The occurrence of atherosclerosis, the violation of fat metabolism begins with disorders in the gastrointestinal tract, practically, with insufficient secretory functional efficiency both in the stomach and in the intestines, especially in the duodenum. Fatty food in human nutrition requires the obligatory use of organic acids, which are contained in lemons, pomegranates, apples, etc. It is the organic acids in some fruits that do not contain a significant amount of carbohydrates that sharply reduce the atherogenicity of cholesterol, practically, destroy its genuine essence, and it is this essence that makes fat harmful to a human. Any food that we humans consume stimulates either the sympathetic or parasympathetic nervous system. If we are born with an increased tone of the sympathetic nervous system, then we should avoid eating food that stimulates it, or vice versa. Some authors divide food into "metabolically fast", which is characterized by high calories, has a lot of protein (meat and dairy products), a significant glucose content, and, on the contrary, "metabolically slow" is characterized by a low glycemic index, etc. Namely, "metabolically fast" products stimulate the sympathetic nervous system. "Metabolically slow" products (vegetables, legumes, fats) increase the tone of the parasympathetic nervous system, promote relaxation and reduce anxiety. But it is necessary to detail the impact of each of the listed products on the condition, in particular, of both the sympathetic and parasympathetic nervous systems.

It is obvious to conduct focused researches on an important scientific problem – healthy nutrition, which, first of all, concerns the more or less perfect development of preventive medicine.

Key words: healthy food, nutrition science, gastrointestinal tract, fatty acids, parasympathetic nervous system, sympathetic nervous system, preventive medicine.

Ростислав Сабадишин. Харчові аспекти харчування людини

Протікання у шлунку хімічних реакцій із різним умістом викликає різку зміну хімічного складу сполук, які утворюються під час перетравлення їжі у шлунку під впливом шлункового соку. Деякі сполуки підсилюють один одного, їх концентрація зростає за впливу елементів на організм людини у цілому. Генетичний матеріал людини підлаштовується під споживану людиною їжу і намагається хоч якось згладити негативний вплив деяких харчових компонентів на організм, але це найбільша проблема існування людини на планеті Земля.

Метою роботи було виявити та науково пояснити харчові особливості харчування людини.

Як відомо, соляна кислота виділяється у достатній кількості, коли організм більше не потребує її. Унаслідок порушення співвідношення виходу соляної або жовчних кислот до фаз травлення їжі виникає виразкова хвороба. Тому для «розігріву» шлунка, стимуляції виділення шлункового соку перед їжею рекомендується вживати «аперитив», хоча такий спосіб харчування не завжди рятує людину від порушень фази секреції шлунково-кишкового тракту. Виникнення атеросклерозу, порушення жирового обміну починається з розладів у шлунково-кишковому тракті, практично з недостатньої секреторної функціональної ефективності як у шлунку, так і в кишечнику, особливо в дванадцятипалій кишці. Жирна їжа в харчуванні людини вимагає обов'язкового використання органічних кислот, які містяться в лимонах, гранатах, яблуках та ін. Саме органічні кислоти деяких фруктів, які не мають значної кількості вуглеводів, різко знижують атерогенність холестерину, практично руйнують його справжню сутність, а саме ця сутність робить жир шкідливим для людини. Будь-яка їжа, яку ми споживаємо, стимулює або симпатичну, або парасимпатичну нервову систему. Якщо ми народжуємося з підвищеним тонусом симпатичної нервової системи, то слід уникати споживання їжі, яка її стимулює, або навпаки. Деякі автори поділяють їжу на «метаболічно швидку», яка характеризується високою калорійністю, містить багато білка (м'ясо і молочні продукти), значний уміст глюкози, і, навпаки, «метаболічно повільну», яка характеризується

ся низьким рівнем глікемії. Саме «метаболічно швидкі» продукти стимулюють симпатичну нервову систему. «Метаболічно повільні» продукти (овочі, бобові, жири) підвищують тонус парасимпатичної нервової системи, сприяють розслабленню і зниженню тривоги. Але слід деталізувати вплив кожного з перерахованих продуктів на стан, зокрема, як симпатичної, так і парасимпатичної нервової системи.

Очевидне проведення цілеспрямованих досліджень із важливої наукової проблеми – здорового харчування, яка, насамперед, стосується більш-менш досконалого розвитку профілактичної медицини.

Ключові слова: здорове харчування, дієтологія, шлунково-кишковий тракт, жирні кислоти, парасимпатична нервова система, симпатична нервова система, профілактична медицина.

Introduction

The stomach is a cauldron into which food with different chemical and biological composition enters. Food in the stomach is mixed, the process of chemical reactions between various compounds and components of food takes place. The flow of chemical reactions in the stomach with different content causes a sharp change in the chemical composition of compounds that are formed during the digestion of food in the stomach under the influence of gastric juice. Some compounds strengthen each other, their concentration increases with elements of influence on the human body as a whole. Some compounds level each other. In the process of digesting food in the stomach, something incredible, special, not fully studied happens. Because it is very covert and in which the great secret of the longevity of a person lies, including the eternal life of a person, the quality of life and the occurrence of diseases that are formed in the process of eating different types of food. It is clear that a person's genetic material adapts to the food that a person consumes and tries to somehow smooth out the adverse effects of some food components on the body, but this is precisely the biggest problem of human existence on planet Earth. If the human mind created a robot with a large number of sensors, and it was this robot that accurately depicted the processes taking place in the stomach during digestion, we would receive a significant amount of information regarding the energy that enters our body and in what form this energy provides the person's body with the necessary substances and how it is useful for a person [1].

In 1903, the Russian scientist read a report at the international physiological congress in Madrid. And in 1904, I. P. Pavlov was awarded the Nobel Prize for the research of the digestive glands' functions. So, the first and serious study of the secretion glands of the gastrointestinal tract was started by I.P. Pavlov, who performed an extremely difficult operation to obtain a fistula of the gastrointestinal tract in animals, received pure juice from the salivary gland to the colon and conducted research on experimental animals for 10 years. After the scientific researches of I. P. Pavlov, there was no such significant, serious methodical approach to the study of the function-

ing of the gastrointestinal tract. Pavlov I.P. studied "gross" changes in the gastrointestinal tract during the consumption of food by an animal, but more "subtle" changes, microdoses of various chemical, biological compounds, etc., have not been studied to the present, since there is no methodical approach to their study [2].

The aim of the study. To identify and give a scientific explanation to the nutritional characteristics of human nutrition by studying the scientific works of foreign and domestic scientists.

Results. Above all, as a result of biochemical or chemical reactions' flow in the stomach area, microdoses of substances that have a serious effect on the body can be formed. Homeopathy – the development of this science continues to this day. And in the arsenal of modern medicinal agents, we use a significant number of homeopathic drugs in practice of treating patients. Homeopathic substances that have a serious effect on the body are also formed in the digestive tract during digestion [3].

In the process of evolution, nature came up with hydrochloric acid, secreted by the stomach, and bile acids, synthesized in the liver, to help break down food to a certain consistency. It is necessary to note the known facts that different acids, which are released in the gastrointestinal tract, affect food in different ways, and especially organic acids, which are introduced into the stomach with food. In addition, there is an insufficient amount of hydrochloric acid's secretion and bile acids' secretion in the human body itself, most importantly, the phases of their secretion are disturbed, sometimes there is a delayed reaction of the necessary maximum secretion of both hydrochloric acid and bile acids. As a result of such violations, a person feels heartburn, reflux after a certain time interval after a person consumes food, especially in excessive amounts [4].

Therefore, hydrochloric acid is released in sufficient quantity when the body no longer needs it. As a result of the violation of the ratio of the output of hydrochloric acid or bile acids to the phases of food digestion, the peptic ulcer disease occurs. That is why it is recommended to use an "aperitif" before eating to "warm up" the stomach, to stimulate the secretion of gastric juice, although this method of nutrition

does not always save a person from violations of the phase secretion of the gastrointestinal tract's secret for digesting food components [5].

A significant number of people note that in the process of nutrition, with excessive consumption of food, especially with a high content of fat, the consumption of Coca-Cola, which contains organic acids, is beneficial for the body and for a satisfactory well-being.

The amount of hydrochloric and bile acids is not enough to oxidize the fats that a person consumes with food to a certain physiological consistency. People subconsciously understood that when eating, especially fatty food, it is necessary to additionally consume products with a high content of organic acids. In science, research is known about the clinical effectiveness of apple cider vinegar, and its therapeutic properties have been confirmed.

The English have a proverb: "An apple a day keep a doctor away" (literal translation – eat an apple every day and you will never know doctors) [6]. In winter, Ukrainians ate such foods as pickles, tomatoes, cabbage, etc., along with fatty food. In Central Asia, after eating lamb, people always drank pomegranate juice, which contains a lot of organic acid. It is noted that freshly squeezed lemon juice has a pronounced effect on the cardiovascular system, probably affecting the digestion of food in the stomach. It is interesting that after consuming such products, a person begins to lose weight, probably because under their influence the energy capacity of food, especially its fat components, decreases [7]. In everyday life, folk healers used urine, which contains uric acid in addition to the products of the breakdown of hormones, for the treatment of various diseases. It is likely that the effect of uric acid on food with a high content of acids contributed to a better assimilation of the ingredients of food breakdown, which became "safer" for the human body as a whole [8]. Therefore, there is a need for prospective scientific studies of the effect of different types of organic acids on the fats consumed by humans, but under the conditions created by nature in the gastrointestinal tract, primarily in the stomach and duodenum. In particular, let's pay attention to the insufficiently studied effect on digestion processes in the stomach cavity of well-known medicines that have an acid in their chemical formula, for example, such as acetylsalicylic acid and other non-steroidal anti-inflammatory drugs, etc. It is likely that their use is possible after eating at least a small amount of fatty food, so that damage to the gastric mucosa is not observed [9].

In the course of clinical research, it was estab-

lished that a violation of liver's excretory function contributes to an increase in the concentration of cholesterol in the blood, however, an increase in the concentration of cholesterol in the blood does not always cause the development of atherosclerosis. It is likely that people who have low stomach acidity may have high blood cholesterol levels. But a high level of cholesterol in the blood does not mean that a person must have atherosclerosis [10].

There is an old saying that the way to a man's heart is through his stomach. Perhaps the way to a healthy human heart and blood vessels lies through his stomach and to a normal, disease-free human life. It all depends on what we eat and how the food becomes as useful as possible for the cells of our body as a result of the digestion process [11].

Note that the thorough process of digestion takes place primarily in the stomach cavity. For example, if a tree or plant is not given the necessary compounds, the tree may dry up. We have studied trees and plants much better compared to advances in the field of medicine. A tree can give good fruit, be beautiful, but die quickly. It would be better that the tree is beautiful, gives good fruit and lives long. Such a situation is possible and often occurs in nature. A person can live a long time and be effective both in the process of work and in the process of rest, it is only necessary to start the path to a stable life in relation to human health, and the beginning of this path begins in the human stomach. Any fatty food must be consumed with products that have organic acids, because some of these organic acids are extremely effective in breaking down fat into metabolites that are beneficial for the body as a whole, and after such changes, cholesterol deposition in the vessels' wall does not occur, provoking the development of the atherosclerotic process [12]. The occurrence of atherosclerosis, a violation of fat metabolism, begins with violations in the gastrointestinal tract, practically, with insufficient secretory functional efficiency both in the stomach and in the intestines, especially in the duodenum. Therefore, fat requires the use of organic acids that interact with it, inactivate it and are themselves inactivated as acids and are not absorbed into the bloodstream. Fatty food does not require the simultaneous use of carbohydrates, which contribute to the penetration of cholesterol into the blood and can increase the level of cholesterol in the blood, which can cause a deterioration of the rheological properties of the blood [13]. Glucose is cheap energy and the body does not oxidize cholesterol for its needs, but uses carbohydrates as a more available source of energy. It is necessary to emphasize once again that fatty food in

human nutrition requires the obligatory use of organic acids, which are contained in lemons, pomegranates, apples, etc. It is the organic acids in some fruits that do not contain a significant amount of carbohydrates that sharply reduce the atherogenicity of cholesterol, practically, destroy its genuine essence, and it is this essence that makes fat harmful to humans. It is possible that fat after the action of organic acids on it in the gastrointestinal tract may not be able to be deposited both in human vessels and in depots, which is a very important factor for maintaining health. It is subject to study which organic acids have a positive effect on digestion processes in the stomach and which type of fat is tropic to the effect of organic acids on it and this effect should be favorable for the body [14].

There is another serious problem that has not been studied much – it is the regulation of gastrointestinal tract's activity by the nervous system. The function of the central nervous system is one of the greatest mysteries in modern science. In the human body, there are two autonomous nervous systems that regulate the activity of all organs and systems, affect tissue metabolism, immunity, etc. There is nothing inside a person that is not subjected to the pronounced regulatory influence of these two nervous systems. For example, if the sympathetic nervous system accelerates the heart rate and increases the blood pressure level, the parasympathetic nervous system decreases the heart rate and lowers the blood pressure level. If one nervous system enhances the secretory activity of the stomach, the other reduces it, etc. All somatic diseases that occur in humans are usually sympathetic- or weight-dependent [15].

For the normal functioning of the human body, there must be an absolute balance between the sympathetic and parasympathetic nervous systems. The occurrence of one of the diseases depends on the occurrence of expressed activation, the predominant influence of one of the autonomic nervous systems on the other during many years of a person's life. Strong stimulation of one of the autonomic systems leads to the occurrence of many diseases. For example, frequent and expressed stress leads to the stimulation of the sympathetic nervous system, which in the future may be accompanied by the occurrence of arterial hypertension, atherosclerosis, myocardial infarction, and some authors point to the stimulation of the formation of cancerous tumors, etc. Any variant of human life affects the function of sympathetic or parasympathetic nervous systems [16].

All diseases, as a rule, are caused by dissonance in the work of two nervous systems. Where does the dissonance in the work of the regulating autonomic

nervous systems, which leads to a number of diseases, come from? For example, any food that we, humans, consume stimulates either the sympathetic or parasympathetic nervous system. If we are born with an increased tone of the sympathetic nervous system, then we should avoid eating foods that stimulate it, or vice versa. Such recommendations have not been developed by doctors yet. Most types of meat of animal origin stimulate the sympatho-adrenal system, especially those animals that die in a state of death fear. It is noted that pork has a high content of catecholamines, or pork inexplicably stimulates the release of catecholamines in humans and increases the tone of the sympatho-adrenal system [17].

Thus, it is necessary to study the influence of any meat products on the tone of the sympathetic and parasympathetic nervous systems. Still, for some reason, mutton is considered a "physiological" meat, since the mutton has no fear of death, probably the consumption of mutton will not be accompanied by activation of the sympathetic nervous system. Different species of fish are subject to detailed study, especially considering their beneficial effect on human life expectancy. Sometimes it is necessary to stimulate the sympatho-adrenal system, especially blood pressure is low, and also to increase the tone of the reproductive system, improve mental activity, while drowsiness, etc. It is necessary to carry out a clear scientific analysis of food products according to the degree of their influence on the sympathetic or parasympathetic nervous system. Having eaten a significant amount of the product in its pure form, with the help of scientific research, we can clearly establish the degree of influence of any food product on the tone of the sympathetic or parasympathetic nervous systems. It goes without saying that such studies must be conducted after consuming coffee, dark chocolate, garlic, onions, nuts, honey, cabbage, etc. The influence of eggs, dairy products, vegetables, fruits, etc. on the autonomic nervous system remains unstudied. For example, apples can stimulate the sympathetic nervous system and increase blood pressure when consumed excessively.

We, people, scientists, researchers, are simply obliged to separate products that are recommended for use by people with an increased tone of the sympathetic nervous system or parasympathetic autonomic nervous system. In addition, we should note that there are probably products that we would call "neutral", since they will not change the tone of the autonomic nervous system. Not to mention natural juices, since such studies are extremely important for the normal vital activity of the human body and

the length of human life. For some reason, important value is attached to the content of polyunsaturated fatty acids in products, the absence of "bad" fats, the value of a certain concentration of certain vitamins and other useful properties of products, and the effect on the tone of the autonomic nervous system, its balance, is not investigated, and precisely such studies have a great future for preventive medicine, since it is much easier to prevent the disease thanks to proper nutrition and lifestyle than to treat it. It is well known that garlic has antimicrobial, antiviral, and antifungal properties, cleans blood vessels from atherosclerotic plaques in properly selected doses, but at the same time, with excessive use, it can aggravate the course of gastritis or peptic ulcer disease, duodenum and stomach. Nuts are useful for metabolism, have a significant amount of vitamin B, zinc, magnesium, and Omega-acids, regulate appetite, balance blood sugar, but have increased fat and high calory content [18].

Different classifications of products are known in science. For example, some authors divide food into "metabolically fast", which is characterized by high calory content, has a lot of protein (meat and dairy products), a significant glucose content, and, on the contrary, "metabolically slow" is characterized by a low glycemic index, etc. Namely, "metabolically fast" products stimulate the sympathetic nervous system. "Slowly metabolic" products (vegetables, legumes, fats) increase the tone of the parasympathetic nervous system, promote relaxation and reduce anxiety [19]. But it is necessary to detail the impact of each of the listed products on the condition, in particular, of both the sympathetic and parasympathetic nervous systems. It is clear that there are mixed products, some of which stimulate the sympathetic nervous system and others parasympathetic. But it is necessary to investigate to what extent the effect of various food ingredients with multidirectional influence on human vegetation is pronounced, taking into account its content. In addition, doctors have not developed recommendations for the use of vitamins, since some vitamins strongly stimulate the sympathetic nervous system, and others – the parasympathetic [20]. The "wrong" concentration of vitamins that some types of food are saturated with, including vegetables and fruits, can dramatically increase the imbalance in the functioning of the sympathetic or parasympathetic nervous systems. For example, it has been established that ascorbic acid has a good therapeutic effect when vagotonia, and when sympathicotonia – Vitamin B6, Vitamin E. Vitamin B6 in amino acid metabolism limits the activity of the cofactor in the synthesis of neurotransmitters, including dopamine, serotonin,

norepinephrine, gamma-aminobutyric acid and the hormone melatonin [21]. Some authors indicate that in case of sympathicotonia it is necessary to prescribe vitamin B1, and in case of vagotonia – B6. Both the lack and the excess of certain vitamins affect the activity of the autonomic nervous system in the first place, through which a favorable or negative effect on the human body is realized [22].

The content of microelements in food is important. For example, in case of sympathicotonia, it is recommended to consume food with a high content of potassium, and in case of vagotonia – calcium is recommended, that is why in the case of weakness of the parasympathetic department of the autonomic nervous system, such potassium preparations as Panangin, Potassium Chloride, etc. are prescribed, and in case of a decrease in the tone of the sympathetic autonomic nervous system – Calcium drugs are prescribed, which are presented in a wide range in medical practice. It should be noted that one of the types of physical training of the body, a person's professional activity, a person's preferences, the use of alcohol, the chemical composition of the water that a person drinks, can selectively stimulate the sympathetic or parasympathetic nervous system. Physical exercises, which are coordinated with deep breathing exercises and elements of yoga, are accompanied by stabilization of emotional balance, effectively suppress the high tone of the sympatho-adrenal system. Watching television programs with elements of mental or emotional stress increase the tone of the sympathetic autonomic nervous system. Physical activity should be separately qualified, both to increase the tone of the parasympathetic autonomic nervous system and the sympathetic nervous system. It is the type of physical activity that needs to be detailed to determine the degree of influence on human vegetation, since physical activity stimulates or oppresses the consumption of certain types of food. It goes without saying that the state of the autonomic nervous system under the influence of various types of alcoholic beverages, which can contain tinctures of various plants for both increasing and decreasing the activity of various segments of the autonomic nervous system, is subject to study [19].

It is clear that the autonomic nervous system with the opposite direction of influence increases its tone compensatory in order to level the excessive activation of another system that was stimulated by vital provoking factors. Thus, any violation in the body is accompanied by a violation of two systems: excessive activation of one system with compensatory activation of another system. The disease, which

depends on the increased tone of the autonomic nervous system stimulated by provoking factors, occurs when the dissonance between the expressed tone of the stimulated nervous system and the compensatory autonomic nervous system exceeds the limit established by human physiology. After a certain period of time, the tone of the compensatory autonomic nervous system increases so much that it can slow down the development of the stimulated autonomic nervous system. In some cases, a relative cure of the disease occurs as a result of compensation. In another situation, the level of functioning of the compensatory autonomic system is pathological and may cause a disease in the future, the occurrence of which depends on the increased tone of the compensatory autonomic nervous system. For example, very often when there is hypertensive disease (sympatho-dependent disease), there is also peptic ulcer disease (weight-dependent disease) or the increased stomach acidity or vice versa. But when a person has high blood pressure, the increase in the secretory activity of the stomach does not occur simultaneously with the onset of hypertensive disease, but after a certain long period of its existence, which leads to a gradual compensatory reaction to the increased tone of the opposite autonomic nervous system. The sequence of occurrence of a sympatho- or weight-dependent disease has time intervals that depend not only on individual features of the nervous system functioning, but also on the treatment prescribed by doctors, on medications that, as a rule, increase or oppress the tone of the sympathetic or parasympathetic nervous system [23].

How to find a golden mean that will help us treat one disease, but at the same time will not contribute to the emergence of another? Note that with a general increase in the tone of the sympathetic nervous system in one of the human organs, the tone of the parasympathetic nervous system may prevail in the body and vice versa. In practice, we need to introduce the determination of the level of the sympathetic and parasympathetic nervous system in teenagers after the full maturation of their organism is established. It is necessary to investigate the level of functioning of these two systems, starting from childhood. We need to create a special passport to which data will be

entered by year in the process of human aging, indicators that would reflect the functioning of the sympathetic and parasympathetic nervous systems. Only then will we be able to predict and program the possibility of the occurrence of any disease in a person in the future, to extend his life span. Only then will we be able to give correct recommendations regarding human nutrition, lifestyle, medication use, etc. [24].

Let's ask ourselves: "Is it good for a person when after 45 minutes – 1 hour after eating, she wants to drink water?" People say that such person is healthy. But we, doctors, know that the desire to drink water after eating can be a precursor to the occurrence of a hypersecretory state of the stomach, peptic ulcer disease, gastroduodenitis, or contribute to the development of diabetes. Dissonance in the work of two nervous systems is an innate feature and appears even in mother's womb. Childbirth is a great stress for the child that is born, which contributes to the emergence of dissonance in the work of the sympathetic and parasympathetic nervous systems in the process of the child's development into an adult. Oxygen starvation of the child during childbirth, birth injuries, medical manipulations, etc., contribute to a expressed imbalance in the work of two nervous systems in the future. Genetic factors are also important, since our genetics has changed and adapted over many millennia to the conditions of birth and living on earth. Considering the fact that human diseases are laid down in childhood, it is in childhood that the formation and emergence of serious diseases in the future begin, which not only require qualified doctors' interventions, but no matter what professional medical efforts we make, the lifespan of a person will be shortened [15].

Conclusions. If from childhood it was possible to normalize the balance of the sympathetic and parasympathetic nervous systems using generally accepted methods, to regulate the main pathophysiological processes that occur every split second in the human body, then life would be longer and more carefree with the understanding that a person can live without diseases, having a future. Sooner or later, purposeful research will be conducted on an important scientific problem, which primarily concerns the more or less perfect development of preventive medicine.

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