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EXPERIMENTAL STUDIES AND RESULTS TRANSLOCATION OF INTESTINAL MICROBES IN DIFFERENT INTERNAL ORGANS AND SYSTEMS OF A GENETICALLY MODIFIED PRODUCT IN LABORATORY ANIMALS

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ANNOTATION

One of the important areas of socio-economic development on a global scale is the solution of food supply, food availability in accordance with rational norms of healthy nutrition, as well as achieving high quality and safety of food consumed by the population. A number of studies are being carried out in the world to assess the biomedical safety of genetically modified food products and the effect of genetically modified soybeans on mutagenic, embryotoxic, carcinogenic and gonadotoxic effects, as well as on hematological and biochemical parameters of the organism of experimental animals. The aim of the study was to study and evaluate the effect of a genetically modified product (commercial product from soybeans) on the translocation of intestinal microbes in an experiment on laboratory animals.

KEY WORDS: ***GMO, soybeans, microbial translocation, outbred rats, nutrient media, Candida, bifidobacteria, lactobacilli, staphylococci, streptococci***

RELEVANCE

Genetically modified organisms (GMO) - these are plant or animal organisms, the genotype of which has been changed in a way that is impossible in nature using genetic engineering methods to give the body new properties (resistance to herbicides, pests, diseases and salting, the action of high and low temperatures, yield, calorie content, and others); changes in the quality of the final product (color, composition, storage duration, ripening time); solving the problems of cleaning the environment from organic pollution and heavy metals; ensuring the synthesis of certain compounds in the plant organism (including pharmacological preparations) and the use of plants for the production of these compounds [1, 4, 5, 6, 7, 9].

Pfalling into the human body, together with the food consumed, of the toxic chemical glyphosate, which is used for GM plants, negatively affects the gastrointestinal bacteria, causing dysbiosis. This disrupts the normal microflora in the intestine, which, in turn, reduces the body's resistance to infectious diseases and, over time, contributes to the occurrence of malignant tumors, diseases of the cardiovascular and endocrine systems, autism, infertility and Alzheimer's disease [3].

THE PURPOSE OF THE STUDY

Study and evaluation translocation of intestinal microbes into various internal organs and systems of a genetically modified product in laboratory animals that received and did not receive a GM product in a comparative aspect.

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MATERIAL AND RESEARCH METHODS

As a GM product in the experiments, we used soybeans grown abroad and brought to our country only for scientific research.

Experimental studies were carried out on white outbred rats weighing at least 130 g. Genetically homogeneous animals and representative in all parameters were used. When conducting experimental studies, the rules of biological safety and ethical principles of working with laboratory animals were strictly observed [2, 8].

The aim of the study was to study and evaluate the effect of a genetically modified product (commercial soybean product) on translocation of intestinal microbesin an experiment on laboratory animals.

To solve this problem, we carried out 3 series of experiments on white outbred rats:

Iseries - 10 rats on the usual traditional diet;

II series - 10 rats feeding on normal SDI;

Series III - 10 rats eating genetically modified food.

The rats were on this diet for 2 months. After these feeding periods, all the animals were slaughtered in a special manipulation room in compliance with all the rules of asepsis and antiseptics (Fig. 1, 2), after which the abdominal cavity was opened and the test material was taken into special sterile disposable containers (Fig. 3, 4), in particular: a piece of liver; a piece of the spleen; blood from the heart; peritoneal fluid; feces from the large intestine;

All used containers were initially filled with 5 ml of nutrient broth. The materials obtained in the laboratory were placed in a thermostat at*t* 37 ° C for 24 hours after the expiration of the incubation period of the materials, serial dilutions were prepared from them and from the corresponding dilutions were inoculated (2 drops) with a Drygalsky spatula on highly selective differential diagnostic nutrient media manufactured by the Indian company HeiMedia.

We used the following nutrient media: Agar Blaurocca; Blood Aga with Na azide; MRS-4; Chocolate agar; 5% blood agar; Yolk salt agar; Agar Endo; Shchukevich agar (on the jamb); Agar Saburo;

After inoculation, all used Petri dishes and test tubes were placed in a thermostat at a temperature 37 ° C for 24-72 hours.

RESULTS AND DISCUSSION

1. Microbiological analysis of crops in the first series of the experiment, where the animals were fed with traditional food.

The materials of these studies are presented in Table 1. The table shows that translocation from the intestine occurred only by microbes of the fungi of the genus Candida, and even then only in the tissue of the liver and spleen. At the same time, the moat and peritoneal fluid were sterile. It is interesting to note that some dysbiotic changes occurred in the feces of these rats, although these data are unreliable. Thus, the quantitative parameters of bifidobacteria and lactobacilli slightly decreased, against this background, the number of streptocci increased. Thus, based on these microbiological studies, it is possiblestate that there are no significant indicators of microbial translocation, except for fungi of the genus Candida, as well as nonsignificant shifts in quantitative parameters in the faeces of the colon.

Table 1
The state of microbial translocation into various organs of experimental rats with normal feeding.

*lg (*M ± m) KOE / ml

№	Groups microbes	The number of microbes in 1 ml				
		Liver	Spleen	Blood	Peritoneal. liquid	Thick intestine
1	Staphylococci	0	0	0	0	4.10±0.1
2	Streptococci	0	0	0	0	6.30±0.3
3	Escherichia LP	0	0	0	0	5.15±0.2
4	Escherichia LN	0	0	0	0	0
5	Mushrooms	4.10±0.2	4.30±0.2	0	0	3.60±0.1
6	Lactobacillus	0	0	0	0	6.10±0.2
7	Proteus	0	0	0	0	0
8	Bifidobacteria	0	0	0	0	5.10±0.2
9	Enterobacter	0	0	0	0	0

2. The state of translocation of intestinal microbes into various organs and tissues of rats when fed with SDI for 2 months.

The results of the conducted microbiological studies in experimental rats when fed with SDI are presented in table No. 2. The table shows that feeding the rats for 2 months with SDI led to the appearance of translocation of only 2 groups of microbes: in particular, fungi of the genus Candida and staphylococci. It should be noted that in this group of

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experimental studies in rats, insignificant dysbiotic changes occur in the feces of the colon.

Table 2
Microbiocenosis disorders in various organs of experimental rats when fed with SDI within 2 months.

***lg (*M ± m) KOE / ml**

№	Groups microbes	The number of microbes in 1 ml				
		Liver	Spleen	Blood	Peritoneal. liquid	Thick intestine
1	Staphylococci	1.0±0.1	1.60±0.1	2.0±0.1	3.10±0.2	5.0±0.2
2	Streptococci	0	0	0	0	4.0±0.3
3	Escherichia LP	0	0	0	0	0
4	Escherichia LN	0	0	0	0	5.0±0.2
5	Mushrooms	5.15±0.3	6.15±0.2	4.30±0.2	2.11±0.1	7.0±0.1
6	Lactobacillus	0	0	0	0	4.0±0.1
7	Proteus	0	0	0	0	5.0±0.2
8	Bifidobacteria	0	0	0	0	4.0±0.1
9	Enterobacter	0	0	0	0	5.0±0.2

3. On the presence of the processes of translocation of intestinal microbes to various organs and systems in experimental rats when fed with genetically modified food products for 2 months.

The results of these experimental microbiological studies are presented in table No. 3. It can be seen from the table that feeding rats with genetically modified foodstuffs intensifies the processes of translocation of organs and systems. So, in fact, in this group of experimental studies occurred in three groups of microbes, such as fungi, staphylococci and streptococci. It is interesting to note that dysbiotic shifts occurred in the colon with all microbes. Against this background, the quantitative parameters of lacto and bifidobacteria significantly decreased.

Table 3
The state of translocation of microbes to various organs in experimental rats when fed with GMOs for 2 months.

***lg (*M ± m) KOE / ml**

№	Groups microbes	The number of microbes in 1 ml				
		Liver	Spleen	Blood	Peritoneal. liquid	Thick intestine
1	Staphylococci	3.0±0.2	2.60±0.2	4.10±0.2	5.11±0.2	6.15±0.2
2	Streptococci	2.30±0.1	2.60±0.2	1.0±0.1	0	4.30±0.2
3	Escherichia LP	0	0	0	0	0
4	Escherichia LN	0	0	0	0	5.30±0.3
5	Mushrooms	6.0±0.3	3.10±0.2	7.0±0.2	4.15±0.2	7.0±0,4
6	Lactobacillus	0	0	0	0	2.0±0.2
7	Proteus	0	0	0	0	3.0±0.1
8	Bifidobacteria	0	0	0	0	2.10±0.1
9	Enterobacter	0	0	0	0	5.45±0.2

CONCLUSIONS

1. First, in rats on a traditional diet, the phenomenon of translocation is practically not observed and the flora of the colon is virtually unchanged.

2. At the same time, in rats with increased use of SOI in the colon, there are shifts in quantitative indicators, which mainly concern fungi of the genus Candida and staphylococci. It was these microbes that translocated to all organs and systems.

3. The most interesting data were obtained in an experiment where rats ate genetically modified food products. In these rats, the number of microbes providing tralocation increased. So, she touched three groups of microbes: fungi of the genus Candida, staphylococci and streptococci.

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