PARAMETERS OF INTESTINAL MICROFLORA IN RATS WITH DYSBACTERIOSIS IN THE DYNAMICS OF AGE

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Abstract: Dysbiotic disorders of the qualitative and quantitative composition of the body's microflora and its functions, caused by various reasons, still remain one of the leading and most difficult to solve problems of modern medicine. Experimental modeling of dysbiosis in laboratory rats revealed an increase in the adhesion of opportunistic microorganisms to intestinal epithelial cells. The mechanisms of development of dysbiosis and its consequences are very complex and multifaceted, therefore, the need to find means that can cover as many links of this pathogenesis as possible is still relevant for medicine.

Introduction

In solving many problems of biology and medicine, an important role is played by experimental studies on animals, which make it possible to model and study the dynamics of a pathological process under various conditions of metabolism. The literature describes various approaches to modeling dysbiosis in animals. Known models of dysbiosis caused by starvation, total blood loss, radiation exposure, the introduction of antibiotics [1].

It has been proven that from 300 to 500 species of various microorganisms live in the large intestine, 90% of them are mutualistic microbes (bifidobacteria, lactobacilli, bacteroids, peptostreptococci), only a small group is represented by conditionally pathogenic microorganisms. The mass of normal intestinal microflora of an adult is more than 2.5 kg, and its number is 10^{14} [2,3]. The objective of this study was to study the quantitative and qualitative composition of the intestinal microbiocenosis of rats with experimental dysbacteriosis induced by prolonged administration of oxacillin, as well as the effect of various groups of probiotic preparations on the microflora of animals in the experiment.

Bacteria of normal microflora represent an evolutionarily created "biological barrier" of a macroorganism, allowing it to exist in the biosphere [4,5,6]. Symbiotic intestinal microflora, primarily bifidobacteria and lactobacilli, through antigenic stimulation enhances the formation of complement, lysozyme, immunoglobulins, induces the synthesis of interferon, stimulates the intestinal lymphoid apparatus, exerting a direct effect on the differentiation of T- and B-lymphocytes in Peyer's patches, inducing functional activity, inducing phagocytes [7,8]. However, when exposed to harmful exo- and endogenous factors, this powerful in composition and
quantity microbiocenosis is disturbed, in the direction of increasing unfavorable microflora and contributes to the development of dysbiosis [9,10,11]. As a result, microbial associations cannot perform the protective and physiological functions that they carry out under the conditions of normocenosis. Disruption of the balance of the microbial ecosystem of the intestines of animals entails a decrease in the antagonistic and metabolic activity of microorganisms, which is reflected in a number of morphofunctional features of various organs and systems, manifested in impaired digestion and absorption of food, the synthesis of vitamins, enzymes, amino acids, a decrease in general resistance and the development of inflammatory processes.

Materials and methods
The experiment was carried out on 1, 2 and 3 week old white outbred rats with an average body weight of 10.5; 20.6 and 31.7 g, respectively. The animals were kept under standard conditions: 12-hour illumination period, temperature 20 ° C. To simulate dysbiosis, oxacillin dissolved in physiological saline was administered orally through a rigid tube to laboratory animals. The introduction of the drug began from 2 days after birth, daily 2 mg of the drug twice a week. The sampling of material for bacteriological research was carried out on the 7th, 14th and 21st days.

Determination of the intestinal microflora of rats after dysbiosis was carried out by sowing feces on selective media for bifidobacteria, lactobacilli, bacteroids and peptostreptococci by the method of serial serial dilutions.

Results and its discussion
When studying the effect of oxacillin on the composition of the microflora of mice, a sharp change in the composition of the microflora was shown (data are presented in table No. 1).

| № | Name of microorganisms | 7 days | 14 days | 21 days |
|---|------------------------|--------|---------|---------|
|   | The number of microorganisms | Norm | Experiment | Norm | experiment | Norm | experiment |
| 1 | The total number of anaerobes | 10\(^10\) 5% | 8\times10\(^8\) | 10\(^10\) 5% | 6\times10\(^6\) | 10\(^10\) 5% | 8\times10\(^8\) |
| 2 | of them with gem. with you | 10\(^9\) 6\times10\(^5\) ↓ | 10\(^9\) 6\times10\(^6\) ↓ | 10\(^9\) 6\times10\(^5\) ↓ |
| 3 | Bifidobacteria | 10\(^8\) 4\times10\(^4\) ↓ | 10\(^8\) 6\times10\(^5\) ↓ | 10\(^8\) 6\times10\(^5\) ↓ |
| 4 | Lactobacillus | | | | |
| 5 | Bacteroids | | | | |
| 6 | Total aerobes of which with hemolytic properties | 10\(^8\) 5% | 2,8\times10\(^6\) | 10\(^8\) 5% | 3,2\times10\(^6\) | 10\(^8\) 5% | 2,8\times10\(^8\) |
| 7 | Escherichia: Lactose positive: | 10\(^8\) 6\times10\(^4\) ↓ | 10\(^8\) 6\times10\(^6\) ↓ | 10\(^8\) 6\times10\(^5\) ↓ |
|   | Lactose negative: | 10\(^2\) -- | 10\(^2\) -- | 10\(^2\) -- |
|   | Hemolytic: | 10\(^1\) -- | 10\(^1\) -- | 10\(^1\) -- |
| 8 | Enterococci | 10\(^6\) 10\(^4\) ↑ | 10\(^6\) 10\(^2\) ↑ | 10\(^6\) 10\(^2\) ↑ |
| 9 | Streptococci gr. A | 10\(^1\) -- | 10\(^1\) -- | 10\(^1\) -- |
| 10 | Staphylococci: Golden: | 10\(^2\) -- | 10\(^2\) -- | 10\(^2\) -- |
|   | Saprophytic: Epidermal: | 10\(^4\) 10\(^4\) | 10\(^4\) 10\(^4\) | 10\(^4\) 10\(^4\) |
The results obtained indicate the development of dysbiosis and confirm the success of the chosen model of experimental dysbiosis. Observation of the appearance, activity, appetite and the nature of the feces of experimental animals revealed that after the use of oxacillin in the vast majority of animals of all experimental groups, characteristic signs of digestive tract disorders were noted: anxiety or lethargy, a decrease in the amount of food consumed, flatulence, feces had an oily or liquid consistency sometimes mixed with mucus, greenish-brown in color.

In the course of the studies, it was found that after a week of administration of oxacillin to rats, there was a decrease in the number of anaerobic bacteria in the large intestine of rats: bifidobacteria and lactobacilli. It should be noted that on the 14th day of the experiment, the number of fungi from the genus "Candida" was increased against the background of a decrease in the number of bifidobacteria and lactobacilli populations compared to the 7th day of the experiment;

Thus, the results obtained allow us to conclude that the experimental use of antibiotics significantly affects the state of the intestinal microflora, manifested by a significant decrease in the populations of bifidobacteria and lactobacilli against the background of a sharp increase in strains of pathogenic anaerobes with hemolytic properties and fungi of the genus Candida. Ultimately, this leads to inhibition of the functionality of the intestine.

Table 1 continuation

| №  | Name of microorganisms | 7 days | 14 days | 21 days |
|----|------------------------|--------|---------|---------|
|    | The number of microorganisms. In 1 gr. f. | Norm | Experiment | Norm | experiment | Norm | experiment |
| 11. | Mushrooms of the genus Candida | $10^2$ | -- | $10^2$ | $8 \times 10^6$ | $10^2$ | -- |
| 12. | Proteus | $10^2$ | -- | $10^2$ | -- | $10^2$ | -- |
| 13. | Klebsiella | $10^2$ | -- | $10^2$ | -- | $10^2$ | -- |
| 14. | Mycoplasma | 0 | -- | 0 | -- | 0 | -- |
| 15. | Clostridia | 0 | -- | 0 | -- | 0 | -- |
| 16. | Pseudomonas | 0 | -- | 0 | -- | 0 | -- |

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