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IMMUNE INDICATORS OF NATURAL ANTI-INFECTION RESISTANCE OF CALVES AND LAMBS

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Abstract. The immune indices of natural anti-infection resistance of calves and lambs were the focus of the research. It was established that high titres of antibodies against conditional pathogenic microorganisms are formed in the blood serum of calves. These titres range from 1:100 to 1:400. Similarly, in the blood serum of lambs, high titres of antibodies against conditional pathogenic microorganisms are formed, ranging from 1:50 to 1:175. These values indicate that the natural immune properties of calves and lambs are high.

Key words: calf, lamb, blood serum, conditional pathogenic microorganisms, natural anti-infection resistance, immune indices, colostral immunity, natural active immunity, antibodies.

Relevance of the topic. The formation of natural resistance of the organism of farm animals is directly related to postnatal ontogenesis. The main cause of diseases in newborn animals is the mismatch between the defence forces of the organism and the environment. Animals are born with practically sterile gastrointestinal and respiratory systems, but at the first contact with the environment they are immediately infected with microorganisms [1,3,4,5].

In recent years, new infectious diseases of significant concern have emerged, with a high degree of transmissibility from animals to humans. During the transition period, the causative agents of these diseases typically gain the status of conditional pathogenic microorganisms [1, 6].

This phenomenon is a major contributing factor to the growing prevalence of conditional pathogenic microorganisms, which have emerged as a primary concern in the realm of modern infectious pathology. It is evident that conditional pathogenic microorganisms can also act as causative agents of infectious diseases when the resistance of the organism is reduced [1, 5, 7, 8].

It is acknowledged that, despite the prevalence of numerous species of conditional pathogenic microorganisms in the environment, a subset of these microorganisms is of paramount importance within this domain. In practice, the most common opportunistic

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pathogens are bacteria such as coliform bacteria, salmonellae, pasteurella, pseudomonads, staphylococci and streptococci [1,2,8].

In young animals, these microorganisms cause severe and life-threatening infectious diseases. Despite the development of special measures for their prevention, control and treatment, the urgency of the problem is not diminishing.

Purpose of the research. To determine immune indices of natural anti-infective resistance of calves and lambs and to study features of formation of colostral and natural active immunity against conditional pathogenic microorganisms in their organism.

Materials and methods of research. The studies were conducted on calves and lambs at the age of 10 days old, 1 month and 3 months old on the farm of cattle and sheep of the livestock enterprise 'Zarafshon' of Kitab district of Kashkadarya region.

We conducted laboratory studies in the research laboratory of the department of 'Physiology, biochemistry and pathophysiology of animals' of our university. Using Wright agglutination reaction we determined the dynamics of antibody accumulation to coliform bacteria, salmonella, pasteurellosis, pseudomonads, staphylococci and streptococci in blood serum of calves and lambs.

Results and analyses of the research. In the course of our scientific research, the objective of which was to study immune indicators of natural anti-infective resistance, we determined and analysed the presence of specific agglutinins against six types of conditional pathogenic microorganisms (Escherichia coli, Salmonella, Pasteurella, Pseudomonas, Staphylococcus, Streptococcus) in the blood serum of lambs and calves.

Initially, the dynamics of antibody accumulation against conditional pathogenic microorganisms in the blood serum of 10-days-old, 1-month-old and 3-months-old calves were studied and analysed (Table 1).

Table 1

Dynamics of antibody accumulation to conditional pathogenic microorganisms in blood serum of 10-days-old, 1-month-old and 3-months-old calves (M±m)

№	Spectrum of antibodies	Age and number of calves (n=)		
		10 days old (n=5)	1 month old (n=5)	3 months old (n=5)
1	Pasteurella agglutinin	1:250±7,07	1:350±8,36	1:350±8,36
2	Salmonella agglutinin	1:200±6,32	1:400 ±8,94	1:400 ±8,94

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3	Pseudomonad agglutinin	1:150±5,47	1:400 ±8,94	1:400 ±8,94
4	Streptococcus agglutinin	1:100±4,47	1:250±7,07	1:230 ±6,78
5	Staphylococcus agglutinin	1:180±6,00	1:250±7,07	1:300±7,74

As demonstrated in Table 1, high titres of antibodies to conditional pathogenic microorganisms were identified in the blood serum of 10-days-old newborn calves. These titres were found to be specific agglutinins with titres of 1:250 to Pasteurella, 1:200 to Salmonella, 1:150 to Pseudomonas bacillus, 1:100 to Streptococcus and 1:180 to Staphylococcus. This finding suggests that the calves have developed colostral immunity.

In the course of our research, we discovered that specific agglutinins with titres of 1:350 against Pasteurella, 1:400 against Salmonella, 1:400 against Pseudomonas, 1:400 against streptococci and 1: are present in the serum of calves aged one month. The serum of calves aged three months was found to contain specific agglutinins with titres of 1:350 against Pasteurella, 1:400 against Salmonellae, 1:400 against Pseudomonads, 1:400 against Streptococci and 1:300 against Staphylococci. In addition, the presence of wave-like dynamics was observed. This finding suggests that natural active immunity was established in the organism of the calves.

In order to provide further clarification on the issue, studies were continued on 10-days-old, 1-month-old and 3-months-old lambs. The dynamics of antibody formation against conditional pathogenic microorganisms in their serum were studied (Table 2).

Table 2

Dynamics of antibody accumulation to conditional pathogenic microorganisms in blood serum of 10-days-old, 1-month-old and 3-months-old lambs (M±m)

№	Spectrum of antibodies	Age and number of lambs (n=)		
		10 days old (n= 20)	1 month old (n=20)	3-months-old (n=20)
1	Coli agglutinin	1:175±4,2	1:130±2,54	1:150±2,73
2	Salmonella agglutinin	1:65±5,4	1:50±1,58	1:80±2,00
3	Pasteurella agglutinin	1:175±7,3	1:80±2,00	1:160±2,82
4	Pseudomonad agglutinin	1:150±5,4	1:100±2,23	1:110±2,34
5	Streptococcus agglutinin	1:175±6,0	1:50±1,58	1:170±2,91
6	Staphylococcus agglutinin	1:150±4,0	1:140±2,64	1:160±2,82

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As demonstrated in Table 2, the blood serum of 10-days-old lambs exhibited the presence of specific agglutinins with titres against coliform bacteria (1:175), salmonella (1:65), pasteurella (1:175), pseudomonads (1:150), streptococci (1:175) and staphylococci (1:150). This finding suggests that passive, or colostral, immunity was established in the lambs' organism.

A study was conducted to ascertain the presence of antibodies in the blood serum of lambs aged one and three months. The titres against Escherichia coli ranged from 1:130 to 1:150, against Salmonella from 1:50 to 1:80, against Pasteurella from 1:80 to 1:160, against pseudomonads from 1:100 to 1:110, against streptococci from 1:50 to 1:170, and against staphylococci from 1:140 to 1:160. The dynamics of these titres were found to be wavy.

In the course of our research, it was observed that the titre of antibodies formed in the blood serum of three-months-old lambs against conditional pathogenic microorganisms was significantly higher than the titre of antibodies formed in the blood serum of one-month-old lambs. This finding suggests that natural immunity was established in the organism of Karakul lambs.

The findings of our research have demonstrated that the offspring of diverse animal species exhibit passive, or colostral, immunity against the conditional pathogenic microorganisms under investigation.

CONCLUSIONS

1. It has been established that high titres of antibodies against conditional pathogenic microorganisms, varying from 1:65 to 1:250, are formed in the blood serum of 10-day-old calves and lambs. This finding suggests that colostral immunity has been established in the organism of calves and lambs.

2. It is evident that the antibodies present within the blood serum of 10-day-old calves and lambs are transmitted from the mother via colostrum, thereby enabling the offspring to defend against the respective bacteria.

3. It has been established that in the blood serum of lambs aged one and three months, high titres of antibodies against conditional pathogenic microorganisms are formed, ranging from 1:50 to 1:175. In the blood serum of calves, these titres range from 1:100 to 1:400. This finding suggests that the organism has developed a natural active immunity.

4. It was observed that the titre of antibodies directed against conditional pathogenic microorganisms in the blood serum of calves was considerably higher than the titre observed in the blood serum of lambs.

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5. The observation that the antibody titre to conditional pathogenic microorganisms in the blood serum of calves does not fall below 1:50 indicates that their natural immune response has a unique character.

Consequently, immune indicators of natural anti-infection resistance in calves and lambs suggest that the development of colostral (passive) and subsequent natural active immunity, i.e. natural resistance, occurs in their organism. This is of great importance in veterinary practice.

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