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ROUTES AND FACTORS OF TRANSMISSION OF LARGE LEUKEMIA VIRUS CATTLE

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Аннотация: в статье приводятся данные экспериментальных исследований о путях передачи вируса лейкоза крупного рогатого скота. Знание этиологии и способах передачи возбудителя и эпизоотической ситуации по лейкозу крупного рогатого скота имеет важное значение для ранней диагностики и при разработке эффективных оздоровительных противолейкозных мероприятий.

Abstract: there are some aspects of the metods of transmission of cattle leukemia virus in the article. Knowledge of the etiology and epizootic situation of leukemia is important for the earli diagnosis and development of effective wellness anti-leukemia measures.

Ключевые слова: пути передачи, онкорнавирусная инфекция, трансплацентарный, преципитирующие антитела, реакция иммунодиффузии, антиген, боофилус, ятрогенный путь.

Keywords: ways of transmission, oncovirus infection, transplacental, precipitating antibodies, immunodiffusion, antigen, boofilus, iatrogenic route.

Introduction. In recent years, significant progress has been made in the study of bovine leukemia. A number of experimental studies have shown the leading role of bovine oncornavirus in the etiology of leukemia [1,2]. Research by numerous authors has revealed a fairly wide distribution of oncornavirus infection among various animal populations [3,4].
Therefore, the necessary targeted measures to combat leukemia in cattle at this stage are the study of the main routes of spread of the pathogen and the development of ways to suppress them.
It should be noted that with leukemia, the virus and antibodies to it are simultaneously present in the body. It is not possible to isolate the bovine leukemia virus (BLV) in the body of animals in a free state, since the pathogen is present exclusively in lymphocytes and mainly in a non-productive state. Transmission of Bovine leukemia virus appears to be possible only through the transmission of infected lymphocytes (1-8).
According to many authors [5,6,7,8] and according to the results of our studies, vertical (gameto-chromosomal) transmission of Bovine leukemia virus during natural and artificial

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insemination through the sperm of infected bulls and rams has not been established, although in some cases transplacental transmission of the virus occurs. However, it should be emphasized that this transmission is generally insignificant (from 8-14%), and animals are mainly infected in the postnatal period, most likely through colostrum, milk, by licking bleeding wounds and iatrogenically, as well as by blood-sucking insects, in contact with sick animals [2-5,8].

Materials and methods. To study the vertical transmission of Bovine leukemia virus, 15 sheep and 6 cows free from the leukemia virus were selected, which were inseminated by experimentally infected rams and sires by natural mating. Research at the RID of born calves and lambs was carried out every 30 days for 1 year.

In another experiment on transplacental transmission of Bovine leukemia virus,, 6 pregnant cows and 10 pregnant ewes experimentally infected with the leukemia virus were used. Studies at the RID of calves and lambs were carried out before feeding colostrum and after they reached the age of six months (in order to exclude (eliminate) colostral antibodies) then every 30 days for 1 year (the experiment lasted 1.5 years).

In another experiment, to clarify the routes of transmission of Bovine leukemia virus, through the mucous membranes of the nasopharynx, eyes and vagina, we conducted an experiment on 9 seronegative heifers. The experimental animals were divided into three groups according to the analogue scheme, with three heads in each group. Heifers of groups I, II, III were infected by irrigating the mucous membranes of the nasopharynx, conjunctiva of the eye and vagina, respectively, with a suspension of the culture liquid TEK MBA-76 at a dose of 2.0 ml. The experimental animals were kept in complete isolation in groups to exclude possible contact. Immunological monitoring of the development of oncornavirus infection was carried out monthly using an immunodiffusion reaction (IDR) with double antigen and long-term complement fixation reactions (LDCR). The observation period for the experimental animals was one year.

The next step in studying the methods of transmission of Bovine leukemia virus, in natural conditions was the study of the role of blood-sucking insects as carriers of Bovine leukemia virus,. In preliminary experiments, we have proven the possibility of VLV infection of seronegative animals by injecting only 2500 lymphocytes (2), which is 0.0005 ml of blood. If we take this circumstance into account, then the possibility of transferring Bovine leukemia virus, with the help of bloodsuckers is beyond doubt. Initially, the experiment investigated the possibility of transstadial transmission of Bovine leukemia virus, by Gialoma asiaticum ticks by injecting them in the nymph and adult stages into negative animals; the previous stages (larva and lymph) fed on the infected donor. For transovarial transmission of oncornavirus through the body of ticks, larvae of ticks of the second generation Boophilus calcaratus, the first generation of which fed on an infected cow, were used. Experimental animals were examined serologically (RIS) on the 7th, 15th, 30th, 45th, 60th days after the last contact with ticks, then monthly. The observation period was 6 months.

In another experiment where blood-sucking insects were also used, the possibility of mechanical transfer of infected lymphocytes through tabanids was determined. Initially, three cows free from BLV were injected with pools of tabanids fed on an infected cow. Taking these results into account, in the subsequent experiment, under strictly controlled conditions, one cow infected with the leukemia virus and three cows free from VLV were placed in a gauze tent 4x4x4 meters, where 10-20 wild-caught tabanids were released daily for 3 days. In a gauze

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tent, horseflies during the day for a very short (5-10, 20 or more seconds) period of time, flying to feed from one animal to another, both infected and free from oncornavirus infection of cattle, that is, conditions for probable transfer were created with a proboscis, Bovine leukemia virus,-infected lymphocytes.

Research results. In the experiment on vertical transmission of Bovine leukemia virus,, in all cases, in the blood sera of newborn lambs (14 heads) and 5 heads of calves, virus-specific precipitating antibodies to the glycoprotein antigen of Bovine leukemia virus, were not detected in the immunodiffusion reaction. Consequently, in our case, during natural insemination, offspring free from Bovine leukemia virus, are born from Bovine leukemia virus,-infected fathers and uninfected mothers, which confirms the opinion that there is no transmission of Bovine leukemia virus, by the gametochromosomal type. At the same time, in the blood sera of 2 lambs and 1 calf, born respectively from 10 sheep and 6 cows, experimentally infected mothers, before drinking colostrum, and then at 6-7 months of age, then virus-specific precipitating antibodies to the glycoprotein antigen of Bovine leukemia virus, were constantly detected in immunodiffusion reactions.

The results of these experiments indicate that transmission of Bovine leukemia virus, is also possible through the transplacental route, since in cows and sheep with a syndesmochorionic type of placenta, immunoglobulins - antibodies do not pass through the placenta from mother to fetus. These data were confirmed in subsequent biotest experiments on other lambs. The obtained research results give reason not only to assume, but also to assert that newborn calves and lambs from mothers seropositive for Bovine leukemia virus, are initially infected slightly (16.6-20.0%) through the transplacental route, and then in most cases through contact with sick animals.

Thus, according to the results of our research, the vertical (gameto-chromosomal) route of transmission has not been established, but the transplacental route occurs in 16.6% of cases in calves and 20.0% in lambs.

In experiments on the transmission of Bovine leukemia virus, through mucous membranes, ryseltates were obtained indicating that precipitating antibodies to the leukemia virus antigen found in RID and in RDSK with a glycoprotein antigen are observed only in animals of group I (in 2 out of 3 infected by irrigation of the nasopharyngeal mucosa, 60- th and 90th days after infection, and then consistently throughout the year, all blood serum samples of animals of groups II and III infected, respectively, on the mucous membranes of the eyes and vagina during the studied periods remained negative. Therefore, our data indicate that. reproduction of oncorrhovirus infection is possible by irrigating the mucous membrane of the nasopharynx, which cannot be said about the mucous membrane of the eyes and vagina, infected with identical material. In our opinion, the mucous membranes of the eyes and vagina, due to the presence of a barrier function of the mucous membranes, are able to protect the body from the penetration of the leukemia virus in the culture fluid. Research. in this direction, a more careful interpretation of this phenomenon is required, since in addition to the well-known function of the mucous membranes, which performs the barrier function of the body, there are probably other factors that provide protection of the body from the penetration of pathogens.

The next step in studying the methods of transmission of Bovine leukemia virus, in natural conditions was the study of blood-sucking insects as carriers of Bovine leukemia virus, since the possibility of infection by the virus with a minimal volume (0.0005 ml) of blood was

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proven. If we take this circumstance into account, then the possibility of transferring Bovine leukemia virus, with the help of bloodsuckers is beyond doubt.

In an experiment on transovarial and transstadial transmission of Bovine leukemia virus, through ticks, all blood samples from animals that were in contact with ticks and that had previously fed on infected animals gave a negative result within the studied time frame. Thus, as a result of a serological examination of the blood sera of experimental animals, no virus-specific precipitating antibodies to the glycoprotein antigen of oncornavirus were detected in any sample during the study period. Therefore, the possibility of transstadial and transovarial transmission of Bovine leukemia virus, by ticks of the species Gialoma asiaticum and Boophilus calcaratus has not been established.

In another experiment where blood-sucking insects were also used, the possibility of mechanical transfer of infected lymphocytes through tabanids was investigated. Before the main experiment was carried out, by means of a bioassay on sheep, the presence of the leukemia virus was established in the pools of tabanids fed on animals infected with Bovine leukemia virus. The results of the studies indicate that in pools of tabanids that fed for 5-10, 20 or more seconds. on infected animals, the bovine leukemia virus was present, since the administration of a suspension of a pool of infected tabanids to three experimental animals causes the development of oncornavirus infection in the latter on days 35-42 after infection. At the same time, no infectious virus was detected in the pools of tabanids caught on the dummy.

The main experiment was carried out, as mentioned earlier, in a gauze tent, under strictly controlled conditions, where tabanids had the opportunity to feed both on animals infected with the leukemia virus and on animals free from Bovine leukemia virus. The gauze tent partially justified itself (although the possibility of uncontrolled penetration, insignificantly, of other hematophagous gnats and mosquitoes was not excluded) since it was possible to reproduce Bovine leukemia virus infection in one of the three animals. Consequently, blood-sucking insects, in particular tabanids, can be considered as contributing factors in the spread of bovine leukemia virus infection.

Conclusions.

1. Offspring from infected fathers and uninfected mothers are born free of oncornavirus infection, however, from infected mothers there are cases of young animals being born, before feeding colostrum, calves and lambs - carriers of antibodies to Bovine leukemia virus, which indicates transplacental transmission.
2. Irrigation of the mucous membranes of the nasopharynx with virus-containing material (TEK MVA-76) revealed the presence of precipitating antibodies in calves, which indicates the presence of oncornavirus infection. Whereas, irrigation of the blue eyes and vagina failed to reproduce Bovine leukemia virus infection.
3. The introduction of virus-containing material into the body of calves in a minimal dose (2500 leukocytes - 0.001 μl of blood) causes infection in them 20-35 days after infection.
4. A mechanical method of transmission of Bovine leukemia virus by tabanids has been established, but transstadial and transovarial transmission of Bovine leukemia virus by Gialoma asiaticum and Boophilus calcaratus ticks have not been observed.

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