

# THE DYNAMICS OF THE CIRCULATING IMMUNE COMPLEXES AT VACCINATION

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## Abstract

The dynamics of circulating immune complexes in serum of blood of newborn calves and pigs of newborn period during vaccination against associative infections in combination of immunomodulators a probiotic laktobakterin and phitoprotiotik was investigated. Since the birth in two stages daily on 20 ml during 10 days with an interval in 10 days calves received laktobakterin and phitoprotiotik. Pigs received laktobakterin in 10 days prior to depriving on 10 ml within 10 days with an interval in 10 days, a phytoprobiotic according to the same scheme. Circulating immune complexes determined by the method of pretsipitation in polyethylene glycol, the size of circulating immune complexes - a pretsipitation of 4% and 3% polyethylene glycol. Vaccination causes increase in quantity of circulating immune complexes in an organism of calves and pigs. Using of immunomodulators decrease immune complexes in circulation of blood and control indicator becomes within standard values. More over, vaccination in combination with probiotic and a phytoprobiotic doesn't cause formation of pathogenic circulating immune complexes.

## Keywords

vaccination, the circulating immune complexes, stimulation, calfs, pigs.

## Introduction

One of indexes of the immune status of an organism is the level of the circulating immune complexes in blood. Immune complexes are formed at accession of antibodies to antigens. Interaction of immune complexes with soluble cell-like effector systems leads to elimination of the bound antigens. Immune complexes are formed constantly as a result of the immune answer of an organism. Though detection of the circulating immune complexes is not specific to any particular disease, it provides necessary information concerning an immunopathology, development and the forecast of a disease. Existence of immune complexes is a sign of the proceeding immune protective process or the autoimmune conflict which can be revealed later by express tests [2, 10].

The circulating immune complexes in small concentration, serve as normative, are an obligatory component of blood serum of clinically healthy animals. During the post-natal period of development of animals the index of level of the circulating immune complexes represents one of criteria for evaluation of the functional maturity of a humoral link of immune system - changing from minimum values at newborns, it reaches indicators of adult animals to 18-month age [3].

It is confirmed that the circulating immune complexes serve as normative indicators and can be used as criteria for evaluation of the functional maturity of immune system of animals. Their level reflects severity of a course of a disease, level of activity of the immune answer of an organism. It is possible to apply indicators of the circulating immune complexes in blood serum with the diagnostic and prognostic purpose at an effectiveness assessment to the carried-out therapy and conditions of immune system in general [4, 5, 7, 9].

### **Material and methods**

In this regard, the purpose of ours research was studying of dynamics of the circulating immune complexes in blood of young growth of farm animals at correction of anti-infectious immunity immunomodulators.

For achievement of a goal groups of newborn calves and pigs on the principle of couples analogs were created. Calves and pigs of control groups contained in conditions of the accepted technology of contents and feeding. Calves of the second group received a fluid probiotic lactobakterin since the birth in two stages daily on 20 ml within 10 days with an interval in 10 days; calves of the third group – a phytoprobiotic with a lucerne of a sowing campaign and a barberry ordinary [6] according to the above-named scheme. Pigs of the second group received a fluid probiotic lactobakterin in 10 days prior to depriving on 10 ml within 10 days with an interval in 10 days, pigs of the third group – a phytoprobiotic with a lucerne of a sowing campaign and a barberry ordinary [1] according to the above-named scheme.

Pigs were vaccinated against salmonellosis, pasteurellosis and a streptokokkoz aged at the age of 30 and 40 days, against a kolibakterioz before depriving with an interval in 10 days twice; calves vaccinated against salmonellosis at 20-day age, against an infectious rhinotracheitis, a parainfluenza-3, respiratory синцитиальной diseases, viral diarrhea and pasteurellosis at 30-day age it is repeated with an interval in 30 days.

Sampling of blood for studying of dynamics of the circulating immune complexes was carried out prior to experience, then for the 25th, 35th, 65th, 75th days at calves; prior to experience, then for the 15th, 25th, 35th days from the beginning of experience at pigs. The quantity of the circulating immune complexes determined by method Yu. A. Grinevich, A. N. Alferov (1981) by the selection precipitation in polyethylene glycol [1]. The size of the circulating immune complexes was estimated by P. V. Struchkov's method et al. (1985) [11].

### **Discussion**

The maintenance of the circulating immune complexes control and experienced groups was in blood serum of calves and pigs at the level of  $36,5 \pm 0,5$  optical units –  $36,9 \pm 0,4$  optical units and  $57,0 \pm 0,6$  optical units –  $57,6 \pm 0,4$  optical units, respectively.

After vaccination against salmonellosis (for the 25th day of researches) at calves the tendency to increase in quantity of the circulating immune complexes was noted. So, at calves of control group the quantity of the circulating immune complexes exceeded background value on 0,8 optical units ( $37,6 \pm 0,5$  optical units), at calves of the first group – on 1,2 optical units ( $37,8 \pm 0,4$  optical units), at calves of the second group – on 1,3 optical units ( $37,9 \pm 0,6$  optical units).

For the 35th and 65th days of researches (after vaccination and a revaccination a vaccine «Kombovak P») at calves increase in blood serum of the circulating immune complexes was registered. So, calves of control group for the 35th and 65th days of researches had a maintenance of the circulating immune complexes above background value on 1,9 optical units ( $38,7 \pm 0,4$  optical units) and on 3,2 optical units ( $39,9 \pm 0,4$  optical units); at calves of experienced groups the quantity of the circulating immune complexes increased, respectively, in the second group - on 2,6 optical units ( $39,2 \pm 0,4$  optical units) and on 3,2 optical units ( $39,7 \pm 0,3$  optical units); in the third group – on 1,9 optical units ( $38,4 \pm 0,6$  optical units) and on 2,9 optical units ( $39,4 \pm 0,4$  optical units). However, the quantity of the circulating immune complexes in blood of calves of control group was above experienced values in the above-stated days.

For the 75th day of researches the tendency of increase in the circulating immune complexes in blood serum of calves of control group remained, and at the calves receiving a probiotic and a phytoprobiotic decrease in quantity of the circulating immune complexes was registered.

For the 15th day of researches (after vaccination against salmonellosis, pasteurellosis, a streptokokkoz and a kolibakterioz) at pigs of the studied groups the quantity of the circulating immune complexes increased concerning a hum noise, respectively, on 1,6 optical units ( $58,6 \pm 0,6$  optical units), on 0,2 optical units ( $57,8 \pm 0,5$  optical units), on 0,25 optical units ( $57,4 \pm 1,8$  optical units).

For the 25th day of researches (after the second vaccination) at pigs control and experienced groups increase in quantity of the circulating immune complexes also remained. So, the maximal increase was registered at pigs of control group –  $59,8 \pm 0,4$  optical units, at the pigs receiving lactobakterin and a phytoprobiotics the quantity of the circulating immune complexes was up to standard  $59,4 \pm 0,4$  optical units –  $59,0 \pm 0,3$  optical units

For the 35th day of researches the quantity of the circulating immune complexes in blood serum of pigs of experienced groups decreased and stabilized within background level ( $57,5 \pm 0,3$  optical units –  $57,4 \pm 0,5$  optical units), and at pigs of control group the tendency of increase in the circulating immune complexes remained.

When studying the size of the circulating immune complexes it is not revealed in blood of average and finely divided complexes. The size varied within  $1,0 \pm 0,01$  Cd -  $1,0 \pm 0,02$  Cd.

## Conclusions

Thus, vaccination causes increase in quantity of the circulating immune complexes in an organism of calfs and pigs. It is bound to increase in antigenic load of an organism of animals and formation of the normal immune answer. Use of immunomodulators promotes decrease in the circulating immune complexes and stabilization of the studied index within normative values. Besides, vaccination and correction of anti-infectious immunity a probiotic and a phytoprobiotic does not cause formation of pathogenic average and finely divided complexes.

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