ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Method Development for Correction the Immunological Status of Newborn Animals.

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ABSTRACT

One of the major problems of applied immunology is the development the techniques and methods to increase the immunobiological status of newborn animals, aimed at a more complete formation of humoral and cellular level. The most promising direction is immunotherapy in newborn animals by intramuscular injection of highly non-specific broad-spectrum immunomodulators. Currently the growth of immune disease has raised, i.e., diseases which are based on immunopathological mechanisms. Among them, - anti-infective protection violation, proliferation and regeneration, allergic and autoimmune processes.Feature of flow diseases with immunopathological conditions are early chronic, torpid to traditional therapy methods and the need for immunorehabilitation. The problem, in spite of tremendous relevance and great practical importance, growing interest a wide range of researchers still have no clear methodological approaches.

Keywords: immunopathological mechanisms, immunorehabilitation, responsiveness, sensitivity, piglets.

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ISSN: 0975-8585

INTRODUCTION

It should been noted that the mother's body, in critical periods of pregnancy, are in a state of physiological immunodeficiency associated with intense formation and development of the fruit, preparing the body for the production of colostrum and milk. For sows this period in the second half of pregnancy (70-100 days).

However, due to the principle of interrelationship and interdependence of homologous functional systems in the complex, "the fruit of a newborn-mother 'may strengthen their own biological responses of the newborn by acting on the maternal organism during gestation, to move to a better level of functioning immediately after birth.

It was have found that babies born in the earlier stages of morphofunctional development as compared to other farm animals, the physiological state of immune deficiency, necessitating the use of immunostimulatory preparations is in the fetal period of development, thereby enabling to obtain and produce posterity that is more viable.

MATERIALS AND METHODS

The technical result, which was have achieved, reduced to the prevention of immune deficiency in newborns fetal period, through the implementation of an immunomodulatory effect in the mother's body in the most intense period (second half) of pregnancy.

This technical result was have tested in control against the experimental group of pregnant sows and their offspring derived from. Implemented by intramuscular administration of highly non-specific broad-spectrum immunomodulator "pirogenal 'pregnant animals at a dose of 0.08 mg / kg body weight for 60 days before the survey 5 injections every day for 40 days before delivery 5 injections at intervals of 1 day, 20 days before farrowing 5 injections with an interval of 2 days, the general course of 15 injections and is aimed at becoming a full-fledged immunobiological status in newborn animals.

The method consists in the following: the use of pirogenal pregnant sows 60 days before the expected farrowing due to its ability to activate macrophages, enhance phagocytosis (leading to increased antimicrobial resistance and accelerated the formation of antibodies) and the production of endogenous interferon, stimulate the production of interleukin-1 (IL-1) inducing proliferation of a number of body cells (fibroblasts, endothelial cells, hematopoietic cells, etc..), interleukin 2 (IL-2), required for the growth of lymphocytes (especially T cells). Thus, the activation of cells of monocyte-macrophage series and secreted them cytokines, increased functional activity of both cellular and humoral in functional system "mother-fetus".

RESULTS AND DISCUSSION

Individual immunomodulatory minimum pyrogenic dose was determined for sows by intramuscular injection rate of repair pigs 0.16, 0.08, 0.04 mg per 1 kg of body weight. The most optimal dosage for animals was 0.08 mg per 1 kg of body weight, which helped to increase the general body temperature to 0,5 ° C, which indicates the adequacy of pyrogenic optimal dose. For 1 hour prior to injection in each sow, twice-rectal temperature measurements were have carried out at intervals of not less than 30 minutes. Differences in temperature readings from the same animal did not exceed 0,1 ° C. The average temperature rise amounted to 0,5 ° C.

In order to establish the positive effect of the application of "pirogenal" were formed by 3 groups of pregnant sows of large white breed for 10 goals - two experimental and one control and piglets born to them on 10 goals. The first of which was administered by intramuscular injection of 0.08 mg / kg JM the drug for 60 days prior to farrowing, once a day, before the morning feeding the general course of 15 injections. The second test group at a dose of 0.08 mg / kg JM 60 days before the survey each day (5 injections), 40 days before giving birth at intervals of 1 day (5 injections), 20 days before farrowing at intervals of 2 days (5 injections), the general course of 15 injections. The third group served as a control, which did not use the above-mentioned drugs. The duration of application is 30 days.

ISSN: 0975-8585

It was found that the injection "pirogenal" experienced sows in the second half of pregnancy have significantly increased natural resistance performance, with normalization of parameters of cellular and humoral immunity, eliminating signs of immune deficiency observed in the second half of pregnancy (Table 1). However, the application of the proposed dosage and frequency of administration for the experimental groups found their differences in the studied parameters.

Table 1: Indicators of immunobiological status the pregnant sows of experimental and control groups

Indicators	Dates research			
	60th day. (n=30)	90th day. (n=30)		
		1 group	2 group	3 control
White blood cells, 10^9/L	5,71±0,04	7,31±0,21	8,97±0,14	6,57±0,16
Lymphocytes, %	32,69±0,15	38,89±1,55	41,44±0,29	38,45±0,56
T lymphocytes10^9/L	1,98±0,06	2,24±0,17	2,51±0,5	1,92±0,05
B lymphocytes10^9/L	1,01±0,01	1,35±0,04	1,69±0,12	1,06±0,01
Red blood cells, 10^{12}/L	3,96±0,35	4,88±0,13	6,78±0,17*	4,37±0,22
Hemoglobin g/L	51,3±0,43	62,6±0,19	85,8±0,21*	62,4±0,11
Ig A, g/L	1,01±0,01	1,42±0,05	1,97±0,08*	1,15±0,02
Ig G, g/L	12,97±0,34	18,77±0,06	26,36±0,33*	16,78±0,15
Ig M, g/L	0,98±0,03	1,22±0,07	1,57±0,07	1,05±0,03

Injections "pirogenal" experienced sows in the second half of pregnancy have a more beneficial effect on the physiological status and morphofunctional maturity of their offspring in the neonatal period. Since the emergence of a confident pose, standing and sucking reflex in the newborn piglets from sows experimental groups were implemented earlier in the first group at 15.5 and 14.5 minutes, from the 2nd to the 18.0 and 24.1 minutes.

Average daily body temperature deviation in the control group on the first day of life to 0,8°C and 1,0°C was higher than in the experimental groups of pigs, at the second day in 0,9 °C and 1,2°C, and on day 2,0°C and 2,3°C respectively.

The analysis of data have revealed that the pigs in the control group at the birth of the body temperature had lower values than the rest of their peers, and the body temperature of an average value for the first day in the neonatal 2,4,6,12,24 hours after birth were reduced up to 36,24 ± 0,03; 36.38 ± 0.09; 36,34 ± 0,02; 36,58 ± 0,03; 36.67 ± 0.04 ° C. The average body temperature for the control group of infants at birth was 36,27 ± 0,03 ° C in relation to 37,24 ± 0,03 ° C in the experimental pigs, indicating that dynamically decrease the value of becoming a body temperature for the selected time interval from analyzed progeny performance relative to peers in the test groups.

According to body weight among newborn piglets in the first days of life, the differences established. Grade distribution in the control group on the largest body mass at birth was highest from a minimum value - 864 g, up to the maximum - 1544 g, and after the first 24 hours the maximum value of the newborn was - 1528 g and the minimum - 836, the range of variation in body weight these animals at birth was 680 grams, and in 24 hours - 664 g, which indicates an increase in the initial value of the ratio of the value of the time interval.

At the same time, the individuals of the control group was have observed transient decline in body weight in the first days of life. At the same time, experimental groups of pigs had higher tendency of these indicators with respect to the evaluation group, while among these animals are not recorded transient decline in body weight, and the positive dynamics of the specified time interval. The tendency, expressed in the superiority of weight, preserved and in 72 hours the newborn.

The level of newborn piglets was morphofunctional maturity for the first group of piglets K1 = 1,09 ± 0,08, for the second K2 = 1,59 ± 0,02 and the third R3 = 1,12 ± 0,04, that was within the physiological values . At the same time in the control group, this ratio was equal Kkont. = 0,84 ± 0,01, that takes a value below physiological level equal 0,99-1,05. Newborns with a low coefficient of catabolism in unfavorable external environment prone to disease .

ISSN: 0975-8585

The main and most important effect of the use of "pirogenal" served as the formation of indicators immunobiological status of pigs from sows experimental groups relative to the control. As for the neonatal period, the resulting offspring had the following differences (Table 2).

Table 2: Indicators of becoming immunobiological status of pigs in the neonatal period, derived from the experimental groups of sows

Indicators	Dates research		
	3rd day (n=100)	5th day (n=100)	10th day (n=100)
White blood cells, 10^9/L	21,44 ± 0,16 36,55 ± 0,12 * 21,12 ± 0,14	30,23 ± 0,17 40,42 ± 0,21 32,11 ± 0,22	35,36 ± 0,26 46,33 ± 0,18 * 30,67 ± 0,45
Lymphocytes, %	11,18 ± 0,28 16,55 ± 0,13 10,31 ± 0,19	16,88 ± 0,23 23,14 ± 0,26 * 16,44 ± 0,26	16,35 ± 0,41 20,34 ± 0,26 * 13,21 ± 0,33
T lymphocytes10^9/L	2,65 ± 0,14 3,35 ± 0,26 2,36 ± 0,37	2,01 ± 0,06 2,47 ± 0,08 2,32 ± 0,05	3,35 ± 0,11 3,83 ± 0,18 * 2,17 ± 0,14
B lymphocytes10^9/L	80,12 ± 0,26 85,47 ± 0,44 * 72,43 ± 0,61	43,16 ± 0,77 71,48 ± 1,52 48,59 ± 0,86	53,36 ± 0,14 58,23 ± 0,67 * 39,57 ± 0,91
Red blood cells, 10^{12}/L	0,29 ± 0,01 0,33 ± 0,04 0,21 ± 0,07	0,26 ± 0,02 0,47 ± 0,04 0,23 ± 0,01	0,33 ± 0,05 0,42 ± 0,02 * 0,27 ± 0,01
Hemoglobin g/L	3,72 ± 0,02 4,04 ± 0,19 3,21 ± 0,11	3,12 ± 0,18 3,83 ± 0,04 2,75 ± 0,11	4,22 ± 0,16 4,34 ± 0,12 * 2,87 ± 0,07
Ig A, g/L	0,49 ± 0,04 0,64 ± 0,05 * 0,34 ± 0,06	0,42 ± 0,09 0,56 ± 0,01 0,32 ± 0,02	0,51 ± 0,15 0,56 ± 0,13 0,36 ± 0,04

It was have established that on the 10th day after the birth of immunobiological indicators of the potential of piglets from the second group of sows were at a high level.It revealed a stimulating effect also on hematopoiesis - the number of red blood cells in the experimental groups of pigs.

CONCLUSION

Thus, any changes in the formation of the main immunobiological and morphofunctional indicators give grounds to assert that most plastic neonatal adaptation neonatal piglets from the second experimental group in relation to analyzed the experimental and control that helps to create a higher level of adaptive, metabolic capacity and immunobiological status in born offspring. Given the above data, the use of the method of correction of immunobiological in newborn animals can serve as the basis for the prevention of post-natal complications.

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