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## **THE INFLUENCE OF SEX STEROID LEVELS IN BLOOD OF BITCHES ON THE PHAGOCYTOTIC ACTIVITY OF NEUTROPHILS.**

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*This article presents data on determining the influence of sex steroids (estradiol and progesterone) on the phagocytic activity of neutrophils in bitches. During estrus at the level of estradiol in serum 51-65 pg/ml the increase neutrophil phagocytosis capacity is marked. While further increase in estradiol levels results in decreased activity of neutrophils. There is a decrease in ability of neutrophil phagocytosis, when progesterone level is between 8 and 26 ng/ml, wich is typical for estrus, but increased level of this hormone does not inhibit the ability of neutrophil phagocytosis.*

**Keywords:** estradiol, progesterone, phagocytic activity of neutrophils, immunosuppression.

The development of certain gynecological disease in bitches is often affected by levels of sex steroids, such as estradiol and progesterone. It is known that the bitches have estrus cycle usually twice a year, wich duration is 21-28 days [1]. Clinical veterinary medicine often registers in female dogs expression of various pathologies sexual apparatus (pyometra, mammary gland tumors, etc.) and systems (the emergence or worsening of skin) that do not belong to them for 2-3 weeks of diestrus [2]. Manifestation of various dysfunctions is directly associated with decreased local immunity and desintocisation function of blood cells, leading to activation of conditionally pathogenic microflora and consequently to the clinical manifestation of diseases [2].

Direct effect of sex steroid hormones to the organs and tissues of the immune system are provided by receptors. Nowadays different receptors as progesterone (PRA, PRB), and estrogen (ER-ot, ER-P) are clearly indentified [3].

In modern scientific literature there is a large number of publications on the influence of sex steroid hormones in the human body, depending on age, sex, stage of sexual cycle but there are no data on the effect of hormones on the immune system of animals including dogs.

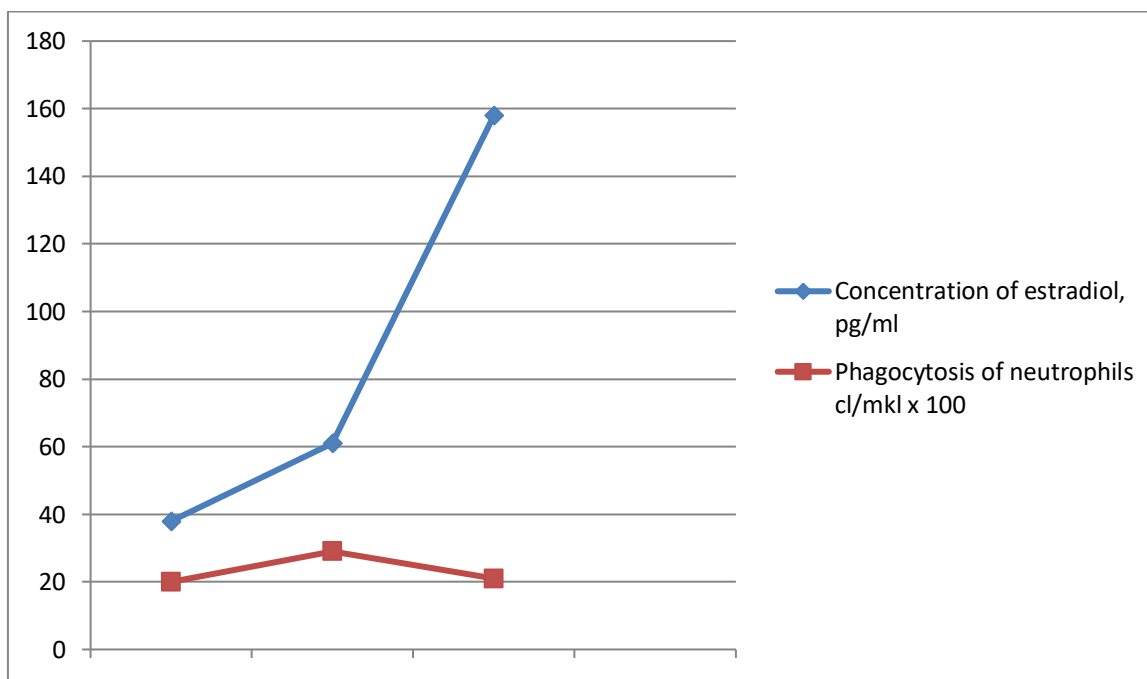
**The aim of our research was** to determine the influence of estradiol and progesterone on the phagocytic activity of neutrophils.

**Materials and methods of research.** For studies venous blood of bitches aged from 2 to 4 years old, Doberman breed, of 8 females was used. Blood was collected once per 14 days for 3 months. The level of estradiol and progesterone in bitches was investigated in serum by ELISA using test systems of "Hema",

Moscow. Marginal level of estradiol during estrus was considered between 51-65 pg/ml and progesterone 8-26 ng/ml.

Phagocytic activity of neutrophils was determined using suspensions of baker's yeast cells. The immunological hole was filled with 0.05 ml. A suspension of leukocytes, subsequently adding 0.06 ml 0.1% suspension of heat-killed baker's yeast. After incubation for 30 minutes at T 37C in prepared smears phagocytic cells were counted. As phagocytic cells were considered neutrophil that captured one or more yeast cells.

**Result and discussion.** In conducting the research it was found that the content of the absolute and relative number of phagocytic neutrophils (PAN) in the blood of experimental animals, was affected by the level of estradiol. Thus, when estradiol level typical for anestrus stage is less than 51 pg/ml, the phagocytic activity of neutrophils is much less than estradiol level of direct estrus (51-65 pg/ml). That is during the activation of proliferative processes in the lining of the uterus associated with preparation for fertilization, PAN also activates.

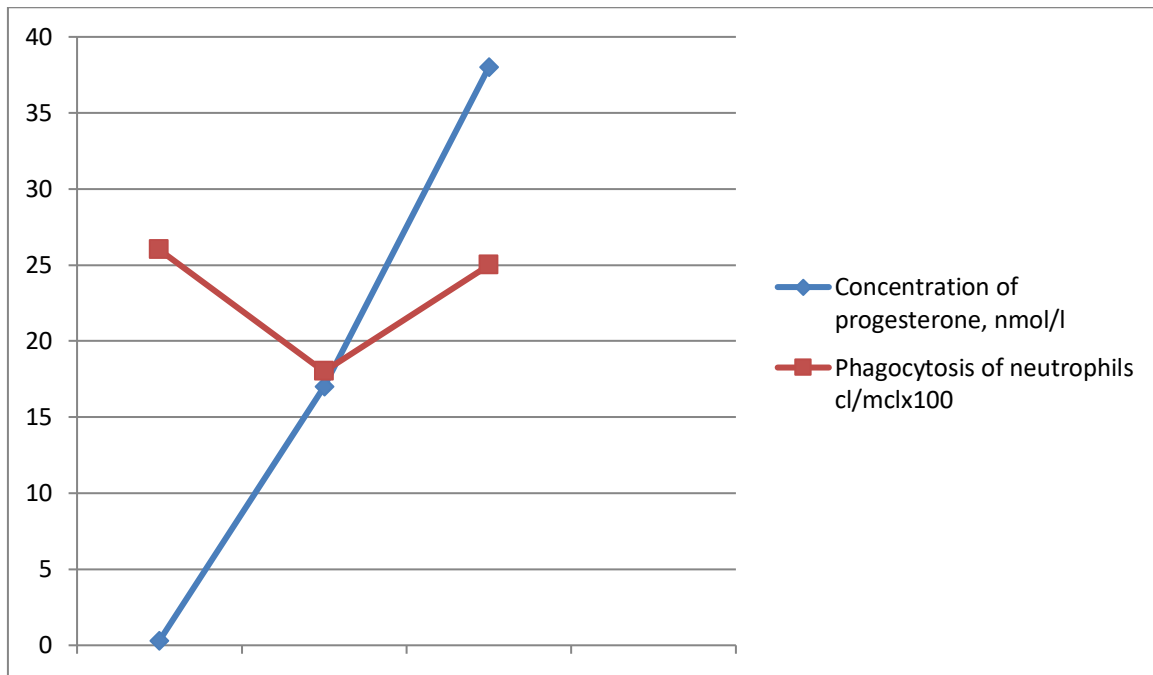


**Fig.1 Dependence of phagocytosis activity of neutrophils from concentration of estradiol in blood of bitches**

Increasing concentrations of estradiol in the blood serum of experimental animals to the level not specific to any stage of the estrus cycle is marked by reduction of PAN. Obviously the length of the reduction will depend on the length of the high concentration of estradiol level in females and the longer it will remain high, the more PAN will decrease. High concentrations of estradiol in serum may be related with persistent ovarian follicles or simultaneous maturation in a large quantity [4].

Thus, summarizing data on the interaction of estradiol on the PAN, it should be noted influence of estradiol on this type of immune protection in the body and therefore the immune system as a whole.

Comparing PAN at various levels of progesterone it should be noted that if it number is less than 8 ng/ml the amount of neutrophils with phagocytic activity is in the physiological range.



**Fig.2 The dependence of the neutrophils activity to phagocytosis on the concentration of progesterone in females blood**

With the increasing amount of this hormone in the studied blood samples to the level typical to estrus (8-26 ng/ml) decline of PAN is marked. This phenomenon can be explained by the fact that for successful attachment of the embryo to the uterine lining immunosuppression is needed because the mothers body considers embryo as a foreign agent and will try to separate it from the body [4]. Further increase in progesterone level in blood does not lead to increased immunosuppressive effect on PAN but increases the activity of neutrophil phagocytosis. This process in the body can be considered as a compensatory increase in PAN after short-term suppression or no sensitivity of neutrophils to high level of progesterone.

Understanding the influence of sex steroid hormones on different parts of the immune system is crucial for determining treatment strategy of various dishormonal disorders in female dogs with autoimmune diseases and their development.

## CONCLUSION

1. The study noted the influence of sex steroid hormones in the body of bitches on the phagocytic activity of neutrophils.
2. The high estradiol concentration in the blood contributes to the inhibition of PAN. Progesterone in physiological limits causes in PAN suppression and in elevated concentrations stimulates this process.

**The prospect of further research.** In the further the research on the effect of sex steroids on humoral immunity of bitches will be conducted.

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