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B- ENDORPHIN LEVELS BEFORE MATING, DURING PREGNANCY, PREPARTURITION AND POSTPARTURITION IN GOATS

(With One Table)

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مستوى الببتا اندورفين قبل التلقيح وأثناء فترة الحمل والنفاس المبكر في مصل إناث الماعز

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أجريت هذه الدراسة على خمسة من إناث الماعز البالغة الخصبة. تم تتبع هذه الحيوانات خلال دورة الشبق وتم تجميع عينات دم قبل التلقيح مباشرة وبعد مرور شهر، شهرين، وثلاثة وأربعة أشهر من الحمل وأيضاً قبل الولادة بيوم واحد وبعدها أيضاً بيوم واحد وأسبوع واحد. ثم تم فصل المصل وقياس مستوى الببتا اندورفين بطريقة المناعة الإشعاعية. أوضحت النتائج أن مستوى الببتا اندورفين أثناء مراحل الحمل المختلفة أبداً ارتفاعاً معنوياً عن مستواه قبل التلقيح. كما أن مستوى الببتا اندورفين ارتفع ارتفاعاً تدريجياً مع تقدم الحمل حتى وصل أعلى معدل له ٧٨ ربيكو جرام لكل مليلتر وذلك قبل الولادة بيوم واحد ثم انخفض هذا المستوى تدريجياً بعد الولادة.

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SUMMARY

B-endorphin level was estimated in serum of goats before mating, during different months of gestation, the day before parturition, the day after parturition as well as a week after parturition using radioimmunoassay technique. The obtained results revealed that the serum levels of B-endorphin at different stages of pregnancy were significantly higher compared to the determined level before mating and conception. The levels of B-endorphin were increased significantly with the progress of pregnancy and reached its maximal level (726.18 Pg/ml) at the day before parturition and declined after parturition. It can be concluded that B-endorphin is necessary for the adaptation mechanism in physiological stress conditions.

INTRODUCTION

B-endorphin is a peptide which is together with adrenocorticotrophic hormone (ACTH), originated from a common precursor proopiomelanocortin (KRIEGER and MARTIN, 1981). It has been suggested that the main source of B-endorphin is the pituitary gland which secretes it and ACTH concomitantly (MAINS *et al.*, 1977 and CARR *et al.*, 1981). However, B-endorphin has also been detected in other organs and fluids including umbilical cord plasma (WARDLAW *et al.*, 1978), placenta (NAKAI *et al.*, 1982), brain (HUGHES, 1975) as well as the pancreas (FELDMAN *et al.*, 1983). It is thought that B-endorphin is involved in central nervous system mechanisms regulating pain tolerance (STARK and FRANTZ, 1983). Moreover, it acts as a neurotransmitter at hypothalamic level participating in the regulation of prolactin and gonadotropins secretion (GROSSMAN, 1983 and STARK & FRANTZ, 1983).

Several studies have been carried out on pregnant women and revealed that concentration of immunoreactive B-endorphin increases during pregnancy with a progressive tendency toward the third trimester (GENAZZANI *et al.*, 1981 and GOLAND *et al.*, 1981). Similar results were also obtained in mice (SHAHA *et al.*, 1984), rats (WARDLAW *et al.*, 1982), cattle (RADWAN *et al.*, 1989), buffaloes (ABU-ZEAD, 1990) as well as in pregnant she-camel (RADWAN *et al.*, 1988).

However, studies dealing with the relationship between B-endorphin and the reproductive performance in goats seem to

be scarce. It is aimed by the present investigation to explore the role of *B-endorphin* in the maternal physiologic adaptation of goats to pregnancy and parturition.

MATERIAL and METHODS

The present study was conducted on five healthy and fertile mature female goats. Animals were exposed to a sexually active male goat twice a day; in the morning and at the evening. A female in estrus and accept mounting, was isolated and a blood sample was taken through jugular vein puncture, before mating and representing the non-pregnant samples. After mating, blood samples were collected monthly from each female. Around the expected date of delivery blood samples were collected daily and the sample collected at the day before parturition was chosen to be the preparturition sample. Blood samples were also collected a day and a week after parturition. Sera were separated by centrifugation of clotted blood at 2500 rpm. Sera were stored at -20°C until hormonal assay.

A special radioimmunoassay technique (RIA) was adopted for the determination of *B-endorphin* using the New England Nuclear *B-endorphin* radioimmunoassay (Cat. No. NEK-003 in plasma), according to the method of *GUILLEMIN et al.* (1977). Validity tests in the form of cross reaction were done to qualify the adaptation of the kits to serum of goats. The obtained data were statistically analysed using the methods adopted by *MEAD and CURNOW* (1983).

RESULTS

Results are presented in Table (1).

Table 1: Changes in *B-endorphin* levels in serum of non-pregnant, during pregnancy, preparturition and post-parturition in goats (Mean \pm S.E.).

Group	B-endorphin level Pg/ml
Non-pregnant (Before mating)	142.36 \pm 4.6
One month pregnancy	170.21 \pm 3.54 ^a
Two months pregnancy	323.33 \pm 6.28 ^b
Three months pregnancy	390.87 \pm 9.07 ^c
Four months pregnancy	450.43 \pm 8.32 ^d
Day preparturition	726.18 \pm 7.48 ^e
Day postparturition	628.35 \pm 20.83 ^f
One week postparturition	214.67 \pm 9.28 ^g

Data with different letters are significantly differ from each other ($P < 0.01$).

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DISCUSSION

The obtained results revealed that the circulating levels of *B*-endorphin at different stages of pregnancy were significantly higher ($P < 0.01$) compared to the determined level before mating and conception (142.36 ± 4.06 Pg/ml) table (1). This finding comes in agreement with previous studies in cows (RADWAN *et al.*, 1989) and buffaloes (ABU-ZEAD, 1990).

On the other hand, the present results disagree with those of she-camel (RADWAN *et al.*, 1988), where *B*-endorphin level showed significant increase during the first stage of pregnancy and then showed severe reduction during the two other stages of pregnancy.

It has been proved that the activity of *B*-endorphin producing cells in the anterior pituitary and placenta increased during pregnancy (FRAIOLI & GENAZZANI, 1980; CARR *et al.*, 1981 and VISWANTHAN *et al.*, 1984). Therefore, the sudden increase in *B*-endorphin level after conception together with the progressive tremendous increase in the hormone level to reach its maximal value just prior to parturition is accepted. It has been suggested that high levels of estrogen and progesterone which are normally detected during pregnancy (MOHAMED *et al.*, 1991), exert a positive effect on the activity of *B*-endorphin producing cells (PETRAGLIA *et al.*, 1982).

It is a fact that pregnancy, specially late stages, acts of labor as well as the physiological postpartum changes are considered states of extreme emotional and physiological stress. It is well known that the main importance of *B*-endorphin is its magic role in the relief of pain (GENTZLER, 1980 and STARK & FRANTZ, 1983). Thus the exaggerated higher levels of *B*-endorphin prior to parturition (726.18 ± 7.48 Pg/ml) and within few hours post partum (628.35 ± 20.83 Pg/ml) seem to be logic and is considered a physiological adaptation mechanism in such conditions. The sudden reduction in *B*-endorphin level a week after delivery (214.67 ± 9.28 Pg/ml) which was accompanied with returning to normal physiological condition supports this view. It can be concluded that *B*-endorphins is necessary for the adaptation mechanism in the physiological stress conditions of both pregnancy and parturition.

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