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LEVELS OF SOME HORMONES IN SALIVA AND SERUM WITH SPECIAL REFERENCE TO OVARIAN STATUS IN COWS

By

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SUMMARY

Blood and saliva samples were collected from 70 mature cows. The corresponding ovaries were collected after slaughtering to record the ovarian structres in each case. Then the collected ovaries were classified into six groups, growing follicles, mature graafian follicles, mature corpus luteum, smooth inactive ovaries, graafian follicle cysts and luteal cysts. The levels of estradiol and progesterone were determined using ELISA technique. The results showed that the tested hormones reached considerable levels in saliva. Mean-while , the hormonal profile in saliva followed the sam pattern as in serum

INTRODUCTION

It is well established that ovarian activity as well as the activity of the whole reproductive system are controlled by several hormonea, thyroid hormones, steroid sex hormones, gonadotropins and prolactin (McDonald, 1980 and Peters and McNatty, 1980). Therefore, determination of the levels of these hormones is of importance and may be satiasfactory to reflect the ovarian and uterine conditions. Estimatio of these hormones is usually carried out in blood. Milk was also used for determination of some hormones, mainly progesterone (Gao et al., 1988) Moreover, women saliva used for estimation of some steroid hormones (Evans et al., 1980 and Walker et al., 1981). However, in animals the use of saliva for hormonal determination is not recorded This work is a trial to study the reloability of saliva for estimation of some hormones, namely Triodothyronine (T_3), estradiol , progesterone, FSH and LH in cattle.

MATERIAL AND METHODS

Blood and saliva samples were collected, individually from 70 mature cows. The corresponding ovaries were then collected after slaughtering to record the ovarian structure in each case. According to McDonald (1980) and Arthur et al. (1982) the collected ovaries were classified into six groups, growing follicles (14), mature graafian follicles (11), mature corpus luteum (13), smooth inactive ovaries (13), graafian follicle cysts (13) and luteal cyst (6)

Separated serum and saliva samples were kept at -20°C for hormonal assay. The level of 17-B estradiol (E_2) and progesterine were determined by radioimmunoassay method (RIA) (Abraham, 1976 and Kubasik, 1984) respectively. Whereas, T_3, FSH and LH levels were determined using ELISA technique (Ruffiea, 1984; Kaplan, 1985 and Voller et al., 1979) respectively. Data were statistically analysed according to Snedecor (1971).

Table (1) : Levels of T_3 , FSH , LH , estradiol and progesterone in serum and saliva of cows during ovarian conditions (Mean ± S.E.).

Ovarian condition	T_3		FSH		LH		Estradiol		Progesterone	
	Serum	Saliva	Serum	Saliva	Serum	Saliva	Serum	Saliva	Serum	Saliva
Growing follicle	a* 0.99 ±0.12	ab 0.47±0.14	* 3.91±0.13	a 1.24±0.18	* 0.92±0.13	0.61±0.07	** 17.09±0.63	2.31±0.25	** 1.82±0.09	a 0.20±0.02
Mature follicle	* 1.58±0.14	a 0.63±0.13	* 1.83±0.17	a 0.98±0.10	a 2.27±0.19	a 1.66±0.25	** 29.03±1.04	3.67±0.28	** 0.66±0.12	0.10±0.01
Luteal stage.	ab 0.63±0.16	b 0.20±0.03	* 0.76±0.09	0.45±0.08	a* 2.01±0.25	ab 1.31±0.13	** 14.51±0.31	a 1.18±0.13	** 9.19±0.68	1.08±0.09
Follicular cyst	* 2.50±0.28	1.24±0.12	a* 0.22±0.03	b 0.08±0.01	b* 0.21±0.04	c 0.08±0.03	** 79.13±5.16	8.02±0.49	** 1.52±0.11	a 0.17±0.03
Luteal cyst	b* 0.66±0.09	ab (.33±0.09	* 0.42±0.08	0.18±0.03	a* 1.95±0.14	ab 1.03±0.14	a** 12.13±0.19	a 1.09±0.18	** 43.86±3.18	5.48±0.25
Smooth inactive ovary	b* 0.61±0.10	b 0.20± 0.05	* 5.68±0.41	a 1.14±0.15	* 3.04±0.28	d 0.97±0.09	a** 11.94±0.18	a 1.20±0.19	** 0.38±0.04	0.06±0.01
			a* 0.21±0.03	b 0.09±0.01	b* 0.28±0.03	c 0.06±0.02				

- SE : Standard error.
- In the same column values having the same letter did not show significant variation while the other values differed significantly (at least at $P \leq 0.05$).

*: Within the same group, comparison between serum and saliva levels showed significant difference (at least at $P \leq 0.05$).

**: Within the same group, comparison between serum and saliva levels showed significant difference (at least at $P \leq 0.001$).

RESULTS

The levels of T_3, FSh, LH, estradiol and progesterone in serum and saliva of cows with different normal and abnormal ovarian structures are tabulated, (Table,1).

DISCUSSION

Concerning the levels of the tested hormones in serum, the obtained results come in full agreement with those recorded previously, in cattle, for T_3 (Abdo, 1962; Afiefy et al., 1970; Soliman et al., 1973 and Soliman et al., 1964), FSH (Schams and Schallenberger, 1976 and Toth, 1979), LH (Anderson and McShan, 1966; Erb et al., 1971 and Christensen et al., 1974), estradiol (Lemon et al., 1975; Lunaas et al., 1974 and Ahmed, 1980) and progesterone (Gomes et al., 1963; Plotka et al., 1976 and Kesler et al., 1977).

The available literature did not refer to the levels of T3, FSH and LH either in the saliva of normally cycling cows or even in those with ovarian disorders. Besides, the obtained results, in respect to estradiol and progesterone levels in saliva of cows having various ovarian disorders, seem to be the first record. However, esterone could be, recently, estimated in mare's saliva (Sist et al., 1988). Nevertheless, these suthors have concluded that salivary monitoring of esterone sulphate could not reflect reproductive state. On the other hand, Gao et al., (1988) found that cow's saliva contins progesterone at a concentration which can provide a good index for plasma progesterone level. This result supports the obtained result in the present study.

The most striking result, in the present study, is the presence of the tested hormones at considerable levels in saliva as well as that they followed the same pattern in serum. This finding leads to the suggestion that saliva can be reliaby used for determination of these hormones. It is thoughout that, the only interpretation for the presence of these hormones in saliva is that they flow by active filtration from blood.

REFERENCES:

Abo, M.S. (1962): Hormonal variations in the blood of buffaloes during pregnancy, M.V.Sc. Thesis, Cairo Univ.

Abraham, G.H. (1976): Estradiol RIA Methods of Hormone Analysis. (Breur., H.; Hamel, D. and Kruskemper, H. eds). Stuttgart Georgthime Varlag. P. 408-422.

Afifey, M.M.; Zaki, K.; Aboul-Fadel, L.A.; Ayoub and Soliman, F.A. (1970): Iodine metabolism in relation to reproductive status in cows. Zbl. Vet. Med. A., 17, 62-67.

Ahmed, H.A. (1980): Postpartum hormonal changes in the blood of buffaloes, Ph.D. Thesis, Cairo Univ.

Anderson, R.R. and McShan, W.H. (1966): Luteinizing hormone levels in pig, cow and rat blood plasma during the estrous cycle. Endocr., 78: 976-982.

Arthur, H.H.; Noakes, D.G. and Pearson, H. (1982): Veterinary Reproduction and Obstetrice , 5th Ed. Baillere, Tindall, London.

Christense, D.S.; Hopwood, M.L. and Wiltbank, J.W. (1974): Levels of hormone sin the serum of cycling beef cows. J. Anim. Sci., 38; 577-583.

Erb, R.E.; Surve, A.H.; Callahan, C.L.; Rendel, R.D. and Garverick, H.A. (1971): Reproductive steroids in the bovine. VII. Changes postpartum. J.Anim.Sci., 33: 1060-1071.

Evans, J.J.; Stewart, C.R. and Merrick, A.Y. (1980); Oestradiol in saliva during the memstral cycle. Brit. J. Obst. Gynoecol., 87: 624-626.

Gao, Y.; Short, R.V. and Fletcher, T.M. (1988): Progesterone concentrations in plasma, saliva and milk of cows in different reproductive states. Brit. Vet. J., 144: 262-268.

Gomes, R.; Lamming, G.E.; Hayness, N.B. and Foxoroft, G.R. (1963): Plasma progesterone and gonadotropin concentrations and oestrous cycle in dairy cattle. J. Reprod. Fert., 20: 133-143.

Kaplan, M.M. (1985): Clinical and laboratoy assessment of thyroid abnormalities. Medical clincial of North Ameerica. 69 (5): Symposium on thyroid diseases.

Kesler, D.J.; Elmore, R.G.; Youngquist , R.S.; Brown, E.M. Graverock, H.A. and Bierschwal, C.J. (1977): Ovarian morphology in dairy cows with ovarian cysts following treatment with GnRH.J. Anim. Sci., 45: 176 (Abstr).

Kubasik, N.P. (1984): Evaluation of a direct solid-phase radioimmunoassay for progesterone. Clin. Chem., 30: 284-291.

Lemon, M. ; Pelletier, J. Saumande, J. and Signoret, J.P. (1975): Prepheral plasma concentrations of progesterone, oestradiol - 17B luteinizing hormone around oestrus in the Cow. J. Reprod. Fert., 42: 137-140.

Lunaas, T.; Rofsd, L./A.C. and Gram, D. (1974): Urinary excretion of oestrone and esradiol-17B in cows with cystic ovaries. Acta. Endocrinol., 75: 330.

McDonald, L.E. (1980): Veterinary Endocrinology and Reproduction. 3rd Ed. Baillere Tindall, London.

Peters, H. and McNatty, K.P. 91980): " The ovary" 1st. Ed. Granded. publishing in Paul-Eleb, Great Britian.

Plotka, E.D.; Erb, R.E.; Callahan, C.J. and Gomes, W.R. (1976): Levels of progesterone in peripherol blood plasma during the estrous cycle of the bovine. j. dairy Sci., 50:1158-1160.

Ruffiea, (1984): Less dosages hormonaux dans L'exploration thyroidioenne. J. Euillets de biologie, 25: 37-47.

Schams, D. Schalenberger. E. (1976): Heterologous radioimmunoassay for bovine follicle stimulating hormones and its applications during the estrous cycle in cattle. Acta Endocr. Denmark. 81: 461-473.

Sist, M.D.; Youngblood, M.A.; Williams, J.F. and Glade, M.J. (1988): Salivary and serum oesrone sulphate levels in pregnant mares. J. Equi. Vet. Sci., 8: 164-167.Snedecor, G.W. (1971): Statistical Methods. 4th Ed. Ames. Iowa, Lowa Univ. Press. U.S.A.

Soliman , F.A. ; Afiefy, M.M.; Zaki, K. Abdul-Fadle, W.; Ayoub, L.A. and Fahmy, M.F. (1973): Variations in thyroid status of the buffalo during the estrous cycle, pregnancy and in conditions of ovarian abnormalities. Zbl. Vet. .Med. A. 20: 324-331.

Soliman, F.A.; Zaki, K.; Soliman, M.K. and Abdo, M.S. (1964): Thyroid function of Friesian cows during the oestrous cycle and in conditions of ovarian abnormalities. Nature, 204, 693.

Toth, G. (1979): Pelviscopic observations on the ovary during the estrous cycle in the cow. Relationship between follicle growth and hormone values. Dissertation. Munchen Vet. Bull., 48, Abst. No. 5153.

Voller, A. Bidwell, D.E. and Bartlett, A. (1979): The enzyme linked Immunorbent Assay (ELISA). Zoology, Soc. London, PP. 16-20.

Walker, S.; Mustafa, A. ; Walker, R.F. and Fahmy , D.R. Riad (1981): The role of salivary progesterone in sudies of infertie women. Brit. Obstet and Gynac., 88: 1009-1015.