SHORT COMMUNICATION

PROTEIN BOUND IODINE LEVELS DURING OESTRUS, PREGNANCY AND NON-PREGNANCY STATES IN GOATS

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Summary: Thyroidal function in goats as estimated by PBI values of blood serum showed a very high activity in oestrus, followed by that in pregnancy state. There was significant increase in PBI values between oestrus and non-pregnancy groups. The lack of significance between pregnancy and non-pregnancy values has been explained.

Mean PBI values in oestrus, pregnancy and non-pregnancy were respectively 5.91, 5.31 and 3.74 μg/100 *ml* blood serum.

Key words: thyroidal function, PBI levels, oestrus, pregnancy, non-pregnancy states, goats

INTRODUCTION

Protein bound iodine (PBI) estimation in blood serum is widely practised in clinics and biological experimentation as an index of thyroidal activity. Organic iodine is a vital constituent in thyroid hormones, and any marked shift from normal values manifests thyroidal malfunctioning.

Nalbandov (8) reported beneficial effects of thyroid hormone treatment in boar, ram and bull resulting in improved libido and fertility returns, and suggested a definite hormonal threshold below which reproduction efficiency in mature animals suffered. Soliman and Reineke (11,12) observed increased thyroidal activity in oestrus in rats, and in pro-oestrus in mice as measured by high I^{131} uptake. Boccabella and Stenelke(1) reported high I^{131} uptake in late oestrus, and low uptake in pro-oestrus stages in rats. This indicated active thyroid participation in reproduction with phasic variations characteristic to the species. The poor ovarian function in cattle, sheep and swine during summer months has been ascribed to slump in thyroid secretion rate (8).

Russel (10), Stoffer *et al.* (13), and Mendez *et al.*(7) reported high thyroidal activity in human pregnancy as determined by PBI estimation, I^{131} uptake, and histological studies of the gland. Stoffer *et al.*(13) observed lack of uniformity among workers in obtaining significant rise in PBI values during human pregnancy. Kiesel and Burns (6) reported 46% increase in

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PBI values in pregnant cows. Keele and Neil (5) observed that greater amount of thyroxine was needed to meet the requirements during pregnancy and puberty.

MATERIALS AND METHODS

Observations were made on groups of ten female goats (between 2-4 years of age) in oestrus, midpregnancy and non-pregnancy states. The goats in oestrus were bled for PBI estimations, just before insemination with artificial technique of breeding. Goats were bled from jugular vein in sterile tubes between 0700-0830 hrs. and 5 *ml* blood collected from each animal. The investigations were conducted in summer months (May to July).

The blood was processed for obtaining serum, and PBI assaying as per method described by Zarrow *et al.* (14). The ceric ammonium sulphate reagent was made fresh every month, and linearity curve with standard concentrations verified every time it is made to check results.

The standard curve for determinations of PBI values was drawn 2-3 hrs earlier, on the day the samples were assayed, and results interpreted directly from the curve. The observations on the samples were made in duplicate.

RESULTS AND DISCUSSION

The results of the study are given in the Table I. It was evident from the table that the PBI values of animals in oestrus were highest, followed by pregnancy and non-pregnancy groups in the order stated. The values in oestrus were higher by 58% and 11.3% over the non-pregnancy and pregnancy states respectively. The values in pregnancy were raised by 42% over the non-pregnant controls.

Table I: Blood serum PBI values ($\mu g/100$ *ml*) in oestrus, mid-pregnancy and non-pregnancy states in goats. The values represent mean $\pm$S.E. of ten observations.

PBI values		
Oestrus (a)	*Mid-pregnancy* (b)	*Non-pregnancy (controls)* (c)
5.91$\pm$0.16	5.31$\pm$0.65	3.74$\pm$0.49
't' value between means cols. (a) and (b)		0.87 N.S.
't' value between means cols. (b) and (c)		1.90 N.S.
't' value between means cols. (a) and (c)		4.12*

N.S. — non-significant. * — significant at <0.05 level.

Comparison by 't' test indicated that difference between the means of oestrus and non-pregnancy groups was significant. The difference between the pregnancy and non-pregnancy and between the pregnancy and oestrus groups were however insignificant.

The results presented the trend that thyroid activity as reflected by PBI values was pronounced in oestrus and pregnancy states in the sequence given.

Russel (10), Freedberg *et al.* (2), Mendez *et al.* (7) and Keele and Neil (5) observed high thyroid activity in human beings to meet the increased demand of thyroxin during pregnancy. Kiesel and Burns (6) reported similar trend in pregnant cattle. However, no reference indicating increased thyroidal activity during oestrus was available in higher animals, except in rats and mice (1,11,12). The information on PBI values in goats was scanty, and probably none available in respect of oestrus and pregnancy states.

Most of the investigators working on different species cited in the foregoing lines were unable to establish significant difference in PBI values during pregnancy as observed by Stoffer *et al.*(13). It has been pointed out earlier by Heinneman *et al.*(3) that changes in PBI values were too small in magnitude to be statistically significant. It has been subsequently demonstrated by Pochin (9) that I^{131} uptake in normal thyroid gland remained for several weeks/months, suggesting that phasic variations might fail to reflect significant changes. This explained non-significant increase in pregnancy values as obtained in this study.

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