CHANGES IN BLOOD HISTAMINE AND BRADYKININOGEN LEVELS DURING DIFFERENT PERIODS OF THE OESTROUS CYCLE IN GOATS

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Summary. Blood histamine and plasma bradykininogen levels were estimated in eighteen normally cyclic goats at different periods of the oestrous cycle. The histamine level increased significantly ($P < 0.05$) on Day 18 of the oestrous cycle. The bradykininogen level decreased significantly ($P < 0.05$) towards the end of oestrus.

INTRODUCTION

Histamine and the kinin-kininase system are reported to play a rôle in the mediation of the actions of reproductive hormones. The intraluminal application of histamine produces hyperaemia, vasodilatation, and oedema in the uterus and antihistamines, like diphenhydramine (Benadryl hydrochloride) and chlorpheniramine (Chlor-Trimenton maleate), block the oestrogen-induced changes (Spaziani & Szego, 1959). Parenteral administration of oestrogen lowers the histamine content of the uterine tissues (Spaziani & Szego, 1958), and the uterine histamine content in rats is significantly reduced during oestrus (Spaziani & Szego, 1958; Kapila, 1967). These findings suggest that the action of oestrogen is possibly mediated through the local release of endogenous histamine.

Exogenous oestrogen increases the blood kininogen levels and decreases the kininase activity in rats (McCormick & Senior, 1971, 1972).

The present investigation deals with the changes in the blood histamine and plasma bradykininogen levels during different periods of the oestrous cycle in goats.

MATERIALS AND METHODS

Eighteen healthy adult female goats of the Barbari breed, weighing 16 to 18 kg and 12 to 15 months old, were used in this study.

Vasectomized goats were paraded in the flock at 3-hr intervals every 24 hr to detect the onset of oestrus.

Jugular blood samples were collected from individual goats (a) at the beginning of oestrus (0 to 6 hr), (b) near the end of oestrus (24 to 30 hr),

(c) around metoestrus (48 to 54 hr), (d) during dioestrus (Days 6 and 12), and (e) around pro-oestrus (Day 18).

Blood histamine was extracted by the method described by Parratt & West (1957). The plasma bradykininogen level was determined by the method of Diniz & Carvalho (1963). Processed samples were air-dried at room temperature (32 to 35°C) with an electric fan. The histamine and bradykininogen were assayed on the isolated guinea-pig ileum suspended in atropinized Tyrode solution (37°C), using histamine acid phosphate (B.D.H.) and bradykinin (BRS; Sandoz) as standards.

Histamine values were expressed in terms of its base. The statistical analysis was carried out according to the methods of Snedecor & Cochran (1968).

TEXT-FIG. 1. Changes in blood histamine (○) and plasma bradykininogen (●) levels at different stages of the oestrous cycle in goats. Vertical lines indicate standard errors. Numbers in parentheses indicate the number of observations.

RESULTS

The blood histamine level of the goats significantly increased ($P < 0.05$) from 23.9 ± 5.8 µg/100 ml on Day 12 to 46.6 ± 7.69 µg/100 ml on Day 18 of the oestrous cycle. With the onset of oestrus, the histamine level fell to a resting value. The plasma bradykininogen level gradually increased from Day 6 of the oestrous cycle, reached the highest value at the beginning of oestrus and fell from

Table 1. Critical difference test for histamine and bradykininogen levels at different stages of the oestrous cycle in goats

<i>Time after oestrus :</i>	<i>Histamine</i>					<i>Bradykinogen</i>						
	18 days	6 days	0 to 6 hr	48 to 54 hr	24 to 30 hr	12 hr	0 to 6 hr	18 days	12 days	6 days	24 to 30 hr	48 to 54 hr
Means	46.66 ^b	33.96 ^{ab}	28.09 ^a	27.35 ^a	24.68 ^a	23.92 ^a	111.30 ^c	100.00 ^{cd}	69.28 ^{cd}	52.63 ^d	51.42 ^d	50.20 ^d

Means are shown in descending order and those with the same superscript are not significantly different.

$111.3 \pm 23.2 \mu\text{g}/100 \text{ ml}$ at 0 to 6 hr to $51.4 \pm 7.4 \mu\text{g}/100 \text{ ml}$ at 24 to 30 hr ($P < 0.05$) after the onset of oestrus (Table 1 and Text-fig. 1).

DISCUSSION

Spaziani & Szego (1958) and Kapila (1967) observed a significant decrease in the histamine content of rat uterine tissue during oestrus. In the present study, the significant increase of blood histamine preceding pro-oestrus and the subsequent fall at the onset of oestrus (Text-fig. 1) suggest the possible involvement of histamine in the concurrent changes in the uterine tract under the influence of oestrogens.

Increase in blood kininogen level has also been observed after the exogenous administration of oestrogen (McCormick & Senior, 1971). The fall in the bradykininogen level in goats has been shown to coincide with the increase in the percentage of ovulation (Prasad, 1974). Levels of 35 and 77% ovulation occurred 24 and 32 hr, respectively, after the onset of oestrus. This finding needs further investigation.

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