There is substrate specificity for both Δ^5-3β- and 17β-HSDHs. DHA and testosterone were more preferentially utilized than pregnenolone and estradiol-17β. The localization of G-6-PDH, $NADH_2$ diaphorase (Fig 3) and lipids (Fig 4) were similar to that of HSDHs.

The enzymes Δ^5-3β- and 17β-HSDHs play an important role in steroid metabolism. The former is involved in the oxidative conversion of Δ^5-3β-hydroxysteroids to Δ^4-3 ketosteroids and the latter in oxidative interconversion of androgens and estrogens. Presence of HSDHs was demonstrated for the first time in the epididymis of hamster[3]. Later several HSDHs have been found in the epididymis of other mammals[2,4,5]. These steroid dehydrogenases are said to be involved in metabolism of steroids and in the maturation of sperms[8]. The strong activity of Δ^5-3β- and 17β-HSDHs in the epididymal epithelium of *Chameleon* indicates that it is the site of steroid metabolism as in mammals. The G-6-PDH activity in the epididymal epithelium also indicates its involvement in anabolic activities like lipogenesis or steroidogenesis. The localization of $NADH_2$ diaphorase which is ubiquitous to all steroidogenic sites and lipids which are the precursors of steroid hormones further confirms the capacity of *Chameleon* epididymis for steroid metabolism.

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EFFECT OF EXPERIMENTAL RUMINAL ACIDOSIS ON BLOOD GLUCOSE AND PLASMA INSULIN CONCENTRATION IN BUFFALO CALVES

Introduction

THE concentration of glucose in blood is maintained within a fairly narrow optimal range during health and is influenced by several factors[1]. Increase in glucose and insulin concentration in blood has been reported by different workers in cattle and sheep fed high grain diets[2,3]. However, there is scanty information in the literature regarding the effect of acute ruminal acidosis on blood glucose and insulin concentrations. The present experiment is designed to study the changes in the above parameters in buffalo calves following experimental induction of rumen acidosis.

Materials and Methods

Experiments were conducted on five fistulated two years old buffalo calves. To establish the normal values, blood samples were collected in the morning before feeding on alternate days for a week. Blood glucose was estimated using Haden modfication of Folin-Wu-mehod as described by Frantel *et al.*[4]. Circulating level of immuno-reactive insulin (IRI) was determined with the help of RIA Kit (Bhabha Atomic Research Centre, Bombay).

To induce acid indigestion, crushed wheat grains were given intra-ruminally at the rate of 50 gm/kg body weight to each animal. Following the induction of rumen acidosis, blood samples were collected at 24 hour interval upto 120 hours.

Results and Discussion

The average biochemical values on blood samples collected from buffalo calves before and after the experimental induction of rumen acidosis are presented in Table I.

A significant rise in blood glucose concentration, observed in the present study, might have been either due to increase in glycogenolysis or gluconeogenesis or due to decreased utilization of glucose by peripheral tissues[5,6]. In advanced stages of rumen acidosis, the hyperglycaemia may be due to the reduction in glucose utilization as a consequence of decreased level of circulating IRI. Sections of liver tissues stained with PAS (Periodic Acid Schiffs) method for demonstration of glycogen revealed depletion of glycogen in the vacuolated hepatocytes. Sections of

TABLE I

Effect of crushed wheat induced ruminal acidosis on blood glucose and plasma insulin concentration at different time intervals in buffalo calves

Parameters	(Normal) 0 hour	Time of sampling				
		24 hours	48 hours	72 hours	96 hours	120 hours
Blood glucose (mg/100 ml)						
Mean	59·9	83·9*	88·6*	100·1*	114·1*	125·1*
SD	± 2·0	± 6·4	± 6·7	± 4·4	± 9·6	± 10·3
Plasma insulin μU/ml						
Mean	24·0	41·8*	50·0*	42·2*	29·7*	18·9*
SD	± 1·1	± 2·2	± 5·9	±11·3	±11·3	± 5·6

* Values significantly changed in comparison to 0 hour at 5% level of significance.

adrenal medulla on histopathological examination revealed that catecholamine secreting cells were degranulated indicating their overactivity. The depletion of liver glycogen may be due to hyperactivity of adrenal medulla to caus. increased glycogenclysis thus contributing towards hyperglycaemia[6]. A rise in glucose level has also been reported by Bide *et al.*[1] in cattle due to sudden change of feed from hay to grains.

In the present study, circulating levels of IRI continued to increase significantly during the first 48 hours of the induction of rumen acidosis and then declined to a significant extent even below the base level of 24·0 ± 1·1 μU/ml at 120 hours. Jenny and Polan[8] also observed an increase in plasma insulin levels in cattle fed with high grain diets. Increase in insulin level might be due to the higher proportions of propionate and butyrate produced in the rumen of animals fed high grain diets which on absorption stimulated insulin secretion. A gradual decrease in the level of IRI after 48 hours, as observed in the present study, can be safely attributed to the process of degranulation due to hyperactivity in the initial stages leading to exhaustion and subsequent atrophy of endocrine beta cells which was confirmed by histopathological examination of endocrine pancreas with Methylene blue-Phloxine-Azure staining[9].

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HETEROCYSTS AS REPRODUCTIVE STRUCTURES IN BLUE-GREEN ALGAE

HETEROCYSTS of blue-green algae are known to have a role in fragmentation and vegetative reproduction, sporulation, as reproductive units, organ of attachment and biological nitrogen fixation[1]. Their role as reproductive organs or units is one of the less investigated aspects. Geitler proposed that heterocysts are archaeic reproductive structures[2], but Fritsch[3] opposed this hypothesis. Heterocyst germination has been