various cellular functions[18]. PPase also plays an important role in energy metabolism during seedling growth. It acts on inorganic pyrophosphate and releases the orthophosphate, producing energy. All the metabolic activities taking part in growth of plant seedling require energy. Present experimental results suggest some relationship between reduced growth of irradiated material and enzymes activity.

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EFFECT OF BILATERAL VASECTOMY ON TISSUE CHOLESTEROL DISTRIBUTION IN ALBINO RATS

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ABSTRACT

The tissue cholesterol distribution was studied in albino rats subjected to bilateral vasectomy. The tissues showed overall elevation in cholesterol content during early phases of vasectomy with a tendency to decline at later phases. In view of changes in cholesterol content in testis and sex accessories, possibility of modulations in their function was suggested. Liver, kidney and dorsal aorta have progressively accumulated the cholesterol content in vasectomized rats.

INTRODUCTION

THOUGH vasectomy has been accepted as a popular contraceptive device for males, a number of side effects such as degeneration of the testis, pathological changes in the epididymis, hyperplasia of the interstitial elements and alterations in androgen synthesis have been reported both in men and animals[1-2]. Since cholesterol forms a precurssor for androgenesis[3] and vasectomy induces alterations in androgen synthesis[4], this contraceptive device may modulate the tissue cholesterol reserves of the animal. Since cholesterol level in the plasma is closely associated with cardiovascular disorders[4-12] it will be essential to understand the impact of vasectomy on the plasma cholesterol content in order to have an overall assessment of this popular contraceptive device. Hence the present study has been undertaken in order to understand the possible effect of vasectomy on tissue cholesterol distribution and its subsequent impact on the general metabolism of the animal.

MATERIAL AND METHODS

Wistar strain albino rats weighing 150 ± 2 g were subjected to normal (conventional) bilateral vasectomy. The operation was performed by the standard vasectomy technique[13-14] and rats were maintained in good aseptic condition for disinfection. Animals were divided into two groups and they were sacrificed on

TABLE I

Cholesterol distribution in the tissues of normal and vasectomized animals at two periods, 15 and 30 days. The cholesterol values are expressed in mg/gm wet wt. + and − indicate increase and decrease of percentage respectively. Mean ± S.D., the mean values represent the average of 8 observations

Sl. No.	Tissue	Control	Vasectomized Animals		% difference between 15th and 30th days
			15 days	30 days	
1.	Plasma (mg/100 ml)	39·3 ±3·1	118·6 ±14·14 +202·02 P < 0·001	63·04 ±4·92 +60·53 P < 0·001	−46·84 P < 0·001
2.	Testis	1·40 ±0·11	6·02 ±0·482 +330·0 P < 0·001	5·64 ±0·62 +302·8 P < 0·001	−6·31 NS
3.	Epididymis	1·33 ±0·08	6·37 ±0·42 +378·9 P < 0·001	5·03 ±0·30 +278·19 P < 0·001	−21·03 P < 0·001
4.	Prostate Gland	1·69 ±0·2	5·69 ±4·18 +236·68 P < 0·001	7·15 ±0·53 +323·07 P < 0·001	+25·65 P < 0·001
5.	Seminal Vesicles	1·30 ±0·08	4·50 ±0·36 +246·15 P < 0·001	3·69 ±0·24 +176·9 P < 0·001	−20·00 P < 0·001
6.	Adrenals	71·85 ±7·82	152·72 ±11·38 +112·55 P < 0·001	130·22 ±16·12 +81·24 P < 0·001	−14·73 P < 0·01
7.	Liver	4·9 ±0·38	8·2 ±0·632 +67·35 P < 0·001	89·47 ±10·48 +1725·9 P < 0·001	−991·1 P < 0·001
8.	Kidney	4·5 ±0·23	10·43 ±1·13 +131·7 P < 0·001	20·35 ±1·42 +352·2 P < 0·001	+95·11 P < 0·001
9.	Heart	1·77 ±0·082	9·31 ±0·72 +425·9 P < 0·001	6·88 ±0·43 +288·7 P < 0·001	−26·1 P < 0·001
10.	Dorsal aorta	3·46 ±0·212	25·56 ±3·03 +638·7 P < 0·001	28·22 ±3·0 +715·6 P < 0·001	+10·4 NS
11.	Brain	20·82 ±1·98	54·81 ±4·32 +163·2 P < 0·001	43·28 ±5·98 +107·87 P < 0·001	−21·02 P < 0·001

two post-operation periods like 15 and 30 days respectively. Reproductive and non-reproductive tissues were isolated for the estimation of total cholesterol by the method described by Natelson (1971)[15].

Results and Discussion

The data presented in the table reveal the extent of changes induced in tissue cholesterol distribution of albino rats in response to bilateral vasectomy.

Testicular cholesterol content was elevated on 15th day of vasectomy. Since the specific cells concerned with androgenesis were under degeneration on vasectomy[1,16,17] and the androgenesis requires cholesterol as a raw material[3], the observed increase in the level of cholesterol of testis suggested the possible impairment in the androgen production of the tissue. The elevated cholesterol might also be due to its accelerated synthesis in vasectomized testis. This observation was in consonance with earlier reports where, androgen production was shown to decrease in the testis on vasectomy[1]. Similarly, epididymis also accumulated equally high cholesterol content in vasectomized rats. Since epididymis was concerned with androgenesis[18], and its cells were degenerating on vasectomy[1,19,20], higher cholesterol content in this tissue was suggestive of the impaired function of epididymal tissue. Besides, epididymis was accumulating large quantities of testicular fluid and hence increased cholesterol level of epididymis might also be partly due to the accumulated testicular fluid. Both prostate and seminal vesicles had elevated cholesterol level in vasectomized rats in comparison to the controls. The elevated cholesterol content in these tissues might be due to its formation from fructose[23] or its active uptake from the blood. Since the seminal plasma of vasectomized animals contain high fructose content[21,22] formation of cholesterol from fructose can be envisaged in prostate and seminal vesicles.

Adrenals also showed elevated cholestrol content on vasectomy. The adrenals were known to synthesize steroid hormones from cholesterol[23] and hence elevated cholesterol content in adrenals was suggestive of depleted corticosteroid production.

Serum cholesterol content was significantly elevated on vasectomy, indicating the active addition of this compound into the blood from the synthetic sites. Liver and kidney were the active sites of synthesis of cholesterol[24]. Both these tissues accumulated considerable cholesterol content indicating accelerated synthesis of this compound in them in response to vasectomy. The elevated serum cholesterol level indicates the active mobilization of this compound from liver and kidney.

Brain, heart and dorsal aorta showed elevated cholesterol content in response to vasectomy on 15th day. However, the pattern of cholesterol distribution in these tissues was different on 30th day of vasectomy. While testis, epididymis and seminal vesicles decreased the extent of the elevation of cholesterol content over the 15th day animals, prostate gland recorded further elevation. This observation might suggest the possibility of regaining the androgenesis by testis and epididymis. However, further elevation in prostate cholesterol level was suggestive of adding higher cholesterol level to the seminal plasma, which was a characteristic feature of the seminal plasma of vasectomized animal. Adrenals recorded a drop in cholesterol content over 15th day level, suggesting the possible onset of steroidogenesis in the tissue on 30th day.

The serum cholesterol level was considerably decreased over the level on 15th day, indicating the possibility of lesser addition of cholesterol from the synthetic sites. Since the cholesterol content of liver and kidney was increased by several folds over the normal level, such a possibility of retension of cholesterol by these tissues can be envisaged. However both brain and heart have decreased the cholesterol level over that of 15th day. But the dorsal aorta continued to accumulate higher cholesterol content even on 30th day of vasectomy.

Thus bilateral vasectomy in rats showed cholesterol accumulation by reproductive and non-reproductive tissues in early phases, with a tendency to decline at later phases.

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INHIBITION OF SHEEP BRAIN ACETYLCHOLINESTERASE BY MALATHION

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ABSTRACT

The *in vitro* effects of malathion, an organophosphorus insecticide on sheep brain acetylcholinesterase was studied in the present investigation. Malathion exerted a mixed type of inhibition especially showing a tendency towards competitive type of inhibition by a greater per cent increase in Km values and a lesser per cent decrease in V_{max} values. The activation energy values were found to increase, indicating decreased catalytic efficiency of the enzyme.

INTRODUCTION

MALATHION (O, O-dimethyl S-(1, 2-dicarboxyethyl), an organophosphorus insecticide is known to interrupt neural transmission by inhibiting the activity of acetylcholinesterase[1–3]. A decrease in vertebrate brain acetylcholinesterase was known to manifest in several behavioural and physiological modifications in the animal[4–5]. A detailed discussion on acetylcholinesterase has been reviewed by several investigators[6,7]. Since various possibilities exist for the inhibition of an enzyme catalysed reaction with its specific substrate, the present investigation is carried out to have a clear understanding of specificity of the enzyme and the kinetic mechanism involving the inhibition of acetylcholinesterase system in the tissues of mammals, during malathion stress.

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MATERIALS AND METHODS

Procurement of Material

Brains were obtained from healthy sheep after decapitation at the local slaughter house in a clean dry, ice jacketed glass beaker. They were quickly transferred to deep freeze and kept at -5 to $2°C$ in the laboratory until further use. The frozen brains were thawed with repeated washings in mammalian Ringer medium. Meninges over the cortical area were removed with care, so that the exposed cortical surface was free from blood vessels. Requisite amount of cortical tissue was taken, pressed gently between the folds of Whatman No. 1 filter paper and 10% homo-