

EFFECT OF PINEAL 5-METHOXYTRYPTAMINE ON
GONADAL FUNCTION OF THE INDIAN GARDEN
LIZARD (*CALOTES VERSICOLOR*)

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ABSTRACT

Administration of pineal indolamine, 5-methoxytryptamine (MT) to male Indian garden lizard, *Calotes versicolor*, indicated an inhibitory influence on its gonads. Injections during the sexually active phase significantly decreased the weights of testes ($P < 0.001$), kidney ($P < 0.005$) and vas deferens ($P < 0.005$) as well as the seminiferous tubule diameter ($P < 0.001$). A correlated significant reduction was observed on the plasma ($P < 0.005$) and testicular ($P < 0.001$) cholesterol levels. The same injections did not produce any effect on the gonads of sexually inactive lizard.

The pineal is involved in the long term adaptation of animal to seasonal reproduction (Follet and Follet, 1981; Stetson and Watson-Whitnyre, 1984). The two indole derivatives, melatonin and 5-methoxytryptamine (MT) produced by this organ appear to implicate this phenomenon. Much pineal research has centered on the role of melatonin in pineal function. Therefore an attempt to assess the effects of MT injections on the gonads of the male Indian garden lizard, *Calotes versicolor* has been made in this paper.

Sixteen adult lizards were obtained during June (gonad active) and November (gonad inactive). They were acclimatized to laboratory conditions for two weeks and then divided into two groups of eight animals each. Animals of Group I were injected intraperitoneally with 10 µg of MT (obtained from Sigma Chemical Co., U.S.A.) in 0.1 ml of normal saline, while of Group II were injected with 0.1 ml of normal saline between 1500-1600 hrs, for 30 continuous days. Similar treatment was repeated during both phases. On 31st day the animals were weighed and sacrificed by decapitation. Blood was collected, centrifuged at 3000 rpm for 30 minutes for collection of plasma and stored in deep freeze for cholesterol estimation by the method of Sackett (1925). Testis of one side, kidney and vas deferens were dissected out, weighed and fixed in Bouin's fluid. The other testis was processed for estimation of cholesterol. The renal sex segment (RSS) cell height and seminiferous tubule diameter were measured with an ocular micrometer. The data was analysed statistically by Student's 't' test.

Injections during June-July significantly reduced gonadal and accessory sex organ weight as well as seminiferous tubule diameter, RSS cell height and plasma and testicular cholesterol levels (Tables 1 and 2). No significant effect was observed during Nov-Dec.

Table 1. Effect of 5-methoxytryptamine (MT) injections on testes, kidney and vas deferens of *Calotes versicolor*

	Jun-Jul		Nov-Dec	
	Control	MT	Control	MT
Testes :				
Weight (g/100g b.wt.)	0.98 ± 0.046	0.72 ± 0.02**	0.04 ± 0.005	0.04 ± 0.002
Seminiferous tubule diameter (µm)	240.50 ± 8.620	172.22 ± 6.00**	154.20 ± 7.610	150.42 ± 10.10
Kidney :				
Weight (g/100g b.wt.)	0.20 ± 0.014	0.14 ± 0.011*	0.13 ± 0.007	0.13 ± 0.01
RSS cell height (µ)	31.20 ± 2.000	18.00 ± 0.400*	16.00 ± 0.500	15.00 ± 0.60
Vas deferens :				
Weight (g/100g b.wt.)	0.04 ± 0.004	0.03 ± 0.001*	0.01 ± 0.004	0.01 ± 0.001

Significance of difference from control — *P < 0.005; **P < 0.001; b.wt = body weight

Table 2. Effect of 5-methoxytryptamine (MT) injections on the cholesterol level of blood plasma and testes of *Calotes versicolor*

	Jun-Jul		Nov-Dec	
	Control	MT	Control	MT
Plasma (mg/100 ml)	211.21 ± 10.42	167.30 ± 4.61*	104.44 ± 6.70	100.61 ± 10.25
Testes (mg/100 mg tissue)	1.45 ± 0.02	0.89 ± 0.01**	0.80 ± 0.06	0.71 ± 0.03

Significance of difference from control — *P < 0.005; **P < 0.001.

This clearly demonstrated an inhibitory effect of MT on the gonadal function of this tropical animal. Besides reducing the seminiferous tubule diameter, MT injections decreased the RSS cell height which is a male hormone dependent organ (Prasad and Sanyal, 1969). Thus, administration of MT lowered the androgen production by testes. This was also evident by the decrease in vas

deferens and kidney weights of animals injected with MT. MT has been found to be very potent in influencing the reproductive system of birds and mammals. An inhibitory as well as stimulatory effect, on the sexual development, had been reported (Pevet *et al.*, 1981; Alexander, 1969). The present results are suggestive of an antigonadotropic effect of this indolamine in *C. versicolor*. Thus, MT is an active potential compound capable of inhibiting testicular activity of this animal. The lack of effect during gonadal inactive phase could be explained by the fact that during Nov-Dec the testes were already atrophied.

Significant reduction in testes and plasma biochemistry further confirmed the gonadal inhibition after MT injections. Androgen level influenced lipid metabolism (Thapliyal *et al.*, 1975). Hence, it can be concluded that exogenous administration of MT induced testicular inhibition leading to lower levels of plasma and testicular cholesterol.

Results of this study indicated that MT is implicated in regulation of gonadal function of this lizard. Its precise physiological role, under various environmental conditions, remains yet to be investigated.

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