



Histopathological Side Effects of Gossypol on Thyroid – Pituitary Axis In Male Palm Squirrel *Funambulus Pennanti* (Wroughton)

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Abstract:

Histopathological side effects on thyroid –pituitary axis was investigated. Gossypol a “China pill”(C30H30O8) is phenolic compound isolated from seed of cotton plant (*Gossypium* species).In 1972 a Chinese scientist isolated “Gossypol acetic acid” as a male antifertility compound and tested its antifertility effects in laboratory animals, primates and man . There are differences of opinion on toxic effects of Gossypol. Further investigations are required to determine side effects of this drug on thyroid and pituitary gland.

In present investigation male received Gossypol 20mg/kg B.W./day for 7 weeks and another group received 30mg/kg B.W./day for 5 weeks. Thyroid gland of treated animals showed no significant changes in its histology. Secretory epithelial cells and C cells (parafollicular cells) showed no significant changes after the treatment. Gossypol induced no changes in TSH cells of anterior pituitary gland. Therefore it is concluded that Gossypol has no histopathological side effects on thyroid –pituitary axis.

Keywords:

Thyroid – pituitary axis, Gossypol.

Introduction:

In the present investigation efforts were made to examine the side effects of Gossypol on thyroid –pituitary axis of Indian palm squirrel which is seasonal breeder. The discovery of this compound by Chinese scientist as male fertility regulating agent (whose action is reversible) is regarded as a breakthrough in the search of male contraceptive. However, side effects such as fatigue, decrease in libido, appetite, dizziness and hypocalcaemic paralysis have been reported by some investigators (Liu and Lyle 1987). Safety and importance of Gossypol as male contraceptive drug for human being is still debatable. Therefore investigation on toxicology is required to determine the side effects of this drug on thyroid gland and mechanism of action of Gossypol in palm squirrel.

Material and methods:

Gossypol was obtained as a gift from WHO. Special programme of Research, Development and Training in Human Reproduction Geneva. Only male squirrel were selected for this experiment. The experiment was conducted during April and May when the animals were sexually active. Detail grouping





of squirrels and experimental protocol is given in Table 1. Pituitary sections were stained with staining technique as recommended by Bhiwgade and Gulhane (1980) and Halmi (1952)

Observations:

Thyroid –(Fig 1 and 2) Thyroid gland of Gossypol treated animals in both groups 20 mg for 7 weeks and 30 mg for 5 weeks showed no significant changes in histology of thyroid gland. Secretary epithelial cells and C cells (parafollicular cells) showed no significant changes after the treatment.

Anterior pituitary – (Fig 3 and 4) Identification of anterior pituitary cell types and its tinctorial properties are given in Table 2. TSH cells of anterior pituitary showed no changes after the treatment.

Result and discussion:

In the present investigation on palm squirrel Gossypol do not induce any histopathological side effects on thyroid gland and thyrotroph (TSH) cells of anterior pituitary gland. Some investigators reported that Gossypol causes hypertrophy, hyperplasia and degranulation of thyroid follicular epithelial cells and reduction of colloid, the effects which are similar to that of goitrogen drug (Rikihisa and Lin, 1989; Lin et al, 1990 and Udoh, 1992)

Mechanism of action of gossypol:

There is no histopathological side effects on the thyroid- pituitary axis.

Table: 1- Experimental Design for Gossypol

Number of Animals and sex	Treatment	Dose Mg/kg.B.W./day	Administration	Duration (weeks)
10 Males Experimental	Gossypol	20 mg	I.M.	7
10Males Control	Sunflower seed oil(vehicle)	E.V. (0.1 ml)	I.M.	7
10Males Experimental	Gossypol	30 mg	I.M.	5
10 Males Control	Vehicle	E.V.(0.1)	I.M.	5
E.V. =Equivalent volume I.M. =Intramuscular (injection)				

Table: 2- Cell Types of Anterior Pituitary and their Tinctorial properties

Staining Technique	Cell Types					
	Type I GH	Type II PRL	Type III TSH	Type IV FSH	Type V LH/ICSH	Type IV ACTH
AF/LG/OG	Light yellow	Light yellow	Violet	Light green	Green	±
± = not specific						





PLATE - I

Effects of Gossypol on Thyroid gland of *Funambulus pennanti* Fig. 1 & 2 Sections Stained with Haematoxylin & Eosin

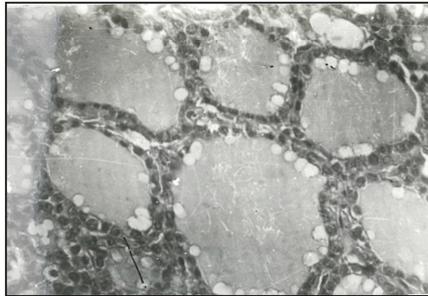


Fig-1 Control : Section of thyroid gland Showing normal cytoplological details (X 290)

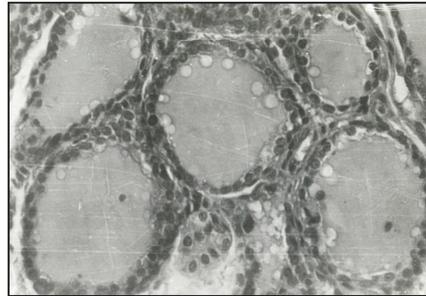


Fig-1 Experimental : Thyroid of Gossypol treated animal showing no significant changes as compared to the control (X 290)

Effects of Gossypol on Anterior Pituitary Fig. 3 & 4 Sections of Pituitary stained with AF/LG/OG

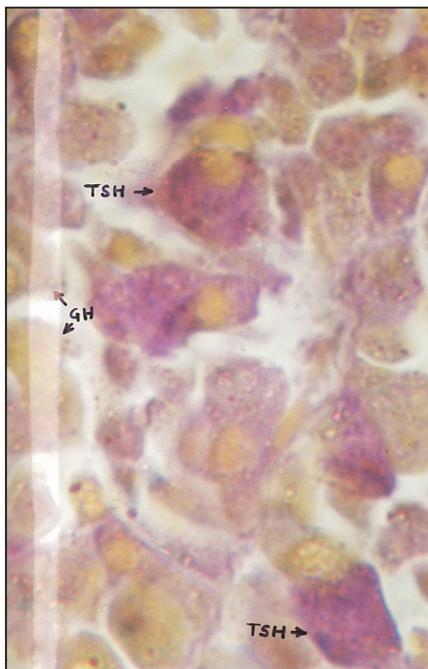


Fig. 3 Control : Anterior Pituitary Showing normal TSH cells (X 1400)

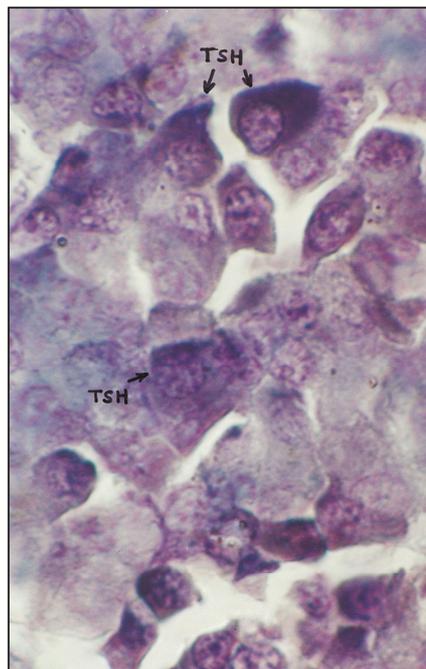


Fig. 4 Experimental : Anterior Pituitary of Gossypol treated animal Showing unchanged TSH cells (X 1400)

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