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Effects of LHRH-Agonist on Adrenal -Pituitary axis in male palm squirrel *Funambuluspennanti* (Wroughton)

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Abstract:

Effects of LHRH-Agonist on Adrenal -Pituitary axis was investigated. The LHRH-Analogue used was LHRH-Agonist (Buserelin acetate). LHRH-Analogue has agonistic or antagonistic action. LHRH -analogues block LHRH function, inhibit pituitary LH secretion and act as antagonist and this action is dose dependent.Perusal of literature has revealed that in the past, investigators have studied action of LHRH-Agonist on testis-pituitary axis ignoring its side effects on adrenal – pituitary axis. It was with this point of view in mind that LHRH-Agonist has been selected for the present study. Further investigations are required to determine the side effects of this drug on adrenal and pituitary gland and its mechanism of action. The Indian palm squirrel Funambuluspennanti is selected for the present investigation. The experiments were conducted during February and March when male squirrels were sexually active. Experimental animals received intramuscular injection of LHRH-Agonist in two dose 0.2 µg/animal/day and 1.0 µg/animal/alternate day for 1 and 4 weeks respectively. After the treatment of 0.2 µg of LHRH-Agonist for 1week showed degranulation and vacuolization in zona glomerulosa and zona fasciculata of adrenal gland. In zona reticularis the presence of vacuoles was more than above two zones.In medullary cells hypertrophy and degranulation occurred. At 1.0 µg of LHRH-Agonist for 4 weeks treatment degenerative changes were more pronounced in all the three zones as well as in medulla of adrenal gland compared to previous experiment. ACTH cells of the treated anterior pituitary gland showed progressive regression. These regressive changes in the adrenal are due to regression in ACTH cells after the

treatment of LHRH-Agonist. Therefore, it is concluded that the action of LHRH-Agonist on adrenal gland is via anterior pituitary gland.

Keywords: Adrenal – Pituitary axis, LHRH-Agonist.Indian palm squirrel.

Introduction:

The population of the world is increasing tremendously which adversely affects economical progress and quality of human life. It is obvious that our rate of reproduction presents a threat to our survival and we have no option but to stabilize population growth. Research on contraceptionis therefore not superfluous but it is a dire necessity. Female contraceptive technology is more advanced as compared to that of the male. Moreover, not much attention has been given to find out male contraceptive pills which are fully effective, safe, reversible and acceptable.

In the present study the LHRH- Analogue used was LHRH-Agonist (Buserelin acetate). Luteinizing hormone releasing hormone (LHRH)analoguehave agonistic or antagonistic action. LHRH analogue block LHRH function, inhibit pituitary LH secretion and act as antagonist and this action is dose dependent (Schally et al 1980)

This discovery of antifertility properties of this compound has aroused considerable interest among reproductive physiologists in search for method of male fertility regulation (Schally et al 1976 and Labrie, 1980). Perusal of literature has revealed that in the past, investigators have studiedaction of LHRH- Agonist on testis-pituitary axis ignoring its side effects on adrenal- pituitary axis. It was with this point of view in mind that LHRH-Agonist has been selected for the present study.

Material and Methods:

LHRH -Agonist was donated by Hoechst Marian Roussel Ltd, England.LHRH-Agonist was diluted in saline solution. Theexperiment were conducted during February and March when male squirrels were sexually active.Experimental animals received intramuscular injection of LHRH-Agonist in two dose,0.2 µg/animal /day and 1.0 µg/animal/alternate day for 1and 4 weeks respectively. Detail grouping of animals and design of the experiment is given in Table 1. Pituitary sections were stainedwith Lead Haematoxylin(PbH) staining technichque as recommended by Solcia et al (1969). Cell types of anterior pituitary and its tinctorial properties is given in Table 2

Results:

Adrenal (Fig.1 & 2)

At 0.2 µg for 1-week treatment showed degranulation and vacuolization in zona glomerulosa and zona fasciculata. In zona reticularis the presence of vacuoles was more than above two zones. In medullary cells hypertrophy and degranulation occurred. At 1.0 µg for 4 weeks treatment degenerative changes were more pronounced in all the three zones as well as in medulla compared to previous experiment.

Anterior Pituitary (Fig. 3 & 4)

After the treatment of LHRH-Agonist, ACTH cells of anterior pituitary showed progressive regression after both the doses.

Discussion :

The present study on adrenal gland of palm squirrel showed degranulation and vacuolization in zona glomerulosa, zona fasciculata and zona reticularis. These regressive changes in the adrenal are due to regression in ACTH cells after the treatment of LHRH-Agonist. However, no change observed in serum corticosterone after the treatment of LHRH-Agonist (Ataya et al., 1988). Zona reticularis synthesize adrenal androgens under pituitary ACTH.

Mechanism of action of LHRH-Agonist:

Direct effect on ACTH cells of anterior pituitary gland causes regression of adrenal cortex. Insufficient production of adrenal androgen may contribute for cessation of spermatogenesis.

Conclusion:

Regression of adrenal gland is via anterior pituitary gland in palm squirrel.

Table 1: Experimental design for LHRH-Agonist

No. of Animals &Sex	Treatment	Dose	Administration	Duration (Weeks)
10 Males (Experimental)	LHRH-Agonist	0.2µg/day	Intramuscular	1
10Males (Control)	Saline	E.V.(0.1ml)	Intramuscular	1
10Males (Experimental)	LHRH-Agonist	1.0µg/alternate day	Intramuscular	4
10 Males (Control)	Saline	E.V. (0.1ml)	Intramuscular	4
E.V. = Equivalent volume				

Plate - I

Effects of LHRH-Agonist on Adrenal gland of *Funambulus pennanti*
Fig. 1 & 2 sections stained with Haematoxylin & Eosin

Fig. 1 Control of Adrenal gland showing normal cytological details (×290)

Fig. 2 Experimental Adrenal of LHRH-treated animal showing pronounced regression (×290)

Effects of LHRH-Agonist on Anterior Pituitary
Fig. 3 & 4 Sections of pituitary stained with PbH (Lead Haematoxylin) (1400)

Fig. 3 Control section of Anterior pituitary showing normal ACTH cells (Black cells)

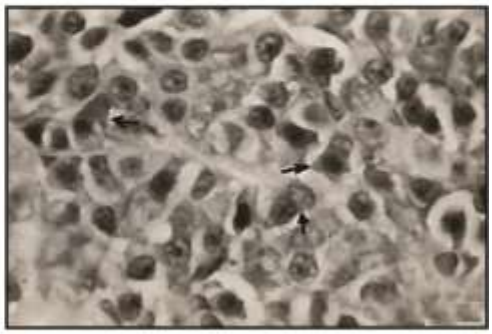

Fig. 4 Experimental section of Anterior pituitary showing regressed ACTH cells (Black cells)

Table 2: Cell types of Anterior Pituitary and their tinctorial properties.

Staining Techniques	Cell Types					
	Type I GH	Type II PRL	Type III TSH	Type IV FSH	Type V LH/ICSH	Type VI ACTH
Solcia et al (1969) PbH (Lead Haematoxylin)	_	_	_	_	_	Black

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