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RESEARCH PAPER

Impact of adrenalectomy on the protein metabolism and histology of the reproductive tissues in albino rats *(Rattusnorvegicus albinus)*

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ABSTRACT

A significant decrease in the levels of total proteins along with an increase in free amino acid (FAA) levels and protease activity were observed in the testis of male and ovary of female rats on adrenalectomy (ADX) at day 15 and 30 compared with sham operated(SO)rats. These results indicate the on set of proteolysis in the reproductive tissues of rats under ADX stress. The magnitude of those changes were significant more in the ovary of female ADX rats than the testis of males. It revealed more susceptibility of females to adrenalectomy than the males. Longer the duration of adrenalectomy more is the protein breakdown in both the sexes as noticed from day 15 to days 30. Corresponding to the changes in protein levels, some degenerative changes in the histology were observed in the testis and ovary of ADX rats at day 15 to dyas 30 of experimentation corresponding to normals. Necrotic spermatogonia and atrophy of leydig cells were seen in the seminiferous tubules of testis in ADX rats on day 15. The spermatogonia was further reducecd at day 30. The ovary exhibited absence of all the stages of developing follicles at day 15 and the breakage of the membrane of oocytes and reduced the number of granulosa cells at day 30. These changes revealed the suppression of ovarian steroidogenesis due to decreased ovarian activity after adrenalectomy. In conclusion, the observations indicated proteolysis in reproductive tissues of rats on adrenalectomy leading to structural disruption and decreased reproductive ability. This is more in females than on males and in both the sexes increased with the duration of adrenalectomy.

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Protien levels in cells are periodically replaced and there is a equilibrium between the synthesis and breakdown of these molecules, which bears a considerable significance in the homeostatic regulation of the cell function (Lehninger,1995). Free aminoacids are essencitial and much needed for protein synthesis, homeostasis and energy production purposes. The level of aminoacid content was shown to be altered in tissues under ADX animals (Almon and Dubois, 1985). Any stress on an animal invokes compensatory metabolic adjustments in its organs through modification and modulation of the quality and quantity of various biochemical constituents and enzymes (Assim and Hanke, 1983). Adrenal gland is an important endocrine gland which secretes hormones concerned with carbohydrate, proteins and lipid metabolism, balance of electrolytes in blood , maintenance of circulatory blood volume, control of sexual maturity and regulation of extracellular fluid volumes. Adrenal gonadal interaction appears to depend upon overlapping function of the steroid hormones of the adrenal gland and gonads organs on the reproductive stress and a variety of mechanisms as reported by Goncharov *et al*. (1984).

Removal of gland would deprive the organism if its normal source of hormones. So, that measurable abnormalities appear in the individual during its life history. Similarly, bilaterial removal of metabolic disturbances which are identical with those appearing in patients with Addison's diseases, such as extreme muscular weakness, a variable degree of hypoglycemia, ceased growth in young animals, loss of body weight, electrolyte imbalance and decreased in reproductive function (De GRoot and Jameson, 2001). Intensive exercise can result dysfunction of the male reproductive system (Manna *et al*., 2003) and degenerative changes are reported in testis of ADX rats (Nair *et al*., 1995).

Several reports though are available on the general impact of adrenalectomy, but very little information is available on the protein levels and histological changes especially in reproductive tissues which are the important sites of growth and development. Therefore, the present work is aimed to understand such studies in the reproductive tissues of male and female adrenalectomized animals in order to understand coherently the implication of Addison's disease.