

Histochemical Changes in the Adrenal Gland of Broiler Chicken Due To Fasting Stress

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ABSTRACT

The present study was carried out to observe the histochemical features of the adrenal gland of broiler chicken (*Gallus domesticus*) and subsequent histochemical changes at different hours of fasting. The experiments were conducted on 24 broiler chickens, divided into four groups (each group consisting of 6 birds) exposed to different hours of fasting. 5µm thick sections were stained with Periodic Acid Schiff-Alcian Blue for mucosubstances and cryosections were stained with Oil red O' for lipids. In the control group, the neutral mucopolysaccharide content was high in the inner aspect of capsule and lower in the cortex. The acid mucopolysaccharide was low in the capsule, negative to low in adrenal cortex and low to moderate in the medulla. High amounts of lipid droplets were present in the peripheral zone followed by inner zone. At different hours of fasting stress, the amount of the mucopolysaccharides and the lipids decreased both in the capsule and parenchyma as compared to the control group indicating the exhausted stage of the cells.

KEY WORDS: Adrenal gland, Broiler chicken, histochemical, mucopolysachharides

1.INTRODUCTION

The survival of animals and poultry mainly depends on the proper functioning of all the body systems. One of the most important and highly complex systems for the survival of the livestock is the endocrine system, which consist of ductless glands. Adrenal gland is one of the most important glands of the endocrine system, which maintains the homeostasis and plays the key role in response to the stress (Randall *et al.*, 2002). Form and structure of endocrine glands are altered by various environmental stress factors like transportation, withdrawal of feed and water which directly or indirectly is reflected in the growth and development of an organism. The adrenal gland shows substantial variation both structurally and functionally because of the specific type of the hormones produced under various stress conditions. Thus present work was aimed to investigate histochemical changes in the adrenal gland of broiler chicken due to fasting stress.

II.MATERIALS AND METHODS

The research was conducted on adrenal gland of broiler chicken in the Division of Veterinary Anatomy and Histology F.V.Sc& A.H, SKUAST-K, Shuhama. A total of 24, five week old broiler chicks were purchased from local Poultry Farms, and were housed in the poultry farm of Division of Livestock Production and Management F.V.Sc& AH. The birds were given one week of acclimatization and were maintained on broiler ration after which they were divided into following groups:-

Group A: Control Group which consisted of 6 birds. **Group B:** Consisted of 6 birds exposed to fasting stress for 12 hours. **Group C:** Consisted of 6 birds exposed to fasting stress for 24 hours. **Group D:** Consisted of 6 birds exposed to fasting stress for 48 hours

The birds were sacrificed (after taking due permission from the institutional animal ethical committee), dissected and the topography of adrenal glands was recorded. The specimen were collected and preserved in specific fixatives. The adrenal gland of birds is small; as a result whole of gland was used for the study. After overnight washing and dehydration procedure, the tissues were embedded into the paraffin and blocks were made. 5µm thick sections were obtained by using a Rotary Microtome and stained for Periodic Acid Schiff-Alcian Blue for mucosubstances and cryosections were stained with Oil red O' for lipids.

III.RESULTS AND DISCUSSION

Two histochemical parameters were studied in the present study viz; mucopolysaccharides and lipids in the adrenal gland.

Control group

The neutral mucopolysaccharides content was high in the inner aspect of capsule, moderate in the wall of blood vessels of capsule, low in cortex and low to moderate in the medullary region. The acid mucopolysaccharide was low in the capsule, negative to low in adrenal cortex, and low to moderate in the aggregating chromaffin cells of the medulla. Similar findings were made in Nigerian fowl by Aire (1980). The presence of neutral and acid mucopolysaccharides was determined by AB-PAS reaction, which was intense in the capsule and medullary tissue while as mild in the cortical tissue (Fig. 1).

The capsule of the gland showed low to mild amount of lipid droplets. High amounts of lipid droplets were present in the peripheral zone followed by inner zone, while as the in sub capsular zone lipid droplets were found to be absent. Phospholipid content was more in the cortex as compared to medulla. Similar observations were made in mallard goose by Hohn *et al.*, (1965) and in goose by George and John (1988).The presence of different lipids in the adrenal gland was observed by Oil Red O reaction which was intense in peripheral zone followed by other two zones and capsule where it was mild to moderate.

IV.EXPERIMENTAL (FASTING) GROUP

At different hours of fasting stress the amount of the mucopolysaccharide and the lipids both in the capsule and parenchyma was found to be lower than the control group. It was indicated by mild to moderate AB-PAS and Oil Red O' reaction of capsule and parenchyma than the control group. The probable explanation of the mild reaction of the capsule and the parenchyma might be depletion in the amount of mucopolysaccharides and lipids

at different hours of fasting stress indicating the exhausted stage of the cells. Similar observations were made in Japanese quail by Basha *et al.*, (2009).

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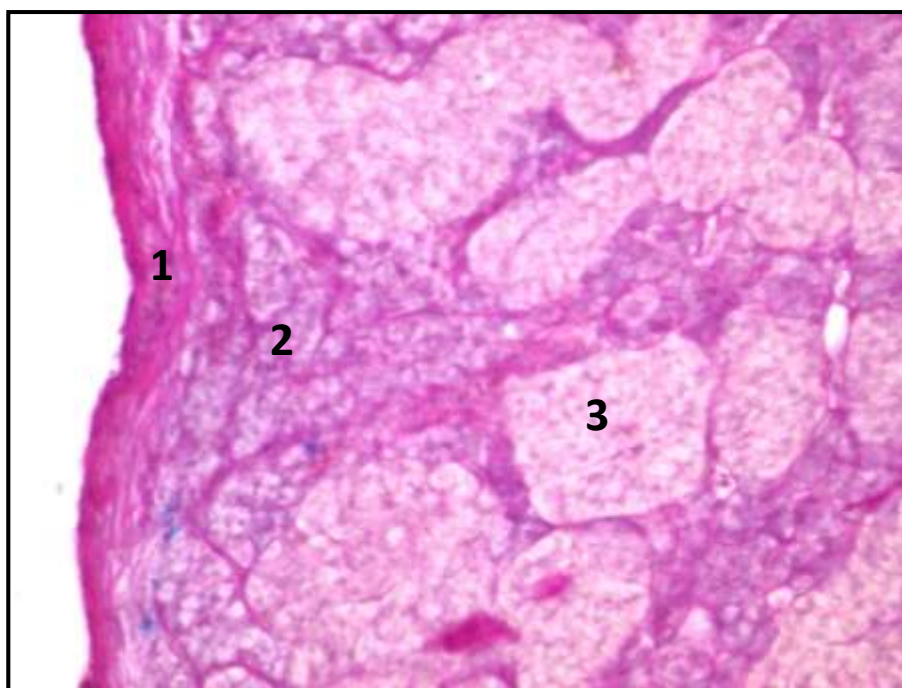


Fig.-1. Cross section of Adrenal gland, PAS-AB stain, 400X. 1. Capsule showing intense PAS reaction 2. Chromaffin tissue with moderate PAS-AB reaction 3. Cortical tissue showing mild PAS reaction.

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