

## HISTOMORPHOLOGY OF ADRENAL CORTEX (INTERRENAL TISSUE) IN GUINEA FOWL\*

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### ABSTRACT

A histomorphological study on the adrenal gland was conducted in guinea fowl of different post-hatch age groups viz., day old, 2, 4, 8, and 12 weeks. Tissue pieces were collected and fixed in 10% neutral buffered formalin, Bouin's fluid, Zenker's fluid and Orth fixative for routine paraffin embedding. Sections of 5-6  $\mu\text{m}$  thickness were subjected to H&E and other special stains. The adrenal cortex was distinguished into two distinct zones, the peripheral subcapsular zone and the central inner zone. The cortical cells of the peripheral subcapsular zone were large columnar cells, arranged in a curved fashion to form a loop. The cells of the inner zone formed straight cords. The cortical cells of cylindrical cords were arranged in double row without enclosing a central lumen. Four types of cells viz., type-I, II, III and IV were identified in the adrenal cortex.

**Key words :** Interrenal tissue, Guinea fowl, Histomorphology.

### INTRODUCTION

The adrenal gland is a vital endocrine gland that occupies a central role in the regulatory mechanisms of the body metabolism. Adrenal corticosteroids in avian species have the same major metabolic roles in carbohydrate, protein, lipid and electrolyte metabolism as in mammals. Among homeothermic vertebrates, birds are unique in which cortical and medullary tissues of the adrenal gland are found always intermingled. Paucity of literature on the histomorphology of adrenal cortex in Guinea fowl prompted us to undertake this research work.

### MATERIAL AND METHODS

The adrenal gland was collected from different post-hatch age groups of Guinea fowl viz., day old, 2, 4, 8 and 12 weeks. Each age group consisted of six birds (irrespective of both the sexes). Tissue pieces were collected and fixed in 10% neutral

buffered formalin, Bouin's fluid, Zenker's fluid and Orth fixative for routine paraffin embedding. Sections of 5-6  $\mu\text{m}$  thickness were subjected to H&E (Bancroft and Stevens, 1996), Masson's trichrome and Unna's method (Luna, 1968).

### RESULTS AND DISCUSSION

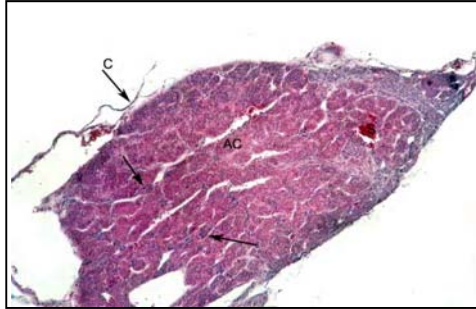
The parenchyma of the adrenal gland of Guinea fowl constituted mainly of three components namely the cortical or interrenal tissue, medullary or chromaffin tissue and vascular sinusoids (Fig: 1).

The adrenal cortex (interrenal tissue) was distinguished into two distinct zones, the peripheral subcapsular zone and the central inner zone as reported by Hassan (1975) in duck and geese, Hodges (1974) in fowl, Bhagyashri and Nadkarni (1980) in pigeon crow and sparrow and Basha *et al.* (2004), in quail. The cortical tissue was made up of radially arranged tall columnar cells. The cortical

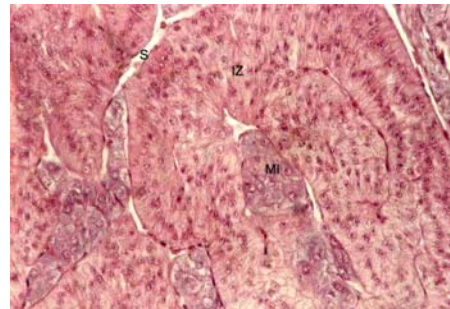
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cells of the peripheral subcapsular zone were large columnar when compared to the narrow central inner zone. The cells of the peripheral subcapsular zone were arranged in a curved fashion to form a loop. The cells of the inner zone formed straight cords which anastomosed with adjacent cords to give a reticulated appearance as found in quails (Ali,2001). In certain areas, they were arranged in a curved fashion enclosing a medullary islet (Fig-2). Cortical cells of the cylindrical cords were arranged in double row without enclosing a central lumen and the basal pole of cells rested on a common basement membrane as in the adrenal gland of avian species (Assenmacher, 1973 and Hodges, 1974). The stack like double row arrangement of cortical cells in the adrenal gland was well established from fourth week of age.

Four types of cells were identified in the adrenal cortex as noted by Mikami *et al.*, (1980) and Basha *et al.*, (2004) in quail adrenal. The type-I cells were large columnar with dense granular, acidophilic and less vacuolated cytoplasm and the nucleus was round or oval euchromatic with distinct nucleoli. These cells were noticed in subcapsular zone of internal tissue. The type-II cells were also large columnar with spherical nuclei and less dense granular, acidophilic and foamy cytoplasm and these cells were located in the inner zone. Type-III cells were columnar with clear cytoplasm. These were noticed in the peripheral portion of the inner zone. Few cells which were low columnar with less granulated cytoplasm and heterochromatic nuclei



**Fig 1** : Parenchyma of adrenal gland of Guinea fowl showing three components. Ac-Adrenal cortex, S-Sinusoid, Medulla, C-Capsule.



**Fig 2** : Inner zone of cortical cells showing double row arrangement and enclosing medullary islets. S- Sinusoid, IZ- Inner zone of cortex, M- Medulla.

were the type-IV cells located in the inner zone of the adrenal cortex.

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