

AGE RELATED HISTOARCHITECTURE OF THE IRIS IN LAYER AND BROILER CHICKEN (*Gallus domesticus*)*

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The iris is peculiar in birds due to the striated nature of its muscles. Though the histological work has been studied earlier, the paucity of literature on the age related micrometry and histomorphology in broiler and layer chicken prompted to take the present study. The eyeballs were collected from six males and six females each in day-old, 4,8,12,16,20,28,40 and 72 week-old layers and day-old, 2,4,6, and 8 week-old broilers. The eyeballs were processed for the paraffin embedding and sections of 5-6mm thickness were made and used for H & E staining. The thickness of the iris was recorded by using the oculometer and tabulated.

The histomorphological observations recorded in the eyeball did not show any changes between the sexes and the right and the left sides among the age groups studied. The thickness of the iris increased as age advanced in both layers and broilers.

The iris was a highly muscular, pigmented tissue and continued posteriorly with the ciliary body. The root of the iris was connected to the base of the cornea by the most anterior fibres of the pectinate ligament, which is similar to the reports of Fitzgerald (1969) in Japanese quails. The iris was thin at the root and immediately it expanded to its maximum thickness and then gradually tapered towards the margin of the pupil. It consisted of five layers

from the anterior to the posterior surface viz., an epithelial layer, a thick sphincter pupillae muscle, a connective tissue layer, a thin dilator pupillae muscle and a deeply pigmented epithelium as described by Hodges (1974) in chicken. The central layers were not clearly delineated in the present study in day-old birds. The epithelial layer consisted of a single layer of flattened cells. The sphincter muscle layer was thick, striated and arranged circularly which comprised considerable width of the iris. The connective tissue layer consisted of collagen fibres, fibroblasts and fine blood vessels. The adjacent muscle layers frequently overlapped this layer and towards the root it was almost indistinguishable. The dilator pupillae muscle consisted of sparse, radially arranged, striated muscle fibres lying immediately posterior to the connective tissue layer (Fig-1). The dilator fibres formed a complete layer behind the sphincter, running into the ciliary region (Walls, 1967). The dilator fibres were inserted peripherally to the connective tissue of the ciliary body. In the proximal third of the iris, a double layer of radial fibres was frequently noticed which is contrary to the findings of Dellman (1993) in mammals where the dilator muscle consists of only a single layer of radially arranged myoepithelial cells. The posterior division of the double layer was truly of radial fibres and the anterior portion was thick and obliquely radiated on the medial side of the connective tissue

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layer. A layer of pigmented epithelium of 3-5 cells thick lined the border of the iris adjacent to the lens. The pigment granules almost completely obscured the cell structure in all the age groups studied. The iris muscles were richly vascularised. The above findings concurred with the reports of Hodges, (1974) in domestic fowl. The chicken can elicit the dilatation of pupil on emotions like fear and excitement by rapid contraction of dilator muscles due to the striated nature (Walls, 1967).

In the present study, the pigment was seen only in the pigment epithelium as in the blue colored eyes whereas, in brown coloured iris, the pigment was distributed in the core of the iris in addition to the pigment epithelium. The cystic protrusion of the pigment epithelium called corpora nigra or granula iridis found at the upper and lower margin of the pupil of the horses and ruminants (Prince *et al.*, 1960) was not observed in the present study.

The stroma of the iris consisted of regularly arranged arcuate bundles of collagen fibres that cross each other. The fibroblasts, mast cells, fixed macrophages and melanocytes represented the major cell population, which is similar to the findings of Dellman (1993) in domestic animals.

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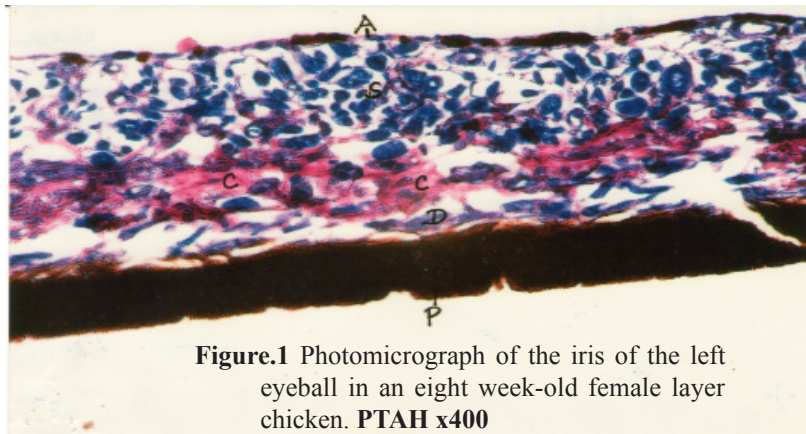


Figure.1 Photomicrograph of the iris of the left eyeball in an eight week-old female layer chicken. PTAH x400

- A-Anterior epithelium
S- Sphincter pupillae muscle
C-Loose connective tissue
D- Dilator pupillae muscle
P- Pigment epithelium