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Ultrastructural studies on the magnum of oviduct in emu (Dromaius novaehollandiae)

Abstract
The Ultrastructure of Magnum was studied in eight adult apparently healthy emu birds. Mucosa contained different folds, of which the primary folds were more prominent. Several tubular invaginations on the primary folds and the openings of the proprial glands appeared on the surface epithelium. The magnum contained ciliated and non ciliated columnar cells, goblet cell of which non ciliated columnar cells and goblet cells were predominant. Two columnar cell types were observed in the surface epithelium i.e. light secretary cells and dark non secretary cells. Prominent elongated mitochondria were concentrated in the sub apical region. Three basic cells were observed in the basal part of tubular glands viz., type A cells packed with strongly electron dense granules, type B cells filled with amorphous material of low electron density.

Keywords: Carcass characteristics, weaner pigs, meat quality, palm kernel cake

Introduction
The emu is the second largest bird and belonged to order Ratite. These birds are reared commercially in many parts of the world for their meat, oil, skin and feathers, which are of high economic value (Sibley and Ahlquist, 1990; Patodkar et al., 2009; Sreedevi et al., 2012; Supriya Shukla et al., 2013 [10, 6, 7, 8]). The ultrastructural studies on the magnum have been carried out in Ostrich (Sharaf et al. 2012) [11]. So the present study was initiated to examine the ultrastructure of the magnum in emu (Dromaius novaehollandiae).

Materials and Methods
The present work on “ultrastructural studies on the Magnum of Oviduct in Emu bird (Dromaius novaehollandiae)” was conducted at the Department of Veterinary Anatomy, College of Veterinary Science, Rajendranagar, Hyderabad. Fresh tissue samples were collected immediately from magnum of oviduct. The dried samples were mounted over the stubs with double-sided conductivity tape and were coated by a thin layer of gold metal over the samples using an automated sputter coater for about 3min (Bozzola et al., 1999) [1]. The processed samples were scanned under Scanning Electron Microscope (model: JOEL-JSM 5600, JAPAN).

For transmission electron microscopy, the tissues from different regions of the oviduct were dehydrated in series of graded alcohol from 50% to 100% for 40 minutes each, infiltrated in 1:1 alcohol and resin, pure resin and later embedded in pure Spurr resin. Both semi thin and ultra thin sections were cut with a glass knife on a Leica Ultra cut UCT-GA-D/E-1/00 ultramicrotome. Semi thin sections of 200-300 nm were stained with Toludine blue whereas, ultra thin sections (50-70 nm) were mounted on copper grids. Then the sections were stained with saturated aqueous Uranyl acetate for 30 minutes and counter stained with 4% Lead citrate for 20minutes (Bozzola et al., 1999) [1] and observed under transmission electron microscope (Model: Hitachi, H-7500, JAPAN).

Results and Discussion
Scanning electron microscopy
The magnum mucosa contained different folds, of which the primary folds were more prominent and showed deep clefts in between. Deep furrows or clefts between the ridges were
Reported to be observed in adult chicken (Jung et al., 2011) [3] and turkey (Parto et al., 2011) [5]. Secondary folds were noticed on the primary folds of magnum. However, the primary folds accompanied by secondary and tertiary folds were reported to be noticed in the proximal part of the magnum, while in the distal part the folds were reported simple without secondary ones in turkey (Parto et al., 2011) [5]. The openings of the proprial glands appeared on the surface epithelium and at the bases of the deep clefts, which agreed with the observations in ostrich by Saber et al. (2009) [9]. The surface epithelium of magnum was pseudostratified ciliated columnar epithelium. Similar finding was reported in fowl by Hodges (1974) [2].

Transmission electron microscopy
The surface epithelium of the magnum contained ciliated and non ciliated columnar cells, goblet cells. Similar observations were reported in the magnum of adult chicken by Jung et al. (2011) [3]. However, the epithelium was reported to contain ciliated and non ciliated cells predominated with ciliated cells by Saber et al. (2009) [9] in ostrich. In contrary to this, in the present study, the lining epithelium of magnum contained more number of non ciliated columnar cells and goblet cells. However, the similar epithelium with more number of goblet cells was also reported in the mucosa of magnum in hen by Mehta and Guha (2012) [4] and Sharaf et al. (2012) [11] in ostrich. The columnar epithelial cells contained granules of low electron density, which agreed with the reports of Wyburn et al. (1970) [12] in fowl. Three basic cells were observed in the basal part of tubular glands viz., type A cells packed with strongly electron dense granules, type B cells filled with amorphous material of low electron density and numerous RER profiles and type C cells with few strongly electron dense granules and prominent organelles, RER Spaces and golgi complex. The above features correlated with the reports of Wyburn et al. (1970) [12] in the magnum of fowl.

References


