



## Histomorphological Study of Infundibulum and Magnum of Indigenous Geese (*Anser anser*)

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### Abstract

*This study* was designed to explore the morphological

and histological features in some aspects of infundibulum and magnum of mature indigenous geese. The results showed that, the oviduct of a mature geese consisted of five functional distinct segments with a mean average of 54.8 cm in length. The luminal mucosa of the oviduct contained distinct longitudinal folds which was vary in height. The infundibulum was subdivided into large differentiated funnel region and neck region. The magnum was highly flexuous. The mucosa in both infundibulum and magnum was modified into variable mucosal branching folds. The mucosal glands started to appear as a glandular budding, which increased in number and size they filled the whole mucosal folds. Then, they were leaving a thin strand of connective tissue that represent the submucosa. The epithelium lining of the infundibulum and magnum was ciliated and non-ciliated pseudo stratified columnar epithelium.

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## Introduction

The morphological and histological of birds genitalia was studied by many workers, for instance, in hens by (Traynis, 1968; Sharandak, 1988; Czareva, 1990; Williams and Ames, 2004), in ostrich by (Sharaf and Abuel-Atta, 2012), and in turkey by (Bakst, 1994). During sexual development, the oviduct of birds undergoes different morphological changes. The process of maturation was under the effect of pituitary gonadal hormones (Sharaf and Abuel-Atta, 2012).

The aims of this study designed to explore the morphological and histological features in some aspects of infundibulum and magnum of mature indigenous geese.

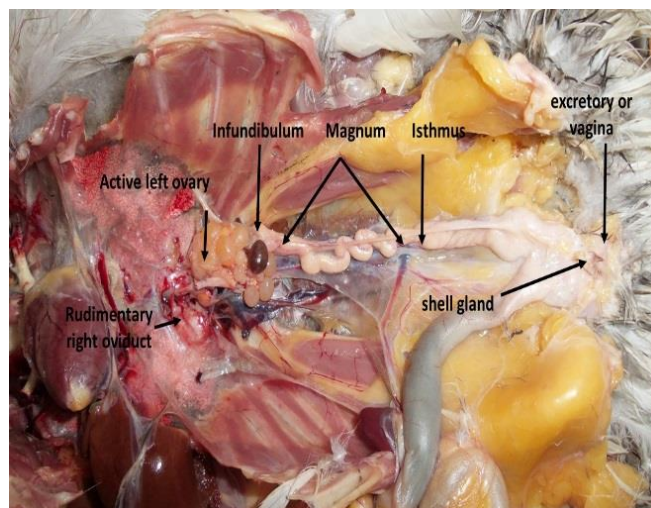
## **Materials and Methods**

Twenty healthy mature indigenous geese were used to in this study. These birds were purchased from local market at Hilla city, Iraq. The birds were killed by decapitation. The Anatomical dissection technique of birds was done according to (Komarov, 1981). The procedure as a ventral midline incision from the distal border of the sternum was done and extended backwards until the end region of the cloaca. The subcutaneous and muscular tissues were pulled gently and exposed by blunt dissection. Thereby, the oviduct of each bird was clearly exposed and some morphological observations was register. Each oviduct was excised from each bird and weighted using an electrical balance. The borders and regions of the oviduct was determined. In addition, the length of the infundibulum and magnum was measured with a ruler. Samples of infundibulum and magnum were fixed in 10% formalin (Luna, 1968) for histological studies. The specimens were washed with tap water, dehydrated, cleared in xylene and embedded in paraffin wax. Sections of five micrometers were stained with hematoxyline and eosin. These stained sections were examined under a light microscope. Height and width of folds and height of epithelial cells of lamina mucosa of infundibulum and magnum were done by used of ocular micrometer (Galighor and Kozloff, 1976).

## **Results and Discussion**

Anatomically, it appeared that the left oviduct of the indigenous goose was predominated, meanwhile the right one was rudimental and located at the right side of the coelom. The left oviduct appeared convoluted, possess thick wall tube like. The left oviduct began from the vicinity of the left ovary and extended to the cloaca (Figure 1). The mean average length was 54.8 cm and its mean average weight was 68.3gm. The oviduct was fixed by a dorsal and a ventral peritoneal ligament to the abdominal coelom. The precise border was present only between the magnum and isthmus. They were precisely differentiated from each other through circular transparent region. This results are in agreement with the report of (Khokhov, 2008). The protrusion which extend in dorsoventral direction, represented the lip of infundibulum. On the other basis of anatomical character, the infundibulum was well differentiated into two main regions; the funnel part, which was the widest part and a tubular part. The funnel part owned thin wall which gradually increased in thickness towards the tubular part. This division of the infundibulum was also previously mentioned by (Aitken and Johuston, 1963). The mean average length of infundibulum was 5.3cm, while the mean average width was 4.42 cm. The mucosa of the infundibular funnel revealed characteristic rough surface, whereas, the folds gradually increased in height towards the tubular part. The tubular part was less convoluted and short one. The results of this study is compatible to previous studies in other domestic birds, such as white leghorn hens (Bakst and Howard, 1975), sexually mature turkeys (El-bargeesy, 1990) in and domestic fowls (Dellman and Eurell, 1998). The mucosal folds of the infundibulum of the oviduct of geese appeared branched and run longitudinally, oblique or tortuous. This fact is in agreement with (Hodges, 1974) and (Nickel *et al.*, 1977), who stated “the infundibular mucosal folds had slightly spiral course”. However, similar finding was also approved

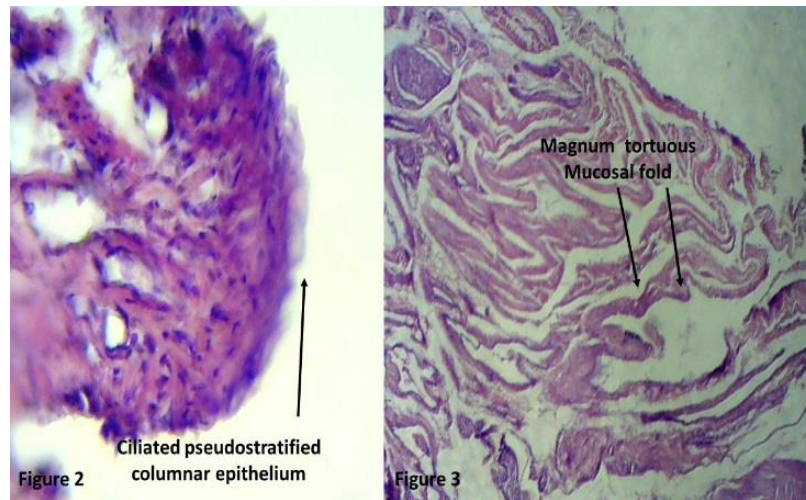
by (Sabar *et al.*, 2010) in Ostriches. Microscopical examination revealed that the mucosa of infundibulum was lined by ciliated pseudo stratified columnar epithelium (Figure 2). Sometimes, ciliated simple columnar epithelium was also notices especially at the funnel region of infundibulum. It might be revealed a relationship between the number of cilia and the stimulation effect of ovarian hormones. This was also assumed by (Anderson and Hein, 1976), and (Fujii, 1981). The current study revealed that the lamina propria of the funnel of the infundibulum had no mucosal gland. This current work also supported by El-Habbak, (1990) report on the oviduct of sexually mature ducks, and also the evidence reported by (Sayed, 2000) on sexually mature quails. But in contrast to (Das and Biswal, 1968) in domestic ducks and (Muwazi *et al.*,1982) in mature ostriches. The epithelial lining of the tubular part of infundibulum was formed of ciliated pseudo stratified columnar type. Branches and unbranched glandular buds might be seen in between the bases of the folds. Simple branched tubular glands lined with pyramidal cells, were present within the lamina propria-submucosa. The tunica muscularis was less differentiated and represented by strands of smooth muscle fibers, which is in accordance with (Sayed, 2000). The magnum appeared as the longest and had the mean average 23.6 cm in length and 1.34 cm in width. The wall of the magnum was relatively thick and its mucosal folds were longitudinally oriented and appeared to be extremely tortuous (Figure 3). These magnal folds represented the primary longitudinal folds and possess free wavy borders. Secondary folds might be presented, which extend in between the primary magnal folds (Figure 4). However, (Hodges, 1974) stated that the magnum of domestic hens carries primary, secondary and tertiary folds. Indeed, according to published data, there were also differences in the number of folds in chicken and domestic hens. This was also supported by (Nickel, 1977), and (McLelland, 1990). The variation between different birds might be attributed to species differences. The lining epithelium of the magnumal mucosa appeared as tall ciliated pseudo stratified columnar, containing goblet cells (Figure 5).



**Figure (1)** Shows the genital tract of mature indigenous geese

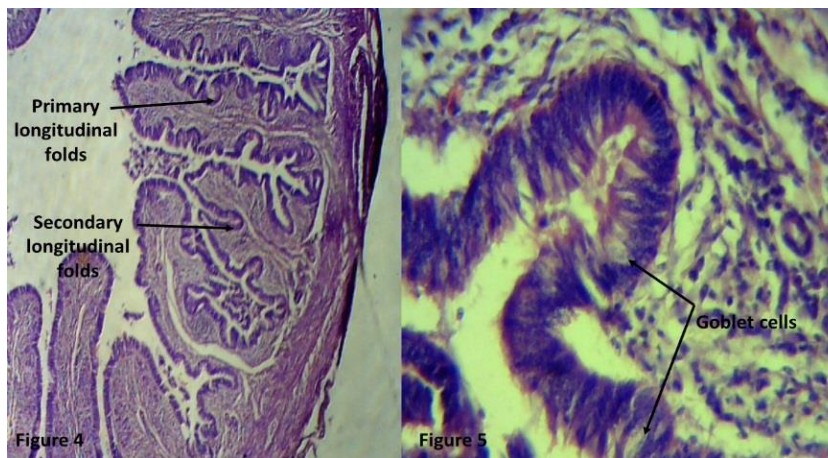
A well-developed lamina propria was presented and the glandular unites occupied this lamina (Figure 6). The glandular structure of the magnum composed of two main cell

types. The first type was the mucous secreting cell or goblet cells. The second type was multicellular glands which include the glandular crypts or glandular tubules. This result in agreement with previous studies in sexual mature turkeys (El-Bargeesy, 1990), in domestic hens (Dellman and Eurell, 1998), in fayoumi hens (Fouad, 1970), and in white leghorn hens (Solomon, 1975). The connective tissue of the magnum submucosa contained plenty of blood vessels. An inner longitudinal and outer circular smooth muscle fibers from the tunica muscularis of the magnum were also noticed.



**Figure (2)** Shows the infundibular mucosa lined by ciliated pseudostratified columnar epithelium (H&E X400)

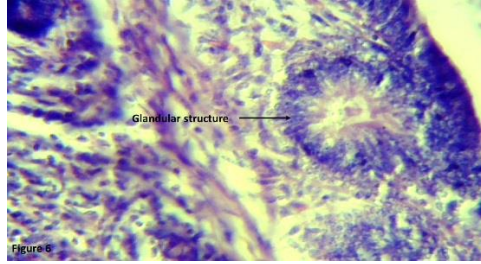
**Figure (3)** Shows the magnum, the mucosal fold which appear tortuous (H&E X100)



**Figure (4)** Shows the histological features of magnum folds

**Figure (5)** Shows the pseudostratified columnar epithelium with goblet cells in the magnumal mucosal epithelium. (H&E X1000)





**Figure (6)** Shows a well-developed granular structure of the magnum embedded in lamina propria of magnum (H&E X1000)

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