
HISTOLOGICAL RESEARCH OF THE MUSCULAR STOMACH IN STRUTHIO CAMELUS

**Ștefania Mariana RAITA, Valerica DANACU, Petronela ROSU, Bogdan GEORGESCU,
Florica BARBUCEANU**

University Of Agronomic Sciences And Veterinary Medicine Of Bucharest,
Faculty of Veterinary Medicine,
Bucharest, district 5, Splaiul Independenței no. 105
E-mail: stefania.raita@yahoo.ro

Abstract

For the histological study were used muscle stomach samples from 5 ostriches, age between 6 months and 3 years. Samples were prefixed in special containers in neutral formalin sol. 10%, after that were adjusted and refitted in the same type of fixator for 24 to 48 hours. The samples were included in paraffin cubes with Kunz instruments machine, then were cut to 3-5 μ m at the microtome. The histological sections were displayed on skimmed slides and kept properly until various staining methods were applied. Ostrich muscular stomach is relatively small, compared to waist, oval, pressed from sides, the most developed component being the muscular tunic. After the exterior appearance, it resembles with hen muscular stomach. (Figure 1). The cuticle that tapes the ostrich muscular stomach mucous is thicker and denser than in notglandular area of the glandular stomach. The cuticle is gathered in large loops and in its structure it is noted inclusion of the protean matrix and the presence of desquamated cells from the surface epithelium as cellular debris and nucleus fragments. The stomach mucosa is taped with a simple columnar epithelium, in lamina propria structure, observing the simple, parallel, tubular, ventricular glands of different sizes, depending on the area examined. On top of it, the glands are slightly lengthened and begin to lose their rectilinear appearance. Muscularis mucosae, unlike hen, for example, is present, but on certain portions it can no longer be observed, being united with the muscles layers. The lymphoid tissue from mucosa is also absent. The muscular layer is best represented, composed of smooth muscle fibers with the three layers: longitudinal outer, circular middle, with the largest consistency of the inner skew layer. Connective fibers are also found at this level. In most regions, there is no exact delimitation of the muscle layers. The aponevrotic layer includes parallel collagen fibers arranged in bundles, including elongated and flattened fibroblasts. The serosa belongs to the visceral peritoneum and is composed of typical connective tissue and mesothelium.

Keywords: *epithelium, gland, muscular stomach.*

Introduction

In Romania there are ostrich farms, proving that it is possible to grow it here as well. Investments are not high, and lower-end agricultural land can be used.

However, it is necessary to mention that, despite the growing interest in the issue of ostrich growth, many questions regarding the ostrich morphology and physiology are not fully elucidated in the scientific literature. The ostrich meat is very fine, with a pleasant, specific taste, characterized by a low cholesterol content of at most 32 mg per 100 grams of fat (1.2%), has a high protein content of about 22% and a rich range of microelements. An adult ostrich female, with a yield of 50 eggs a year, allows to be obtained 4 tons of meat per season.

There are very few published materials about the anatomy and histology of this bird. They usually contain information about the structure of the skeleton and breeding organs.

Particularly, the morphology data of this bird's digestive system are insufficient and quite succinct, being fragmentary and with general character.

In fact, knowing the structure of ostrich digestive system has not only a general biological importance but also a practical one.

Materials and methods

For the histological study were used muscle stomach samples from 5 ostriches, age between 6 months and 3 years.

Samples were prefixed in special containers in neutral formalin sol. 10%, after that were adjusted and refitted in the same type of fixator for 24 to 48 hours. The samples were included in paraffin cubes, then were cut to 3-5 μm at the microtome. The histological sections were displayed on skimmed slides and kept properly until various staining methods were applied. 50 histological preparations were obtained which were examined using the 4, 10, 25, 50 and 100 lenses.

Results and discussions

The ostrich muscular stomach wall from the inside to the outside shows: cuticle, mucous, muscular, aponevrotic layer and serous.

The cuticle that tapes the ostrich muscular stomach mucous is thick and dense. It is gathered in large loops and in its structure, at a closer examination, it is noted inclusion of the protean matrix and the presence of desquamated cells from the surface epithelium as cellular debris and nucleus fragments (Figure 2; Figure 3).

The stomach mucosa is taped with a simple columnar epithelium, in lamina propria structure, observing the simple, parallel, tubular, ventricular glands of different sizes, depending on the area examined. On top of it, the glands are slightly lengthened and begin to lose their recurrence. Muscularis mucosae, unlike hen, for example, is present, but on certain portions it can no longer be observed, being united with the muscles layers. The lymphoid tissue from mucosa is also absent.

In the optical microscope, the cuticle is formed from the lamellae: some arranged parallel to the mucosa surface and others arranged perpendicular to the mucosa surface (Figure 4).

The stomach mucosa is taped with a simple columnar epithelium, in lamina propria structure observing the simple parallel tubular ventricles of different sizes, depending on the area examined (Figure 5). To the base, the glands are slightly lengthened and begin to lose their rectilinear appearance (Figure 6). Epithelial cells have a spherical appearance, are basophilic, and their secretion is well highlighted from their upper third (Figure 3). In some segments, the ventricular mucosa is covered by a thick cuticle, continuously secreted by the cells of the ventricular glands (Figure 7), evidence of their secretion activity, evidenced by a positive histochemical reaction (Figure 8, Figure 9). These cells have a globular appearance at the base of the gland structure, gaining a cubic appearance. Thus, the hypothesis that the activity of these cells determines holocrine secretions, which underlie the production of compounds in the formation of cuticle layers, is highlighted (Figure 10, Figure 11).

The mucosal muscle, unlike the hen, for example, here is present, but on certain portions it can no longer be observed, being united with the muscles layers. The lymphoid tissue from mucosa is also absent.

The muscular layer is best represented, consisting of smooth muscle fibers with the three layers: longitudinal outer, medial circular, with the largest consistency of the inner skew layer (Figure 12). Conjunctive fibers are also found at this level (Figure 13). In most regions, there is no exact delimitation of the specified muscle layers.

The aponevrotic layer comprises parallel collagen fibers arranged in bundles, including elongated and flattened fibroblasts.

The serosa belongs to the visceral peritoneum and is composed of typical connective tissue and mesothelium (Figure 14).

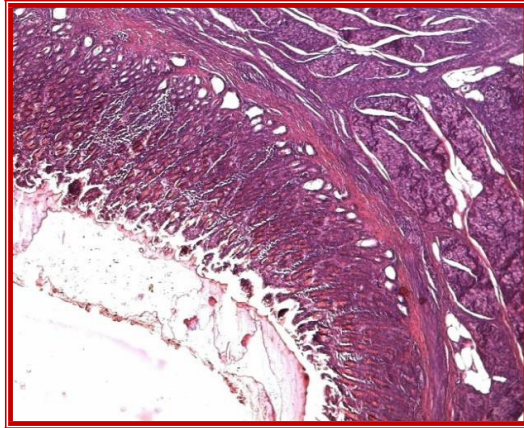


Figure 1. Muscular stomach. Hen. General view of the histostructure on muscular stomach. Col. HE x 25 (original)

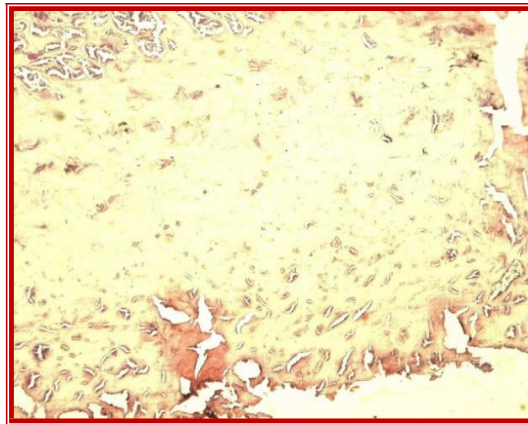


Figure 2. Ostrich. Detailed view of the ventricular cuticle. Presence of nuclear residues, of heterochromatic nucleus and of cauliflower-shaped surface formations. Col. HE x 50 (original)

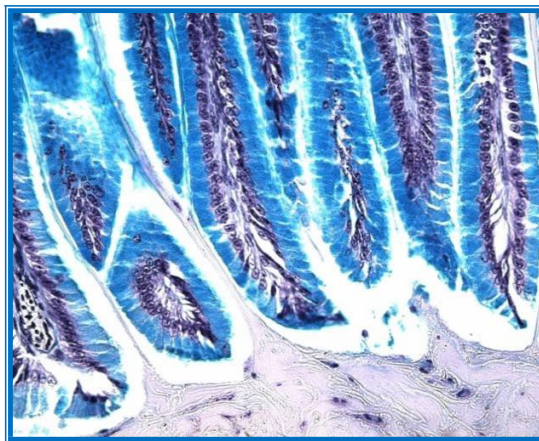


Figure 3. Muscular stomach. Ostrich. The presence in cuticle composition of protean matrix and exfoliated cells from the surface epithelium. Col. AA x 400 (original)

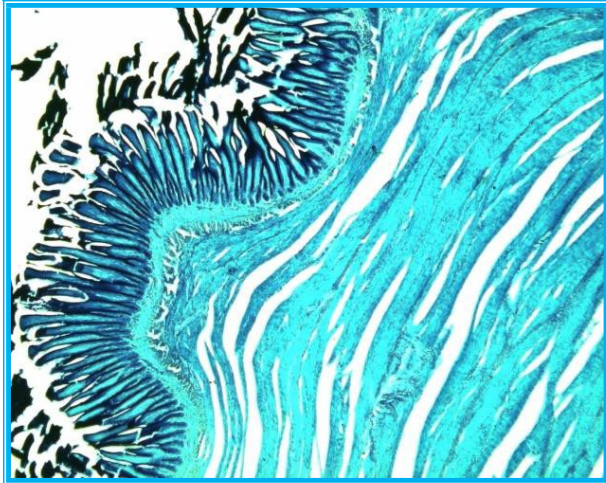


Figure 4. Ostrich. Muscular stomach. Image referring to the distribution of cuticular blades and muscle layer, which encompass muscularis mucosae
Col. HEV x 50 (original)

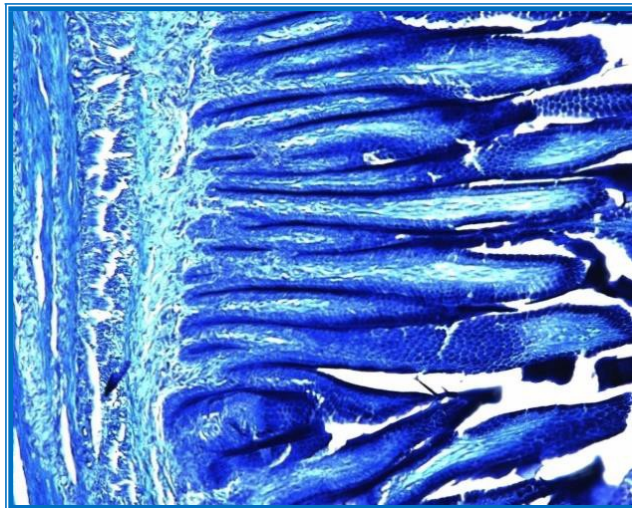


Figure 5. Ostrich. Muscular stomach. Lamina propria structure, with the distribution of simple tubular ventricular glands, in parallel position Col. AT x 200 (original)

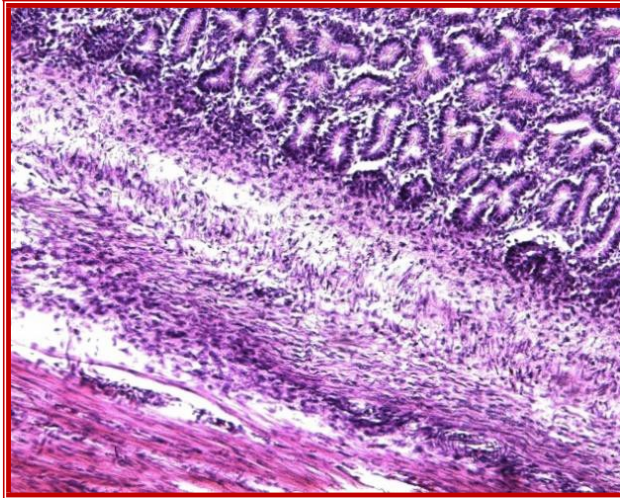


Figure 6. Ostrich. Muscular stomach. View of the widening of the glands from the ventricular mucosa toward its basis
Col. HE x 200 (original)

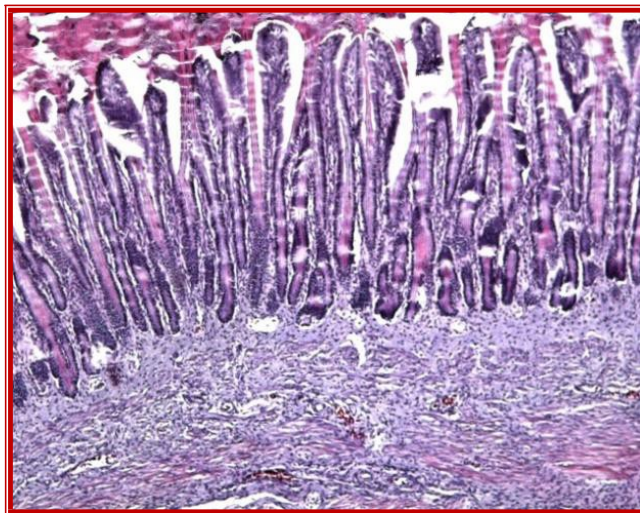


Figure 7. Ostrich. Muscular stomach. The formation of the cuticle
Col. HE x 100 (original)

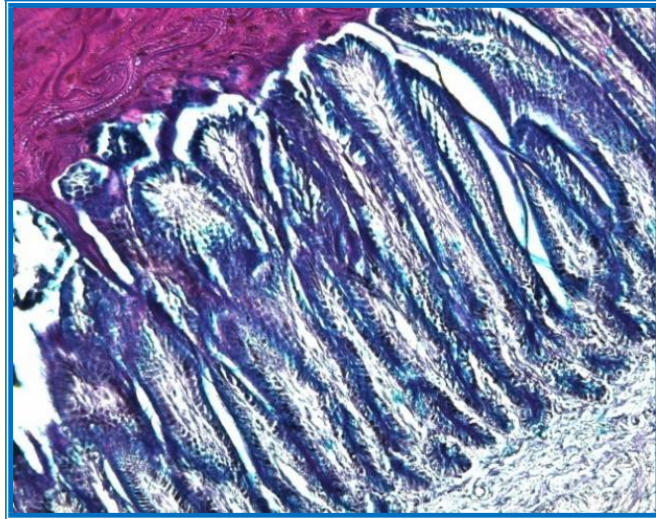


Figure 8. Muscular stomach. Ostrich. Histochemical AA and positive PAS reaction
Col. AA-PAS x 200 (original)

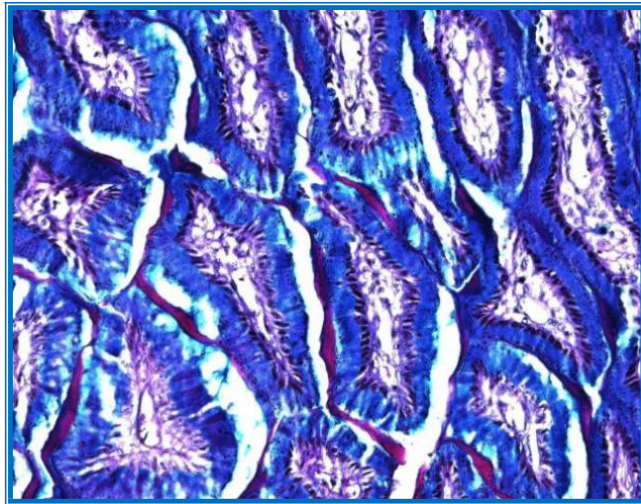


Figure 9. Muscular stomach. Ostrich. Detailed view of secretion products
of the ventricular glands
Col. AA-PAS x 400 (original)

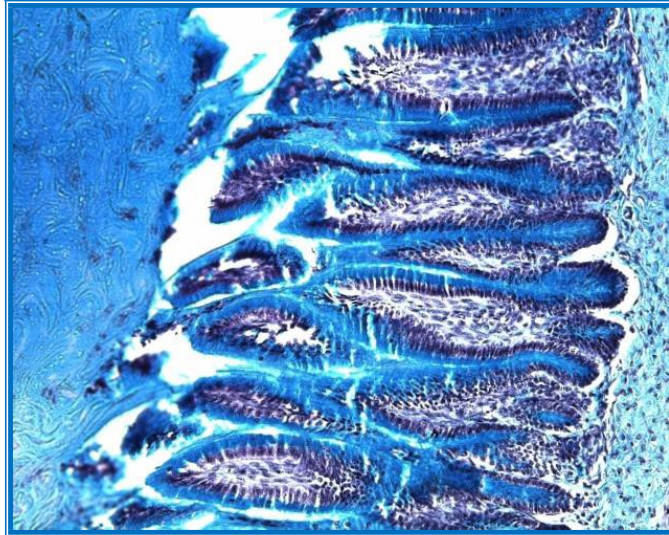


Figure 10. Muscular stomach. Ostrich. View of the continuous secretion activity of the glandular cells
Col. AA x 200 (original)

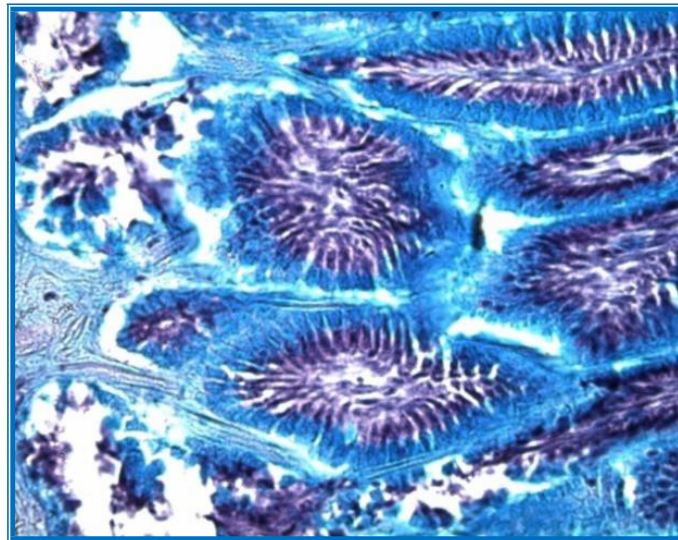


Figure 11. Muscular stomach. Ostrich. Detailed view of the glandular epithelium cells which produce MPG acids, highlighted through histochemical reaction with Alcian Blue
Col. AA x 400 (original)

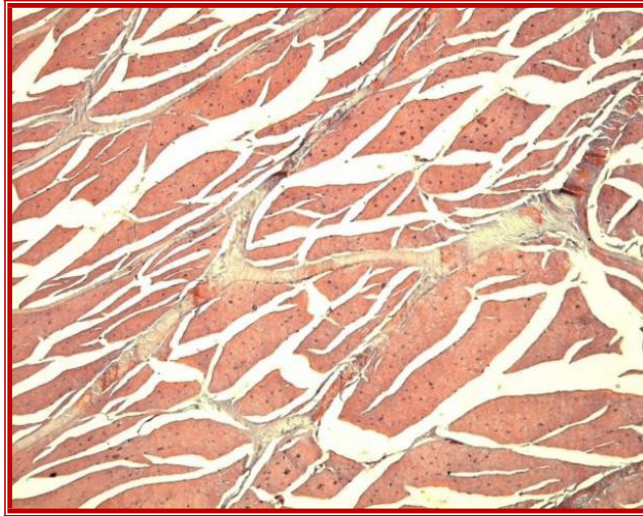


Figure 12. Ostrich. Muscular stomach. View of the external muscle layer, showing smooth muscle fibers and conjunctive fibers, blood vessels, nerves
Col. HE x 50 (original)

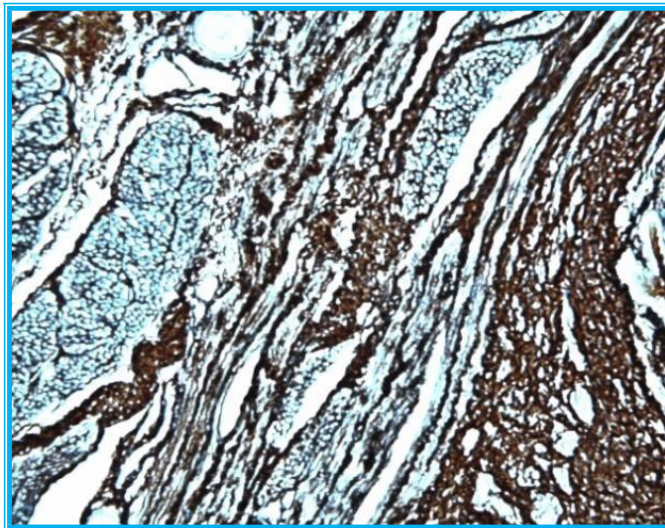


Figure 13. Muscular stomach. Ostrich. Reticulin fibers distribution in the ventricular wall structure after silver staining process
Col. Gomori x 200 (original)

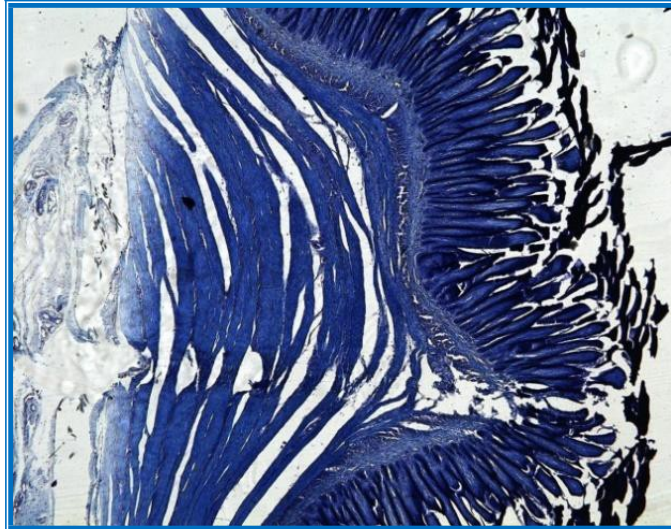


Figure 14. Ostrich. Muscular stomach. View of the serous at the ventricle level
Col. AT x 50 (original)

Conclusions

The ventricular mucosa is covered by the thick cuticle, continuously secreted by ventricular glands cells.

Muscle of the mucosa is present, but on certain portions it can no longer be observed, being united with the layers of the musculature.

The muscular layer is best represented, composed of smooth muscle fibers with the three layers: longitudinal outer, circular middle, with the largest consistency of the inner skew layer.

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