



Ultrastructural Observation of Vagina in Pre-Laying and Laying Japanese Quail (*Coturnix Coturnix Japonica*)

PN Thakur*, JY Waghaye, CS Mamde, SD Kadam and NM Karad

Department of Veterinary Anatomy, College of Veterinary and Animal Sciences, Parbhani Maharashtra Animal and Fishery Sciences University, Nagpur, Maharashtra, India

*Corresponding Author: PN Thakur, Department of Veterinary Anatomy, College of Veterinary and Animal Sciences, Parbhani Maharashtra Animal and Fishery Sciences University, Nagpur, Maharashtra, India.

DOI: 10.31080/ASVS.2022.04.0509

Received: August 12, 2022

Published: September 12, 2022

© All rights are reserved by PN Thakur, et al.

Abstract

The vagina was collected from 12 birds each at end of 4th week, 5th week (Pre-laying period), 6th week and 7th week (laying period). The birds were sacrificed and entire oviduct starting from infundibulum to vagina was excised by abdominal laprotomy and cranial displacement of sternum. The collected samples were washed with normal saline and were cut into its different segment. The TEM observations revealed that the lining epithelium of the vagina was composed of ciliated, non-ciliated, with few goblet cells. The ciliated cells were characterized by the presence of spherical to oval elongated apically placed euchromatic nucleus with dispersed clumps of chromatin. The cytoplasm showed mitochondria, supranuclear Golgi body, free ribosomes, and rough endoplasmic reticulum. The cilia were attached to the dark basal bodies on the apical border.

Keywords: Ultra Structure; TEM; Vagina; Japanese Quail

Introduction

Quail are small birds and commercially grown for their eggs and meat. In India commercial farming of quails is increasing day by day as the investment and maintenance cost is very less compare to other birds.

Japanese quails are fast growing birds compared to other poultry birds as quails start laying eggs in about 6-7 weeks of age. Japanese quails by virtue of their early maturity, short breeding cycle and disease resistance are preferred to poultry in commercial and research fields. Quail becomes ready for marketing in 5 weeks of age.

Materials and Methods

To study ultrastructural cellular details, fresh tissue samples of vagina from each group were collected for transmission elec-

tron microscopy. The samples were collected in 4% glutaraldehyde and stored at 4°C. Subsequently tissue was washed in cold sodium cacodylate buffer solution (pH 7.4) by giving three changes of 30 minutes each. Then tissue was fixed in 1% osmium tetroxide for two hours at 4°C. The tissue was rehydrated in ascending grades of alcohol (50, 70, 80, 90, 95 and absolute ethyl alcohol) and embedded in Epon-araldite mixture. Ultra-thin section were taken on microtome and then mounted and stained with saturated solution of uranyl acetate and lead citrate. The sections were examined and photographed by transmission electron microscope for ultra-structural cellular details at RUSKA Labs, College of Veterinary Sciences, Rajendranagar, Hyderabad.

Results and Discussion

The tissues of the vagina processed for the transmission electron microscopic study confirmed the microscopic structure of the vagina, observed under the light microscope.

The TEM observations revealed that the lining epithelium of the vagina was composed of ciliated, non-ciliated, with few goblet cells. The ciliated cells were characterized by the presence of spherical to oval elongated apically placed euchromatic nucleus with dispersed clumps of chromatin. The cytoplasm showed mitochondria, supra-nuclear Golgi body, free ribosomes and rough endoplasmic reticulum. The cilia were attached to the dark basal bodies on the apical border. The non-ciliated cells showed basally placed euchromatic nuclei with cytoplasm rich in organelles. However, the cytoplasm of both ciliated and non-ciliated cells of vaginal epithelium exhibited the presence of electron-lucent as well electron-dense granules in all age groups (Figure 1-3).

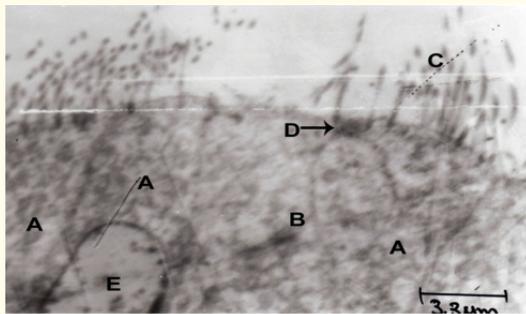


Figure 1: Transmission electron photomicrograph of the vagina at 4th week old bird showing.

- A. Ciliated cells,
 - B. Non ciliated cells
 - C. Cilia
 - D. Basal bodies
 - E. Nucleus
- (Printing magnification X 5790).

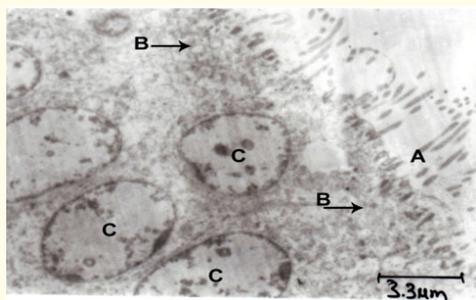


Figure 2: Transmission electron photomicrograph of the vagina at 7th week old bird showing.

- A. Ciliated cells,
 - B. Basal bodies
 - C. Nucleus
- (Printing magnification X 5790).

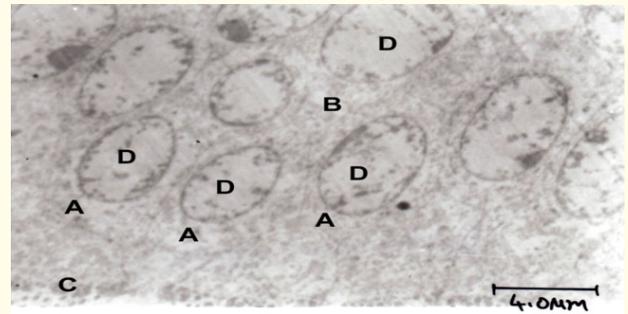


Figure 3: Transmission electron photomicrograph of the vagina at 6th week old bird showing.

- A. Ciliated cells
 - B. Non ciliated cells
 - C. Cilia
 - D. Nucleus
- (Printing magnification X 5790).

In accordance with the present findings, [6] in Ostrich reported the euchromatic nuclei with the cytoplasmic rough endoplasmic reticulum, mitochondria, free ribosomes and Golgi apparatus with electron-dense and electron-lucent substances in the vaginal epithelial cells, whereas [4] examined mucosal folds were narrower in vagina. [1] Reported the luminal surface of apical ciliated cells showed cilia with interspersed long slender microvilli. The apical non-ciliated cells showed basally placed elongated and heterochromatic nuclei with supranuclear secretory granules [2]. Recorded fine structural study on tubular gland cells in oviducts from actively laying Japanese quail and hen, the Golgi apparatus was directly involved in the formation of secretory granules. [3] Noted the wall of the tube consisted of the mucus membrane, muscular layer and serous coat. [5] Recorded electron light secretory granules in the proprial glands of the uterus of the Pekin duck oviduct. They mentioned that electron microscopy revealed the appearance of mucous granules in luminal cells before the appearance of secretory granules in the tubular gland cells [7]. Observed the transmission electron microscopic observations on the oviduct of Punjab white quail. The uterine epithelium composed of ciliated and non-ciliated cells. The ciliated cells possessed numerous cilia with randomly interspersed long slender microvilli.

Conclusions

The transmission electron microscopic study affirmed the histomorphological observations on vagina studied under light microscopy. In general, the histomorphology of the vagina in Japanese quail (*Coturnix japonica*) was found close to that of the other avian species. The observations of the present study confirmed the age-dependent growth and histological alterations in the vagina of the oviduct till the 7th week of age

Bibliography

1. Bansal N., *et al.* "Transmission electron microscopic studies on the oviduct of domestic hen". *Indian Journal of Poultry Science* 46.2 (2011): 271-274.
2. Fertuck HC and JD Newstead. "Fine structural observations on magnum mucosa in quail and hen oviducts". *Zeitschrift für Zellforschung* 103 (1970): 447-459.
3. Makita T and Kiwaki S. "The fine structure of infundibulum-magnum junctional area of the quail oviduct". *Japanese Journal of Zootechnical Science* 39.7 (1968): 292-298.
4. Mohammadpour AA. "Comparative histomorphological study of uterus between laying hen and duck". *Pakistan Journal of Biological Science* 10.19 (2007): 3479-3481.
5. Ozen A., *et al.* "Light and electron microscopic studies on the oviduct epithelium of the Pekin ducks (*Anas platyrhynchos*)". *Ankara Universitesi Veteriner Fakultesi Dergisi* 56 (2009): 177-181.
6. Saber AS., *et al.* "Light, scanning and Transmission Electron Microscopical study on the oviduct of the Ostrich (*Struthio camelus*)". *Journal of Veterinary Anatomy* 2.2 (2009): 79-89.
7. Sukhadeve SV., *et al.* "Electron microscopic studies on the oviduct of panjab white quail". *Journal of Animal Research* 8.4 (2018): 915-918.