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Popular Article

Role of Harderian Gland in Avian – an overview

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Introduction

The Harderian gland (HG) is a dominant orbital gland and lympho-epithelial organ in avian species. It is popularly named one of the major para-ocular exocrine glands of domestic fowl. The Harderian gland is an important part of conjunctiva associated lymphoid tissue (CALT) (Payne, 1994., Pawar *et al.*, 1998 and Khan *et al.*, 2007). The lymphoid tissue of the chicken is divided into "central" and " peripheral" ones. The central lymphoid tissue includes bursa of Fabricius and thymus. The peripheral lymphoid tissue includes the spleen, caecal tonsils and all the mucosa-associated lymphoid tissues including respiratory tract, genitourinary tract, alimentary tract and head associated lymphoid tissues that consist of Harderian glands (Islam *et al.*, 2017). It presents granulocytes, macrophages, and lymphocytes in the sub-epithelial layer and lumina of the lobules for local immunity of the orbit. It plays an essential role in the immune response of the ocular region as well as in the upper respiratory system (Mobini, 2012). The gland was first described by the Swiss physician Johann Jacob Harder in 1694, in *Dama vulgaris* deer. Since then, much data has been reported regarding these glands, known as Harder's glands or Harderian glands. In avian three types of Harderian glands (HG) based on histomorphological features observed (Burns, 1992) as follows.

- a. Compound tubule-acinar
- b. Compound tubular
- c. Mixed type



Nature of Secretion

The Harderian glands (HG) produces lacrimal fluid which influences the main function is to lubricate the surface of the eyeball and especially nictitating membrane in birds. This gland is also as a source of pheromones and growth factors (Klećkowska-Nawrot *et al.*, 2015). The HG gland involved in the protection of the eye against bright light and play role in photodynamic process (Funasaka *et al.*, 2010). The gland may have endocrine function (Pradidarcheep *et al.*, 2003). In avian the gland has great role in response to infection and vaccination (Salam *et al.*, 2003) conditions.

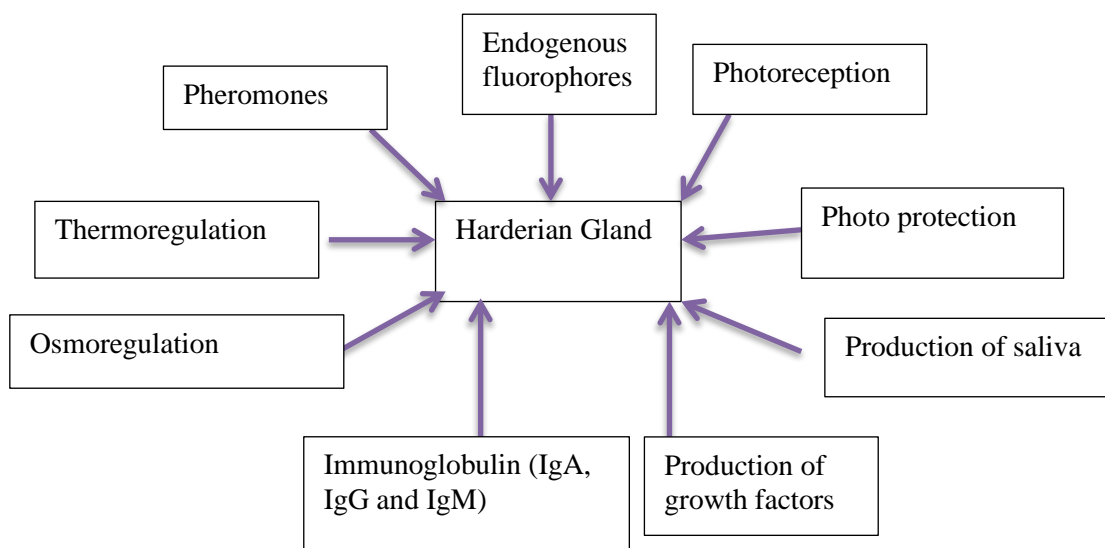


Fig. 1: Schematic diagram of Harderian glands and its possible diversified function

Gross morphology

Harderian gland of bird shows considerable species differences in location. In White Leghorn chickens the Harderian gland is located in the ventro-medial aspect of the eyeball extending rostrally from the optic nerve (Pawar *et al.*, 2000). In contrast, it has been reported that Harderian gland of native chickens of Bangladesh is situated on the dorsal posterior surface of the eyeball occupying the considerable part of the orbit. While in Rook, this gland is located in the ventral and posterior medial to the eyeball (Jahan *et al.*, 2006). In the Canadian ostrich, the Harderian gland is located ventromedial around the posterior part of the eyeball. In duck, this gland is located in the anterior medial part of the orbit.

Shape

In White leghorns, the Harderian gland is hourglass shaped and in Rook it is tongue shaped (Jahan *et al.*, 2006). In native chickens of Bangladesh, this gland is triangular in shape. Whereas,

in Canadian ostrich, the Harderian gland is flattened, oval shaped, irregular in outline and pointed in the dorsal end (Frahmand *et al.*, 2015).

Conclusion

The Harderian glands shows diversified functional responsibilities in birds as well as other animals. It produces local immunoglobulins against many viruses in young chicks of growing level. It naturally protects the eyes and upper respiratory tract also in growing chicks.

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