International Journal of Science, Environment and Technology, Vol. 6, No 3, 2017, 2132 – 2136
ISSN 2278-3687 (O)
2277-663X (P)

HISTOCHEMICAL STUDIES ON INTESTINAL LYMPHOID TISSUES IN KADAKNATH BREED OF POULTRY (*Gallus gallus domesticus*)

Dr. Prashant Gedam[1], Dr. Amol Salankar[2], Dr. Naresh Nandeshwar[3], Dr. U.P. Mainde[4], Dr. T. Rama[5], Dr. Rasmita Panda[6], Dr. V. Ravikanth[7] and Dr. Sandip Bansode[8]
[1,2,34]Nagpur Veterinary College, Maharashtra, Nagpur.
[5,6,7,8]College of Veterinary Science, Korutla
E-mail: nvc1828@rediffmail.com

Abstract: The histochemical studies on lymphoid tissue of the intestine was carried out on 30 birds of Kadaknath breed of chicken, divided in to 3 different age groups as GI (6 weeks), GII (12 weeks) and GIII (18 weeks).

The lamina propria of the small intestine showed PAS positive material with varying intensity in the different cells. The lymphoid tissue was scattered throughout the intestine in the diffuse and aggregated form in all the groups under present study. The cytoplasm of the epithelium, mucobacterial layer and lamina propria showed the moderate acid mucopolysaccharides in almost all the parts of intestine. The aggregated solitary lymphatic nodules were present in the caeco-colicphatic tissue was predominant in Gr.II birds. The germinal centers were well market in Gr. II and Gr. III birds. The acid phosphatase activity was weak in the lymphoid follicles of Gr.I, but its intensity was more in Gr.III birds.
The glycogen activity was strong in lymphatic of Gr. II birds. The neutral mucopolysaccharide was dominant. The acid phosphatase activity was weak where as the alkaline phosphatase activity was stronger in 12-18 week old birds.
Keywords: Intestinal lymphoid tissue, kadknath, Peyers patches, Histochemical.

1. Introduction

India is ranking currently fifth in the world as a broiler producer and fourth in the egg production. The annual egg production in India is recorded as 53,000 million and poultry meat as 3.2 million tones (Saxena, 2009).

Kadaknath breed of poultry is reared since long time by tribals of Bhil and Bhilala community of Jhabua and Dhar districts of Western Madhya Pradesh. The black coloration of the flesh is due to the deposition of melanin pigment in the connective tissue of organs and in the dermis (Rao and Thomas, 1984).

The lymphoid tissue of the gut has a significant role in preventing diseases caused by gut pathogens (Hanger and Heath, 1994). It is possible that this tissue respond to antigen, gaining

*Received May 26, 2017 * Published June 2, 2017 * www.ijset.net*

access via the mucous membrane. Hence it is essential to study histochemistry of the fundamental structure in order to probe the immune mechanism of the gastrointestinal tract.

2. Materials and methods

The present research work on histochemical studies on intestinal lymphoid tissues was carried on 30 birds in Kadaknath poultry. The histochemical studies of lymphocytes and lymphatic nodules of the intestine was carried out divided into 3 different age groups as GI (6 weeks), GII (12 weeks) and GIII (18 weeks). Following staining procedures were carried out for histochemical study.

1. Periodic Acid Schiff's (PAS) technique for demonstration of glycogen (Bancroft and Steven, 1982)
2. Combined Alcian Blue PAS technique for the demonstration of acid and neutral mucins (Bancroft and Steven, 1982)
3. Acid and Alkaline phosphatase activity (Singh & Sulochana, 1996)

3. Result

Glycogan

The lamina where as the other cells and the epithelium showed mild reaction in Gr.I. The activity was higher in Gr.II. birds with low intensity in Gr. III birds. propria of the small intestine showed PAS positive material with varying intensity in the different cells. The lymphocytes showed strong reaction, the lymphoblasts showed moderate reaction

The mucobacterial layer on the surface epithelium showed strong PAS positive reaction (Fig. 1). The lymphatic nodules showed high degree of PAS reaction. The caecal tonsils also showed the positive reaction in all the age groups. The colon showed mild to moderate reaction in Gr.I, but strong reaction occurred Gr.II and Gr.III (Fig 2). The observation of the present study regarding the presence of PAS positive activity in gut is considered as necessary for the proliferations of the lymphatic nodules.

Mucopolysaccharides

The cytoplasm of the epithelium, mucobacterial layer and lamina propria showed the moderate acid mucopolysaccharides in almost all the parts of intestine. The lymphocytes, lymphoblast and others cells in lamina propria as well as some of the cells of epithelium showed neutral mucopolysaccharides. This intensity was moderate in Gr.I and moderate to strong in Gr.II and Gr.III (Fig 3).

As far as the aggregated lymphoid nodules are concerned the neutral mucopolysaccharides was dominant in the follicles of all the age groups of animals. The

inter-follicular connective tissue showed mild to moderate reaction for neutral mucopolysaccharides (Fig 4).

Acid Phosphatase

The acid phosphatase activity was weak in the lymphoid follicles of Gr.I, but its intensity was more in Gr.III animals (Fig 5). The present scanning of literature showed no reference regarding the acid phosphatase activity, but its presence may be associated with its significance related to its ability to catalyze the enzymes.

Alkaline Phosphatase

The alkaline phosphatase activity in lymphatics & lamina propria was weak in Gr.I, but moderate to strong activity occurred in Gr.II and Gr.III (Fig 6). The reaction was weak to moderate in the lymphatic nodules, indicative of metabolic activity. The strong alkaline phosphatase activity in the capillaries was indicative of dephosphorylation essential for absorption and transportation of metabolites. The present finding might be ascribed to the cellular modification occurring in the lymphatic nodules during the maturation of lymphocytes.

5. Conclusions

In histochemical study, the PAS positive reaction was higher in lymphatic nodules with varying degree but the activity was higher in Gr- II birds. The caecal tonsils showed higher activity which is indicative of necessity for their proliferation. The acid mucopolysaccharide was moderate in epithelium and lamina Propria. The lymphatic showed presence of neutral mucopolysaccharide.

The acid phosphates were weak in lymphoid follicles of Gr- I, but its intensity was more in Gr- III. The alkaline phosphates were weak to moderate in lymphoid follicles in Gr.I, but stronger activity was found in Gr. III. The strong activity in capillaries was indicative of dephosphorylation essential for absorption and transportation of metabolites.

References

[1] Bancroft, J.D.; and Stevens, A. (1982). In, Theory and practice of Histological Techniques, 2nd Edition, Churchill Livingstone, Edinburgh.

[2] Drury, R.A.B. and E.A. Wallington (1980). In Carleton Histological Technique 5th Ed; Oxford University Press, New York / Toronto.

[3] Hanger, J.J. and Heath, T.J. (1994). The arrangement of gut - associated lymphoid tissues and lymph pathways in the koala (Phascolarctos cinereus) J. Anat. 185: 129-134.

[4] Pramod Kumar D. and Thandava Murthy C. (1996). Micro anatomical studies on the caecal tonsil of white leghorn birds. IJVA 8(1/2): 12-15.

[5] Pramod Kumar D. and Thandava Murthy C. (2007). Neonatal development of the caecal tonsil in white Leg Horn (WLH) birds. IJVA 19 (2): 18—21.

[6] Rao, G.V. and Thomas, P.C. (1984). The breed characterization of Kadaknath breed of indigenous (Desi) chicken, Avian Research, 68:55-57

[7] Samuelson, Don A. (2007). In Textbook of Veterinary Histology First edition, Saunders, Elsevier, Philadelphia, USA: 268.

[8] Shukla, S. and Singh, G.K. (1998). Anatomical Studies on Gut - associated Lymphoid tissue in Neonatal Pups IJVA 10 (1/2): 48-52.

[9] Sing, U.B. and S. Sulochana (1996). In Hardbook of Histological and Histochemical Technique, 1st edition, premier publishing House, Hyderabad.

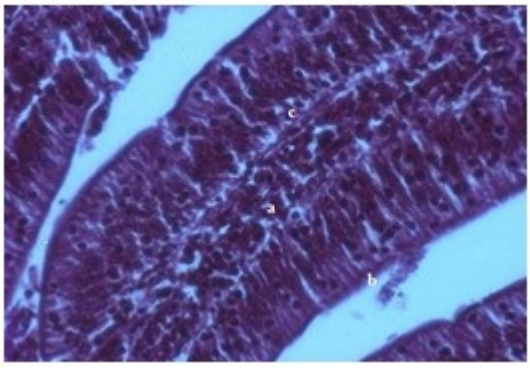

Fig 1: Photomicrograph of Jejunum (Gr. I) villus.
a) Lymphocytes in lamina propria.
b) Intraepithelial lymphocytes
c) Subepithelial lymphocytes (PAS 400 X)

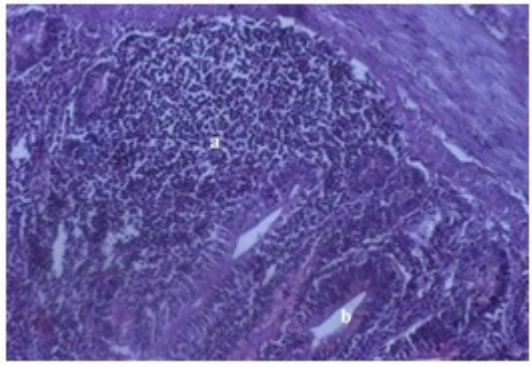

Fig 2: Photomicrograph of Ileum (Gr. III) showing a) Lymphatic nodule and b) Crypts of liberkuhn (PAS 200 X)

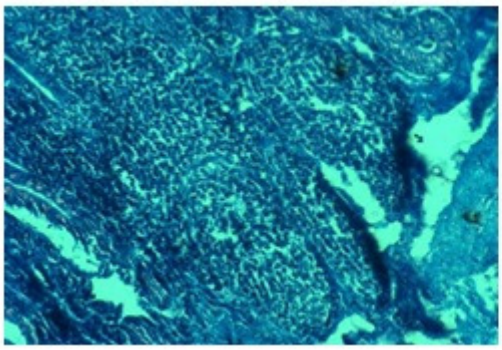

Fig 3: Photomicrograph of Caecum (Gr. III) showing reaction in lymphatic nodules (Ab PAS 200 X)

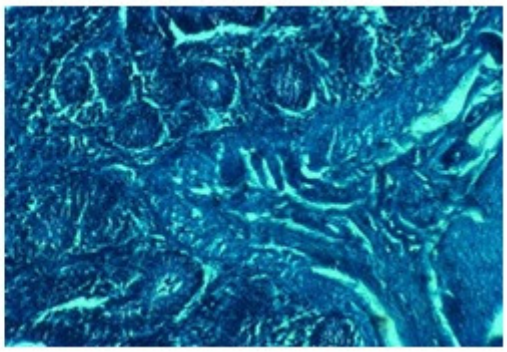

Fig 4: Photomicrograph of Colon (Gr. III) showing Ab PAS reaction (Ab PAS 200 X)

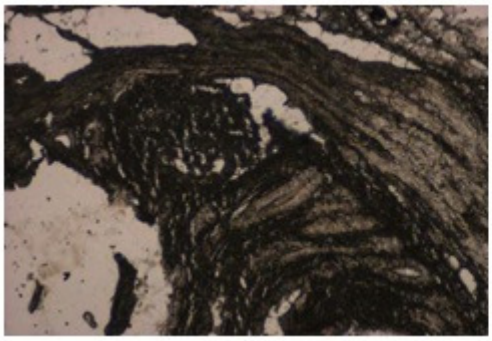

Fig 5: Photomicrograph of Caecum (Gr.I) showing Acid phosphatase reaction (Acid phosphatase 100 X)

Fig 6: Photomicrograph of Caecum (Gr.III) showing Alkaline phosphatase reaction (Alkaline phosphatase 200 X)