# GROSS LOCALIZATION AND DISTRIBUTION OF GUT ASSOCIATED LYMPHOID TISSUE IN GOAT (*CAPRA HIRCUS*)

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#### ABSTRACT

The intestine of four goats were cut at the mesenteric border and preserved in 2% glacial acetic acid for 6-8 hours to localize the distribution of lymphoid tissue. The lymphoid tissue was present in the form of oval to elliptical raised areas on the mucosal surface of the small intestine. The duodenum did not show any Peyer's patches, however, very few small round nodules were observed towards its distal part. There were two types of morphologically different Peyer' patches (PP) in the jejunum and ileum. The Peyer's patches of jejunum were present at regular intervals. The patches were oval to elliptical in shape with numerous fossulae on their surface. The ileal Peyer's patch was in the form of a continuous strip. The jejunum had longest and maximum number of Peyer's patches. The large intestine was having solitary lymphoid nodules which were confined to the distal colon and rectum. The colon had more number of solitary lymphoid nodules as compared to the rectum.

Key words: Duodenum, Jejunum, Ileum, Caecum, Colon, Rectum, Payer's Patches.

Goat is a multi functional animal and its rearing is an enterprise which has been practiced by a large section of population in rural areas in India. Morphological analysis of the goat digestive tract has led to its being classed as an intermediate feeder, situated between the concentrate selectors at one extreme and the grass-roughage eaters at the other (Hofmann, 1973 and 1989). The intestine being the important segment of the digestive tract is prone to the various parasites and pathological conditions. The intestine contains lymphoid tissue in the form of nodules within the mucosa as part of mucosa associated lymphoid tissue and in the gut as gut associated lymphoid tissue (GALT) which helps to maintain the immunity. The intestine and the GALT are essential components of whole body immune defense, protecting the body from foreign antigens and pathogens, while allowing tolerance to commensal bacteria and dietary antigens (Forchielli and Walker, 2005). The GALT initiates immune response to specific antigens encountered along the entire gut mucosal surface (Cesta, 2006). The GALT is important in diagnosis and vaccination schedule in some diseases like Mycobacterium avium which causes paratuberculosis in goats (Munjal et al., 2005). The gross studies on gut associated lymphoid tissue of intestine had been studied in goat (Gautam et al., 2013), dog (Shukla and Singh, 1998), various farm animals (Liebler-Tenorio and Pabst, 2006) and in cattle (Yasuda et al., 2013). The anatomical study of small and large intestine in relation to GALT will be helpful in understanding the mechanism of digestion and immunity.

# MATERIALS AND METHODS

The small and large intestines were procured from local slaughter house immediately after slaughtering of goats. The intestine of four goats was cut at the mesenteric border and preserved in 2% glacial acetic acid for 6-8 hours to localize the distribution of lymphoid tissue (Carlens, 1928).

## **RESULTS AND DISCUSSION**

The lymphoid tissue was present in the form of an oval to elliptical raised areas on the mucosal surface of the small intestine. Numerous small lymphoid fossulae on the mucosal surface of the small intestine were observed as reported in goat (Gautam et al., 2013), buffalo (Alboghobeish and Nejat, 1999) and Japanese black calves (Yasuda et al., 2013). The duodenum was not having any Peyer's patches (PP) formation but very few small round nodules were observed towards the distal part of the duodenum (Fig.1). Similar findings were observed in buffalo (Alboghobeish and Nejat, 1999), however, Peyer's patches were reported towards the terminal end of the duodenum in goat (Gautam et al., 2013). There were two types of morphologically different Peyer's patches observed in the jejunum (JPP) and ileum (IPP). These were located along the anti-mesenteric border of the small



Fig. 1: Lymphoid nodules (LN) in duodenum of goat; 2: Jejunal Peyer's patches (JPP) in jejunum of goat.



Fig. 3: Jejunal Peyer's patches (JPP) in jejunum of goat; 4: Ileal Peyer's patches (IPP) in ileum of goat; 5: Lymphoid nodules (LN) with central depression (D) in colon of goat; 6: Lymphoid nodules (LN) with central depression (D) in rectum of goat.

intestine as reported in goat (Gautam et al., 2013) and Japanese black calves (Yasuda et al., 2013). The Peyer's patches were very few and very small patches were present in middle part of jejunum (Fig. 2) as reported in goat (Gautam et al., 2013) and buffalo (Alboghobeish and Nejat, 1999). The distribution of Peyer' patches in caudal segment of jejunum were more frequent and these were large in size (Fig. 3) as reported in local Assam goat (Gautam et al., 2013). The ileal Peyer's patch (IPP) was in the form of a continuous strip and it was observed as single continuous aggregation of lymphoid follicles (Fig. 4) which was in total agreement with findings in Assam goat (Gautam et al., 2013), buffalo (Alboghobeish and Nejat, 1999) and Japanese black calves (Yasuda et al., 2013). The number of Peyer's patches was highest in the jejunum. The average number of Peyer's patches in jejunum was found to be around 30-35 whereas it was reported to be 25-40 in ruminants and 14-27 in pigs (Griebel and Hein, 1996) and around 37-38 in adult Assam goat (Gautam et al., 2013).

In the present study, solitary lymphoid nodules in large intestine were mainly confined to the distal colon and rectum. These were in the form of some minute round tubercles with central depression (Fig. 5) as reported in Assam goat (Gautam *et al.*, 2013). The density of solitary lymphoid nodules was found to be higher in the rectum (Fig. 6) as reported in Assam goat (Gautam *et al.*, 2013).

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