

HISTOCHEMICAL OBSERVATIONS ON THE LYMPH NODES OF GOAT FOETUSES*

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*Part of M.V. Sc. thesis submitted by first author to Kerala Agricultural University

ABSTRACT

Prenatal histochemical studies on the lymph nodes of goat were conducted in six caprine foetuses in the last month of gestation. Lymph nodes exhibited only traces of glycogen, weak activities of acid and alkaline phosphatases and weak reaction for lipids. But deposition of fat was seen around the capsule of superficial lymph nodes from fourth month onwards, for providing protection.

INTRODUCTION:

The lymph nodes are the only lymphatic organs located in the course of lymphatic vessels, with the characteristic function of filtering of the lymph before it flows into the venous system. The activated immune cells proliferate in the lymph nodes and produce antibodies to protect the body against disease and infection. Although research has been conducted on the histochemistry of lymph nodes in other species of animals, the prenatal histochemical studies on the caprine lymphatic system are scanty. Hence this study was conducted to explore into the histochemical changes occurring in the lymph nodes of goats during the prenatal life.

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MATERIALS AND METHODS

The study was conducted on six caprine foetuses in the last month of gestation. The age of the foetuses was calculated using the formula derived by Singh *et al.* (1979), for goat foetuses, $W^{1/3} = 0.096(t - 30)$, where, W = Body weight of the foetus in g and t = Age of the foetus in days. Representative lymph nodes from five major lymphocenters were dissected out from the foetuses, viz. parotid and mandibular lymph nodes from lymphocenters of the head, prescapular lymph node from neck, caudal mediastinal lymph node from thoracic cavity, jejunal mesenteric lymph node from abdominal viscera, and prefemoral lymph node from abdominal wall. For detection of carbohydrates the material was fixed in chilled acetone at 4°C. The specimens were dehydrated and embedded in high melting paraffin (MP 58°C - 60°C). Serial sections of five micron thickness were cut. For studies on lipids and phosphatases, frozen sections of 10 to 20 µm thickness were also prepared.

RESULTS AND DISCUSSION

Carbohydrates

Lymphocytes in the lymph nodes exhibited PAS positive reaction and traces of glycogen granules in the cytoplasm by last month of gestation (Fig. 1). This was in confirmation to the findings of Lillie and Fullmer (1976) in the

lymphoid cells of animals.

Small lymphocytes exhibited traces of glycogen granules in the cytoplasm but these granules were absent in the large and medium sized lymphocytes. These differences may be attributed to a change in the structure of cells during the course of development. Banks (1981) reported that presence of glycogen indicated the cells' ability to store this most important intracellular polysaccharide inclusion which served a nutritive function as the storage form of energy of cells.

Enzymes

A weak activity of acid phosphatase was detected in the medullary cords, capillary endothelium and cortex of lymph nodes (Fig. 2). Similar reports were given by Gomori (1941) in both human and animal lymph nodes. Acid phosphatase activity is indicative of the lysosomal activity. So the weak reaction indicated that the lysosomal activity was reduced during foetal stages.

A weak activity of alkaline phosphatase (Fig. 3) was also detected in the medullary cords and capillary endothelium of lymph nodes. Similar observations were made by Smith (1958) in mice. Najpande and Srivastava (1974) reported that the enzyme was localized in the areas where active differentiation was taking place, while it disappeared from other parts where differentiation phase had already been completed.

The cortex also showed a weak reaction for alkaline phosphatase similar to the reports of Gadre *et al.* (2001) in calves.

Lipids

Lymph nodes showed only a weak reaction for lipids when stained with oil red 'O' (Fig. 4). Similar reports were made by Magnusson and Majeed

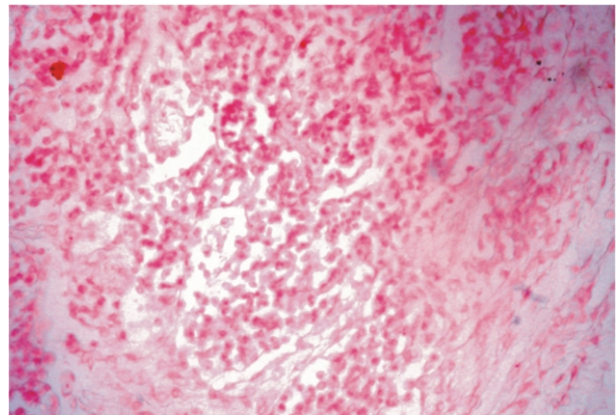


Fig. 1. Parotid lymph node showing presence of glycogen (145 days). Best's Carmine x 400
1. Cortex 2. Capsule 3. Accumulation of fat

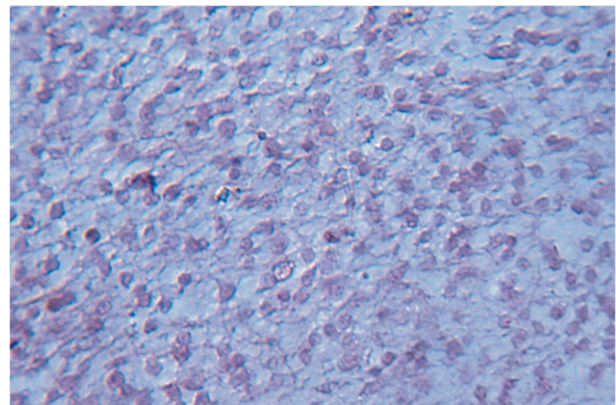


Fig. 2. Mandibular lymph node showing weak acid phosphatase activity (145 days).
Gomori's method x 100.

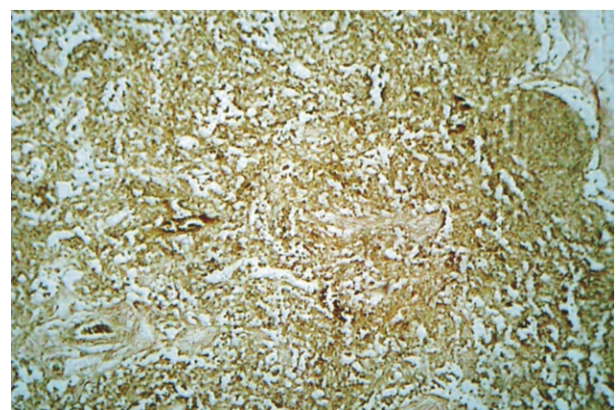


Fig. 3. Prefemoral lymph node showing weak alkaline phosphatase activity (145 days).
Gomori's method x 100.

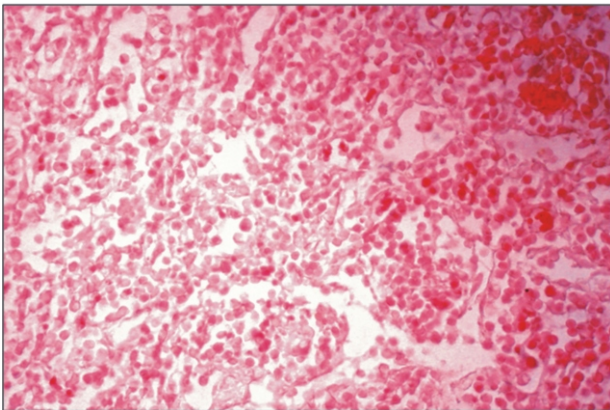


Fig. 4. Prescapular lymph node showing weak reaction for lipids (145 days). Oil red 'O' x 100.

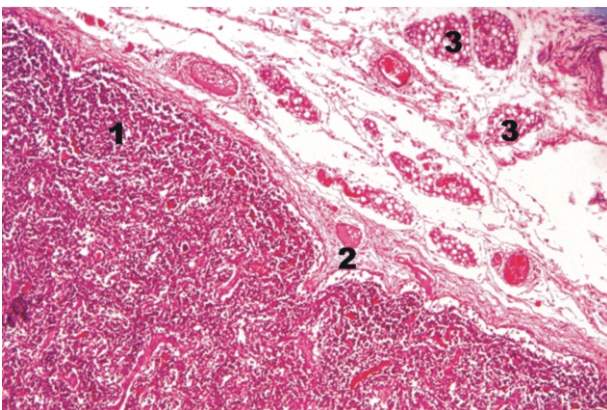


Fig. 5. Parotid lymph node (99 days). H&E x 100.
1. Cortex 2. Capsule 3. Accumulation of fat

(1978) in mesenteric lymph node of old rat. But Gomori (1946) was unable to find lipase activity in human spleen and lymph node. Banks (1981) reported that detection of lipids indicated the presence of fatty acid metabolism as an important source of activated acetate to drive the tricarboxylic acid (TCA) cycle. The weak reaction in this study indicated lesser storage activities during developmental periods.

Capsular surface of the superficial lymph nodes showed deposition of fat from fourth month onwards by 99 days of gestation (Fig. 5). This might be a protective adaptation for the peripheral nodes lying near the movable parts of the body.

REFERENCES

- Banks, W.J. 1981. *Applied Veterinary Histology*. Williams and Wilkins, Baltimore, p. 572
- Gadre, K.M., Malik, M.R. and Ramakrishna, V. 2001. *Handbook of Calf Lymph Node*. Jaypee Brothers Medical Publishers, New Delhi, p. 20
- Gomori, G. 1946. Distribution of lipase in tissues under normal and under pathologic conditions. *Arch. Path.* 41: 121-129
- Lillie, R.D. and Fullmer, H.M. 1976. *Histopathological Technique and Practical Histochemistry*. Tenth edition. The Blakiston Company, New York, p. 800
- Magnusson, G. and Majeed, S. 1978. Histochemical study of mesenteric lymph node in old rats. *Lab. Anls.* 12: 99-102
- Najpande, P.G. and Srivastava, R.K. 1974. A note on the localization of alkaline phosphatase in thirty-day-old sheep foetuses. *Indian J. Anim. Sci.* 44: 503-505
- Singh, Y., Sharma, D. N. and Dhingra, L.D. 1979. Morphogenesis of testis in goat. *Indian J. Anim. Sci.* 49: 925-931
- Smith, C. 1958. Studies on the thymus of the mammal histology and histochemistry of embryonic and early postnatal thymuses of C57BL/6 and AKR stain mice. *Am. J. Anat.* 116: 611-630