

LIGHT MICROSCOPIC STUDIES ON SPLEEN OF CHICKEN (GALLUS DOMESTICUS)

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SUMMARY

Light microscopic studies on spleen were done in layer chicken of various age groups ranging from day-old to 40 weeks. The spleen was encapsulated by a connective tissue capsule and the trabeculae were poorly developed in all age groups studied. The major cellular population of the white pulp included lymphoblasts, lymphocytes of various sizes, follicular dendritic cells and reticulum cells. Periarterial lymphatic sheath was found adjacent to the central artery. The red pulp composed of pulp cords and had erythrocytes, reticular cells, lymphocytes, macrophages, granulocytes, plasma cells and mast cells. The arterioles that continued into the red pulp formed sheathed capillaries or ellipsoids.

Key words: Spleen, chicken, light microscopy

Spleen is a principal organ of systemic immunity and its importance in disease resistance is accentuated by the scarcity of avian lymph nodes (John, 1994). The avian spleen functions as a major blood filtering organ and is the major source of antibody production. It also plays an important role in erythrocyte destruction, phagocytosis and antigen-antibody interactions (Burke and Simon, 1970).

Spleen tissue were collected from layer chicken of six different age groups such as day-old, four, eight, twelve, twenty and forty weeks. Six birds were used in each age group. The birds were procured from the Institute of Poultry Production and Management, Nandhanam, Chennai. The tissues were fixed in 10 % neutral buffered formalin and Bouin's fluid. The fixed tissues were processed and paraffin sections of 3-5 μ thickness were stained with routine haematoxylin and eosin (Singh and Sulochana, 1978) and Masson's trichrome stain for collagen and muscle fibres (Luna, 1968).

In day-old chick the spleen was enclosed by a fibrous capsule which had a flattened layer of mesothelium externally. The capsule was consisted mainly of collagen fibres and few elastic and smooth muscle fibres in all age groups. The cellular

components of the capsule included the smooth muscle cells and fibroblasts. The thickness of the capsule increased due to more collagen fibres with advancing age as reported by Hodges (1974) in fowl and Bradley and Grahame (1960) in chicken.

The parenchyma of the spleen was consisted of red pulp, white pulp and blood vessels. The white pulp appeared as islands enclosed by red pulp and the distinction between the two pulps was not marked in the present study, which was similar to the findings of King and McLelland (1981) in birds. This could probably be the reason for clear zonal demarcation of white and red pulp and absence of marginal zone in the present study as in the spleen of rodents (Jeurissen *et al.*, 1992).

The white pulp consisted of lymphocytes of various sizes, reticular cells, macrophages, plasma cells, lymphoblast and fibroblast (Fig. 1). These cells were found to be diffusely distributed as clusters or follicles of formative stage in all the age groups studied. At the periphery of these follicles, arteries were observed. From the age of eight weeks onwards, more lymphoid follicles were seen and their number increased as the age advanced. In 20 week-old birds, round lymphoid follicles surrounded by a thin fibrous covering were noticed with smaller arteries at their periphery.

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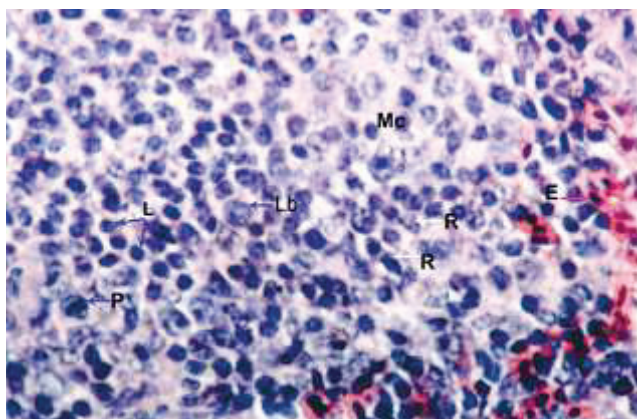


Fig 1. Photomicrograph of a spleen of a day-old chick showing the cellular composition of the white pulp. Note erythrocytes (E), lymphoblast (LB), plasma cell (P), lymphocyte (L) and macrophage (Mc). (H. & E. x 1000)

The periarterial lymphatic sheath (PALS), a diffuse lymphatic sheath was observed adjacent to the central artery in all age groups. It consisted of closely packed small lymphocytes and several medium to large sized lymphocytes. Few macrophages and plasma cells were occasionally found towards the periphery of the periarterial lymphatic sheath.

The red pulp was found to have splenic cords and venous sinusoids. In all age groups, the splenic cords consisted of erythrocytes, reticular cells, lymphocytes, macrophages, plasma cells and mast cells (Fig. 2). In this study, the arterioles from the periphery of the white pulp were found to enter the red pulp as sheathed capillaries. These capillaries were found to be surrounded by reticular cells and macrophages formed the ellipsoids. These observation were in accordance with the findings of Rose (1981) in chicken and Geetha Ramesh *et al.* (2001) in laboratory animals.

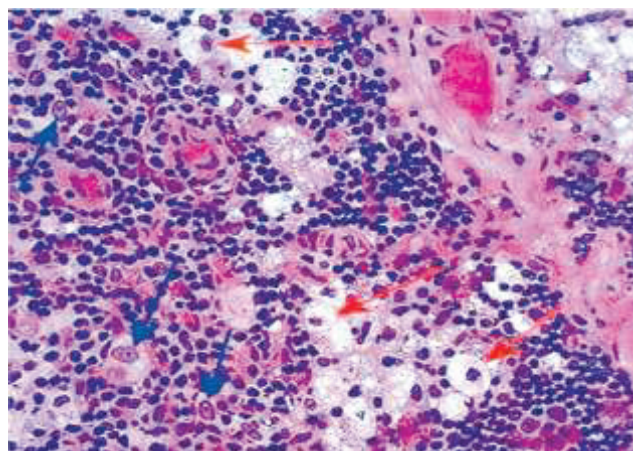


Fig 2. Photomicrograph of spleen of an eight week-old bird showing the plasma cell and macrophage (arrows) in the red pulp. (H. & E. x 1000)

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