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## Histological Study of the Bursa of Fabricius of Broiler Chickens During Heat Stress

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**Abstract:** One hundred, one day old Boiler chicks were randomly divided into two groups and kept in two rooms of different temperatures, first at a temperature of  $35\pm 2^{\circ}\text{C}$  and the second at a temperature of  $24\pm 2^{\circ}\text{C}$  (neutral). A samples were collected after heat exposure at 4 stages during experimental (1st, 2nd, 4th and 6 th week). Samples which were taken from the second room were served as control group. The result revealed that heat stress decreased weight of the bursa of Fabricius. Birds sacrificed at the sixth week showed a bursa with a thin parenchyma, the basal membrane hardly visible, the epithelium is folded, appearance of numerous cysts and leading subepithelial connective tissue, follicles showing lymphoid depletion and necrosis in more than 45 % of cells and moderate interfollicular fibrosis.

**Key words:** Histology, bursa of Fabricius, broiler chickens, heat stress

### INTRODUCTION

Lymphoid system of birds is Composed of central or primary lymphoid organs whose function is the development and maturation of cells: it is the thymus and Bursa of Fabricius in birds (replaced in humans by bone marrow), the development of these organs is independent of antigenic stress and secondary lymphoid organs [spleen, Mucosa Associated Lymphoid Tissue (MALT)...] whose development is conditioned by the occurrence of antigenic stress (Brugere-Picoux and Silim, 1992; Alamargot, 2005).

The aim of our study was to investigate the development of the Bursa of Fabricius of Broiler chickens during heat stress.

### MATERIALS AND METHODS

Hundred chicks of one day old (Race ISA15) were divided into two groups and kept in two rooms of different temperatures, first at a temperature of  $35\pm 2^{\circ}\text{C}$  and the second at a temperature of  $24\pm 2^{\circ}\text{C}$  (neutral).

A sample of 8 subjects were randomly taken from the two rooms at ages: 1, 2, 4, 6 week, sacrifice, the bursa of Fabricius were collected carefully set in a 10% formalin (Gridley, 1960) and sent to histological study in Agroveterinary institute of Souk Ahras (Algeria).

The achievement of blades for histological examination was made according to the technique described below, a successive passage through the different compartments of the automaton, whose goal is dehydration (passages in alcohols of different degrees), the clarification (xylene) and impregnation (infiltration) in

paraffin (Bennoune, 2011). The residence time of the fragments in the automaton is 24 hours. blocks were then cut to a thickness of  $5\mu$  using the microtome (MIC 509, Euromex, Japan) (Luna, 1968). The sections were floated on a warm water bath at  $37^{\circ}\text{C}$  flotation for stretching, then the sections were mounted on clean slides using an adhesive (egg albumin) and dried on a slide warmer. The sections were stained with Mayer's hematoxylin and eosin (H & E). The histological structures of the lymphoid tissues were observed using an optical microscope under low ( $\times 10$ ) and a high magnification ( $\times 40$ ).

### RESULTS AND DISCUSSION

A normal state (Group neutral temperature); Bursal follicles appeared large and densely populated. The cortex was separated from the medulla by a basal membrane, visible in most sections. Interfollicular walls thin and extended to the epithelium.

Cell populations apparently normal. According to Hodges (1974) , Riddell (1987) and Khenenou *et al.* (2012) at this age this microscopic appearance characterized a normal Bursa of Fabricius. During heat stress ( $35\pm 2^{\circ}\text{C}$ ) birds sacrificed one day after and during the first and second weeks of age, had a similar microscopic aspect with normal Bursa of Fabricius (Fig. 1-A).

Birds sacrificed at the sixth week showed a bursa with a thin parenchyma, follicles showing lymphoid depletion and necrosis in more than 45% of cells and moderate interfollicular fibrosis. Basal membrane hardly visible,

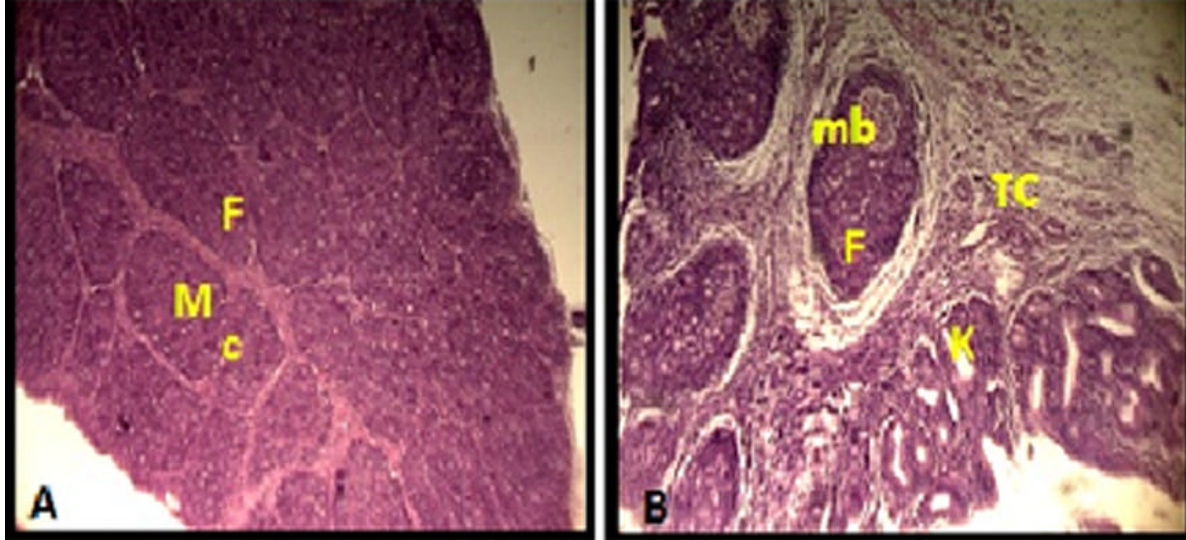


Fig. 1(a-b): Histological aspect of the bursa of Fabricius during heat stress; A (Neutral). B (Heat) (H and E X400). C: Cortex M: Medulla, K: Cyst., TC: Connective tissue, F: Follicle, MB: Basel membrane

epithelium is folded, appearance of many cysts and most important subepithelial connective tissue (Fig. 1-B). Detailed observation revealed cells with retracted cytoplasm, with clear signs of atrophy (Arai *et al.*, 1997 and Kerr, 1993).

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