

## **ANATOMICAL AND HISTOLOGICAL STUDY OF THYMUS GLANDS IN BROILER CHICKS EMBRYO ( *Gallus gallus domesticus*)..**

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### **ABSTRACT**

The study designed to investigate the anatomical and histological structures of the thymus gland in broiler chick embryos. Ten healthy, normal embryos at 12<sup>th</sup> and 20<sup>th</sup> days old chick embryos were used, divided into five embryos for each age. The thymus was well developed at 12<sup>th</sup> day chick embryo, Anatomically consisted of 6-8 lobes which are similar in both sides .small, translucent bean shaped lobes that became pale in color at 20<sup>th</sup> day old embryo, these lobes located in both sides of the neck, positioned parallel to the jugular vein and vagus nerve.

Histological structures of thymus gland were composed of capsule, cortex and medulla. At 12<sup>th</sup> day old of chick embryo the thymus was surrounded by a thin connective tissue capsule, which septa extends into the gland stroma to form a lobulation for each lobe, the cortex and medulla was not differentiated at this age. At 20<sup>th</sup> day old chicks embryo, the lobules start to recognize and composed of external dark stained cortex with a high population of lymphocytes and internal light stained medulla with less abundant of lymphocytes , reticular fiber and epithelial reticular cells with the appearance of Hassall's corpuscles.

### **. INTRODUCTION**

The immunity of the chicken enhancing to avoiding the body from disease and assisting it to protect extreme creative potential are understood (1). The immune or lymphatic organs of the birds, divided into morphological and functional distinct

component; the first one is namely "Thymus" that produced T cells. While, bursa of Fabricius account of the produced B cells that leads to form the humoral protection (2). The thymus and bursa of Fabricius of birds is a sources to be a 'central or chief lymphoid tissues', Thymus varies from other lymphoid structures as it is suffering from many changes be regarding with age (3,4). The thymus is a major lymphoid organs which are the initials of the lymphoid tissues to be shaped and raises directly after the natal in reaction to postnatal microorganism stimulus and required a large amounts of developed T lymphocytes and solely (5,6,7) The thymus in broiler chicken is a lymphoepithelial organ and appears as a pair of chain, lobulated gland, each chain located on each side of the neck and composed of 6-8 lobes string close to the jugular vein and vagus nerve extending from the third cervical vertebra to the upper thoracic segments (8). The lobes surrounded by a thin connective tissues from which, septa is extended and divided these lobes into lobules, (9). Each lobule is divided into a histologically separated cortex and medulla, disconnected by a vascular zone between the cortex and medulla. The outer area is stained with dark color and heavily populated by small immature T cells. Middle area is lightly stained, it's cell population is less in number than the cortex and contains larger, many developed T lymphocytes noticeable epithelial cells, Hassall's corpuscles, phagocytic cells and dendritic cells. The medulla is constant among neighboring lobules (10).

The study aimed to investigate the different development stages of the chick embryos

## **MATERIALS AND METHODS**

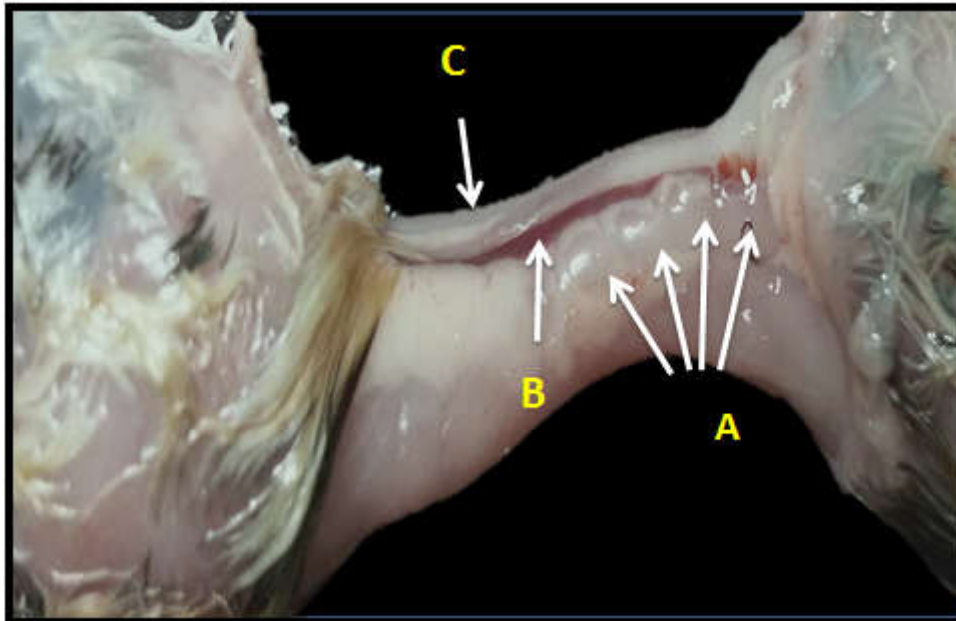
Twenty five eggs were collected from Basra healthy poultry farming (Fadak company) incubated eggs at 12<sup>th</sup> and 20<sup>th</sup> day old embryos (*Gallus gallus domesticus*).. The anatomical features of thymus gland were studied through making a surgical incision at the ventral aspect of the neck, then the thymus gland on both sides of broiler chicken were collected immediately for histological study(11). The thymus was removed from its attachment with adjacent tissues by (*thymectomy*), then the collected thymus was transferred to series steps according to the (12, 13). The specimens were fixed with 10% formalin for (72 hour) then washed with tap water for 4-6 hrs the dehydrated with ethanol alcohol in different changes (70%, 80%, 90%, 100% and 100%) for 2 hours for each changing then cleared by xylene and infiltrated

and imbedded with paraffin wax (14), then trimming by rotary microtome and sectioned and put them on the glass slide and mounting with Mayer's albumin and put on hot plate to dry , then stained with (Heamatoxyline and eosin) stains and Masson's Trichrom stain.

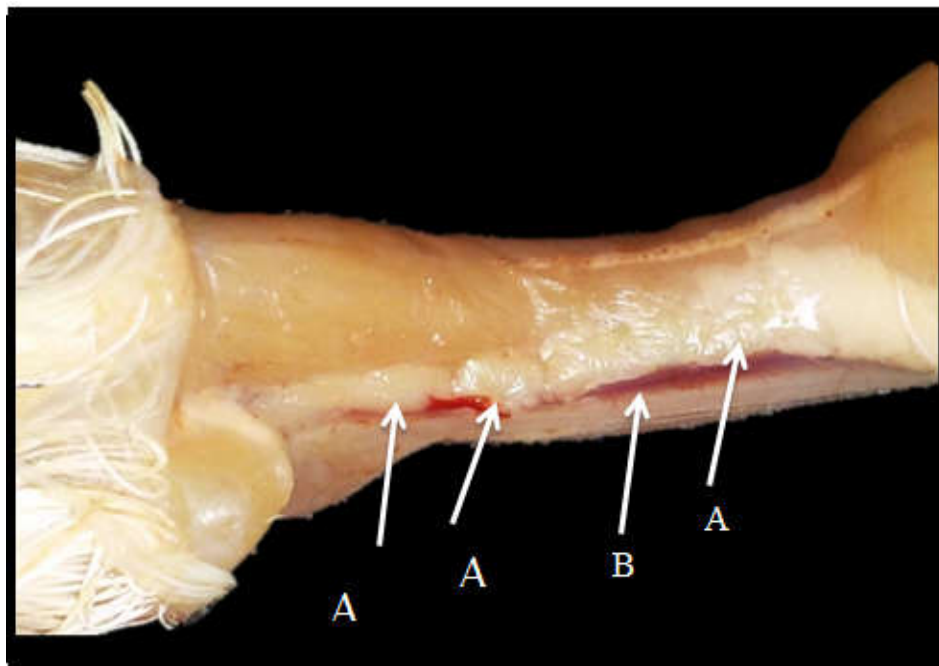
## **RESULTS AND DISCUSSION**

The thymic lobes in the 12<sup>th</sup> day of incubation were developed as a small, flat, translucent buds, white to pale in color, parallel to the jugular vein and vagus nerve (Fig.1), this in agree with (15, 16) in native chicken in Bangladesh and in Partridge respectively while this result was disagreement with (17). The thymic lobes were differed in number depending on its location, on the right side there are six lobes , in contrast to the left side were eight lobes, this in agree with (18, 19, 20) in Guinea fowl, in chicken and Khaki Campbell duck respectively. At 20 days embryo the individual lobe was becoming more obvious, white to pale in color and the lobes more enlarged (Fig.2) this is in agreement with (21), who stated that the thymus lobes are white to yellowish in color.

The histological structures of thymus gland initiate as a network of fibers at 12<sup>th</sup> day embryo, and then surrounded by a connective tissue capsule (Fig.3, 4 ), this in agreement with (15). Many branches of fine septa were originated from connective tissue capsules to divide each lobe into lobules these lobules was recognized to the outer zone cortex, and inner zone medulla ( Fig.5). At 20<sup>th</sup> day old embryo founds of Hassall's corpuscles (Fig.6) this accordance with (15,16) in Partridge and native chicken of Bangladesh respectively.

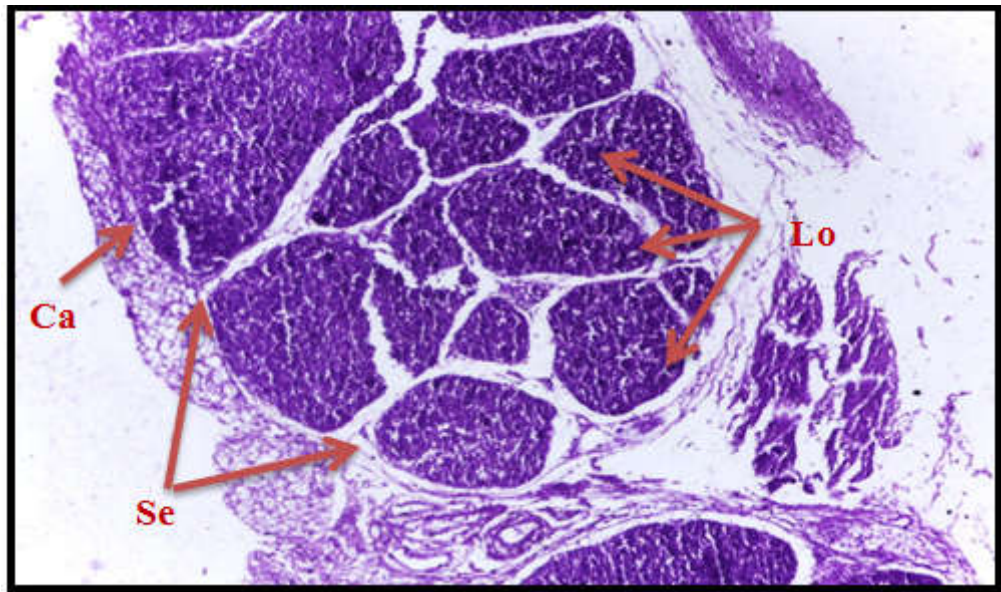


**Figure 1:** Anatomical structures of thymus gland at 12 day embryo the left anterior cervical region. (A): lobes (chain) of thymus as a bud. (B): Jugular vein. (C). Vagus nerve.

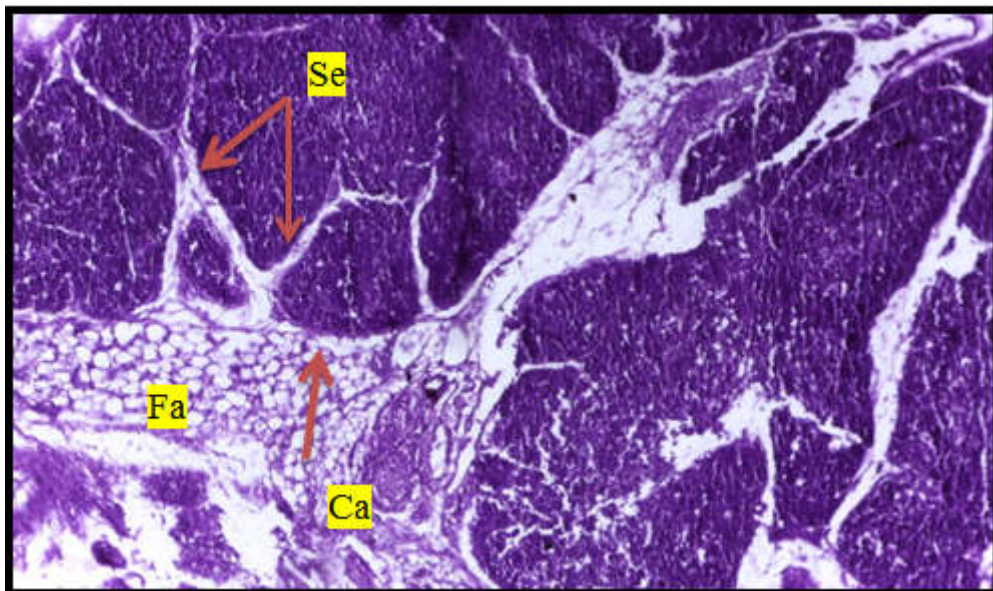


**Figure2:** Thymus gland at 20 day old embryo ,the right side of the neck extended to the thoracic inlet: show (A) white to pale, elongated thymus lobes, (B) jugular vein.

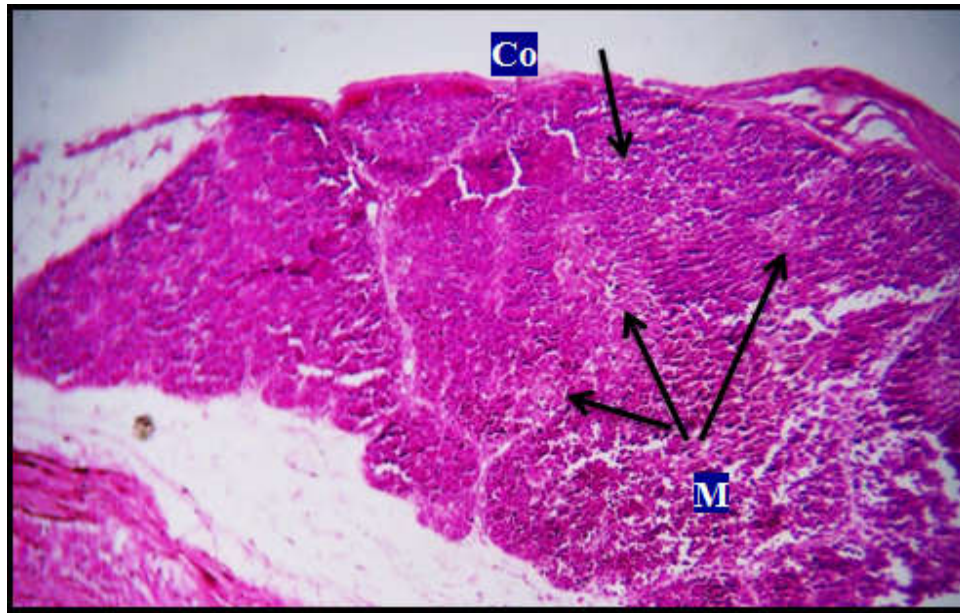




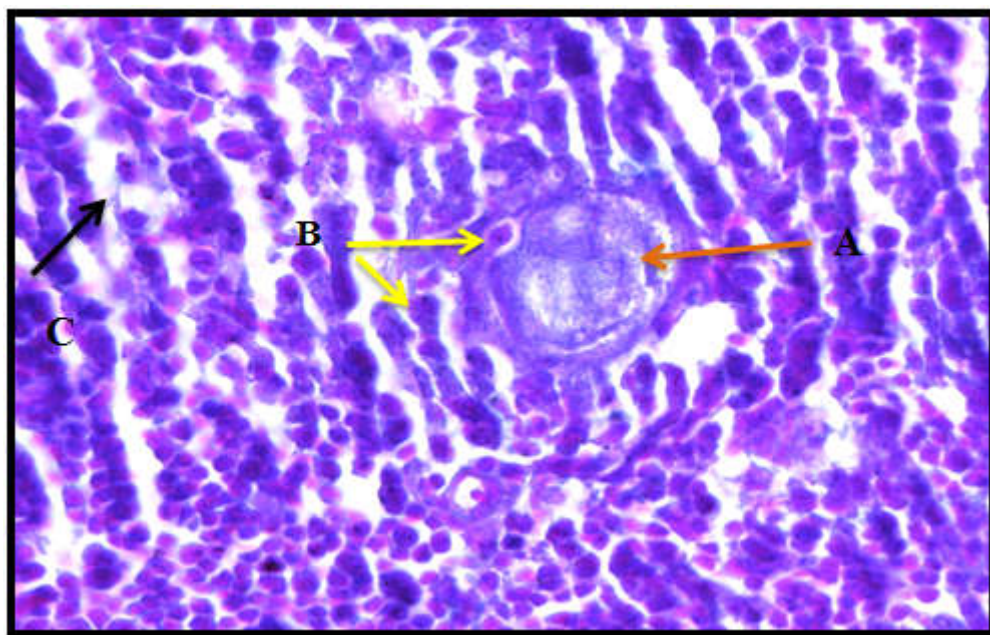
**Figure 3:** The thymus gland at 12<sup>th</sup> day old embryo, **Ca-** capsule of thymus gland. **Se-** septa extended from the capsule. **Lo-**Lobules of thymus gland. H&E stain. 10x



**Figure 4:** The thymus gland at 12<sup>th</sup> day old embryo: **Ca-** capsule, **Se-** Septa between lobules, **Fa-** Fat tissue (adipose tissue) H&E stain 10x.



**Figure 5:** thymus gland at 20 day old embryo show beginning of (Co)-Cortex (dark stained) and (M) Medulla (pale stained) to appear in the thymus gland by H&E stain 10x.



**Figure 6:** thymus medulla at 20 day old embryo: A- Hassall's corpuscles, B- Epithelial reticular cells- Reticular fiber, ( Masson's Trichrom stain 10x).



## دراسة تشريحية ونسجية للغدة الصعترية في اجنه فروج اللحم

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### الخلاصة

صممت الدراسة الحالية لإيضاح الصفات التشريحية والنسجية للغدة الصعترية لأجنة فروج اللحم. حيث تم اخذ عشره اجنه سليمه صحيا بعمر الثاني عشر والعشرون يوما من عمر الجنين مقسمة الى خمسة اجنة لكل عمر. يكون تطور الغدة الصعترية بشكل واضح في اليوم الثاني عشر من عمر الطير وتشريحيا: تكونت الغدة من 6-8 فصوص صغيرة وشفافة والتي بعد ذلك تصبح بيضاء شاحبة اللون في اليوم العشرون من عمر الجنين، تقع هذه الفصوص على جانبي الرقبة متموضعة بصورة موازية للوريد الوداجي والعصب الحائر. تألفت التراكيب النسيجية للغدة الصعترية من محفظة، قشرة ولب. في اليوم الثاني عشر من عمر الجنين كانت الغدة محاطة بمحفظة رقيقة من النسيج الضام وامتدت منها حويصلات مؤدية الي ظهور الفصيصات لكل فص. في اليوم العشرون من عمر الجنين بدأت الفصوص بالتميز متكونه من قشرة خارجيه غامقه اللون مع وفره بالخلايا للمفيه ولب داخلي فاتح اللون مع محتوى اقل من الخلايا للمفيه مع وجود اليف شبكيه وخلايا طلائييه شبكيه مع ظهور اجسام هسالنز.

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