

## Testis and Ovary development Histological study affecting by age and weight of Local Goat Kids

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### Abstract

The study was carried out at postgraduates labs of Agriculture college, Al-Muthanna University, from 20 / 8 / 2022 to 20 / 1 / 2023 to investigated the Histological alteration of testes and ovaries structure development affected by age and weight of Local Goat Kids, A total of 60 samples (testes and ovaries), were brought from Al-Muthanna slaughters, the samples (testes and ovaries samples) were submitted to hygienic examination and Prepared in Labs by cleaned from adhesive and cut off for 4 cm samples and saved in formalin 10 % until the histological Technique performed . The results were showed the well gradually development in histological structure of Gonads (Testes and Ovaries) with age progress and weight developed in Goat Kids , The testis showed the seminiferous tubules which developed to contain all stages od Spermatogenesis , while the ovary showed as actively secreted organ contain all stage of follicular development . In conclusion , the histological structure of Gonads (Testes and Ovaries) which developed with age progressing and weight increasing with age and time and weight and can be considered as vital and active indicator for reproduction and fertility criteria .

**Key Words : Testes , Ovaries , Age , Weight , Development .**

### Introduction

The goat considered the main important natural source of the animal precursor and the local and world economy which raised for the meat and milk and hair in the clothes industry (Al-Janabi *et al.*, 2007) . The reproductive system in goat were formed from the pairs of testes in male , pairs of ovaries in females which considers the vital gametes organs in reproductive system to produce male sperms

and female ova for united in sexual behavior and produced the new embryos (North *et al.* , 2015) . The testes and ovaries consider the main organ of male and female reproductive system which as dual functional gland. It performs both exocrine function as production of sperm and ova and endocrine function as production of Testicular hormone as testosterone and ovarian hormones chiefly progesterone and estrogen which responsible for behavioral changes in female goat

(Priedkalns, 2014) . The male reproductive system is formed by two milky white testes, each one consists of anterior and posterior portion separated anteriorly and fused posteriorly, the seminiferous tubules in testis started to developed and take an identical property and it was easy to describe the complete structure in stage of collecting duct system formation (Al-Yasery *et al.*, 2016). Nickel *et al.* (2016) claimed the testis of Donkey is elliptical in shape has caudal extremity which directed to the anal opening and situated in the perineal region , the tunica vascularis occupied the tunica dartus and the caudal part (tail) of epididymis is large in volume and formed funal process and the orientation of the testis is located horizontally . Ghosh (2016) described the ovary of goat as oval elongated structures situated below the 3rd or 4th lumbar vertebrae. Each ovary was enclosed completely by peritoneal pouch called ovarian bursa , while Ibrahim , (2008) and Al-Yasery *et al.*, (2019) described ovary in cattle that externally covered by germinal epithelium which formed graffian follicles and tunica albugenia was a fibrous layer below germinal epithelium . Richings *et al.*, (2006) observed the stroma in the tamer wallaby-marsupials was composed of connective tissue network , spindle shaped cells and few involuntary muscle fibers . Nickel *et al.*,(2015) claimed the ovum of goat was situated in the centre of mature follicles while the remnant of ruptured follicle was converted into corpus luteum . Wrobel *et al.*,(2019) showed that the growth and histology of ovarian follicles after cold storage and the collected ovaries were placed in cold storage in Phosphate-buffered saline at 4 ° C for 24hr or 48hr , the changes were evident in the germinal epithelium , cortex and interstitial tissue after cold storage . AL-Samarrae *et al.*, (1999) showed ovaries of female sheep composed from two surface which concave from side to side and has 2 extremities , cranial extremity appeared

flattened and convex in length while caudal was rounded , average length of ovary (7)cm and diameter(3.5) cm .Rahem et al. (2007) described normal histology of reproductive tissues from immature female dogs and sequential microscopic changes that occurred during different stages of estrous cycle in ovary, uterus, vagina and mammary glands. Their observations were associated with estrous cycle plasma hormone levels and expression of sex-steroid receptors in these tissues on earlier reports.

## **Materials and Methods :**

### **Collection of study samples :**

The study was carried out in postgraduates labs of Agriculture college/ Al-Muthanna University from 20 / 8 / 2022 to 20 / 1 / 2023 to investigated the Histological alteration of Testes and ovaries Structure development affected by Age and Weight in Local Goat Kids , in study were used 60 samples (testes and ovaries) which brought out from Al-Muthanna slaughters , the slaughtered animals (testes and ovaries samples) were submitted to hygienic examination and Prepared in Labs by cleaned from adhesive and cut off for 4 cm samples and saved in formalin 10 % to performed until the histological Technique performed .

### **Experimental Design :**

The study was carried out on 60 samples (testes and ovaries) which brought out from Al-Muthanna slaughters , the samples were subdivided to 3 age and weight categories includes first category (4-8 months age and 10-18 kg weight) , Second category (9-12 months age and 19-27 kg weight) and finally Third category (13-16 months age and 28-35 kg weight) , each category had 20 experimental samples (10 male testes and 10 female ovaries) were examined and placed in hygienic environments.

## The Histological technique

In the histological methods we take the samples (1 cm) from the fixative organs in formalin 10 % to

washing for 5 minutes in tap water to remove the fixative effect , then making the steps of routine histological technique which include dehydration by serial of progressive concentrations of ethanol (50% - 100%) 2 hours for each step , the clearing by using the zaylene , infiltration by using paraffin wax path embedding by paraffin wax blocks , sectioning by using Rotary Microtome to thin 6-7 micrometer plates which placed in water

### Results and Discussion :

#### Histological Results of First Category :

**Histological results showed testis structure** (Fig 1) which surrounded by tunica albugina of loose connective tissue rich with wide blood vessels and send trabiculae divided it into several lobules and each lobule consist of several testicular cord . The cords has germinal prespermatogonial and spermatogonia cells in small lumen which formed by beginning in cord center by programed degeneration (Apoptosis) . The interstitial space was consist of mesenchymal cells with less fetal leydig cells seen as single or aggregated around small capillary (Fig. 4) . most of cord are canalized and has clear irregular lumen and converted to seminiferous tubule . The newly formed seminiferous tubule epithelium was become stratified mainly by prespermatogonial and elongated sertoli cells appears as irregular columnar cells with large nuclei rested on basal lamina of tubule . These finding are agreed with Gondo *et al.*, (2019) in Small Ruminants and Al-Yasery *et al.*, ,(2020) in Arrabi sheep and in Goats by Russeo *et al.*, (2018). While disagreed with Doros *et al.* , (2017) in African Sheep and Fardeo *et*

path and then placed in glass slides covered by Mayers Albumin Solution to become ready to staining by using the (Hematoxline - Eosine stain for general structure of tissue , and other stains for explaining connective tissue , glycogen granules and lipid drops in liver , kidney and heart tissues such as PAS , best carmine stain and osmium dichromate , then slides become ready to examined by microscope by making Calibration curve for each focus by using Ocular and Stag micrometer and photographed by digital camera Genex (Luna , 1968) ( Bancroft and Gamble , 2008) (Al-Yasery *et al.*, 2019).

*al.*,(2021) in European Moher Goat .This differences may be due to differences in time of formation of lumen or puberty starting and androgen level action in at one month or the physiological difference between species of animals .

**Histological structure of ovary** (Fig 1) show cover low cuboidal singl layere, cell of squamous called epithelium germinal with visceral peritoneum mesothelium and Inferior to germinal epithelium. These finding are agreed with Gosht *et al.*, (2020) in Ruminants and Al-Yasery *et al.*, ,(2018) in Awassi sheep , Parsa *et al.*, (2017) and Senari *et al.*, (2018) in Goats , while disagreed with Onyango *et al.*,(2000) in female Coat .This differences may be due to differences in time of formation of lumen or puberty starting and androgen level action in at one month or the physiological difference between species of animals .

#### Histological Results of Second Category :

**Histological structure of testes in second Category** (Fig. 2) showed the developed capsule consists of connective tissue mainly of fibrocytes , collagen and smooth muscle fibers . The interstitial tissue become less and consist of mature

interstitial cells which is leydig cells of oval or round spherical nuclei present as single or groups .The seminiferous tubules seen lined by stratified germinal epithelium resting on very well defined basement membrane and contain spermatogonia , primary and secondary spermatocyte , spermatid and sertoli cells and well define Ledige cells and fibroblasts . The spermatogonia and primary spermatocyte appears as large oval cell with spherical nucleus rested on basement membrane in seminiferous tubules result in mitotic division located in midway between spermatogonia and spermatids .The secondary appeared smaller than primary found near lumen and attached to sertoli cells . These observations were similar to Al-Yasery *et al.*, (2020) in Arrabi sheep and Prakash *et al.*,(2008) in bonnet Monkey and with Al-Samarrae *et al.*,(1998) and Al -Khuzae , (2007) in Rams, and AL-Hameary , (2018) in adult Goat but disagreed with Kast *et al.*, (2017) in testis of Camel .

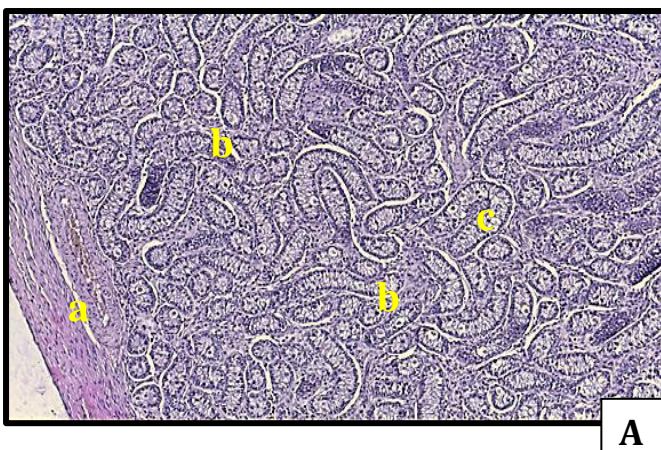
**Histological structure of ovary in second Category** (Fig. 2) . This stage recorded the developed Primary follicles were agreed with Esson *et al.* , (2017) and Patra *et al.*, (2018) in female goats and Khaki *et al.*, (2019) in female Marino sheep which

referred to development of ovary structure and presence of different stages of follicles .

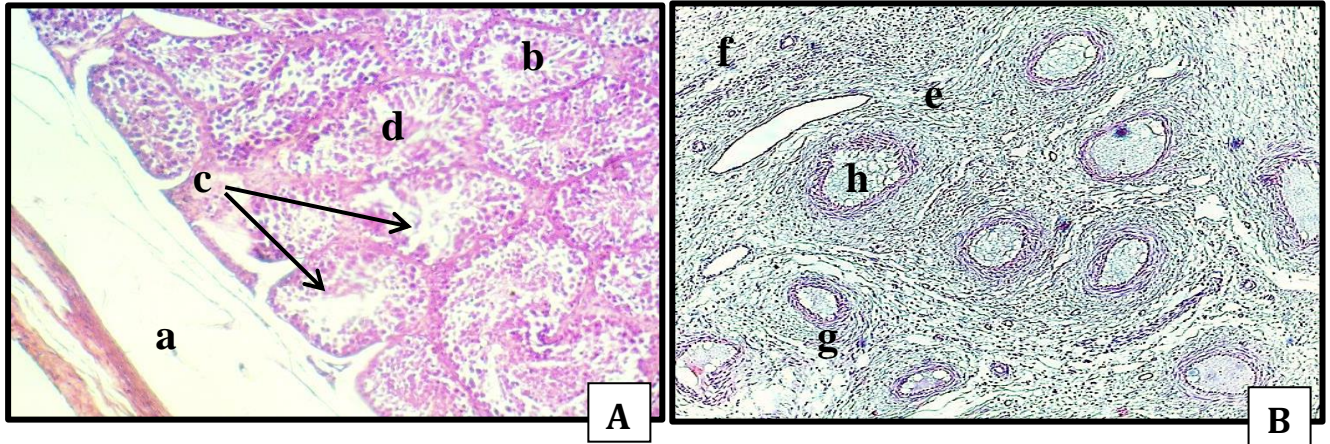
### **Histological Results of Third Category :**

**Histological structure of testes in Third Category** (Fig.3) showed that most of seminiferous tubules have regular wide lumen and most of spermatogenesis lineage has occurred . It is clear define spermatogonia dark and pale , primary and secondary spermatocytes and spermatid . Wave of the spermatid and sertoli cells in cross section of seminiferous tubule were increased . All events of the spermatogenesis were seen in this age from spermatogonia to mature sperm in lumen of seminiferous tubule .This result was agreed with Cheah *et al.*,(2020) in sheep and goats and Castro *et al.*,(2019) who found the seminiferous tubule developed rapidly in adult new Zealand goat and Gofur *et al.*,(2018) in indigenous Bull .

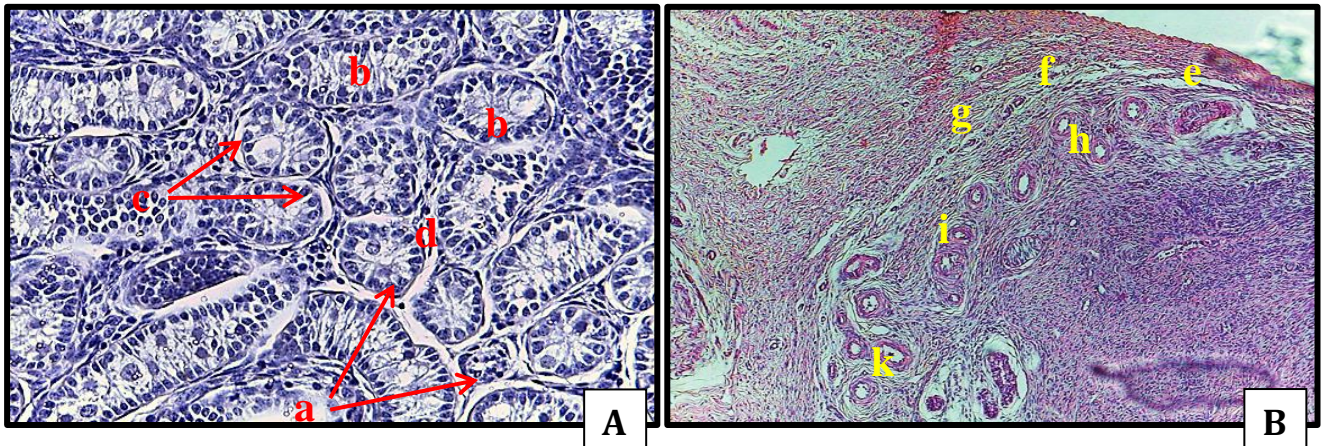
**While Histological structure of ovary in Third Category** (Fig.3) showed the developmental events in ovary especially after ovulation which recorded transform were agreed with Esson *et al.* , (2017) and Patra *et al.*, (2018) in female goats and disagreed with Verma *et al.*, (2018) in female Pig .



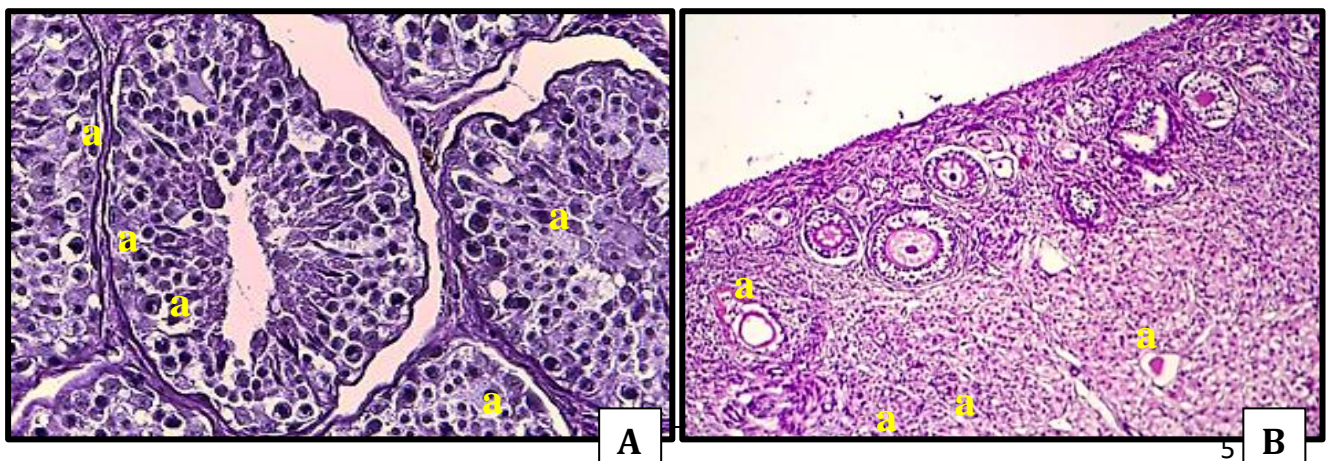
**Figure (1)** cross section of A) Testis , B) Ovary of Goats Kids in First Category show : a) Capsule of testis , b) Testicular cords , c) interstitial tissues , d) Germinal epithelium of ovary , e) Theca Interna, f) Theca Externa , g) Primordial follicle . H & E stain, 200X.



**Figure (2)** cross section of A) Testis , B) Ovary of Goats Kids in Second Category show : a) Capsule of testis, b) Testicular cords, c) Vacillation to form Seminiferous tubule , d) Newly Formed Seminiferous tubule , e) Theca Interna, f) Theca Externa , g) Primordial follicle , h) Primary follicle . H & E stain, 200X.



**Figure (3)** cross section of A) Testis , B) Ovary of Goats Kids in Third Category show : a) Testicular cords , b) Newly Formed Seminiferous tubule , c) Basement membrane , d) Leydig cells , e) Germinal epithelium of ovary , f) Theca Interna, g) Theca Externa , h) Primordial follicle , i) Primary follicle , k) Secondary follicle . H & E stain, 200X.



**Figure (4) cross section of A) Testis , B) Ovary of Goats Kids in Third Category show :**  
**a) Testicular cords , b) Newly Formed Seminiferous tubule , c) Basement membrane , d) Leydig cells , e) Germinal epithelium of ovary , f) Theca Interna, g) Theca Externa , h) Primordial follicle , i) Primary follicle , k) Secondary follicle . H & E stain, 200X.**

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