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## Histological studies of the interstitial tissue in the testes of large white Yorkshire pig (*Sus scrofa*)

**Seema Sikarwar, Rakesh Mathur and Ashok Dangi**

### Abstract

The present study was conducted on the testes of 12 Large White Yorkshire pig between the age of seven months to around one and half year for histological study. The interstitial tissue was present in area between the adjacent seminiferous tubules. The fibrous component composed mainly of collagen and reticular fibres. Blood vessels were also seen in the loose connective tissue. The cellular component consisted of mainly fibroblasts and the interstitial cells (Leydig cells). The Leydig cells were large and polygonal in shape, arranged singly or in clusters between seminiferous tubules and placed in close vicinity to the arteriole and capillaries. The average width of Leydig cells were  $8.13 \pm 0.50 \mu\text{m}$  which ranged between from  $4.55 \mu\text{m}$  to  $10.85 \mu\text{m}$ .

**Keywords:** Histological, interstitial tissue, testes, pig, leydig cell

### 1. Introduction

Animal husbandry is an important sub-sector of agriculture in India. Piggery is the sector that directly plays an important role in the socioeconomic status of the poor rural people, more particularly in the tribal population of the country as it acts as an insurance coverage for the downtrodden and socially weaker section of the society (Sailo *et al.* 2016) <sup>[16]</sup>. The Large White Yorkshire pig is a rugged and hardy breed. It can withstand a wide range of climatic conditions. This breed is also known as “The World’s Favorite breed”.

From all the domestic animals, pigs are the most prolific animals with shorter generation interval. They can fit into diverse systems of management. Cost and availability of feed and the price fetched for the animal are the chief factors for influencing profitable pig production. The Large White breed of pig was developed in England in the late 1700s and has been rated as the leading breed of pigs in the world as Yorkshires in the USA and Canada, are direct descendants of the Large White. It is also known as the Yorkshire pig and the English Large White pig.

The testes are the most essential and primary organs of the male reproductive system. The testis is a bipartite glandular organ, which contain both exocrine and endocrine compartments. Its exocrine function is to produce male germ cells and its endocrine role is mainly directed to produce male sex hormone (Borysenko and Beringer, 1988) <sup>[6]</sup>.

### 2. Materials and Methods

The testes were procured from the apparently healthy animals from the local abattoir house, Bikaner, immediately testes were carried in plastic container to the department for further study. Small pieces of tissues (4-6 mm thickness) were collected from the 12 pairs (12 right and 12 left) of testes. From the each testis, tissues were obtained from the various anatomical regions to explore the regional differences, if any. Tissues were immediately fixed in 10% formal saline for 48 hrs., Bouin’s fluid for 12 hrs. and Zenker’s fluid for 18 hrs. After fixation, the tissues were washed in running tap water for 6-10 hrs. The tissues were dehydrated in various ascending grades of alcohol. After proper dehydration, tissues were embedded in paraffin wax of melting point of 58-60 °C. The tissues were sectioned serially at 5  $\mu\text{m}$  thickness. Then the sections were mounted on albuminized slides and dried. Finally the sections were stained with the routine histological stains to demonstrate different components of the testes.

For the micrometrical observations, diameter of various parts of testicular tissues and cells was measured from random samples seen under a light microscope in high power (400X). The present study was conducted in the Department of Veterinary Parasitology, RAJUVAS,

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Bikaner, Rajasthan. The histological details of the testis across various areas were recorded on the basis of the paraffin sections stained with haematoxylin & eosin and special staining methods, used in the current study. Micrometry was done by using an ocular micrometer after calculating calibration with stage micrometer to measure the observations on mean parameters of various testicular tissues and cells. Width of Leydig cells were used in the micrometrical study.

### 3. Results and Discussion

In the present study, the interstitial tissue was present in area between the adjacent seminiferous tubules (Fig. 2, 3). It consisted of mainly loose connective tissue, having fibrous and cellular component. The fibrous component composed mainly of collagen and reticular fibres (Fig. 1, 4). Similar findings were recorded by Goyal (1971) [12] in buffalo, Kishore *et al.* (2007) [14] in ram, Yaseen (2009) [23] in Marwari goat and Singh (2013) [19] in Marwari sheep. The cellular component consisted of mainly fibroblasts and the interstitial cells (Leydig cells). Whereas, Dellmann and Brown (1986) [8] in domestic animals, Babu (2012) [2] in pig, Adhikary *et al.* (2014) [1] in Indigenous bull and Hanumant (2016) [12] in goat, reported that the intertubular spaces had loose connective tissue, blood and lymph vessels, fibrocytes, free mononuclear cells and Leydig cells.

Blood vessels were also seen in the loose connective tissue (Fig. 2). These observations were mentioned by Burgos *et al.* (1970) [7] in domestic animals and Singh (2013) [19] in Marwari sheep. Trautmann and Fiebiger (1957) [21] mentioned that the interstitial tissue found lamellar structure and contained vessels and nerves in domestic animals.

However, Sudhakar and Sharma (1993) [20] explained that the interlobular connective tissue also found nerve fibres in Spiti ponies. Kishore *et al.* (2007) [14] in ram reported that the cellular component mainly composed of mesenchymal cells and clumps of epitheloid cells along with fibroblasts and the interstitial cells in ram. Whereas, Bashir *et al.* (2012) [15] viewed that the interstitial tissue lay between the seminiferous tubules and composed of loose connective tissue network, blood and lymph vessels, fibrocytes, fibroblasts and interstitial (Leydig) cells in adult Bakerwali goat.

The Leydig cells were large and polygonal in shape, arranged singly or in clusters between seminiferous tubules and placed in close vicinity to the arteriole and capillaries (Fig. 2, 3). These cells were characterized by granular cytoplasm and spherical nucleus with one or two eccentrically placed nucleoli. These observations were in accordance with the reports of Goyal (1971) [12] in buffalo, Bansal *et al.* (2009) [4] in guinea pig, Mohammed *et al.* (2011) [15] in Indigenous male goat and Adhikary *et al.* (2014) [1] in indigenous bull. In contrary to above findings Trautmann and Fiebiger (1957) [21] in domestic animals and Burgos *et al.* (1970) [7] in domestic animals, mentioned that the Leydig cells were found large, round in shape with clear outline and had single large spherical eccentric nucleus. Bacha and Bacha (2000) [3] in boar, Babu (2012) [2] in pig and Hanumant (2016) [13] in goat, described that Leydig cells were polyhedral in shape and observed in clusters. Moreover, Burgos *et al.* (1970) [7] in domestic animals mentioned that these cells were seen either in irregular groups or scattered in the inter-tubular spaces solitarily. Eurell and Frappier (2006) [10] in domestic animals, Pathak *et al.* (2013) [16] in donkey and mule and Elzoghby *et al.* (2014) [9] in sheep, mentioned that the Leydig cells found in cords or clusters were mostly polymorphous with spherical

nuclei.

However, Fawcett *et al.* (1973) [11] in mammalian species reported that Leydig cells and interstitial tissue were had dominant feature with little interstitial tissue in the boar, zebra and opossum. Wrobel and Hees (1987) [22] mentioned that heterotrophic Leydig cells were found within the interstitial tissue and in the mediastinum testis of the cat. The above observations could not be confirmed in the current study.

The average width of Leydig cells were  $8.13 \pm 0.50 \mu\text{m}$  which ranged between from  $4.55 \mu\text{m}$  to  $10.85 \mu\text{m}$ . Whereas, Yaseen (2009) [23] observed lower values ( $7.548 \pm 0.44 \mu\text{m}$ ) in Marwari goat and Singh (2013) [19] ( $6.351 \pm 0.37 \mu\text{m}$ ) in Marwari sheep.

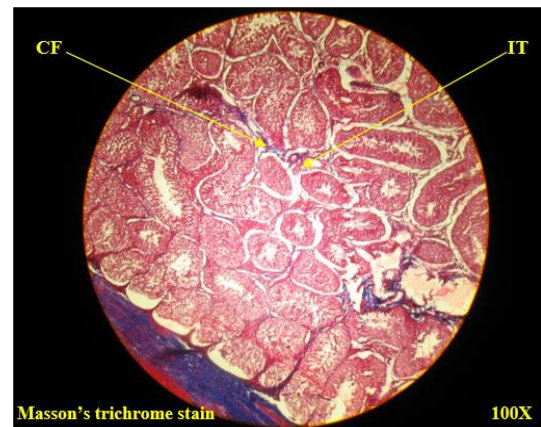


Fig 1: Cross section of testis showing Collagen fibres (CF) and interstitial tissue (IT)

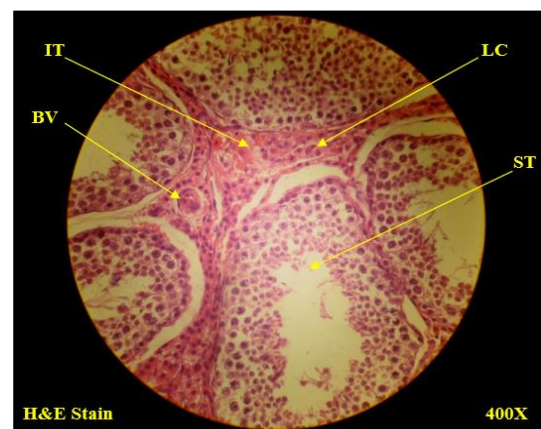


Fig 2: Cross section of testis showing Interstitial tissue (IT), Blood vessels (BV), Leydig cells (LC) and Seminiferous tubules (ST)

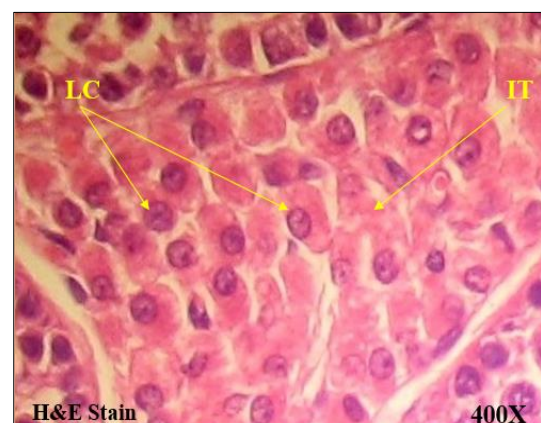
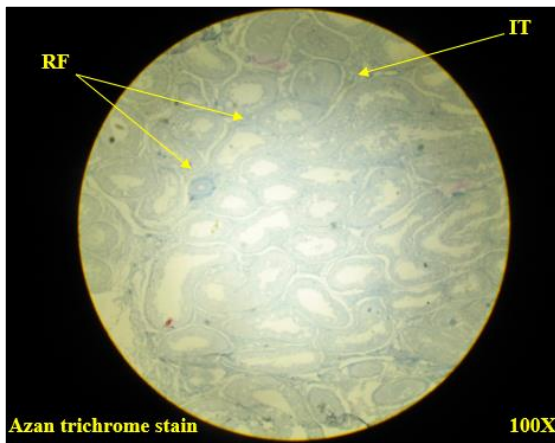


Fig 3: Cross section of testis showing Leydig cells (LC) and Interstitial tissue (IT)



**Fig 4:** Cross section of testis showing Reticular fibres (RF) and Interstitial tissue (IT)

#### 4. Conclusion

The interstitial tissue was present in area between the adjacent seminiferous tubules. The fibrous component composed mainly of collagen and reticular fibres. The cellular component consisted of mainly fibroblasts and the interstitial cells (Leydig cells). Blood vessels were also seen in the loose connective tissue. The Leydig cells were large and polygonal in shape, arranged singly or in clusters between seminiferous tubules and placed in close vicinity to the arteriole and capillaries.

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