Histomorphological Studies on the Spermatogenic Cells, Sertoli Cells and the Interstitial Tissue of the Testis in Adult Bakerwali Goat

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Received: 21 July 2012; Accepted: 28 December 2012

ABSTRACT

The present histological study was conducted on the testis of adult Bakerwali goats. The seminiferous tubules were comprised of type A and B spermatogonia, primary spermatocytes at various phases of differentiation (leptotene, zygotene, pachytene and diplotene), secondary spermatocytes, round spermatids, elongated spermatids and spermatozoa. Sertoli cells were irregularly columnar cells that extended from the basal lamina to the lumen of tubules. The interstitial tissue lay between the seminiferous tubules and consisted of loose connective tissue network, blood and lymph vessels, fibrocytes, fibroblasts and interstitial or Leydig cells. The Leydig cells had spherical shaped vesicular nucleus. The cytoplasm was eosinophilic and vacuolated.

Key words: Bakerwali goat, Interstitial tissue, Seminiferous epithelium, Testis

RESULT AND DISCUSSION

The spermatogenic cells: The type-A spermatogonia (Fig. 1) were large, oval or elliptical cells located close to the basement membrane of the seminiferous tubules. They had large and oval nuclei containing uniform chromatin material. The nucleoli were usually more than one. The cytoplasm was lightly eosinophilic.

The leptotene primary spermatocytes were uniformly rounded cells with spherical nuclei. The chromatin substance was organized to form dense filamentous network which filled the nucleus completely. The cytoplasm was lightly stained. The nuclei were distinct spheroid shaped (Fig. 1). The zygote primary spermatocytes were marked by their deeply stained nuclei, which were usually notched, but occasionally rounded in shape. The chromatin substance appeared coarse. The nuclei were ill-defined and nuclear envelope was indistinct. The cytoplasm of the cells was pale stained (Fig. 1).
pachytene primary spermatocytes were characterized by large spherical cells and their nuclei were uniformly spheroid. The chromatin material appeared in coarse filamentous arrangement leaving irregular interstices in the nucleoplasm. The nuclear envelope was indistinct and nucleoli were small and faintly stained. The cytoplasmic rim was comparatively broad and faintly stained (Fig. 1). The diplotene primary spermatocytes were characterized by their largest size of the spermatogenic series. They were large, rounded cells with spherical nuclei. The chromatin material was more loosely arranged. They were stained lightly than the pachytene nuclei. The nuclear membrane was indistinct and the nucleoli were rarely perceptible. The cytoplasmic rim surrounding the nucleus was weakly eosinophilic (Fig. 1).

The secondary spermatocytes were smaller in size than the primary spermatocytes but larger than the round spermatids. They were rounded in shape and their nuclei were spherical with centrally placed small dot like clumps of chromatin interconnected with fine filamentous network. The nuclear membrane was distinct with indistinct nucleoli. The cytoplasm was scant and eosinophilic. The round spermatids (Fig. 2) were the smallest cells of the spermatogenic series. They possessed spherical nuclei and had thin peripheral cytoplasmic rim. The chromatin substance appeared granular with 2 to 3 larger irregular aggregates which stained more intensely than the surrounding nuclear material. The nuclear membrane was thin and prominent.

The elongated spermatids (Fig. 1) were characterized by elongated nuclei with condensed chromatin. They stained more deeply and either remained attached to the Sertoli cell cytoplasm or migrating centripetally towards the lumina of the seminiferous tubules. The spermatozoa (Fig. 1) were usually found attached to the Sertoli cells at their ad luminal border and in the lumen of the seminiferous tubules after their release from the Sertoli cells. The head was elongated-oval in shape.

Based on the distribution pattern of chromatin and size of the spermatogonia, type-A and type-B spermatogonia were recognized in the present work. Similar types of spermatogonia was also reported in rams (Schahidi and Smidt, 1980) and goat (Baishya et al., 1987; Gurya, 1987; Bordoloi and Dhangra, 1990). The intermediate type of spermatogonia was not classified in the present study as the criteria of these cells having irregular distribution of numerous Fuellung positive chromatin granules in ovoid nucleus and their attachment to the nucleoli and nuclear membrane did not hold good in goat as also observed by Bordoloi and Dhangra (1990).

The present histological characteristics were in agreement with the earlier findings reported in Dwarf Nigerian ram (Aire, 1973), goat (Bordoloi and Dhangra 1990; Islam et al., 2002; Karmore et al., 2003), native rams of Iran (Schahidi and Smidt, 1980).

**Sertoli cells:** Sertoli cells (Fig. 1) were irregularly columnar cells that extended from the basal lamina to the lumen of tubules. The location of the nuclei varied in different cells. The shape of the cell was pyramidal with the base towards the basal lamina and the apex was directed towards the lumen to which clumps of spermatozoa were attached. The nucleus was large, lightly stained and irregular in shape with a distinct nucleolus. The cytoplasm was moderately eosinophilic. Similar histological characteristics pertaining to the Sertoli cells had also been reported in goat (Bordoloi and
Dhingra 1990; Islam et al., 2002; Karmore et al., 2003; Leal et al., 2004) and rams (Kishore et al., 2006).

**Interstitial tissue:** The intertubular connective tissue revealed predominance of reticular fibres with less collagenous and absence of elastic fibres, while collagen became the main fibre type in adult goats. The Leydig cells had spherical shaped, vesicular and more or less eccentrically placed nucleus (Fig. 3). One to three large nucleoli were scattered in the granular chromatin which was distributed predominantly towards the periphery of the nucleus. The cytoplasm was eosinophilic and vacuolated. They were arranged in a group of 2-4 cells. Nerve fibres were present as isolated strands in the interstitial tissue. Similar arrangement of the Leydig cells was reported in goats (Bordoloi and Dhingra, 1983; Karmore et al., 2001; Sarma, 2009). The Leydig cells were seen mostly around the blood vessels, indicating their endocrine nature as also reported in West African Dwarf goat (Ezeasor, 1985) and in pubertal goats (Karamore et al., 2001).

The oval to spindle shaped fibroblasts at different stages of development was seen in the intertubular area. The nucleus of the fibrocyte was spindle shaped and darkly stained (Fig. 3). The cytoplasmic boundaries of these cells were rarely perceptible. The nuclei of the fibroblasts were of same shape as fibrocytes, but lightly stained. A tiny nucleolus could be seen in the fibroblasts. Similar histological features pertaining to these cells were also reported in goats (Karamore et al., 2001; Sarma, 2009). The undifferentiated mesenchymal cells were somewhat oval in shape. They had vesicular nuclei and contained one to three chromatin granules. The cytoplasm was abundant and weakly acidophilic with indistinct cell boundaries.

**REFERENCES**


