HISTOMORPHOLOGICAL CHANGES IN OVARY OF GOAT DURING VARIOUS STAGES OF FOLLICULOGENESIS

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ABSTRACT

The present investigation was carried out to study the histomorphological changes in ovaries of adult non-descript goat (Capra hircus) during various stages of folliculogenesis in the month of August to November 2005. The reproductive organs free from gross pathological lesions with follicles on ovaries of 30 adult non-descript, non pregnant female goats were collected from the Government Slaughter House, Supela, Bhilai (C.G.). The ovaries were kept intact with individual identity tag and were brought to the laboratory in normal saline solution at 37°C temperature in thermos flask quickly. On arrival at the laboratory ovaries were trimmed of the extraneous tissue, washed free of blood and detritus using normal saline solution. The ovaries were classified on the basis of size of the largest follicle on surface of one of the ovaries as in group A up to 4 mm, group B 4-6 mm and group C more than 6 mm, each group consisted of 10 pairs of ovaries. Histomorphologically the ovary was covered by germinal epithelium which decreased in height from 8.34 ± 0.99 µm in group A to 5.22 ± 1.033 µm in group C . The shape changed from cuboidal to squamous type. The range of diameter of the follicles was 96.00 - 691.00 µm, 720.00 - 1440.00 µm and 2400.00 - 4032.00 µm in group A, B and C respectively. The membrana granulosa and liquor folliculi gave intense positive response to PAS- Alcian blue.

Key words : Goat, Ovary, Histomorphological changes, Folliculogenesis

Livestock plays an important role in the national economy of an agricultural developing country like India. In India 70 per cent of small and marginal farmers hold 80 per cent of total livestock which shows that livestock constitutes the backbone of Indian agriculture and economy.

The goat is one of the smallest domesticated ruminants which have served mankind earlier and longer than cattle and sheep. It is managed for the production of milk, meat and wool, particularly in arid, semitropical or mountainous countries.

Gonads and reproductive tracts are directly concerned with successful reproduction and fertility in female animals. The hormones released during various phases of folliculogenesis is having significant effect on histomorphplogy of various part of reproductive system. The present study was undertaken to evaluate the histomorphological changes in ovary of adult non-descript goat (Capra hircus) during various stages of folliculogenesis.

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The research work was carried out in the laboratory of the Department of Animal Reproduction, Gynaecology and Obstetrics and Veterinary Anatomy and Histology, College of Veterinary Science and Animal Husbandry, Anjora, Durg (C.G.). The reproductive organs of 30 adult non-descript female goats (free from gross pathological lesions) were collected from the Government Slaughter House, Supela, Bhilai (C.G.) in the month of August to November 2005. It was assured that organs of 30 goats belong to various follicular stages by gross examination. The ovaries were kept intact with individual identity tag and were brought to the laboratory in normal saline solution at 37°C temperature in thermos flask quickly.

Thereafter ovaries were trimmed of the extraneous tissue, washed free of blood and detritus using normal saline solution. The ovaries were divided in to following three groups and histomorphological changes in the ovaries were observed on the basis of size of the largest follicle on surface of the ovaries as in group - A, up to 4 mm, group - B, 4-6 mm and group - C, more than 6 mm.

All samples were processed by standard alcohol-benzene schedule and processed for paraffin embedding technique (melting point 58° - 60°C and 60°C - 62°C). Thin section (3-7 µm) were stained with haematoxylin and eosin (Luna 1968) for fibrocellular architecture, Masson's trichome method (Masson, 1929) for connective tissue, Toluidine blue for acid mucopolysacharides, Periodic Acid Schiff method (Bancroft and Stevens, 1996) for glycogen; Van Gieson's method (Mallory 1961) for collagen fibres and Weigert's method for elastic fibers. Micromorphological measurements were recorded by calibrated ocular micrometer for height of germinal epithelium and height of follicular epithelium.

The ovary was externally covered by cuboidal epithelial lining of thickness 8.34 ± 0.99 µm which formed the germinal epithelium. The Parenchyma was divisible into external zona parenchymatosa or cortex and central medulla or zona vasculosa. Reticular cells and fibres formed the interstitium to accommodate the follicles, cells, vessels and nerves. The primordial and the primary follicles occupied the peripheral cortical stroma. The secondary and tertiary follicles were present in the deeper cortex. The mature or Graafian follicles were seen approaching the tunica albuginea. The average height of follicular epithelium was 24.32 µm.The connective tissue of the zona parenchymatosa was slightly dense. Intense PAS- Alcian blue (2.5pH) activity was recorded in the cells of membrana granulosa and liquor folliculi indicating presence of mucopolysacharides.

The germinal epithelium was 6.29 ± 1.03 µm thick lesser than in group A. It was made up of squamous cells. The tunica albuginea appeared denser than in the group A. The density of the collagen fibres was more as compared to group A. Elastic fibres could not be traced. The maximum size of the follicle was 1440.00 µm. The cortical stroma was also dense as compared to group A. The medulla or zona vasculosa was made up of vascular loose connective tissue but was comparatively denser.

Intense PAS- Alcian blue (2.5pH) activity was recorded in the cells of membrana granulosa and liquor folliculi as in group A.

The germinal epithelium was made up of squamous type of cells The height of which was 5.22 ±1.03 µm The tunica albuginea was less dense with finer collagen fibre as compared to group A and B. The fibres of the cortical stroma were finer as compared to the group A and B. Vascularity of the stroma was increased. The maximum diameter of the follicle was 4032.00 µm.

Intense PAS- Alcian blue (2.5pH) activity was recorded in the cells of membrana granulosa and liquor folliculi as in group A and B. The shape of the germinal epithelial cells and constitution of the tunica albuginea resembled to the reports of Bacha and Bacha (1990), Aughey and frye (2001) and Trautman and Fiebiger (2002).

In present study the ovary is found to be externally covered by cuboidal epithelium lining which formed the germinal epithelium . The secondary and tertiary follicles were present in the deeper cortex. The tunica albuginea appeared denser in the group B. The tunica albuginea was less dense with finer collagen in group C. Intense PAS- Alcian blue (2.5pH) activity was recorded in the cells of membrana granulosa and liquor folliculi, are similar in all the three groups.

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REFERENCES

Aughey, E. and Frye, F.L. 2001. Comparative Veterinary Histology with Clinical Correlates. Manson Publishing Ltd. London, UK.

Bacha, William J. and Bacha, Linda, M. 1990. Colour Atlas of Veterinary Histology 2nd edition. Walnut Street Philadelphia, Pennsylvania.

Bancroft, J.D. and Stevens, A. 1996. Theory and practice of Histological Techniques, 4th edition. Churchill and Livingstone. London.

Trautmann, A.,Fiebtger, A.T. 2002. Fundmental of histology of domestic animals. In: The female genital organs. Green World Publisher India. 279-301.

Luna, L. G. 1968. Manual of Histological Staining Methods. Armed Forces Institute of Pathology. The Blacklstan Division McGraw-Hill book Co.,Inc. New York.

Mallory, F. B. 1961. Pathological Technique.. Hafner Publishing co.,New york. pp. 152

Masson, P. J. 1929. In Manual of Histological Staining Methods.(Ed.)Luna G L. Armed Forces Institute of Pathology. The Blackistan Division McGraw-Hill book co., New York.