

Transplacental Transmission of Macromolecules from Maternal to Foetal Compartments in the Gravid Sheep Uterus

Dr. J. Violet Beulah

Department of Veterinary Anatomy, Madras Veterinary College

Abstract: *The developing concepts (embryo-foetus and associated placental membranes) maternal uterus which must be established during the peri-implantation period for pregnancy, recognition, signaling, implantation, regulation of gene expression by uterine epithelial and stromal cells, placentation and exchange of nutrients and gases. The uterus provide a microenvironment in which molecules secreted by uterine epithelial or transported into the uterine lumen represent histotroph required for growth and development of the conceptus and receptivity of the uterus to implantation. Gravid uteri of sheep were collected from the local abattoir. Crown rump length of foetuses was measured to calculate the age of the foetus as well as to assess the stage of pregnancy. Samples from the uterus were processed and sections of 5 micron thickness were cut for standard staining techniques. Aggregates of Brown to black pigments were seen mostly in the uterine endometrium particularly in the glandular area. In addition fine granules were also seen just beneath the uterine epithelium. Histological features of pigment cells were observed and discussed.*

Keywords: Maternal, Foetal, Placentomes and Haematomas

1. Introduction

Sheep embryos enter the uterus on day 3 develop to spherical blastocysts and then transform from spherical to tubular and filamentous conceptuses of pregnancy with extra-embryonic membranes extending into the contralateral uterine horn between days 16 and 20 of pregnancy. Elongation of Ovine conceptuses is a prerequisite for central implantation involving opposition and adhesion between trophoblast and uterine luminal and superficial glandular epithelia. There is a transient loss of uterine superficial glandular epithelia allowing intimate contact between trophoblast and uterine basal lamina adjacent to uterine stromal cells to about day 25 of pregnancy when uterine superficial glandular epithelium begins to be restored and placentation continues to day 75 of gestation. All mammalian uteri contain uterine glands that produce or selectively transport a complex array of proteins and other molecules into the uterine lumen is known collectively as histotroph. Uterine glands and the molecules that they secrete or transport into the uterine lumen are essential for conceptus development. Ewes that lack uterine glands and histotroph fail to exhibit normal estrous cycles.

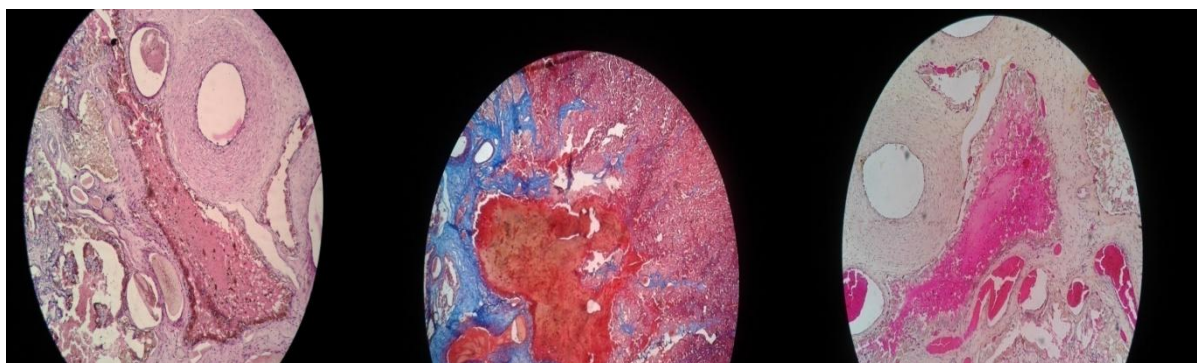
2. Materials and Methods

Histological study was conducted with small pieces of gravid uteri of sheep. Tissues were collected and preserved in 10 percent neutral buffered formalin for 48 hours and processed for light microscopy by paraffin of melting point 58-60°C. The paraffin blocks were sectioned to obtain 5-6 micron thick sections which were stained with following routine histological and special staining techniques to demonstrate different components.

- 1) Haematoxylin and Eosin stain for routine observation (Singh and Sulochana 1997)
- 2) Masson's trichrome method for collagen fibres (Singh and Sulochana 1997)
- 3) Perl's prussian blue for iron deposits (Luna 1968)
- 4) Grimelius's method for argyrophilic cells (Luna 1968)
- 5) Lendrum's method for fibrin (Singh and Sulochana 1997)
- 6) Periodic acid Schiff for glycogen (Singh and Sulochana 1997)

3. Results and Discussion

Hematomas were found only in the arcade zone of the placentomes as it was reported by (Bazer et al., 2012) in sheep (fig 1-5).



Haematoxylin and Eosin stain 4X

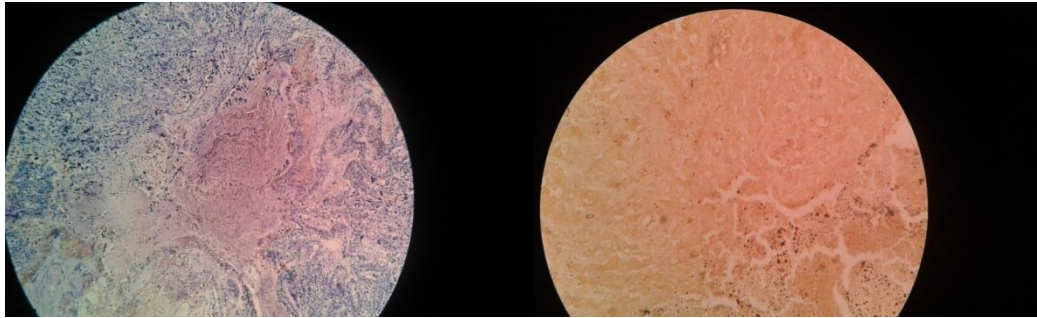
Masson's trichrome 4X

Lendrum's 4X

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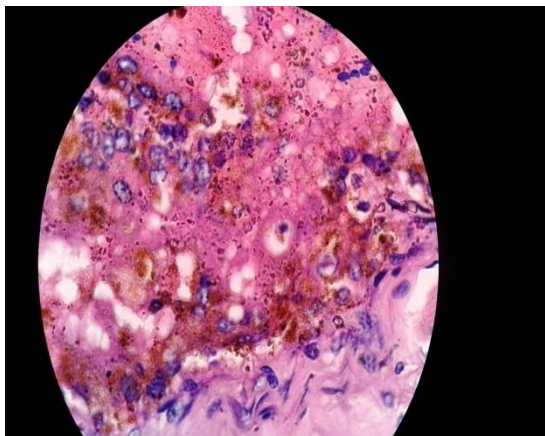


Periodic Acid Schiff 10 X Gremilu's 10 X

Figure 1-5: Placental Haematomas

Mononucleate and binucleate trophoblast cells were evident lining the external surface of the chorioallantois as it was observed by (Bazercet al., 2011) in mammals (fig 6).

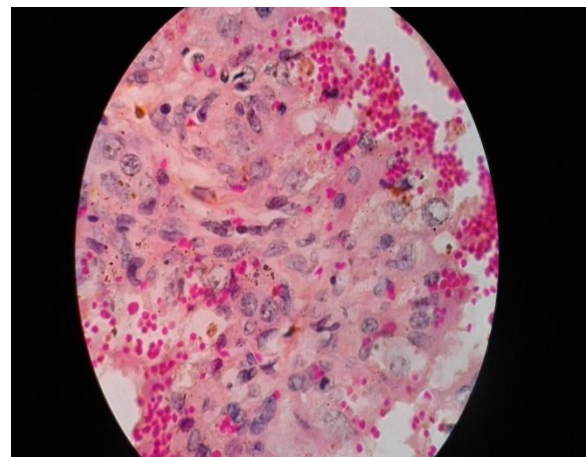
placentomes of all the sheep specimens as it was reported by (Bazer et al., 2011) in mammals (fig 8)



Haematoxylin and Eosin stain 100X

Figure 6: Mononucleate and Binucleate cells

Mononucleate trophoblast cells lining the arcade zones of the placentomes engulfed the red blood cells from the haematoma. The mononuclear trophoblast cells were demonstrated (fig 7) as it was noticed by (Gracy et al., 2001).



Lendrum's 100 X

Figure 8: Foetal mononuclear trophoblast cells

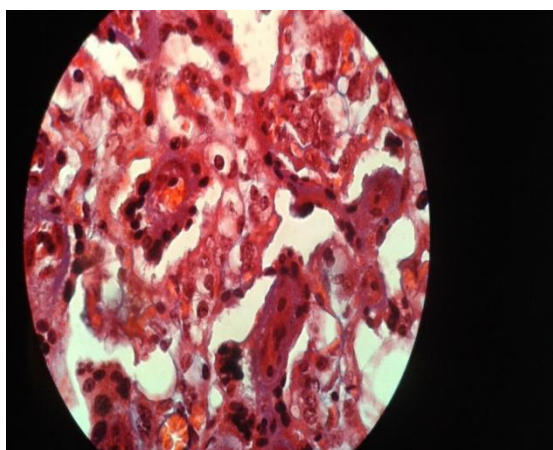
Transfer of nutrients across the placental barriers was noticed.

4. Conclusion

Placental hematomas and erythrophagocytosis of trophoblast cells in the placentomes of sheep may be an important structural modification for providing the foetus with nutrients.

References

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Masson's trichrome 100X

Figure 7: Mononuclear trophoblast cells

More of mononuclear cells were observed near the hematoma in all the specimens. Escape of blood close to the hematomas may only be sporadic and no erosion of maternal vessels observed. Erythrophagocytosis by foetal mononuclear trophoblast cells were observed in the

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