

# UNILATERAL RELATIONSHIP OF EMBRYO AND THE CORPUS LUTEUM IN GOAT

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**Summary :** The relationship between embryo and corpus luteum was studied in an experiment on Barbari goats which were made unilaterally pregnant by embryo transfer 5 days after oestrus. Two embryos were transferred to each recipient whose luteal stage was coinciding with that of the donor. The site of transfer was either ipsilateral uterine horn (group I) or contralateral uterine horn (group II). The "ipsilateral uterine horn" refers to the horn on the same side as the corpus luteum; the "contralateral uterine horn" refers to the horn on the side opposite to the corpus luteum. In all 10 recipients (5 in each group) having unilateral ovulations were used.

Two of the 5 recipients, where embryos were transferred in ipsilateral uterine horn conceived and delivered two normal kids. None of the recipients where embryos were transferred in contralateral uterine horn conceived. The results of the experiment indicate that a unilateral feto-ovarian mechanism is involved in maintenance of the CL in goat.

**Key words :** embryo

corpus luteum

goat

## INTRODUCTION

Although it is a common practice during embryo transfer procedures to place the fertilized ovum (embryo) in the horn ipsilateral to the ovary bearing the CL, a knowledge on the nature of relationship (local or generalised) between embryo and CL becomes obvious for wider use of the technology successfully. A local relationship exists between embryo and the corpus luteum in sheep (6) and pig (2, 3).

The relationship between embryo and the corpus luteum has not been demonstrated in the goat. The object of the present experiment was, therefore, to study the

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way by which the embryo influences the life span of the corpus luteum. In order to study this, a technique was used whereby embryos were transferred to the uteri (both ipsilateral and contralateral to CL) of nonpregnant recipient goats at 5 days after oestrus.

## MATERIAL AND METHODS

A flock of 40 mature female goats of Barbari breed was maintained under standard feeding and management conditions. Those goats exhibiting an oestrous cycle length of 20-21 days were used in the present experiment.

The oestrus in cycling nannies (both donors and recipients) was synchronized by feeding melengestrol acetate (MGA) with concentrate mixture @ 0.15 mg/animal for 16 days. Pregnant mare serum gonadotropin (PMSG) was administered subcutaneously in a group of nannies (only donors) on the last day of MGA feeding to enhance the number of ovulations.

After the treatment the oestrus was detected each day in the morning and evening by parading a vasectomized buck. On appearance of oestrus the donor nannies (MGA+PMSG treated) were inseminated twice (once on the first detection of oestrus and second at 12 hrs later). Fresh semen collected from the proven bucks having good vigour was used for insemination. The remaining goats (MGA treated) in oestrus were left empty and later used as recipients.

The techniques used for collection of embryos from the donors and the subsequent transfer to recipients were as described previously (1).

The embryos were collected by flushing the uterine horns of 5 donors at 5 days after the onset of oestrus. A stereoscopic binocular microscope was used for identification and isolation of embryos in the uterine flushings. The embryos thought to be normal were placed in a medium (ringer solution) kept in a glass pipette attached to a syringe until transfer was done (30-45 min).

Two embryos were transferred to each recipient whose luteal stage was coinciding with that of the donor. The site of transfer was either ipsilateral uterine horn (group I) or contralateral uterine horn (group II). The "ipsilateral uterine horn" refers to the horn on the same side as the corpus luteum; the "contralateral uterine horn" refers to the horn on the side opposite to the corpus luteum. The nannies exhibiting ovulations in only

one ovary at the time of laparotomy were used as recipients in the present experiment. In all 10 recipients (5 in each group) having unilateral ovolutions were used.

After the transplantation of embryos, the recipients were examined with vasectomized buck to determine the post operative oestrus; the nannies which did not come in oestrus, and were, therefore, presumed to be pregnant, were allowed to go to term.

The recipients had no chance to come in contact of any buck. Their own ova released during oestrus got degenerated as there was no chance for them to unite with male gametes. As such any birth in recipient goats was considered out of transferred embryos.

### RESULTS AND DISCUSSION

The number of donors and recipients used, the number of embryos collected, the number of embryos transferred and the number of kids born are presented in Table I.

TABLE I : Results of ipsilateral and contralateral transfer of embryos in goats.

1. No. of donors used	..	..	5
2. No. of embryos collected from donors	..	..	25
3. No. of embryos with normal cleavage	..	..	20
4. No. of recipients used :			
a. Ipsilateral transfer	..	..	
b. Contralateral transfer	..	..	5
5. No. of embryos transferred :			
a. Ipsilateral transfer	..	..	10
b. Contralateral transfer	..	..	10
6. No. of recipients conceived :			
a. Ipsilateral transfer	..	..	2
b. Contralateral transfer	..	..	Nil
7. No. of kids born :			
a. Ipsilateral transfer	..	..	2
b. Contralateral transfer	..	..	Nil

Two of the 5 recipients, where embryos were transferred in ipsilateral uterine horns conceived and delivered two normal kids. None of the recipients where embryos were transferred in contralateral uterine horns conceived.

The results of the experiment indicate that a unilateral feto-ovarian mechanism is involved in maintenance of the CL in goat. Luteal maintenance occurred when embryos were ipsilateral to the CL, whereas luteal regression occurred when embryos were contralateral to the CL. A local relationship also exists between the conceptus and the corpus luteum in sheep (7) and Cow (8).

The mechanism by which the embryo overcomes the luteolytic effect of the uterus in the goat is unknown. Evidence for the production and release of a luteotropin which passes from a gravid uterine horn to the adjacent ovary through a local veno-arterial pathway has been reported for sheep (4, 5). Considering the similarity of the anatomy of the utero-ovarian vascular pedicle between ewe and goat, it is possible that a veno-arterial pathway also exists for the local luteotropic effect of a gravid uterine horn in the goat.

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