COLLECTION OF BOVINE OVIDUCT SECRETIONS*

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A simple method for cannulation of the bovine oviducts permitting the collection of daily samples of secretions would enhance the study of fertility as well as contribute to knowledge in the field of embryo nutrition and development. Olds & VanDemark (1957) used a wringer technique to obtain oviduct secretions from slaughterhouse material. Carlson, Black & Howe (1970) described a procedure for the continuous collection of oviduct fluid from the cow. Cannulation of the oviduct was accomplished with a single silastic cannula held in the oviduct by two collars sutured to the ovarian end of the oviduct. Numerous oviducal fluid collection systems have been used with varying degrees of success. Hamner & Fox (1969) reviewed collection techniques used in several species including the sheep, pig, monkey and rabbit. Yoshinaga, Mahoney & Pincus (1971) reported continuous collection from both oviducts.

The animals used in this study were nulliparous dairy heifers (10 to 20 months of age) which were observed in oestrus at least once before surgery. All operations were performed at mid-cycle under either local anaesthesia (Neurothesia) or inhalation general anaesthesia (Fluothane and N₂O).

Following laparotomy in the region of the left paralumbar fossa, the reproductive tract was brought to the opening for observation and cannulation. Under general anaesthesia, it was possible to obtain a fuller exposure of the reproductive tract through the flank incision.

A double-walled silastic (Dow Corning Corporation, Midland, Michigan) cannula sealed together with silicone adhesive (Medical Adhesive-Silicone Type A, Dow Corning) was threaded into and sutured within the fimbria of the left oviduct with 5-0 silk. Several sutures through the silicone adhesive bleb and the adjoining tissue as well as two to four sutures around the fimbria and cannula were used to hold the device in place. The overall length of the cannula was 46 to 60 cm depending on the size of the animal. The utero-tubal junction was ligated with a single 3-0 suture to prevent flow of secretions into the uterus or backflow from the uterus into the oviduct. Care was taken to include only the oviduct with this ligature so that no sizeable blood vessels were occluded. Since both ends of the oviduct were sealed off, any fluids collected were either secreted by cells of the oviduct or by transudation from the

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vascular system. Due to the presence of the cannula and the possible irritation involved, it is not possible to assume that the volume of secretions collected was quite normal. Histological preparations of both oviducts were made after the collection period in order to compare the cannulated left oviduct with the normal right oviduct. The results indicated that no gross changes occurred during the collection period. Since silastic, which is essentially non-reactive, was used for cannulation and fluid output did follow a definite cyclic pattern, homeostasis is strongly indicated.

Once the cannula was secured in place, the system was checked for patency by injecting air into the cannula, and the tract was allowed to return to its normal position. A single circular suture was placed around the cannula and

Table 1. Daily oviduct secretion in the cow

Day of cycle	Animal number			Mean $\pm$ S.E.
	412	418	419	
1 (Oestrus)	3.74	6.87	1.56	4.06 $\pm$ 1.54
2	2.41	5.62	2.37	3.47 $\pm$ 1.08
3	4.20	4.12	1.66	3.33 $\pm$ 0.83
4	3.32	1.95	1.20	2.16 $\pm$ 0.62
5	1.85	2.50	1.07	1.81 $\pm$ 0.41
6	2.15	1.68	0.37	1.40 $\pm$ 0.53
7	1.97	2.28	0.37	1.54 $\pm$ 0.59
8	1.93	1.83	0.36	1.37 $\pm$ 0.51
9	0.63	1.31	0.05	0.66 $\pm$ 0.36
10	0.77	1.58	0.00	0.78 $\pm$ 0.46
11	1.06	1.19	0.20	0.82 $\pm$ 0.31
12	2.08	1.41	0.35	1.28 $\pm$ 0.50
13	1.70	1.42	0.50	1.21 $\pm$ 0.36
14	1.85	1.94	0.35	1.38 $\pm$ 0.52
15	1.75	0.70	0.85	1.10 $\pm$ 0.33
16	2.00	0.29	0.44	0.91 $\pm$ 0.55
17	1.12	0.66	0.23	0.67 $\pm$ 0.26
18	1.63	0.57	0.28	0.83 $\pm$ 0.41
19	1.29	2.00	0.50	1.26 $\pm$ 0.43
20	1.09	1.82	1.02	1.31 $\pm$ 0.26
21	0.52			0.52

Oviduct secretion values expressed in ml/24 hr.

through the muscles immediately above the reproductive tract in order to keep the cannula away from the rumen and adjoining tissue. The collection end of the cannula was brought to the exterior through a small stab incision in the upper flank approximately 8 in. below the tuber coxae. No major infections developed using this procedure even when cannulae were left in place for several cycles.

The collection system (Plate 1) was both inexpensive and easily constructed. A plastic 35-ml syringe container sutured to the animal's skin with a single suture served as a holder and protective device for the 10-ml glass vial where the oviducal secretions were accumulated.

Within 3 hr of the operation carried out under general anaesthesia, the animal had recovered sufficiently to be returned to an individual box stall and remained there throughout the collection period. All animals were given daily injections of penicillin (2×10^6 units) and streptomycin (1 g) for the first

The device used for daily collection of bovine oviducal fluid.

8 days after surgery. Each animal was given two injections/week for the next 3 weeks. Antibiotics were discontinued 1 month after the operation unless signs of minor infection were observed where the cannula came through the skin to the exterior. The sterile glass collection vials used in this study worked satisfactorily but during the daily process of changing vials, there was always the possibility of contaminating the end of the cannula and thereby providing an avenue for infection.

The daily volume of the secretions varied significantly during the oestrous cycle (Table 1). As reported by Restall (1966) in the sheep and Carlson *et al.* (1970) in the cow, the maximum volume was recorded under the influence of oestrogen but very low levels were recorded when progesterone influence predominated. The largest amount of fluid collected per day from one animal was 6.87 ml during oestrus. This volume exceeds values reported by Carlson *et al.* (1970) in the cow and by Engle, Witherspoon & Foley (1970) in the mare although the pattern of secretion found during the course of this work was quite similar. The cyclic pattern was evident in all animals and is in contrast to the earlier report of Olds & VanDemark (1957).

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