

# A simple method for repetitive blood sampling of cattle

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A simple practical technique is described for the collection of blood samples from at least six cattle concurrently at short time intervals for up to 48 h. The technique is advantageous in that it is carried out under minimum stress conditions.

'n Eenvoudige praktiese tegniek vir die gelyktydige trekking van bloedmonsters van ten minste ses beeste, met kort periodes tussen trekkings, word beskryf vir 'n tydperk van tot 48 h. Die voordeel van hierdie tegniek is dat dit onder toestande van minimale spanning geskied.

**Keywords:** Stress, sampling, cattle, method

Endocrinological research often requires the collection of blood samples at short intervals over relatively long periods of time (48 h). Since stress has an effect on the levels of thyrotropin (Krulich, Giachetti, Marchlewska-Koj, Hefco & Jameson, 1977), cortisol (Bareham, 1975), and prolactin (Rigg & Yen, 1977), care has to be exercised to reduce stress to a minimum during blood sampling. Ideally, the animals should be able to continue with activities such as eating, drinking, and limited physical movement while being sampled. Furthermore, experimental design would be simplified if a number of animals could be sampled concurrently.

A technique for cattle has thus been developed in which a number of animals can be sampled at frequent intervals under conditions which minimize stress and allow the animals to stand, lie down, eat, and drink. The two key features of the technique are the use of a foam-rubber collar to assist in securing and protecting the catheter and a pulley system capable of maintaining a gentle tension on the catheter tubing.

Catheter insertion was carried out as follows. Firstly, with the animal restrained in a neck clamp, a stainless steel cannula with a 2,2 mm inside diameter was introduced into the jugular vein. A polythene catheter with outside diameter 600 mm × 2 mm, disinfected in 95% alcohol, was then introduced into the jugular vein through the cannula for a distance of at least 150 mm. Once a good flow of blood from the catheter had been confirmed, the cannula was removed by sliding it over the external length of the catheter. The catheter was then filled with saline containing heparin (200 IU/ml) and stoppered. A normal leather cattle halter was then fitted to the animal and a 30 mm × 150 mm × 1000 mm foam-rubber collar attached to the posterior margin of the halter (Figure 1) so as to cover and protect the entry site of the catheter. The catheter was woven through the foam rubber in a dorsal direction. The end of a silicone rubber tube with an inside diameter of 3000 mm × 2 mm was forced through the foam-rubber collar in a ventral direction to meet and connect with the free end of the catheter. After withdrawing the air from the tubing, it was filled with heparinized saline, stoppered,



**Figure 1** A heifer fitted with a jugular vein catheter during an experiment in which blood samples were taken every 30 min for 48 h. The foam-rubber collar and pulley system can be seen clearly.

and secured to the collar. At this stage the animal was transferred to a stall and loosely chained by the halter to the feeding trough to prevent excessive movement. The silicone tubing was then passed through a pulley system as shown in Figure 1.

The pulley system maintains a constant gentle tension on the tubing and this prevents the tubing from becoming entangled. Heparin solution plus blood equivalent to the volume of the catheter and tubing (approximately 10 ml) plus a further 5 ml was withdrawn and discarded before blood sampling. Immediately after blood collection, the tubing and catheter was again flushed and filled with heparinized saline solution.

The 3000 mm silicone rubber tubing not only allows the animal a reasonable degree of movement but also allows the syringe to be located some distance away from the animal, thereby minimizing disturbance to the animal. As a precautionary measure, animals received 1 000 000 IU long-acting penicillin intramuscularly.

Using this system, one assistant/researcher has successfully drawn blood from six cows concurrently at half hourly intervals for 48 h. To compare the degree of stress experienced by animals bled under catheterized conditions and jugular vein venipuncture while secured in a neck clamp, serum cortisol was quantitated on the first sample drawn from five cattle after catheter insertion and on every 24th sample (i.e. 12, 24, 36 & 48 h) after the initial sample, as well as on every 12th sample of blood collected weekly for a year by normal venipuncture. The mean ( $\pm$  sd) cortisol concentration for the initial sample was  $30,4 \pm 17,5$  nmol/l, for the 12, 24, 36 &

48 h samples it was  $12,9 \pm 6,0$  nmol/l and for the venipuncture samples it was  $25,9 \pm 13,2$  nmol/l. Both the initial sample value and the venipuncture sample value were significantly higher than the values of the sample collected via catheter ( $P < 0,01$ ).

Although numerous authors have described catheterization (Anderson & Elseley, 1969; McGilliard, 1972; Katz & Bergman, 1969; Hale, 1974), little has been reported on the practical aspects of protecting catheters implanted into cattle. The method described in this communication is simple, inexpensive and lends itself to concurrent blood sampling from a number of animals and results in minimal stress in the animals.

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