Summary

BLOOD LEVELS OF PROGESTERONE IN THE EWE

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THE OESTROUS CYCLES OF ROMNEY EWES were determined by means of raddled teasers. Blood progesterone levels during the cycles were measured by means of a chemical assay, with a limit of sensitivity of about 0.15μg./ml. blood. In each case, assays were carried out on a blood sample from the jugular vein and on a sample obtained at laparotomy from the ovarian vein draining the active ovary. Most ewes were sampled only once or twice. The results from 150 samples were analysed for an average oestrous cycle of 17 days, day 1 being the day of onset of oestrus.

In no case was progesterone detected in blood from the jugular vein. In ovarian venous blood, detectable amounts appeared on the third day of the cycle. Thereafter the mean concentration increased to about 1.8μg./ml. on the seventh day, was maintained at about this level until the sixteenth day, and fell to less than 0.15μg./ml. on the seventeenth day.

The concentrations in the blood of yearling ewes fell within the range of those of three-year-old sheep.

There was considerable variation between different sheep on those days of the oestrous cycle when progesterone was detectable, and, in some sheep, between samples obtained during the main luteal phase (seventh to sixteenth day) of different cycles. In individual sheep, during the luteal phase of any one cycle, the variations in progesterone concentration in the ovarian venous blood were relatively small.

DISCUSSION

Q: : *I was interested in the comment on the differences between Suffolks in England and Romneys in New Zealand in their response to PMS. I have found similar differences between different parts of Britain within the same breed of horses in their response to purgative drugs. Therefore, your observations may not be due to breed but could be due to differences in location.*

A: : Yes.

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Q: : *The variations you find in the levels of progesterone between different sheep may not be significant. With other hormones and with other species of animals, it has been shown that it is the balance between the levels of different hormones which are significant rather than the absolute level of any one particular hormone.*

A: : I have been trying to explain the reasons for wide variations in the levels of progesterone between sheep, and agree that the balance between different hormones may be the significant factor.

Q: : *Progesterone must be physiologically active at levels well below those detectable by your assay method. Dilution with the circulating blood must be the main factor involved. Would it not be wiser to take blood from the right side of the heart or from the arteries before the blood has circulated through the head? Have you noticed any differences in the cycling behaviour of ewes with low and high levels of progesterone?*

A: : Two factors are involved in this process. First, dilution, as has been mentioned. We have demonstrated this by sampling blood from the ovarian vein after it has been joined by veins from the reproductive tract. Secondly, metabolism must also play a part, otherwise there would be a build-up of progesterone in the blood. We have not been able to recognize any relationship between the levels of progesterone and the cycling of the sheep.

Q: : *Progesterone may be metabolized into some other progestational substances. Has Dr. Edgar any ideas on attacking this particular problem?*

A: : Yes, I am attempting to make a comparison between our method and the bio-assay method of Hooker and Forbes. Dr. D. S. Flux of Massey College has offered to do this for us using the same sample of blood. This will give us a lead as to whether we are dealing with the same material.

Q: : *What effect does the presence of two corpora lutea in the ovary have on the concentration of progesterone?*

A: : On a few occasions we have found ewes with two corpora lutea in one ovary. In these cases, the concentration of progesterone in the blood fell within the same range as from ovaries containing one corpus luteum. In one instance, we had a ewe in which there was one corpus luteum in one ovary and two in the other. The concentration of progesterone in the blood from each of the two ovarian veins was almost exactly the same.

Q: : *Have you made any observations on the anatomical size of the corpus luteum where two are present; would these be similar to a single one?*

A: : Dr. Wallace has made such observations and found that usually multiple corpora lutea are smaller in size than a single corpus luteum.