

Brief Communication

PLASMA PROGESTERONE INCREMENTS IN SOWS
TREATED WITH ACTH

In sows ovarian cysts are readily inducible by ACTH injections during the follicular phase of the oestrous cycle (*Liptrap* 1973). It thus appears that adrenal hyperactivity in pigs may be of consequence for the secretion of gonadotropins required for ovulation. A steroid possibly relating ovarian to adrenal function could be progesterone which has been identified in considerable amounts in porcine adrenal tissue as well as in the adrenal effluent (*Holzbauer & Newport* 1969). Our data support the notion that in the pig the adrenal potential for progesterone secretion may indeed be appreciable.

ACTH (Synachten "CIBA"®, 1 mg, corresponding to 100 i.u.) was injected intravenously in four sows, two of which were lactating and thus supposedly having inactive ovaries. The two others had been ovariectomized, but at slaughter one of them was found to have a tissue remnant in which several large follicles (2—3 cm in diam.) had developed.

Blood samples were obtained from the jugular vein. Progesterone was extracted from the plasma with petroleum ether (b.p. 35—60°C) and measured by radioimmunoassay. The specificity of the antiserum employed has been characterized (*Andresen & Onstad* 1979). A noticeable cross-reaction with progesterone was observed for deoxycorticosterone (6.7 %) which would have been extracted with an efficiency of about 20 %. Various other steroids tested, such as 17 α -OH-progesterone, corticosterone or cortisol, did not cross-react to any significant extent (< 1 %).

Quite uniform increments of progesterone (about 2 ng/ml, Table 1) were found within 30 min after ACTH injection in three of the animals. The consistency of these results indicates that this type of response to ACTH is probably representative for normal animals. The maximal levels (about 2.5 ng/ml) amounted to approx. 1/10 of those found during the luteal phase of the cycle (*Stabenfeldt et al.* 1969) and were thus considerably higher than the low levels (0.5 ng/ml) generally associated with follicular development and ovulation.

Table 1. Plasma progesterone in lactating (A and B) and in ovariectomized sows (C and D) treated with ACTH (100 i.u.) intravenously. Means of duplicate determinations. Estimate of the 95 % confidence interval for values < 3 ng/ml: ± 0.4 ng/ml.

	Progesterone, ng/ml			
	A	B	C	D*
Day 1	0.8	0.2	0.6	8.2
Day 2, ACTH inj.				
0 min	0.4	0.3	0.0	7.6
10 "	2.0	1.4	1.6	lost
20 "	2.7	2.2	2.6	16.5
30 "	1.3	2.6	2.5	15.8
1 h	1.2	1.7	2.0	15.8
2 "	0.6	1.0	1.8	12.8
4 "	0.6	0.2	0.6	6.2
Day 3	0.8	0.0	0.2	5.7

* Ovariectomy incomplete, several large follicles in the remnant tissue.

The relatively very high initial level of progesterone in the fourth sow might have been caused by secretion from the piece of ovarian tissue present, which, however, was devoid of corpora lutea. The possibility that the large follicles were in a process of luteinization was unfortunately not explored. It is of particular interest to note that also the progesterone increment (8 ng/ml) after ACTH in the animal concerned was very much larger and more persistent than in the three others. In this case the adrenal capacity for progesterone secretion thus seemed to be abnormally increased. A similar condition of the adrenals in intact animals might presumably dispose for infertility by interference with gonadotropin secretion.

The evidence that progesterone could serve a role in the apparent ovarian-adrenal relation in pigs does not exclude that other steroids of adrenal origin may also be involved.

E. Benjaminsen and T. Lunaas

The Department of Reproductive Physiology and Pathology,
Veterinary College of Norway, Oslo.

REFERENCES

- Andresen, Ø. & O. Onstad*: Brunstkontroll og drektighetskontroll hos ku ved hjelp av progesteronbestemmelse i melk. (Oestrus control and pregnancy control in cattle by progesterone determination in milk). *Norsk Vet.-T.* 1979, *91*, 411—421.

- Holzbauer, M. & H. M. Newport:* Adrenal secretion rates and adrenal tissue concentrations of pregnenolone, progesterone, 11 β -OH-androstenedione and some other steroids in young pigs and dogs. *J. Physiol. (Lond.)* 1969, *200*, 821—848.
- Liptrap, R. M.:* Oestrogen excretion by sows with induced cystic ovarian follicles. *Res. vet. Sci.* 1973, *15*, 215—219.
- Stabenfeldt, G. H., E. L. Akins, L. L. Ewing & M. C. Morrissette:* Peripheral plasma progesterone levels in pigs during the oestrous cycle. *J. Reprod. Fertil.* 1969, *20*, 443—449.

(Received February 4, 1980).

Reprints may be requested from: E. Benjaminsen, the Department of Reproductive Physiology and Pathology, Veterinary College of Norway, P.O. Box 8146 Dep., Oslo 1.