INHIBITION OF PARTURITION IN SWINE BY THE DITHIOCARBAMOYLHYDRAZINE, ICI 33828*

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Two experiments were conducted to determine if methallibure (ICI 33828), a hypothalamus-inhibiting dithiocarbamoylhydrazine (Malven, 1971) would prevent parturition.

In Exp. 1, thirteen pregnant Yorkshire, Poland China and Yorkshire $\times$ Poland China gilts were divided into three groups. Three gilts were assigned to be controls, four were fed 150 mg ICI 33828/gilt/day from the 100th to the 116th day of gestation and the six remaining gilts received ICI 33828 from the 100th day of gestation until parturition. Piglet numbers and weights were determined on the day of parturition.

In Exp. 2, fourteen pregnant Yorkshire or Poland China sows were randomly assigned to be untreated controls or fed 200 mg ICI 33828/sow/day from Day 100 of gestation until parturition. Piglet numbers and weights were obtained at birth and at 1 week of age. The females in both experiments were checked daily for evidence of milk ejection.

The duration of gestation was significantly longer ($P < 0.05$) for sows and gilts treated with ICI 33828 (Tables 1 and 2). The gilts removed from treatment at Day 116 did not litter until Day 118, indicating that the physiological changes initiating parturition in ICI 33828-treated sows must have started on or before Day 116.

Milk ejection first occurred on the day of, or the half day preceding, parturition in all groups. It was significantly later in gestation for sows and gilts treated with ICI 33828 ($P < 0.05$). This differs from the data of Nellor (1963) where treatment of sows with 6-methyl-17-acetoxy-progesterone prevented parturition but milk ejection occurred on the date that parturition was normally due. This difference is probably due to different sites of action of the two drugs, ICI 33828 being a hypothalamic inhibitor and known to block oxytocin release (Garbers & First, 1968).

Fewer sows exhibited *post-partum* oestrus after treatment with ICI 33828 (Table 2), though the day on which *post-partum* oestrus occurred was not significantly different from that for controls.

The number of live or dead pigs at birth and the mean birth weights did not differ significantly between treatment groups in either experiment. In Exp. 2, litters from sows treated with ICI 33828 were heavier at birth but the mortality

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from birth to 1 week of age was greater than that of the controls ($P < 0.01$). There was no significant difference in piglet or litter weights at 1 week of age.

The mechanism through which ICI 33828 prolonged gestation is not known. The corticosteroid, dexamethasone, when administered to swine fetuses or to the mother will induce parturition (North, 1971), as it does in sheep (Liggins, 1968). The fetal pituitary and its release of ACTH may also be necessary for the initiation of parturition in swine, as in sheep (Liggins, Kennedy & Holm, 1967; Liggins, 1968). If it is assumed that the teratological changes reported to occur in the fetuses when the sow is treated with ICI 33828 (King, 1969; Christenson, Schafer, Teague & Grifo, 1971) are evidence that the drug crosses the placenta,

TABLE 1

DATA IN EXP. 1 FOR MEAN GESTATION LENGTH, FIRST DAY OF MILK EJECTION, AND LITTER SIZE OF CONTROL AND ICI 33828-TREATED GILTS AND MEAN WEIGHT OF PIGLETS AT BIRTH

Treatment	No. of gilts	Milk ejection, 1st day		Gestation		Piglets			
		Days	S.D.	Days	S.D.	No. born		Average wt (lb)	
						Live	Dead	Live	Dead
Control	3	114.7*	0.58	115*	0.0	8	1	3.0	1.5
ICI 33828 100 to 116 days	4	118.0	1.83	118.3	1.71	5.8	1.3	3.7	1.8
ICI 33828 100 days to parturition	6	118.7	0.82	118.7	0.82	7.8	1.8	3.2	1.9

* Significantly less than the other two means, $P < 0.05$.

TABLE 2

DATA IN EXP. 2 FOR MEAN GESTATION LENGTH, FIRST DAY OF MILK EJECTION, DAY OF *post-partum* OESTRUS AND LITTER SIZE OF CONTROL AND ICI 33828-TREATED SOWS AND MEAN WEIGHTS OF LITTERS AT BIRTH AND AT 1 WEEK OF AGE

Treatment	No. of sows	Milk ejection, 1st day		Gestation length		Post-partum oestrus		No. of piglets born		No. dead birth to 1 week	Litter wt (lb)	
		Day	S.D.	Days	S.D.	No.	Day	Live	Dead		Birth	1 week
Control	7	114.1	2.0	114.1	2.0	6*	3.8	6.7	0.15	0	20.5	37.0
ICI 33828	7	118*	2.4	118*	2.4	3	6.3	9.3	0.41	2.7**	29.3*	33.7

* $P < 0.05$. ** $P < 0.01$.

then it is reasonable to expect that parturition was delayed due to inhibition of the release of fetal ACTH. How the parturition initiation mechanisms eventually overcome this inhibition is without explanation.

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REFERENCES

- CHRISTENSON, R. K., SCHAFER, J. H., TEAGUE, H. S. & GRIFO, A. P., JR (1971) Influence of methallibure on early pregnancy in swine. *J. Anim. Sci.* **33**, 1156.
- GARBERS, D. L. & FIRST, N. L. (1968) The effects of ICI 33828 and oxytocin on milk ejection and milk production in the lactating sow. *J. Reprod. Fert.* **17**, 551.
- KING, G. J. (1969) Deformities in piglets following administration of methallibure during specific stages of gestation. *J. Reprod. Fert.* **20**, 551.
- LIGGINS, G. C. (1968) Premature parturition after infusion of corticotrophin or cortisol into fetal lambs. *J. Endocr.* **42**, 323.
- LIGGINS, G. C., KENNEDY, P. C. & HOLM, L. W. (1967) Failure of initiation of parturition after electrocoagulation of the pituitary of the fetal lamb. *Am. J. Obstet. Gynec.* **98**, 1080.
- MALVEN, P. C. (1971) Hypothalamic sites of action for methallibure (ICI 33828) inhibition of gonadotropin secretion. *J. Anim. Sci.* **32**, 912.
- NELLOR, J. E. (1963) Induced delayed parturition in swine and cattle. *Physiologist*, **6**, 244.
- NORTH, S. A. (1971) *The induction of parturition with corticosteroid*. M.S. thesis, University of Wisconsin, Madison.