EARLY PREGNANCY DIAGNOSIS BY SERUM PROGESTERONE LEVELS IN SWINE

K. Kawata*, N. Saga, T. Nakao, and N. Tsunoda
Department of Veterinary Obstetrics and Gynecology,
School of Veterinary Medicine, College of Dairying,
Rakuno Gakuen University, Ebetsu, Hokkaido, Japan

Serum progesterone levels in pregnant sows can be determined by radioimmunoassay (RIA) and the method has been used successfully to the early pregnancy diagnosis of this species (Ellendorff et al., 1976 ; Mori, 1979). However, RIA has some disadvantages, mainly due to restrictions on the use of radioisotope. Johmen et al. (1980) have established a method of enzyme immunoassay (EIA) of serum progesterone in swine, in which β-galactosidase from *E. coli* was used as a label instead of radioisotope. The present study is concerned with early pregnancy diagnosis by serum progesterone levels using EIA.

A total of 442 blood samples (2 ml) was taken from the ear veins or *Vena cava cranialis* of 291 sows and gilts in a farm during 18-21 days after service (day 0 = day of first service). The blood was placed for 2 hours at room temperature and then centrifuged (3,000 rpm, 10 minutes). Sera obtained were kept at -20°C until EIA was carried out. Serum progesterone levels of 5.0 ng/ml or more were diagnosed to be pregnant and levels less than 5.0 ng/ml were determined not to be pregnant. Accuracy of diagnosis was based on parturition.

The results diagnosed as pregnant by serum progesterone levels on 18, 19, 20 and 21 days after service were 87.9 (87/99), 93.6 (88/94), 95.3 (143/150) and 96.3 % (26/27), respectively (Table 1). On the other hand, the results diagnosed as non-pregnant by serum progesterone levels were all 100 % on the above-mentioned days after service. Thus, a total accuracy of diagnosis was 90.1, 94.4, 96.2 and 96.4 % on respective days after service.

In the same herd, the accuracy in pregnancy diagnosis based on non-return rate (NR) by 21 days after service was 81.6 % (191/234) in positive cases and 100 % (24/24) in negative cases, respectively.

Statistically, a highly significant difference ($P < 0.01$) was obtained between pregnancy diagnoses by progesterone assay on day 19 or 20 and by the NR method. Significance ($P < 0.05$) was also observed between diagnostic accuracy of progesterone assay on day 18 and that on day 20.

In conclusion, early pregnancy diagnosis about 20 days after service by serum progesterone levels by EIA can be used successfully in swine practice.

Selected references

Ellendorff, F., Meyer, J. N., and Elasaesser, F. ; Br. Vet. J. 1976, 132: 543.
Mori, J. ; Jpn. J. Anim. Reprod. 1979, 25(5): 22.
Johmen, M., Nakao, T., Tsunoda, N., and Kawata, K. : Jpn. J. Anim. Reprod. 1980, 26(2): 77.

Table 1. Comparison of pregnancy diagnoses by progesterone assay and non-return method

Accuracy	progesterone assay on				non-return by
	day 18*	day 19	day 20	day 21	day 21
Number of cases examined	121	107	186	28	258
Diagnosed pregnant	99	94	150	27	234
Fallowed	87	88	143	26	191
Accuracy (%)	87.9	93.6	95.3	96.3	81.6
Diagnosed not pregnant	22	13	36	1	24
Not fallowed	22	13	36	1	24
Accuracy (%)	100.0	100.0	100.0	100.0	100.0
Accuracy in total (%)	90.1 [c]	94.4 [a]	96.2 [b,c]	96.4	83.3 [a,b]

* day 0 = day of first service
[a]/a and [b]/b : $P < 0.01$; [c]/c : $P < 0.05$