Rapid Communication

Oxytocin Receptors in the Porcine Myometrium during the Estrous Cycle and Early Pregnancy

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Abstract Affinity (Kd) of oxytocin receptors (OTR) in the porcine myometrium ranged from 0.48 to 0.77 nM. There was not significant difference in Kd values among the stages of the estrous cycle and early pregnancy. However, maximum number of OT binding site varied with the stages of the estrous cycle, but were constant at early pregnancy. These results suggested that OT in the myometrium probably plays a role for uterine contraction via OTR in the estrous stages instead of controlling the luteal function.

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Key words: oxytocin receptor, porcine myometrium, estrous cycle

Recently, we have reported the existence and characteristics of oxytocin receptor (OTR) in the porcine endometrium²⁾. We suggested that the fluctuation of characteristics in OTR plays an important role in regulating the estrous cycle of the pig as seen in other animals. Although there has been a report on binding sites of oxytocin (OT) in porcine myometrium in late pregnancy⁶⁾, this information may not be applicable to the myometrium of the estrous cycle and early pregnancy. A measurement of OTR in the porcine myometrium may be essential for a better understanding of the role of OT in the estrous cycle and establishment of pregnancy. Therefore, the present study was conducted to quantify and characterize OTR in the porcine myometrium during the estrous cycle and early pregnancy.

Materials and Methods

Uteri from crossbred sows (Landrace x Large White x Duroc) were obtained immediately after slaughter at four stages of the estrous cycle (Days (D) 0, 5, 10 and 15) and of the early pregnancy (D 5 and D15 after mating). OTR in myometrium were assayed as described previously²⁾. Briefly, OT antagonist, [d(CH₂)₅, Tyr(Me)², Thr⁴, Tyr-NH₂⁹]-OVT(OVT)¹⁾, (Penin-

sula Laboratories, Belmont, CA, USA) was iodinated by a modified lactoperoxidase method⁴⁾. OTR assays were conducted as similar method of Serina *et al*⁵⁾.

The data obtained on binding of ¹²⁵I-OVT and OT to membrane of porcine myometrium were calculated by Scatchard analysis³⁾. The goodness of fit for the selected model was examined by the 'runs test'. Specific binding of ¹²⁵I-OVT to membrane preparation from different stages of the estrous cycle and early pregnancy were compared among each group of data by analysis of variance.

Results and Discussion

Affinity (Kd) of myometrial OTR on D0 was similar to that of D5, 10 and 15. In early pregnancy, Kds were 0.48±0.29 nM on D5 and 0.61±0.40 nM on D15, respectively. Kds of myometrial OTR distributed from 0.48 to 0.77 nM, and there was not significant difference in each stage of the estrous cycle and early pregnancy (Table 1).

Changes in maximum number of OT binding site (Bmax) in the myometrium were almost same pattern as seen in the endometrium²⁾. Bmax on D0 was high (1245.0 fmol / mg protein). Bmax on D5, 10 and 15 of the estrous

Table 1. Kd values for OTR in porcine myometrial membrane preparations (n=3, mean $\pm$ S.E)

Values	Kd (nM)				P
	Day 0 (Estrus)	Day 5	Day 10	Day 15	
Non-pregnant	(0.77)*	0.77 $\pm$ 0.38	0.61 $\pm$ 0.04	0.68 $\pm$ 0.27	N.S
Pregnant	————	0.48 $\pm$ 0.29	————	0.61 $\pm$ 0.40	N.S
P		N.S		N.S	

* : n=1, N.S : non significant

Kd values from different stages of estrous cycle were compared within non-pregnant or pregnant pigs, and values from same stages (Days 5 and 15) of non-pregnant and pregnant pigs were also compared.

Fig. 1. Maximum number of OT binding site in the porcine myometrium from the stages of estrous cycle and early pregnancy

cycle were 564.7, 644.4 and 744.0 fmol / mg protein, respectively. Bmax on D5 and 15 of the early pregnancy were 281.6 and 329.0 fmol / mg protein, respectively (Fig.1). In the two stages of the early pregnancy, Bmax were constant but lower than that of the luteal stage. Our results revealed the existence of specific OTR in the porcine myometrium during the estrous cycle and early pregnancy. OT in the myometrium supposedly plays a role for uterine contraction via OTR in the estrous stage instead of controlling the luteal function.

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