

Unilateral Ovariectomy Affects the Oviductal Environment through Changes in Steroids

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The parity structure of many herds means it is important to maximize litter size in replacement gilts, by avoiding management practices that contribute to embryonic loss. Nutritional studies in gilts and sows have shown that differences in circulating progesterone in early pregnancy may mediate nutritional effects on embryo survival and thus affect litter size. During this critical window of time the embryo resides within the oviduct, and lowered steroid concentrations in this period may affect the oviductal environment. Oviduct secreted proteins (POSP 1-3) are thought to be steroid induced, which suggests that differences in steroids during the peri-estrus period may affect the quality of the oviductal environment. However, steroid concentrations in the oviduct circulation are increased by a sub-ovarian countercurrent system and it is important to determine the importance of steroid concentrations in the countercurrent circulation for the secretion of oviduct proteins.

To study steroid dependent regulation of oviductal protein secretion, gilts (n=15) were unilaterally ovariectomized and at third estrus, ovulation was detected using transcutaneous ultrasonography at 8h intervals. Blood samples were taken 12-24 h after ovulation under general anaesthesia from jugular veins and oviduct veins ipsilateral (I) and contralateral (C) to the remaining ovary, to determine steroid concentrations. Concurrently, both oviducts were flushed and fluid protein concentration was determined, and POSP 1-3 were visualised using immunoblotting techniques. Results (table below) confirm an effective sub-ovarian countercurrent system and the potential for different steroid environments to affect oviductal protein secretion.

	Progesterone (ng/ml)	Estrogen (pg/ml)	Protein conc. (ng/ml)	POSP 1-3 (OD*mm ²)
I oviduct	54.53 ^a	6.9 ^a	47.3 ^a	2.48 ^a
C oviduct	2.27 ^b	3.8 ^b	86.9 ^b	1.69 ^b

^{a,b} indicates a significant difference (P<0.05) within column

Implication: Insight into the control of oviduct protein secretion by steroids, and the role of the oviduct in embryonic loss, will facilitate sow and gilt management to maximize litter size. This research is supported by Alberta Pork Producers.