

Role of Uterine Lymphocytes in Angiogenesis during Early Pig pregnancy

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Background

Natural killer lymphocytes are recruited to the pig uterus in early pregnancy but their functions are unknown. Analogous cells in mice and humans are responsible for triggering changes in the mother's uterine arteries that directly supply developing fetuses. We hypothesize that porcine uterine lymphocytes contribute to and regulate maternal angiogenesis at critical times in early pregnancy when 30% mortality occurs.

Objectives

- To identify and quantitate angiogenic factors in porcine uterus during early pregnancy.
- To determine if genes that promote maternal vascular angiogenesis are expressed by uterine lymphocytes.

Methods

Endometria were collected from non-pregnant virgin pigs and gilts on gestation days (gd) 15, 19 and 23. Pure populations of 500-1000 lymphocytes were isolated from specific uterine microdomains by Laser Capture Microdissection (LCM) from cryopreserved uterine sections stained with Haematoxylin and Eosin. Gene expression in LCM-captured lymphocytes was compared to that in total endometrial tissue collected from different uterine regions using quantitative real time polymerase chain reaction.

Results

Gene quantification by real time PCR				
Gene	Endometria NP, gd15, 19,23	LCM isolated 500 Lymphocytes	Between littermates	Mesometrial and antimesometrial sides
VEGF	√	√	√	√
HIF-1 α	√	√	√	√
IFN- γ	√	√	√	√
Flt-1	√	In progress	In progress	In progress
Flk-1	√	√	In progress	In progress

Take Home Messages

- A progressive increase in VEGF (vascular endothelial growth factor) expression was observed from gd 15 to 23 in endometrial tissues and in lymphocytes
- This is the first report of HIF-1 α (hypoxia-induced Factor-1) and IFN- γ (interferon gamma) expression by uterine lymphocytes during early pig pregnancy
- Interconceptus variability in gene expression is observed. Dying conceptuses do not induce maternal VEGF and are associated with massive elevation in IFN- γ .
- Production of IFN- γ in porcine implantation sites switches from fetal trophoblasts to maternal lymphocytes during attachment.

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