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Obstetrics Vet. | 2nd semester | 4th year

Maternal Recognition of Pregnancy

The developing embryo enters the uterus between d 2 and 5 after ovulation depending on the species. For the early embryo to become an established pregnancy, luteolysis must be prevented (the corpus luteum must be maintained), so two major events have to take place:

1. PGF₂α synthesis and secretion must be stopped

2. Progesterone must be maintained

The conceptus must provide a timely (before luteolysis) biochemical signal, concepts signals its presence to the dam, signals enable pregnancy to continue. If a signal is not delivered quickly enough, luteolysis will occur, progesterone will decline, and the early embryo will die.

A. In the cow and ewe:

- The blastocyst begins to secrete trophoblast protein
- Both ovine and bovine trophoblast protein belong to a class of <u>glycoprotein</u> known as <u>interferon</u>
- Ovine interferon-tau (oIFN-tau) and Bovine interferon-tau (bIFN-tau).
- The trophoblast produces oIFN-tau and bIFN-tau <u>between d 13 to d 17</u> as the conceptus elongates (spherical to tubular to filamentous) and then stopping after day 24 of pregnancy.

Mechanism of action:

The oIFN-tau and bIFN-tau bind to the endometrium, inhibit endometrial oxytocin receptor synthesis, the activity of $PGF_2\alpha$ does not change and therefore, luteolysis does not occur.

Remember:

The Oxytocin, oxytocin receptors, progesterone, estradiol, and $PGF_2\alpha$ all play a role in luteolysis).



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B. In the mare:

Mechanism of action:

- The presence of the conceptus helps to prevent luteolysis.
- The equine conceptus doesn't produce proteins; their role in maternal recognition is unknown.
- The conceptus must <u>migrate</u> within the uterus between <u>12 to 14</u> times per day during days 12, 13, and 14 of pregnancy to inhibit $PGF_2\alpha$ production.
- This migration appears to be very important because the early embryo does not elongate.
- Conceptus must "<u>touch</u>" enough receptors or secrete "proteins" and place them near (On) receptors to maintain pregnancy.

C. In the sow:

Mechanism of action:

- The conceptus of the pig produces estradiol between d 11 and 12 after ovulation (coincides with the elongation of the conceptus)
- Estradiol serves as the signal for maternal recognition of pregnancy.

<u>What happens to PGF₂α?</u>

- $PGF_2\alpha$ is produced by the endometrium <u>re-routed</u> into the uterine lumen and <u>metabolized</u>, rather than being drained by the uterine veins.
- Luminal PGF₂ α has little access to the circulation and can't cause luteolysis.
- The sow must have at least <u>two conceptuses</u>, in each uterine horn for pregnancy to be maintained.
- If there no two concepts, $PGF_2\alpha$ is secreted in an endocrine manner and luteolysis will occur, and pregnancy will be terminated.

D. In the women:

- The basis of early pregnancy tests is human chorionic gonadotropin (HCG).
- HCG is produced by trophoblast cells of the early embryo and is secreted as early at d 12 to 13 after ovulation.

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