Early pregnancy regulates Toll-like receptors expression in ovine trophoblasts and peripheral blood leucocytes

Interferon-tau (IFN-t), released from the embryonic trophoblasts, is the first embryonic signal in ruminants and drives the process of maternal recognition of pregnancy. It possesses critical functions such as regulation of prostaglandin secretion, conceptus elongation, immunological tolerance, and the secretory function of the endometrial glands in the uterus. Association between IFN-t and the immune response during early pregnancy attracts attention for research. The innate immune system critically regulates the immune mechanism during pregnancy which provides a proper environment for the development of allogeneic embryo/fetus.

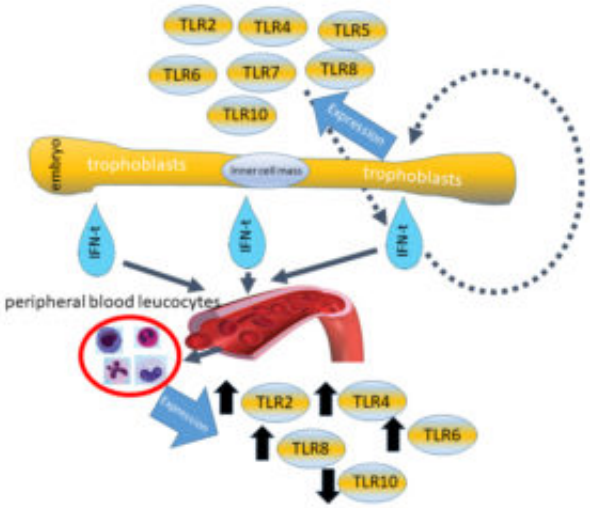

Fig. 1. A schematic model of Toll-like receptors expression in ovine trophoblasts and peripheral blood leucocytes. An up arrow (?) indicates up-regulation, a down arrow (?) indicates down-regulation. Cells or tissues also are defined, IFN-t: interferon-tau.

As a significant component of the innate immune system, Toll-like receptors (TLRs) are localized in the cell membrane and intracellularly, and activates the acquired immune system. The interplay among the embryo, uterus, and peripheral immune cells is required to generate immune tolerance for the establishment and maintenance of pregnancy.

Therefore, in this study, the aim was to explore the expression profiles of TLRs in trophoblasts and peripheral blood leucocytes (PBLs) during ovine early pregnancy. Our results revealed that ovine trophoblasts express TLR2, TLR4, TLR5, TLR6, TLR7, TLR8, and TLR10. Among those, TLR4 at both mRNA and protein levels, have a unique expression profile. We also suggested that the involvement of TLRs in early pregnancy regulated immune mechanism in ovine PBLs as indicated

by differential expression levels for TLR2, TLR4, TLR6, TLR8 and TLR10 (Fig. 1). According to these results, we suggest that the early ovine trophoblasts play an immunological role at the maternal-fetal interface. Moreover, tight regulation of TLRs in PBLs is also necessary for the successful establishment of early pregnancy in ewes.

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