Implantation is critical for pregnancy outcome and its progression relies on tightly coordinated interactions between the receptive endometrium and the developing embryo. We recently showed that FOXL2—a key gene for ovarian differentiation in vertebrates—was expressed and regulated in the endometrium during oestrous cycle and early pregnancy. The present study aims to investigate the contribution of progesterone in the regulation of FOXL2 expression in the endometrium of ruminants using various physiological and experimental models. In keeping with our former data, ovine FOXL2 expression was low during the luteal phase while RNA and protein levels significantly increased during the luteolytic phase. In early pregnant ewes, trilostane treatment (an inhibitor of 3β-hydroxysteroid dehydrogenase activity) prevented P4 rise and led to a significant increase of FOXL2 transcript expression compared to the control group (1.4-fold, P < 0.05). Ovariectomized cows and ewes treated with exogenous P4 for 6 and 12 days, respectively, exhibited a significant inhibition of FOXL2 mRNA expression compared to control ovariectomized females (for cattle, 2.2-fold; for sheep, 1.8-fold; P < 0.05). In vitro incubation of bovine endometrial explants with P4 for 48 hours led to FOXL2 mRNA down-regulation compared to control condition (2.6-fold, P < 0.05). Activity of ruminant FOXL2 promoter transfected in COS cells was modulated by P4 when P4 receptors were overexpressed. Collectively, our results demonstrate FOXL2 as a new progesterone-regulated gene in endometrium of ruminant origin. Determining the biological actions of FOXL2 will be necessary to define the contribution of this transcription factor in the regulation of endometrial physiology.

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