

C-C Motif Chemokine Ligand 2 Regulates Prostaglandin Synthesis and Embryo Attachment of the Bovine Endometrium during Implantation

尹, 治善

<https://hdl.handle.net/2324/4496101>

出版情報 : Kyushu University, 2021, 博士 (農学), 課程博士

バージョン :

権利関係 : Public access to the fulltext file is restricted for unavoidable reason (3)

Name : Chisun Yun

Title : C-C Motif Chemokine Ligand 2 Regulates Prostaglandin Synthesis and Embryo Attachment of the Bovine Endometrium during Implantation

(着床期ウシ子宮内膜における CC モチーフケモカインリガンド 2 によるプロスタグランジン合成と胚接着の制御)

Category : Koh

Thesis Summary

C-C motif chemokine ligand 2 (CCL2), which regulates immune cells, has been reported to be expressed in the bovine endometrium during pregnancy. However, the details of how CCL2 is involved in the implantation mechanism of bovine embryos are still unclear. The purpose of this study is to analyze the expression pattern and functional properties of CCL2 in the bovine endometrium and embryos.

The qPCR analysis of the tissue showed that not only the amount of *CCL2*, but also *CCL8* and *CXCL10* were high at the implantation stage. The amount of *CCL2* was significantly high in IFN α treated bovine endometrial stromal (BES) cells in vitro. In bovine endometrial epithelial (BEE) cells, however, the amount of *CCL8* and *CXCL10* were significantly high in the treatment group, but not for *CCL2*. The mRNA of each chemokine receptors (*CCR1*, *CCR2* and *CXCR3*) was detected in the endometrial tissues and cells by RT-PCR. Cellular proliferation of BEE and BES significantly increased by the CCL2 treatment. The amount of prostaglandin (PG) E2 synthases, *PGES1* and *PGES2*, and PGF2 alpha synthase, *AKR1C4*, were high at the implantation stage compared with luteal stage. The amount of *PGES2* and *AKR1B1* were significantly increased by CCL2 treatment dose-dependently in BEE. In BES, on the other hand, the amount of *PGES3*, *AKR1A1* and *AKR1C4* were increased by CCL2 treatment. The qPCR analysis of the tissue showed that there were no differences in the amount of PGs transporter transcripts (*MRP4* and *PGT*) between the luteal and

implantation stages. The amount of *MRP4* and *PGT* were significantly high in CCL2 treated bovine endometrial epithelial (BEE) and stromal (BES) cells *in vitro*. The mRNA of chemokine receptors (*CCR1*, *CCR2* and *CXCR3*) were detected in the bovine trophoblastic cells derived from the blastocyst (BT) by RT-PCR. The amount of *PCNA* and *IFNt* were significantly high in the BT treated with CCL2 compared to the control. CCL2 significantly increased the attachment rate of BT vesicles to BEE in *in vitro* co-culture system. The amount of *OPN* increased in BEE, and *ICAM-1* increased both in BEE and BT by CCL2 treatment.

These results indicate that CCL2, which expression increased in bovine endometrium during implantation by embryonic factors, has the potential to regulate the synthesis and circulation of PGs in the endometrium and the embryo growth. In addition, CCL2 has a possibility of regulating the process of bovine embryo attachment to the endometrium by modulation of binding molecules.