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Paternal Contribution To Placentation And Pregnancy Success

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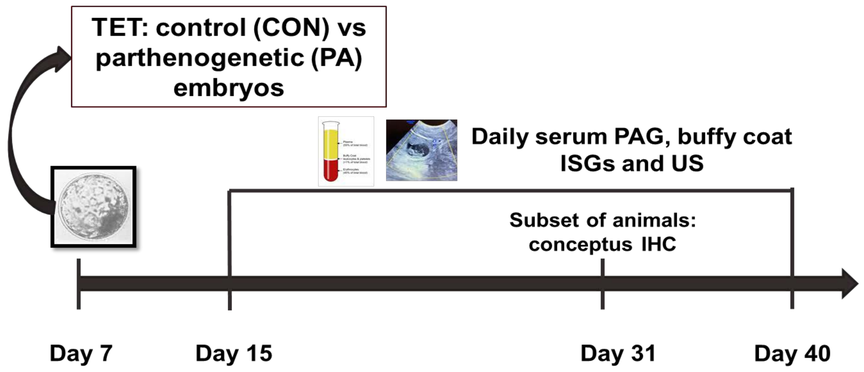
INTRODUCTION

Establishment of pregnancy is a complex process and involves regulated interactions between maternal and paternal genetics for proper embryonic and placental development to occur. Regardless of this significant contribution, little progress has been made towards understanding the role of paternal genetics during pivotal periods of development post fertilization, such as placentation. Investigating this relationship can help elucidate the mechanism of pregnancy failure in ruminant species. Our objective was to compare pregnancy development in bovine embryos in absence of paternal genetics (parthenogenetic embryos) with normal biparental embryos (control embryos). Our hypothesis was that parthenogenetic embryos have compromised embryonic implantation and placental development.

MATERIALS AND METHODS



SUMMARY

- ✓ Parthenogenetic (PA) pregnancies can be maintained up to days 40-50 of gestation in cattle, making it a suitable model to study parental contribution to embryo implantation and placental development;
- ✓ PA embryos had extensive trophoblast proliferation but no active site of implantation and/or endometrium invasion;
- ✓ PA pregnancies had decreased circulating conceptus products (PAG and ISGs) when compared to control pregnancies;
- ✓ Paternal genetics seem to play major roles in embryonic implantation and further investigation of this relationship can help elucidate mechanism of embryonic mortality in cattle during this period of gestation.

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RESULTS

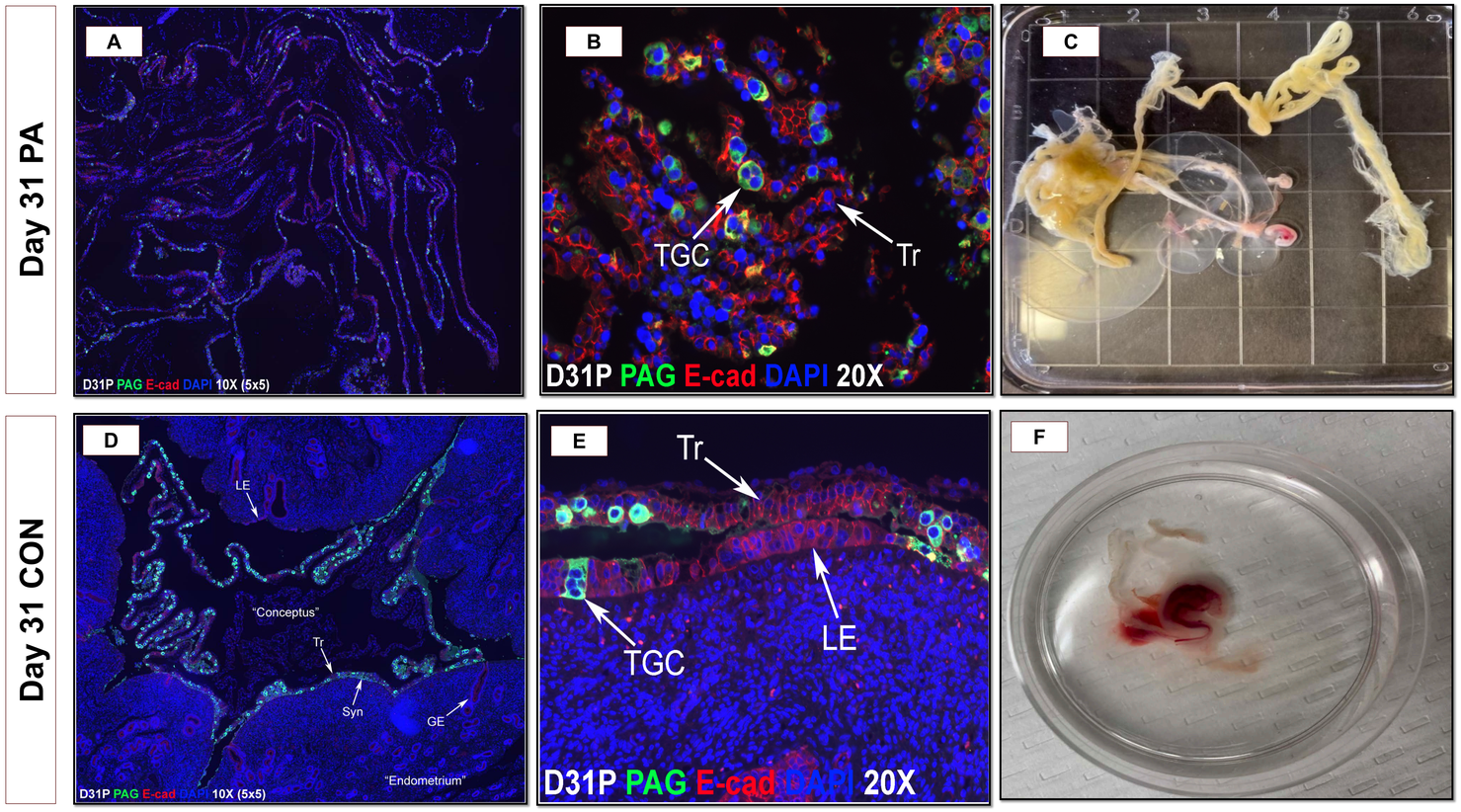

Figure 1. **A,B:** IHC of parthenogenetic (PA) embryos harvested at day 31 of gestation (**C**). **D, E**: IHC of control (CON) embryo harvested at day 31 of gestation (**F**). Pregnancy associated glycoprotein (PAG), E-cadherin (E-cad), Trophoblast giant cell (TGC), Trophectoderm (Tr), Luminal Epithelium (LE), Glandular Epithelium (GE).

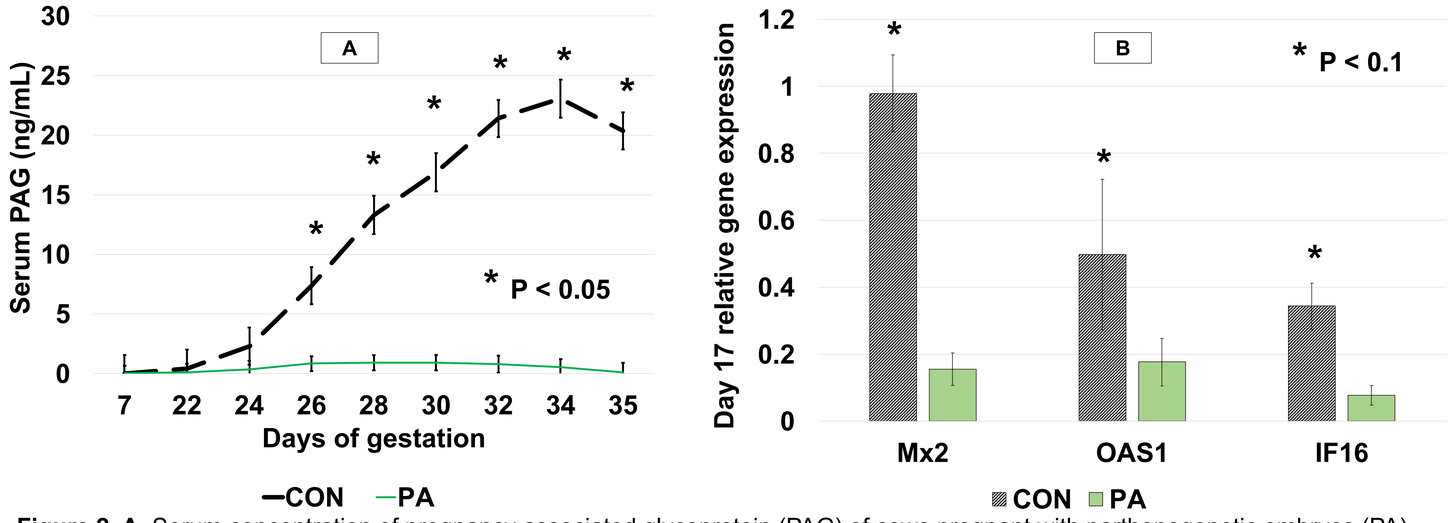

Figure 2. A. Serum concentration of pregnancy associated glycoprotein (PAG) of cows pregnant with parthenogenetic embryos (PA) compared to cows pregnant with control (CON) embryos. **B**. Relative expression of interferon-stimulated genes (Mx2, OAS1, IF16) in peripheral blood leukocytes of cows pregnant with parthenogenetic (PA) embryos compared to cows pregnant with control (CON) embryos on day 17 of gestation.