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Somatic cell nuclear transfer is associated with altered expression of angiogenic factor systems in bovine placentomes at term

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ABSTRACT. Low efficiency of somatic cell cloning by nuclear transfer has been associated with alterations of placental vascular architecture. Placental growth and function depend on the growth of blood vessels; VEGF-A and bFGF are the most important factors controlling neovascularization and vascular permeability in the placenta. We hypothesize that the VEGF-A and bFGF systems are disrupted in placentomes from cloned animals, contributing to the

placental abnormalities that are common in these clones. We determined mRNA expression and protein tissue localization of VEGF-A, bFGF, and their receptors in placentomes from cloned and non-cloned bovine fetuses at term. Real-time RT-PCR revealed that VEGFR-2 mRNA was increased in cloned male-derived placentomes, while mRNA of bFGF and its receptors were decreased in placentomes of cloned females. VEGF-A system proteins were found to be located in placentomal endothelial, maternal and fetal epithelial and stromal cells; there was a variable pattern of cellular distribution of these proteins in both cloned and non-cloned animals. Alterations in the expression of VEGF-A and bFGF systems suggest that angiogenic factors are involved in abnormal placental development in cloned gestations, contributing to impaired fetal development and poor survival rates.

Key words: Vascular endothelial growth factor; Clones; Bovines; Fibroblast growth factor; Placenta

