The purpose of the present study was to investigate the effects of prostaglandin (PG) E2 and tumor necrosis factor (TNF) alpha on expression of vascular endothelial growth factor (VEGF) and its receptors, fms-like tyrosine kinase (Flt-1) and fetal liver kinase-1/kinase insert domain-containing receptor (Flk-1/KDR), in cultured porcine luteal cells. Real-time PCR was used for quantification of VEGF and its receptors mRNA, whereas VEGF release by luteal cells was determined by radioimmunoassay (RIA). Only the highest dose of PGE2 (1 mM) after 6 hr of incubation stimulated VEGF release by luteal cells collected in the mid-luteal phase (P<0.05). Moreover, PGE2 (100 nM, 1 mM) significantly stimulated VEGF secretion by luteal cells in the late phase and during pregnancy on Days 10–12 (P<0.05). Elevated mRNA expression of both VEGF 120 and VEGF 164 isoforms was found in luteal cells cultured with PGE2. The lack of an effect of PGE2 on VEGF receptors mRNA expression was observed. TNFa was able to significantly stimulate VEGF release from cells obtained in the mid- and late luteal phase or during early pregnancy. All tested doses enhanced mRNA levels of VEGF 120 isoform, but not VEGF 164. Additionally, TNFa was able to decrease Flk-1/KDR mRNA expression, whereas Flt-1 mRNA levels were not affected. These
results indicated that PGE2 and TNFa influenced VEGF ligand-receptor system expression in porcine luteal cells and may therefore play an important role in regulation of luteal functions during the estrous cycle and pregnancy in pigs.