ABSTRACT

In vitro, meotic maturation of porcine oocytes and cumulus expansion are induced by FSH and EGF-like peptides AREG and EREG. FSH and EGF-like peptides induce expression of cumulus expansion-related genes (*HAS2*, *PTGS2* and *TNFAIP6*). To define signaling pathways that control FSH- and AREG-induced cumulus expansion, porcine cumulus-oocyte complexes were treated with specific protein kinase inhibitors. Inhibitors of MAPK3/1, MAPK14 and ERBB1 significantly reduced both FSH- and AREG-induced expression of *HAS2*, *PTGS2* and *TNFAIP6*. These inhibitors decreased FSH/LH-induced expression of *AREG* and *EREG* in mural granulosa cells. Surprisingly, inhibitor of PKA had no effect on *AREG* expression in cumulus-oocyte complexes but the inhibitor decreased expression of *TNFAIP6* induced by AREG. Inhibitor of PI3K increased expression levels of *AREG* and *PTGS2* but *EREG*, *HAS2* and *TNFAIP6* were reduced. Expression levels of the cumulus expansion-related genes were not affected by an analog of cGMP (8-CPT-cGMP). However, 8-CPT-cGMP blocked spontaneous *in vitro* meiotic maturation of porcine oocytes and its effect was abolished by FSH.

Key words: cumulus expansion, cumulus expansion-related genes, meotic maturation, FSH, amphiregulin, cGMP