ASSOCIATION OF PLASMINOGEN ACTIVATORS WITH CUMULUS EXPANSION AND OOCYTE MATURATION

Li, Sheng-hsiang

Bidirectional intercellular communications between the oocyte and their surrounding cumulus cells are es sential for the oocyte developmental competence. Previous studies showed that plasminogen activators (PAs), i.e., urokinase–type (PLAU) and tissue–type (PLAT) PA, may involve in the process of oocyte maturati on. How cumulus cell
expressed PAs affect cumulus expansion and oocyte maturation remains to be determined. Here, we eval uate the expression of PLAT in cumulus cells of mature and immature human oocytes and use the mouse model to study the effect of the enzymatic activity of PLAU on cumulus expansion during oocyte maturati on in vitro. PLAT, the human cumulus cells predominantly expressed PA, was differentially expressed betw een cumulus cells of immature and mature human oocytes as determined by the quantitative real–time p olymerase chain reaction. To assess the effect of the enzymatic activity of PLAU on oocyte in vitro maturat ion (IVM), two PLAU–specific inhibitors, i.e., 4–chlorophenyl guanidine hydrochloride (4CGH) and UK122, were added before oocyte IVM. PLAU specific inhibitors were dose–dependently inhibited mouse cumulus –oocyte complex expansion and the subsequent oocyte maturation. The dynamics of cumulus expansion r ecorded by a time–lapse imagine analyzer revealed that the inhibition of cumulus expansion by 4CGH was first detected at 6 h during IVM. Increasing fetal bovine serum concentration in culture medium from 10% to 20% reversed the suppression of 4CGH in a dose–dependent manner. Replacement of medium serum t o the fetuin protein showed a similar inhibitory effect of the 4CGH on cumulus expansion and oocyte mat uration.Taken together, the PA may involve in the process of oocyte maturation. The enzymatic activity of PLAU in mouse oocyte in vitro maturation is primarily contributed by the endogenous expression of cumul us cells though it also derived from serum supplementation to the IVM medium.