

LYSOPHOSPHATIDIC ACID MAY CONTRIBUTE TO INCREASING THE FERTILIZATION RATE IN THE MICROENVIRONMENT OF RAT OVIDUCTS.

Authors

Kurusu, Shiro, Author, Terashima, Ryota, Co-Author, Kawaminami, Mitsumori, Co-Author

Abstract Body

Lysophosphatidic acid (LPA) is a recently recognized lipid mediator that is synthesized by autotaxin (ATX) and acts through binding to specific GPCRs, LPA1-6. It has been shown to be involved in several reproductive processes of women and cow. Here, we determine whether LPA system may exist in the mature follicles and oviducts and affect the fertilization of ovulated ova. Immature female rats of Wistar-Imamichi strain treated with eCG/hCG were used. ATX and LPA1-4 expression in cumulus-oocyte complex (COC) and the oviduct were examined by immunohistochemistry. ATX was absent in mature follicles and COC but present in oviductal epithelial cells. LPA4 was expressed in oocytes of the follicle and ovulated ova, and LPA3 was expressed in cumulus cells. In the oviduct, mucosal epithelial cells expressed both LPA3 and LPA4, and smooth muscle cells expressed LPA4. After ovulation, cumulus oophorus expand and this naturally denuded ovum, in the absence of fertilization, degenerates with a hallmark of fragmentation. These two processes were evaluated after intra-ovarian bursal injection of reagents at 19 hours after hCG. The number of denuded ova (that did not involve cumulus oophorus expansion) was increased by LPA and decreased by anti-ATX antibody. LPA inhibited and a chemical inhibitor of ATX increased fragmentation rates. Overall results suggest that LPA synthesis and reception system exists in rat COC and microenvironment of the oviduct and affects cumulus oophorus expansion and ovum viability.