http://biology.num.edu.mn
http://mjbs.100zero.org/
Volume 11(1-2), 2013

Mongolian Journal of Biological Sciences

ISSN 1684-3908 (print edition)
MJBS
ISSN 2225-4994 (online edition)

Original Article

Involvement of LPA Receptor 3 in LPA-induced BGC-803 Cell Migration

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Abstract

Key words:
Lysophosphatidic acid receptor 2, 3 (LPAR2, LPAR3), cell migration, gastric cancer

Article information:
Received: 06 Jan. 2014
Accepted: 31 Mar. 2014
Published: 20 Apr. 2014

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Lysophosphatidic acid（LPA）is a bioactive phospholipid mediator, which elicits a variety of biological functions mainly through G-protein coupled receptors. Although LPA is shown to stimulate proliferation and motility via LPA receptors, LPAR1 and LPAR3 in several cancer cell lines, but the role of LPA receptors in gastric cancer cells is still being unknown. However, several researches reported that LPAR2 play an important role in the carcinogenesis of gastric cancer, but there is no report to show the LPAR3 involvement in the carcinogenesis. For this reason, we examined LPA receptors (LPAR1, LPAR2 and LPAR3) in BGC-803 cells along with real time PCR method. Real-time PCR analyses were used to evaluate the expression of LPA receptors in BGC-803 cells. Among these receptors, LPAR3 was shown to be highly expressed in BGC-803 cells, a human gastric cancer cell line. Transient transfection with LPAR3 siRNA was observed to reduce LPAR3 mRNA in BGC-803 cells and eliminate the LPA-induced cell migration. The results suggest that the LPAR3 regulates LPA-induced BGC-803 cell migration.

Cite this paper as: Oyungerel, E., Tseveensuren, Ts., Gansukh, O., Juan, L. R, & Damirin, A., 2013. Involvement of LPA receptor 3 in LPA-induced BGC-803 cell migration. *Mong. J. Biol. Sci.*, 11(1-2): 25-30.

Introduction

Lysophosphatidic acid (LPA), a bioactive phospholipid with diverse physiological actions involved in triggering tumor cell invasion and metastasis, as well as malignant cell growth. In recent years, also found that, LPA as an intercellular messenger, could lead to a very wide range of biological effects, and its significant biological effects including the promotion of cell proliferation, promote platelet aggregation, aggregation and smooth muscle cells involved in tumor cell infiltration (Damirin *et al.,* 2007; Komachi *et al.,* 2009). Lysophosphatidic acid (LPA) is a bioactive phospholipid mediator, which elicits a variety of biological functions mainly, through G-protein coupled receptors (Shida *et al.,* 2003; Aoki *et al.,* 2002). Lysophosphatidic acid acts as an extracellular signaling molecule by binding to and activating at least eight known G-protein coupled receptors (GPCRs): LPA1-LPA8 (Noguchi *et al.,* 2009; Komachi *et al.,* 2009). The biological roles of LPA are diverse and include developmental, physiological, and pathophysiological effects (Contos *et al.,* 2000). This diversity is mediated by broad and overlapping expression patterns and multiple downstream signaling pathways activated by cognate LPA receptors (Bandoh *et al.,* 1999; Hama & Aoki, 2010). LPA receptors through different types of LPA showed a lot of biological activity, including the mobilization of Ca^{2+}, changes of cAMP accumulation in actin rearrangement and combined changes in cell