

Effect of Toll-Like Receptor 3 Agonists on the Functionality and Metastatic Properties of Breast Cancer Cell Model

Nastaran Alizadeh¹, Mohammad Mehdi Amiri², Alireza Salek Moghadam¹, Amir Hassan Zarnani¹, Farshid Saadat³, Farnaz Safavifar⁴, Azar Berahmeh⁴, and Mohammad Reza Khorramizadeh^{4,5,6}

¹ *Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*

² *Department of Pathobiology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

³ *Department of Immunology, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran*

⁴ *Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, Iran*

⁵ *Biosensor Research Center, Endocrinology and Metabolism Molecular-Cellular Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran*

⁶ *Department of Medical Biotechnology, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Tehran, Iran*

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ABSTRACT

There exists compelling evidence that Toll-like receptor 3 (TLR3) agonists can directly affect human cancer cells. The aim of this study was to investigate anti-cancer effects of TLR3 agonist in human breast cell line.

We assessed potential effects of poly (A:U) on human breast cell line (MDA-MB-231) on a dose-response and time-course basis. Human breast cell line MDA-MB-231 was treated with different concentrations of poly (A:U) and lipopolysaccharide (LPS). Then, the following assays were performed on the treated cells: dose-response and time-course cytotoxicity using colorimetric method; matrix metalloproteinase-2 (MMP-2) activity using gelatin zymography method; apoptosis using annexin-v flowcytometry method; and relative expression of TLR3 and MMP-2 mRNA using reverse transcriptase polymerase chain reaction (RT-PCR) method. Following treatments, dose- response and time-course cytotoxicity using a colorimetric method, (MMP-2) activity (using gelatin zymography), apoptosis (using annexin-v flowcytometry method) assays and expression of TLR3 and MMP-2 genes (using PCR method) were performed.

Cytotoxicity and flowcytometry analysis of poly (A:U) showed that poly (A:U) do not have any cytotoxic and apoptotic effects in different concentrations used. MMP-2 activity analysis showed significant decrease in higher concentrations (50 and 100 µg/ ml) between treated and untreated cells. Moreover, poly A:U treated cells demonstrated decreased expression of MMP-2 gene in higher concentrations.

Collectively, our data indicated that human breast cancer cell line (MDA-MB-231) was highly responsive to poly (A:U). The antimetastatic effect of direct poly (A:U) and TLR3 interactions in MDA-MB-231 cells could provide new approaches in malignant tumor therapeutic strategy.

Keyword: MDA-MB-231; MMP-2; Poly (A:U); TLR3

Corresponding Author: Mohammad Reza Khorramizadeh; PhD; Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Research Institute, Tehran University of Medical

Sciences, P.O. Box 14114-13137 Tehran, Iran. Tel: (+98) 8822 0037-8; Fax: (+98 21) 8822 0052, E-mail: khoramza@sina.tums.ac.ir 25(1):9-