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Evaluation of γ-interferon kinetics in HSV-1 infected mice in different days post infection (in vivo) and post re-stimulation (in vitro)

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Abstract

Gamma interferon (IFN-γ) is among the most important immune factors for limiting of herpes simplex virus (HSV) infections. However, our knowledge about the kinetics of IFN-γ production after HSV infection is limited. The present study examines the kinetics of IFN-γ expression following secondary infection with HSV-1. Using semiquantitative RT-PCR assay, the expression of IFN-γ in spleen lymphocytes was significantly detected on 14 days but not 7 days after intraperitoneal inoculation of HSV-1, while ELISA detected IFN-γ on both days. At various hours after in vitro re-stimulation of spleen cells, RT-PCR showed a decreasing pattern of mRNA transcripts, whereas, ELISA assayed an increasing amount of secreted protein through the experiment.

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Despite the contrast results of ELISA and RT-PCR, regarding the short half-life of mRNA, the data are in correlation with each other and need to interpret.

Keywords: HSV-1; Gamma interferon; Kinetics; Post infection; Post re-stimulation; BALB/c mice

Résumé

L' interferon gamma (IFN-γ) constitue l'un des plus importants facteurs permettant de limiter les infections à virus herpès simplex. Cependant, nos connaissances concernant la cinétique de la production de l'IFN-γ après infection herpétique sont limitées. La présente étude examine la cinétique de la production de l'IFN-γ suivant les infections secondaires par le virus herpétique. Utilisant le test PCR-RT semi-quantitatif, la production de l' IFN-γ dans les lymphocytes de la rate de la souris a été significativement détectée le quatorzième jour et non le septième jour après l'inoculation intrapéritonéale du virus tandis que l'ELISA a permis de détecter l'interféron au septième et au quatorzième jour.

Par ailleurs, les taux d'interféron évalués par PCR-RT semi-quantitative après re-stimulation au septième et au quatorzième jour ont diminué après huit heures dans les deux groupes infectés, alors que l'ELISA montre une augmentation de la production dans les mêmes conditions dans les deux groupes.

Mots Clés: Herpès virus simplex 1 (HSV-1); Interféron gamma; cinétique

1. Introduction

Cytokines, the regulatory proteins of immune system, have been shown to play an important role in host immune defence. Among these agents, IFN-γ has been proven to have a wide range of regulatory functions in the immune response [1,2]. IFN-γ up regulates the expression of MHC-I, which in turn stimulates CD_8^+ T cells. These cells have the most important function in host immunity against intracellular pathogens and clearance of viral infections [3–5]. Furthermore, high level of IFN-γ indicates the Th_1 response. Modulation of immune response toward a Th_1 phenotype increases the strength of host immunity against many pathogens like *HSV* [6,7].

IFN-γ plays a protective role in *HSV*-1 acute diseases [8]. It is also crucial for T-cell mediated viral clearance and limiting the reactivation of latent infection. The frequency of recurrent herpetic lesions has been shown to be proportional to IFN-γ level in blood and lesions [9–14]. Evaluation of IFN-γ production in natural or experimental infections leads to a better understanding of the immune functions and designing more effective vaccines. Furthermore, the rapidity of IFN-γ production after infection is also one of the important factors in evaluation of vaccine efficacy [15,16].

Beside the importance of IFN-γ in immune defence, in the case of HSV, due to the critical role of IFN-γ in limiting of virus latency, the rapidity of IFN-γ production is more important.