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Inhibition of Mixed Infection Caused by Human Immunodeficiency Virus and Herpes Virus by Fullerene Compound

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Abstract : Background and aims: Human Immunodeficiency Virus (HIV) infection is very often associated with Herpes Simplex Virus (HSV) infection but HIV patients are treated with a cocktail of antiretroviral drugs which are toxic. The use of an antiviral drug which will be active against both viruses like ferrovir found in our previous studies is rather actual. Earlier we had shown that Fullerene poly-amino capronic acid (FPACA) was active in case of monoinfection of HIV-1 or HSV-1. The aim of the study was to analyze the efficiency of FPACA against mixed infection of HIV and HSV. Methods: The peripheral blood lymphocytes, CEM, MT-4 cells were simultaneously infected with HIV-1 and HSV-1. FPACA was added 1 hour before infection. Cells viability was detected by MTT assay, virus antigens detected by ELISA, syncytium formation detected by microscopy. The different multiplicity of HIV-1/HSV-1 ratio was used. Results: The double viral HIV-1/HSV-1 infection was more cytopathic comparing with monoinfections. In mixed infection by the HIV-1/HSV-1 concentration of HIV-1 antigens and syncytium formations increased by 1,7 to 2,3 times in different cells in comparison with the culture infected with HIV-1 alone. The concentration of HSV-1 increased by 1,5-1,7 times, respectively. Administration of FPACA (1 microg/ml) protected cells: HIV-1/HSV-1 (1:1) – 80,1%; HIV-1/HSV-1 (1:4) – 57,2%; HIV-1/HSV-1 (1:8) – 46,3 %; HIV-1/HSV-1 (1:16) – 17,0%. Virus's antigen levels were also reduced. Syncytium formation was totally inhibited in all cases of mixed infection. Conclusion: FPACA showed antiviral activity in case of mixed viral infection induced by Human Immunodeficiency Virus and Herpes Simplex Virus. The effect of viral inhibition increased with the multiplicity of HIV-1 in the inoculum. The mechanism of FPACA action is connected with the blocking of the virus particles adsorption to the cells and it could be suggested that it can have an antiviral activity against some other viruses too. Now FPACA could be considered as a potential drug for treatment of HIV disease complicated with opportunistic herpes viral infection.

Keywords : antiviral drug, human immunodeficiency virus (hiv), herpes simplex virus (hsv), mixed viral infection
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