



Inhibition effect of silver nanoparticles on herpes simplex virus 2

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ABSTRACT. The herpes simplex virus 2 (HSV-2) is one of the most important sexually transmitted pathogens, and can facilitate the spread of human immunodeficiency virus. The currently available antiviral drugs have certain limitations. Nanosilver has received increasing attention recently with respect to its antibacterial and antiviral properties. The purpose of this study was to determine the inhibiting effect and mechanism of silver nanoparticles (Ag-NPs) on HSV-2. The cytotoxicity of Vero cells induced by different Ag-NP concentrations was investigated by using the methyl thiazolyl tetrazolium (MTT) assay. The inhibiting effect of Ag-NPs on HSV-2 at various times was also evaluated by using a plaque assay. The toxicity of 100 $\mu\text{g}/\text{mL}$ Ag-NPs on Vero cells was very low. The mixture of Ag-NP suspension and HSV-2 prior to infecting cells could significantly inhibit the production of progeny viruses. Ag-NPs also inhibited the replication of HSV-2 for 24 h before infecting cells with HSV-2. Therefore, 100 $\mu\text{g}/\text{mL}$ Ag-NPs could completely inhibit HSV-2 replication. Ag-NPs at nontoxic concentrations were capable of inhibiting HSV-2 replication when administered prior to viral infection or soon after initial virus exposure. This suggests

that the mode of action of Ag-Nps occurs during the early phases of viral replication.

Key words: Silver nanoparticles; Herpes simplex virus 2; Antiviral therapy