Application of anticancer drug based on recombinant histone protein as inhibitor of adenoviral infection *in vitro*

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Histones are a family of basic proteins that associate with DNA in the nucleus and help condense it into chromatin. The balance of histone acetylation and deacetylation is an epigenetic layer with a critical role in the regulation of gene expression. Anticancer drug OncoHist based on recombinant histone H1.3 has strong anti-proliferative properties against leukemic blast cells. OncoHist has been studied extensively as potential treatment for hematologic malignancies, such as leukemias, lymphomas and myelomas. Here we present our data on analysis of antiviral properties of the recombinant histone H1.3 in *in vitro* using replication-deficient recombinant adenovirus serotype 5 encoding green fluorescent protein. Recombinant adenovirus was generated using ViraPower Adenoviral Expression System (Invitrogen). Recombinant adenovirus was pre-incubated with recombinant histone H1.3 to assess its effect on adenoviral infection of HeLa cells. The efficiency of adenoviral infection was determined by number of GFP+ cells using flow cytometry. To determine the effect of recombinant histone H1.3 on the ability of adenoviral particles to form plaques we used HEK239A cells (Invitrogen). To investigate the effect of recombinant histone H1.3 on adenoviral infection we used its maximum non-toxic dose — 250 ug/ml. In our work we demonstrated for the first time that recombinant histone H1.3 significantly reduces the infectivity of recombinant adenovirus. Using of a mixture of recombinant histone H1.3 and recombinant adenovirus lead to decreases the fluorescence intensity (2% GFP-positive cells) in contrast to standard adenovirus infection (14% GFP-positive cells). Also, recombinant histone H1.3 exerts an inhibitory effect on plaque formation on HEK293A cells, infected with recombinant adenovirus. Adding of histone H1.3 to the recombinant adenovirus at a dilution 10^{-6} lead to a reduction of plaque formation in 7,7 times, which confirms antiviral properties of histone H1.3 towards adenoviruses. Further experiments are needed to determine mechanism of interaction of recombinant adenoviral particles with histone H1.3. Our study provides new direction for clinical application of recombinant of histone H1.3 as an antiviral drug for the treatment of adenoviral infections.