

Induction of apoptosis in MCF-7 cells by the hemagglutinin-neuraminidase glycoprotein of Newcastle disease virus Malaysian strain AF2240

Abstract

Newcastle disease virus (NDV) exerts its naturally occurring oncolysis possibly through the induction of apoptosis. We hypothesized that the binding of the virus to the cell via the hemagglutinin-neuraminidase (HN) glycoprotein may be sufficient to not only induce apoptosis but to induce a higher apoptosis level than the parental NDV AF2240 virus. NDV AF2240 induction of apoptosis in MCF-7 human breast cancer cells was analyzed and quantified. In addition, the complete HN gene of NDV strain AF2240 was amplified, sequenced and cloned into the pDisplay eukaryotic expression vector. HN gene expression was first detected at the cell surface membrane of the transfected MCF-7 cells. HN induction of apoptosis in transfected MCF-7 cells was analyzed and quantified. The expression of the HN gene alone was able to induce apoptosis in MCF-7 cells but it was a less potent apoptosis inducer compared to the parental NDV AF2240 strain. In conclusion, the NDV AF2240 strain is a more suitable antitumor candidate agent than its recombinant HN gene unless the latter is further improved by additional modifications.

Keyword: Hemagglutination unit; Hemagglutinin-neuraminidase glycoprotein; Interferon alpha; Newcastle disease virus