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A DNA Aptamer Prevents Viral Infection by Blocking the Receptor Binding Region of Influenza Haemagglutinin

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Current means of prevention and therapy of influenza are unsatisfactory in many respects. The approach taken in the present study is to prevent and/or eliminate infection by site-specific blocking the binding of the virus to host cell receptors. We describe a novel oligonucleotide, known also as an aptamer, which has been designed to complement the receptor-binding region of the influenza haemagglutinin (HA) molecule by using a DNA library and processing by the SELEX method. We show that this DNA aptamer is indeed capable of blocking the binding of virus to target cell receptors. This blocking results in the inhibition of the haemagglutinin capacity of the virus and the prevention of viral infection in vitro in tissue culture. Furthermore, it inhibits viral infection in an animal model, as manifested by 95~99% reduction of virus burden in the lungs of treated mice.