Fusion Polypeptide Proteins as Antiviral Agents Against Enveloped Viruses (11001)

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Technology description

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This invention is a fusion protein combining Actinohivin (AH) (an actinomycete-derived lectin) with the Fc domain of a human monoclonal immunoglobulin. The lectin-AH portion of the fusion protein specifically binds to a cluster of highmannose-type glycans uniquely found on the HIV-1 envelope, thereby eliciting nanommolar antiviral activity against multiple HIV strains. The immunoglobulin FC portion provides various biological functions, such as antibody-dependent cellular cytotoxicity and complement-dependent cytotoxicity. Preliminary studies have demonstrated that the combination of the HIV-1 microbicide activity of AH with the immune functions of Fc exhibit potent antiviral activity against other enveloped viruses, including influenza, hepatitis C virus (HCV), Ebola virus, and Severe Acute Respiratory Syndrome coronavirus (SARS-CoV).

UofL researchers have focused on the development of a recombinant production system for various AH-Fc constructs that will allow for rapid in vitro and in vivo efficacy analyses. We are using recombinant plant virus-based expression systems for rapid, high-level expression of high-quality AH-Fc proteins. The AH-Fc fusion protein continues to show potential in terms of antiviral efficacy and safety upon use as a novel antiviral agent.

Markets Addressed

The University of Louisville is seeking a business partner interested in commercializing a novel antiviral agent manufactured from recombinant plant virus-based expression systems. The AH-Fc fusion protein is proposed to have utility as HIV-1 microbicides, with antiviral activity against enveloped viruses that have HMGs, including influenza, hepatitis C virus, Ebola virus, SARS-CoV. There is a strong market need for an effective anti-viral compound, particularly for HIV infections. Millions of new HIV infections are reported every year worldwide, with a majority of those new infections occurring mainly in developing regions where the

availability of antiretroviral drug therapies is extremely limited, and consequently, AIDS is among the leading causes of death. There is an urgent need for a woman-controlled, safe, effective, and inexpensive topical microbicide, at least until prophylaxis through vaccination becomes globally available.
These antiviral agents could be applied to prevent the transmission and infection of enveloped viruses. AH-Fc fusion proteins may be effective as immunotherapy agents against some type of cancer associated with HMGs (high-mannosetype glycans). AH-Fc fusion proteins may also be used as diagnostic tools for such viruses and cancer.
Fields of Use Available: All Commercial Fields

Advantages

A novel anti-viral agent designed for antiviral activity against enveloped viruses such as HIV, HCV, influenza, SARS-CoV, Dengue and Ebola.
Entry/fusion inhibitory proteins (MAbs and lectins) exhibit very potent and specific anti-HIV activities, yet are unlikely to be absorbed into the tissues/circulation.

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