New antiviral agents for prevention and treatment of AIDS and Hepatitis C

CSIC, IDIBAPS, UPMC, CIBER and UPF have developed new agents based on G-quadruplex structures with strong antiviral activity against both Human Immunodeficiency and Hepatitis C Viruses by targeting fusion inhibition.

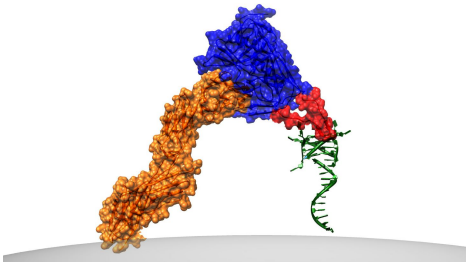
An offer for Patent Licensing and/or R+D collaboration

Lipid-labelled G-quadruplex with microbicidal activity

Enveloped viruses such as Human Immunodeficiency Virus (HIV), Hepatitis C Virus (HCV), Herpes Viruses (CMV, HSV-2…) as well as Ebola virus among others are forming a ubiquitous class of human pathogens of global public health concern. The related envelopes share common features concerning lipid composition and the associated glycoproteins.

Discovery of cell entry inhibitors targeting HIV, HCV, CMV and HSV-2 would represent a major stride to severely limit the infection caused by these pathogens.

Broad spectrum viral entry inhibitors have been designed in the context of microbicide development for topical use to prevent infection by sexual transmission. Bifunctional molecules associating singular short nucleic acid sequences with appropriate lipid groups, forming a G-quadruplex, have been developed showing potent antiviral activity against HIV-1 and all major genotypes of HCV (nanomolar range) in cell cultures with low toxicity.



Structure simulation

Main advantages and applications

- Increased stability towards nuclease degradation, conferring a prolonged inhibitory effect.
- Lipid moieties presence increases x10 Q-quadruplex efficacy.
- G-quadruplex acts interfering contact between the virus and the host, through interaction with HIV gp120 and HCV E2, inhibiting entry of the viral particle into the cell.
- Very low cytotoxicity. Less toxic than current retrovirals.
- Antiviral/virucidal spectrum against other enveloped viruses under exploration.
- Expected to maintain persistent protection of the mucosal tissues exposed to HIV or/and HCV viral particles due to the virucidal activity.

Patent Status

European priority patent application filed

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