Antiviral Compounds and Uses thereof

UNIVERSITÀ DI SIENA 1240

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Invention

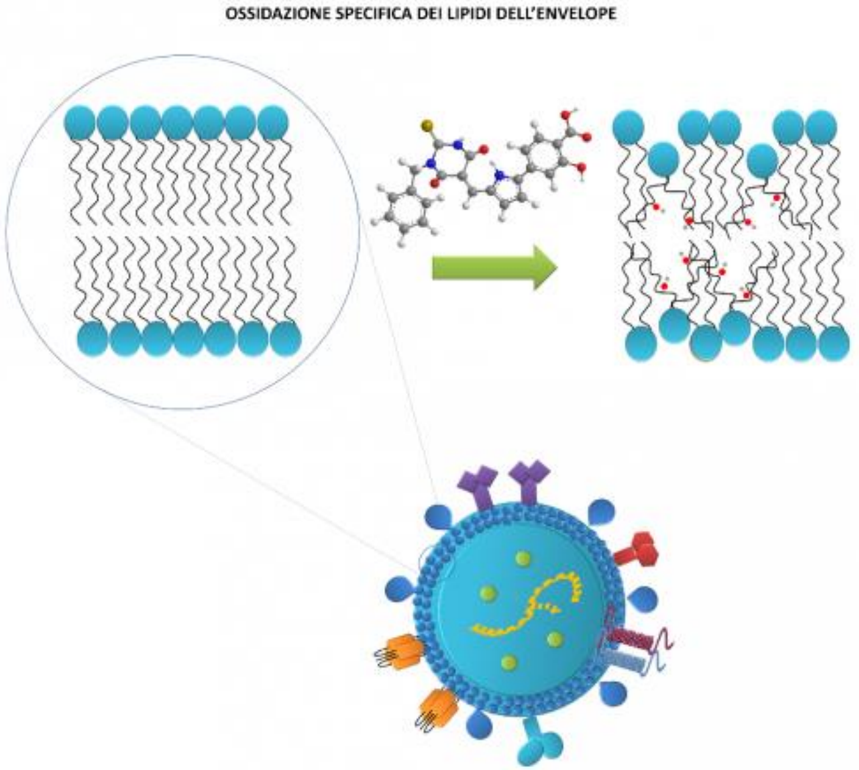
Current antiviral approaches requires a high efficacy in addition to the absence of toxicity, as they act inside cells and are usually virus-specific. Nevertheless, the virus in question may develop resistance to commonly used drugs.

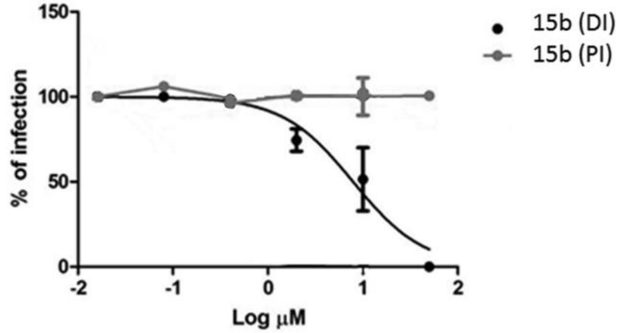
To prevent the emergence of resistant viral strains, the compounds of the invention act directly on the extracellular virus. Through light-promoted radical oxidation of the outer lipid component, the compounds destabilise the viral envelope, thus preventing the virus from entering the cell. The selectivity of the compounds is related to the membrane repair mechanisms of eukaryotic cells, which is absent in viruses.

The compounds have demonstrated potent activity against 9 emerging viruses causing recent epidemics, including resistant strains. They are also potentially active against SARS-CoV-2 (*in vitro* test).

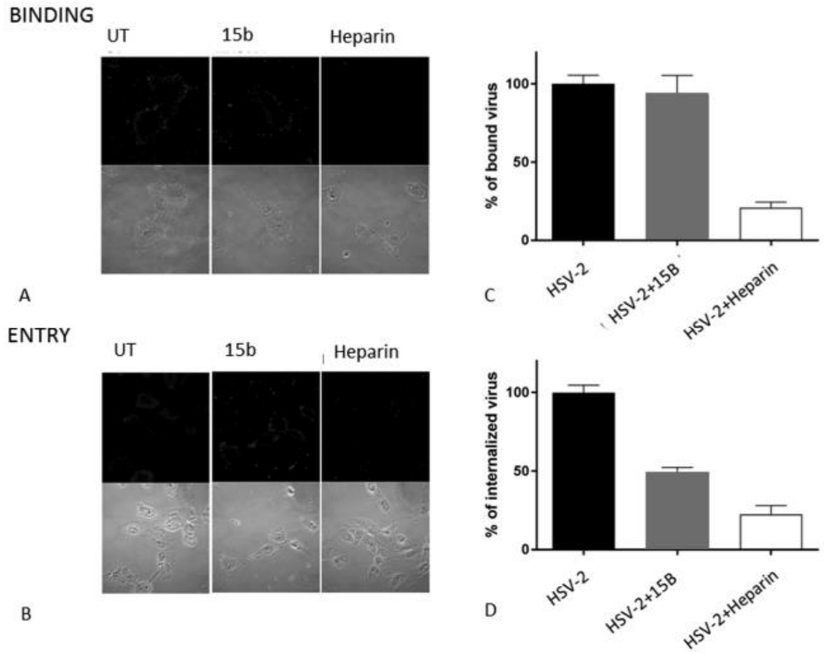
They exhibit good *in vitro* characteristics of permeability, solubility and metabolic stability, allowing them to be used through various routes of administration, and includes combination with other antiviral agents. They therefore represent an innovative tool to combat emerging viruses as they are potentially active against all enveloped viruses (ZIKV, DENV, CHIKV, SARS-CoV-2).

Drawings & pictures





Virucidal activity of the compound against HSV-2, expressed as pfu (Plaque Forming Units) per mL

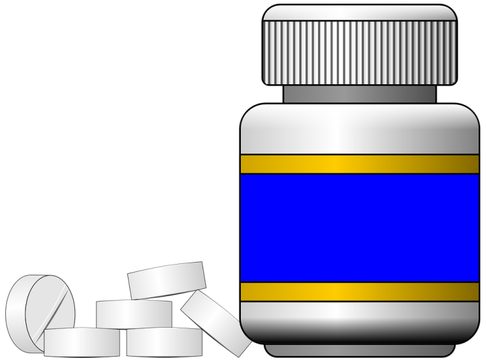


Mechanism of action of the compound against HSV-2 binding to VERO cells (A, C) and HSV-2 entry into VERO cells (B,D)

Industrial applications

The technology may be of interest to chemical and/or pharmaceutical companies having (or wishing to expand to) medicines for the treatment of infectious agents in pipeline.

In particular, the invention can be formulated as a vaginal microbicide for the prevention of sexually transmitted diseases, as well as a nasal spray for the prevention and treatment of respiratory infections. Given the mode of action potentially allowing their use against all enveloped viruses, they represent a first line of action against new viral strains for which there are no specific treatments or vaccines.



Possible developments

Currently evaluated at a TRL of 3, the technology can be further developed within specific technology maturation projects aimed at raising the level and allowing its introduction into the industrial network.

The group has already selected and synthesised a candidate lead to be tested on murine efficacy models (infected with HSV-2 and SARS-CoV-2).

The group is looking for industrial partners operating in the pharmaceutical field interested in collaborating for the above-mentioned technological maturation of the invention, identifying further lead candidates, improving its characteristics and determining its pre-formulation as a Preclinical Candidate for regulatory studies.

The University of Siena is open to specific agreements to exploit, license or option the patented invention.

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