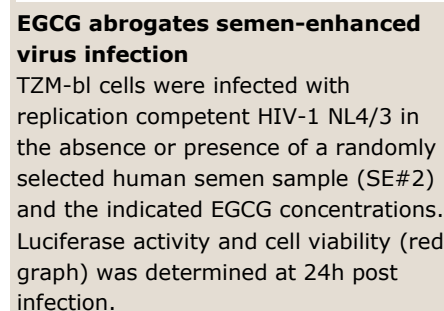


Topical Microbicide for Preventing Sexual Transmission of Viral Infections

Reference Number: TO 13-00034

Challenge

Sexual transmitted viruses like HIV, HPV, Hepatitis B virus or Herpes-simplex virus are a major burden for human health. On the global scale, the HIV-1 epidemic is primarily driven by heterosexual transmission, accounting for the vast majority of the currently 33 million infected people. The first generation of microbicides against HIV that was clinically tested, (e.g., Carraguard or Savvy), unfortunately turned out to be ineffective. A second generation of microbicides, based on antiretroviral substances like reverse transcriptase or fusion inhibitors, is presently being tested.



EGCG abrogates semen-enhanced virus infection

TZM-bl cells were infected with replication competent HIV-1 NL4/3 in the absence or presence of a randomly selected human semen sample (SE#2) and the indicated EGCG concentrations. Luciferase activity and cell viability (red graph) was determined at 24h post infection.

However, these might not solve all problems, because it is well known that the development of resistance to specific antiretroviral drugs is common. Therefore, advanced topical therapeutics able to prevent sexual transmission of viral diseases would thus be desirable.

Technology

Catechins could now be pinpointed to serve as valuable supplements to improve the preventive effect of topical microbicides. Recently, fragments of the prostatic acidic phosphatase (PAP) were identified in the human semen that form β -sheet-rich amyloid fibrils and boost infectivity of a broad range of HIV-1 strains. Although their exact mode of action is largely unknown, these fibrils, termed semen-derived enhancer of virus infection (SEVI), apparently capture virions, attach them to the surface of target cells, and thereby strongly promote HIV transmission during sexual intercourse. The inventors tested several catechins, which are major components of green tea, and now demonstrated that selected catechins, such as epigallocatechin gallate (EGCG), suppress the infectivity-enhancing effect of human semen by degrading semen-derived amyloid fibrils and interfering with their formation.

Commercial Opportunity

The technology is offered for co-development or licensing.

Developmental Status

The inventors showed that EGCG abrogates semen-enhanced HIV infection *in vitro* without affecting cell viability.

Patent Situation

A priority-establishing European Patent application was filed in 2008.

Further Reading

Hauber et al. (2009). The main green tea polyphenol epigallocatechin-3-gallate counteracts semen-mediated enhancement of HIV infection. PNAS. published online before print May 18, 2009, doi:10.1073/pnas.0811827106

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