Novel antiviral compound K21 effective against HSV-1

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Background

The quaternary ammonium silane (K21) was created through sol-gel chemistry, using an ethoxylated version of an organosilane quaternary ammonium compound and TetraEthyl Ortho Silicate (TEOS) as precursors. Hydrolysis and condensation of K21 with TEOS produces a 3-dimensional antimicrobial macromolecule with multiple arms of membrane rupturing potential (1). K21 was originally developed to be used in dental healthcare (i.e. in tooth cavities and for coating of implants). Antimicrobial assessment of K18 (the methacrylate version of the QAM) and K21 showed inhibited growth of several types of microorganisms including E. coli, Staphylococcus aureus, Porphyromonas gingivalis (2, 3) and Chlamydia trachomatis (Unpublished). As some of the Human herpesviruses including HSV-1, HHV-6A, HHV-6B, HHV-7, HCMV and EBV reside in the human oral cavities and are shed in the saliva to induce infection; we tested in vitro the effect of K21 on HSV-1 infection.

Results

1. K21 possesses anti-HSV-1 activity.
2. K21 downregulates HSV-1 induced cell death possibly by inducing Bcl-2 expression.
3. K21-mediated downregulation of HSV-1 does not lead to viral latency.
4. K21 induces HSV-1 infection-mediated host cell death possibly by inducing senescence after 48-72 hrs of viral infection.

Conclusions

1. K21 downregulates HSV-1 infection by an unknown mechanism without affecting viral DNA polymerase activity.

References: