Title

Studying antiviral activities of St. John's wort *(Hypericum perforatum) in vitro*.

Authors

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Abstract

St John's wort (*Hypericum perforatum*) is an herbal medicine widely used as an antidepressant across Europe, Unites States, West Asia and North Africa. Recent studies have reported this drug's antiviral activity against HIV, HSV-1 influenza A and SARS-CoV-2, but little is known about how it affects the expression of host antiviral immune genes. This study examined the antiviral potential of St. John's wort in vitro.

Cytotoxicity of the drug extract was measured by trypan blue exclusion in HEK-293T and HL-60 cells. After treating cells with the drug, RNA was extracted and reverse-transcribed into cDNA, and primer specificity was confirmed by PCR gel electrophoresis. Lastly, qPCR was performed to quantify the expression of 16 antiviral genes that were normalized to GAPDH and B-actin. Interaction networks of the upregulated genes were analyzed with STRING 12.0 database. In a parallel arm, BS-C-1 cells were infected with human coronavirus OC43 (MOI 0.05) and treated with the drug extract before, after and during the infection. Viral output was assessed by serial dilution and cytopathic effect (CPE).

The conclusion resulted in upregulation of 16 antiviral genes in a cell-type-specific way, supporting its further investigation as an antiviral candidate. No CPE was seen in the viral assay; further optimization is ongoing. Future directions that need to be carried out is protein-level validation to confirm functional antiviral activity.