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## Compositions and Extracts with Antiviral Activity

For the past half a century, alternative therapies to diseases have been increasingly sought in the US and globally. A 2002 study estimated 19 percent of adults used a botanical therapy to treat illnesses or conditions and that number seems to be rising. Isolating the active compounds of many botanicals offers novel treatment possibilities for a myriad of medical conditions.

Melissa officinalis is an herb that has been traditionally used for a variety of medical purposes, with usage mostly centered on stress and anxiety reduction but also for GI tract disorders and herpes simplex virus (HSV).

Researchers at Arizona State University have isolated extracts of Melissa officinalis and developed compositions with modified active compounds for antiviral applications. The initial therapeutic focus for the extracts was on treating HSV, but inventors found that it showed promising activity against an Ebola-VSV chimera virus, and has great potential for other viruses as well. Active compounds of the extract were isolated and modified so that their antiviral abilities could be increased. The extracts and compositions appear to inhibit virus attachment to the cell and reduce viral infection via the heparin-sulfate proteoglycan receptor. Results from early studies show the compositions to have an IC<sub>50</sub> of 65-90µM, but IC<sub>50</sub> values as low as 25µM can be obtained with certain modifications.

These extracts and compositions represent novel therapeutics for multiple viruses including members of the herpes virus family and filovirus family and could be developed as stand-alone or combination therapeutics.

### Potential Applications

- Antiviral therapeutics
- Ebola & other Filoviruses
- Herpes simplex virus

### Benefits and Advantages

- The extract is not toxic to cells in vitro and the toxicity of the compositions is expected to be very low (selectivity index for cellular toxicity of 750)
- The compositions are highly water soluble, aiding in systemic treatment – by comparison, acyclovir, a standard herpes antiviral, has very low water solubility
- Combination therapeutics - the extract and compositions inhibit virion binding to cells, compared to the intracellular mechanisms of current therapeutics. Combined therapeutics could achieve greater virus control
- The extract has a selectivity index of greater than 300 for Ebola-VSV chimera virus and Herpes simplex virus
- The compounds investigated can either be obtained from an abundantly available herb or from common synthetic precursor compounds
- IC50 values of 65-90µM, but IC50 values as low as 25µM can be obtained with certain composition modifications
- Modified compositions have a 44-fold increase in antiviral activity

For more information about the inventor(s) and their research, please see [Dr. Jacobs departmental webpage](#) [Dr. Cahill's departmental webpage](#) [Dr. Wagner's departmental webpage](#)