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# Cell culture experiments reveal potent antiviral activity of Cistus incanus extracts against HIV and Ebola

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Scientists at the Helmholtz Zentrum München discover that extracts of the medicinal plant Cistus incanus (Ci) prevent human immunodeficiency viruses from infecting cells. Active antiviral ingredients in the extracts inhibit docking of viral proteins to cells. Antiviral activity of Cistus extracts also targets Ebola- and Marburg viruses. The results were published in *Scientific Reports*.

Virus infections are among the ten leading causes of death worldwide and represent a major global health challenge. Their control requires the continuous development of new and potent antiviral drugs/therapeutic options. Despite the availability of numerous drugs for chronic treatment of HIV/AIDS, new drugs are needed to prevent the emergence of drug resistant viral variants. Furthermore, new antiviral drugs are required for rapid treatment of acute infections by viruses like Marburg and Ebola viruses during acute viral outbreaks. A recent study by the team of Professor Ruth Brack-Werner and Dr. Stephanie Rebensburg from the Institute for Virology (VIRO) of the Helmholtz Zentrum München demonstrates that extracts of the medicinal plant attack HIV and Ebola virus particles and prevent them from multiplying in cultured cells.

## HIV: broad activity, no resistance

The Brack-Werner team found potent activity of Ci extracts acted against a broad spectrum of clinical HIV-1 and HIV-2 isolates. This also

included a virus isolate resistant against most available drugs. "Antiviral ingredients of Ci extracts target viral envelope proteins on infectious particles and prevent them from contacting host cells", Brack-Werner explains. No resistant viruses were detected during long-term treatment (24 weeks) with Ci extract, indicating that Ci extract attacks viruses without causing resistance. The Brack-Werner study suggests that commercial herbal extracts from plants like Cistus incanus or other plants like Pelargonium sidoides are promising material for the development of scientifically validated antiviral phytotherapeutics. "Since antiviral activity of Ci extracts differs from all clinically approved drugs, Ci-derived products could be an important complementation to current established drug regimens", says Brack-Werner.

## Antiviral activity of Cistus extracts also targets Ebola and Marburg proteins in virus particles

Ci extracts not only blocked different HIV isolates, but also virus particles carrying Marburg and Ebola viral envelope proteins. Analysis of the antiviral components of the extract revealed the presence of multiple antiviral ingredients that may act in combination. These results firmly establish broad antiviral activity of Ci extracts against various major human viral pathogens, including previously reported activity against influenza viruses.

## Potential applications of Ci extract for global control of lethal virus infections

Further development of these plant extracts may advance global treatment and control of virus infections in various ways. Thus these plant extracts may be useful starting material for the development of potent herbal agents against selected virus infections. Another

application could be their development into crèmes or gels (i.e. microbicides) that prevent transmission of viruses like HIV during sexual intercourse. Finally, these plant extracts represent promising collections of natural antiviral agents for the discovery of new antiviral molecules.

Future work in the Brack-Werner lab will focus on investigating the antiviral potential of these plant-derived products for applications in humans and detailed analysis of their active antiviral ingredients.

**More information:** Stephanie Rebensburg et al. Potent in vitro antiviral activity of Cistus incanus extract against HIV and Filoviruses targets viral envelope proteins, *Scientific Reports* (2016). DOI: 10.1038/srep20394

Markus Helfer et al. The Root Extract of the Medicinal Plant Pelargonium sidoides Is a Potent HIV-1 Attachment Inhibitor, *PLoS ONE* (2014). DOI: 10.1371/journal.pone.0087487

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