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Topic of Research: Anti-viral Efficacy of Glycyrrhizin, Chrysin on the Life Cycle of Hepatitis B virus

Finding: Our study reveals that Glycyrrhizin and Chrysin have promising anti-viral efficacy against the Hepatitis B virus in cell line of hepatic origin. Further study needs evaluating their efficacy in other hepatic cell lines, non-hepatic cell lines and animal models of chronic HBV infection.

Background: Currently, **interferon (IFNs) and nucleoside analogues (NAs)** are the existing antivirals. Its long-term administration causes dose-dependent side effects, drug-resistance. Hence, it is of paramount importance to develop novel plant based anti-HBV candidates.
Methodology: HepG2 were treated with different concentrations of Glycyrrhizin and Chrysin for 72 h and non-toxic doses were determined by MTT assay. 1µg (pHBV 1.3X) wild type construct was transiently transfected in HepG2 cells. We performed ELISA by monitoring the concentrations of HBV surface antigen (HBsAg) and Hepatitis B e antigen (HBeAg). Extracellular HBV DNA and intracellular cccDNA were quantified by SYBR green real-time PCR assay. Molecular docking method was used where Glycyrrhizin, Chrysin and positive control lamivudine were docked with a HMGB1. The Absorption, Distribution, Metabolism, Excretion, and Toxicity (ADMET) properties were calculated by SwissADME and AdmetSAR web tool.
Results: Glycyrrhizin, Chrysin and lamivudine showed very good binding affinity and developed very stable complex with HMGB1 ($\Delta G = -7.0$ kcal/mol), ($\Delta G = -5.7$ kcal/mol) and ($\Delta G = -4.3$ kcal/mol) respectively. *In vitro* studies demonstrated that they decrease the expressions of HBsAg, HBeAg, supernatant HBV DNA, and cccDNA in a dose-dependent manner.
Conclusions: Glycyrrhizin and Chrysin have encouraging anti-HBV potential.

Keywords: Hepatitis B virus, Glycyrrhizin, Chrysin, HMGB1, cccDNA