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Antiviral effects of some plant extracts in veterinary field

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Viral infection plays an important role in human and animals diseases. Despite the progress made in immunization and drug development, many viruses lack preventive vaccines and efficient antiviral. The use of antiviral drugs in human and veterinary medicine are limited in comparison with the use of antimicrobial agents due to viral mutation, new virus, toxic effects, the severity of viral diseases, ability of virus to survive intracellularly, the high costs and the non-availability of specific antiviral chemical agents against veterinary pathogens. Lack of effective antiviral necessitate finding a new effective antiviral compounds and the most antiviral against viruses of veterinary importance are still used as animal models in the development of human antiviral drugs. Plants are naturally gifted at the synthesis of medicinal compounds, led to discovery of new, cheap drugs with high therapeutic potential beside a rich source of phytochemicals with different biological activities including antiviral activities; today's advanced analytical chemistry tools, developing standardization and extraction methods, as well as standard virus assays. Plant extracts provide a rich resource for novel antiviral drug development and have a wide variety of active compounds including flavonoids, terpenoids, lignans, sulfides, polyphenolics, coumarins, saponins, furyl compounds, alkaloids, polyines, thiophenes, proteins and peptides have been identified and some volatile oils have also exhibited a high level of antiviral activity. Overlapping mechanisms has shed light on where they interact with the viral life cycle, such as viral entry, replication, assembly and release, as well as on the targeting of virus host specific interactions capable of inhibiting of several viruses, could help develop broad spectrum antivirals for prevention and control of viral pathogens. In vitro antiviral activity of several plants extracts from *Erythroxylum deciduum, Lacistema hasslerianum Chodat, Xylopia aromatica, Heteropteris aphrodisiaca, Acacia nilotica* (gum arabic tree), *Lippia graveolens (Guettarda angelica (Velvet seed), Prunus myrtifolia, Symphyopappus* is by inhibiting the replication and interfering with the early stages of viral adsorption and replication as in Bovine *herpesvirus 1 (BHV-1), Equine herpesvirus 1, Feline herpesvirus-1* (FHV-1) and Pesudorabies virus. Also, RNA viruses such as Foot-and-mouth disease virus (FMDV) inhibited with polyherbal plant extracts from Ashwagandha, Tulsi, Turmeric Morinda elliptica L., and the M. citrifolia L. Also, Bovine viral diarrhea virus (BVDV), Classical swine fever virus inhibited with extracts from Phylantus orbicularis, Guazuma ulmifolia and Stryphnodendron adstringens as well as Canine distemper virus (CDV), Parainfluenza-3 (PI-3) and Canine parainfluenza virus-2 (CPIV-2) inhibited by extracts from Ageratum conyzoides Linn. (Goat weed). All of these medicinal plants have antiviral effect in vitro as well as in vivo as many studies in exploration and characterization bioactive ingredients of plant extracts and antiviral mechanisms, as well as assessing the efficacy and potential application in vivo. The present review showed that many plant species have a significant antiviral activity against DNA and RNA viruses in vitro and in vivo, but further extensive studies for safety, drug interaction and the possibility of combination therapy with other natural products should be done.

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Single-nucleotide polymorphism of IL28B rs12979860 is an irrelevant biomarker for HCV pretreatment prediction

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Interferon (IFN) therapy has been a treatment regimen for HCV with significant side effects and poor efficacy especially against genotype 1 and 4. Therefore, treatment prediction remains a matter of great concern for patients and physicians. Initially, treatment failure was attributed to epidemiological, viral and host factors such as HCV genotype, viral load, interferon sensitivity determining region (ISDR), body mass index, ethnicity, gender, various single-nucleotide polymorphisms (SNPs) and stage of liver disease. However, HCV genotype, pretreatment viral load and IL28B rs12979860 SNP remained three major pretreatment predictors of therapy. IL28B rs12979860 SNP located in the upstream region of interleukin-28B (IL28B) has shown association with interferon (IFN) treatment response especially in hepatitis C virus (HCV) genotype 1-infected patients and widely used as pretreatment prediction test. Pakistan, being the country with second highest prevalence of HCV with predominantly 3a genotype infection, bears a significant disease burden. The present study was conducted to evaluate the effect of rs12979860 genotypes on treatment response in HCV-3a-infected patients. This study shows that the CC genotype is providing protection against infection to HCV. But once infected, the CC genotype patients show viral persistence following IFN therapy. The TT genotype is assisting the 3a patients in viral clearance after IFN treatment. Moreover, recently introduced direct acting agent, Sofosbuvir (HCV RNA polymerase inhibitor) with Ribavirin is providing high cure rates irrespective of rs12979860 polymorphism in genotype 3 patients.

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