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1. Antiviral activity of Sambucus FormosanaNakai ethanol extract and related phenolic acid constituents against human coronavirus NL63.

Authors Weng, Jing-Ru; Lin, Chen-Sheng; Lai, Hsueh-Chou; Lin, Yu-Ping; Wang, Ching-Ying; Tsai, Yu-Chi; Wu, Kun-Chang; Huang, Su-Hua; Lin, Cheng-Wen
Source Virus research; Nov 2019; vol. 273 ; p. 197767
Publication Date Nov 2019
Publication Type(s) Journal Article
PubMedID 31560964
Database Medline
Available at Virus research from Unpaywall
Abstract Human coronavirus NL63 (HCoV-NL63), one of the main circulating HCoVs worldwide, causes respiratory tract illnesses like runny nose, cough, bronchiolitis and pneumonia. Recently, a severe respiratory illness outbreak of HCoV-NL63 has been reported in a long-term care facility. Sambucus FormosanaNakai, a species of elderberry, is a traditional medicinal herb with anti-inflammatory and antiviral potential. The study investigated the antiviral activity of Sambucus FormosanaNakai stem ethanol extract and some phenolic acid constituents against HCoV-NL63. The extract was less cytotoxic and concentration-dependently increased anti-HCoV-NL63 activities, including cytopathicity, sub-G1 fraction, virus yield (IC50 = 1.17 μg/ml), plaque formation (IC50 = 4.67 μg/ml) and virus attachment (IC50 = 15.75 μg/ml). Among the phenolic acid constituents in Sambucus FormosanaNakai extract, caffeic acid, chlorogenic acid and gallic acid sustained the anti-HCoV-NL63 activity that was ranked in the following order of virus yield reduction: caffeic acid (IC50 = 3.54 μM) > chlorogenic acid (IC50 = 43.45 μM) > coumaric acid (IC50 = 71.48 μM). Caffeic acid significantly inhibited the replication of HCoV-NL63 in a cell-type independent manner, and specifically blocked virus attachment (IC50 = 8.1 μM). Therefore, the results revealed that Sambucus Formosana Nakai stem ethanol extract displayed the strong anti-HCoV-NL63 potential; caffeic acid could be the vital component with anti-HCoV-NL63 activity. The finding could be helpful for developing antivirals against HCoV-NL63.

2. Antiviral activity of AV-001 against influenza and three common cold viruses

Authors Zhou S.S.
Source Journal of Natural Remedies; Jul 2014; vol. 14 (no. 2); p. 174-178
Publication Date Jul 2014
Publication Type(s) Article
Database EMBASE
Available at Journal of Natural Remedies from informaticsjournals.com
Abstract AV-001 is a dietary supplement; it is used as a throat and nose spray composed of natural ingredients, including Sambucus nigra (European elder) and eucalyptus with 1, 8-cineole. The aim of this study was to evaluate the antiviral activity of AV-001 against the pathogenic viruses human influenza A viruses H1N1 and H7N9, respiratory syncytial virus, rhinovirus, human coronavirus, and adenovirus. Antiviral activity was evaluated by reduction of the viral-induced cytopathic effect; AV-001 was assessed against a challenge virus in suspension, inoculated onto host cells, and assayed for infectious viral load.AV-001 inactivated human influenza A viruses H1N1 and H7N9, respiratory syncytial virus, rhinovirus, and human coronavirus, by 37.17 Log_{10}, 36.42 Log_{10}, 34.72 Log_{10}, 34.35 Log_{10} and 33.92 Log_{10}, respectively. Thus, AV-001 exhibited strong and broad-spectrum antiviral activities and may represent an effective treatment or preventive agent for respiratory viral infection by inactivating the viruses upon their entry into the body.

3. Sambucus nigra extracts inhibit infectious bronchitis virus at an early point during replication.

Authors Chen, Christie; Zuckerman, David M; Brantley, Susanna; Sharpe, Michka; Childress, Kevin; Hoiczyk, Egbert; Pendleton, Amanda R
Source BMC veterinary research; Jan 2014; vol. 10 ; p. 24
Publication Date Jan 2014
Publication Type(s) Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Journal Article
PubMedID 24433341
Database Medline
Available at BMC veterinary research from BioMed Central
Available at BMC veterinary research from Europe PubMed Central - Open Access
Available at BMC veterinary research from ProQuest (Health Research Premium) - NHS Version
Available at BMC veterinary research from Unpaywall

Abstract BACKGROUNDInfectious bronchitis virus (IBV) is a pathogenic chicken coronavirus. Currently, vaccination against IBV is only partially protective; therefore, better preventions and treatments are needed. Plants produce antimicrobial secondary compounds, which may be a source for novel anti-viral drugs. Non-cytotoxic, crude ethanol extracts of Rhodiola rosea roots, Nigella sativa seeds, and Sambucus nigra fruit were tested for anti-IBV activity, since these safe, widely used plant tissues contain polyphenol derivatives that inhibit other viruses.RESULTSDose-response cytotoxicity curves on Vero cells using trypan blue staining determined the highest non-cytotoxic concentrations of each plant extract. To screen for IBV inhibition, cells and virus were pretreated with extracts, followed by infection in the presence of extract. Viral cytopathic effect was assessed visually following an additional 24 h incubation with extract. Cells and supernatants were harvested separately and virus titers were quantified by plaque assay. Variations of this screening protocol determined the effects of a number of shortened S. nigra extract treatments. Finally, S. nigra extract-treated virions were visualized by transmission electron microscopy with negative staining.Virus titers from infected cells treated with R. rosea and N. sativa extracts were not substantially different from infected cells treated with solvent alone. However, treatment with S. nigra extracts reduced virus titers by four orders of magnitude at a multiplicity of infection (MOI) of 1 in a dose-responsive manner. Infection at a low MOI reduced viral titers by six orders of magnitude and pretreatment of virus was necessary, but not sufficient, for full virus inhibition. Electron microscopy of virions treated with S. nigra extract showed compromised envelopes and the presence of membrane vesicles, which suggested a mechanism of action.CONCLUSIONSThese results demonstrate that S. nigra extract can inhibit IBV at an early point in infection, probably by rendering the virus non-infectious. They also suggest that future studies using S. nigra extract to treat or prevent IBV or other coronaviruses are warranted.

4. Sambucus nigra extracts inhibit infectious bronchitis virus at an early point during replication

Authors Chen C.; Brantley S.; Sharpe M.; Pendleton A.R.; Zuckerman D.M.; Hoiczyk E.
Source Planta Medica; Jul 2013; vol. 79 (no. 10)
Publication Date Jul 2013
Publication Type(s) Conference Abstract
Database EMBASE
Available at Planta Medica from Unpaywall

Abstract Vaccination against infectious bronchitis virus (IBV), a pathogenic chicken coronavirus, is not wholly effective. The secondary compounds of plants may provide better treatments or preventions against IBV. Crude ethanol extracts of Rhodiola rosea roots, Nigella sativa seeds, and Sambucus nigra fruit were tested for anti-IBV activity. Cells and virus were pretreated with the highest possible non-cytotoxic dose of individual plant extracts, followed by infection in the presence of extract. Cells and supernatants were harvested separately following an additional 24h incubation with extract. Virus titers from infected cells treated with R. rosea and N. sativa extracts were not substantially different from infected cells treated with solvent alone. However, treatment with S. nigra extracts reduced virus titers by three orders of magnitude at an MOI of 1 in a dose-responsive manner. Infection at a low MOI reduced viral titers by seven orders of magnitude and pretreatment of virus alone was necessary, but not sufficient, for full virus inhibition. Electron microscopy of virions treated with S. nigra extract showed compromised envelopes and the presence of membrane vesicles, suggesting a mechanism of action. These results demonstrate that S. nigra can inhibit IBV at an early point in infection. Future studies will address the factors, in addition to pre-treatment of virus, that are necessary for full virus inhibition. Overall these studies identified a plant extract with previously unknown effects against IBV and could potentially lead to effective treatments or prevention of this or similar coronaviruses.

5. Decreased sialylation of the acute phase protein alpha1-acid glycoprotein in feline infectious peritonitis (FIP).

Authors Ceciliani, Fabrizio; Grossi, Claudia; Giordano, Alessia; Pocacqua, Vanessa; Paltrinieri, Saverio
Source Veterinary immunology and immunopathology; Jun 2004; vol. 99 (no. 3-4); p. 229-236
Publication Date Jun 2004
Publication Type(s) Research Support, Non-u.s. Gov't Journal Article
PubMedID 15135988
Database Medline

Abstract Feline infectious peritonitis (FIP) is an immune-mediated disease of domestic and exotic felides infected with feline coronavirus. FIP is characterized by the overexpression of an acute phase protein, the alpha1-acid glycoprotein (AGP). In humans, AGP is a heavily glycosylated protein that undergoes several modifications of its glycan moiety during acute and chronic inflammatory pathologies. We studied the changes in AGP glycosylation in the course of FIP. Specifically, we focussed our attention on the degree of sialylation, fucosylation and branching. This study presents a purification method for feline AGP (fAGP) from serum, using an ion exchange chromatography strategy. The glycosylation pattern was analyzed in detail by means of interaction of purified fAGP with specific lectins. In particular, Sambucus nigra agglutinin I and Maackia amurensis agglutinin lectins were used to detect sialic acid residues, Aleuria aurantia lectin was used to detect L-fucose residues and Concanavalin A was used to evaluate the branching degree. By this method we showed that fAGP did not present any L-fucose residues on its surface, and that its branching degree was very low, both in normal and in pathological conditions. In contrast, during FIP disease, fAGP underwent several modifications in the sialic acid content, including decreased expression of both alpha(2-6)-linked and alpha(2-3)-linked sialic acid (76 and 44%, respectively when compared to non-pathological feline AGP).

6. Antiviral screening of British Columbian medicinal plants.

Authors McCutcheon, A R; Roberts, T E; Gibbons, E; Ellis, S M; Babiuk, L A; Hancock, R E; Towers, G H
Source Journal of ethnopharmacology; Dec 1995; vol. 49 (no. 2); p. 101-110
Publication Date Dec 1995
Publication Type(s) Research Support, Non-u.s. Gov't Journal Article
PubMedID 8847882
Database Medline
Abstract One hundred methanolic plant extracts were screened for antiviral activity against seven viruses. Twelve extracts were found to have antiviral activity at the non-cytotoxic concentrations tested. The extracts of Rosa nutkana and Amelanchier alnifolia, both members of the Rosaceae, were very active against an enteric coronavirus. A root extract of another member of the Rosaceae, Potentilla arguta, completely inhibited respiratory syncytial virus. A Sambucus racemosa branch tip extract was also very active against respiratory syncytial virus while the inner bark extract of Oplopanax horridus partially inhibited this virus. An extract of Ipomopsis aggregata demonstrated very good activity against parainfluenza virus type 3. A Lomatium dissectum root extract completely inhibited the cytopathic effects of rotavirus. In addition to these, extracts prepared from the following plants exhibited antiviral activity against herpesvirus type 1: Cardamine angulata, Conocephalum conicum, Lysichiton americanum, Polypodium glycyrrhiza and Verbascum thapsus.

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#	Database	Search term	Results
1	Medline	(coronavirus OR corona-virus OR "corona virus").ti,ab	10835
2	Medline	(covid-19 OR "covid 19" OR covid19).ti,ab	1292
3	Medline	exp CORONAVIRUS/	11513
4	Medline	(sars-cov-2 OR sarscov2 OR "sars cov 2").ti,ab	402
5	Medline	(1 OR 2 OR 3 OR 4)	16508
6	Medline	(elderberr* OR elder-berr* OR "elder berr*").ti,ab	309
7	Medline	exp SAMBUCUS/ OR exp "SAMBUCUS NIGRA"/	342
8	Medline	(sambuc*).ti,ab	1221
9	Medline	(6 OR 7 OR 8)	1416
10	Medline	(5 AND 9)	4
11	Medline	"CORONAVIRUS INFECTIONS"/ OR exp "SEVERE ACUTE RESPIRATORY SYNDROME"/	8886
12	Medline	(9 AND 11)	0
13	EMBASE	(coronavirus OR corona-virus OR "corona virus").ti,ab	11678
14	EMBASE	(covid-19 OR "covid 19" OR covid19).ti,ab	999
15	EMBASE	exp CORONAVIRINAE/ OR exp CORONAVIRIDAE/ OR exp CORONAVIRUS/ OR exp "CORONAVIRUS INFECTION"/ OR exp "CORONAVIRUS INFECTIONS"/ OR exp "CORONAVIRUS 229E, HUMAN"/ OR exp "CORONAVIRUS NL63, HUMAN"/ OR exp "CORONAVIRUS OC43, HUMAN"/	19120
16	EMBASE	(sars-cov-2 OR sarscov2 OR "sars cov 2").ti,ab	318
17	EMBASE	(13 OR 14 OR 15 OR 16)	23480
18	EMBASE	(elderberr* OR elder-berr* OR "elder berr*").ti,ab	389
19	EMBASE	exp SAMBUCUS/ OR exp "SAMBUCUS NIGRA"/ OR exp "SAMBUCUS FLOWER"/ OR exp "SAMBUCUS NIGRA EXTRACT"/ OR exp "SAMBUCUS NIGRA FLOWER EXTRACT"/	1098
20	EMBASE	(sambuc*).ti,ab	1493

21	EMBASE	(18 OR 19 OR 20)	2001
22	EMBASE	(17 AND 21)	6
23	Medline	exp CORONAVIRIDAE/	12686
24	Medline	(9 AND 23)	2
25	PubMed	(coronavirus OR corona-virus OR "corona virus").ti,ab	16315
26	PubMed	(covid-19 OR "covid 19" OR covid19).ti,ab	1934
27	PubMed	(sars-cov-2 OR sarscov2 OR "sars cov 2").ti,ab	733
28	PubMed	(25 OR 26 OR 27)	17004
29	PubMed	(elderberr* OR elder-berr* OR "elder berr*").ti,ab	313
30	PubMed	(sambuc*).ti,ab	2044
31	PubMed	(29 OR 30)	2136
32	PubMed	(28 AND 31)	4