

# Glycyrrhizin, an active component of liquorice roots, and replication of SARS-associated coronavirus

J Cinatl<sup>1</sup>, B Morgenstern, G Bauer, P Chandra, H Rabenau, H W Doerr

Affiliations [expand](#)

PMID: 12814717 PMCID: [PMC7112442](#) DOI: [10.1016/s0140-6736\(03\)13615-x](#)

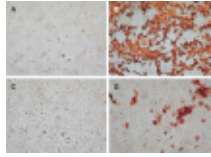
## Abstract

The outbreak of SARS warrants the search for antiviral compounds to treat the disease. At present, no specific treatment has been identified for SARS-associated coronavirus infection. We assessed the antiviral potential of ribavirin, 6-azauridine, pyrazofurin, mycophenolic acid, and glycyrrhizin against two clinical isolates of coronavirus (FFM-1 and FFM-2) from patients with SARS admitted to the clinical centre of Frankfurt University, Germany. Of all the compounds, glycyrrhizin was the most active in inhibiting replication of the SARS-associated virus. Our findings suggest that glycyrrhizin should be assessed for treatment of SARS.

[PubMed Disclaimer](#)

## Figures

---



**Figure** Effect of glycyrrhizin on replication of...

## Similar articles

### [Glycyrrhizin Effectively Inhibits SARS-CoV-2 Replication by Inhibiting the Viral Main Protease.](#)

van de Sand L, Bormann M, Alt M, Schipper L, Heilingloh CS, Steinmann E, Todt D, Dittmer U, Elsner C, Witzke O, Krawczyk A.

*Viruses*. 2021 Apr 2;13(4):609. doi: 10.3390/v13040609.

PMID: 33918301      [Free PMC article.](#)

### [Treatment of SARS with human interferons.](#)

Cinatl J, Morgenstern B, Bauer G, Chandra P, Rabenau H, Doerr HW.

*Lancet*. 2003 Jul 26;362(9380):293-4. doi: 10.1016/s0140-6736(03)13973-6.

PMID: 12892961      [Free PMC article.](#)

## Antiviral activity of glycyrrhizic acid derivatives against SARS-coronavirus.

Hoever G, Baltina L, Michaelis M, Kondratenko R, Baltina L, Tolstikov GA, Doerr HW, Cinatl J Jr.

J Med Chem. 2005 Feb 24;48(4):1256-9. doi: 10.1021/jm0493008.

PMID: 15715493

## Antiviral effects of Glycyrrhiza species.

Fiore C, Eisenhut M, Krausse R, Ragazzi E, Pellati D, Armanini D, Bielenberg J.

Phytother Res. 2008 Feb;22(2):141-8. doi: 10.1002/ptr.2295.

PMID: 17886224 [Free PMC article.](#) Review.

## [Anti-virus research of triterpenoids in licorice].

Pu JY, He L, Wu SY, Zhang P, Huang X.

Bing Du Xue Bao. 2013 Nov;29(6):673-9.

PMID: 24520776 Review. Chinese.

[See all similar articles](#)

## Cited by

### Anti-dengue viral activity of Glycyrrhiza glabra roots in Vero cells.

Jayasekara KG, Suresh S, Goonasekara C, Soyza P, Perera N, Gunasekera K.

Sci Rep. 2024 Oct 29;14(1):25922. doi: 10.1038/s41598-024-76184-5.

PMID: 39472523 [Free PMC article.](#)

## Alternative splicing responses to salt stress in *Glycyrrhiza uralensis* revealed by global profiling of transcriptome RNA-seq datasets.

Yao H, Li G, Gao Z, Guo F, Feng J, Xiao G, Shen H, Li H.

Front Genet. 2024 Jul 9;15:1397502. doi: 10.3389/fgene.2024.1397502. eCollection 2024.

PMID: 39045328 [Free PMC article.](#)

## Glycyrrhizic Acid Nanoparticles Subside the Activity of Methicillin-Resistant *Staphylococcus aureus* by Suppressing PBP2a.

Rijo P, Abuamara TMM, Ali Lashin LS, Kamar SA, Isca VMS, Mohammed TS, Abdrabo MSM, Amin MA, Abd El Maksoud AI, Hassan A.

Pharmaceuticals (Basel). 2024 May 6;17(5):589. doi: 10.3390/ph17050589.

PMID: 38794159 [Free PMC article.](#)

## Microbial $\beta$ -Glucuronidase Hydrogel Beads Activate Chemotherapeutic Prodrug.

Jeong Y, Han X, Vyas K, Irudayaraj J.

ACS Appl Mater Interfaces. 2024 Jun 5;16(22):28093-28103. doi: 10.1021/acsami.4c02568. Epub 2024 May 22.

PMID: 38775441

## Identification of natural compounds (proanthocyanidin and rhapontin) as high-affinity inhibitors of SARS-CoV-2 Mpro and PLpro using computational strategies.

AlAjmi MF, Azhar A, Hasan S, Alshabr AZ, Hussain A, Rehman MT.

Arch Med Sci. 2021 Mar 20;20(2):567-581. doi: 10.5114/aoms/133706.

eCollection 2024.

PMID: 38757037      **Free PMC article.**

[See all "Cited by" articles](#)

## References

1. Drosten C, Gunther S, Preiser W. Identification of a novel coronavirus in patients with severe acute respiratory syndrome. *N Engl J Med.* 2003;348:1967–1976. - [PubMed](#)
2. Crance JM, Scaramozzino N, Jouan A, Garin D. Interferon, ribavirin, 6-azauridine, and glycyrrhizin: antiviral compounds active against pathogenic flaviviruses. *Antiviral Res.* 2003;58:73–79. - [PubMed](#)
3. Jeong HG, Kim JY. Induction of inducible nitric oxide synthase expression by 18 $\beta$ -glycyrrhetic acid in macrophages. *FEBS Lett.* 2002;513:208–212. - [PubMed](#)
4. Lin YL, Huang YL, Ma SH. Inhibition of Japanese encephalitis virus infection by nitric oxide: antiviral effect of nitric oxide on RNA virus replication. *J Virol.* 1997;71:5227–5235. - [PMC](#) - [PubMed](#)
5. Booth CM, Matukas LM, Tomlinson GA. Clinical features and short-term outcomes of 144 patients with SARS in the greater Toronto area. *JAMA.* 2003;289:1–9. - [PubMed](#)

## MeSH terms