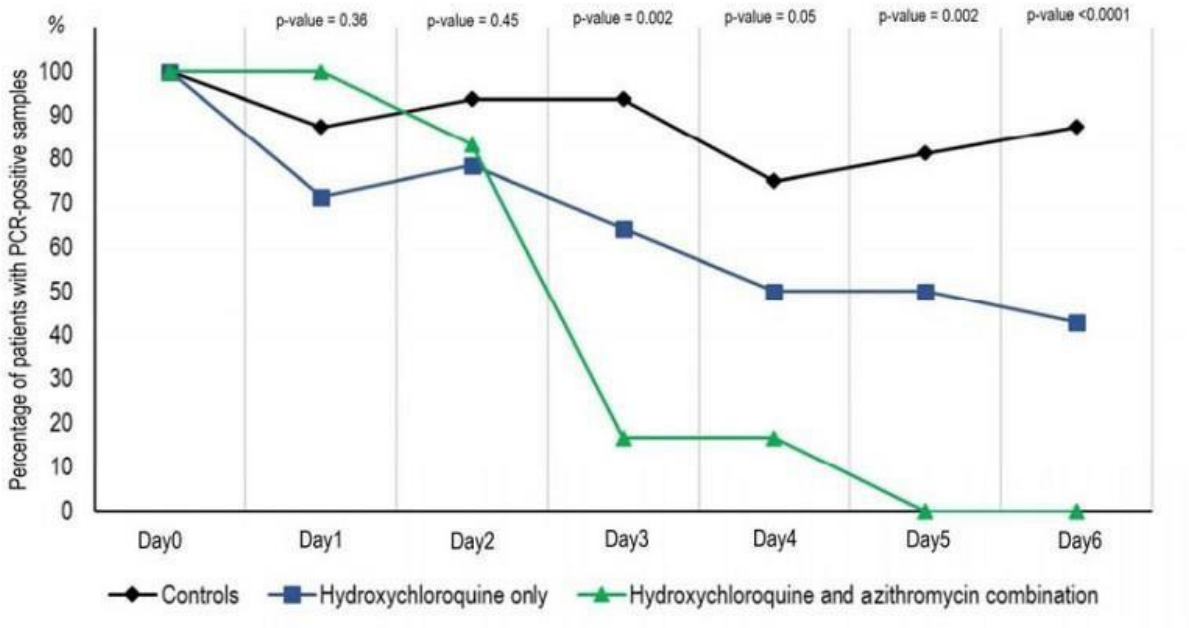
Table 1. Human coronavirus (HCoV) receptors/co-receptors as possible targets for chloroquine-induced inhibition of the virus replication cycle

Coronavirus	Receptor [a]	May also bind	Replication cycle inhibited by chloroquine [b]
Alphacoronavirus			
HCoV-229E	Aminopeptidase N (APN)/CD13		Yes
HCoV-NL63	Angiotensin-converting enzyme 2 (ACE2) Heparan sulfate proteoglycans [c]		?
Betacoronavirus			
HCoV-OC43	HLA class I [d], IFNinducible transmembrane (IFITM) proteins in endocytic vesicles [e]	Sialic acid (*O*acetylated sialic acid) [f]	Yes
SARS-CoV-1	Angiotensin-converting enzyme 2 (ACE2)	DC-SIGN/CD209, DC-SIGNr, DC-SIGN-related lectin LSECtin [g]	Yes
HCoV-HKU1	HLA class I [h]	Sialic acid (*O*acetylated sialic acid)	?
MERS-CoV [i]	Dipeptidyl peptidase 4 (DPP4)/CD26		Yes
SARS-CoV-2	ACE2 [i]	Sialic acid?	Yes

HLA, human leukocyte antigen.

Adapted from Graham et al. [102]. Chloroquine could interfere with receptor (ACE2) glycosylation and/or sialic acid biosynthesis. According to Milewska et al. [103]. [d] According to Collins [104]. [e] According to Zhao et al. [105]. [f] According to Vlasak et al. [106]. [g] According to Huang et al. [107]. [h] According to Chan et al. [109]. [I] It is worth noting that different host cell proteases are required to activate the spike (S) protein for coronaviruses, such as SARS-CoV-1 S protein that requires activation by cathepsin L [100], or MERS-CoV that requires furin-mediated activation of the S protein [109].



The combination reduced detectable virus in all patients tested within 6 days