



Investigational and repurposed drugs for COVID-19 treatment

There are no proven effective treatments yet for COVID-19. Many clinical trials are currently studying the safety and effectiveness of some non-specific antiviral drugs. **This infographic provides an overview of what is currently known about five of these drug treatments.***



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Remdesivir

Type of drug	Adenosine nucleotide analogue prodrug										
Mechanism of action	Interferes with viral RNA-dependent RNA polymerase activity, thus preventing viral replication										
Originally used for	Ebola virus infection										
Initial observations of effect against SARS-CoV-2	Has shown potent in vitro antiviral activity at low (micromolar) concentrations against cells infected with SARS-CoV-2 Been found to shorten the time to recovery to a greater extent than a placebo in adults who were hospitalized with COVID-19 and showed evidence of lower respiratory tract infection										
Known adverse effects	Elevation of hepatic enzyme levels, gastrointestinal complications, rash, renal impairment, and hypotension										
Investigation status	Total ongoing clinical trials: 9 <table border="1"> <thead> <tr> <th>Phase</th> <th>No. of trials</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>1</td> </tr> <tr> <td>Phase 2/3</td> <td>1</td> </tr> <tr> <td>Phase 3</td> <td>6</td> </tr> <tr> <td>Phase 4</td> <td>1</td> </tr> </tbody> </table>	Phase	No. of trials	N/A	1	Phase 2/3	1	Phase 3	6	Phase 4	1
Phase	No. of trials										
N/A	1										
Phase 2/3	1										
Phase 3	6										
Phase 4	1										

Favipiravir

Type of drug	Purine nucleotide analog prodrug																				
Mechanism of action	Inhibits viral RNA-dependent RNA polymerase, thus preventing viral replication																				
Originally used for	Influenza																				
Initial observations of effect against SARS-CoV-2	In combination with interferon- α , has been shown to enhance viral clearance and lead to improved lung condition as assessed by chest imaging																				
Known adverse effects	QT interval prolongation, hyperuricemia, diarrhea, elevation of transaminase levels, reduction in neutrophil count																				
Investigation status	Total ongoing clinical trials: 24 <table border="1"> <thead> <tr> <th>Phase</th> <th>No. of trials</th> <th>Phase</th> <th>No. of trials</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>2</td> <td>Phase 2/3</td> <td>3</td> </tr> <tr> <td>Phase 0</td> <td>5</td> <td>Phase 3</td> <td>8</td> </tr> <tr> <td>Phase 1/2</td> <td>1</td> <td>Phase 4</td> <td>2</td> </tr> <tr> <td>Phase 2</td> <td>3</td> <td></td> <td></td> </tr> </tbody> </table>	Phase	No. of trials	Phase	No. of trials	N/A	2	Phase 2/3	3	Phase 0	5	Phase 3	8	Phase 1/2	1	Phase 4	2	Phase 2	3		
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Lopinavir-Ritonavir (in combination)

Type of drug	Protease inhibitors																
Mechanism of action	Inhibits 3-chymotrypsin-like protease and prevents generation of the viral replicase-transcriptase complex, therefore inhibiting viral replication																
Originally used for	HIV infection																
Initial observations of effect against SARS-CoV-2	Limited evidence showing possible decrease in viral load May lead to greater clinical and radiological improvements when administered in combination with umifenovir																
Known adverse effects	Gastrointestinal complications, pancreatitis, hepatotoxicity, cardiac conduction abnormalities																
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Chloroquine/Hydroxychloroquine

Type of drug	4-Aminoquinoline																								
Mechanism of action	Interferes with the glycosylation of angiotensin-converting enzyme 2 (ACE2, the cellular receptor to which SARS-CoV-2 binds), thus blocking virus fusion with the host cell Also hinders viral trafficking and replication by inhibiting proteolytic processing and endosomal acidification																								
Originally used for	Malaria, rheumatoid arthritis																								
Initial observations of effect against SARS-CoV-2	Each shown to improve viral clearance and reduce symptom duration																								
Known adverse effects	QT prolongation and, when taken together with azithromycin, increased risk of cardiotoxicity																								
Investigation status	Total ongoing clinical trials with chloroquine, hydroxychloroquine, or both: 214 <table border="1"> <thead> <tr> <th>Phase</th> <th>No. of trials</th> <th>Phase</th> <th>No. of trials</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>19</td> <td>Phase 2/3</td> <td>19</td> </tr> <tr> <td>Phase 0</td> <td>3</td> <td>Phase 3</td> <td>72</td> </tr> <tr> <td>Phase 1</td> <td>8</td> <td>Phase 4</td> <td>43</td> </tr> <tr> <td>Phase 1/2</td> <td>2</td> <td>Retrospective study</td> <td>1</td> </tr> <tr> <td>Phase 2</td> <td>47</td> <td></td> <td></td> </tr> </tbody> </table>	Phase	No. of trials	Phase	No. of trials	N/A	19	Phase 2/3	19	Phase 0	3	Phase 3	72	Phase 1	8	Phase 4	43	Phase 1/2	2	Retrospective study	1	Phase 2	47		
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Ribavirin

Type of drug	Guanosine analog										
Mechanism of action	Interferes with viral replication as well as with RNA-protective mechanisms and reduces the fidelity of viral replication, which decreases the viability of the virus										
Originally used for	Respiratory syncytial virus infection, hepatitis C										
Initial observations of effect against SARS-CoV-2	Has demonstrated potent antiviral activity in vitro against cells infected with the virus										
Known adverse effects	Hematologic toxicity observed when used to treat MERS-CoV infection in combination with interferon α -2										
Investigation status	Total ongoing clinical trials: 8 <table border="1"> <thead> <tr> <th>Phase</th> <th>No. of trials</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>2</td> </tr> <tr> <td>Phase 1</td> <td>1</td> </tr> <tr> <td>Phase 2</td> <td>3</td> </tr> <tr> <td>Phase 3</td> <td>2</td> </tr> </tbody> </table>	Phase	No. of trials	N/A	2	Phase 1	1	Phase 2	3	Phase 3	2
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*Drug-specific information is based on literature that was available until April 30, 2020. Information on the numbers/phases of clinical trials is based on data available until June 4, 2020.

To learn more, read **COVID-19-related literature summaries** and access a **global clinical trial database** at covid19.researcher.life