**CHEM VS. COVID TIMELINE**

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**FDA approves first COVID-19 antiviral**

**Nucleoside analogues**

Nucleoside analogues, molecules which resemble naturally-occurring building blocks that make up virus RNA, have been developed for COVID-19. They’re picked up by the virus enzyme which copies RNA, RNA polymerase, but stop it from functioning, stopping the virus copying itself.

**Adenosine triphosphate**

One of four nucleosides that make up RNA

![Adenosine triphosphate structure](image)

**Remdesivir (active form)**

The structural changes in nucleoside analogues are responsible for sabotaging the virus’s RNA replication process.

![Remdesivir (active form) structure](image)

Remdesivir became the first antiviral drug to be approved in the USA for the treatment of COVID-19. It is not as effective as first thought but similar drugs are in development.

**Other treatment candidates**

The WHO have said there is insufficient evidence that remdesivir is effective against SARS-CoV-2, and cautioned against its use. But another nucleoside analogue, molnupiravir, does reduce the risk of hospitalisation and death from COVID-19.

**Molnupiravir (active form)**

Molnupiravir exists as two interchangeable structures. One form mimicks the uridine (U) nucleoside, the other form mimicks the cytidine (C) nucleoside.

![Molnupiravir (active form) structure](image)

Protease inhibitor drugs have also shown promise. These drugs bind to the viral protease enzyme and stop the virus from copying itself. Pfizer’s PF-07321332 is an example which is currently in clinical trials.

**How did it help?**

**More effective medicines**

Understanding how antivirals against SARS-CoV-2 work, even if they are not particularly effective, helps scientists work out how to make more effective drugs.

**Combination therapy**

Giving antiviral drugs in combination rather than individually is more effective at blocking virus replication, so the more options we have the better.

**Future viruses**

Some of the drugs being developed against SARS-CoV-2 may also be effective against other viruses, making them potentially useful during future pandemics.

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