Darunavir (Prezista) Possible Treatment for COVID-19
Darunavir, What is it?

Antiretroviral Protease Inhibitor

Currently being used as an HIV and AIDS treatment/therapy
What is a Retrovirus and What Does it Do?

- Retroviruses, such as HIV, are viruses with an RNA genome that ultimately inserts a copy of itself into its host’s DNA.
- This is done by using reverse transcriptase to produce DNA from its RNA.
- It then uses an integrase to place the copy of the DNA into the host’s DNA.
- This allows the virus to be lazy and the host’s machinery then transcribes and translates the DNA, like it were its own, creating more copies of the virus.

The figure shows HIV budding from a lymphocyte using scanning electron micrograph.
How Darunavir Works

• Within retroviruses are a complex of proteins called the POL polyprotein

• This includes retroviral aspartyl protease, reverse transcriptase, RNase H and integrase

• The retroviral aspartyl protease, with a functional dimer structure, is used to cleave the polyprotein into functional fragments

• Darunavir interacts with the retroviral aspartyl protease by binding to its active site causing a conformational change to the enzyme

• This binding disrupts the dimerization of the enzyme and therefore disrupts replication
Using Darunavir as a Treatment for COVID-19

- Experiment testing the effective of binding of Darunavir to target enzymes’ active sites
- Target enzymes: Coronavirus Endopeptidase C30 (CEP_C30) and Papain like Viral Protease (PLVP)
- Image: CEP_C30 (white) and PLVP (green) with side chains (blue) interacting with Darunavir (red)
- Found that when Darunavir binds, it causes a conformational change within the enzyme structures
- Also found that Darunavir binds to PLVP more tightly than it does to CEP_C30
“Efficacy and Safety of Darunavir and Cobicistat for Treatment of COVID-19”

NIH Clinical Trial

Testing both Darunavir and Cobicistat (another drug used as an HIV treatment) by giving a randomized group one tablet per day (does not specify if the drugs were taken separately or together)

Primary Outcomes:

Testing the clearance rate of throat, sputum, or lower respiratory secretions on day 7

Secondary Outcomes:

Testing clearance of same areas at day 3 and day 5
Determining the number of patients with adverse effects
Determining critical illness at 2 weeks
Determining mortality rate at 2 weeks


