International Journal of Scientific & Engineering Research Volume 11, Issue 9, September-2020
ISSN 2229-5518

EFFICIACY OF ANTI-MALARIAL DRUGS TO COVID-19 AND THEIR EFFECTS

Ayesha Tariq[1], Minna Rizwan[1], Tayyaba Amjad[1] , Rumaza Asad[1] , Sammar Nathenial[2]

[1, 2] Department of biochemistry, Kinnaird College for Women University, Lahore, Pakistan.

Email Address: ayeshatariq2949@gmail.com, rumazaasad9@gmail.com

Anti-malarial drugs have always been of great importance in treating malaria prophylaxis T2DM and more. In the running pandemic of SARS-CoV-2 or COVID 19, the repositioning of these drugs led to the inevitable results on the basis of their mechanism to binding the main COVID-19 protease, increasing the PH levels, interfering with the glycosylation [1]. After reviewing the referenced data, the opinion could be made more vividly i.e. these anti-malarial drugs aminoquinolines (Chloroquine CQ or Hydroxychloroquine) possess an efficacy with, the COVID-19, its main proteases.

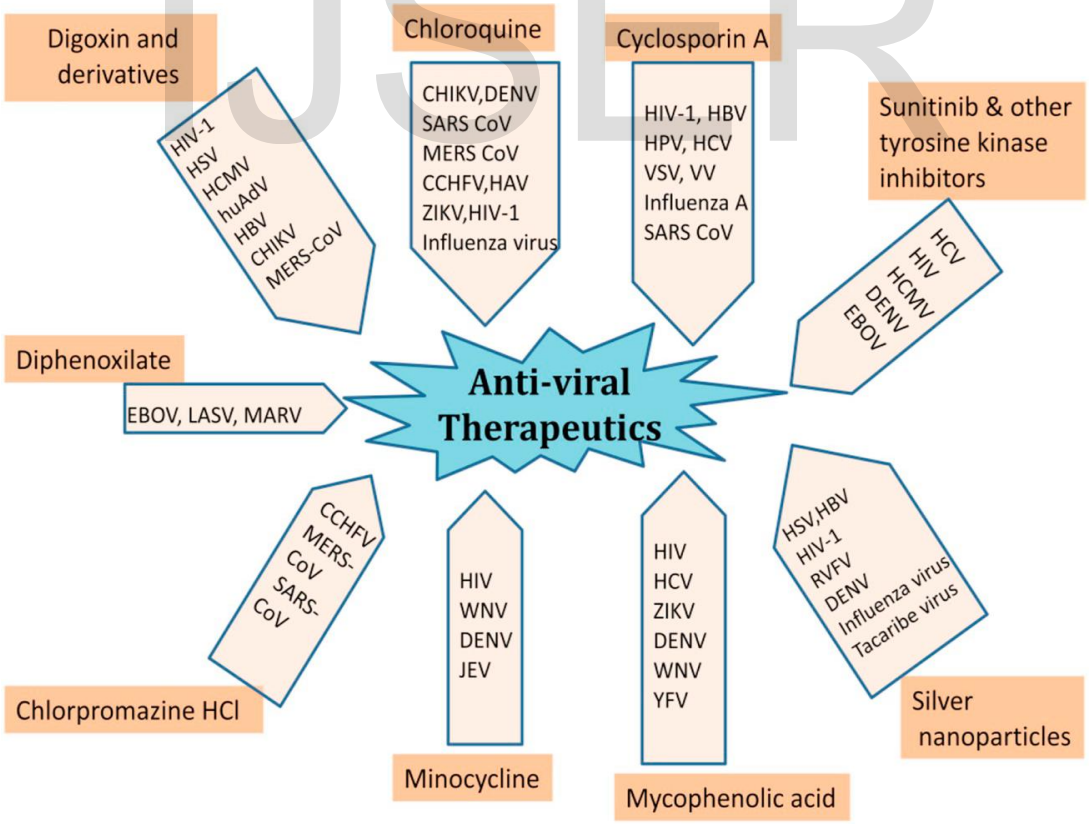

Figure 1: Examples of drugs repurposing for viral infections

Upon docking with hydroxychloroquine this protease can its shape and can be destabilized and hence can cause inhibition of the virus spread. Replication can thus be prevented by changing the active sites of the enzymes as it halts the fusion process with certain organelles such as lysosomes and the post translation modification of the Golgi body [2,3].

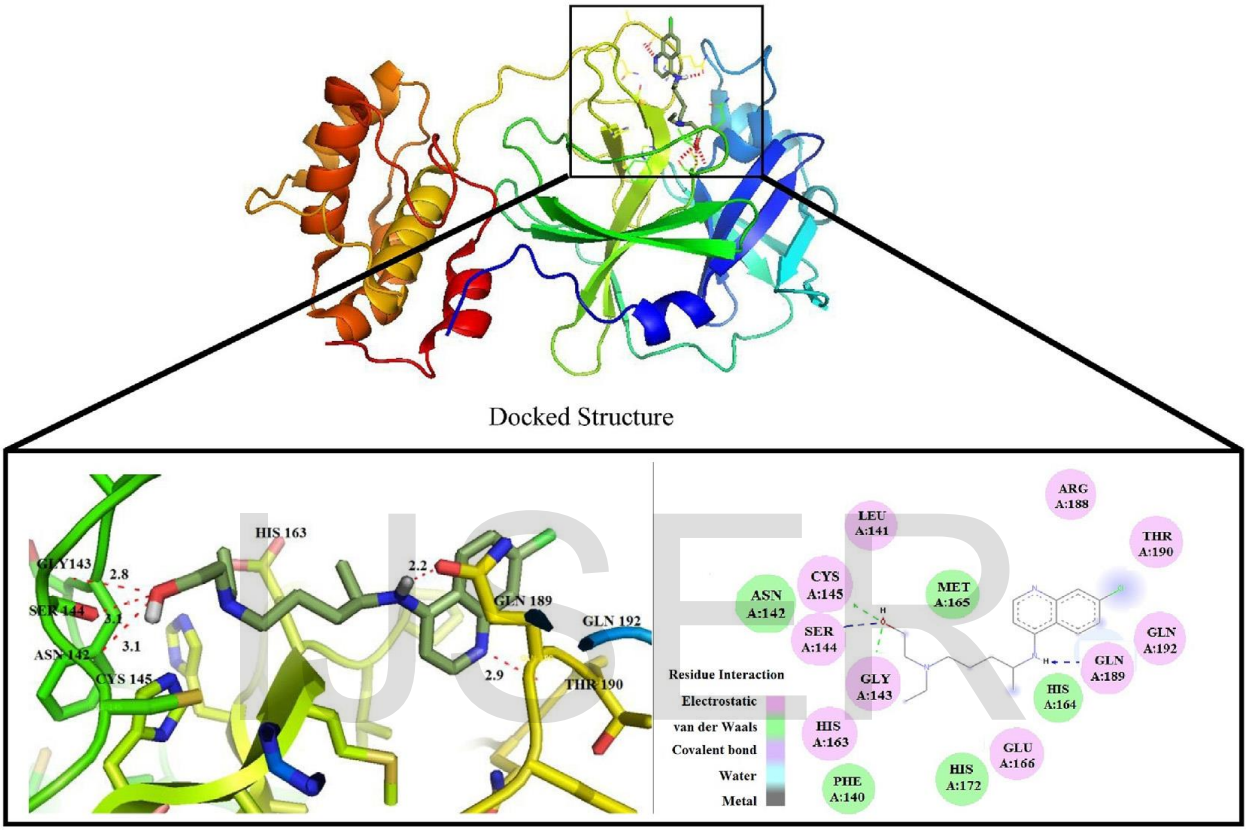

Figure 2: Docked structure of COVID 19 main protease.

Hydroxychloroquine or chloroquine are said to be similar but work effectively in the presence of other different medications. Setting alone the high dosage of these drugs can prove to be fatal. CQ can work in accordance with ritonavir and HCQ is in effect with an antibiotic azithromycin. Patients tend to recover at a higher rate with the dosage of HCQ in accordance with azithromycin as it removes any bacterial strains from the body which could lead to infections [4].

There is still no clarification of the drug being used for Covid-19 patients i.e. Hydroxychloroquine (an anti-malarial drug). It might work along with usual care for patients who were mildly ill from the coronavirus mostly of age 45. Hence there's some interrelated similarity between autoimmune disorders and Covid-19 as they have mild effect of immunomodulatory or anti-viral part of

hydroxychloroquine [6]. Macrolides, such as azithromycin with its immunomodulatory effects along with hydroxychloroquine may seems to rise cardiovascular diseases so it might be possible the anti-viral part, to some extent can be able to treat this [7]. Dihydroartemisinin-piperaquine (DHP) as compare to artemether-lumefantrine (AL) is more effective in treating malarial patients. Hence more research should be done on DHP to analyze its mode of action against malaria so it is expected to be used in trials against Covid-19 [8].

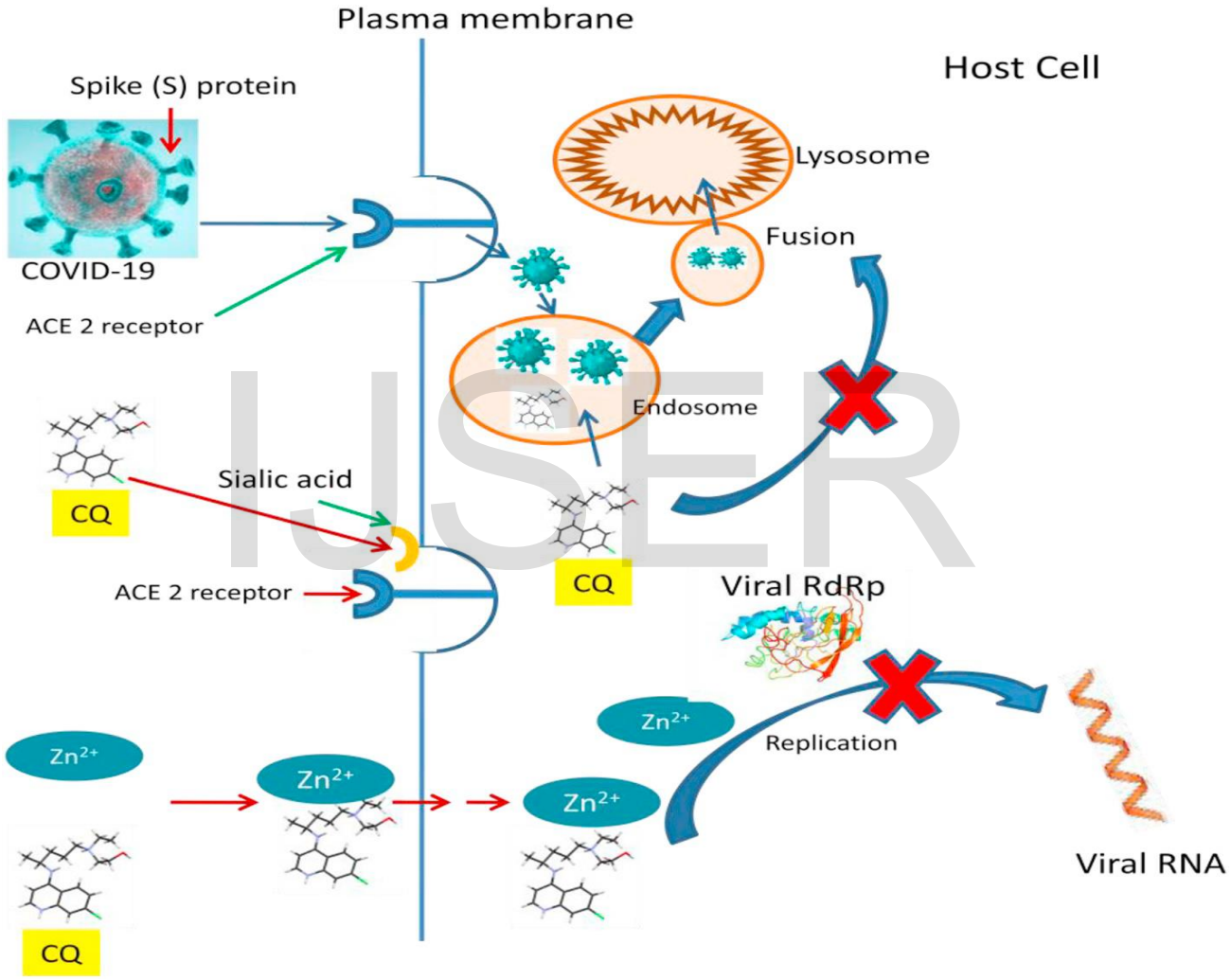

Figure 3: Proposed mechanism of action for aminoquinolines (CQ: Chloroquine; RdRp: RNA dependent RNA polymerase; Green color arrow: names; Red Color arrow: Zn2+ ionophore action of CQ; Blue color arrow: COVID-19 entry into host cell, endosome and lysosome; X: Site of action for CQ).

No medicine for COVID-19/ Cov-SARS-2 has been discovered till now but Remdesivir is an anti-viral medicine used in malarial infection treatment is being used to treat COVID-19 patients. Hence, it is not a much effective medicine to cure COVID-19 but it helps to reduce the virulence of corona virus [9]. Hydroxychloroquine is an anti-malarial drug which increases cells pH by embedding themselves in lysosome. They are proven beneficial in systemic Lupus Erythematosus as it is a dangerous disease for skin and organs [10]. Hydroxychloroquine not only prevents skin from any kind of damage but also helps the safe organ development of fetus of pregnant woman with no dangerous or life-threatening side effects [11].

The case studies of patients getting these antiviral drugs can also present some of the adverse effects and YES this is true. While opinionating should be about the positive effect of anti-malarial drugs on COVID 19, it should also be brought under considerations the negative effects that it could make on a human life. Especially the people with cardiopathy, retinopathy, lung disorders. HCQ has been effective in treating diabetes as it binds to the ACE2 enzymes and thus more research should be made on its purpose of serving to COVID 19 [1,2,5].

IJSER

REFERENCES

1. M. Patil V, Singhal S, Masand N. **A systematic review on use of aminoquinolines for the therapeutic management of COVID-19: Efficacy, safety and clinical trials. ScienceDirect. 2020.** URL: https://www.sciencedirect.com/science/article/pii/S0024320520305233
2. Singh A, Singh A, Shaikh A, Singh R, Misra A. **Chloroquine and hydroxychloroquine in the treatment of COVID-19 with or without diabetes: A systematic search and a narrative review with a special reference to India and other developing countries. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2020** URL: https://www.sciencedirect.com/science/article/pii/S1871402120300515
3. Quiros Roldan E, Biasiotto G, Magro P, Zanella I. **The possible mechanisms of action of 4-aminoquinolines (chloroquine/hydroxychloroquine) against Sars-Cov-2 infection (COVID-19): A role for iron homeostasis? [Internet]. Pharmacological Research. 2020**. URL: https://www.sciencedirect.com/science/article/pii/S1043661820312123
4. Baildya N, Ghosh N, Chattopadhyay A. **Inhibitory activity of hydroxychloroquine on COVID-19 main protease: An insight from MD-simulation studies. Journal of Molecular Structure. 2020.** URL: https://www.sciencedirect.com/science/article/pii/S0022286020309200
5. Jean S, Lee P, Hsueh P. **Treatment options for COVID-19: The reality and challenges [Internet]. Journal of Microbiology, Immunology and Infection. 2020.** URL: http://www.sciencedirect.com/science/article/pii/S1684118220300943
6. Mehra M, Desai S, Ruschitzka F, Patel A. **RETRACTED: Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis [Internet]. journal of lancet. 2020.** URL: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31180-6/fulltext
7. **Malaria Drug Helps Virus Patients Improve, in Small Study [Internet]. Nytimes.com. 2020.** URL: https://www.nytimes.com/2020/04/01/health/hydroxychloroquine-coronavirus-malaria.html
8. Naing C, A. Whittaker M, Htet Htet N, Nway Aye S, Wah Mak J. **Efficacy of antimalarial drugs for treatment of uncomplicated falciparum malaria in Asian region: A network**

IJSER

meta-analysis [Internet]. 2019. URL: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0225882

9. Souza Cabral R, Mendes Klumb E, Noronha Neta Couto M, Carneiro S. **Evaluation of Toxic Retinopathy Caused by Antimalarial Medications With Spectral Domain Optical Coherence Tomography [Internet]. 2018**. URL: https://pubmed.ncbi.nlm.nih.gov/30403262/

10. Yeming Wang, MD, Dingyu Zhang, MD, Prof Guanhua Du, PhD, Prof Ronghui Du, MD, Prof Jianping Zhao, MD, Prof Yang Jin, MD, Prof Shouzhi Fu, MD, Prof Ling Gao, MD, Prof Zhenshun Cheng, MD, Prof Qiaofa Lu, MD. **Remdesivir in adults with severe COVID-19: a randomised, double-blind, placebo-controlled, multicentre trial [Internet]. THE LANCET. 2020.** URL: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31022-9/fulltext

11. Ponticelli C, Moroni G. **Hydroxychloroquine in Systemic Lupus Erythematosus (SLE) [Internet]. 2017.** URL: https://pubmed.ncbi.nlm.nih.gov/27927040/

IJSER