

## Letter to Editor

# What is the Role of the Anti-Parasitic Drugs in the Treatment of Coronavirus Disease 2019?

Sara Rahmati Roodsari<sup>1</sup>, Zahra Arab-Mazar<sup>2,3\*</sup>

<sup>1</sup> Functional Neurosurgery Research Center, Shohada Tajrish Comprehensive Neurosurgical Center of Excellence, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>2</sup> Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

<sup>3</sup> Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Received: 18 August, 2020; Accepted: 07 December, 2020

**\*Corresponding Author:** Zahra Arab-Mazar, Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. Email: [z.arabmazar@gmail.com](mailto:z.arabmazar@gmail.com), ORCID: 0000-0002-7823-9922

**Please cite this article as:** Rahmati Roodsari S, Arab-Mazar Z. What is the role of the anti-parasitic drugs in the treatment of coronavirus disease 2019? *Novel Biomed.* 2021;9(1):31-2.

## Dear Editor-in-chief

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a rapidly emerging viral infection causing coronavirus disease 2019 (COVID-19). The first report of the novel coronavirus, SARS-CoV-2, originated in Wuhan, China, in early December 2019<sup>1</sup>. Currently, there is no U.S. food and drug administration (FDA) approved drugs for the treatment of patients with COVID-19. A great deal of effort is ongoing to find effective therapeutics and preventive measures against this transmissible virus with high mortality. As result, available data are limited, and there are minimal randomized controlled trial (RCT) data on the efficacy of antiviral or immunomodulatory agents for the treatment of COVID-19<sup>2</sup>. Most of the treatment protocols are based on observational studies and anecdotic reports<sup>3,4</sup>.

Until now, there is no specific drug therapy available for the treatment of COVID-19. However, some potential anti-parasitic drugs like hydroxychloroquine and azithromycin, antifilarial drug Ivermectin and antiviral drugs have been tested by many research groups worldwide for their possible effect against the COVID-19<sup>5</sup>. Ivermectin was a revolutionary drug in the 1980s, the forerunner of a new group of

antiparasitic agents with activity against both parasitic nematodes and arthropods. Ivermectin has valuable public health applications for controlling strongyloidiasis and scabies and filariasis, through its effect on transmission<sup>6,7</sup>. Recent reports suggested that the treatment of COVID-19 by the single dose of Ivermectin was found to reduce the viral load up to 5000 fold in vitro culture within 48 h<sup>8</sup>. Mechanism of action of this drug against COVID-19 is still unknown, but the important features of this drug is that no toxicity was observed during in vitro culture.

Chloroquine (CQ) and hydroxychloroquine (HCQ) have been used to treat malaria for 70 years. Chloroquine (CQ) has showed low toxicity with strong inhibition on MERS-CoV and SARS-CoV<sup>9</sup>. Chloroquine likely accumulates in lysosomes, where it sequesters protons and increases the pH. The drug modulates immune response by interacting variety of host proteins and cellular processes.

The HCQ is derivative of CQ, and is the first category drug which is prescribes for COVID-19 infection therapy<sup>10</sup>. This drug is a first line drug for malaria treatment and also has been used for rheumatoid arthritis and systemic lupus erythematosus treatment<sup>11</sup>. HCQ specific feature is affecting acid balance and can inhibit many enzymes. Moreover, it can obstruct the

viral post-translational modifications and glycosyl-transferases<sup>12</sup>.

Many Research centers and institutes all around the world have announced institutional guidelines for off-label use of drugs for COVID-19, including CQ and HCQ with different dosages and duration for either treatment or prophylaxis, but there is no standard recommendation for prescribing these medications for this disease. In addition, CQ and HCQ have many side effects, including cardiac toxicity (QT prolongation, torsade de pointes, and ventricular arrhythmia), which may be harmful in the elderly, who are also high risk for COVID-19<sup>13</sup>.

However, it is still not clear that whether these drugs have a better therapeutic effect, when compared to other drugs or combination therapy of multiple drugs. Consequently, this editorial makes comprehensive view on anti-parasitic drugs, which can be used in the current treatment COVID-19 disease.

**Keywords:** COVID-19, Treatment, Anti-parasitic drugs, Hydroxychloroquine, Chloroquine

## References

1. Arab-Mazar Z, Sah R, Rabaan AA, Dhama K, Rodriguez-Morales AJ. Mapping the incidence of the COVID-19 hotspot in Iran—Implications for Travellers. *Travel Medicine and Infectious Disease*. 2020.
2. Keshtkar-Jahromi M, Bavari S. A call for randomized controlled trials to test the efficacy of chloroquine and hydroxychloroquine as therapeutics against novel coronavirus disease (COVID-19). *The American Journal of Tropical Medicine and Hygiene*. 2020;102(5):932.
3. Calvo C, Tagarro A, Otheo E, Epalza C, de la Infección GdS, editors. Actualización de la situación epidemiológica de la infección por SARS-CoV-2 en España. Comentarios a las recomendaciones de manejo de la infección en pediatría. *Anales De Pediatría (Barcelona, Spain: 2003); 2020: Elsevier*.
4. Vollaard A, Gieling E, van der Linden P, Sihna B, de Boer M. Medicamenteuze behandelopties bij patiënten met COVID-19 (infecties met SARS-CoV-2). 2020.
5. Siddiqui AJ, Jahan S, Ashraf SA, Alreshidi M, Ashraf MS, Patel M, et al. Current status and strategic possibilities on potential use of combinational drug therapy against COVID-19 caused by SARS-CoV-2. *Journal of Biomolecular Structure and Dynamics*. 2020:1-14.
6. Collins KL. Profitable gifts: a history of the Merck Mectizan donation program and its implications for international health. *Perspectives in biology and medicine*. 2004;47(1):100-9.
7. Kipp W, Bamhuhiiga J, Rubaale T, Büttner Dw. Adverse Reactions to Ivermectin Treatment in Simulium Neavei—Transmitted Onchocerciasis. *The American Journal of Tropical Medicine and Hygiene*. 2003;69(6):621-3.
8. Caly L, Druce JD, Catton MG, Jans DA, Wagstaff KM. The FDA-approved drug ivermectin inhibits the replication of SARS-CoV-2 in vitro. *Antiviral research*. 2020:104787.
9. Cong Y, Gross R, Zhou H, Frieman M, Bollinger L, Wada J, et al. MERS-CoV pathogenesis and antiviral efficacy of licensed drugs in human monocyte-derived antigen-presenting cells. *PLoS one*. 2018;13(3):e0194868.
10. Beura S, Prabhakar C. In-silico strategies for probing chloroquine based inhibitors against SARS-CoV-2. *Journal of Biomolecular Structure and Dynamics*. 2020(just-accepted):1-25.
11. Sinha N, Balayla G. Hydroxychloroquine and covid-19. *Postgraduate Medical Journal*. 2020.
12. Choudhary R, Sharma AK. Potential use of hydroxychloroquine, ivermectin and azithromycin drugs in fighting COVID-19: trends, scope and relevance. *New Microbes and New Infections*. 2020:100684.
13. Nord JE, Shah PK, Rinaldi RZ, Weisman MH, editors. Hydroxychloroquine cardiotoxicity in systemic lupus erythematosus: a report of 2 cases and review of the literature. *Seminars in arthritis and rheumatism*; 2004: Elsevier.