

## A REVIEW ON: COVID-19, THE STEP TOWARDS PREVENTION, TREATMENT

Swamini S. Waghchaure<sup>1\*</sup> and Yamini D. Potkule<sup>2</sup>

<sup>1</sup>Department of Pharmaceutics, Dr. Vitthalrao Vikhe Patil Foundation College of Pharmacy, Vilat Ghat, Dist- Ahmednagar, Maharashtra 414111.

<sup>2</sup>Department of Pharmaceutics, Amrutvahini College of Pharmacy, Amrutnagar, Sangamner, Dist- Ahmednagar, Maharashtra 422608.

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### \*Corresponding Author

Swamini S. Waghchaure

Department of

Pharmaceutics, Dr.

Vitthalrao Vikhe Patil

Foundation College of

Pharmacy, Vilat Ghat, Dist-

Ahmednagar, Maharashtra

414111.

### ABSTRACT

Coronavirus disease (covid19) is a condition caused by severe acute respiratory syndrome coronavirus (SARS-COV-2), it is a highly transmittable and pathogenic viral infection, firstly emerged in Wuhan city of china, then spread whole around the world. The elderly and small children under the 10 years and people with underlying diseases are susceptible to infection more readily. The clinical symptoms of covid-19 patients include fever, pneumonia, dry cough, fatigue and respiratory infection, to stop such infection; there is need of effective medical treatments along with some therapies. In this review, the various drugs used against covid19 were discussed along with mechanism of action, also the convalescent plasma therapy were discussed to improve viral outbreak.

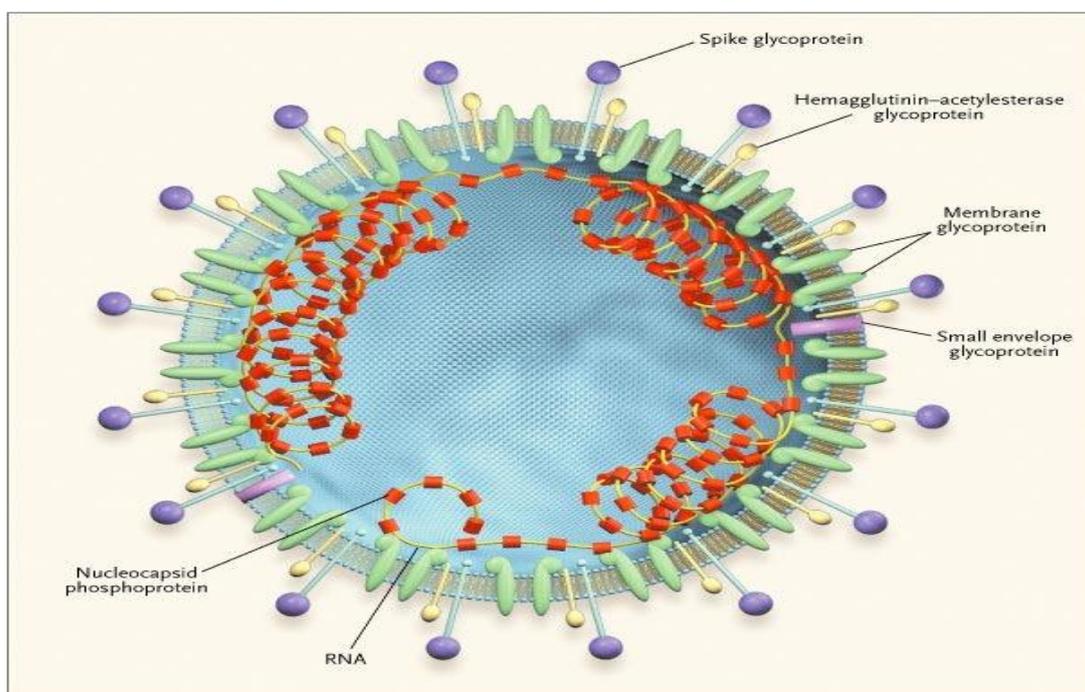
**KEYWORDS:** COVID 19, Transmission of coronavirus, antibiotics and antiviral drugs, convalescent plasma therapy.

### INTRODUCTION

All countries have been facing a various dangerous outbreaks like cholera, ebola, and now we facing a dangerous viral disease named covid 19.<sup>[1]</sup> The covid 19 belonging to the family of *coronaviridae*, these are the largest group of viruses cause various common or less common symptoms like pneumonia, fever, cough, shortness of breath, lungs infection, muscle pain, sore throat. Novel coronavirus disease is a viral respiratory disease caused by severe acute respiratory syndrome corona virus 2, they was originated from Wuhan city of Hubei Province

in China in December 2019. The WHO (World Health Organization) officially named the disease as covid19.

Coronavirus having crown like spikes on outer surface which helpful to attack and binding living cells.<sup>[2]</sup> Corona viruses is the single stranded RNA virus, size rang is about 65-125nm in diameter and 26 to 32kbs in length.



**Figure 1: Structure of coronavirus virion.**

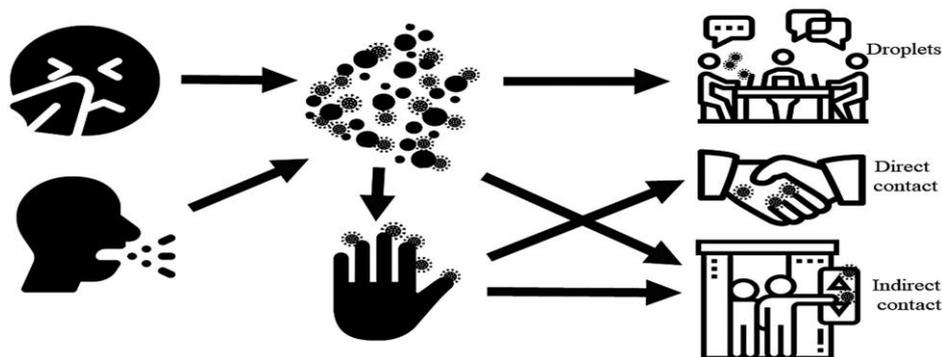
In the world seven type of human coronaviruses are able to produce infection in the people, in which four human coronaviruses more commonly infected to people such as 229E (HCoV-229E), OC43 (HCoV-OC43), NL63 (HCoV-NL63) and HKU1 (HCoV-HKU1). That stain causes a severe disease include MERSCoV causes Middle East Respiratory Syndrome (MERS), SARS-CoV causes Severe Acute Respiratory Syndrome (SARS) and most recent SARS-CoV-2 causes COVID-19.<sup>[4]</sup>

### **Transmission of coronavirus**

Coronavirus were transmitted from animals include cats, rats, mice, dogs, pigs to humans.<sup>[2]</sup> Generally coronavirus is spread by route of droplets, direct contact, and indirect contact. This virus get entry into the body by mouth, nose, and eyes (transmission of coronavirus). The coronavirus may spread via direct contact with infected patient by coughing or

sneezing.<sup>[5]</sup> In marketed places this virus transmitted or spread more rapidly by coughing or sneezing without covering mouth in public place, touching or shaking hands with person, and touching an objectives. It has been reported that, The corona virus may infect to person at distance between 6 feet radius, and shows symptoms in 2-24 days after infections.

**COVID-19 transmission routes: droplets, direct contact, and indirect contact**

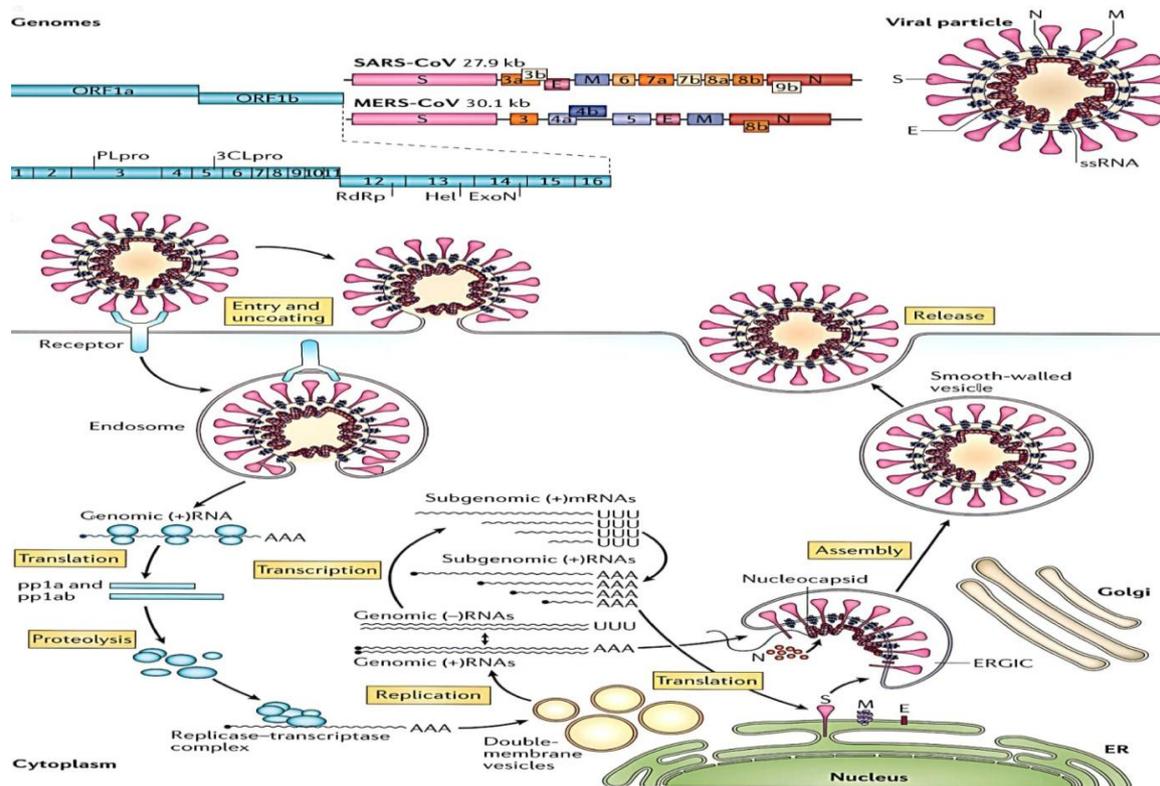


**Figure 2: Transmission of coronavirus.**

### Corona virus life cycle

#### Steps involved<sup>[4]</sup>

1. Attachment and entry
2. Replicate protein expression
3. Replication and transcription
4. Assembly and release.



**Figure 3: Coronavirus life cycle.**

**Symptoms of coronavirus disease<sup>[9,10]</sup>**

**Symptoms of covid19 include:** people may start to experience symptoms in 2-24 days after the infect to virus.

- Fever
- Cough
- Breathlessness or difficulty breathing
- Tiredness
- Sore throat
- Runny nose
- Chills
- Fatigue
- Muscle pain
- Nausea and vomiting
- Headache
- Loss of taste and smell

Those symptoms were varying from one person to another. Currently no any vaccine is available on covid19, so treatment like self care and OTC medications. People in older age and those having medical health problems including high Bp, diabetes, heart problems, lungs problems, and cancer are at higher risk of developing serious illness and anyone can catch corona virus disease.<sup>[2]</sup>

**Prevention**

According to WHO guidelines, the infected patient stay in single room they separated from other family members, avoid contact and maintained distance.<sup>[11]</sup>

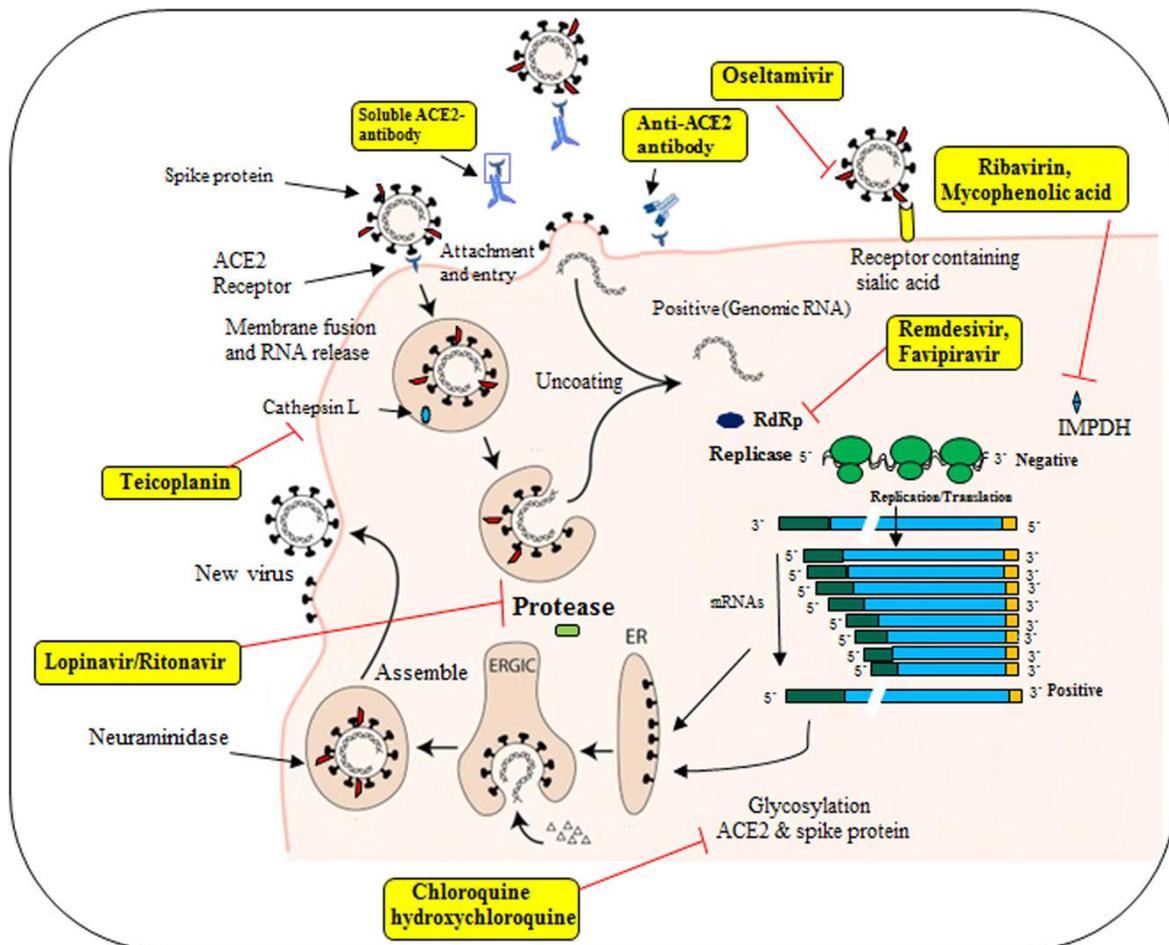
Prevention and management is important to control corona virus infection. There is a need for the collective effort of the public and the government.

- Avoid sneezing and coughing at public place.
- Cloth towels should be avoided for drying hands and disposable tissue papers should be preferred.<sup>[12]</sup>
- Cleaning the hand with soap or disinfection with sanitizer
- Mouth and nose cover with face mask
- Avoid the contact with infected people and maintained the appropriate distance.

The WHO advised against close contact with infected person or patient, farm animals and wild animals.

It advisable to stay home if anyone have flu and common cold like symptoms, not go to school, avoid public places, avoid travelling , drinking warm water.

## Treatments



**D** Figure 4. coronavirus drug treatment with mechanism

### Chloroquine / Hydroxychloroquine<sup>[14]</sup>

Chloroquine/hydroxychloroquine has an antimalarial, antiamoebic, immunomodulatory and a potential broad -spectrum antiviral drug, It should be effective and safe treatment on coronavirus.

After enter into body the main target cell for the SARS-CoV-2 are enterocytes and pnenmocytes. chloroquine /hydroxychloroquine should block the entry of virus into cell via inhibiting glycosylation of host receptors, proteolytic processing, and endosomal

acidification. Effective dosing of chloroquine for treating covid 19 has 500 mg orally once or twice daily, and for hydroxychloroquine is 400mg twice daily for 1 day followed by 200mg twice daily.

### **Lopinavir/ritonavir<sup>[14]</sup>**

Lopinavir is class of protease inhibitor have high specificity for HIV-1 protease. Lopinavir is administered in combination with Ritonavir. Lopinavir having poor bioavailability and extensive biotransformation, it is combination with ritonavir to enhance its exposure. Lopinavir/ritonavir is used in combination to treat HIV infection and demonstrated invitro activity against the covid 19 via inhibiting 3- chymotrypsin like protease. The dosing regimen of lopinavir/ritonavir for the treatment of covid 19 is 400mg/100mg, twice daily upto 14 days. Adverse effect include Diarrhea, nausea, and asthenia observed inpatient receiving lopinavir/ritonavir.

### **Remdesivir<sup>[15,16]</sup>**

Remdesivir is a drug use for the treatment of coronavirus. It is broadspectrum antiviral agent (GS 5764) and is a monophosphate prodrug that undergoes metabolism to an active C adenosine nucleoside triphosphate analogue. Remdesivir has antiviral mechanism which delayed chain cessation of nasal viral RNA. Remdesivir in patient with covid 19 receive 200mg dose and subsequent dose of 100mg for 9 consecutive days via intravenous infusion.

### **Teicoplanin<sup>[17]</sup>**

Teicoplanin is used as antibiotic, they treat staphylococci infection. Teicoplanin showed efficacy for inhibiting the first stage of MHRs coronavirus cycle in human cells. It is glycopeptides antibiotic widely used for bacterial infection was found to be active in vitro against covid 19. Teicoplanin is acts on early stage of viral life cycle by inhibiting the low P<sup>H</sup> cleavage of the viral spike protein by cathepsin L, there by preventing the release of genomic viral RNA and the continuation of virus replication cycle. Dosing regimen of tecoplanin for coronavirus patient is daily dose of 400 mg.

### **Favipiravir<sup>[6]</sup>**

Favipiravir is newly founded drug that is under the clinical trial for treatment of coronavirus disease. These drug acts by the inhibition of RNA dependent RNA polymerase enzymes, they are converted into its active form phosphoribostlated form into the cell, identify the substrate

and inhibit the RNA polymerase activity. They have potential activity against SARS-CoV-2 which having RNA virus.

### Oseltamivir<sup>[18]</sup>

Oseltamivir drug is generally used for the treatment of influenza A and B virus. Oseltamivir is the antiviral drug used in combination with empirical antibiotics they also shows effect in coronavirus patient. A study in wuhan reported that no any positive output were observed after receiving antiviral treatment with oseltamivir. This drug used in clinical trial in several combinations like with favipinavir and chloroquine.

### Covalescent plasma therapy<sup>[19,20]</sup>

The covalescent plasma therapy shows the success in covid-19, done in various era of our country and also china. Covalescent plasma being an hopeful treatment, in this plasma is the main constituent, that is collected from an infected individual of covid-19, then transfused into infected patients as a post exposure prophylaxis.

Covalescent plasma a passive antibody therapy that showed success as a neutralizing antibody against other corona virus epidemics. Covalescent plasma derived antibodies neutralized virus by preventing replication (e.g. complementary activation of phagocytosis) or by binding without interfering with replication.

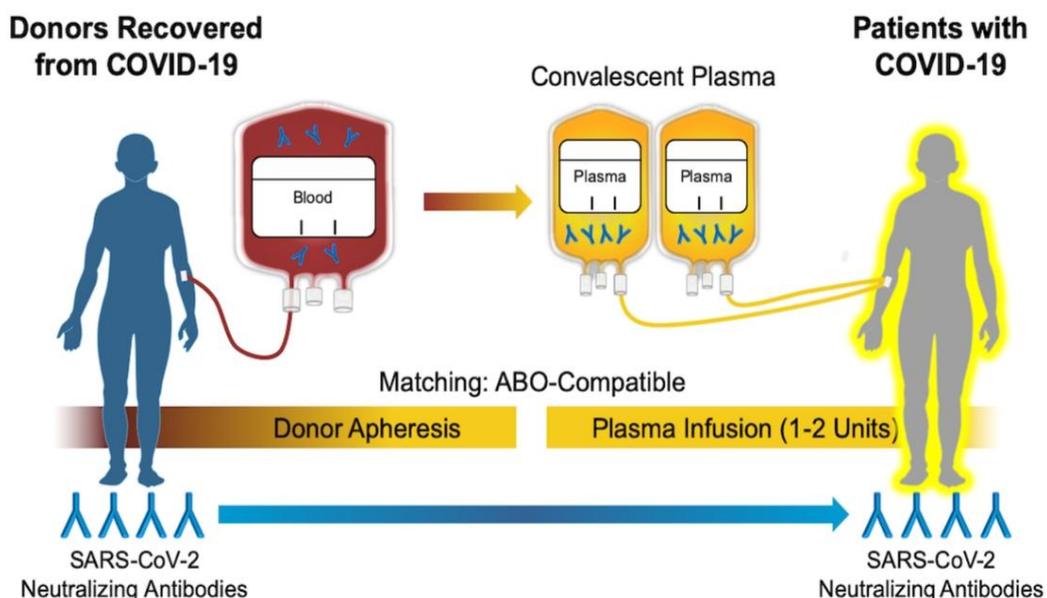


Figure 5: Covalescent plasma therapy.

**Antiviral mechanism**

Neutralizing antibodies play an important role in virus clearance, which is essential in protecting against viral disease.

In this therapy, due to convalescent plasma, passive immunity derives that can provide these NABs that restrain the infection. In SARS-CoV and MERS-CoV, it was discovered that these NABs bind to spike receptor binding protein (S1-RBP) S1-N-terminal domain S2, thus inhibiting the entry.

Limiting viral amplification. Moreover, other antibody-mediated pathways such as complement activation, antibody-dependent cellular cytotoxicity and/or phagocytosis also promote the therapeutic effect of convalescent plasma.

**CONCLUSION**

Over the world, coronavirus causes rapid spreading of such infectious disease; this is likely to increase day by day. Researches on coronavirus will continue to investigate many aspects of viral replication and pathogenesis. Coronavirus is the viral disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus. Infected person shows symptoms like flu, fever, and difficulty for breathing.

Coronavirus majorly spreading through direct contact with droplets of infected person, as per WHO guidelines, avoid the direct contact with patients and also avoid the marketed places, it should also be caused by touching hands, so human to human contact must be restricted to avoid its spreading, also to follow social distancing along with there is need of proper medical treatment. There is no any anti-corona vaccine to prevent or treating disease but some supported therapies were work, so highlighting the proper drug treatment is necessary, along with their mechanism of action against such type of virus, also focusing towards the therapies such as plasma therapy that were studied and successfully treated in many people to outbreak the coronavirus chain. It also increases the interest of research area, ongoing vaccine has been proposed for clinical trial to date.

**REFERENCES**

1. Md Insiat Islam Rabby. Current Drugs with Potential for Treatment of COVID-19: A Literature Review. *J Pharm Pharm Sci* ([www.cspsCanada.org](http://www.cspsCanada.org)), 2020; 23: 58 – 64.

2. Imran Ali and Omar M.L. Alharbi. (COVID-19: Disease, management, treatment, and social Sci. Total Environ, 2020; 1, 728: 138861.
3. Kathryn V. Holmes. SARS-Associated Coronavirus. N Engl J Med, 2003; 348: 1948-1951
4. Richa Arora and Neha Rastogi. CORONA VIRUS - A REVIEW OF COVID-19 .wjpls, 2020; 6(6): 56-62.
5. Sasmita Poude Adhikari, Sha Meng, Yu-Ju Wu, Yu-Ping Mao, Rui-Xue Ye, Qing-Zhi Wang, Chang Sun, Sean Sylvia, Scott Rozelle, Hein Raat and Huan Zhou Adhikari et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. Infectious Diseases of Poverty, 2020; 9: 29.
6. Abdul Hafeez, Shmmon Ahmad, Sameera Ali Siddqui, Mumtaz Ahmad, Shruti Mishra. A Review of COVID-19 (Coronavirus Disease-2019) Diagnosis, Treatments and Prevention. EJMO, 2020; 4(2): 116–125.
7. Chien-Chin Chen MD, FIAC. Biosafety in the preparation and processing of cytology specimens with potential coronavirus (COVID-19) infection: Perspectives from Taiwa, 2020; 7.
8. Emmie de Wit, Neeltje van Doremalen, Darryl Falzarano & Vincent J. Munster SARS and MERS: recent insights into emerging coronaviruses, 2016; 14; 523–534.
9. Shrikrushna Subhash Unhale, Quazi Bilal Ansar, Shubham Sanap, Suraj Thakhre, Shreya Wadatkar, Rohit Bairagi, Prof. Suraj Sagrule and Prof. Dr. K. R. Biyani. A REVIEW ON CORONA VIRUS (COVID-19) wjpls, 2020; 6(4): 109-115.
10. [www.who.int/covid19/information](http://www.who.int/covid19/information)
11. Dharmendra Kumar, Rishabha Malviya, Pramod Kumar Sharma. Corona Virus: A Review of COVID-19. EJMO, 2020; 4(1): 8–25.
12. Pranab Chatterjee, Nazia Nagi, Anup Agarwal, Bhabatosh Das, Sayantan Banerjee, Swarup Sarkar, Nivedita Gupta, Raman R. Gangakhedkar. The 2019 novel coronavirus disease (COVID-19) pandemic: A review of the current evidence. Indian J Med Res, 2020; 151: 147-159.
13. Bahman yousefi, saeid valizadeh, hadi ghaffari, Azadeh vahedi, mohsen karbalaei, majid eslami. Aglobal treatment for cornavirus including Covid19. Jcel physiol, 2020; 1-10.
14. Dinesh Kumar Badyal, Rajiv Mahajan. chloroquine: Can it be a Novel Drug for COVID-19. Int J App Basic Med Res, 2020; 10: 128-30.

15. JamesM. Sanders, PhD, PharmD; MargueriteL. Monogue, PharmD; TomaszZ. Jodlowski, PharmD; JamesB. Cutrell, MD. Pharmacologic Treatmentsfor Coronavirus Disease 2019(COVID-19) AReview, 2020; 12, 323: 18.
16. G.X., W.Z., Z.H., M.W., R.C., and L.Z. Remdesivir and chloroquine effectively inhibit the recently emerged novel. Cell Research, 2020; 30: 269–271.
17. Sophie Alexandra Baron, Christian Devaux, Philippe Colson, Didier Raoult, Jean-Marc Rolain. Teicoplanin: an alternative drug for the treatment of coronavirus COVID-19?. International Journal of Antimicrobial Agents, 2020. doi: <https://doi.org/10.1016/j.ijantimicag.2020.105944>.
18. Harapan H, Itoh N, Yufika A, Winardi W, Keam S, Te H, Megawati D, Hayati Z, Wagner AL, Mudatsir M. Coronavirus disease, 2019. (COVID-19): A literature review. Journal of Infection and Public Health, 2020. doi: <https://doi.org/10.1016/j.jiph.2020.03.01913>.
19. Manuel Rojas, Yhojan Rodríguez, Diana M. Monsalve, Yeny Acosta-Ampudia, Bernardo Camacho, Juan Esteban Gallod, Adriana Rojas-Villarraga, Carolina Ramírez-Santana, Juan C. Díaz-Coronado, Rubén Manrique, Ruben D. Mantilla, b, Yehuda Shoenfeld, i, Juan-Manuel Anaya, b. Convalescent plasma in Covid-19: Possible mechanisms of action. Autoimmunity Reviews, <https://doi.org/10.1016/j.autrev.2020.102554>.
20. Teixeira da Silva JA. Convalescent plasma: A possible treatment of covid-19 in India. Medicinal Journal Armed Forces, 2020; 76: 236-237.