IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

COMPARATIVE STUDY BETWEEN ALLOPATHIC AND HOMEOPATHIC MEDICINES FOR CORONA VIRUS

[1]Nancy, [2]Dr. Gulshan Sindhwani, [3]Dr. Meenu Rani

[1]Student, [2]Assistant Professor, [3] Assistant Professor

[1]Department of Pharmaceutical Education and Research,

[1]Bhagat Phool Singh Mahila Vishwavidyalaya, Sonipat, India

Abstract : Covid-19 belongs to the family of Coronaviridae which has several variants like SARS, MERS, Omicron etc. that have the ability to spread infection. This is zoonotic infection. It can mainly affect the lungs or other respiratory parts. Some clinical trials are performed (Hong kong trial, Italian trial) for the analysis of the medicines/ treatment which one is more effective for covid-19 treatment. Detecting methods are also available for the confirmation of covid-19 infection. After detection and case study analysis, we observe that the homeopathic treatment is best for covid-19 infection alerts.

Keywords **:** Covid-19, SARS, MERS, Zoonotic, Treatment, Homeopathy, Allopathy.

1. INTRODUCTION

Coronavirus are a family of viruses that cause illness such as respiratory diseases or gastrointestinal diseases. Respiratory diseases can range from the common cold to more severe diseases.

- Middle East Respiratory Syndrome (MERS-CoV).[2]
- Severe Acute Respiratory Syndrome (SARS-CoV).

A novel coronavirus (nCoV) is a new strain that has not been identified in humans previously. Once scientists determine exactly what coronavirus it is, they give it a name (as in the case of COVID-19, the virus causing it is SARS-CoV-2). [1,111]

The new strain of coronavirus — COVID-19 — was first reported in Wuhan, China in December 2019. The virus has since spread to all continents. Coronaviruses are often found inbats, cats and camels. The viruses live in but do not infect the animals. Sometimes these virusesthen spread to different animal species. The viruses may change (mutate) as they transfer to other species. Eventually, the virus can jump from animal species and begins to infect humans.In the case of COVID-19, the first people infected in Wuhan, China are thought to have contracted the virus at a food market that sold meat, fish and live animals. Although researchersdon't know exactly how people were infected, they already have evidence that the virus can bespread directly from person to person through close contact. [2]

Coronaviruses are zoonotic[5], meaning that the viruses are transmitted between vertebrate animals to humans. It has been determined that MERS-CoV was transmitted from dromedary camels to humans and SARS-CoV from civet cats to humans. [4] The source of the SARS-CoV-2 (COVID-19) is yet to be determined, but investigations are ongoing to identify the zoonotic source to the outbreak.

1.1. NAMING OF CORONAVIRUS

As the journal *Nature* reported in 1968, "these viruses are members of a previously unrecognized group which [the virologists] suggest should be called the coronaviruses, to recallthe characteristic appearance by which these viruses are identified in the electron microscope."

The word "corona" has many different meanings. But it was the sun that the virologists had inmind when they chose the name coronaviruses. As they wrote, they compared "the

characteristic 'fringe' of projections" on the outside of the virus with the solar corona (not, as some have suggested, the points on a crown).[3] Coronaviruses got their name from the way that they look under a microscope. The virus consists of a core of genetic material surrounded by an envelope with protein spikes. This gives it the appearance of a crown. The word Corona means "crown" in Latin.[1] They are called "corona" because of crown- like spikes on the surface of the virus. Severe acute respiratory syndrome (SARS), Middle Eastrespiratory syndrome (MERS) and the common cold are examples of coronaviruses that cause illness in humans.

2. CLASSIFICATION OF CORONAVIRUS

Variants of Coronavirus: Coronaviridae is the name given to a family of viruses with two subfamilies, Letovirinae and Coronavirinae. The latter has four genera, Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus [7], These include seven coronaviruses that can infect humans. Coronaviruses can also infect non-human mammals, theycan be carried by birds or infect them, and they can be carried by bats.[3]

Alpha: First variant of concern described in the United Kingdom (UK) in late December 2020.Eg. B.1.1.1.7

Beta: First reported in South Africa in December 2020.Eg. B.1.351.

Gamma: First reported in Brazil in early January 2021.Eg. P.1.

Delta: First reported in India in December 2020.[9]Eg. B.1.617.2

Omicron: First reported in South Africa in 9 November 2021.

As expect SARS-CoV is zoonotic and originated from the bats. It is observed that many peopleare consuming various animals as food-stuffs. Some animals like bats, snakes, cats, mice, rats,dogs, pigs, etc. should not be consumed as these may have dangerous microbes while the onlysafe animals should be consumed. Moreover, it is also advisable that we should consume vegetables and fruits as maximum as possible in our food. There is an urgent need to educate our new generation for science and technology to fight against any such disaster in future;

the world is progressing towards advancement and even we don't have highly specialized research centers. Therefore, there should be highly specialized research centers under the umbrella of WHO and funded by all

the countries of the world. These centers shouldbe located in the various parts of the world and be efficient, capable and specialized to controlany calamity in the world in the future. The most important required research centers are for viral diseases, bacterial illnesses, mosquito, and insect-based diseases, cancer, etc. Furthermore, the authors reported that TGEV and MHV could be used as conservativesurrogates for modelling experience, transmission risk and control measurements for enveloped viruses like influenza virus and SARS-CoV virus on the surfaces. Therefore, it maybe expected that the propagation of SARS-CoV-2 will decrease at high temperatures and low humidity. Now, we are at the end of April 2020 and progressing towards the summer. Therefore, it is expected that the coronavirus cases will decrease in the coming time; especiallyin the Middle East countries.[55]

To date seven human coronaviruses (HCoVs) have been identified. Four of them are common;less high risk and typically cause only mild respiratory illnesses in healthy human adults.

The other three (those causing MERS, SARS and COVID-19 cases) are known to cause moresevere illness such as shortness of breath and even death. COVID-19 illness tends to be milderthan SARS and MERS but more severe than disease caused by the four common coronaviruses.

2.1. WHO FIRST DISCOVERED CORONAVIRUS?

- Avian infectious bronchitis was first described in newborn chicks in 1931 by Schalk &Hawn and by Bushnell & Brandly in 1933. These papers were both cited by Beach & Schalm, 1936, who confirmed that the infection was due to a filterable virus and identified two strains, with cross-immunity. The virus was cultivated in 1937 by Fred Beaudette and Charles Hudson, from the New Jersey Agricultural Experiment Station and later by Cunningham & Stuart in 1947.
- In 1951 Gledhill & Andrewes isolated a hepatitis virus from mice, now also known to be a coronavirus.
- In 1965, the virologist David Tyrrell, Director of the Medical Research Council's Common Cold Research Unit at Harnham Down near Salisbury in Wiltshire, and his colleague Mark Bynoe published a paper in the British Medical Journal, in which theydescribed a virus, which they called B814, and identified it as a cause of the common cold. They tried to characterize other viruses, but without much success, and thought that viruses of which they found evidence were rhinoviruses.
- On 1 April 1967 Tyrell, this time with his colleague June Almeida, from the Departmentof Medical Microbiology in London's St Thomas's Hospital Medical School, identifiedthree uncharacterized respiratory viruses, of which two had not previously been associated with human diseases. They reported that two of the viruses, 229E and B814,of which they published electron micrographs, were indistinguishable from the particles of avian infectious bronchitis.
- Then Almeida and Tyrell, with six other colleagues, reported in Nature in 1968 that there was a group of viruses that caused not only avian bronchitis but also murine hepatitis and upper respiratory tract diseases in humans, as shown in Figure 1, taken from their brief annotation, which was published under the general heading "News andViews". This is the first recorded instance of the term "coronaviruses".

The virus of avian infectious bronchitis is classified as a gamma coronavirus, while most of thecoronaviruses that infect humans are betacoronavirus. The human coronavirus HCoV-229E described by Almeida and Tyrrell is an alphacoronavirus.

3. HISTORICAL BACKGROUND

The World Health Organisation (WHO) has declared the coronavirus disease 2019 (COVID-19) a pandemic. [1] A global coordinated effort is needed to stop the further spread of the virus. A pandemic is defined as "occurring over a wide geographic area and affecting an exceptionally high proportion of the population."[2] The last pandemic reported in the world was the H1N1 flu pandemic in 2009.

On 31 December 2019, a cluster of cases of pneumonia of unknown cause, in the city of Wuhan, Hubei province in China, was reported to the World Health Organisation. In January 2020, a previously unknown new virus was identified [3][4], subsequently named the 2019 novel coronavirus, and samples obtained from cases and analysis of the virus' genetics indicated that this was the cause of the outbreak. This novel coronavirus was named Coronavirus Disease 2019 (COVID-19) by WHO in February 2020.[5] The virus is referred to as SARS-CoV-2 and the associated disease is COVID-19. [6] On 9 December 2020, there have been 67,780,361 confirmed cases of COVID-19, including 1,551,214 deaths, reported to WHO.s

SARS-CoV-2 sequenced at the early stage of the COVID-19 outbreak only shares 79.6% sequence identity with SARS-CoV through early full-length genomic comparisons. However, it is highly identical (96.2%) at the whole-genome level to Bat-CoV RaTG13, which was previously detected in *Rhinolophus affinis* from Yunnan Province, over 1500 km from Wuhan.Bats are likely reservoir hosts for SARS-CoV-2; however, whether Bat-CoV RaTG13 directlyjumped to humans or transmits to intermediate hosts to facilitate animal-to-human transmissionremains inconclusive. No intermediate host sample was obtained by scientists in an initial cluster of infections of the Huanan Seafood and Wildlife Market in Wuhan, where the sale of wild animals may be the source of zoonotic infection. Furthermore, the earliest three patients with symptom onset had no known history of exposure to the Huanan market. Therefore, theremay be multiple sources of COVID-19 in the beginning. According to previous studies by metagenomic sequencing for the samples from Malayan pangolins *(Manis javanica)* in Guangxi and Guangdong, China, it has been suggested that pangolins might be the intermediatehosts between bats and humans because of the similarity of the pangolin coronavirus to SARS-CoV-2. However, the additional phylogenetic analyses effectively trace COVID-19 infection sources. [6]

4. ETIOLOGY OF CORONAVIRUS

Signs and symptoms of coronavirus disease 2019 (COVID-19) may appear 2 to 14 days after exposure. This time after exposure and before having symptoms is called the incubation period.You can still spread COVID-19 before you have symptoms (presymptomatic transmission). Common signs and symptoms can include:[9]

- Fever
- Cough
- Tiredness

Early symptoms of COVID-19 may include a loss of taste or smell.[8]Other symptoms can include:[9]

- Shortness of breath or difficulty breathing
- Upper respiratory tract infection in immunocompetent individuals.
- Muscle aches
- Chills
- Sore throat
- Runny nose
- Headache
- Chest pain
- Pink eye (conjunctivitis)
- Nausea
- Vomiting
- Diarrhoea
- Rash

The severity of COVID-19 symptoms can range from very mild to severe. Some people may have only a few symptoms. Some people may have no symptoms at all, but can still spread it (asymptomatic transmission). Some people may experience worsened symptoms, such as worsened shortness of breath and pneumonia, about a week after symptoms start. Some peopleexperience COVID-19 symptoms for more than four weeks after they're diagnosed. These health issues are sometimes called post-COVID-19 conditions. Some children experience multisystem inflammatory syndrome, a syndrome that can affect some organs and tissues, several weeks after having COVID-19. Rarely, some adults experience the syndrome too.[8]

4.1. DISPERSION OF CORONAVIRUS.

The main route of human-to-human transmission is by droplets, which are generated during coughing, talking, or sneezing and are then inhaled by a healthy individual. They can also be indirectly transmitted to a person when they land on surfaces that are touched by a healthy individual who may then touch their nose, mouth, or eyes, allowing the virus entry into the body. Fomites are also a common issue in such diseases. [11]

Droplet transmission occurs when a person is in in close contact (within 1m) with someone who has respiratory symptoms (e.g coughing or sneezing,) and is therefore at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets (which are generally considered to be > 5-10 μm in diameter). Therefore, transmission of the COVID-19 virus can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person (e.g. stethoscope or thermometer). [19] They may remain in the airfor long periods of time and be transmitted to others over distances greater than 1 m. [19,20]

Aerosol-based transmission of the virus has not yet been confirmed. [11] Stool-based transmission via the faecal-oral route may also be possible since the SARS-CoV-2 has been found in patient faeces. [12, 13] Some patients with COVID-19 tend to develop diarrhoea, which can become a major route of transmission if proper

sanitation and personal hygiene needs are not met. There is no evidence currently available to suggest intrauterine vertical transmission of the disease in pregnant women. [12, 13] More investigation is necessary of whether climate has played any role in the containment of the infection in countries such as India, Singapore, China, and Israel, as these are significantly warmer countries as compared with the UK, the USA, and Canada. Ideally, a warm climate should prevent the virus from surviving for longer periods of time on surfaces, reducing transmissibility. [10]

5. PATHOPHYSIOLOGY

The SARS-CoV-2 infection enters the host cells through the spike protein by binding to ACE2 for internalization and aided by TMPRSS2 protease. The virus interaction with ACE2 may downregulate the anti-inflammatory function and heighten angiotensin II effects in predisposedpatients.[15] With the challenge we face with COVID-19, some have been advocating forthe use (or cessation) of Angiotensin II receptor type 1 (AT1 receptor) blockers and ACE inhibitors during the treatment of COVID-19 in patients with hypertension. Currently the recommendation of the Council on Hypertension of the European Society of Cardiology is that patients should continue their antihypertensive treatment with no changes because we do not have evidence supporting its cessation. [16] However, further research is needed to back theserecommendations with more evidence.

These changes are mainly related to proinflammatory cytokines including interleukin (IL)-6, IL-10 and tumor necrosis factor α, granulocyte colony stimulating factor, monocyte chemoattractant protein 1, macrophage inflammatory protein 1α, and increased expression of programmed cell death 1, T-cell immunoglobulin and mucin domain 3 (Tim-3). [17] These changes contribute to lung injury pathogenesis, hypoxia-related myocyte injury, body immuneresponse, increased damage of myocardial cells, and intestinal and cardiopulmonary changes. These changes lead to accumulation of oxygen free radicals, changes in intracellular pH, accumulation of lactic acid, electrolyte changes and further cellular damage. [14] An overviewof the viral life cycle is shown in figure 1.

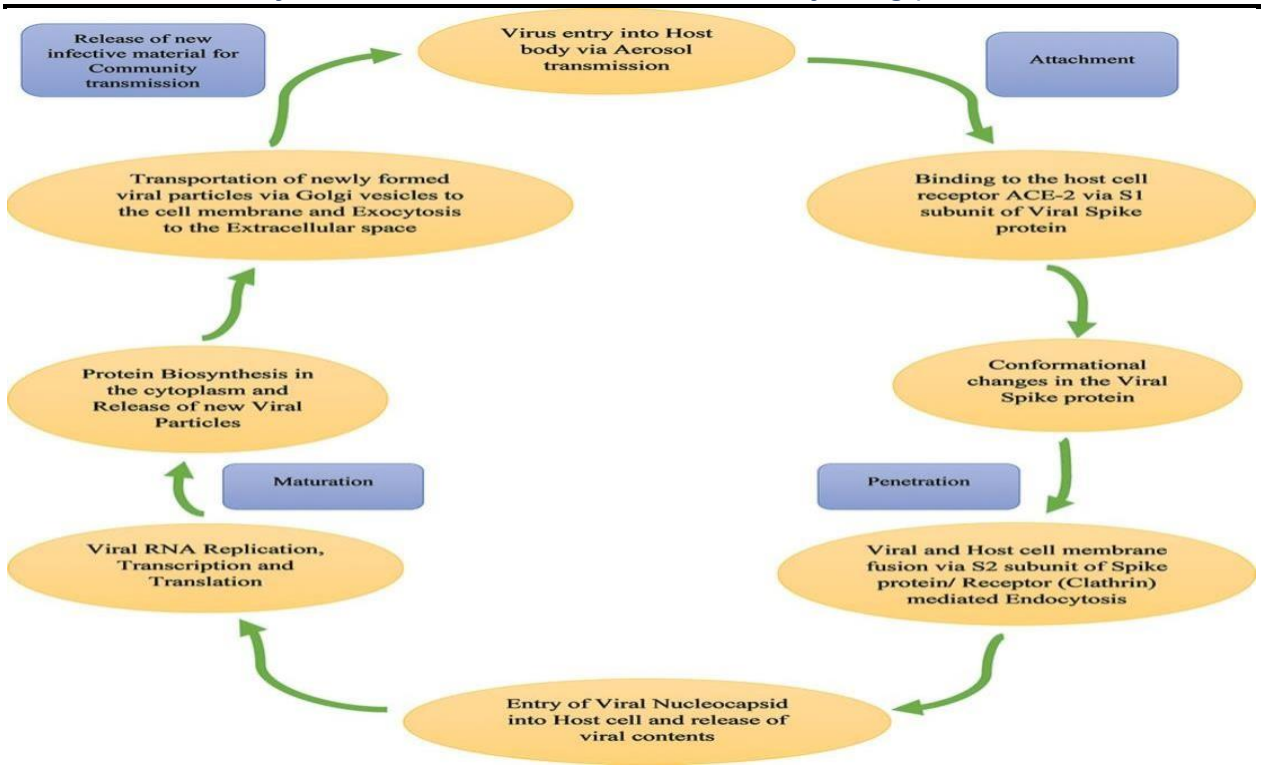

Figure 1: The severe acute respiratory syndrome coronavirus-2 life cycle. [18]

6. MODELS USED IN CORONAVIRUS

6.1. Mouse models: The main impediment to the infection of mouse (*Mus musculus*) cells with SARS-CoV-2 is the lack of appropriate receptors to initiate viral infection. SARS-CoV- 2—as severe acute respiratory syndrome coronavirus (SARS-CoV)—uses the cellular surface protein angiotensin-converting enzyme 2 (ACE2) to bind and enter cells, and mouse ACE2 does not effectively bind the viral spike protein. Several strategies have been developed to solve this problem, as detailed here. [22]

6.2. **Virus adaptation to mouse ACE2:** The spike protein of SARS-CoV-2 can be modified to gain effective binding to mouse ACE2. One strategy to achieve this modification is the sequential passaging of SARS-CoV-2 in mouse lung tissue. [23] Using two approaches, mice have been sensitized for infection but have developed only very mild disease. [24] One potential caveat is that the mutations in the SARS-CoV-2 spike protein that enhance affinity for the mouse ACE2 receptors are located in the receptor-binding domain, which is the primary target for the neutralizing antibody response.

6.3. Expression of human ACE2 in genetically modified mice: There are currently three transgenic mouse models, in which human ACE2 is under the expression of a tissue-specific promoter (for example, the *Krt18* promoter for epithelial cells [25]; K18-hACE2 mice), auniversal promoter (cytomegalovirus enhancer followed by the chicken β-actin promoter [26]or the endogenous mouse *Ace2* promoter. [27] With the exception of the model in which humanACE2 is controlled by the *Ace2* promoter, mice develop encephalitis after infection with SARS-CoV [28] or SARS-CoV-2[29] in these models. However, while SARS-CoV infection of K18-hACE2 mice results in highly lethal encephalitis, the neurological infection caused bySARS-CoV-2 infection in these mice is less severe.

Similar models that express human dipeptidyl peptidase 4—the receptor used by Middle East respiratory syndrome coronavirus (MERS-CoV)—have successfully been developed. One mouse model humanized with human ACE2 has been reported, and supports replication of SARS-CoV-2 in respiratory and brain tissues

(although mice do not develop severe disease).

[30] This system, which was pioneered in studies of MERS [31], allows the transient replication of SARS-CoV-2 in the lungs of mice for several days until immune clearance. Virusis generally cleared by seven days after infection, although not in some immunocompromisedmice. [26]

6.4. Other mouse models and approaches

Severely immunodeficient mice transplanted with human immune cells have widely been usedto study human-specific viral infections [32], and the combination of human immune system and ACE2 expression could help to further explore the efficacy of vaccines and therapies—inparticular, those that modulate human immune cells. However, infection remains heavily dependent on a functional entry receptor. [33] Collaborative Cross mice were previously used with mouse-adapted SARS-CoV to identify mechanisms of pathogenesis and genetic loci thatdetermine susceptibility. [34] All of these models will be useful for the evaluation of vaccines and antiviral agents, and some share features with the human disease. At present, no mouse model recapitulates all aspects of COVID-19 in humans, especially the unusual features such as the pulmonary vascular disease and hyperinflammatory syndromes observed in adults and children, respectively. [35]

6.5. Syrian hamster model: Syrian hamsters (*Mesocricetus auratus*) are small mammals thathave been used as models for infection with respiratory viruses, including SARS-CoV, influenza virus and adenovirus. [36] In silico comparison of the ACE2 sequence of humans—known to interact with the receptor-binding domain of the SARS-CoV-2 spikeglycoprotein—with that of hamsters [37] suggested that Syrian hamsters might be susceptible to infection with SARS-CoV-2. All hamsters that have been challenged by different groups and with different SARS-CoV-2 isolates consistently showed signs of respiratory distress, including laboured breathing. [37] Thus, aged hamsters and male hamsters seem to develop a more severe disease than young and female hamsters, respectively. [38]

Histologically, inflammatory infiltrates with abundant expression of viral antigen and apoptosis were observed in the upper and lower respiratory tract, starting at 2 days after infection, being at their most severe at 4 days after infection and resolving at 14 days after infection. Lung disease was also demonstrated by computed tomography. High-resolution micro-computed tomography scans showed airway dilation and substantial consolidations in the lungs of infected hamsters. [39]

Interferon-γ, and pro-inflammatory chemokines and cytokines, were potently induced at two and four days after infection, respectively, and dropped to the baseline level at seven days afterinfection. SARS-CoV-2-induced lung pathology in hamsters appears to be driven by immune pathology, as lung injury at four days after infection is markedly reduced in STAT2-knockouthamsters whereas viral loads are massively increased and viral RNA is disseminated in severalperipheral tissues. [39] Serum neutralizing antibodies were detected as early as seven days afterinfection. Furthermore, SARS-CoV-2 can be transmitted between hamsters via close contact and non-contact routes. [40] Transmission via fomites was possible, but not efficient. [40] Limited or

no efficacy has been demonstrated for the repurposed drugs hydroxychloroquine (with or without azithromycin) and favipiravir—although high doses of favipiravir did reduceinfectious virus titres in the lungs of infected hamsters. Adoptive transfer of SARS-CoV-2 neutralizing antibodies protected hamsters from SARS-CoV-2-induced disease. [41]

6.6. Ferret models: Ferrets (*Mustela putorius furo*) have been shown to be a highly valuable model for testing the pathogenicity and transmission of human respiratory viruses, including influenza virus and respiratory syncytial virus. [42] Following mucosal exposure to SARS- CoV-2, clinical alterations in ferrets are undetectable or mild and may include lethargy, nasal discharge, wheezing, oropharyngeal build-up of mucus, sneezing and loose stools. [43] Shedding of SARS-CoV-2 virus is observed in nasal and oropharyngeal swabs. [44] Ferrets also are able to transmit virus efficiently to uninfected ferrets in experimental settings. Efficient transmission occurred from experimentally infected ferrets to naive cage-mates; transmission from exposed ferrets to companion ferrets that were separated by steel grids did occur, but wasnot efficient. [44]

6.7. Non-human-primate models: non-human primate models have been explored for COVID-19 in rhesus macaques (*Macaca mulatta*), cynomolgus macaques (*Macaca fascicularis*) and African green monkeys (*Chlorocebus aethiops*). Studies from several laboratories have shown high levels of viral replication for 7–14 days (including both viral RNA and infectious virus) in both the upper and lower respiratory tract, pathological features of viral pneumonia and the variable induction of mild clinical disease. [45] non-human primates inoculated via multiroute mucosal, intrabronchial and aerosol exposure showed radiographic abnormalities (by chest X-ray, computed tomography scan or fluorodeoxyglucosepositron emission tomography scan) within 2 days, which tended to resolve by 11–15 days after infection.

Currently, two non-human-primate studies in rhesus and cynomolgus macaques have focused on the effect of age on infection with SARS-CoV-2. [45] These studies highlight the importance of including age in the selection criteria of animals, as testing treatment options for severe disease require animal models that recapitulate the disease as seen in humans. Recent studies have reported the immunogenicity and protective efficacy of several candidates for a COVID-19 vaccine in the rhesus macaque model. [46] Despite this caveat, the vaccines testedso far have induced binding and neutralizing antibodies and have resulted in substantial reductions of viral replication in the lower respiratory tract, and—to a lesser extent—the upperrespiratory tract, following challenge with SARS-CoV-2. Vaccine-elicited neutralizing- antibody titres also correlated with protective efficacy.

6.8. Additional animal models: In addition to animal models that are more commonly used in infectious disease research, recent studies have characterized infection with SARS-CoV-2 in other animals. Here we highlight these recent findings, which may have implications for virus ecology and the evolution of the current pandemic like fruit bats, chickens, dogs, etc.

6.8.1. Minks: The mink (*Neovison vison*), which is a member of the Mustelidae, has previouslybeen shown to be susceptible to infection with SARS-CoV; mink lung epithelial cells and lung-derived cells could also be

infected with SARS-CoV. Minks are also naturally susceptible to infection with SARS-CoV-2. In the Netherlands, an infection of mink with SARS-CoV-2 on two breeding farms was detected at the end of April 2020—most probably as a result of contactwith a farm worker who was infected with SARS-CoV-2. [47]

6.8.2. Cats: Three experiments have 9 demonstrated that domestic cats (*Felis catus*) are highlysusceptible to infection with SARS-CoV-2 and are able to transmit the virus to naive cats. [48]

6.8.3. Pigs: By contrast, infection with another bat betacoronavirus—known as swine acute diarrhoea syndrome coronavirus (SADS-CoV)—has been demonstrated in swine. [49] Therefore, owing to their importance as livestock and the enormous global number of pigs, it may be important for future studies to address the putative susceptibility of additional pig breeds to infection with SARS-CoV-2.

6.8.4. Chickens and ducks: These findings are similar to those previously reported for infection with SARS-CoV, in which experimental inoculation of different bird species with SARS-CoV (including chickens) resulted in neither replication nor seroconversion. [50]

6.8.5. Fruit bats: Pre-pandemic studies that assessed the potential emergence of SARS-like coronaviruses in bats indicated that some of these viruses were able to use several orthologuesof human ACE2 for docking and entry. [51] Conversely, previous studies showed that a SARS-like coronavirus did not replicate in fruit bats after experimental inoculation. [52]

7. Comparison between Allopathy and Homeopathy

Table 1: Comparison between allopathy and homeopathy are given below:

ALLOPATHY	**HOMEOPATHY**
It provides a faster result by the use of therapy, surgery and some modern / advance technologies to treat disease.	It provides a slower result by the use of traditional / conventional remedies to promote health.
It is short term treatment technologies.	It is long term treatment technologies.
It follows the time-to-time research and development technologies so, it is evidence-informed medication techniques.	It tries to improve the immune system ability of patients naturally at the low dose of medicines.
Allopathic medicines are prescribed form of medicines.	Homeopathic medicines are not prescribed form of medicines.

These medicines are given on the basis of symptoms and diseases.	These medicines are given on the basis of Theory of Simplex, Theory of Similia,Theory of Minimum, Theory of drug dynamization, Theory of drug proving, Doctrine of chronic disease.
It shows many side effects/ adverse effects after administration of drug.	It shows less side effects/ adverse effects after dose administration because of the high amount of diluted form of drug is provided.
It is mostly toxic in nature and affect the immune system.	It is non- toxic in nature and stimulate the working of immune system.
Some dosage forms are: tablets, capsules, syrup, elixirs, linctus, powders, etc.	Some dosage forms are: tablets, gels, creams, ointments, oromucosal preparations, etc.

Dr. Routh, an allopathic physician from Britain, was an allotted authority by the medical appointee of London to list a mortality-statistics for all diseases. After studying of total 32,655homeopathic cases, and 119,630 allopathic cases from several hospitals of England, Australia,and Germany, in 1852 he was strained to give evidence against Allopathy. The recorded mortality rate under homeopathic treatment was 4.4%, and the under allopathic treatment mortality rate was 10.5%.[79]

8. TREATMENTS / THERAPY

8.1. ALLOPATHY: A system of medical practice that aims to combat disease by use of remedies (as drugs or surgery) producing effects different from or incompatible with those produced by the disease being treated— compare Homeopathy.[53]

8.1.1. ROLE OF ALLOPATHY IN COVID 19

In the allopathic approach, treatment in coronavirus included intravenous infusion of fluid, oxygen therapy, and life support system in critical cases. It was advisable if anyone prevails symptoms of the virus like flu, fever, and breathlessness, they should contact the doctor immediately. This virus is similar to the human immunodeficiency virus (HIV) in terms of virus replication and proteins. Different administrating drugs were found to clear and handle in vitro action against SARS-CoV and MERS-CoV. [62]

8.1.2. EFFECTIVE ALLOPATHIC MEDICINES USED IN COVID-19

- **Chloroquine and Hydroxychloroquine**

Chloroquine" is an allopathic antimalarial drug used to treat patients infected with malaria. It is an FDA approved drug for treating malaria, lupus, and rheumatoid arthritis. [56] It was primarily recognized in the 1930s. [57] Chloroquine and hydroxychloroquine have a possibilityof curing an intestinal disorder, systemic lupus erythematosus (SLE), and rheumatoid joint torment (RA). [63] Chloroquine and hydroxychloroquine obstruct glycosylation of host receptors, proteolytic, and maturation of endosomes. These mechanisms have immunomodulatory shocks to host cells by bringing down the cytokine level and control of autophagy and

lysosomal. In vitro studies revealed that in the low micromolar concentration, chloroquine crushes SARS-CoV-2 with a half-maximal credible Center (EC50) and hydroxychloroquine with a lower EC50 for SARS-CoV-2 differentiated, i.e., EC50 = 6.14 μMand chloroquine: EC50 = 23.90 μM. [64]

The treatment of COVID-19 included the oral dosage of chloroquine (500 mg) and hydroxychloroquine (400 mg) on daily basis. [65] But still, there is a lack of data which provesthe mechanism of chloroquine and hydroxychloroquine. Pharmacokinetic studies reviewed thatthe ideal dose of hydroxychloroquine for treating COVID-19 patients should be replaced by 200 mg twice instead of 400 mg on daily basis. [64] Unusually, elective outlines are made for600 mg of total dose step by step by dividing reliant on freedom and clinical experience for Whipple's disease. [65]

Some evidence shows that Chloroquine is effective in treating coronaviruses infections.
[58] Chloroquine inhibits HCoV-OC43 (human coronaviruses strain OC43) replication in HRT-18 cells, with a 50% effective concentration (± standard deviation) of 0.306 ± 0.0091μMand a 50% cytotoxic concentration (± standard deviation) of 419 ± 192.5 μM, resulting in a selectivity index of 1,369". In addition, a recent study conducted by Wang, et al. [59] indicatesthat Chloroquine effectively prevents entry step and post-entry into Vero E6 cells for COVID-19 infection. The authors further demonstrated that besides Chloroquine' s antiviral activity, it has an immunomodulating activity, which may synergistically enhance its antiviral effect *in vivo*.

Furthermore, Chloroquine is not only one of the best medicines being used for many years butit is also hypothetically appropriate to cure the COVID-19. [59] There are many side effects ofusing Chloroquine. For instance, [60] reported that although antimalarial drugs (Chloroquine and Primaquine) are helpful to treat patients infected with vivax malaria, at the same time thesedrugs cause several adverse effects mainly related to gastrointestinal leading to nonadherence of drug treatment. The authors further reported that these drugs also reduce the lack of appetitealong with blurred vision, pruritus, insomnia, etc. Whereas, there is not any side effect reportedby any scholar/patient or doctor/physician who used china off in a homeopathic way. The symptoms of COVID-19 are the same as compared to Cinchona Off symptoms. [61]

- **Lopinavir/Ritonavir and Other Antiretrovirals**

  The Food and Drug Administration (FDA), USA, recommended and certified lopinavir/ritonavir, an oral drug for HIV, with in vitro activity against other novel coronaviruses through the control of 3-chymotrypsin-like protease. [66] There is no in vitro study data for lopinavir/ritonavir against SARS-CoV-2 but a review on lopinavir/ritonavir wasassessed for the treatment of SARS and MERS which showed clinical observations and analysis of SARS with less mortality rate and incubation rates, along with experimental research. The studies revealed that drugs should be used during the early stages of viral replication, i.e., beginning 7–10 days; otherwise, late initiation with lopinavir/ritonavir had noeffect on clinical outcomes. [67]

- **Ribavirin**

  A guanine basic drug named ribavirin handles viral ribonucleic-subordinate and polymerase whose activity against various coronavirus makes it a challenger for the treatment of the COVID-19 outbreak. In vitro studies of this drug proved to show advancement against SARS-CoV by blocking the replication of the virus. This mechanism required a high dose of this drug,i.e., 1.2 to 2.4 g orally as expected along with blend treatment. Past

studies told that the patientsgot either endogenous or enteral cooperation [68] and no data exists in its role with the respiratory syncytial disease in COVID-19. The trial on 30 patients confessed questionable results in which out of 30 examinations, 26 were re-evaluated, with 4 assessments exhibiting hematologic and liver toxicity. On the other hand, in the treatment of MERS, ribavirin was mixed with interferons and its clinical studies resulted in no observable and remarkable effect on viral clearance. Due to a lack of clinical data with ribavirin for SARS-CoV-2 strategies, itssupportive occupation must be extrapolated from other nCoV data.

- **Remdesivir**

Remdesivir (other name GS-5734) is a prodrug monophosphate which helps in the absorptionof C-adenosine nucleoside triphosphate. It was studied that the antimicrobial activity of this drug against RNA proved to be contagions especially in the family of *Coronaviridae* and *Flaviviridae.* Due to its low EC50 value, it proved to be therapeutic against the emergence of Ebola virus disease based on its selectivity against host polymerase of Ebola. Because of broad reach, presently, remdesivir and it's in vitro studies against coronavirus help in treating SARS-CoV-2 with EC50 and EC90 estimations of 0.77 μM and 1.76 μM, respectively, and are proved to be a fruitful expected treatment for COVID-19. On the other hand, in murine lung defilement models accompanied by MERS-CoV, remdesivir drug prohibited the lung channel and lessened viral lung titers more than comparator agents. [69]

- **Dexamethasone**

Dexamethasone is a type of chemically derived corticosteroid which acts as an immunosuppressor. It abridged deaths by 1/3 in patients getting invasive mechanical ventilation and by 1/5 in patients being delivered oxygen without invasive mechanical ventilation. However, therapy did not decrease the death in patients not getting breathing support at randomization. Therefore, dexamethasone abridged 28-day mortality among those getting invasive mechanical ventilation. [70] Mechanistically, it inhibits the growth of the cytokines which cause infection and is therefore useful in this COVID-19-relatedhyperinflammation or cytokine storm. It has a high rate of activity and also lasts for a longer duration as compared to other cortisone. Studies have shown that it is only useful in those caseswhere the condition of the patient is critical and cannot be used for the generalized treatment of all patients. [71] The mode of action of various allopathic drugs is summarized in Fig. 2. These above-discussed drugs mainly inhibit angiotensin-converting enzyme 2 (ACE2), endocytosis, non-structural protein 3C-like protease, and non-structural proteins RNA- dependent RNA polymerase (RdRp) to stop viral infection and growth. All the information regarding the allopathic medicines used in COVID 19 are given below in Table 2. And the mechanism of actions of allopathic medicines shows in Figure 2.

Table 2: Allopathic medicines information for COVID 19. [79-87,96-98,101-110]

Drugs	**MOA**	**Uses**	**Composition**	**Dosage**	**Brand name**	**Mfd. Company**	**Side effects**
Remdesivir	It is a prodrug of ATP and constrained the RNA-dependent RNA polymerase enzyme which is essential for viral replication.	Antiviral (for IV infusion only), also known as anticoronavirus medicine.		IV for 5-10 days.	Remdac, Cipremi.	Zydus Cadila Healthcare Ltd., Cipla Ltd.	Respiratory disorders, failure of functioning in various body organs.
COVIFOR 100 mg injection	Remdesiviris broad-spectrum antiviral medicine by interfere with RNA polymerase enzyme.	For hospitalised patients of coronavirus.	Approved by: DCGI, FDA, EUA. Remdesivir 100mg per 20ml.	Ist day:2 doses of remdesivir injection. 2^{nd}- 5^{th} day: 1 dose of 100mg /day.	HETERO, Desrem	HETERO HEALTH CARE Ltd., Mylan Pharmaceuticals Pvt. Ltd.	Low B.P., renal damage, temp. increase, low RBCs count, etc.
Chloroquine and hydroxychloroquine	By interfere with the production of hemezoin to the heme by releasing the digestion of Hb.	Antimalarial, auto immune disorders, For treating the hospitalized patients for emergency		500mg, B/d (oral route).	Aralen phosphate.	USFDA.	Hepatic and renal failure, hypoglycaemia, nerve cell damage which leads to the brain problems.

		only.					
Corticosteroids	They interfere with the protein receptors in the cytoplasm by forming the steroid-receptor complex.	Treating against inflammation and supress the immune system.	Dexamethasone hydrocortisone, methyl prednisolone used randomly.	Dexamethasone:20mg o/d (1-5 days); 10mg o/d (6-10 days), Hydrocortisone: oral or iv 160mgb/d or q/d, methyl prednisolone: 32mg b/d.	Neutec, Cortef, Methyl pred-DP.	Shivansh Enterprises, Agra, Pfizer	Psychiatric problems, high blood sugar level(hyperglycaemia), etc.
Ribavirin	It belongs to the guanosine nucleoside antimetabolite, antiviral drugs which inhibit the replication of viral genetic material (RNA) and the capping of mRNA.	Antiviral drug, hepatitis C		15mg/kg/day b/d, 0.1g/1 ml, iv.	Rebetol Virazole Ribavac, mibavirin.	MEDIVAC Ltd., MBA Pharmaceuticals Pvt. Ltd.	Diarrhoea, abnormal heart rhythm, etc.

Lopinavir + Ritonavir	It belongs to the protease inhibitor class of antiviral medication which is used to treat HIV (Human immune deficiency virus) by acting on Cyt. P4503A4 enzyme.	Antiviral, non-OTC drugs.	Kaletra: lopinavir(200 mg/1) + ritonavir(50mg/1).	Oral administration	Kaletra	Abbott	Acute kidney dysfunctioning, increase lactic acid production, heart problems, etc.
Paxlovid	It is the protease inhibitor of SARS-CoV-2 betacoronavirus from preventing the transmission of coronavirus.	Antiviral medicine, mild to moderate infection from corovirus, also effective in delta variant of coronavirus i.e Omicron.	Nirmatrelvir + ritonavir.	3 tablets b/d for 5 days orally administration.	Paxlovid; Bexovid	Pfizer Beximco Pharmaceuticals; Beximco Pharma. Bangladesh	Dark colouration of urine, liver problems, yellowing of skin i.e jaundice like symptoms.

Sotrovimab	It is recombinant monoclonal antibody helps in restricting the entry of virus in human cells.	It is the monoclonal antibodies and used in the treatment of omicron treatment, emergency use of covid-19.		One 8ml single dose vial.	Xevudy	GSK's India	Hypertension hypotension respiratory problems, headache, muscular pain, etc.
Molnupiravir	It is investigational drug inhibit reproduction of SARS-CoV-2 virus RNA which is the cause of covid-19 infection.	First oral antiviral medication for the treatment of covid-19, Omicron and delta variants, emergency use.		5 days course.	Molflu	Merck and Ridgeback Company.	Cause teratogenic and mutagenic effect.
Casirivimab - imdevimab	It is the combination of IgG1 monoclonal antibody	It is used in the treatment of mild- to	600mg/600mg per 10 ml given by single Intraveneous infusion.	One 10 ml single-dose.	Regen-Cov	Regeneron and Roche	Pruritis, respiratory problems, hives, etc.

		– moderate coronavirus infection					
Bamlanivimab - etesevimab	They are monoclonal antibodies which are artificially prepare in laboratory proteins to boost up the immune system and effective against coronavirus.	Emergency use for after exposure prevention of covid-19.	700mg/20ml+ 1400mg/20ml given by single IV infusion only.			Eli Lily and Company.	Nausea, pruritis, sleepiness, hypersensitivity reactions.
Covaxin,	These vaccines are covered by the complete virus to treat as inactivation of SARS-CoV-2 infection.	Treatment of covid-19 in emergency use.	Aluminium hydroxide gel 250ug, imidazoquinolinone 15ug, 2-phenoxyethanol 2.5mg, phosphate buffer.	Require 2 doses and stored at 2-8°C.	Covaxin,	Bharat Biotech Ltd.	Headache, pain or swelling at injection site irritation, fever.
CoronaVac,					Sinovac,	Sinovac Life SciencesCo. Ltd. Beijing	
Sinopharm					Sinopharm	Bio-Institute of Biological Products Co. Ltd.	
AZD1222,	These vaccines are obtained from the non-replicating	Investigational vaccine for Intramuscular		10 X 0.5ml doses.	ChAdOx1-S	Oxford / AstraZeneca,	Nausea, vomiting, headache, cold, muscle or joint pain.

BBV154	viral vector to reduce the spreading of covid-19 infection.	injection in the treatment of coronavirus infection.				Bharat Biotech.	
Covishield,	These vaccines are obtained from the non-replicating viral vector to reduce the spreading of covid-19 infection.	Treatment of coronavirus infection in emergency use.	L- Histidine, L- Histidine hydrochloride monohydrate, magnesium chloride hexahydrate, polysorbate 80, ethanol, sucrose, NaCl, EDTA, water for injection.	Require 2 doses	AstraZeneca formulation.	Serum Institute of India. Oxford,	Pain, headache, tiredness, fever, cold, etc.
Sputnik V,				Intramuscular injection, stored at 2-8°C.		Gamaleya Research Institute,	
Ad26.COV2.S				Single dose vaccine.	Janssen	Johnson& Johnson.	
HGCO19,	These vaccines are obtained from RNA of virus.	Covid-19 Treatment.		Require 2 doses of Vaccines.		Gennova Biopharmaceuticals Limited	Fever, pain, stomach ache.
BioNTech,				Stored at -80- -60°C,		Pfizer	
mRNA-1273.				Stored at -25- -15°C and 2-8°C.		Moderna.	

ZyCoV-D	It acts onDNA plasmid of virus to stop the growth of coronavirus infection.	For intrader mal use needle free injectorin emerge ncy case.		3 doses vaccine .	Zydus Cadila.	Zydus Cadila Healthcare Ltd.	Fever, painat the site of injection, fatigue, etc.
BECOV2A ,	These vaccines are obtained from the protein subunit of coronavirus.					BiologicalE Limited,	Fever, painat the site of injection.
BECOV2B ,						BiologicalE Limited,	
BECOV2C ,						BiologicalE Limited	
BECOV2D ,						BiologicalE Limited,	
AKS-452,						University Medical Center Groningen ,	
COVOVAX					Novavax formula tion	Serum Institute of India,	

NVX-CoV2373,						Novavax,	

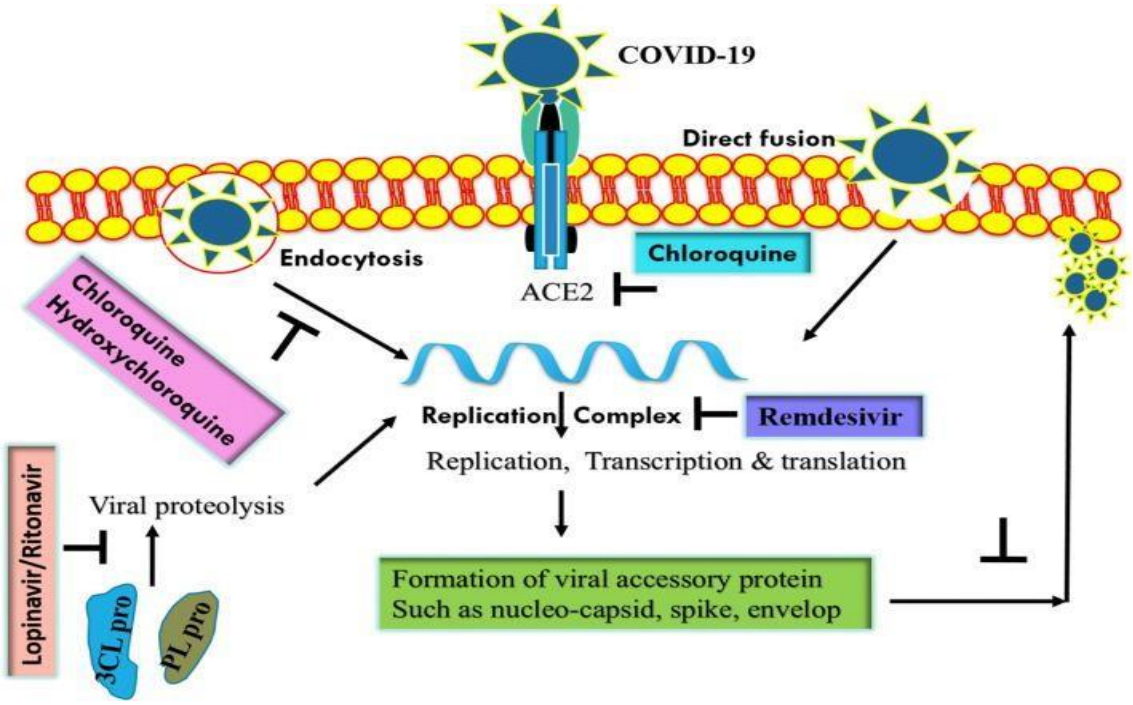

Fig. 2 This illustration depicts the mechanisms of action of allopathic drugs via various routesincluding inhibition of endocytosis process, viral proteolysis, replication complex, and ACE2 during COVID-19 infection. [72]

8.2. HOMEOPATHY: Homeopathy, or homeopathic medicine, is a medical philosophyand practice based on the idea that the body has the ability to heal itself. Homeopathy was founded in the late 1700s in Germany and has been widely practiced throughout Europe. Homeopathic medicine views symptoms of illness as normal responses of the body as it attempts to regain health.

8.2.1. PRINCIPLE: Homeopathy is based on the idea that "like cures like." That is, if a substance causes a symptom in a healthy person, giving the person a very small amount of thesame substance may cure the illness. In theory, a homeopathic dose enhances the body's normalhealing and self-regulatory processes. [54]

8.2.2. ROLE OF HOMEOPATHY IN COVID 19

Homeopathic drugs were confirmed by Homeopathic Materia Medica which was written by Boericke and Allen. Single medicine was prescribed as per the Law of Similia.[79] A total of60 species of medicinal plants from 36 families and 54 genera were documented as being perceived. Among them, the most common families were Apiaceae (6 species), Zingiberaceae(4 species), Amaryllidaceae (4 species) and Lamiaceae (4species). And most common genus were Allium (3 species), Terminalia (2 species), Mentha (2 species), Cinnamomum

(2 species),and Syzygium. Likewise, the most perceived species was *Zingiber officinale* (39.79%) followed by *Curcuma angustifolia* (34.11%). The habit analysis showed that the medicinal plants belonging to herb, shrub, climber, and tree species were 56.67%, 11.67 %, 6.67%, and 25% respectively. Leaves (33.68%) were the most predominantly used parts, followed by seeds(23.33%), fruits (21.67%), roots (13.33%), rhizomes (11.67%), whole plant (8.33%), bark (6.67%) stem (1.67%), and bulb (1.67%). The most commonly used method of preparations was to grind the parts, boil with hot water or milk, and drink. [78]

From the last 200 years in the late 1700s, a German physician named Dr. Samuel Hahnemannfounded the homeopathy as a therapeutic medicine which helped to treat many epidemics, fearful, and severe diseases like cholera, fever, chikungunya, hepatitis, and malaria. The preventive measures of homeopathy are eminent and undeniable; as homeopathic medicines act remarkably on a health condition and cure the diseases. The scientific literature related to homeopathy is highly witnessed [72-74]. There are numerous confirmations that in the year 1918–1919, when Spanish flu emerged, homeopathy had shown amazing results, during which around about 21 million patients died around the world and about 5,00,000 in the USA alone.

A study revealed that there was a difference in the mortality rate among the patients which were treated by homeopathy and physicians, i.e., 1–2% appeared differently as they were treated by homeopathy as compare to 50–60% of patients who were treated by allopathic. In homeopathic treatment, every patient after being fully diagnosed and analyzed receivedmedicines. The medical grounds of homeopathy have a clear protocol of sanitation, antibiotics,and vaccinations to control the infections. The name of the homeopathic therapies was previously reported to prevent viral infections that are presented henceforth. [75] *Arsenicum album* is formed when for continuously 2–3 days arsenic is heated with distilled water. On thebasis of the fact sheet released by the CCRH (Central Council for Research inHomeopathy), *Arsenicum album* 30 can be considered as "prophylactic medicine" COVID-19.

[76] The inflammatory symptoms shown by COVID-19, Arsenic toxicity, and HIV infection are the same and there is a definite synergy between them and may have the suitable potentialto aggravate each other. Therefore, *Arsenicum album* may be considered as a suitable remedy for COVID-19 treatment. Arsenic is one of the constituents in it which showed its enumeratingimpact on the different macrophage cells as well on tumour cells. Also, it showed decreased NF-κβ hyperactivity (nuclear factor kappa-light-chain-enhancer of activated B cells; diminished verbalization of reporter quality of green *fluorescent protein* (GFP) in transfect HT29 cells) and decreased TNF-α (tumor *necrosis factor-alpha*) release in macrophages. *Arsenic album*-30 was advised to be taken once in a day for 3 days. The tinctureof album-20 is arsenic trioxide which is highly diluted and it works to prevent disease. [77] The use of medicinal plants has increased during the COVID-19 pandemic as a private behaviour (not under the control of government). A lot of misinterpretations of the use of medicinal plants to treat or prevent COVID-19 have been spreading throughout Nepal which need to be managed proactively. [78]

8.2.3. Some Clinical Trials of Homeopathy

- **Hong Kong trial:** A homeopathic clinical trial data was available from Homeopathy Research Institute, Hong Kong. The trial was conducted on 18 people of 6 different clusters. All of them were treated successfully with homeopathic medication.
- **New York trial:** A disorder similar to flu has appeared in New York at the starting of2020. Later in February 2020, it was clear that the flue was due to the novel coronavirus(SARS-CoV-2). A data was recorded in New York which indicates that several patientswere responding well to homeopathy.
- **Italian Trial:** In Italy, 50 cases examined consisted of 29 females, 20 males and in onecase the gender was not specified. There were 4 paediatric cases out of 50. They were treated with homeopathy and the hospitalization rate in this group of 50 patients treatedhomeopathically for COVID-19 was 0 though hospitalization rate was 20.4% in Italy regardless of their symptomatological status.

8.2.4. EFFECTIVE HOMEOPATHIC MEDICINES USED IN COVID-19: The effective homeopathic medicines which are generally used in covid-19 treatment are asgiven below in table 3 and the mechanism of action of homeopathic medicines is givenbelow in Figure 3.

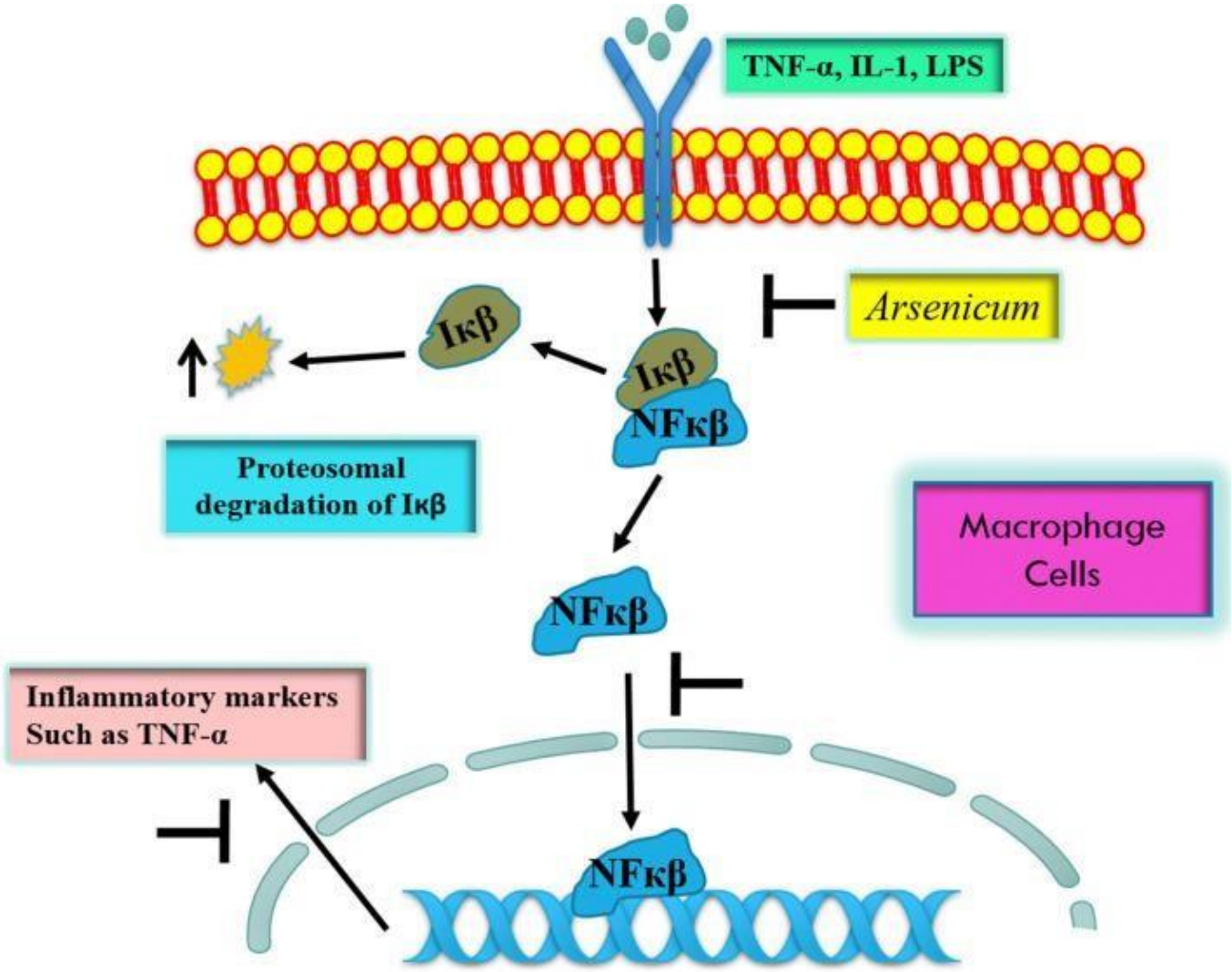

Fig. 3: Schematic representation of mechanistic insight of *Arsenicum* via downregulation ofNF-κβ and TNF-α in macrophages. [72]

Table 3: Effective homeopathic medicines used to treat COVID-19. [79, 88-95,99-100]

DRUGS	USES	FAMILY	EFFICIENT DOSAGE	BRAND NAME	MANUFACTURING COMPANY
Arsenicumalbum 30C	Anti-inflammatory.	Arsenic	O/d in starved stomach for 3 days.	MediLexicon	MediLexicon HealthcareIndia Ltd.
Bryonia alba 30	Anti-inflammatory and antinocice ptive	Cucurbitaceae	Adults: 5 granules T/d. Child: 3 granules T/d.		Dr Willmar Schwabe India Pvt. Ltd.
Rhus toxico dendron	Antiviral and antiarthritis medicine.	Anacardiaceae.			SBL Pvt. Ltd.
Belladona	Antispasmodic and anticonvul sant	Solanaceae		Butibel	Similia Homoeo Laboratory, Kerala, India.
Carolina Jasmine 30	Antianxiety and painkiller	Loganiaceae	Adults: dissolve 4 tablets sublingually Q/d.	Standard Homeopathic	Standard Homeopathic Company, USA
Vitamin Ctablets	Immunity booster.	Rutaceae		Eucee	Quixotic Pharma Pvt. Ltd.
Nux vomica 30	Antidepressant, GIT disorders treatment.	Loganiaceae.		SBL Homeopathy.	SBL PVT. LTD.
Pulsatilla nigricans	Food poisoning, migraine, respiratory disorders.	Ranunculaceae.		SBL Homeopathy.	Exportdeals.
Coast redwood	Antiseptic, antipyretic , antirheumatic, anthelmint ic, etc.	Cupressaceae.		Hill Natural Extract.	Hill Natural Extract LLP,Greater Noida.

9. CONCLUSION

I have studied only beta- coronavirus includes HCoV-OC43, Severe Acute Respiratory Syndrome human coronavirus (SARS-HCoV), HCoV-HKU1, AND Middle Eastern respiratory syndrome coronavirus.

Homeopathy is based on the principle of “like can cure like” which is symptomatic treatment.In other words, an ill patient can be treated through a substance that also produces similar symptoms. It means that homeopathy

improves the vital force/immune system against the symptoms.

Most of the elderly patients died because of poor immune system. So, the Homeopathy system is more suitable for COVID 19 disease treatment according to increasing the no. of coronavirus infectious patients and their less immune power.

10. REFERENCES

1. Aronson, J. K. Coronaviruses – a general introduction. Retrieved from The Centre for Evidence-Based Medicine (25 March 2020): Available at: https://www.cebm.net/covid- 19/coronaviruses-a-general-introduction/ .

2. Coronavirus, COVID-19. (n.d.). Retrieved from 100 Years of Cleveland Clinic: Available at: https://my.clevelandclinic.org/health/diseases/21214-coronavirus-covid-19 .

1. 3. Lowe, R. Coronavirus Disease (COVID-19). Retrieved from Physiopedia (24 June 2021): Available at: https://www.physio-pedia.com/Coronavirus_Disease_(COVID-19) .

4. World Health Organization. Coronavirus. Available at: https://www.who.int/health-topics/coronavirus. Accessed on: 22 November 2021.

5 Chan JF, et. Al. Middle East respiratory syndrome coronavirus: another zoonotic betacoronavirus causing SARS-like disease. Clinical microbiology reviews (1 April 2015);28(2):465-522.

6. Liu Y.C., et. Al. COVID-19: The first documented coronavirus pandemic in history. ScienceDirect (August 2020); volume 43, issue 4; 328-333.
https://doi.org/10.1016/j.bj.2020.04.007.

7. Cui J, et. Al. Origin and evolution of pathogenic coronaviruses. Nature Reviews Microbiology (10 December 2018); Available at: https://www.nature.com/articles/s41579- 018-0118-9 .8

8. Wiersinga W.J, et. Al. Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19) A Review. JAMA | Review (10 July 2020); 324(8): 782-793. Doi: 10.1001/jama.2020.12839; Available at: https://jamanetwork.com/journals/jama/fullarticle/2768391 .

9. Cascella M, et. Al. Features, Evaluation, and Treatment of Coronavirus (COVID-19) - StatPearls - NCBI Bookshelf (nih.gov) (2 September 2021). Available at: https://www.ncbi.nlm.nih.gov/books/NBK554776/.

10. Keni R., et. Al. COVID-19: Emergence, Spread, Possible Treatments, and Global Burden. frontiers in Public Health (28 May 2020); https://doi.org/10.3389/fpubh.2020.00216; Available at: https://www.frontiersin.org/articles/10.3389/fpubh.2020.00216/full .

11. WHO | Q&A on Coronaviruses. Available at: https://www.who.int/news-room/q-a- detail/q-a-coronaviruses. Accessed on: 22 December 2021.

12. Holshue ML, et al. First Case of 2019 Novel Coronavirus in the United States. N Engl. J Med. (2020) 382:929–36. Doi: 10.1056/NEJMoa2001191.

13. Yeo C, et. Al. Enteric involvement of coronaviruses: is faecal–oral transmission of SARS-CoV-2 possible? Lancet Gastroenterol Hepatol (2020) 5:335–37. Doi: 10.1016/S2468- 1253(20)30048-0.

14. Azer S.A., et. Al. COVID-19: pathophysiology, diagnosis, complications and investigational therapeutics. ScienceDirect (September 2020) volume 37, 100738; https://doi.org/10.1016/j.nmni.2020.100738; Available at: https://www.sciencedirect.com/science/article/pii/S2052297520300901 .

15. Wenhui Li, et al. Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus. Nature, 426 (6965) (27 November 2003), pp. 450-454, Available at: https://www.nature.com/articles/nature02145 .

16. European Society of Cardiology; Position statement of the ESC Council on hypertensionon ACE-inhibitors and angiotensin receptor blockers (13 March 2020). Available at: https://www.escardio.org/Councils/Council-on-Hypertension-(CHT)/News/position- statement-of-the-esc-council-on-hypertension-on-ace-inhibitors-and-ang .

17. F. Chiappelli, et. Al. CoViD-19 immunopathology and immunotherapy; Biomedical Informatics, 16 (31 March 2020), pp. 219-222; Available at: https://www.bioinformation.net/016/97320630016219.htm .

18. Parasher A. COVID-19: Current understanding of its Pathophysiology, Clinical presentation and Treatment. BMJ Journals; Volume 97, Issue 1147; Available at: https://pmj.bmj.com/content/97/114/312 .

19. WHO; Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. reliefweb (27 March 2020); Available at: https://reliefweb.int/report/world/modes-transmission-virus-causing-covid-19-implications-ipc-precaution-recommendations?gclid=EAIaIQobChMIhPGavov69AIVkYNLBR0MTQ5CEAAYAi AAEgJjRfD_BwE

20. Karia R., et. Al. COVID-19 and its Modes of Transmission. NCBI (1 September 2020):1- 4; Doi: 10.1007/s42399-020-00498-4 ; Available at:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7461745/ .

21 What is coronavirus? The different types of coronaviruses. UK Research and Innovation (25 March 2020); Available at: https://coronavirusexplained.ukri.org/en/article/cad0003/ .

22. Fontela C.M., et. Al. Animal models for COVID-19. Nature (23 September 2020) :586, 509-515; Available at: https://www.nature.com/articles/s41586-020-2787-6 .

23. Gu H., et. al. Rapid adaptation of SARS-CoV-2 in BALB/c mice: novel mouse model forvaccine efficacy. BioRxiv (2 May 2020); Preprint at: https://doi.org/10.1101/2020.05.02.073411 ; Available at: https://www.biorxiv.org/content/10.1101/2020.05.02.073411v1.

24. Dinnon lll K. H., et. al. A mouse-adapted model of SARS-CoV-2 to test COVID-19 countermeasures. Nature (19 January 2021): 586, 560-566; https://doi.org/10.1038/s41586- 020-2708-8 ; Available at: https://www.nature.com/articles/s41586-020-2708-8 .

25. McCray P. B. Jr, et. al. Lethal infection of K18-hACE2 mice infected with severe acute respiratory syndrome coronavirus. J. Virol. (1 November 2006): 81, 813–821; Doi: 10.1128/JVI.02012-06; Available at:

https://pubmed.ncbi.nlm.nih.gov/17079315/ .

26. Tseng C.-T. K., et.al. Severe acute respiratory syndrome coronavirus infection of mice transgenic for the human angiotensin-converting enzyme 2 virus receptor. Journal of Virology(22 December 2020): 81, 1162–1173; https://doi.org/10.1128/JVI.01702-06 ; Available at: https://journals.asm.org/doi/10.1128/JVI.01702-067

27. Bao L., et. al. The pathogenicity of SARS-CoV-2 in hACE2 transgenic mice. Nature (7 May 2020): 583, 830–833. Doi: 10.1038/s41586-020-2312-y; Available at: https://pubmed.ncbi.nlm.nih.gov/32380511/ .

28. Netland J., et, al. Severe acute respiratory syndrome coronavirus infection causes neuronaldeath in the absence of encephalitis in mice transgenic for human ACE2. Journal of Virology (22 December 2020). 82, 7264–7275 (2008); https://doi.org/10.1128/JVI.00737-08 ; Available at: https://journals.asm.org/doi/10.1128/JVI.00737-08 .

29. Rathnasinghe R., et. al. Comparison of transgenic and adenovirus hACE2 mouse models for SARS-CoV-2 infection. bioRxiv (6 July 2020) Preprint at: https://doi.org/10.1101/2020.07.06.190066 (2020); Available at: https://www.biorxiv.org/content/10.1101/2020.07.06.190066v1 .

30. Sun S.-H., et. al. A mouse model of SARS-CoV-2 infection and pathogenesis. Cell Host Microbe (8 July 2020) 28, 124–133.e4 (2020). https://doi.org/10.1016/j.chom.2020.05.020 ; Available at: https://www.sciencedirect.com/science/article/pii/S1931312820303024 .

31. Zhao J., et. al. Rapid generation of a mouse model for Middle East respiratory syndrome. Proceedings of the National Academy of Sciences (April 2014), Volume 111, Issue 13, 2014, pp.4970-4975; Doi: 10.1073/pnas.1323279111; Available at:https://ui.adsabs.harvard.edu/abs/2014PNAS..111.4970Z/abstract .

32. Spengler J. R., et. al. Severity of disease in humanized mice infected with Ebola virus or Reston virus is associated with magnitude of early viral replication in liver. J. Infect. Dis. 217,58–63 (2018); Doi: 10.1093/infdis/jix562; Available at:https://pubmed.ncbi.nlm.nih.gov/29087482/ .

33. Price A., et. al. Transcriptional correlates of tolerance and lethality in mice predict Ebola virus disease patient outcomes. Cell Rep. (11 February 2020):30, 1702–1713.e6 (2020). Doi: 10.1016/j.celrep.2020.01.026; Available at: https://pubmed.ncbi.nlm.nih.gov/32049004/ .

34. Gralinski L. E., et. al. Genome wide identification of SARS-CoV susceptibility loci using the collaborative cross. PLoS Genet (9 October 2015): 11, e1005504; Doi: 10.1371/journal.pgen.1005504; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4599853/ .

35. Feldstein L. R., et. al. Multisystem inflammatory syndrome in U.S. children and adolescents. N. Engl. J. Med. (23 July 2020): 383(4), 334–346 (2020); Doi: 10.1056/NEJMoa2021680; Available at: https://pubmed.ncbi.nlm.nih.gov/32598831/.

36. Miao J., et. Al. Syrian hamster as an animal model for the study on infectious diseases. Front. Immunol (1 October 2019): 10, 2329; Doi: 10.3389/fimmu.2019.02329; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6781508/ .

37. Chan J. F.-W., et. al. Simulation of the clinical and pathological manifestations ofcoronavirus disease 2019 (COVID-19) in golden Syrian hamster model: implications for disease pathogenesis and transmissibility. Clin. Infect. Dis (26 March 2020): ciaa325; Doi: 10.1093/cid/ciaa325; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7184405/ Osterrieder N., et. al. Age-dependent progression of SARS-CoV-2 infection in Syrian hamsters. Immunology Network : 12, 779 (2020) ; :https://doi.org/10.1101/2020.06.10.144188
; Available at : https://www.immunology.ox.ac.uk/covid-19/covid-19-immunology-literature- reviews/age-dependent-progression-of-sars-cov-2-infection-in-syrian-hamsters .

38. Boudewijns R., et. al. STAT2 signaling as double-edged sword restricting viral dissemination but driving severe pneumonia in SARS-CoV-2 infected hamsters. bioRxiv (2 July 2020); Preprint at: https://doi.org/10.1101/2020.04.23.056838 ; Available at: https://www.biorxiv.org/content/10.1101/2020.04.23.056838v2 .

39. Sia S. F., et. al. Pathogenesis and transmission of SARS-CoV-2 in golden hamsters. Nature(15 May 2020): 583, 834–838; Doi: 10.1038/s41586-020-2342-5; Available at: https://www.meta.org/papers/pathogenesis-and-transmission-of-sars-cov-2-in/32408338 .

40. Rogers T. F., et. al. Isolation of potent SARS-CoV-2 neutralizing antibodies and protectionfrom disease in a small animal model. Science (15 June 2020): 369, 956-963; Doi: 10.1126/science.abc7520; Available at: https://www.science.org/doi/10.1126/science.abc7520.

41. Enkirch T. & von Messling, V. Ferret models of viral pathogenesis. Virology (26 March 2015): 479–480, 259–270; http://dx.doi.org/10.1016/j.virol.2015.03.017 ; Available at: https://core.ac.uk/reader/82733090 .

42. Blanco-Melo D., et. al. Imbalanced host response to SARS-CoV-2 drives development of COVID-19. Cell (April 2020): 181, 1036–1045.e9. Available at: https://www.caf- dcf.be/litterature/imbalanced-host-response-to-sars-cov-2-drives-development-of-covid-19/ .

43. Schlottau K., et. al. Experimental transmission studies of SARS-CoV-2 in fruit bats, ferrets, pigs and chickens. SSRN (15 April 2020); http://dx.doi.org/10.2139/ssrn.3578792 ; Preprint at: https://ssrn.com/abstract=3578792 .

44. Rockx B., et. al. Comparative pathogenesis of COVID-19, MERS, and SARS in anonhuman primate model. Science (29 May 2020): 368, 1012–1015. Doi: 10.1126/science. Abb 7314; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7164679/ .

45. Corbett K. S., et. al. Evaluation of the mRNA-1273 vaccine against SARS-CoV-2 in nonhuman primates. N.E.J.M. (28 JULY 2020): 383:1544- 1555; https://doi.org/10.1056/NEJMoa2024671 ; Available at: https://www.nejm.org/doi/full/10.1056/nejmoa2024671 .

46. Oreshkova N., et. al. SARS-CoV-2 infection in farmed minks, the Netherlands, April and May 2020. Eurosurveillance (11 June 2020): 25, 1016; Available at: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2020.25.23.2001005 .

47. Shi J., et. al. Susceptibility of ferrets, cats, dogs, and other domesticated animals to SARS-coronavirus 2. Science (8 April 2020): 368, 1016–1020; Doi: 10.1126/science. Abb 7015; Available at: https://www.science.org/doi/10.1126/science.abb7015 .

48. Zhou P., et. al. Fatal swine acute diarrhoea syndrome caused by an HKU2-relatedcoronavirus of bat origin. Nature (4 April 2018): 556, 255–258; Available at:https://www.nature.com/articles/s41586-018-0010-9 .

49. Swayne D. E., et. al. Domestic poultry and SARS coronavirus, southern China. Emerg. Infect. Dis. (5 May 2004): 10, 914–916; Available at: https://wwwnc.cdc.gov/eid/article/10/5/03-0827_article .

50. Menachery V. D., et. al. A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence. Nat. Med. (9 November 2015): 21, 1508–1513; Available at: https://www.nature.com/articles/nm.3985 .

51. Si L., et. al. Human organs-on-chips as tools for repurposing approved drugs as potential influenza and COVID19 therapeutics in viral pandemics. bioRxiv (19 August 2020); Preprint at; https://doi.org/10.1101/2020.04.13.039917 ; Available at: https://www.biorxiv.org/content/10.1101/2020.04.13.039917v3 .

52. Allopathy. Merriam-Webster.com Medical Dictionary, Merriam-Webster, Available at: https://www.merriam-webster.com/medical/allopathy . Accessed on: 26 Dec. 2021.

53. Available at: https://www.uofmhealth.org/health-library/aa104729spec#tp21108 . Accessed on: 26 Dec. 2021.

54. Ali I. et. Al. COVID-19: Disease, management, treatment, and social impact. Sci. Total Environ. (22 April.2020); 728: 138861pril 2020); Doi: 10.1016/j.scitotenv.2020.138861; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7175909/ .

55. Available at: https://www.fda.gov/news-events/press-announcements/coronavirus-covid- 19-update-fda-continues-facilitate-development-treatments. Accessed on: 27 December 2021.

56. Cooper RG, et. Al. Chloroquine: Novel uses and manifestations. Indian J Med Res (2008),127:305-316.

57. Clercq D., et. Al. Potential antivirals and antiviral strategies against sars coronavirus infections. Expert Rev of Anti-infective Therapy (April 2006); 4:291-302; Doi:10.1586/14787210.4.2.291; Available at: https://www.proquest.com/docview/921305109.

58. Wang M., et. al. Remdesivir and chloroquine effectively inhibit the recently emerged novelcoronavirus (2019-ncov) in vitro. Cell Research (4 February 2020); 30:269-271; https://doi.org/10.1038/S41422-020-0282-0 ; Available at: https://academic.microsoft.com/paper/3005212621/reference/search?q=Remdesivir%20and%20chloroquine%20effectively%20inhibit%20the%20recently%20emerged%20novel%20coronavirus%20(2019-nCoV)%20in%20vitro.&qe=Or(Id%253D3001118548%252CId%253D2725497285%252CId

%253D2991491848%252CId%253D2255243349%252CId%253D2292021561%252CId%25
3D1971292277%252CId%253D2095807050%252CId%253D2074095102%252CId%253D2
018534682%252CId%253D1979536387)&f=&orderBy=0&showAllAuthors=1 .

59. Braga CBe., et. al. Side effects of chloroquine and primaquine and symptom reduction in malaria endemic area (mâncio lima, acre, Brazil). Interdiscip Perspect Infect Dis (18 August 2015); 2015:346853;

Doi: 10.1155/2015/346853; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4556080/#_ffn_sectitle .

60. Memon A.S. COVID-19:Comparative Study of Homeopathic Medicines (Cinchona or China Officinalis and Zincum Metallicum) and Allopathic Medicine (Chloroquine and Zinc). Journal of Research in Medical and Dental Sciences ;(2020) Volume8, Issue 3; Available at: https://www.jrmds.in/articles/covid19-comparative-study-of- homeopathic-medicines-emcinchonaem-or-emchina-officinalisem-and-zincum-metallicum- and-allopathic-medi-53398.html .

61. Morra ME, et. al. Clinical outcomes of current medical approaches for Middle Eastrespiratory syndrome: a systematic review and meta-analysis. Rev Med Virol. (May 2018) ;28(3): e1977; Doi: 10.1002/rmv.1977; Availableat: at: https://pubmed.ncbi.nlm.nih.gov/29664167/ .

62. Zhou D, et. Al. COVID-19: a recommendation to examine the effect of hydroxychloroquinein preventing infection and progression. J. Antimicrob Chemother (20 March 2020): Volume 75, Issue 7, July 2020, Pages 1667–1670; https://doi.org/10.1093/jac/dkaa114 ; Available at: https://academic.oup.com/jac/article/75/7/1667/5810487.

63. Colson P, et. Al. Chloroquine and hydroxychloroquine as available weapons to fight COVID-19. Int J Antimicrob Agents (April 2020);55(4):105932; Doi: 10.1016/j.ijantimicag.2020.105932; Available at: https://pubmed.ncbi.nlm.nih.gov/32145363/.

64. National Health Commission and State Administration of Traditional Chinese Medicine. Diagnosis and treatment protocol for novel coronavirus pneumonia. Available at: https://www.chinalawtranslate.com/wp-content/uploads/2020/03/Who-translation.pdf Accessed on: 27 December 2021.

65. de Wilde AH., et. al. Screening of an FDA-approved compound library identifies four small-molecule inhibitors of Middle East respiratory syndrome coronavirus replication in cellculture. Antimicrob Agents Chemother. (August 2014);58(8):4875-84; Doi: 10.1128/AAC.03011-14; Available at: https://pubmed.ncbi.nlm.nih.gov/24841269/ .

66. Stockman LJ, et. Al. SARS: systematic review of treatment effects. PLoS Med. (12 September 2006):2006;3: e343; Doi: 10.1371/journal.pmed.0030343; Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1564166/ .

67. Siegel D, et. al. Discovery and Synthesis of a phosphoramidate prodrug of a Pyrrolo[2,1-f][triazin-4-amino]

Adenine C-Nucleoside (GS-5734) for the treatment of Ebola and emerging viruses. J. Med. Chem (26 January 2017), 60, 5, 1648–1661; https://doi.org/10.1021/acs.jmedchem.6b01594; Available at: https://pubs.acs.org/doi/10.1021/acs.jmedchem.6b01594 .

68. Sheahan T.P., et. al. Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV. Nat Commun. (10 January 2020): 2020;11: 1–4; https://doi.org/10.1038/s41467-019-75313940-6 ; Available at: https://www.nature.com/articles/s41467-019-13940-6 .

69. Horby P, et. al. Dexamethasone in Hospitalized Patients with Covid-19-Preliminary Report.N Engl J. Med. (22 June 2020); Doi: https://doi.org/10.1101/2020.06.22.20137273 ; Available at: https://www.medrxiv.org/content/10.1101/2020.06.22.20137273v1 .

70. Theoharides TC, et. al. Dexamethasone for COVID-19? Not so fast. J Biol Regul Homeost Agents. 34(4):1241-1243; https://doi.org/10.23812/20-EDITORIAL_1-5 ; Available at: https://www.biolifesas.org/biolife/2020/06/19/dexamethasone-for-covid-19-not-so-fast/ .

71. Talwar S., et. Al. Ayurveda and Allopathic Therapeutic Strategies in Coronavirus Pandemic Treatment 2020. Current Pharmacology Reports (22 October 2020): 6, pages354–363; Available at: https://link.springer.com/article/10.1007/s40495-020-00245-2 .

72. Bala R, et. Al. Historical Journey of Homoeopathy during Epidemic Diseases in the Light of 2019 Novel coronavirus pandemic. Int J Sci Healthy Res. (2020); (5):215–33 ISSN: 2455-7587. Available at: https://www.academia.edu/43506346/Historical_Journey_of_Homoeopathy_during_Epidemic_Diseases_in_the_Light_of_2019_Novel_Coronavirus_Pandemic .

73. Jacobs J. Homeopathic prevention and management of epidemic diseases. Homeopathy (August 2018);107(3):157-160; Doi: 10.1055/s-0038-1649487; Available at: https://pubmed.ncbi.nlm.nih.gov/29753299/ .

74. Government of India. Advisory for Corona virus. Press Information Bureau 2020. https://pib.gov.in/pressreleasepage.aspx?prid=1600895. Accessed on: 27 December 2021.

75. Available at: https://indianexpress.com/article/explained/debate-over-a-homoeo-drug- arsenicum-album-coronavirus-vaccine-6439697/ . Accessed on: 27 December 2021.

76. Chakraborty PS, et. al. Effect of individualized homoeopathic treatment in influenza like illness: a multicenter, single blind, randomized, placebocontrolled study. Indian J Res Homoeopathy(March 2013);7:22–30 ; Doi:10.4103/0974-7168.114268 ; Available at: https://www.researchgate.net/publication/273756101_Effect_of_individualized_homoeopathic_treatment_in_influenza_like_illness_A_multicenter_single_blind_randomized_placebo_controlled_study.

77. Khadka D., et. Al. The use of medicinal plants to prevent COVID-19 in Nepal. Journal of Ethnobiology and Ethnomedicine (8 April 2021): 17; Available at:

https://ethnobiomed.biomedcentral.com/articles/10.1186/s13002-021-00449-w .

78. Haque Md. I., et. Al. Combined Homeopathy and Allopathy Treatment for COVID-19: A Review. Bangladesh J Infect Dis (2020); 7(suppl_2):S38-S45 ; Doi: https://doi.org/10.3329/bjid.v7i00.50161 ; Available at: https://www.researchgate.net/publication/346668105_Combined_Homeopathy_and_Allopathy_Treatment_for_COVID-19_A_Review .

79. COVID19 vaccine tracker. https://covid19.trackvaccines.org/country/india/ . Accessed on:13 Jan. 2022.

80. Available at: https://www.google.com/imgres?imgurl=https://ichef.bbci.co.uk/news/1024/cpsprodpb/13EDE/production/_118303618_more_vaccines_compared2x640nc.png&imgrefurl=https://www.bbc.com/news/world-asia-china-57543842&tbnid=JRkNJgPRZXRPmM&vet=1&docid=Q_pUU50HwIRLKM&w=1280&h=2250&itg=1&hl=en-GB&source=sh/x/im. Accessed on: 13 Jan. 2022.

81. Merck and Ridgeback's Investigational Oral Antiviral Molnupiravir Reduced the Risk ofHospitalization or Death by Approximately 50 Percent Compared to Placebo for Patients withMild or Moderate COVID-19 in Positive Interim Analysis of Phase 3 Study. MERCK (1October 2021). Available at: https://www.merck.com/news/merck-and-ridgebacks- investigational-oral-antiviral-molnupiravir-reduced-the-risk-of-hospitalization-or-death-by- approximately-50-percent-compared-to-placebo-for-patients-with-mild-or-moderat/.

82. THE TIMES OF INDIA; Experts divided over use of molnupiravir; low demand for drug.(11 January 2022). Read more at: http://timesofindia.indiatimes.com/articleshow/88818929.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst.

83. precision VACCINATIONS; PAXLOVID Oral Antiviral (PF-07321332). https://www.precisionvaccinations.com/vaccines/paxlovid-oral-antiviral-pf-07321332. Accessed on: 9 January 2022.

84. Miller K. What You Need to Know About Paxlovid, Pfizer's COVID-19 Pill. Prevention (23 December 2021). Available at: https://www.prevention.com/health/a38602689/paxlovid-pfizer-covid-19-pill/. Accessed on: 8 Jan. 2022.

85. COVID-19: reminder of risk of serious side effects with chloroquine and hydroxychloroquine. European Medicines Agency (23 April 2020); Available at: https://www.ema.europa.eu/en/news/covid-19-reminder-risk-serious-side-effects- chloroquine-hydroxychloroquine.

86. COVID-19: Advice, updates and vaccine options. Mayo CLINIC; Corticosteroid (Oral Route, Parenteral Route). Available at: https://www.mayoclinic.org/drugs- supplements/corticosteroid-oral-route-parenteral-route/description/drg-20070491. Accessedon: 7 January 2022.

87. Du G-H et. Al, Pharmacological Mechanisms and the Modulation of Pain. ScienceDirect.Advance in

Pharmacology (2016). Available at: https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical- science/gelsemium.

88. Available at: https://www.drugs.com/ingredient/belladonna.html. Drugs.com. Accessedon: 5 January 2022.

89. Buttaravoli PM. Toxicodendron (Rhus) Allergic Contact Dermatitis: (Poison Ivy, Oak, or Sumac). ScienceDirect (2022). Available at: https://www.sciencedirect.com/topics/immunology-and-microbiology/rhus.

90. Kurd R. et. Al. Homeopathic Treatment for COVID-19-Related Symptoms: A Case Series.Complementary Medicine Research; https://doi.org/10.1159/000517924. Available at: https://www.karger.com/Article/FullText/517924.

91. Ilhan M. et. Al. Anti-inflammatory and antinociceptive features of Bryonia alba L.: As a possible alternative in treating rheumatism. De Gruyter Open. Accessed on: 5 January 2019. https://doi.org/10.1515/chem-2019-0003. Available at: https://www.degruyter.com/document/doi/10.1515/chem-2019-0003/html.

92. Jethani B. et. Al. Clinical Characteristics and Remedy Profiles of Patients with COVID-19:A Retrospective Cohort Study. PubMed, NCBI (May 2021);110(2):86-93. Doi: 10.1055/s- 0040-1718584. Epub: 10 February 2021. Available at:https://pubmed.ncbi.nlm.nih.gov/33567460/.

93. The Indian EXPRESS (3 June 2020). Explained: What is Arsenicum album 30, touted tobe effective against Covid-19? Available at: https://indianexpress.com/article/explained/debate-over-a-homoeo-drug-arsenicum-album- coronavirus-vaccine-6439697/.

94. my KOKLATA (1 January 2022). Demand for Covid antibody therapy surges in Kolkata,docs warn against misuse. Available at: https://www.telegraphindia.com/my-kolkata/news/kolkata-hospitals-report-jump-in-demand-for-covid-antibody-therapy-docs-warn-against-misuse/cid/1845689.

95. THE ECONOMIC TIMES (31 December 2021 at 06:48 am). India may have to wait longerfor Pfizer, GSK's Covid drugs. Available at: https://m.economictimes.com/industry/healthcare/biotech/pharmaceuticals/india-may-have- to-wait-longer-for-pfizer-gsks-covid-drugs/amp_articleshow/88603405.cms.

96. THE ECONOMIC TIMES (31 December 2021 at 06:54 am). Bangladeshi firm launchesfirst genericof Pfizer drug. Available at: https://m.economictimes.com/industry/healthcare/biotech/pharmaceuticals/bangladeshi-firm- launches-first-generic-of-pfizer-drug/amp_articleshow/88603468.cms.

97. THE ECONOMIC TIMES ONLINE (20 December 2021). How do worlds vaccines stackup against

Omicron? Available at: https://economictimes.indiatimes.com/news/web- stories/how-do-worlds-vaccines-stack-up-against-omicron/slideshow/88386292.cms.

98. Stang D. Rhus Toxicodendron. University of Illinois (8 July 2017). Available at: https://www.healthline.com/health/rhus-toxicodendron.

99. Zadeh NM. Et. Al. Mechanism and adverse effects of COVID-19 drugs: a basic review.Int J Physiol Pathophysiol Pharmacol. (15 August 2021); 13(4): 102–109. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8446775/.

100. PubChem; Available at: https://pubchem.ncbi.nlm.nih.gov/compound/Remdesivir. Accessed on: 7 January 2022.

101. Hetero Healthcare Brands. Available at: https://www.heterohealthcare.com/pharmaceutical-brands. Accessed on: 7 January 2022.

102. Desrem. Mylan Pharmaceuticals Pvt Ltd. Available at: https://www.1mg.com/medicines/desrem-213830. Accessed on: 7 January 2022.

103. Mechanisms of Drug Action and Resistance (Focus on Antimalarials). Available at: http://www.tulane.edu/~wiser/protozoology/notes/drugs.html. Accessed on: 7 January 2022.

104. Chloroquine (Oral Route). MAYOCLINIC. Available at: https://www.mayoclinic.org/drugs-supplements/chloroquine-oral-route/description/drg- 20062834. Accessed on: 7 January 2022.

105. Corticosteroids. NIH (16 December 2021). Available at: https://www.covid19treatmentguidelines.nih.gov/therapies/immunomodulators/corticosteroid s/. Accessed on: 7 January 2022.

106. Indiamart. Available at: https://m.indiamart.com/proddetail/dextec-tablet-22375863633.html. Accessed on: 7 January 2022.

107. Ribavirin. DRUGBANK online. Available at: https://go.drugbank.com/drugs/DB00811.Accessed on: 7 January 2022.

108. Lopinavir. DRUGBANK online. Available at: https://go.drugbank.com/drugs/DB01601.Accessed on: 7 January 2022.

109. BBC News (28 December 2021). Covovax and Corbevax: What we know about India's new Covid vaccines. Available at: https://www.bbc.com/news/world-asia-india-55748124.

110. Rezaei N, et. Al. Introduction on Coronavirus Disease (COVID-19) Pandemic: The GlobalChallenge. Adv Exp Med Biol. (11 May 2021);1318: 1-22. Doi: 10.1007/978-3-030-63761- 3_1. PMID: 33973169. Available at: https://pubmed.ncbi.nlm.nih.gov/33567460/.