International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 1 Jan - Feb 2025, pp: 491-495 www.ijprajournal.com ISSN: 2456-4494

Remdesivir Drug

Bongirwar Nidhi[1*], Paravthi bhaskar[2], Mushtipally sai kumar[3], Junna Sriya[4], MD Mubeenuddinnehal[5], Subhra manna[6], Talha shary Uddin[7]

1,2 Assistant Professor of Chilkur Balaji College of Pharmacy, Aziz Nagar RR District, Hyderabad, Telangana, India

3, 4, 5,6,7 Students of Chilkur Balaji College of Pharmacy, Aziz Nagar RR District, Hyderabad, Telangana, India 6 Principal of Chilkur Balaji College of Pharmacy, Aziz Nagar Rr District, Hyderabad, Telangana, India

** Corresponding Author: Bongirwar Nidhi*

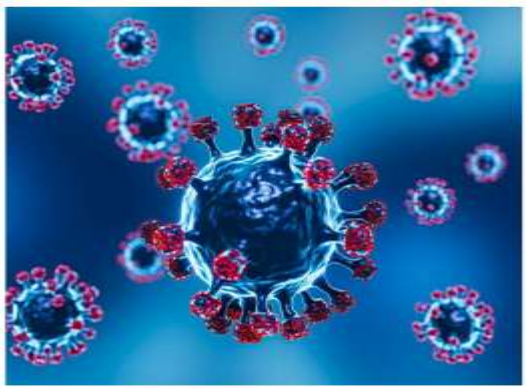
Date of Submission: 10-01-2025 Date of Acceptance: 20-01-2025

ABSTRACT:
Remdesivir is a nucleotide analogue prodrug with broad spectrum anti viral activity. Covid 19 is caused due to SARS- CoV-2 corona virus.Illness caused by severe acute respiratory syndrome corona virus 2 infection. Remdesivir was recently approved by the US food and drug administration.Remdesivir also appears to improve time to clinical recovery, increase rate of recovery and reduce time on supplemental oxygen and readmission rates. The clinical features of COVID 19 are varied ranging from an asymptomatic state to acute respiratory syndrome and multi organ dysfunction. The diagnosis of the disease starts by gathering sample of the upper and lower respiratory tract of infected person. Alsochest X-ray and CT Scan used in the diagnosis stage.

KEY WORDS: SARS coV2, COVID 19, Idiopathic pneumonia, Acute respiratory syndrome

I. INTRODUCTION:

It includes a brief explanation of epidemiology, pathogenesis, diagnosis, therapy and prevention of COVID_19.Covid19 is caused by SARS coV2 corona virus. An unidentified etiology, pneumonia outbreak in wuhanthe provincial capital of Hubei ,China in December 2019.Coronavirus disease 2019 (COVID_19), the illness caused by severe acute respiratory syndrome corona virus 2 infectionfirst it was appeared in china in December 2019 as an unusual idiopathicpneumonia.Developed initially for Ebola, it works by interfering with the virus ability to replicate, potentially reducing the severity of the illnessThe global spread of COVID_19 was the rapidwith the world health organization declaring in a global pandemic in March 2020. Remdesivir enters the host cell and is converted into its active metabolite.COVID 19 highly effects respiratory illness and spread mainly via exposure to air bone particles, droplets.Remdesivir is used specially for the treatment of COVID 19 .Additionally the diagnosis of the disease starts by gathering the lower and upper respiratory tract of the infected person.Also chesta X-ray and CT scan are used in the diagnosis stage. Remdesivir is an adenosine nucleotide analogue prodrug with broad spectrum antiviral activity against RNA virus. Remdesivir is used in hospitalized and non hospitalized patients with COVID 19.Atleast half of patients with coronavirus disease 2019 requiring invasive mechanical ventilation have died on hospital and the associated burden on health care systems especially intensive care units has been overwhelming in several affected countries .Remdesivir is a potent inhibitor of SARS-COV _2 infection replication in human nasal and bronchial airway epithelial cells. Therefore COVID 19 is a huge hazard to human health.The symptoms of COVID 19 vary widely but often include cough,breathing difficulties and fever. Patients with mild COVID 19 can treat their symptoms inRemdesivir durg approved for the treatment through the world wide.Remdesivir also improve clinical recovery and increases the recovery rate.And reduces the time on supplemental oxygen.



International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 1 Jan - Feb 2025, pp: 491-495 www.ijprajournal.com ISSN: 2456-4494

Mechanism of action:-

Remdesivir (GS-5734) is the phosphoramidite prodrug of a monophosphate nucleoside analog (GS-441524) that acts as a viral RNA-dependent RNA polymerase (RdRp) inhibitor, targeting the viral genome replication process.

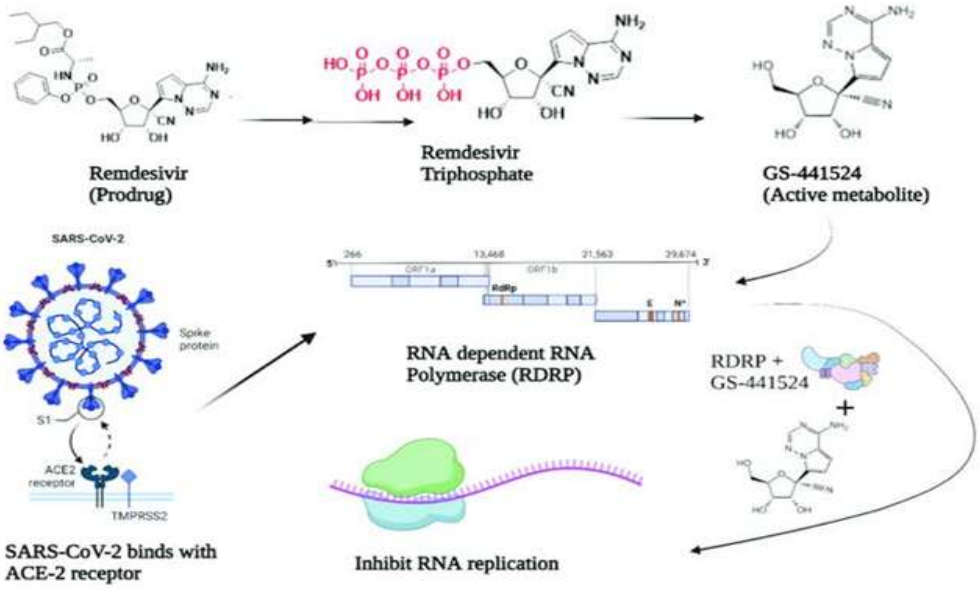
Nucleoside analogs do not permeate through the cell wall that easily. On their subsequent entry into the host cell, they require phosphorylation to produce nucleoside triphosphate (NTP), which resembles adenosine triphosphate (ATP) and can be used by the RdRp enzymes or complexes for genome replication.

Once the remdesivir is metabolized by the host cells into its pharmacologically active analog adenosine triphosphate (GS-443902), it competes with ATP for integration by the RdRp complex into the nascent RNA strand and upon subsequent incorporation of a few more nucleotides, results in termination of RNA synthesis limiting viral replication.

Remdesivir demonstrated potent antiviral activity against SARS-CoV-2 in vitro in primary human airway epithelial cultures and human lung cells. Remdesivir also had a dose-dependent inhibitory effect on SARS-CoV-2 replication with a half-maximal effective concentration

ETIOLOGY:

Covid19 is caused by the infection with the severe acute respiratory syndrome coronavirus, also called asSARS-CoV-2.



1.Viral origin: SARS-CoV-2, a member of corona virus family

2.Animal Reservoir: Bats, possibly pangolins or other intermediate hosts.

3.Transmission: Human-to-human via respiratory droplets, contact, and formites.

Symptoms:

COVID 19 symptoms vary from person to person.

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 1 Jan - Feb 2025, pp: 491-495 www.ijprajournal.com ISSN: 2456-4494

Some of the following symptoms are:

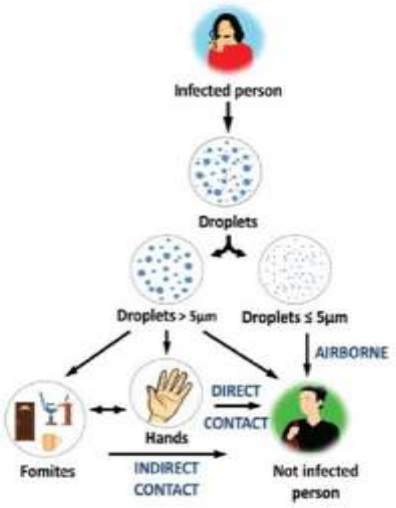
- Fever or chills
- Cough
- Headache
- Tired Ness
- Muscle or body aches
- Shortness of breath
- Loss of taste
- Loss of smell

Epidemiology :

- According to the preliminary research the patients between 49 to 66 had interacted with the Huanan seafood market , which sold the variety of live wild animals such as bats, chicken and marmots . These wild animals are connected to COVID 19 epidemic in Wuhan.WHO reports that SARS-COV-2 infection is found in the environmental samples collected from the Huanan seafood market. SARS-COV and MERS-COV naturallyoccurs in the bats and spreads to the humans by palm covers and dromedary camel.

Routes of transmission:

- The COVID 19 transfer through the respiratory droplets and through touch these are the primary modes of transmission.SARS-COV2 are found in the urine and stool of the patients , according to the recent findings suggesting a potential of the fecal-oral transmission.



Pathogenesis:-The SARS -COV2 virus is the cause for the COVID 19,it causes the deadly illness that is major health problem world. The SARS -COV2 causes the pneumonia for the human ,which affects the lower respiratory tract.But the symptoms of pneumonia are not severe as those of SARS or MERS infection. Respiratory failure and hyper inflammation may cause death of the person.An asymptomatic phase with or without detectable virus , a non severe symptomatic phase involving the upper airway involvement and a severe potentially fatal disease with hypoxia and progress to acute respiratory distress syndrome (ARDS)with viral load are the three phases that the SARS -COV2 infection and disease can be roughly divided .

The four primary proteins that the corona virus genome encodes are spike . nucleocapsid, membrane and envelope.Viral entrance into entrance into target ACE11 -expressing body cells medicated by S protein. The SARS -COV2 and SARS-COV genomes are nearly 75 percent similar and both viruses use the angiotensin converting enzyme 2 receptor to infect endothelial cells.These two viruses same amino acid residues required for the receptor binding .

Patients infected with the COVID 19 have been found to have the elevated blood levels of various cytokines and chemokines . Similar to SARS -COV2 and MERS -COV infections , the resulting cytokine storm sets off a powerful inflammatory cytokine levels were all observed in COVID-19 causes damage to the lungs and several other organs including the liver ,kidneyand heart ,which results in multiple depletion and is the direct cause of mortality

Diagnosis:

The US Food and Drug administration shows types of diagnosis for COVID 19 they are,

Molecular test:

This test looks for genetic material from the COVID 19 virus.

Polymerase chain reaction test are molecular tests and lab technician mostly uses reverse transcription polymerase chain reaction also shortened to RT_PCR. It is also called as NAAT TEST nucleic acid amplification test.PCR is the most accurate test among the antigen test.

Nucleic acid amplification test (NAAT):

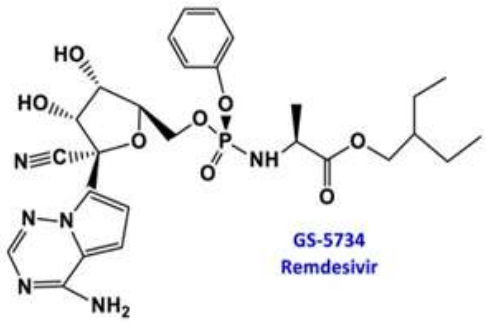
According to WHO,NAAT is used to confirm COVID 19 disease using a nose swab and blood sample utilising a fluorescence polymerase chain reaction. During a blood test a health care professional take a blood sample from vein in your arm,using a small needle after it is inserted, a small amount of blood will be collected into a test tube or

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 1 Jan - Feb 2025, pp: 491-495 www.ijprajournal.com ISSN: 2456-4494

vial. You may feel little sting when the needle goes in or out. It takes less than 5 min.
Nasal swab taken from the front part of your nostrils also from the back of your nostrils .This procedure also known as nasal mid-turbinate swab. It is also taken from the upper most part of your nose and throat.

Antigen test:
This test looks for the viral proteins known as antigens.
Antigen test also called as COVID 19 test. This test gives a rapid result. This test is less accurate than the PCR test.

Structure of remdesivir:



The chemical name for remdesivir is 2-ethylbutyl N-((S)-(2-C-(4-aminopyrrolo(2,1)(1,2,4)triazin-7-yl)-2,5-anhydro-d-altrononitril-6-O-yl)phenoxyphosphoryl)-L-alaninate.
It has a molecular formula: $C_{27}H_{35}N_6O_8P$
Molecular weight : 602.6g/mol.

Brands:
It is marketed under various brands names by different pharmaceutical companies:

Authorised brands:
- Veklury (Gilead sciences)-original developer
- Covifor (Dr.Reddy's laboratories)
- Remdac(Cipla Limited)
- Redyx(MyLAN Laboratories)
- **Other brands:**
- Desrem (Hetero health care)
- Remwin (Zydus Cadila)
- viroxar (AstraZeneca pharma)

Countries with approved brands:
- United States : Veklury (Gilead sciences)
- India :Covifor (Dr.Reddy's laboratories)
- Europe :Veklury (Gilead sciences)
- Japan : Veklury (Gilead sciences)
- Australia: Veklury (Gilead sciences)

Dosage forms:
- Intravenous (IV) Injection
- Lyophilized powder for injection
- Solution for injection

For adults: injection lyophilized powder for reconstitution
- 100mg/vial

Injection concentrated solution
- 100mg/20ml

For pediatric:
Injection lyophilized powder for reconstitution
- 100mg/vial

NOTE: Use lyophilized powder to prepare dose for children weighing 1.5 to <40 kgs
Injection concentrated solution
- 100 mg/20 ml (5 mg /ml) for children greater than or equal to 40 kgs

Side effects:

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 1 Jan - Feb 2025, pp: 491-495 www.ijprajournal.com ISSN: 2456-4494

More common:

- Bleeding
- Backpain
- Chest tightness
- Dark coloured urine
- Tightness in the throat and difficult in swallowing

Less common:

- Seizures
- Skin rash
- Nausea

II. CONCLUSION:

Thusly the studies demonstrated that intravenous doses of remdesivir were adequate tolerated in patients. This medication was not utilized in seriously effected by COVID 19. Hand cleanliness, social distancing, and quarantine are the key components in stopping the spread in society. It is crucial to stop the disease from spreading throughout the society.

REFERENCE:

[1]. https://pmc.ncbi.nlm.nih.gov/articles/PMC10474216/
[2]. https://link.springer.com/article/10.1007/s40121-023-00900-3
[3]. https://www.scielo.br/j/ramb/a/dmVpW8W4GBKn3bPYPCBhCBL/
[4]. https://www.mayoclinic.org/tests-procedures/covid-19-diagnostic-test/about/pac-20488900
[5]. https://jamanetwork.com/journals/jamaneurology/fullarticle/775430
[6]. https://medlineplus.gov/lab-tests/pcr-tests/
[7]. https://www.webmd.com/drugs/2/drug-179015/remdesivir-intravenous/details
[8]. https://www.nhs.uk/medicines/remdesivir-veklury/side-effects-of-remdesivir/
[9]. https://www.drugs.com/sfx/remdesivir-side-effects.html
[10]. https://www.ncbi.nlm.nih.gov/books/NBK563261/
[11]. https://go.drugbank.com/drugs/DB14761
[12]. https://www.ncbi.nlm.nih.gov/books/NBK563261/
[13]. https://www.sciencedirect.com/topics/medicine-and-dentistry/remdesivir
[14]. https://en.m.wikipedia.org/wiki/Remdesivir
[15]. https://www.gilead.com/-/media/files/pdfs/medicines/covid-19/veklury/veklury_pi.pdf