



A REVIEW: COVID-19 REPURPOSED AND AUTHORIZED DRUGS AND ITS SIDE EFFECTS.

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Abstract: - Coronavirus disease 19 (covid-19) is an infectious disease caused by the novel SARS-CoV-2 (Severe Acute Respiratory Syndrome Corona virus-2) has emerged as a worldwide threat in December-2019 and then spread rapidly. Scientists and Clinicians are attempting to find antivirals specific to the virus, vaccine development for a novel virus is a challenging effort for them which may take several years to discover. Design and repurpose of existing drugs have been studied by researchers for the approval of other conditions which are effective against covid-19. Repurposed drugs may not be highly potent, as they are not developed specifically to this particular virus. Finally, two vaccines have been granted for emergency use approval in India by the government. The main purpose of this study on covid-19 vaccine development, repurposed drugs and approved drugs- its side effects, advancements and challenges during vaccine development. By this we can understand the vaccine development process and its current authorized approved drugs.

Index Terms: covid-19, SARS-COV-2, Antivirals, Repurposing drugs, Emergency use approval, Vaccine development.

I. INTRODUCTION:

Researchers have been working indefatigably till today to design new drugs and repurpose existing drugs to treat novel coronavirus SARS-CoV-2 and the research is still ongoing. Covid-19 is a beta coronavirus that materialized from bats and then transferred to humans through intermediate hosts. It spreads through respiratory droplets leading to respiratory tract infections which may further leads to severe pneumonia, multiple organ involvement and Fatal outcomes. The covid-19 pandemic has resulted in nearly 50 million infections, holding more than one million human lives globally. A potent vaccine is critically needed to prevent global pandemic of Covid-19 currently and once all are vaccinated and immune to covid-19, a return to normalcy with no social distancing or masks can be achieved.

At the beginning of August, WHO (world health organisation) Director General Tedros Adhanom, said “There is no silver bullet at the moment, and there might never be”, at a virtual press conference. Treatments aided for the recovering of covid-19 was applauded by Tedros. Research groups aimed to identify both novel and existing drugs for their ability to mitigate symptoms and viral replication. FDA has approved drugs for antiviral against two others highly pathogenic Human coronavirus i.e., SARS-COVID-2 and Middle East Middle East Respiratory Syndrome Corona virus (MERS-COV).

Antiviral treatments: It may target viral components directly or other cellular processes involved in viral replication.

Here is an overview of Existing Antimicrobials having potential activity against SARS-COV-2:

It is highly demanded that a combination of drugs needed to both neutralize the virus and in order to suppress Covid-19 symptoms. Two existing drugs improves survival of Covid-19 patients.

Example: Baricitinib plus Remdesivir shows promise in trial.**II. CLASSIFICATION OF DRUGS, ITS USES AND DRAWBACKS:**

S.No	Antimicrobial drugs	Classification	Rational for use	Drawbacks
1.	Dexamethasone (Anti-inflammatory actions)	Corticosteroid, Glucocorticoid	It is the first drug shown to save lives of Covid-19 patients, observed lower 28-day mortality (state of death) in those patients who received dexamethasone and respiratory support (ventilation or oxygen alone)	The only drawback of this drug is it may not work in those who were not receiving Respiratory support.
2.	Remdesivir	Nucleoside Analogue	Remdesivir is a broad- spectrum antiviral with in-vitro activity against coronavirus. It inhibits viral RNA polymerases. It reduces recovery time in those with severe disease	It is not affordable worldwide and has limited supply.
3.	Choloroquine	Antimalarial	Choloroquine have immunomodulating properties. And has in-vitro activity against SARS-COV-2	FDA revoked choloroquine due to lack of data to support efficacy
4.	Hydrple: Baricitiniboxychloroquine	Antimalarial	Disease modifying Anti -rheumatic drug. It produces Multiple effects; reduced cytokine production, inhibits immune activation	It is not advised as usage in setting covid-19 due to adverse events (hepatitis and renal failure)
5	Lopavivir and Ritonavir	HIV protease inhibitor	Blocks the action of enzymes critical to HIV replication. used to treat HIV-1 infection	There is no beneficial effect of lopavivir and Ritonavir for covid-19 patients

III. DRUG RELATED COVERAGE OF EXISTING DRUGS FOR COVID-19:

- Aspirin is being identified as a possible treatment for covid-19
- Beta blockers can also be used to treat covid-19
- FDA approved Remdesivir for covid-19
- Accelerated studies screening identified 25 Existing drugs capable of disrupting SARS-COV-2 cell entry
- Phase-3 trials states Dual Antibody injection's ability to prevent covid-19 infection
- Existing Alcoholism drug potentially effective against Covid-19
- Trial tests cancer drug ability to reduce Respiratory symptoms of Covid-19
- Rheumatoid arthritis drug could be repurposed to treat covid-19 patients
- Nitric oxide may prevent replication and spread of SARS-CoV-2
- Synthetic antiviral proteins inhibit covid-19
- No clinical benefits of Lopavivir and Ritonavir in hospitalized patients studied in recovery trial

IV. VACCINE RESEARCH AND DEVELOPMENT LANDSCAPE (ADVANCEMENTS)

- The global covid-19 vaccine research and landscape includes 115 vaccine candidate and out of which 78 are confirmed as active and 37 are unconfirmed
- Of the 78 confirmed active projects,73 is researched under preclinical stages
- 31 vaccine candidates reached clinical trial phase. They found 27 drugs inhibiting replication of coronavirus
- 20 priority compounds are identified and out of them 17 tested drugs inhibit SARS-COV-2

V. CHALLENGES FACED DURING VACCINE DEVELOPMENT;

Challenges for SARS-COV-2 vaccine development include;

- Clinical recruitment, defining a correlate of protection and proving Efficacy, especially when there is a public pressure to release vaccine for general use.
- And another major challenge in SARS-COV-2 vaccine development is establishment of correlates of protection.
- The other challenge is faced at the commercial production of clinical trial materials.

VI. AUTHORIZED AND APPROVED DRUGS/VACCINES:

Nine vaccines have been granted for emergency use Authorizations or approved for full use by **National regulatory authorities:**

S.No	Vaccines	Technology	Authorization	Phase	Status
1	Pfizer-BioNtech covid-19 vaccine;(BioNtech, pfizer, Fosun pharma)	Mod RNA Encapsulated in lipid nanoparticles	Emergency	2,3	Approved in Saudi Arabia and other countries. Emergency in use in US and other countries.
2.	Modern Covid-19 vaccine (Modern, NIAID, BARDA, CEPI)	Lipid nanoparticle dispersion containing Mod RNA	Emergency	3	Emergency use in us, Edu other countries
3.	Oxford-AstraZeneca covid-19 vaccine (University of Oxford, AstraZeneca, CEPI)	Modified chimpanzee adenovirus vector (chAdoxi)	Emergency	2,3	Emergency use in Britain, India and other countries
4.	Gam-covid-vac (sputnik V) Gamaleya Research institute of Epidemiology and Microbiology)	Non -replicating viral vector (adenovirus)	Emergency	3	Early use in Russia and other countries
5	Corona Vac Dino vac	Inactivated SARS-COV-2	Emergency	3	-
6.	BBIBP-corV sinopharm: Beijing Institute of Biological products, Wuhan institute of Biological products	Inactivated SARS-COV-2 (Verocells)	Emergency	3	Approved in China, U.A.E, Bahrain. Emergency use in Egypt, Jordan
7.	Ad5-nCoV (convidicea) Casino Biologics, Beijing institute of Biotechnology of the Academy of Military medical sciences	Recombinant adenovirus type-5 vector	Emergency	3	Limited use in China
8.	EpiVaccorona vector	Vaccine based on peptide antigens	Emergency	2,3	-
9.	BBV152 (covaxin) Bharat Bio tech, Indian council of medical research	Inactivated SARS-COV-2	Emergency	3	Emergency use in India

VII. VACCINE PRODUCTION: Two vaccines have been granted emergency use approval in India.

1. **Covishield:** developed by Oxford University and AstraZeneca and produced by serum Institute of India.
2. **Covaxin:** Developed and produced in India by Bharath Biotech.

Government aims to complete the first phase of vaccinations by August 2021. Both Covid-19 vaccines will need 2 shots to get most protection

VIII. LIMITATIONS:

1. Vaccine will be administered to people only above 18 years of age in two doses.
2. Pregnant and lactating women should not be a part of any covid-19 vaccine trial.
3. People having allergic reaction to previous doses will not be given the vaccine shot.

IX. SIDE EFFECTS FOR BOTH COVAXIN AND COVISHIELD;

1. **Covaxin:** Injection side pain, headache, fatigue, fever, body ache, abdominal pain, nausea and vomiting, giddiness, dizziness, tumour, sweating, cold, cough and injection site sweating.
2. **Covishield:** Headache, fatigue, myalgia (pain in muscle), injection site tenderness, Malaise(weakness), pyrexia, chills, arthralgia, nausea

These are mild effects, that can be relieved by taking paracetamol. Side effects are the normal signs that our body is building protection. These side effects may affect your ability to do daily activities, but they will go away in few days.

❖ **To reduce pain and discomfort; where you got the shot**

- Apply a clean, cool, wet cloth over the area
- Use or exercise your arm
- To reduce discomfort from fever; drink plenty of fluids, and dress lightly.



X. CONCLUSION:

The covid-19 pandemic currently is the most important health emergency crisis across the world. The lack of vaccine and treatment to the covid-19 patients worsened world. Many platforms worked tirelessly to produce vaccine that shows potent activity against SARS-COV-2, many clinical trials were performed on existing drugs for their ability to stop viral replication and symptoms of Covid-19. After many researches and clinical trials, two vaccines got approved in India. There are also some antiviral agents that can cure covid-19 to some extent.

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