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COVID-19: AN OVERVIEW

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ABSTRACT

In recent days there is an outbreak of a disease worldwide which affect the respiratory system and this disease called as COVID-19 has been declared as pandemic by WHO. SARS-COV2 causes corona virus disease (COVID-19) and this causative agent is proving to be having potential of a very fatal disease and this has been of great concern globally. Many measures have been recently taken worldwide to reduce the person to person transmission of this disease. Children and elderly people are more susceptible to the said infection. The disease is transmitted by inhalation or contact with infected droplets and the incubation period ranges from 2 to 14 days. In this review article, we gathered some information related to this disease. This review highlights a brief introduction of coronavirus including origin and history, structure of corona virus, its lifecycle, and pathophysiology. Symptoms, diagnosis and treatment available of the disease under discussion are also discussed in short. An overview of the ongoing clinical trials in regard to the disease has also been summarised in short in this review.

KEYWORDS: Covid-19, Corona Virus, Covid, Structure of Corona Virus, Pandemic.

INTRODUCTION[1][2][5][7]

In latin language the name corona means ‘the crown'. Biological name of corona virus is Sarbacovirus Coronaviridae. This virus belongs to order- Nidovirales, Sub-family- Orthocoronavirinae, Sarbacovirus subgenus and family- Coronaviridae.

The Coronaviridae are the large family of single stranded RNA viruses which are protein enveloped with but present Coronavirus is named as SARS COV-2 virus. The subgroups of coronaviruses family are alpha (a), beta (b), gamma (g) and delta (d) coronavirus. This is 7th coronavirus which affected the humans. In humans these viruses can cause diseases like flu, cold, dry cough and pneumonia. These viruses can also cause the illnesses like Sevare Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). The international committee has been confirmed that SARS COV-2 virus have the genetic similarity with SARS COV and the other names of this virus are – Novel coronavirus and 2019-nCOV.

ORIGIN AND HISTORY[3][4][6]

Generally coronavirus spread through animals to the humans, this process is called as spillover. Before SARS COV-2 virus there was a virus known as SARS COV which was found in china in 2003 and it was transmitted to the humans through civet cats. Another type of corona virus known was MERS COV which was found in saudi arabia in 2012 and was transmitted through the Camels.

The exact dynamics of the spread of SARS CoV-2 is unknown yet but some prediction said that on the basis of patients found whome were on seafood in huanan, south china which suggests zoonotic origin of the virus. Another theory based on genetic similarity of SARS COV -2 with those viruses which can be found in the bats. The SARS COV-2 virus is 96% similar to the coronaviruses which can be found in the bats. The 2nd theory tells that Somewhere in China, a bat flits across the sky, leaving a trace of coronavirus in its droppings, which fall to the forest floor. A wild animal, possibly a pangolin, catch up the infection from the excrement. The novel virus accumulated in wildlife. Eventually an infected animal is captured by the human and that person catches the disease, then it transfered on to workers at a wildlife market. But these are not the authentic theories.

First time, the SARS COV-2 virus was unknown betacoronavirus and was found in bronchoalveolar samples taken from a patient in wuhan city, south china in Dec 2019. This patient was complaining about having pneumonia but after some specific tests it was predicted that, that was a new virus.

The following preventive measures were taken to prevent this virus from spreading:

1) 31/12/2019 - China alerted the WHO regarding flu like cases in Wuhan.
2) 05/01/2020 – WHO advised against travel restrictions.
3) 07/01/2020 – Virus identified as coronavirus/2019-nCOV.
4) 11/01/2020 – First death by corona virus.
5) 22/01/2020 – First emergency committee convened on IHR.
6) 31/01/2020 – WHO declared public health emergency of international concern (PHEIC).
7) 03/02/2020 – WHO strategic preparedness and response plan (SPRP) released.
8) 04/02/2020 – WHO requested the activation of UN crisis management policy to establish a crisis management team.
9) 06/02/2020 – UNDCO & WHO briefed all resident coordinators & UN country teams.
10) 11/02/2020 – WHO gives a name to Coronavirus disease i.e. COVID -19.
11) 12/02/2020 – SPRP operational planning guidelines are released.

Today there are 638,146 cases was found corona positive and 30,039 deaths was confirmed from all over the world (till 30/03/2020).

Structure of Virus[8][9][10]

The virus is spherical in shape and it consist of three components in its structure as follows:

1) Protein envelope
2) RNA as a genetic material and
3) Protein spikes.

Coronavirus viruses are spherical in shape with diameters of approximately 125 nm. There are 4 type of proteins in this virus, these are: 1) M- Membrane protein, 2) S- Spike protein, 3) E- Envelope protein and 4) N- Nucleocapsid protein. The genetic material i.e. RNA is surrounded by the protein called nucleocapsid proteins. The RNA is enclosed in shell which consist of envelope which is composed by envelope protein, protein spikes which are composed of spike protein and membrane glycoproteins. The spikes jump on the human cells, then undergo a change in structure and because of that the viral membrane get fused with the cell membrane. The viral genes can enter into the host cell to multiply to produce more viruses. Recent work shows that, SARS-CoV-2 spikes bind to receptors on the human cell surface called angiotensin-converting enzyme 2 (ACE2) same as that of SARS CoV which was reported in china in 2002-2003.

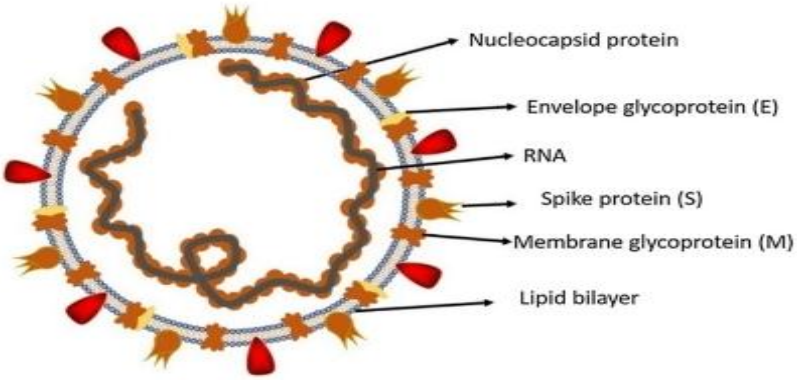

Fig. 1: Structure of corona virus.

Corona viruses contain a non-segmented, positive-sense RNA genome of ~30 kb. The genome contains a 5′ cap structure along with a 3′ poly (A) tail, allowing it to act as a mRNA for translation of the replicase polyproteins. The specific organization of the coronavirus genome is 5′-leader-UTR-replicase-S (Spike)–E (Envelope)-M (Membrane)-N (Nucleocapsid)-3′UTR- poly (A) tail with accessory genes interspersed within the structural genes at the 3′ end of the genome.

Life Cycle of Coronaviruses[10][11]

There are 4 steps of viral life in human:

1) Attachment and Entry
2) Translation of replicase gene from viral RNA
3) Replication and transcription
4) Assembly and release

1) Attachment and Entry

The attachment of the virus to the membrane is started by interaction between two components i.e. 1) S proteins and 2) its receptors. S protein contain the Receptor binding domain (RBD) on which the virus attaches first. The virus mist have entry into the cytosol hence for that it will perform following actions.

- Cleavage of S protein
- This cleavage exposes the fusion peptides
- The 2 heptide will join to S2 site
- This will form the bundle
- This bundle is responsible for the mixing of the viral and cellular membrane
- Then the fusion of the membranes occurs

- At last the virus will release its viral genome into the cytosol of the cell.

2) Translation of replicase gene from viral RNA

Replicase gene encodes two large ORFS which are rep1a and rep1b which are responsible for the coding of two proteins i.e. 1) pp1a and pp1ab. To express this two proteins, the virus have to use slippery sequence (5'-UUUAAAC-3') and a pseudoknot which is responsible for ribosomal frameshifting. Generally ribosome unwind the pseudoknot and continue the translation until stop codon arrives to stop the process.

Sometimes the pseudoknot stops the ribosome for the translation process which results in frameshifting of ribosomes. Polyprotein contain NSPS 1-11 and 1-16. Many NSPS gather into replicase transcriptase complex (RTC) to make an environment which is good for RNA synthesis. This results in replication of RNA and sub-genomic RNA transcription.

3) Replication and transcription

RNA synthesjs produces 1) Genomic RNA and 2) sub-genomic RNA. This sub-genomic RNA act as m-RNA for both structural and accessory genes. Genomic and sub-genomic RNA are produced through negative strand intermediate.

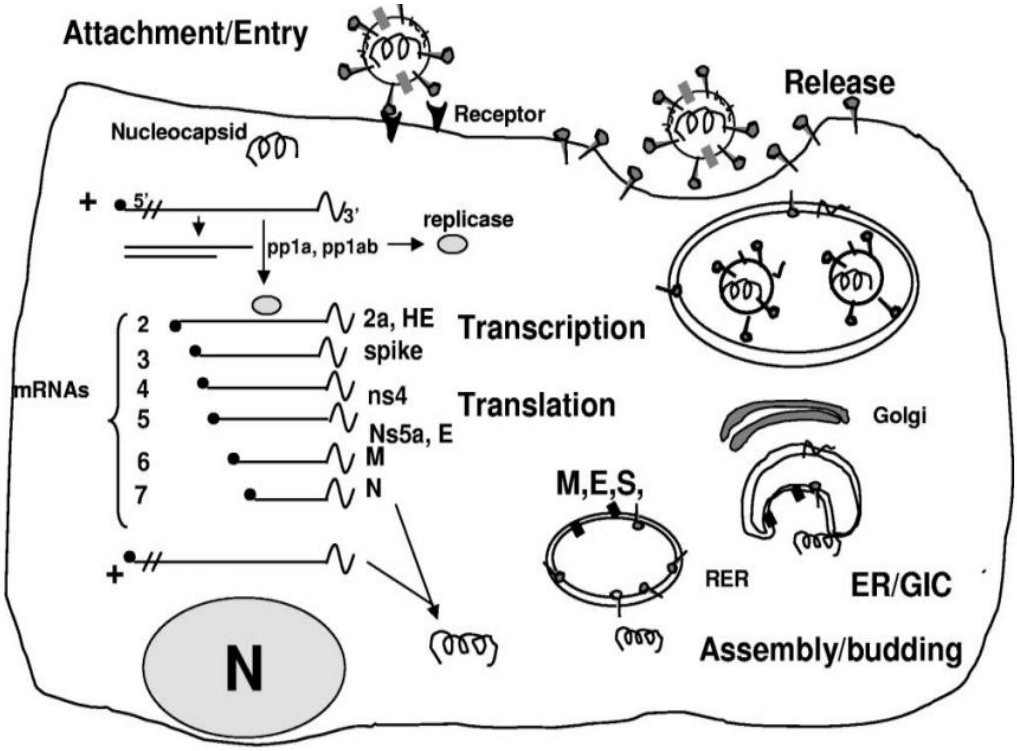

Fig. 2 Mechanism of cell cycle of virus in humans.

4) Assembly and Release

After forming sub-genomic RNA synthesis and replication, the structural proteins i.e. S, M, E and N are first translated and then inserted into the endoplasmic reticulum. This protein moved towards endoplasmic reticulum – golgi intermediate compartment (ERGIC). At this site the mature viruses are formed And gathered. This newly formed viruses then got release from the cell to produce more viruses.

Spreading of The Virus[5][12][13]

On 31 December 2019 the china had informed 44 cases of pneumonia of unknown etiology to the World Health Organization (WHO) in Wuhan City, Hubei Province. Most of the patients were linked to a large seafood and live animal market in Huanan South China Seafood Market.

After then, the virus has spread rapidly and therefore on 30 January 2020 the WHO declared a public health emergency of international concern. This outbreak spread so fast that it had spread from a single city to an entire country in only 30 days.

Table: Country wise increase in no. of cases and deaths.

Sr. No.	Name of Country	Date	Confirmed case	Confirmed deaths
1.	Spain	5 Feb	1	0
		13 Feb	2	0
		21 Feb	2	0
		29 Feb	32	0
		8 Mar	430	5
		16 Mar	7753	288
		24 Mar	33089	2182
		31 Mar	85195	7340
2.	Italy	1 Feb	2	0
		8 Feb	3	0
		16 Feb	3	0
		24 Feb	124	2
		1 Mar	1128	29
		8 Mar	5883	234
		16 Mar	24747	1089
		24 Mar	63927	6077
		31 Mar	101739	11591
3.	China	20 Jan	282	0
		28 Jan	4537	106
		5 Feb	24363	491
		13 Feb	46550	1268
		21 Feb	75569	2239
		29 Feb	79394	2838

		8 Mar	80859	3100
		16 Mar	81077	3218
		24 Mar	81747	3283
		31 Mar	82545	3314
4.	UK	1 Feb	2	0
		8 Feb	3	0
		16 Feb	9	0
		24 Feb	9	0
		1 Mar	23	0
		8 Mar	210	2
		16 Mar	1395	35
		24 Mar	6654	335
		31 Mar	22145	1408
5.	Germany	28 Jan	1	0
		5 Feb	12	0
		13 Feb	16	0
		21 Feb	16	0
		29 Feb	57	0
		8 Mar	795	0
		16 Mar	4838	12
		24 Mar	29212	126
		31 Mar	61913	583
6.	Iran	24 Feb	43	8
		1 Mar	593	43
		8 Mar	5823	145
		16 Mar	14991	853
		24 Mar	23049	1812
		31 Mar	41495	2757
7.	France	28 Jan	3	0
		5 Feb	6	0
		13 Feb	11	0
		21 Feb	12	1
		29 Feb	57	2
		8 Mar	706	10
		16 Mar	5380	127
		24 Mar	19615	869
		31 Mar	43977	3017
8.	USA	28 Jan	5	0
		5 Feb	11	0
		13 Feb	14	0
		21 Feb	15	0
		29 Feb	63	0
		8 Mar	213	11
		16 Mar	1678	41
		24 Mar	42164	471
		31 Mar	140640	2398

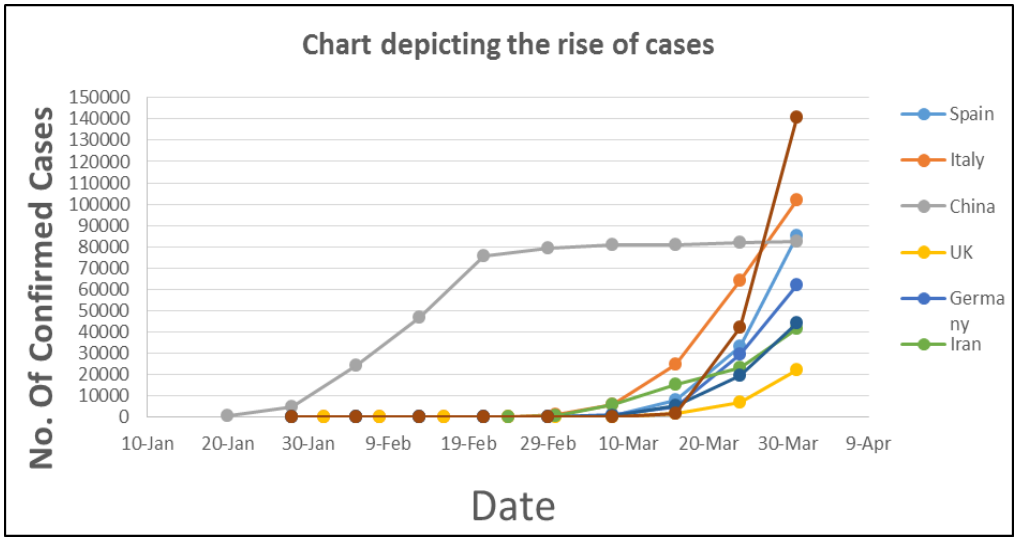

Chart depicting the rise in Confirmed Cases

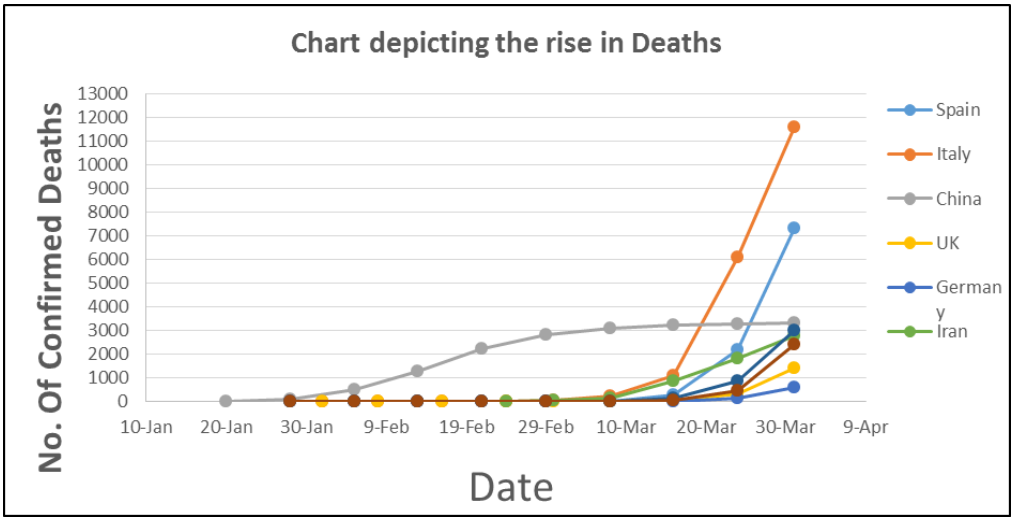

Chart depicting the rise in Deaths

Incubation Period of The Virus[14]

The SARS CoV-2 is very sensitive virus that it can live in air upto 3 hrs. The virus can stay alive for different duration on the different types of surfaces.

The following table shows the capacity of the viruses to stay alive on the different type of surfaces:

Sr no.	Surface type	Incubation period
1	Air	3 hrs
2	Cardboard	24 hrs
3	Plastic	2-3 Days
4	Stainless steel	2-3 Days
5	Copper	4 hrs

Pathophysiology[11][15]

The exact pathophysiology of the virus is unknown yet but structural analysis that it may be affect by binding with ACE-2 receptors in humans which suggests that it may have similar mechanism as of SARS COV. The genetic material i.e. RNA is surrounded by the protein envelope which have protein spikes on it. These virus attach to human cells, then undergo a structural change and because of that the viral membrane attach with the cell membrane. The viral genes then enter into the host cell to be copied to produce more viruses. Recent work shows that, like the virus that caused the 2003 SARS outbreak, SARS-CoV-2 spikes bind to receptors on the human cell surface called angiotensin-converting enzyme 2 (ACE2). A furin like cleavage site has been identified in spike protein of virus which does not exist in other SARS like corona virus.

Symptoms of Covid-19[16][17][18][19]

The explosion of symptoms depends upon the respiratory strength of the individual. Thats why this disease can be seen largely in the old age patient or babies. Approximately 80% of patients were found with mild illness, 14% were found with severe illness, and 5% were found with critical illness. Early reports suggest that illness severity is associated with older age or patients who already had diseases like blood pressure, diabetes or asthma.

Most common symptoms are as follows

1) Respiratory symptoms

I) Cold
II) Pneumonia
III) Fever
IV) Dry cough
V) Shortness of breath

2) Gastrointestinal symptoms

I) Diarrhoea
II) Nausea
III) Vomitting

3) Other symptoms includes

I) Dyspnoea
II) Myalgia

III) Anorexia
IV) Sputum production
V) Sore throat
VI) Confusion
VII) Dizziness
VIII) Headache
IX) Rhinorrhoea
X) Haemoptysis
XI) Chest pain.

Approximately 90% of patients were found with more than one signs, and 15% of patients present with fever, cough, and dyspnoea. It appears that fewer patients have prominent upper respiratory tract or gastrointestinal symptoms compared with SARS, MERS, or influenza. Before 1 to 2 days of onset of fever the patient can experience mild symptoms like nausea cough etc. Most children present with mild symptoms, without fever or pneumonia. However, they may have signs of pneumonia on chest imaging despite having minimal or no symptoms. The study on pregnant women with COVID-19 showed that the clinical symptoms in pregnant women were similar to non-pregnant women.

Diagnosis[15][19][20][21]

As the coronavirus that causes the COVID-19 disease spreads across the world, for the diagnosis of the virus use real time reverse transcription–polymerase chain reaction (real time RT-PCR). The real time RT-PCR is one of the most accurate laboratory methods for detecting, tracking, and studying the coronavirus.

What is real time RT-PCR?

For detecting the presence of specific genetic material from any pathogen, including a virus the real time RT-PCR method is used. In this method radioactive isotope markers are used to detect targeted genetic materials, but subsequent refining has led to the replacement of the isotopic labelling with special markers, most frequently fluorescent dyes.

This method is the choice for diagnosis of human CoV, as multiplex real-time RT-PCR assays have been developed. They are able to detect all four respiratory HCoVs and could be further adapted to novel CoVs. Serologic assays are important in cases of RNA my be very hard to isolate and it is no longer present and for epidemiological studies. It was suggested by

the Chinese center for disease control and prevention to use primers and probes like ORF1ab and N gene regions for the detection of SARS CoV-2 by RT-PCR.

Why use real time RT-PCR?

1. This technique is highly sensitive and specific.
2. It can deliver a reliable diagnosis as fast as three hours.
3. Real time RT-PCR is significantly faster than the other methods which used for the isolation of virus.
4. This method has a lower potential for contamination or errors as the entire process can be done within a closed tube.
5. It continues to be the most accurate method available for detection of the coronavirus.
6. Other methods of diagnosis like CT scan, High-throughput sequencing also been suggested by different health authorities.

Treatment Available[10][22]

There are some symptom controlling drugs that are showing effectiveness in treating COVID-19 but there is no exact therapy or treatment for the virus as well as for the disease.

Following are the drugs which can be used for the symptomatic relief: (https://www.cebm.net/covid-19/registered-trials-and-analysis)

- Antiviral drugs
- Antimalarial drugs
- Antibiotics and antiparasitics
- Non-specific anti inflammatory and immunosuppressive drugs
- Kinase inhibitors
- Monoclonal antibodies
- Miscellaneous agents

For the testing of the treatment of the COVID-19 the drug called as tocilizumab (Actemra) is in phase-III of clinical trials. This is an immunosuppressive drug which is generally used for Rheumatoid arthritis and systemic juvenile idiopathic arthritis. It blocks interleukin-6 It is found effective against COVID-19 in its phase-II study and now it has been entered in phase-III study. The tocilizumab specially approved by FDA for the treatment of cytokine release syndrome (CRS) which is one of the condition found in COVID-19. In the clinical trial it has been found that tocilizumab was used for the treatment of CRS in 59% patients.

The antimalarial drugs like chloroquine and hydroxychloroquine had also found effective in COVID-19. Till now Chloroquine (N-4-(7-Chloro-4-quinolinyl)-N1,N1-diethyl-1,4-pentanediamine) has been used to treat malaria. As time passes the plasmodium falsiparum developed resistance to the Chloroquine and hence the more effective and less toxic drug hydroxychloroquine was invented. In some region of the world these antimalarial drugs are use to treat the COVID-19 but it still lacks the experimental evidence.

- There are several drugs that are under clinical trials and testings:

1) Immunoglobulin- it contains non specific antibodies; it can block viral Fc receptor activation by boosting endogenous neutralizing antibodies and preventing antibody-dependent enhancement of infection.
2) Interferons- Activate cytoplasmic enzymes affecting viral messenger RNA translation and protein synthesis.
3) Interleukin-2- It shows anti inflammatory action.
4) Favipiravir- Inhibitor of viral RNA dependent RNA polymerase which can be used in treating influenza and inhibiting polymerase of other viruses like ebola, yellow fever and norovirus.
5) Triazavirin- Non-nucleoside antiviral drugs which is effective against tick borne encephalitis virus and forest spring encephalitis virus.
6) Umifenovir- Membrane haemagglutinine fusion inhibitor in influenza virus; this is active against influenza virus as it reduces the risk of pneumonia.
7) Danoprevir- Hipatitis C virus NS3 protease inhibitor that to be used in combination with ritonavir.
8) Darunavir- HIV protease inhibitor used in combination with cobicistat which is a CYP3A inhibitor.
9) Lopinavir + ritonavir – This both are HIV reverse transcriptase inhibitors and ritonavir is use to increse the effect of another drug ny blocking CYP3A4.
10) Remdesivir- It is a nucleotide analogue (inhibotor of RNA dependent RNA polymerase) which is use to treat ebola and marburg virus. It was also effective against SARS CoV-1 and MERS.
11) Thalidomide- It is a immunosuppressive drug and it inhibits the production of excess tumour necrosis factor- alpha.

- Following are the names of the universities and research organisations who are continuously doing research for to discover the cure for COVID-19 :

1) Moderna -US biotech firm.
2) Curevac – A German company.
3) Inovio- US biotech
4) Imperial college- london
5) Applied DNA science
6) Zydus cadila
7) Stemirna therapeutics
8) GSK (Glaxosmithkline)
9) Novavax -US based company
10) Altimune
11) Vaxart
12) Expre2ion
13) Generex biotechnology
14) Vaxil bio

Clinical Trials[23][24][25]

Clinical trials are conducted using many drugs like recombinant human angiotensin converting enzyme-2, NK cells (Natural Killing cells), DNS Enriched in eicosapentanaenoic acid, gamma-linolic acid and antioxidants and traditional Chinese medicine but the proper cure had not found yet.

- **Ongoing clinical trials on COVID-19**

1) **Recombinant human angiotensin converting enzyme-2 as a treatment for patients with COVID-19**

- This is a small pilot study investigating whether there is any efficacy signal that warrants a larger Phase 2B trial, or any harm that suggests that such a trial should not be done. It is not expected to produce statistically significant results in the major endpoints. Primary efficacy analysis will be carried only on patients receiving at least 4 doses of active drug. Safety analysis will be carried out on all patients receiving at least one dose of active drug. It is planned to enroll more than or equal to 24 subjects with COVID-19. It is expected to have at least 12 evaluable patients in each group. Experimental group: 0.4 mg/kg rhACE2 IV BID and standard of care Control group: standard of care.

- Intervention duration is up to 7 days of therapy.

2) Phase I/II study of universal off the shelf NKG2D ACE2 CAR-NK cells for therapy of COVID-19

- SARS-CoV-2 infection mainly leads to interstitial pneumonia. The patients with low immunity have more serious conditions. At present, there is no specific drug/therapy available for COVID-19. NK cells are the major cells of the natural immune system, which are essential for innate immunity and adaptive immunity, and are indispensable in the defense of virus infection. NKG2D is an activating receptor of NK cells, which can recognize and thus clear virus infected cells. NK cells modified by CAR play a role in targeted cell therapy, and have benn demonstrated very safe without severe side effects such as cytokine releasing syndromes. CAR-T cell-mediated cytokine release syndrome (CRS) and neurotoxicity have been shown to be abrogated through GM-CSF neutralization. ACE2 is the receptor of SARS-CoV-2 and binds to S protein of the virus envelope. We have constructed and prepared the universal off-the-shelf IL15 superagonist- and GM-CSF neutralizing scFv-secreting NKG2D-ACE2 CAR-NK derived from cord blood. By targeting the S protein of SARS-CoV-2 and NKG2DL on the surface of infected cells with ACE2 and NKG2D, respectively, and with the strong synergistic effect of IL15 superagonist and CRS prevention through GM-CSF neutralizing scFv, we hope that the SARS-CoV-2 virus particles and their infected cells can be safely and effectively removed, thus providing a safe and effective cell therapy for COVID-19. In addition, ACE2 CAR-NK cells can competitively inhibit SARS-CoV-2 infection of type II alveolar epithelial cells and other important organ or tissue cells through ACE2 so as to make SARS-CoV-2 abortive infection (i.e., no production of infectious virus particles).
- This project is an open, randomized, parallel, multicenter phase I/II clinical trial. The NKG2D-ACE2 CAR-NK cells secreting super IL15 superagonist and GM-CSF neutralizing scFv are going to be give by intravenous infusion (108 cells per kilogram of body weight, once a week) for the treatment of 30 patients with each common, severe and critical type COVID-19, respectively.

3) Hyperimmune plasma for to treat patient with COVID-19

- Apheresis from recovered donors will be performed with a cell separator device, with 500-600 mL of plasma obtained from each donor. Donors are males, age 18 yrs or more, evaluated for transmissible diseases according to the italian law. Adjunctive tests will be

for hepatitis A virus, hepatatis E virusand Parvovirus B-19. All donors will be tested for the Covid-19 neutralizing title. Each plasma bag obtained from plasmapheresis will be immediately divided in two units and frozen according to the national standards and stored separately.

- Based on experience published in literature 250-300 mL of convalescent plasma will be used to treat each of the recruited patients at most 3 times over 5 days.

4) Lopinavir/ Repinavir, Ribavirin and IFN-Beta combination for nCoV treatment.

- Apheresis from recovered donors will be performed with a cell separator device, with 500-600 mL of plasma obtained from each donor. Donors are males, age 18 yrs or more, evaluated for transmissible diseases according to the italian law. Adjunctive tests will be for hepatitis A virus, hepatatis E virusand Parvovirus B-19. All donors will be tested for the Covid-19 neutralizing title. Each plasma bag obtained from plasmapheresis will be immediately divided in two units and frozen according to the national standards and stored separately.
- Based on experience published in literature 250-300 mL of convalescent plasma will be used to treat each of the recruited patients at most 3 times over 5 days.

5) Post exposure prophylaxis therapy for SARS coronavirus-2

- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a rapidly growing virus which can cause disease called as COVID19. The current strategy is to use public health model of identifying the infected cases, their isolation, and quarantine to stop transmission of the virus. To the outpatients therapy is generally not given.
- Chloroquine or Hydroxychloroquine can be used for the antiviral effects against SARS-COV-2 which might prevent COVID19 disease. This trial is using a alteration of standard malaria dosing of hydroxychloroquine to provide post-exposure prophylaxis therapy.
- The trial is open to enrollment of healthcare workers or household contacts nationwide from across the United States. One must have a known diagnosis or exposure to a known cases.

Precautions and Preventions[26][27]

It is very necessary to avoid germs and stay in very fresh environment. This virus is present in the infected person's droplets of sneezed mucous. So it is very important to do certain things to keep your environment clean and clear.

Following are the precautions that one should take to avoid the risks:

1. Avoid close contact with people who are ill and maintain at least three feet distance between you and anyone who is suffering from coughing or sneezing.
2. Avoid touching your face specially eyes, nose, and mouth.
3. Stay at your home if you are ill.
4. Cover up your mouth and nose if you are coughing or sneezing with a tissue, then dispose that tissue.
5. Clean and disinfect frequently-touched objects using a regular household cleaning wipe.
6. The Centers for Disease Control (CDC) recommends that only infected people should wear masks to prevent the spread of this virus.
7. Wash the hands with soap and water, especially after coming from the bathroom or before eating or after blowing your nose, coughing, or sneezing.
8. If soap and water are not readily available, use a hand sanitiser with at least 60% alcohol.
9. If you have a fever, cough and difficulty breathing, go to medical facility immediately and get yourself checked up.

CONCLUSION

In conclusion, world is dealing with the challenge of containing the disease caused by novel corona virus, COVID-19. And it is a fact that researchers are struggling to know to the mysterious biological features of novel corona virus. Chinese government first started to gain success in controlling the outbreak of COVID-19 by implementing the public health strategies such as hygiene of people specially those of hands, using masks, isolating the positive patients, quarantining the suspects and lockdowns. These strategies are then followed by most of the other countries as well. There are no promising clinical treatments still for treating the novel coronavirus. Being said that, the researchers are working to find efficient therapeutic plans for treating the disease. Because of the fact that this pandemic is not over yet in the world, research literature is still increasing from different parts of the world. It may be seen that physicians will definitely intervene the transmission of the disease and be successful in controlling the disease and that will be of great benefit to human health.

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