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PANDEMIC DISEASE - CORONAVIRUS

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ABSTRACT

It is an infectious disease and virus were unknown before outbreak began in China, Wuhan in December 2019. Its respiratory disease by newly discovered `coronavirus`. COVID-19 is a viral pneumonia which is a acute respiratory syndrome(SARS) and causative organism known as "SARS-CoV-2''. Caronavirus vaccine is theoretical treatment that prepare person's he select immune system for strain of corona virus, reducing risk of infection. SARS-CoV-1, MERS-CoV, SARS-CoV-2 this is carona virus strain.

KEYWORDS: caronavirus;COVID-19; SARS-CoV-2; MERS-CoV; High fever; Dry cough; Tiredness; Favipiravir; Remdesivir; chloroquine; hydroxychloroquine; Tocilizumab; Lopinavir; Ritonavir; Swab testing kit; Immunity boosting kadha; Hand sanitizer.

INTRODUCTION

One of most deadly pathogen of recent targeting the human respiratory system which is coronavirus (SARS-CoV-2). Coronavirus disease is a communicable disease. it can cause different illness i.e. from comman cold to more severe disease such as Middle East Respiratory Syndrome (MERS-CoV) & Severe Acute Respiratory Syndrome (SARS-CoV). Coronavirus firstly recognized in Wuhan, China & its named as Coronavirus disease 2019 (COVID-19). 'CO' for Corona, 'VI' for Virus and 'D' for disease.

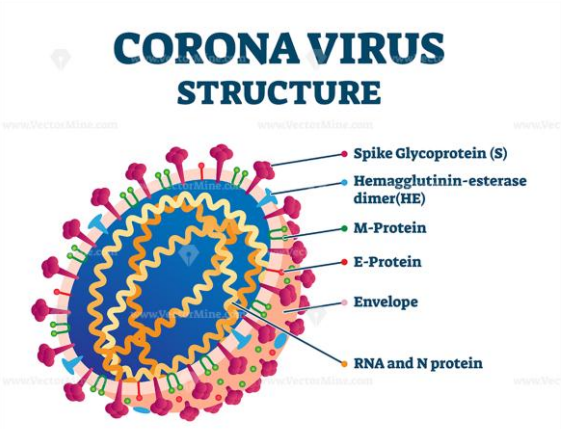
Previously this disease was nominated as '2019 novel coronavirus' or '2019-nCoV'. According to experts, SARS-CoV-2 origanated from bats. Its zoonotics, means they are transmitted between animals & humans. On 29 June 2020 WHO announced the COVID-19 are pandemic disease. This virus transmitted through the respiratory droplet of infected person by the coughing, sneezing & touching contaminated suefaces with the virus.COVID-

19 shows different symptoms in different people, mostly fever, cough, diarrohea & in more severe cases shows pneumonia, breathing difficulties, chest pain etc. People with mild symptoms and healthy should manage their symptoms at home. But elder people having Cardiovascular disease, Diabetes, Asthma & Cancer are more likely develop serious illness. From eaelier outbreacks Severe Acute Respiratory Syndrome Coronavirus(SARS-C0V) and Middle East Respiratory Syndrome Coronavirus(MERS-CoV) which treat the public health. Its is a enveloped positive-sense single-stranded RNA virus which segregated into four genera ie. alpha-coronavirus, beta-coronavirus, gama-coronavirus, delta-coronavirus. There are four endemic coronavirus infrction(HCoV-299E,HCoV-OC43, HCoV-HKU1, HCoV-NL63) which cause mild illness involving immune compromised system, flu, comman cold.

In December 2019, coronavirus is pandemic caused by SARS-CoV-2 virus shows symptoms high fever, dry cough, mylegia, pneumonia, fatigue, dyspnea. Drug is approved by FDA for COVID-19 treatment on the basis of drug repurposing and in-vitro inhibition straregy such lopinavir, ribavirin, remdesivir, acyclovir, chioroquine, hydroxychloroquine, ganciclovir.

STRUCTURE OF CORONAVIRUSES

- Corona virus are enveloped so indicating facts the sensitive to lipid solvents.
- They have club or petal shaped projection of their surfaces.
- They have positive single stranded RNA(ss RNA) genome and amongst all coronavirus.
- They have largest genome 27-32 kbp size.



- Virus of size 100-160 nm.
- They have helical symmetry and they can infect several animal.
- Among the six genera Coronavirus contain-Alpha corona, Beta corona, Gamma corona, Delta corona, Bafinivir, Torovirus.
- Human Coronavirus belongs to Alpha Coronavirus-229E, NL63.

Beta coronavirus-SARS, MERS, OC43, HKV2.

- Coronavirus that genome four structural proteins

1) Nucleocapsid (N) phosphoprotein:-Which is Ribonucleoprotein. N protein forms a complex with RNA assist in viral assembly.

2) Membrane (M) glycoprotein embedded in lipid bilayer. It forms viral envelop.

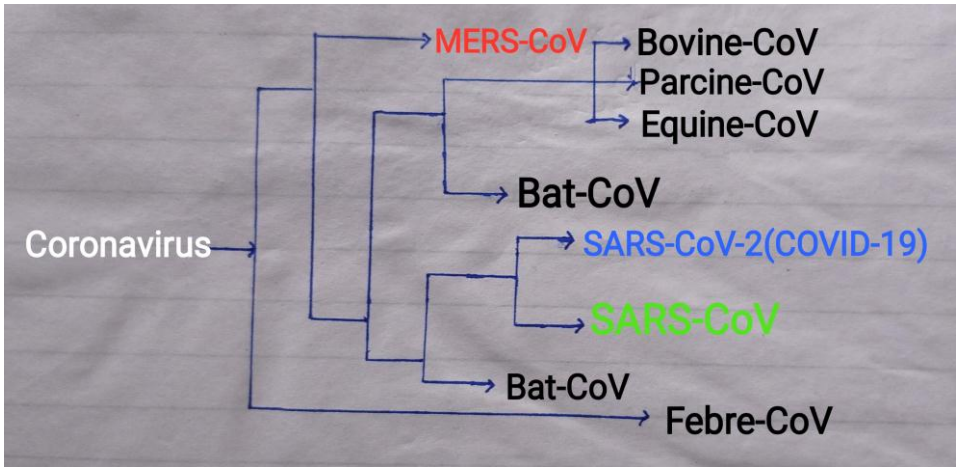
3) Spike (S) glycoprotein:-That makes the metal shaped peplomers. S protein togather with HE protein assist in viral entry to the human cell. S protein attaches to the receptor protein ACE2.Crown like appearance.

4) Small envelope (E) protein:-It form the viral envelope. E1 is matrix glycoprotein-transmembrane protein. E2 peplogenic-fusion.

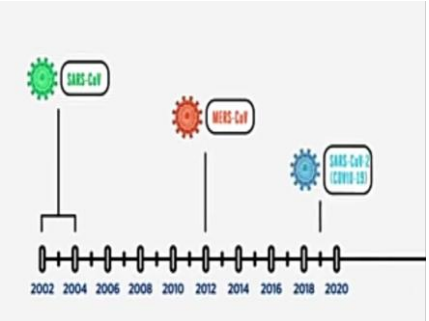
LIFE CYCLE

Coronavirus make more copies of itself and send it out.

Corona virus are rather large family of viruses.

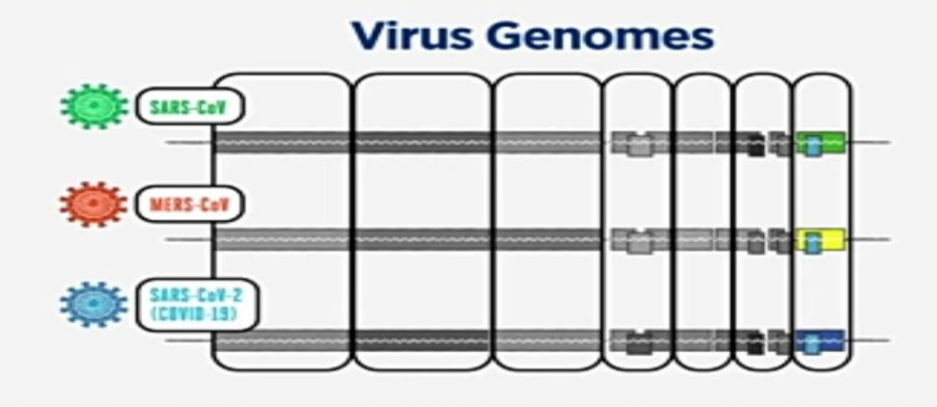


They are RNA viruses, perticuly in, recent year, virus such as SARS-CoV & MERS. Which are coronaviruses that have made the jump from another animals & humans. But have been associated with much more severe disease' And so SARS-Cov-2 represent third of that, What I call severe coronavirus disease.



Corona virus Genome

Coronavirus all have a very similar genome structure, but based on specific sequence of there gene and the number of genes they have specialized for pathogenesis, It can differented one from another.

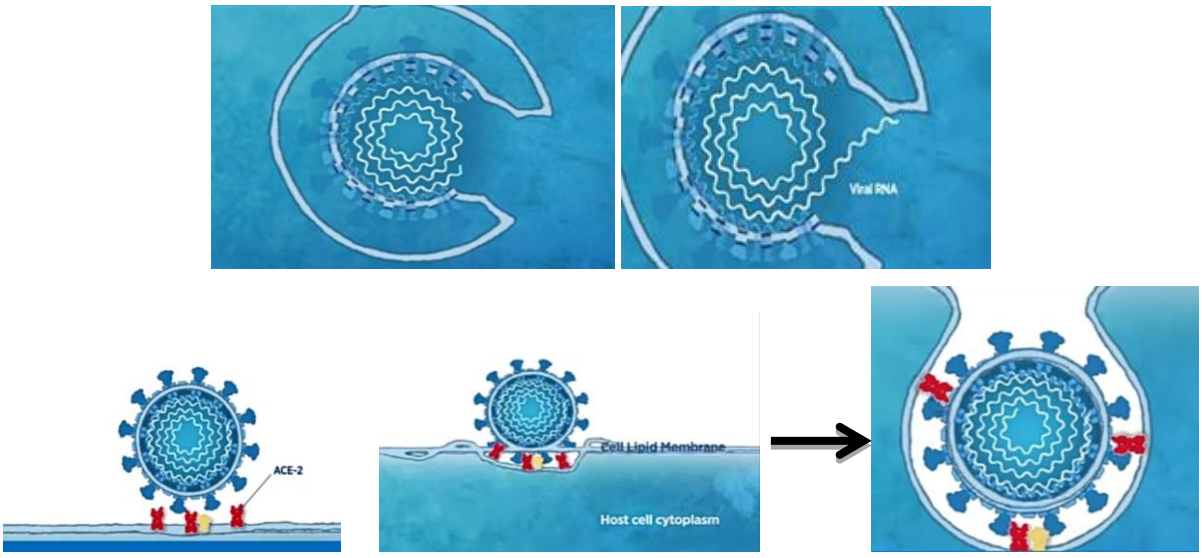


1. Infection

A virus has to do find way to attach itself to cell that it can specifically get in there. That is virus receptor interaction & for SARS-CoV-2. It binds to a protein called Angiotensin Converting Enzyme-2(ACE-2) of some but not all cell.

2. Internalization

Viruses then have to get inside a cell, in case of SARE-CoV. It has sort of membrane around it that hides. Its genetic material from the outside world. Body cell have same kind of membrane around them that hides their material from outsides world. So when these two thing come together, virus has to find.

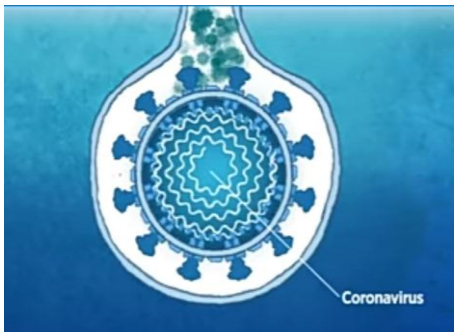


3. Protease processing

A wat to get its gene inside the host cell.

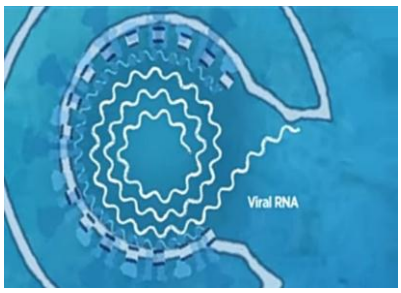
4. Membrane Fusion & Release Of Viral RNA

The virus genome, when it enter a cell. start to find something in the host called ribosome and ribosome it what turn RNA into protein.



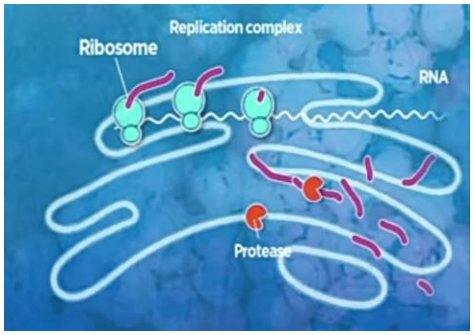
5. Translation & RNA Replication

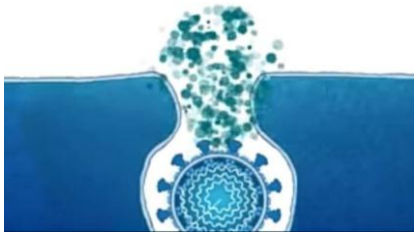
Its takes of sequence of RNA & then it translate that into protein sequence. RNA is primarily the means that have express our genes. The more viral RNA that's in the cell, the more of that RNA will be translated into protein & faster the virus can take over the cell. Their RNA serves those two purpose. It encodes the genes that it has to complete its lifecycle. But it also is way that it sends a massage out to cells to say," make more of genes". And so within a few hours, there is large protein of your protein within your cells that are either from virus or that the virus has some how manipulated.



6. Packaging & Assembly

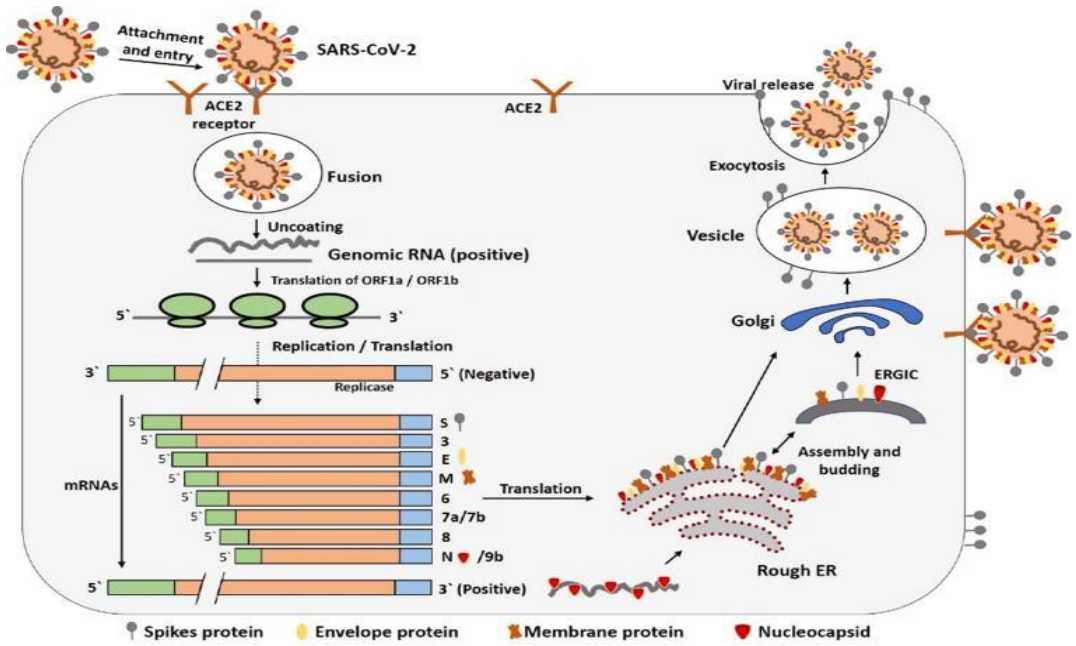
Of the virus lifecycle, the virus sends out its protein to particular places within the cell that are then the places where protein are concentraded & new virus particle are made.





7. Exocytosis & Release

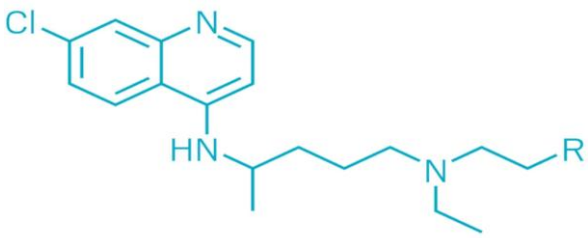
New virus particle are made.



DRUG APPROVED IN CORONAVIRUS

1) Remdesivir

- Its under two trial.
- Investigational intravenous drug with broad antiviral activity.
- Inhibit viral replication through premature terminatiyof RNA transcription.
- In-vitro activity against related beta corona viruses.

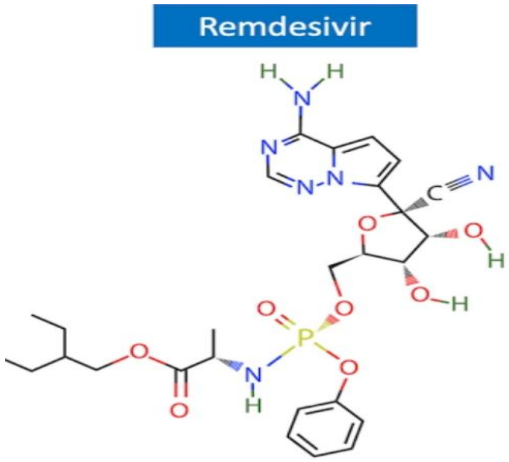


Chloroquine, R = H
Hydroxychloroquine, R = OH

- Blocks RNA dependent polymerases.
- Several randomized trial are underway to evaluate efficacy of Remdesivir for moderate or severe COVID-19.
- Mechanism of action-

*As an adenosine nucleotide triphospate analog

*The active metabolite of remdesivir interferes with the action of viral RNA-dependent RNA production



*Thus the inhibit the virus production

2) Chloroquine or hydroxychloroquine

- Oral prescription drug used for treatment of malaria and certain inflammatory conditions.

#Chloroquine:- It used treatment of malaria and chemoprophylaxis.

 # Hydroxychloroquine:-It is used treatment of Rheumatoid Arthritis system is lupus erythematosus and porphyria cutanea tarda treatment.

- Both drugs have in vitro activity against SARS-CoV,SARS-CoV-2 & other corona virus. Hydroxychloroquine:-Higher potency against SARS-CoV-2.
- Both have been reported to inhibit SARS-CoV-2.
- Chloroquine included in treatment guidelines from China's National Health Commission and was reportedly associated with reduced progression of disease and decrease duration of symptoms (primary data supporting these claims have not been published)
- In an open label study of 36 patients with COVID-19.

❖ Hydroxychloroquine (200 mg three per day for 10 days) was associated with higher rate of undetectable SARS-CoV-2 RNA on nasopharyngeal specimens at day 6 compared with no specific treatment (70 versus 12.5%).

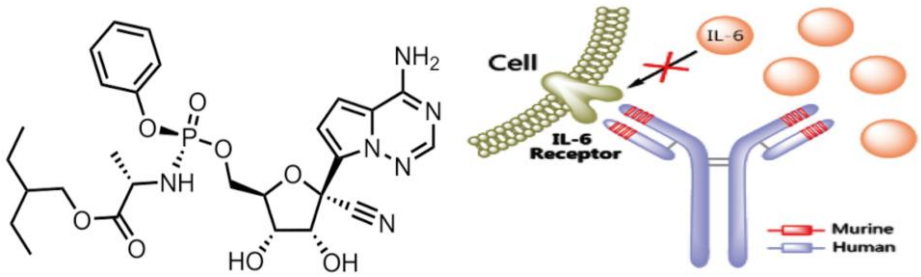
- Some clinicians think it is reasonable to use hydroxychloroquine (or chloroquine) in hospitalized patients with severe or risk for severe infection if they are not eligible for other clinical trials.

❖ Despite the limited clinical data

- ❖ Given the relative safety of short term use of hydroxychloroquine
- ❖ Luck of known effective intervention
- ❖ In vitro antiviral activity
- Possibility of drug toxicity (QTc prolongation and retinal toxicity) should be considered prior to using hydroxychloroquine.Particularly in individuals who may be more susceptible to these effect.
- Optimal dosing and duration of hydroxychloroquine for treatment of COVID-19 are unknown
- Some U.S. clinicians have reported anecdotally different hydroxychloroquine dosing such as:
- ❖ 400 mg BID on day one, then daily for days
- ❖ 400 mg BID on day one, then 200 mg BID for 4 days
- ❖ 600 mg BID on day one, then 400 mg daily on days 2-5.
- b.I.d.(on prescription): means twice (two times) a day

#Abbreviation for "bis in die" (Latin)-twice a day

3) Tocilizumab



- IL-6 inhibitor tocilizumab for patients with severe COVID-19 and elevated IL-6 levels(treatment guidelines from China's National Health Commission)
- Agent is being elevated in a clinical trial
- Under investigation for COVID-19 pneumonia
- Tocilizumab injection-present 2 clinical trials
- Inhibition of IL-6 receptors by tocilizumab leads to reduction in cytokine and acute phase reactant

4) Lopinavir/Ritonavir

- Little to no role in treatment of SARS-CoV-2 injection
- Combined protease inhibitor

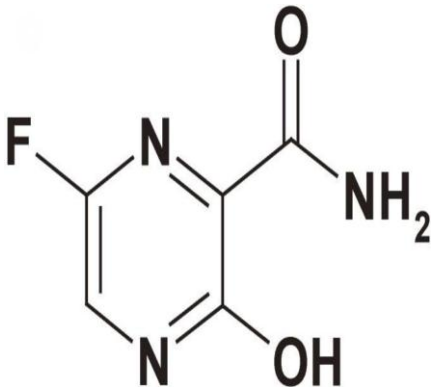
- ❖ primarily been used for HIV infection
- ❖ In vitro activity against the SARS-CoV
- ❖ Some activity against MERS-CoV in animal studies

- No difference in time to clinical improvement or mortality at 28 days in a randomized trial of 199 patients with severe COVID-19 given lopinavir-ritonavir(400/100 mg) twice daily for 14 days in addition to standard care versus those who received standard of care

5) Favipiravir

Mechanism of action

- It's action is thought to be related to the selective inhibition of viral RNA-dependant RNA polymerase
- Thus inhibit the viral RNA Replication and inhibit growth
- other resurch suggests that favipiravir induces lethal RNA transcription mutations, producing nonviable viral phenotype
- Favipiravir is prodrug that is metabolized to its active form,favipiravir-ribofuranosyl-5'-triphosphate(favipiravir-RTP),available in both oral and intravenous formulation



TEST OF CORONAVIRUSES

Thre are two main test -

1) Swab testing(Nasopharyngeal & oropharyngeal swab)

2) Antibody test or Blood test or Serological test

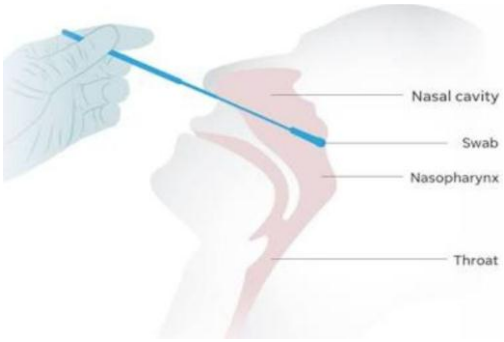
These test shows corona virus present in body.

1) Swab testing

a) Nasopharyngeal swab

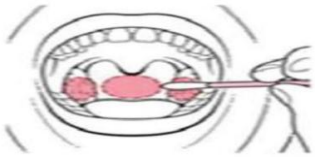
Procedure:-

- Open the sampling kit.
- Apply hand sanitizer with at least 60% alcohol.
- Sample collection should using sterile swab made from artificial cotton with flexible plastic shafts.
- calcium alginate swab or swab with wooden shafts must not used,becose they cause patient injury.
- Insert the swab into nostril, Don't insert it more than half an inch into nostril.
- Leave the swab at this depth for few second while gently wiping the wall by twisting the swab shaft.
- Slowly and gently remove the swab and immediately insert the swab into the sample collection tube, which may contain 2-3 ml of viral transport media.



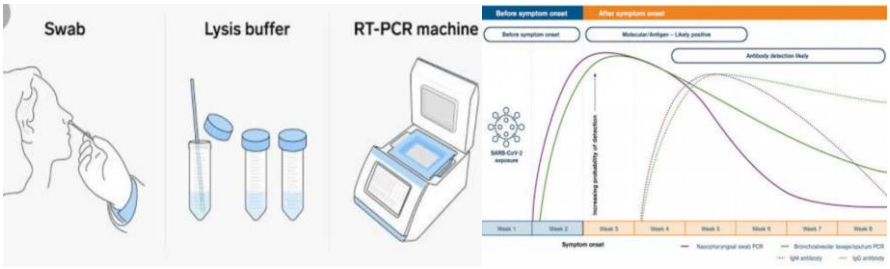
b) Oropharyngeal swab

- Sample collected through the mouth.
- Insert the swab into oral cavity without touching lips, teeth, toungue, hard palate or soft palate.
- These surface should avoided as they are often colonized by wide range of microbes.
- Collect sampling the oropharyngeal wall.
- Sample collection tube sent to the laboratory as quickly possible.



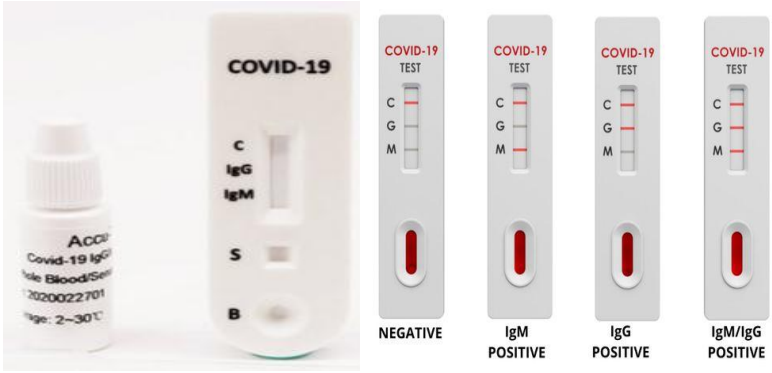
PCR testing

Which stand for Polymerase Chain Reaction-Its able to take genetic material from the virus, target specific gene segments that only that virus has and make very large number of copies of those segments so that detected and measure in PCR machine. Sample is mixed with chemical reagents and put in machine that duplicate the genetic material. If virus exists the copies made by machine will confirm it's prence.



2) Antibody test or Blood test or Serological test

- Collect the sample from finger.
- This sample determine blood has antibodies to fight against the virus.



RESULT

- ❖ If test has positive, then it that antibodies present in blood, means infected corona virus at some point of time in past few days. Symptoms not has been visible, but body generated antibodies to fight it.
- ❖ If test has negative, no antibodies in body. That maeans not infected by corona virus.
- This test result time in 15 minutes. Result indicator kit simillar to pregnancy test. This kit show three latter C,G and M.

- 'C' is a control line. 'C' line always visible.
- Put blood sample below the M.
- If there is line beside C and there's no line beside G and M. This means test is negative. It means no antibodies in body to fight against corona virus.
- G and M refers to IgG and IgM type of antibidies. There are two different types of antibodies.
- IgM antibodies are shows blood contracted a fresh infection.

❖ If indicator shows line C and M. This means that result positive and there are IgM antibodies present in body. It indicate contracted the corona virus recently in past few days.

❖ If indicator shows line on both G and M, It means both IgG and IgM antibodies are present in blood.

❖ If line shows up only G, It means contracted corona virus infection quite some time ago. Range of more than 20-25 days.

- Result negative, If there's line only on c and not on G and M.

IMMUNITY BOOTING - KADHA

Kadha is tried & tested one and it shared by COVID-19 survivor. It is immunity boosting that helped her combat condition. Consuming herbal drinks & taking proper rest and survive deadly viral disease. It is also known as" Life Saving Kadha''. Kadha consuming once or twice a day. Black pepper show important role in getting rid of cough & cold. When added in ratio 1:10 with turmeric.

No.	Ingredient	Taken quanty	Chemical constuent	use
1.	Black pepper	6 Piece	Piperine	• Improve breathing • Reduceinflammation
2.	Clove	2 Piece	Eugenol	• Antioxident • Decrese oxidative stress • Prevent liver disease • Expectorant
3.	Ginger	½ tablespoon	Gingerol	• Used in respiratory disorder • Antihypertensive • Anti-inflammatory
4.	Giloy (Amruta)	10 Gram	Columbin, Tinosporaside, Palmatin, Jatrorhicine	• Anti-inflammatory • Antipyretic • Improve immunity
5.	Turmeric	2 Gram	Curcumin	• Anti-inflammatory • Immunity booster • Improve digotion

6.	Basil(Tulsi)	10 Leaves	Eugenol	• Promote blood circulation • Anti-inflammatary
7.	Jaggery	As per test	Sucrose	• Antiallergic • Relax respiratory muscles
8.	Lemon	3 Drop	Limonene	• Source of Vit-C • Immunity booster
9.	Water	1000 ml		• As a solvent

Procedure

- Take any one type of vessels ie. tea pot for kadha.
- Then adding purified water in vessel for boiling.
- In mortar & pestle crushed-Cinnamon, Clove, Ginger, Black pepper.
- Clove do not adding more because it will heat up in body.
- These crushed species takes place in boiling water.
- Then adding remaining ingredient.
- Add jiggery as per your test.
- These mixture boiled in 10 minute in slow flame.
- After 10 minute, turn off the heat.
- Add lemon juice as per your test.
- Kadha is ready to drinking.

Property

a) Colour: yellow

b) Odour: characteristics

c) Taste: sweet

d) Life period: 1-2 days

HAND SANITIZER

It's one of best way to protect yourself & your family from getting sick or infection. Hand sanitizer can kill 99% germs include bacteria, virus and protozoa.

No.	Ingredients	Taken quanty	Uses
1.	60%Alcohol	100 ml	• It kills most bacteria, fungi & stop some viruses
2.	Detol soap	50 gm	• Antibacterial • Make skin softer, smoother & healthy
3.	Neem leaves	10 leaves	• Prevent infection • Ensures instant hygiene • Antimicrobial • Antifungal
4.	Aloe-vera gel	15 gm	• Provides moisture & nourishment • Balance the harsh drying effect of the alcohol
5.	Glycerin	2 tablespoon	• Emollient • Prevent dry, rough, scoly itchy skin.
6.	Basil	5 leaves	• Moisturizer • Hygienic • Germ free • Cleaning
7.	Camphor	1 piece	• Eliminate germs & provides nourishment & refreshness
8.	Distilled water	750 ml	• As a solvent

Procedure

- Take few Aloe-vera leaves, cut top skin, then remove all gel or juice. If not available Aloe-vera leaves you take Aleo-vera gel.
- In blender add detol soap and 500 ml purified water.
- This mixture blended about 5-7 minutes.
- In pan add 250 ml purified water for boiling. After boiling water add above blending mixtuer and mix well.
- Then boil the mixture about 5-10 minutes.
- Lets it cool for 30 minutes.
- After cooling it well harder.
- Put into blender again.
- In blender add Aleo-vera gel, neem leaves, basil leaves, camphor,60%alcohol,glycerine and 100 ml purified water.
- Blend well for 4-5minutes.

- Then it fill quickly transparent bottle or sprayable dispenser.
- Finally, Handwash ready to use.
- Wash your hand at least for 20 seconds.

Property

- Appearance-White foam
- Fragrance-Mild alcohol odour
- Texture- semisolid
- pH-7-8

Hand Sanitizer proper technique

Step 1:

Apply enough sanitizer to completely cover both hands.

Step 2:

Rub hands togather, palm to palm.

Step 3:

Rub back of each hand with palm of ther hand.

Step 4:

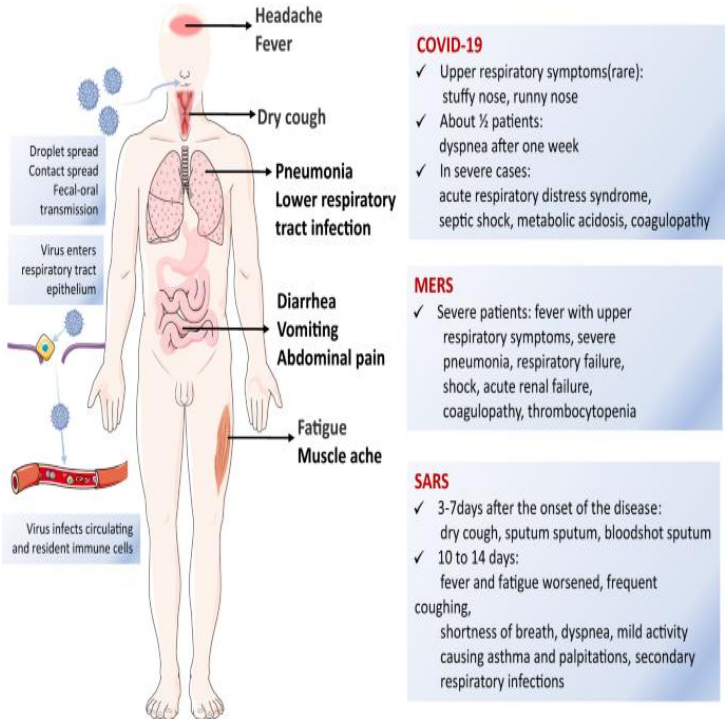
Spread sanitizer over and under fingernails.

Step 5:

Spread sanitizer between fingers.

Step 6:

Keep rubbing hands togather until they are dry. Do not dry with a towel.



SYMPTOMS

COVID-19 affects different ways in people. It is infectious disease caused by SARS-CoV-2.SARS CoV-2 virus is more stronger than SARS-CoV virus with reproductive number 3 to 5.7. It indicate spreading infection of COVID-19 from infected person.

The incubation period from 2-14 days before symptoms appear.

A) Most common symptoms

a) High fever(100.4'F or higher)-88%
b) Dry cough (after 2-7 days develop)-68%
c) Tiredness-70%

B) Less common symptoms

1. Aches & muscle pain-15%
2. Diarrhea-22%
3. Headache-26%
4. Sore throat-15%
5. Conjunctivitis-10%
6. Loss of test or smell-15%
7. Shortness of breath-19%

8. Ranny nose-25%
9. Discoloration of finger or toes-7%

C) Serious Symptoms

1) Chest pain or Hypertension (increase blood pressure)

2) loss of speech or movement

3) Difficulty of breathing or Shortness of breath

Transmission- Cough or sneezes from infected person or touching contaminated objects.

If you have serious symptoms, young treat immediately medical attention. Always visiting your Doctor or Healthy facility.

Who are healthy people always manager their mild symptoms at home.

PREVENTION OF CORONAVIRUS

1) Wash hands frequently

Scrub backs of hands, between fingers and under nails for at least 20 seconds with soap and water or alcohol-based hand rub to kill viruses.

2) Avoid crowded places

When someone coughs or sneezes, they release small liquid droplets from their nose or mouth that may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus.

3) Avoid touching eyes, nose and mouth

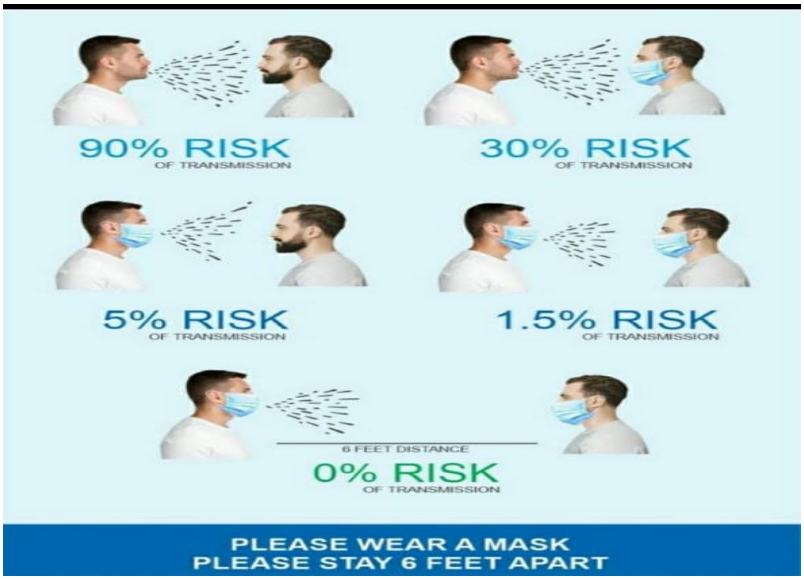
Hands touch many suefaces and can pick up viruses. Once contaminated, hands can transfer the virus can enter your body.

4) Practice respiratory hygiene

Droplets spread virus, By following good respiratory hygiene, you protect the people around you from viruses.

5) Wear a mask if you have respiratory symptoms

Mask isn't required to be worn by all. Only those with respiratory symptoms (coughing or sneezing) need to use it to protect others from gatting the virus. If you use a mask, make sure it is disposed of properly.



CONCLUSION

On March 11 World Health Oranganization (WHO) declared COVID-19. It's pandemic disease is clearly an international public problem. This article helpful in what we know about pathogen, how it infects cells and cause disease & clinical characteristics of disease. This resurch paper helpful in to avoiding infection from one person to another person ie. Coronavirus. In this article include all point to decrease Coronavirus. Also providing homemade Kadha and Hand sanitizer. Which are free from harmful chemicals. Kadha is improving immunity power. Which are not infected to body organ. Hand sanitizer kills the microorganism. Coronavirus are globally distributed. It occur coronavirus respiratory infection. There have been rapid advances in what we know about the pathogen, how it infects cells and cause disease and clinical characteristics of disease. Due to rapid transmission, countries around the world should increase attention into disease.

"Stay home Stay safe"

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