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A Comprehensive Report On Critical Aspects Of The Virus That Caged Us.

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ABSTRACT

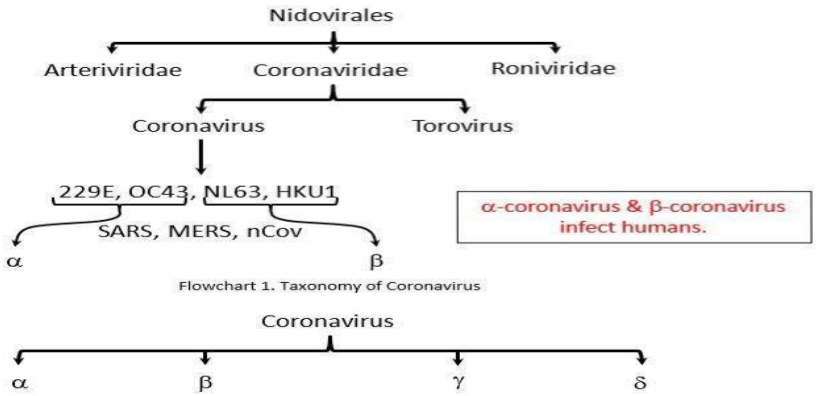
SARS COV-2 is a zoonotic single stranded, positively charged RNA virus belonging to the family of coronaviruses and order of Nidovirales and there are evidences regarding its transmission to humans which state it jumped from bats to pangolins to humans via several mutations. There are several different methods that are being considered for the treatment including Ivermectin, Hydroxychloroquine, carbon quantum dots, plasma therapy, etc. Testing of patients is being carried out by RT-PCR. The gear to fight the virus includes coveralls, goggles, gloves, etc. Soaps, disinfectants and sanitizers have also played a crutial role in the fight against the virus.

1. INTRODUCTION

SARS-CoV-2 is the virus that has, pushed all mankind into a vulnerable and helpless state. In this piece of literature I shall attempt to elaborate the information available about the virus. It remains no secret that the virus has already affected more than 5.6 million people globally. It therefore becomes more important to know and understand the nature of the threat.

2. BIOLOGICAL ASPECTS OF THE VIRUS.

What is generally being referred to as the novel corona virus among the masses, has another name in the scientific community. It is known as SARS COV II as it closely resembles the SARS virus. It belongs to a family of viruses commonly called 'corona viruses'. The word corona means crown and refers to the spike glycoproteins on the capsid membrane of the virus that binds to the receptors of the cells. This family of viruses includes viruses that are usually weak and most of them do not even affect humans, however 7 members of this family have been found to infect humans and usually cause diseases like the common cold and



Flowchart 1. Taxonomy of Coronavirus

influenza. In past few years and in the light of the recent events, it has been seen that these

weak viruses have potentially mutated and have infected humans to cause a number of major threats in the form of epidemics and pandemics such as SARS, MERS and CoVID-19 being the latest entry to the list.

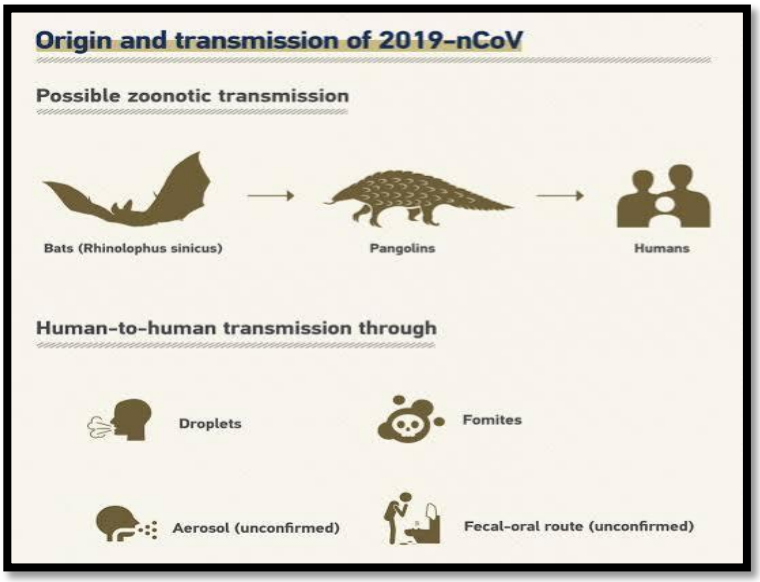
Corona viruses can be of different types (alpha, beta, gamma or delta). The CoVID-19 causing SARS-COV-2 is a beta virus with RNA as its genetic material. The RNA is positive stranded and is capped and polyadenylated. It means that the virus belongs to the order of viruses called Nidovirales. Although the virus is supposedly weak as it has a slow rate of mutation and a low mortality rate, it has a very high rate of spreading and that is where the problem steps in. Researchers all around the world are struggling to produce vaccines. A recent study conducted at the National Institute of Biomedical Genomics, West Bengal reveals that there are atleast 11 strains of the virus. The study suggests that the original strain is called O and it has mutated to different types, A2a being the most prevalent strain that has affected a cosmopolitan crowd including India. The A2a strain is causing more trouble due to its better compatibility to bind to ACE 2 receptors in the lungs due to a single mutation in the spike proteins from aspartic acid to glycine. This further increases the probability of leading to a cytokine storm that may worsen the patient's condition.

3. HISTORY OF THE VIRUS.

We are learning new things about the virus each day and hence there is an immense amount of data. Amidst all this, scientists have been trying to trace back the first case in order understand the nature of transmission and its modes. If the reports of South Morning China Post are to be believed, the very first case of covid 19 may have come out from Hubei province in China almost a month before the cases began in Wuhan. The case of Hubei happens to be a 55 year old man who may actually have been the first patient of this pandemic. In fact a few of the initial cases strangely turn out to have no connections to the vet market in Wuhan. This simply means that those people may have caught the infection from other already infected people.

However something to ponder about is the fact that this virus is said to have transmitted from horseshoe bats to humans but this transmission could not have occurred directly. There needs to be another animal that carried it to humans from Horseshoe bats. It is because of this transmission from animals to humans that this virus is zoonotic. However the transmittance could not have been from bats to humans directly. There must have been an intermediate host in the body of which the virus may have further mutated. In the early findings it was being speculated that the intermediate host could have been snakes as they have 80% of the spike proteins required SARS Cov 2 but in an interesting turn of events it turned out that the intermediate host most probably were pangolins. The idea of snakes being the intermediates was dropped because it stood next to impossible for a virus to transmit from a cold blooded environment to human body. A study conducted at the Michigan University shows that it is not possible to consider only the usage of codons to study the intermediate host. The study also found out that the lung samples of the Malayan pangolins resemble the SARS Cov 2 virus in humans. The 2 viruses even share 91% of their genetic sequences.

It is however to be noted that bats do not pose any potential threat as the virus seems to have originated from bats but has then mutated. The virus found in bats is RATG13 which is said to be an ancestor of the SARS-CoV-2 virus. RATG13 is not a zoonotic virus and does not effect humans. However it has been observed that bats are kind of a primary host to a lot of viruses and this attributes to the exceptional immunity of bats which provides viruses live vectors that can communicate the virus in a much better manner as they are also the only flying mammals.



4. ABOUT THE DISEASE.

COVID-19 is an acronym for corona virus disease 2019. The disease affects different people in a myriad ways. Most of the infected people have chances ofdeveloping mild to moderate symptoms of illness and may even recover without any special hospitalization whatsoever being under self isolation.

The disease Covid-19 does not yet have a specified set of symptoms to identify or demarcate it from other diseases. It may sometimes even be asymptomatic. Most of the severe cases are characterized by the difficulty in breathing and pneumonia.

Most common symptoms however are listed below,

01.Fever

02.Dry cough

03.Tiredness

Less common symptoms:

Aches and pains

Sore throat

Diarrhoea

Conjunctivitis

Headache

Loss of taste or smell

A rash on skin, or discolouration of fingers or toes

Serious symptoms:

Difficulty breathing or shortness of breath

Chest pain or pressure

Loss of speech or movement.

One should seek immediate medical attention if they have serious symptoms. People mostly with mild symptoms who are otherwise healthy should manage their symptoms at home.

On average it takes 5–6 days from when someone is infected with the virus for symptoms to show, however it can take up to 14 days. Hence 14 days is the prepatient period. It can be as low as 2 days also. People with preexisting health conditions are are a lt a higher risk of contracting the disease. Also the elderly are to be taken care of. Even the mortality rate differs in different age groups and regions.

5. TREATMENTS

01.Hydroxychloroquine

It is an example of a classic, old anti-malarial drug.

Hydroxychloroquine functions through the followingmechanism, it basically increasesthe pH of lysosomes in the antigen-presenting cells and as an inhibitor of the phenomenon called autophagy (the phenomenonthat involves the selective degradation or rather the removal of damaged cell organelles from the cell via the autophagosome).

The anti-viral properties of the drug are also attributed to a mechanism that essentiallyincorporates the interference with glycosylation of the angiotensin-converting enzyme- (ACE)-2, which happens to be tge the cellular receptor of SARS-CoV (1, 2) in human lungs and other parts of the respiratory tract. It also yeilds high tissue absorption with a terminal half-life of almost 40 days that is mainly attributed to high-tissue deposition and not reduced clearance. There are certain major side effects howsoever and they include vomiting, headache, changes in vision i.e., retinopathies, muscle weakness and QT prolongation.

02.Cytokine suppressant drugs.

Recent reports elucidate the fact that a few critically important research studies from China show that for a good numberof the patients who died of Covid-19there, it could have been their own immune system’s response that is accountable, rather than the virus itself, that makes it all themore fatal. The phenomenon involved in this case is called a cytokine storm.

In case of a patient having a cytokine storm, it is an excessive burst of immune initiatedresponses that seem to possess threat as they damage the healthy lung tissues, this leading to acute respiratory distress and sometimes even to a much worse scenario, multi-organ failures. Untreated or under treated cytokine storm syndromesmay be potentiallydangerous and can even be usually fatal. Patients in some of the other studies who developed cytokine storm syndrome after viral triggers often ironically possessed subtle genetic immune defects resulting in the uncontrolled immune response. Cytokine storms lead to frequently fatal multi-organ dysfunction syndrome (MODS) making the situation further painful.

Those people with cytokine storm syndromeare also required to betreated for the hyperactive immune initiatedresponses. In such cases,the hyperactivity or over reactivityof the immune responses can subdue all the positiveeffects of medication and may turn out to be lethal or fatal. All the Covid-19 patients who have sickness, serious enough for hospitalization should be diagnosedby a cheap, rapid, and easy to access serum ferritin blood test. This is a great screening test for the detection and determination of the probability or chances opf a cytokine storm syndrome causing haywire in severely sick patients who have high fevers.

In the lightof the recent events , a number of a specific anti-cytokine approaches have proven to be of great value and haveceremoniously emerged out to be an effective alternative in the treatment of a variety of cytokine storm syndromes, including the ones that are initiated as a responseto the infectious viruses. Cytokinesuppressant drugs usually include medicines that target interleukin-1 (IL-1), IL-6, IL-18, and interferon-gamma. Although,we know that the random trials would be the first step required so as to confirm the one, if any, of the above stated therapeutics will prove its effectively and efficiency in thetreatment of Covid-19-infected patients who showsymptomsof severe cytokine storm syndromes, IL-6 blockade is the one that has most recently been the one reported by researchersto be put to use in China with some unprecedentedly successful outcomes in some individuals receiving this as part of their treatment and medication.

03.Plasma therapy

The convalescent plasma therapy which has recently created a lot of buzz, aims at the using of antibodies generated from the blood samples of a recovered Covid-19 patient so as to treat those severely affected people. The therapy can also be used to immunise those people who are at a higher risk of contracting the virus -- such as health workers, families of patients and other high-risk contacts.

This therapy's principle or concept is very simple and basic and is based upon the fact that the blood of a patient who has recovered from Covid-19 will contain antibodies with the specific ability of fighting novel coronavirus. The theory is that the recovered patient's antibodies, once ingested into a patient under treatment,will begin targetting and fighting the novel coronavirus in the second patient.

The convalescent plasma therapy is referred to as the passive immunisation as, according to researchers, it is a preventive measure and not a treatment for the Covid-19 disease

04.Ivermectin

Ivermectin has proved to be an excellent and promising inhibitor for the COVID-19 pandemic causing novelcoronavirus (SARS-CoV-2) in in-vitro conditions.A single dose of treatment provided with the promising drug was efficientenough in order to effect ~5000-fold reduction in the viability of the virus in just the next 48 hours or so in cell cultures. Ivermectin has been approvedby theFDA,a drug for parasitic infections, and therefore it has a potential for repurposing during the pandemic .

Ivermectin is usually widely available, due to the fact that it is included in the WHO model list of essential medicines.Ivermectin has been approved by the FDA as an anti-parasiticanti-parasitic drugthat has previously proven to have a broad-spectrum of anti-viral activity in vitro, it is an inhibitor of the causative virus (SARS-CoV-2), with a single addition to Vero-hSLAM cells 2 h post infection with SARS-CoV-2 able to effect ~5000-fold reduction in viral RNA in about 48 h. Ivermectin therefore assures us about the further investigation for a plethora of possible benefits when it comes to humans. The combination of an anti-parasitic drug dosage in right quantities with an antibiotic that had produced truly "astounding" outcomes when it is used in order to treat the patientsof coronavirus, thus helping the thousands of patients who are infectedso as to recover within a very short span of four days that too without having shown any visible side effects yet.

It was the medical team under the leadership of Dr Md Tarek Alam, who happens to be the head of the Bangladesh Medical College Hospital's medicine department, had recently reported theirstudy and its conclusions.

There are several other combinations of medicines that are presently being administered to the patients. Several attempts have also been put in making a vaccine but none has been successfully made yet.

Virions of the novel coronavirus are in the form of spheres that appear to have an average diameter of 125 nm. The studies have revealed that these viruses have a viral envelope and a positive-sense single-stranded RNA genome. Virus particles of coronavirus have four types of structural proteins, that are named as follows – spike (S), membrane (M), envelope €, and nucleocapsid (N) proteins, are one of which the S protein has an important role in attaching or binding the virus to its host's cells and allowing it to enter the host's cells; therefore , an effective way of fighting against this virus could be targeting the S protein's mechanism of action by developing special drugs and inhibiting compounds so as to disable the binding .

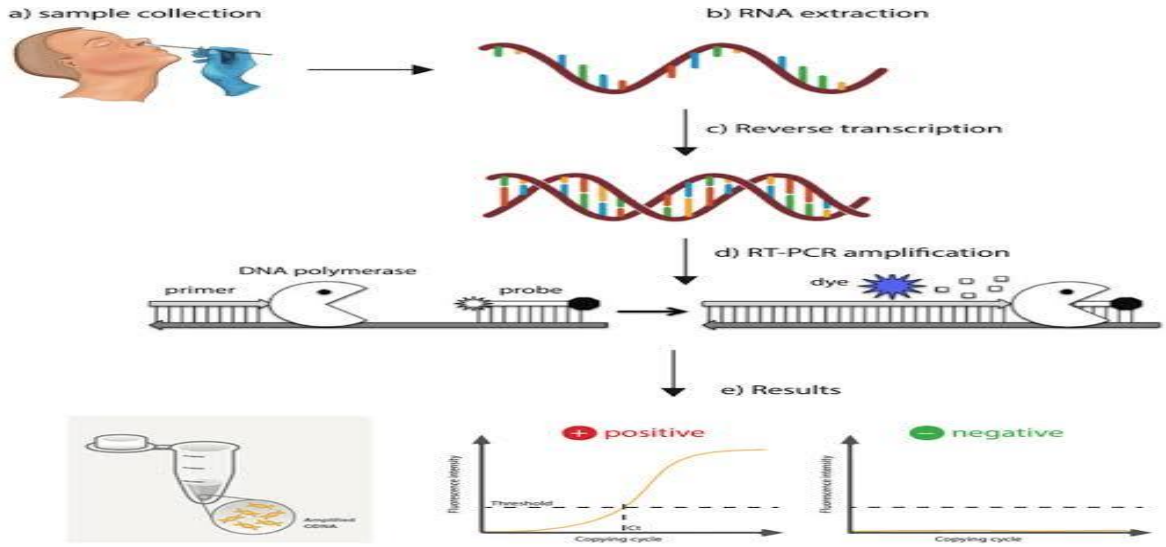
05.The role of Nanotechnology as a solutiontoCoronavirus.

Attributed to their high specific surface area and a possibility of being functionalized with a variety of functional groups, nanomaterials such as gold nanoparticles and carbon quantum dots (CQDs) are exceptional choices for interacting with viruses and preventing their entry into the host cells.

A group of researchers from the University7 of Lille, Francein a collaboration with the Ruhr-University Bochum, Germany, have latelybeen workingand have been successful in presenting their work that the CQDs functionalized with boronic acid ligands interfere with the functions of coronavirus's S proteins and hence they significantly inhibit the entry into the host cells. The studies that the group made have been successful at demonstrating that the addition of these nanomaterials to the cell culture medium, before and during infection with coronavirus, considerably reduces the rate of infection of the cells. Surprisingly, after one viral life cycle – which happens to be 5.5 hours for the new coronavirus – a great inhibition activity has also been observed at the viral replication step that follows.

06.Other advancements

There has been all sorts of researches going on in the combat against this virus. The most recent additions has been the use of T cells to produce antibodies against the virus. This study has come out from the Beijing Institute of Biotechnology where the scientists claim that the antibodies are seemingly working against the virus. However it is yet to be put to trials.



6.TESTING.

RT-PCR is the technique that is being used to test the patients. The method is highly reliable and accurate. It involves the basic principles of a polymerase chain reaction with the use of a thermostable taq polymerase. It follows the principle of reverse transcription as the virus is single stranded RNA. Firstly samples are collected from the patient by cotton swabs that are put in the nose or ears. The samples are then treated for testing in real time. This method is highly accurate and the results can be seen while the reaction goes on as the quencher and the fluorescent tags give a particular colour if positive.

7. TRANSMISSION OF VIRUS

The disease COVID-19 is highly communicable and spreads primarily by the droplets that are produced as an aftermath of the contagious coughing or sneezing by a patient who has already been infected by COVID-19. The WHO recently declared that the disease is air borne. This might happen in two ways:

Direct or close contact established : A person might have chances of getting the infection by being in a close vicinity with a COVID-19 patient (within one to severalmetersfrom the person who is infected), especially in case choosenot to cover their face while coughing or sneezing.The viabilityof the virus while being suspended in airis a seriousmatter of concern. Indirect contact: The droplets of the cough or sneeze survive on the surfaces and clothes for many days. Therefore,touching any of such infected surface or cloth and then touching one's mouth, nose or eyesmay lead to the transmissionof the deadly disease.

The virus survives on surfaces. If the new studyreports, that were published in the New England Journal of Medicine are to be believed, the virus doesdisintegrate over the due

course of a day or so over different surfaces. Data regarding the same has been enlisted as follows -

8. DIFFERENT KINDS OF SURFACES

Metal-Examples: Metal surfaces such as doorknobs, jewelry and silverware. Upto 5 days maximum.

Wooden surfaces -Examples: office furniture, chairs. Upto 4 days maximum.

Plastic surfaces -Examples: milk or any other containers and detergent bottles that are used, seats oftrains and busses , bags, elevator buttons. Usually upto 2 to 3 days from infection.

Stainless steel made surfaces -Examples: pots or the cooking pans, kitchen sinks, metallic water bottles. Upto2 to 3 days from the point of infection.

Cardboard like surfaces-Examples: Cartonsand other boxes used for shipping . Upto24 hours maximum.

Copper made surfaces-Examples: coins and pennies, teakettles, utensils and other cookware. Usuallyupto maximum 4 hours from the point of infection.

Aluminum surfaces-Examples:Cans, foilsheets, tinfoil, water bottles. Mostly2 to 8 hours from the point of infection.

Glass and glasslike fibre-Examples: drinking glasses, measuring cups, mirrors, windows. Up to 5 days

Ceramic surfaces -Examples: Kitchen dishes,cutlery, pottery, and alsocoffee mugs. Max.Upto5 days.

Paper-Examples: mail, newspaper. The length of time varies. Some strains of coronavirus live for only a few minutes on paper, while others live for up to 5 days.

Edibles -Examples:Thevirus doesn’t seem to spread via food that is well cooked.

Water- The novel Coronavirus is yet to be seen in drinking water. It means it doesnot affect water as of now. If it somehow does enter the water supplychannel, then also it wouldn’taffect us as the local water treatment plant filters disinfects the water, andthat should kill all thegerms(if any).

Fabrics and other clothes -Examples: All sorts of clothes and linens wears.

There hasn’t been sufficient research about the viability of the virus over fabric surfaces. It is however assumed that the life of the virus over fabric surfaces won’t be as long as it is on metal surfaces.

Shoes

One study tested the shoe soles of medical staff in a Chinese hospital intensive care unit (ICU) and found that half were positive for nucleic acids from the virus. But it’s not clear whether these pieces of the virus cause infection. The hospital’s general ward, which had people with milder cases, was less contaminated than the ICU.

Skin and hair

There's no research yet on exactly how long the virus can live on your skin or hair. Rhinoviruses, which cause colds, survive for hours. That's why it's important to wash or disinfect your hands, which are most likely to come into contact with contaminated surfaces.

When the virus becomes suspended in droplets smaller than 5 micrometers — known as aerosols — it can stay suspended for about a half-hour, researchers said, before drifting down and settling on surfaces where it can linger for hours. The finding on aerosol in particular is inconsistent with the World Health Organization's position that the virus is not transported by air.The virus does not linger in the air at high enough levels to be a risk to most people who are not physically near an infected person.

The effect of temperature on the virus is still under study and is generally observed that the virus is killed and destroyed at around 75 degree Celsius.

9. GEAR FOR FIGHT AGAINST CORONA.

TheU.S. Centers for Disease Control in one of its press releases had recommended or rather issued instructions and relevant advisory regarding guidelines for healthcare workersincludingthe entire staff and for all those peoplewho possess a huge potential of coming in contact with the peopleinfected with thevirus. Workers should use various types of PPE (if available) in order to protectthemselves from getting infected:

10. GOWNS.

ANSI or AAMI PB70 Level 3 or 4 isolation gowns are the ones that provide maximumsafety against being infected and hence must be used for medium to high level risk of being contaminatedwhere ever there is a containment zone. Surgical gowns at levels 1-4 can be worn for all of the levels of exposure while in surgery, and ANSI/AAMI PB70 Level 1 or 2 gowns can be worn for activities with minimal risk of exposure to the virus. Gowns much be such that they cover all exposed areas of the body under all circumstances .

11. COVERALLS.

Coveralls are actually substitutes to traditional gowns so much so that they actuallyseem to provide better protection against the covid19 causing novel coronavirus, butdespite all this it is an arguablefact that these are far more uncomfortable to carry around because of the extra layer of insulation. In addition to all this, healthcare workers and other staff may sometimes be unfamiliar with them and therefore it only adds up to the trouble of disposal.

12. GLOVES.

Nonsterile patient examination gloves are the onesthat must be used in order to treat Covid-19 patients. These ones may usually include any of the following like natural rubber or nitrile rubber or polychloroprene, and vinyl gloves. The act of double gloving or extended length gloves are not considered necessary but may be worn in case, one has protective concerns.

13. RESPIRATORS.

Surgical N95 respirators or N95 masks, are reallyfamous and effective in their function they can filter out all microbes. It should mandatorily be worn by healthcare staff in sterile environments or by the ones who are at a high risk of catchinginfection.

Non surgical N95 masks are also available or other face masks should be used by the people who possess a lesser chance of being infected, just as a precautionary measure.

14. EYE PROTECTION.

Face shields and goggles that are disposable must be brought to use and it should be kept in mind that these products need to be disposed off after every single use.

For each type of PPE, there are different raw materials and manufacturing processes.

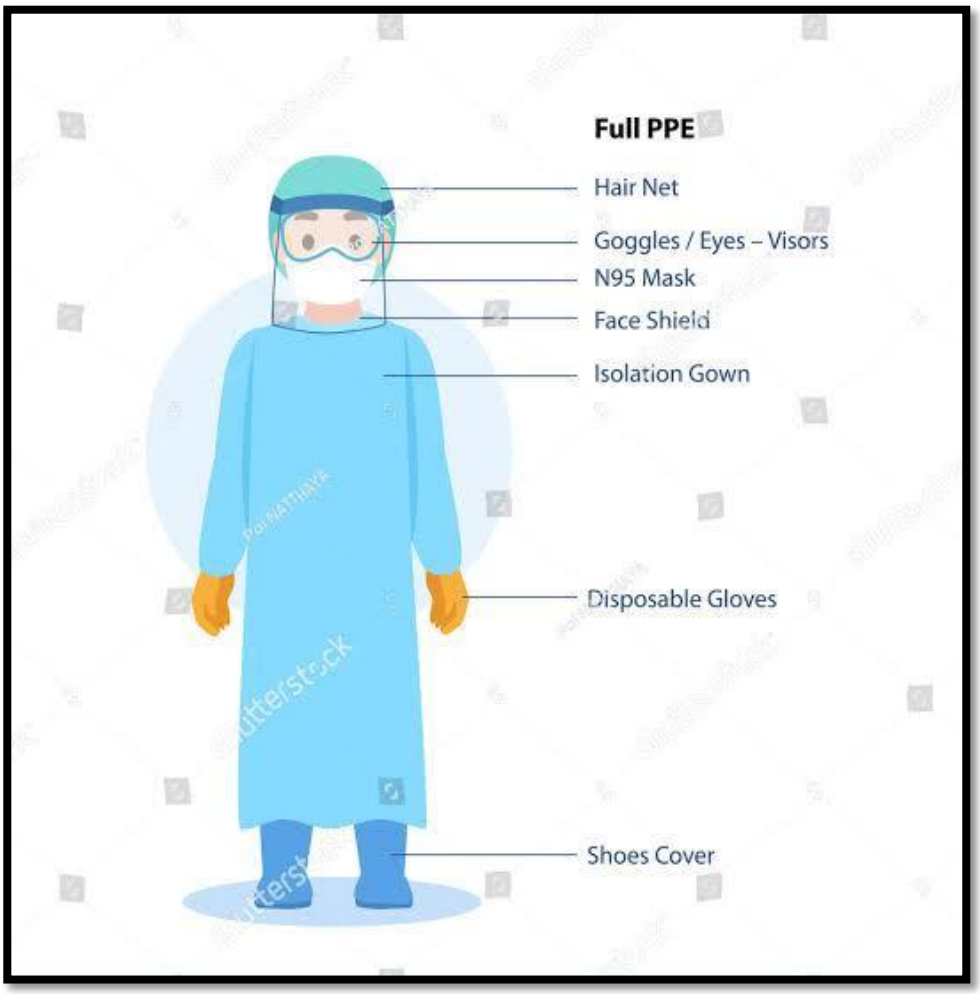
15. RESPIRATORS

N95 Respirators, a specialized type of mask with higher filtration capabilities, these are one of the most complicated types of PPE's to manufacture. They are ususlly made with a meltblown nonwoven fabric, which is produced by extruding plastic (commonly polypropylene) fibers one micron in diameter onto a conveyor. These layers form bonds as they continue to cool to form the cloth for the respirators. The fabric is layered with a needled prefiltration layer of nonwoven fabric, which is mostly hot calendared and thick enough so that it can be molded into the shape of a mask. Protective layers of nonwoven fabric then cover the mask's inside and outside surface. Once masks are completed they are sterilized thoroughly in order to maintain hygiene.

PAPRs, or Powered Air Purifying Respirators, are more intricate devices with various parts that may vary on whether the model is a half mask, full face piece, helmet, or hood type of mask. All PAPRs are however designed to have a motor blower fixed with a rechargeable battery pack, this attaches to a breathing tube such that it brings air to the face. Air is here filtered through a cartridge that is similar to filters on those reusable respirator masks. PAPRs may have a tightly fitted face piece made of usually rubber or even silicone sometimes. They may alternatively have a loose-fitting head covering piece, which is often made of nonwoven polypropylene, with a clear visor, commonly made of acetate or PET. There are also CAPRs, a streamlined variant of paprs.

16. MASKS

The surgical masks are made using specialized machinery, they are then sterilized properly. Nonwoven polypropylene and textile materials are fed from bobbins into the machinery that cuts and ultrasonically welds them together. Surgical masks mostly have a single layer of textile material surrounded by other layers of nonwoven material on both sides, making for 3-4 layers total depending on the mask size and quality. The machine binds all the other parts like ear loops or metal strips before the masks are sterilized and packed.



17. FACE SHIELDS

They are simple PPE and consist of a visor, a lightweight plastic or metal frame, and a suspension system that can attach the shield to the wearer's head to form a structure. They're generally worn over other PPE such as masks and goggles for an added layer of protection. Visors can be made up of plastics such as polycarbonate, propionate, acetate, polyvinyl chloride, and polyethylene terephthalate glycol (also known as PETG). This plastic is often given anti-glare, anti-fog, anti-static, or other coatings. The attached suspension systems may include elastic straps, Velcro, headbands, glasses-type temple bars, pin-lock, or ratchet systems.

18. GOGGLES

Goggles almost always start with injections of molded lens made with high purity polycarbonates, one of the more impact- and scratch-resistant plastics that are available . The most difficult part of forming lenses is that fact of ensuring that these remain clear, which is why precision control of factors like temperature and pressure much more important, and lenses must be inspected once they're taken out of the machine. This way it can be assured that no compromise has been made with the quality. Although there are vented goggles (which feature holes around the edges to let out moisture), the CDC has recommended indirectly vented or non-vented goggles be worn for infection control. Lenses are most commonly painted with anti-fog, anti-scratch, anti-glare, and other coatings, and hence are attached to softer material such as silicones that form a much more flexible material for the

wearer's face, creating a tighter seal for better protection. Straps, which can be made of materials such as elastic or neoprene, are then attached to keep the goggles in place.

19. PROTECTIVE GOWNS

There are various types of protective gowns available, worn depending on the level of expected exposure to the contamination as well as whether the gown is multi-use or disposable by nature. In the U.S. single-use gowns are most common as they are cheap. These gowns are generally made with spunbond or meltblown nonwovens produced through thermal, chemical, or mechanical bonding. The raw material for this cloth is synthetic, typically polypropylene, polyester, polyethylene, or something similar. Varying the fiber type, bonding process, and fabric finish can change the properties of the material for specific uses. Sometimes these gowns combine nonwovens with plastic film or other materials that provide greater protection from liquids. Reusable gowns can be made from 100% cotton or polyester, as well as cotton/polyester blends. The fabric is tightly woven and then sometimes pressed to improve its liquid resistance.

20. COVERALLS

Coveralls are commonly made from high-density polyethylene (HDPE) formed into a nonwoven fabric that allows heat and sweat to leave the suit while preventing liquids and aerosols from entering it. The sewing of coveralls can be the most difficult part to get right. Seams are closed by putting tape on them to strengthen them and keep them from leaking. However, places where multiple seams join (such as the armpit) can be difficult to seal properly, often making suit construction a trade secret. Lastly, the interfaces on the suit, including the zipper, cuffs, and the edge of the hood or collar, are made liquid-tight to prevent leakage. Depending on the application, cuffs and hood/collar interfaces can be elastic or liquid-tight seals. Zippers can have fabric flaps that cover them or be specially made as liquid-tight zipper assemblies.

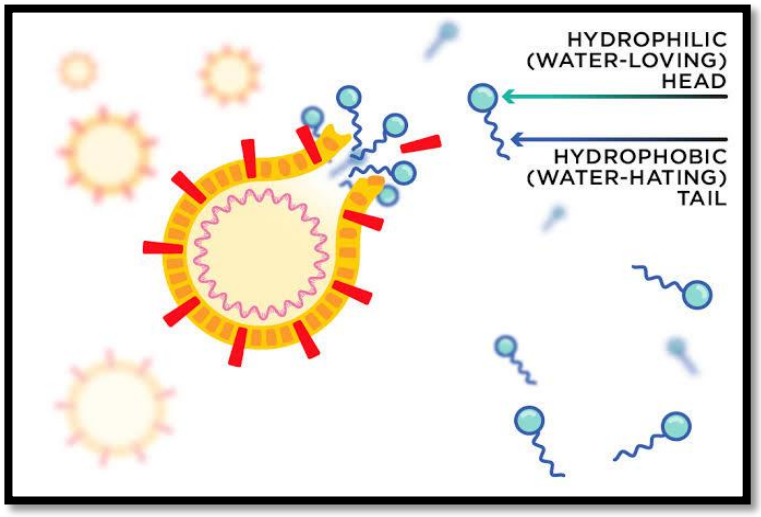
21. GLOVES

Medical gloves as such can be made of several different types of materialssuch as rubber, from latex to natural rubber to nitrile. Rubber gloves are made by dipping clean ceramic or aluminum molds shaped like hands into calcium nitrate, a coagulant, and calcium carbonate, which helps the gloves slide off the forms. The forms then are dipped into liquid rubber, with the glove thickness determined by how long they're in the tank. Latex gloves are dipped in hot water and chlorine to reduce potential latex allergy symptoms in wearers, and then they're vulcanized to make them more elastic and tear-resistant. Gloves are rinsed a second time and the cuffs are rolled, then they're dipped into corn starch and dried. Either air jets or workers then remove the gloves, and they're tumbled with hot air to get rid of excess powder. Finally, gloves are tested by filling them with air and water to make sure they're free of defects. Dependingon the level of testing, higher-performing batches are designated as medical gloves, while lower performance batches that still pass minimum qualifications become industrial gloves.

22. CHEMISTRY OF SOAPS AND SANITIZERS AGAINST CORONAVIRUS.

The World Health Organization has issued guidelines regarding the washing of hands. It recommends the 6 step hand washing technique for atleast 20 seconds in order to generate enough heat to kill germs. The WHO suggests that alcohol based sanitizers or regular soaps

may be brought to use while washing hands. The alcohol that makes up the sanitizers may be either ethyl alcohol or isopropyl alcohol, or a combination of both of them. Ethyl alcohol is drinking alcohol, as it is the form present in all alcoholic beverages. Isopropyl alcohol is also known as the rubbing alcohol, it is used as antiseptic or solvent and is dangerous to consume.

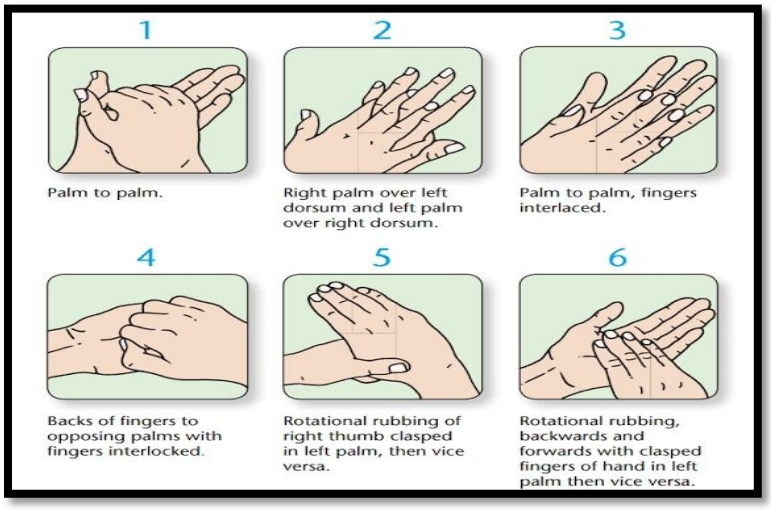


The two are chemically similar, but have different structures chemically.

The gel consists of water and various additives in a fixed proportion. Acrylic acid polymers known as carbomers are added in order to help to create the consistency of the gel, while emollients and moisturizers are added to help to protect the skin and make the sanitizer easier to spread on the palms.

It is however to be noted that some modern hand sanitizers are alcohol free. Though they use alternative cleaning agents that are effective against certain specific bacteria, they do NOT offer much protection when it comes to the novel coronavirus, COVID-19. To protect you from coronavirus, the Centers for Disease Control (CDC) states that a hand sanitizer must contain at least 60% alcohol along with the other components.Hand sanitizers are found to be extremely ineffective against certain viruses, such as the gastrointestinal illness-causing norovirus, because those viruses lack external membranes. Fortunately enough, the novel coronavirus, COVID-19, does have such a membrane.

Hand sanitizers work against coronavirus in the following two ways. Initially , disrupting that external membrane kills, or inactivates, the virus and protects you. Second, the sanitizer strips



oils from your skin that tend to harbor the virus, as well as a variety of bacteria.

The amount of alcohol in sanitizers is most suitably 70% along with gels and water. This is because having a higher percentage of water ensures a larger surface contact time before the alcohol evaporates. Water also acts as a catalyst in the lysis of the capsid layer of the virus. Using higher or lower compositions of alcohol will adversely affect the efficiency of the product. The material that suits the most is isopropyl alcohol followed by ethanol.

23. CONCLUSION

The coronavirus causing Covid-19 has a high rate of transmission so much so that the low mortality rates also begin to matter. The virus basically causes respiratory problems leading to tiredness and dizzyness. It also might cause a cytokine storm that may worsen the patient's condition causing pneumonia like syndrome. The development of a vaccine may take upto another 6 months or so. Until then we have got to live our lives accepting the fact that the way we used to interpret and interact with the world is going to change forever and as we fight our way out of this pandemic we have created history from the record number of patients to the manufacturing and production of personal protective equipments.

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