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Roll of Chemistry in Suppressing the Spread of Covid-19 Virus

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Abstract: Covid-19 is a contagious infection caused by the newly identified corona virus, which was originally seen in Wuhan city, China, in December 2019. It has now spread all over the world in a very short time of a few months. This is a brand new virus so scientists are trying their best to understand it. There is a lot to learn about the corona virus. Overall, it has been estimated that the corona virus can survive for 3 to 6 days at different material surfaces and for several hours in the air. It is mainly spread by droplets containing saliva or droplet particles when an infected person coughs or sneezes and that is why the virus sometimes lands on the surface. Hands touch many surfaces and come in contact with virus and get contaminated, from these contaminated hands virus can transmit to the eyes, nose or mouth. When the virus enters in to the body the person becomes infected and get ill, thus to stop the spreading of infectious corona virus rapidly, keep hands away from contaminated unknown surfaces, wash hands regularly using either soap or water and maintain physical distancing, and avoid social gatherings. These are considered to be as the most important activities to prevent the spread of the virus. However, the question arises, what should we do to keep our homes away from getting contaminated from virus and how can we fight the virus? During the study, we will discuss methods and chemistry for preventing and controlling the spread of corona virus. Chemistry plays a key role in understanding the structure of the virus and in developing chemical preventive measures, and also introduce new drugs to cure Covid-19 infection. The collaboration between Chemists and biomedical researchers and also the interdisciplinary interactions between different branches of the chemical community are all together essential to develop the needful result in time. This study relies on the literature available online. Still further new studies, researches are required to eliminate and prevent infection.

Keywords: Contagious infection, Chemical preventive measures, Biological chemistry, Covid-19, SARS-CoV-2.

1.1. Introduction: Covid-19 (Corona Virus Infection 2019) is a new infection caused by a novel severe acute respiratory distress syndrome, coronavirus-2 (SARS-CoV-2). It has grown to be global pandemic for many months, disrupting modernity society on a large scale that most people around the world they had never seen in their entire lives.[1-4] This is believed that this virus came from a species of bat and that transferred to people by the host. Since then, person to person noticed rapid spread. This new corona virus is very close to the previously reported corona virus SARS-CoV-1, MERSCoV (Middle East respiratory syndrome) with respect to causes severe acute respiratory distress[6], proteins on its surface and host cell receptor. Viruses can cause severe illness through pneumonia and chronic respiratory depression disorders. This virus has infected millions of people, resulting in more than one million deaths as of this writing and the numbers continue up[7]. In general, people's lives and the global economy severely affected. To meet the challenges of today's world, public health services workers working on the front line to reduce the spread of this disease With great efforts, progress has been made rapidly is carried out by biologists and biomedical scientists to understand biological response to this viral infection, including virus detection, gene sequencing, and define the structure of the protein[1,8,9]. Personal precautions measures[10] include chemical protection measures such as: soapy water, bleach solution, alcohol -based sanitary ware, and hydrogen peroxide has been conceptualized and prepared for destroy viruses[11]. Advancement of various trials tools[12-19], antiviral drugs[20-29], vaccines[30-32], and other medical the interaction[10] was developed in a rapid manner. These activities seem far out of place chemistry

which usually deals with elements and chemistry compound However, there is plenty of room for chemists, in fact, they have contributed greatly, and can do more for assistance in global crises[10] while covered by chemistry a somewhere between physics and biology. According to biochemistry, we are all alive and well through a series of biochemical reactions that occur in highly controlled settings way with almost no errors and glitches or damage to this reaction causes pain and equally death SARS-CoV-2 is detected, it binds to human cells receptors, namely angiotensin-converting enzyme 2 (ACE2) and affecting lung cells that can cause death[9]. In this case, Biochemistry plays an important role in understanding viral structures in particular, the protein structure of the viral, genome and mode of action. Many reviews have been published recently on Covid-19 addresses recent advances in analysis, diagnosis and treatment of this virus[10-43]. In this review, we have discusses Covid-19 facts and literature beginning with the host Event in binding SARS-CoV-2, chemical precautions and the development of the reuse of chemical drugs perspective Here, we highlight Covid-19 in interface of chemistry and biology where revealed by biochemistry structure and how the virus works. As well as, biomaterial chemistry offers an elegant way to produce better products for preventive measures such as cleansers, face masks with improved properties. Preparation and mechanism chemical precautions (such as hand washing with soapy water, use of hand sanitizer and hygiene fomite surface with disinfectant) to destroy the virus is discussed by combining the principles of chemistry and biology. Computational chemistry has modelled proteins from Covid-19 to identify chemical compounds[22] that can be resisted against this virus while medicinal and organic chemistry is contribute by the synthesis of anti-viral compounds. Here, we also reviewed the four most effective repurpose drugs, emphasizing their synthetic routes in recent advances, namely Hydroxychloroquine, Remdesivir, Lopinavir and Dexamethasone, being tested in mass clinics trials in Covid-19 patients show some promise results

1.2. SARS-CoV-2 structure:

Chemistry, especially biochemistry, responds quickly this global pandemic. Biochemists help us understand the structure of this virus is better. Transmission electron microscope (TEM) image of SARS-CoV-2 in the displayed cells spherical virus particles stained with blue (Fig.1)[44]. The virus consists of three main building blocks: single stranded The RNA genome, the viral membrane consists of a lipid bilayer and surface proteins. The RNA genome is made up of 30000 nucleotides and encoded four structural proteins namely, Nucleocapsid (N) proteins, Membrane proteins (M), Envelope protein (E), Spike protein (S), and many non structural proteins protein (NSPS) (Fig.1). The nucleocapsid (N) protein is multipurpose protein, which helps in the formation of nucleocapsid to protect the genome. the nucleocapsid is formed by wrapping the viral RNA genome with ribonucleoproteins complicated[45]. M-protein is the most abundant in over the virus and its main role is to support viral assembly as a central regulator due to the natural distortion of the membrane[46]. E-protein is the smallest membrane protein composed of about 76-109 amino acid residues and play an important role role in viral assembly, envelope formation, membrane permeability of host cells and vulnerabilities[47,48]. Protein S is a an important structural transmembrane protein consisting of 1200-1400 amino acid residue in outer envelope virus Protein S is responsible for viral entry because identifies host - specific receptors found in humans cell surface. Host-guest identification is virus-specific, and specificity determines viral tropism and pathogenesis[49,50]. S the proteins exist as assembled homotrimers where each The monomer consists of two functional units, S1 and S2. The S1 subunit is responsible for host identification whereas S2 the subunits are responsible for host-guest membrane fusion[50] Terminal the S1 subunit domain is considered a carbohydrate the recognition domain and the C-terminal domain are called receptor-binding domains (RBD) because they support the host-guest contact and primarily responsible for the entry of the virus into identify protein receptors of infected lung cells.

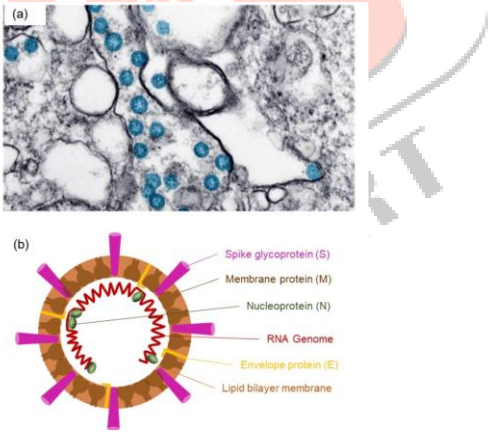

Figure 1. Structure of SARS-CoV-2. (a) Transmission electron microscopy SARS-CoV-2 spherical virus particles in cells (taken from refrigerator 44), (b) The Viruses consist of the following basic building blocks: single-straced RNA genome (ssRNA), lipid bilayer membrane and various proteins such as nucleoprotein (N), envelope protein (E), membrane protein (M), spike protein (S protein).

Mechanisms of viral entry, replication and RNA packaging in human cells is described in (Figure 2). S. Protein mediates the entry of viruses into cells by binding to their receptors, followed by fusion and endocytosis. Thus, the virus has an increase The protein that recognizes the human cell receptor is ACE2. He believe that fusion occurs at low pH between the virus and target host membrane via the S2 subunit. After logging in, it went viral the single-straced RNA genome is launched into the cytoplasm and translated into two major polypeptides (pp1a and pp1ab),

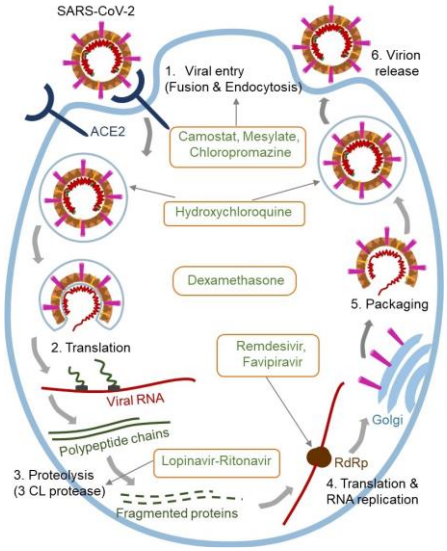

Figure 2. The SARS-CoV-2 infection cycle shows different stages. Potential targets for many selected antiviral drugs to interfere with different steps of showing the cycle of infection. Using camostat and mesylate to block virus / host cell interaction and inhibition of viral entry, the use of Hydroxychloroquine lowering pH that prevents endosome maturity; Use of Lopinavir-Ritonavir as a protease inhibitor to inhibit viral polypeptide synthesis; Remdesivir as nucleoside / nucleotide analogues to prevent viral -mediated RNA polymerase genome replication; Dexamethasone as an anti-inflammatory drug to control accustomed respond. This is well discussed in the drug development section (infrared video).

which is split and made mature nsps (also called functional proteins) of the two viral proteases 3CLpro (3 C-like proteases or major proteases) and PLpro (like papain proteases)[51]. Also, RNA replication occurs resulting in many genome copy processes and processes by viruses replication complexes, including RNA.-dependent RNA polymerase (RdRp), helicase and other accessories (non -structural) proteins. Viral protein structures such as M, S and E-proteins synthesized in the cytoplasm and then placed compartment between the endoplasmic reticulum-Golgi[48] Therefore, many of these building blocks are formed in virus -infected areas cells and spontaneously assemble themselves to produce new ones viruses (Figure 2). Finally, this virus was exported from the infected cells go through a process called exocytosis and become infected other cells. Basically, viruses have a spherical supramolecular structure a structure to which all building blocks are associated weak non-contact contacts. Therefore very light chemical such as because the soap / detergent is enough to break the unit and break viruses (video infrared). Although understand the structure and the characteristics of the virus seem to be absent in the region chemistry, supramolecular assembly structure, surfactants such as lipid bilayers (vide infra), molecular recognition, structure of proteins and nucleic acids are familiar subjects to extensive chemistry. SARS-CoV-2 contains 16 highly preserved non-structural proteins (nsps) that serve other functions. Different from them protein has a definite and very important role and it is primary protease (Mpro, also called 3CLpro referred to as 3C-like protease), such as papain protease (PLpro), which is RNA –dependent RNA polymerase (RdRp) and these nsps were exploited as druggable target due to the presence of crystal structure along with their important role in viral infections. They are both The proteases 3CLpro and PLpro are responsible for the cleavage of polyproteins and they have a major role in viral replication and adjust the host cell response. Therefore, they are exploited as main target for the development of antiviral drugs. RdRp is very important enzymes, which mediate transcription and replication RNA in the life cycle of SARS-CoV-2. In addition, this enzyme has no human counterpart and thus has opportunity to be a drug target for antiviral development[53]. There are interesting compounds that can inhibit this activity of this protease. Potential targets and mechanisms of action for some select antiviral drugs are discussed in medicine development section. Previous studies have tested the former SARS-CoV-1 has been revealed to be the mechanism of virus interaction with cells likely to be assisted by RBD with S the protein bound to the ACE2 peptidase domain[54]. In the same way, SARS-CoV-2 is also believed to enter cells with interactions between RBD and ACE2[9,49,50,55]. Agar to understand the higher infection rates for SARS-CoV-2 and for looking for ways to reduce the high rate of infection, structure SARS-CoV-2 was recently discussed in comparison with SARS-CoV-1. Mutations have recently been discovered in SARS-CoV-2 spike protein (S) may be responsible for increased correlation for ACE2[56]. McLellan et al co-workers solve the structure of the Spike SARS-CoV-2 trim trimer in prefusion conformation at 3.5 cryoelectron resolution microscope[9] Structural and biophysical studies suggested that the SARS-CoV-2 S protein binds ACE2 with increased affinity compared to the SARS-CoV-1 S protein Atomic level structural data from the help of SARS-CoV-2 helps examine its mutations and provide further engineering to the protein efforts that can increase protein expression in vaccine development. To gain a structural insight into the introduction of ACE2 by SARSCoV-2, Li and colleagues crystallized the complex formed by ACE2 and SARS-CoV-2 and break down the crystal structure RBD protein S is complex with ACE2[57]. Results showed that the ACE2 binding point in SARS-CoV-2 RBD was adopted denser configuration than SARS-CoV-1 RBD and some mutated residues in SARS-CoV-2 RBD for stabilization of virus binding hotspots on the RBD interface and ACE2. The structural properties of SARS-CoV-2 RBD are responsible for the increased binding interaction for human ACE2.

Recently, a group of computational chemists led by Amin studied the binding relationship between amino acid residues between ACE2 and protein S for SARS-CoV-1 and SARS-CoV-2 individuals using molecular dynamics (MD) simulation and Monte Carlo (MC) sampling approach[58]. The surface of the ACE2 protein in RBD has been detected has a negative electrostatic potential, while the positive potential observed for SARS-CoV-1 S or SARS-CoV-2 S. Protein proteins.

The total energy that exists between ACE2 and SARSCoV-2 is slightly larger than SARS-CoV-1 because higher electrostatic interactions. Electrostatic bond most of the energy comes from the salt bridge between R426 and ACE-2-E329 for SARS-CoV-1, whereas between K417 and ACE2-D30 for SARS-CoV-2. The increased strength that exists is not because of a single mutant, but because of the whole structural changes caused by all mutations together. The results likely support the notion that SARS-CoV-2 Viruses are a product of biological evolution, not laboratory engineering viruses[59]. Ching and colleagues have reported previously method for measuring the interactions between amino acids by expectation the concept of accurate analysis of amino acid bond pairs (AABP). They have recently used this method on The SARS-CoV-2 spike protein RBD. The results show that with the large AABP emerging from the nearest nearby AA in the main order, there is a significant contribution of AABP of other nonlocal AA by covalent and hydrogen bono[60]. The high rate of infectious spread SARS-CoV-2 can be understood from Figure 3. In general, mutations produce strong chemical interactions between S proteins and receptors on the surface of human cells and them Strong interactions are responsible for the high delivery rate of Covid-19.

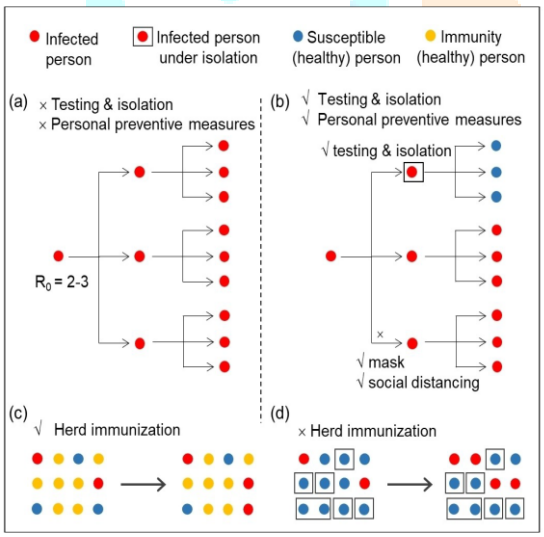

Figure 3. Spread of Covid-19. (a) In the absence of intervention, The infection spreads freely in a population with a high baseline multiplication number (R0), (b) By, isolated individuals and the application of personal precautions such as use masks and social distance can slow the spread of infection. (c) friend Immunity is developed in people who have recovered from Covid-19 or obtained it vaccines, so that the infection does not spread freely between individuals / population, and (d) In the absence of herd safety (blue circle in the box represents a prone person under isolation) infection can be contagious among the population.

In the absence of any intervention, the contaminated people can infect an average of two to three people with a basic multiplication number (R0) of 2-3[61,62]. R0 is the representation of virus transmission, showing the average the number of new infections caused by infectious people in indigenous population. Once again all newly infected can go on to infect three other people. It continues this way and rapid expansion of infection in the population (Fig.3a). On the other hand, after the implementation of interventions, such as medical testing of infected people, isolation of infected people and the use of personal precautions may be limited delivery to others (Figure 3b).

2. Chemical preventive measures:

Personal precautions play an important role in stop the spread of SARS-CoV-2 virus in the absence of any drugs and vaccines. Overall, this precaution can be physical, chemical or immunological. Sa for example, prevalence can be regulated by social compliance keep the distance at least one meter and wear a face mask is under physical custody. Chemical avoidance measures include disinfecting surfaces with chemicals, wash hands with soapy water or hand sanitizer. Dude immunity, develops in people who have recovered from Covid-19 or receive the vaccine, may be harmful chain of infection in a population. The role of herd safety can be understood from Figure 3c, d. Until we have a vaccine or medicine in our hands, it is very important for us to follow Strict personal protective measures to prevent infection from SARS-CoV-2.

2.1 Face masks:

It is well known that wearing a mask to the public is the most useful self-preservation[63]. A a team of chemists led by Molina decided on the delivery Covid-19 pathway by investigating trends and mitigation measures in Wuhan, Italy, and New York City, three major earthquake centres during January to May, 2020[64]. Their analysis showed that air transmission highly infectious route and the main route for spread Covid-19. The results concluded that the difference between wearing and not wearing a face mask is the main sign elements to limit the course of the pandemic by reduction number of infections. To prevent human -to -human transmission, wearing a mask in public is the most useful measure, compared with the concurrent social distance, quarantine and contact tracing.

Surgical masks or general N95 are not recommended for use several times until now. Because, it's not possible sterilize itself for reuse and it causes high economic costs for a mask. Moreover, the lack of masks is experienced in early stage of pandemic. Therefore, it is necessary proper method to decaminate agar masks extend the life of the available supply. Constipation the process should not compromise the suitability and proper function of the mask[65,66]. In 2009, a team of researchers reported decontamination method in which a single treatment with hydrogen peroxide vapor, UV light or dry heat below 100 ° C does not affect the ability of the N95 masks to filter out small particles[67]. In context from the current sensation of Covid-19, many more recent investigations. Recently Schwartz and co –workers develop a method for sterilization N95 mask using hydrogen peroxide vapor. This method does not change

the match of mask and does not leave residue apart from water as a by-product in the process of constipation. Even their studies does not use SARS-CoV-2, but has been tested in other biologics indicator Studies show that most masks can do undergo this constipation process for at least 30 cycles without missing any matches[68]. Recently, Cui and colleagues at Stanford University is reviewing several methods for disinfecting the N95 mascara[69]. They found that the heating (≤ 85 ° C) was below a bit moisture is the most comforting and non - destructive technique for decay without altering the filtration capability of the N95- mask. They first started by heating the mask to a temperature of 75 ° C due to the wide availability of 75 ° C quilt blanket heating the oven temperature in the hospital and then more the probe used 85 ° C, and found that 75 ° C was not enough to inactivate SARS-CoV-2. Optimized conditions for decay at 85 ° C with 30% relative humidity possible to continue up to 50 cycles without sacrificing functionality of the mask. In particular, disinfectants based on alcohol and chlorine such as bleaching interfere with the electrostatic charge mask, which is an integral part of filters and significantly reduces filtering efficiency. Although, it are good candidates for cleaning hard surfaces, they should not used to clean N95 masks.

Recently, a team of materials chemists developed procedure for the operation of the surgical mask with self –cleaning properties[70] and therefore the commercially available masks reusable and recyclable which saves some layer of graphene on top of the mask[70]. Super hydrophobic graphene is not allowed to enter water droplets on the virus sticking and more importantly, The temperature on the surface of this mask can quickly rise to about $80C^0$ under sun exposure, where provide masks to be used again after sun sterilization and such masks may provide better protection against SARS-CoV-2. Recently, an IST company has also developed a similar mask on nanofilm coating that creates a hydrophobic molecular barrier which prevents the absorption of droplets into the face shield masks[71].

Aside from blocking virus droplets by wearing a mask, that is will be useful for the temporary deactivation of liquid droplets of the virus past the mask. For this deactivation, antivirus or Gentle sanitizing molecules can be placed inside the mask to that virions are disabled when they pass through the mask. However, the chemical modification approach to this mask is a must designed in the manner required by the sanitizing molecule will only be removed from the mask during ejection[10]. In general, physical treatments such as UV irradiation, heating and Dehydration is useful for disabling the virus. It can also carried out by chemical sanitization using mild, mild acid, oxidant, alcohol, or surfactant[72,73]. Such a chemical approach can be very effective in limiting the spread and virus transmission [74]

2.2 Chemistry of Soaps / detergents in killing SARS-CoV-2:

Soaps and detergents are very effective at killing viruses (Figure-4). Both soap and detergent chemically contains surfactants (short form of surface active agent). Surfact molecules are usually long chain salt salts fatty acids (e.g. $C_{17}H_{35}COONa$, sodium stearate) are known as amphiphiles. Amphiphiles have two parts, long chains like fat called hydrophobic tail that avoids water and at the end of COO^- Na^+, These are called hydrophilic (or lyophobic) heads. Regular cleaning The mechanism of the detergent is as follows. When soap or detergent dissolved in water, many detergent molecules are controlled together to form tiny bubbles called hydrophilic micelles the head group is oriented outwards facing the water while the hydrophobic or lipophilic tail is hidden here develop a hydrophobic pocket with the potential to trap normally dirt from our skin or clothing (Figure 4). Recently amphiphiles are similar in structure to the lipid molecules of biological membranes[75]. Hence surfactant molecules compete with lipids in viral membranes and exchange they are easy, because viruses are aggregated structures where the weakest connection is in the lipid bilayer. NS the surfactant molecules attached (to the membrane) are bound to water on one end and binds to lipids on the other side in a push-pull contact that destroys the viral membrane. Nasa way, the soap destroys the fat membrane and therefore the virus structure disorganized and disorganized (Fig.4). Same as dirt, viral substances are washed with water as micelles, formed by soap molecules in water, forming a hydrophobic pockets that capture virus fragments. Besides break the structure of the virus, the other role of detergent is Viruses cannot stick to the skin in the presence of soap, and washed with running water. For all this to happen effective reaction, it is recommended to wash hands with soapy water for at least 20 seconds.

2.3 Hand sanitizers:

Similar to soap / detergent, hand sanitary ware is also useful to get rid of the virus. It is always recommended to bring hand sanitizer when someone goes out of the house somewhere soap-water is not accessible or useful. What about hand sanitizer? kill SARS-CoV-2? Chemistry can be well explained. First of all, the cleaners we use to inactivate SARS-CoV-2 alcohol -based hand sanitizer (Fig. 5). According to the formulation provided by the WHO[76,77], hand sanitizers commonly contain four components: (a) alcohol which can be either ethyl alcohol or isopropanol, (b) water, (c) glycerol and (d) hydrogen peroxide. Ethanol or isopropanol selection criteria in The manufacture of hand-sanitizer is suspected because of its excellent quality Soluble in water and non -toxic. Alcohol especially responsible for destroying the virus. Because, the lipid bilayer of viral membranes cannot survive the presence of alcohol

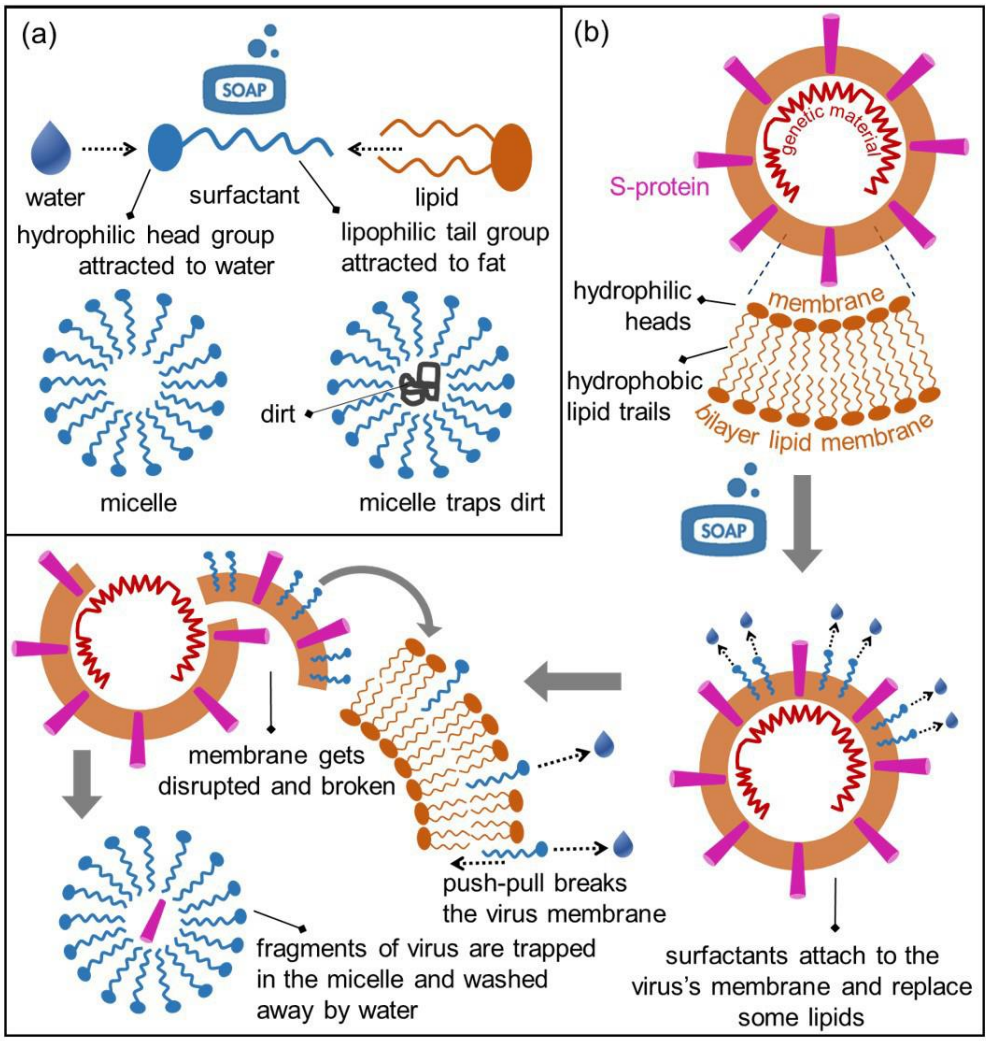

Figure 4. The mechanism of soap in the destruction of the virus. (a) Common soap (surfactant) cleaning mechanism with micelle formation, (b) Soap breaks down SARSCoV-2. The structure of SARS-CoV-2 features a membrane composed of surfactants such as a lipid bilayer. The soap molecule attaches to the viral membrane and then the bonds are cut at a later date and separated into smaller fragments that are trapped by micelles and washed with water.

that lipids dissolve in it and consequently the virus the membrane dissolves and the virus becomes inactive (Fig.5). sakes, alcohol causes denaturation of viral proteins where folded the protein is converted into turned protein leading to the loss of their biological activity (Fig.5). Thus alcohol plays a role important role in the destruction of viruses by liquefying lipids membranes and denature viral proteins. It could be noted that alcohol is mainly in the range of 60-90% is fast viruses. When the alcohol concentration is below 50%, the effectiveness for disinfection abruptly decreases. Again

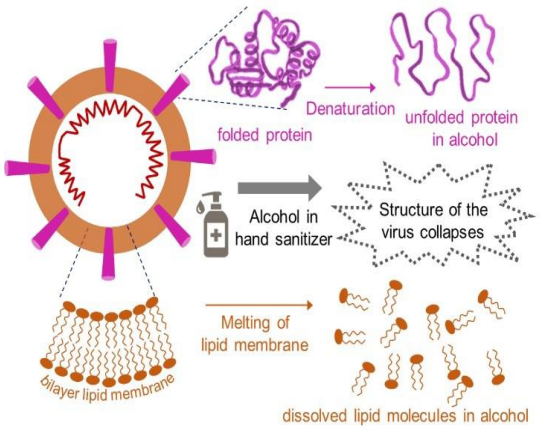

Figure 5. Mechanism of alcohol (hand sanitizer) in destroying the virus by lipid membrane liquefaction and denaturation of viral proteins

moreover, higher alcohol concentrations are not always present produce more effectively. Increase the percentage of alcohol simultaneously reducing the percentage of water in the cleaner, while the water content also has an important destructive function virus In particular, water is very important because it acts as a catalyst to denature cell wall proteins. For example, 70% the isopropyl alcohol solution penetrates the cell membrane well spread throughout the cell, denature all proteins, and therefore the virus is destroyed. Essential water content in solution slows down the process of evaporation, which is caused increased effectiveness with increased surface contact time. When the concentration of isopropyl alcohol exceeds 91%, it aggregates immediately protein and as a result, the protective layer is developed to keep other proteins from further coagulation[78] A third of glycerol acts as a moisturizer the agent prevents the skin from drying out and the fourth General components of hydrogen peroxide are usually included to avoid bacterial contamination in hand sanitary ware. In addition, H_2O_2 can help destroy viral proteins and genetic material of its

oxidizing properties (Fig.6), where it is reduced in water. Chemical processes can be said to be the basis for the manufacture of these materials includes hand sanitizer. In addition to cleaning our hands, hand sanitizer is also possible applied to hard / fomite surfaces. The hand sanitizer is portable and therefore provides advantage of soapy water, which is inaccessible or useful to all over the place. But to break the virus, there is soapy water more effective than cleanings (Figures 4, 5)[79] We have The mechanism of action of the two sanitizers is discussed and with soapy water to not activate the virus but its effectiveness can be explained by how we use it. Use in bulk Hand sanitizer is definitely not the pragmatic choice we need limit the number of one -time uses to a few ml in quantity. In addition, severe alcoholism is a major drawback because alcohol -based detergents evaporate quickly and just leave less time in contact with the virus. In limited time evaporation, the cleaner may not react effectively and inactivate viruses especially those in the palm of our hands line

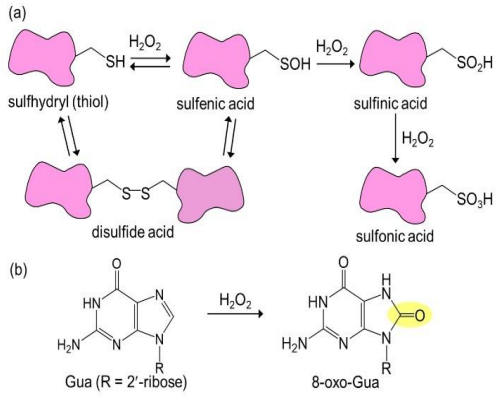

Figure 6. H_2O_2 in the destruction of viruses by oxidizing viral proteins. (A) Schematic representation showing the steps involved in H_2O_2 oxidation of cystine protein residues containing thiol groups to be eliminated and other analogues, (b) The oxidation of Guanosine RNA units to 8-oxo- guanosine.

As a result, rub the following two hands afterwards cleaning apps has been less effective somehow to some Instead, clean our hands with a soap solution a minimum of 20 seconds followed by a large amount of water ensure complete exposure of the virus to inactivity. Bath soap non-volatile or expensive solutions such as alcohol-based cleaner So clearly gives the cost performance ratio. Advantages of using alcohol-based soap solution cleaner

2.4 Bleaching for surface sanitization:

Fomite surfaces are generally cleaned with a disinfectant spray, for example, chlorine -based bleach, which is a liquid sodium hypochlorite (NaClO) solution. based on chlorine Bleach is commonly used for household disinfection and cleaning[80]. NaClO is unstable in solution and relatively stable as a dilute state in which Na^+ and ClO^- and ions are dissolved This stoichiometric solution mainly has a pH of 11. Because hypochlorous acid is a weak acid whereas NaOH is a strong base as given in the following equation.

$$NaCl + H_2O \text{ -------- > } HOCl + NaOH$$

The following species are formed in solutions.

$$HOCl_{(aq)} \text{ ------- > } H^+ + ClO^-$$

$$HCOl_{(aq)} + Cl^- + H^+ \text{ -------- > } Cl_{2\ (aq)}) + H_2O$$

Hypochlorite exhibits a variety of antimicrobial activities and useful for killing a number of common pathogens different concentrations. For example, hypochlorite is used against rotavirus at a concentration of 0.05%, whereas concentrations higher than 0.5% are required for some resistant pathogens such as C. difficile[81]. In context Covid-19, 0.1% hypochlorite concentration is recommended[82]. Bleaching oxidizes and destroys viral proteins and genetic material, because NaClO is unstable in solution and easily decompose in chlorine. The surface should be exposed in hypochlorite solution for at least 10 minutes to kill virus Unlike soapy water or hand sanitizer, it can only applied to a hard surface of fomite, not to our hands. Hypochlorite can be used to wash hands only when the concentration Hypochlorite is very low at about 0.05%, and this hypochlorite solutions are usually prepared with calcium hypochlorite[78]. Sa reached the final desired concentration of hypochlorite, it is required to dilute commercially available chlorine –based bleach products where the chlorine concentration usually varies between 4% and 6%[80,83]. It will be noted that the high concentration of chlorine in commercial bleach can cause corrosion of metals, alloys, many thermoplastics and irritating the skin with potential side effects

2.5 Hydrogen peroxide for surface sanitization:

The H_2O_2 solution can only be applied to hard / fomite surfaces, no in our hands and the minimum concentration should be 0.5%[80]. It oxidizes and destroys viral and genetic proteins material (Fig. 6) and should be left on the surface for at least 10 minutes to kill the virus effectively. H_2O_2 is oxidized viral RNA and proteins. Contains residual Cys Protein thiol group and oxidized to disulfide and other analogues such as sulfenic acid, sulfinic acid and finally sulfonic acid of H_2O_2[84]. In addition, the genomic unit of Guanosine has been oxidized to 8-oxo guanosine[85]. However, the use of these chemicals disinfectant or sanitizing is a restricted substance, as it were does not cover all types of exposed areas. Practical application, the cleaner may not work equally throughout on the surface due to concerns about volatility and dewetting. In addition, it requires repeated cleaning applications periodically to keep the surface virus free. Therefore, necessary to form a cleaning surface gently releases disinfectant molecules to clean the surface and therefore reduce delivery through

objects. It will be noticed that the coating should be non -toxic, durable, and resistant to friction and washing where the material chemist can contribute to this new area of research to combat Covid-19.

3. Conclusion:

In conclusion, we discussed the importance of synergy between chemistry and biology to combat Covid-19 extraordinary circumstances. The following major areas of chemistry will have a key: duty to find reality solutions in Covid-19. Pressure is given the supramolecular structure of the assembly, surfactant bilayers, study the structure of proteins, molecules recognizing the context of the structure and host binding of SARS-CoV-2 virus. Formation of micelles by soapy water, decay viral membranes of surfactants, oxidation's proteins disinfectant, denaturation of protein alcohol is described as part of chemical precautions. Development of synthetic routes to drugs and their mechanism of action described in drug development. Mentioned above familiar topics in various chemistry and discussed about Covid-19. based on chemicals research organizations have refocused their efforts against against Covid-19. The biochemist revealed the structure of the virus Components, computational chemists contribute to modelling Covid-19 proteins to identify anti-viral drug candidates, and the medical chemists contacted themselves identification of potential anti-viral drugs and finally, organic chemists are engaged in synthetic enhancement method of drug reuse. Importantly, chemists too involved in developing personal custody. So, in these uncertain times, the chemist's response to the battle Covid-19 is very important. Chemists may have potential to make more contributions, however, is one of the main barrier for them is the lack of access to virions, which currently limited to a small number of experts laboratory. Regardless of the chemical response, environmental protection may play a role in resistance to Covid-19 as lower Covid-19 deaths found in some forests regions in Italy as described in a recent study[86] In conclusion, the entire chemistry community contributed to combat Covid-19. To overcome this great challenge, no just a quick and collaborative approach between chemists and biomedical researchers but there are also groups formed from different chemical science communities are needed. Until an effective drug or vaccine is available, we have to consider "prevention is better than cure" where chemicals science contributes to conceptualization and construction products for the preservation of the chemical mechanism well explained by chemists.

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