

Points of Interest for the New Coronavirus SARS-CoV-2 Causing COVID-19

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Received: August 20, 2020; **Published:** September 10, 2020

Since the beginning of civilization, infectious diseases have affected humans. The early history of these diseases was characterized by sudden and unpredictable outbreaks, often of epidemic proportions, so that the current situation that the planet is experiencing because of the new coronavirus, is a trigger more product of multiple factors, with a high share derived from anthropogenic activity. Coronaviruses belong to the family *Coronaviridae*. The size of the genomes varies between 26 and 32 kilonucleotides, being one of the largest RNA positive viruses. Coronaviruses can cause respiratory and digestive diseases in both birds and mammals, including man, in whom they can produce diseases ranging from a common cold to more severe conditions such as bronchitis, bronchiolitis and pneumonia. Monitoring and communication with the medical team is essential to detect respiratory distress early.

Many studies and researches have been carried out all over the world in relation to the COVID-19, but very few deal with the control of this virus, its permanence and/or circulation in the air, and the airborne transmission of SARS-CoV-2.

If we take into account the specific weight of the SARS-CoV-2 virus (approximately 8 Kilobytes) and that of the air ($12,671 \text{ N/m}^3$) then we would have to take into account physical, chemical and mathematical elements, as well as biotechnological ones, all of which must be brought together and put into function in medicine, for a better control of the disease, since we must see the control of the pandemic as a whole, and not focus only on the human being.

The SARS-CoV-2 virus goes unnoticed among humans, throughout the length and breadth of planet earth, is an invisible enemy that weighs practically nothing and whose main means of propagation is airborne, so that the viral particle remains for a considerable period of time in the air (survival and transmission data) until precipitate/fall by the action of gravity on dissimilar surfaces, including skin, hair, clothing, walls, floor, etc. so the debate has been rekindled about the extent to which common respiratory viruses, including severe acute respiratory syndrome 2 (SARS-CoV-2) coronaviruses, are transmitted by respiratory droplets vs. aerosols. Droplets are classically described as larger entities ($> 5 \mu\text{m}$) that fall rapidly to the ground by the force of gravity, typically 3 to 6 feet in height. Aerosols are smaller particles ($5 \mu\text{m}$) that evaporate quickly into the air, leaving behind a droplet nucleus that is small, sufficient and lightweight to remain suspended in the air for hours (analogous to pollen).

Experimental data support the possibility that SARS-CoV-2 can be transmitted by aerosols (so-called airborne transmission) even in the absence of aerosol generation procedures (such as intubation or non-invasive positive pressure ventilation). Talking and coughing produce a mixture of droplets and aerosols in a range of sizes, which these secretions can travel together up to 27 feet, enough time to remain suspended in the air and viable for hours. If SARS-CoV-2 is carried by aerosols that can remain suspended in the air for extended periods, medical masks would be inadequate (because aerosols can penetrate and circumvent the masks), face shields would only provide partial protection (because there are open vents between the masks) and the wearer's face), and 6 feet of separation would not provide

protection against aerosols that remain suspended in the air or are carried by currents. These data provide a useful theoretical framework for possible aerosol transmission for SARS-CoV-2, but what is less clear is the extent to which these characteristics lead to infections, demonstrating that talking and coughing can generate aerosols or that it is possible to recover viral RNA from the air does not prove aerosol transmission; infection depends on the disease, route of exposure, inoculum size, duration of exposure, and host defenses.

If we take into consideration all of the above, then we have to go beyond frequent hand washing with abundant soap and water, the application of chlorine solutions on hands, as well as on blankets at the entrances of workplaces and homes, plus the cleaning of the environment and the optimization of interior ventilation, because the results obtained so far in more than seven months of confronting the pandemic, have not been as expected. As was stated at the beginning, the problem of the pandemic must be seen as a whole and in an integrated manner, which is why the treatment and control of the SARS-CoV-2 virus must include heat treatment (Thermonebulization) and cold treatment (motorized backpacks and sprinklers), with pesticides that include/contain in their chemical composition alcohol, also based on chlorine and surfactant detergents, and always from top to bottom, with a correct calibration of the nozzles and perfect technical state of the equipment used in the treatment actions.

Volume 5 Issue 10 October 2020

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