Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Stability of SARS-CoV-2 in different environmental conditions

We feel the need to address several errors in the findings presented in the Correspondence by Alex W H Chin and colleagues.[1] Some results of this research challenge the current hand hygiene programmes recommended by different public health authorities, and we think that caution is required when applying those results to protect human health during infectious disease outbreaks, including the outbreak of COVID-19.

It has been shown that unmedicated soap and water appears to be highly effective in removing influenza virus[2,3] and inactivating coronaviruses.[4,5] The combined action of soap and water effectively dissolves the fat membrane of the coronavirus as well as the glue that holds the virus together, detaching it from the surface (eg, skin) and causing it to fall apart like a house of cards.[6] The authors considered household soap a disinfectant, whereas regular household soaps are not disinfectants but are a more of a detergent or cleaner. Additionally, the US Environmental Protection Agency does not list soap solution as a disinfectant in the list of disinfectants for use against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[7] WHO's recommendations for cleaning practice suggest to clean surfaces with regular household soap or detergent before using household disinfectants such as 0·1% or 0·5% sodium hypochlorite.[8] The applied method of research by Chin and colleagues[1] to add SARS-CoV-2 culture to a prepared 0·1% soap solution is problematic. The results might imply that in order to inactive coronavirus using a soap solution, people should put their hands in a pan of hand soap solution for more than 5 minutes. This is different from what actually happens when people wash their hands with soap. We believe that the results of this research could thus be misleading, in terms of protective methods to be used against SARS-CoV-2. Besides, we were surprised to note that the authors did not specify the type of soap used in their tests, which is important factor in predicting its virucidal effects.

It seems that the Correspondence also does not address the effects of shorter incubation times on virus activity. The virucidal effects of different disinfectants on SARS-CoV-2 were investigated with a number of incubation times (eg, 5, 15, and 30 min), and no infectious virus could be detected in all cases with the exception of a 5-min incubation with hand soap. However, the authors did not consider an incubation time of less than 5 min, for example 1 min or less. Data published in February and March of 2020 suggest effective inactivation of coronavirus with 62–71% ethanol, 0·5% hydrogen peroxide, 0·5% sodium hypochlorite, and 0·1% sodium hypochlorite within 1 min.[9–10] Washing hands with soap and water for 40–60 s is also recommended in WHO's hand hygiene practices against enveloped viruses such as SARS-CoV-2.[8] Commonly, the length of time required to carry out handwashing using soap and water is less than 1 min and the minimum is 20 s.[6] Therefore, it would have been more appropriate to test incubation times of less than 5 min, such as 10–50 s and 1–3 min to test the virucidal effects of soap.

Lastly, the concentration and exposure time of antiseptics are important parameters for their efficacy. Chin and colleagues[1] applied chlorinated homemade bleach solutions at a concentration of 0·1% and 0·05%, using the same incubation times starting at 5 min. The results indicated similar efficiency of inactivation of SARS-CoV-2 for both concentrations. Since both of these disinfectant solutions can inactivate the virus in less than 1 min,[9,10] an incubation time of 5 min or more means they were not able to differentiate the effect of each of these concentrations on the stability of the virus. Again, it would have been more appropriate to test incubation times of less than 5 min instead.

We declare no competing interests.

Reza Dehbandi,
**Mohammad Ali Zazouli*
mzazouli@mazums.ac.ir

Department of Environmental Health Engineering, Health Sciences Research Center, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran

1 Chin AWH, Chu JTS, Perera MRA, et al. Stability of SARS-CoV-2 in different environmental conditions. *Lancet Microbe* 2020; **1:** e10.
2 Collignon PJ, Carnie JA. Infection control and pandemic influenza. *Med J Aust* 2006; **185** (suppl 10)**:** S54–57.
3 Grayson ML, Melvani S, Druce J, et al. Efficacy of soap and water and alcohol-based hand-rub preparations against live H1N1 influenza virus on the hands of human volunteers. *Clin Infect Dis* 2009; **48:** 285–91.
4 Montville R, Schaffner DW. A meta-analysis of the published literature on the effectiveness of antimicrobial soaps. *J Food Prot* 2011; **74:** 1875–82.
5 Sickbert-Bennett EE, Weber DJ, Gergen-Teague MF, Sobsey MD, Samsa GP, Rutala WA. Comparative efficacy of hand hygiene agents in the reduction of bacteria and viruses. *Am J Infect Control* 2005; **33:** 67–77.
6 Türsen Ü, Türsen B, Lotti T. Coronavirus-days in dermatology. *Dermatol Ther* 2020; published online April 19. https://doi.org/10.1111/dth.13438.
7 United States Environmental Protection Agency. List N: disinfectants for use against SARS-CoV-2. https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19 (accessed May 4, 2020).
8 WHO. Water, sanitation, hygiene, and waste management for the COVID-19 virus: interim guidance. April 23, 2020. https://www.who.int/publications/i/item/water-sanitation-hygiene-and-waste-management-for-the-covid-19-virus-interim-guidance (accessed May 2, 2020).
9 Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect* 2020; **104:** 246–51.
10 Kampf G. Potential role of inanimate surfaces for the spread of coronaviruses and their inactivation with disinfectant agents. *Infect Prev Pract* 2020; **2:** 100044.