

A Few Practical Tips for Everyone: Concerning the Covid 19 Pandemic

Turski Wojciech Antoni*

Holy Cross (Swietokrzyska) College in Kielce, Poland

***Corresponding Author:** Turski Wojciech Antoni, Holy Cross (Swietokrzyska) College in Kielce, Poland.

Received: January 11, 2021; **Published:** February 27, 2021

Abstract

The objective is just to give a few practical tips concerning SARSCoV-2:

1. To gargle with warm 5% NaCl solution or/and inhale warm sea or mineral water as there is quite strong affinity of polar residues of aminoacids of SARSCoV-2 spike proteins to ions from salt.
2. Gargling with warm baking soda with the same effect but additionally some depolymerization of viral RNA might be achieved due to an alkaline hydrolysis.
3. Thus, caustic soda is much more effective but obviously not for internal use.

Keywords: SARS-CoV-2; Polar Aminoacid Residues; Caustic Soda; Baking Soda; Gargling; Inhalation; Washing Out Viruses; RNA Hydrolysis; Viruses' Damage

The virus does not breathe, does not eat anything - it does not have its own metabolism. It does not travel, attack or kill. Even more so: *de facto* the virus does not multiply!

So, why then we say it is so dangerous? Well, we, the people are multiplying the virus(-es) that will be inside our target cells and will be there because "we let this virus in". Because we have the receptors for the virus. We are the ones who multiply the virus! In its entirety - including its "beautiful crown", which gave it its name [mind you this whole crown and its spikes and lipid envelope come from the human body, and in fact from... eaten steaks and butter].

A few practical notes for everyone:

1. People who have not worked with RNA do not know that RNA, and therefore SARS-CoV2 RNA, is hydrolyzed into much, much smaller, completely harmless fragments [small oligonucleotides, even mono 2'-3'-mononucleotides] in relatively highly alkaline solutions at room temperature, and much faster at about 50 - 70 degrees [1,2] [and thus already in the solution of NaOH: caustic soda, even only about 1.2 - 1.5% i.e. 0.3 - 0.375 mole/l; a solution of ordinary baking soda (NaHCO₃) should have to be bit more concentrated: 0.5 - 1 mole/L, thus 0.42 - 0.84%]. Unfortunately, mentioned NaOH solution is too alkaline and may simply burn epithelium, so for gargling just baking soda can be recommended. But in some cases [see further] NaOH solutions might be very useful but not for internal use.
2. Electric charges of amino acids from the surface proteins of the crown of SARS-CoV-2 strongly attract ions, both Na⁺ cations and Cl⁻ anions, so plain gargling with a fairly concentrated e.g. 5% warm NaCl solution admittedly will not kill viruses present in the throat, but will rinse out quite a lot of them. The same can be done by inhalation of warm seawater, mineral water, especially with a lot of essential oils - having in turn the affinity for lipids of the virus envelope.

This suggestion is strongly supported by a number of key papers on binding SARS-CoV-2 to the receptor. The spike proteins [crown of SARS-CoV2] are trimers but each trimer has two subunits [S1 and S2]. S1 [representing the correct spike] recognizes through its receptor binding domain [RBD] the extracellular [peptidase] domain PD of angiotensin converting enzyme 2 [ACE2] being the receptor of

coronavirus. An extended loop region of the RBD spans the arch-shaped $\alpha 1$ helix of the ACE2-PD like a bridge. There are first of all polar residues [3].

In a text below polar aminoacids from virus RBD [in spike proteins of the crown] are marked in bold/ At the N terminus of $\alpha 1$, **Gln498**, **Thr500**, and **Asn501** of the RBD form a network of H-bonds with **Tyr41**, **Gln42**, **Lys353** and **Arg357** from ACE2. In the middle of the bridge, **Lys417** and **Tyr453** of the RBD interact with **Asp30** and **His34** of ACE2, respectively [3]. At the C terminus of $\alpha 1$, **Gln474** of the RBD is H-bonded to **Gln24** of ACE2, whereas Phe486 of the RBD interacts with Met82 of ACE2 through van der Waals forces and there begins an area of “deep penetration” of virion into an hydrophobic pocket of peptidase domain of ACE2 [4].

Additionally [5,6]: the cleavage of the bond between the S1 and S2 subunit with some proteases [indispensable for fusion of viral envelope with the membrane of target cell] occurs between two residues of arginine [Arg] in the region rich in arginine residues [7,8].

It just turns out that the binding of virus spike proteins to the receptor occurs in a region rich in polar amino acids and ionized residues. Therefore, the formation of ion-dipole and ion-ion [ion] bonds [“salt bridges”] between chloride and sodium ions [from NaCl solution] and ionized residues [like NH_3^+ of lysine 417] or -mostly-polar residues of aminoacids - from viral protein can easily pull out viruses and “wash them out”. Well, I mean just “sole” viruses not yet bound “specifically” with their receptor [peptidase domain of ACE2] i.e. just “nonspecifically bound” to some proteins of any epithelial surface. However, it is even quite possible [in spite being more difficult] that some viruses might be even taken out from already existing complexes with the receptor membrane protein molecules. It is just a competition between viruses, surface or receptor proteins and salt [environment] ions in making weak but still more energetically probable bonds. It is pretty obvious that higher salt concentration and higher temperature elevates probability of viruses’ washing out.

Gargling with a warm solution of “baking soda” [2.5 - 10% NaHCO_3] will not only flush out a large portion of the viruses, but maybe even hydrolyze viral RNA into mixture of oligo nucleotides but if we spit the “flushes” out into a soap solution with caustic soda added, the viral RNA can be “liquefied” completely, just destroyed.

It has been recommended as a way to get rid of even trace amounts of potentially infectious viral RNA from DNA preparations [9] - but it can be applied to any mixture containing viral RNA.

Bibliography

1. Voet, *et al.* “Biochemistry (4th edition)”. New York: J. Wiley and Sons (2011): 85.
2. Lipkin D., *et al.* “The Mechanism of the Alkaline Hydrolysis of Ribonucleic Acids”. *Journal of the American Chemical Society* 76.11 (1954): 2871-2872.
3. Yan R., *et al.* “Structural basis for the recognition of SARS-CoV-2 by full-length human ACE2”. *Science* 367.6785 (2020): 1444-1448.
4. Wan Y., *et al.* “Receptor Recognition by the Novel Coronavirus from Wuhan: an Analysis Based on Decade-Long Structural Studies of SARS Coronavirus”. *Journal of Virology* 94.7 (2020): e00127-00120.
5. Glowacka I., *et al.* “Evidence that TMPRSS2 activates the severe acute respiratory syndrome coronavirus spike protein for membrane fusion and reduces viral control by the humoral immune response”. *Journal of Virology* 85.9 (2011): 4122-4134.
6. Liu M., *et al.* “Inhibition of SARS-CoV-2 (previously 2019-nCoV) infection by a highly potent pan-coronavirus fusion inhibitor targeting its spike protein that harbors a high capacity to mediate membrane fusion”. *Cell Research* 30.4 (2020): 343-355.
7. Hoffmann M., *et al.* “SARS-CoV-2 Cell Entry Depends on ACE2 and TMPRSS2 and Is Blocked by a Clinically Proven Protease Inhibitor”. *Cell* (2020).

8. Heurich A., *et al.* "TMPRSS2 and ADAM17 cleave ACE2 differentially and only proteolysis by TMPRSS2 augments entry driven by the severe acute respiratory syndrome coronavirus spike protein". *Journal of Virology* 88.2 (2014): 1293-1307.
9. Lemire KA., *et al.* "Alkaline hydrolysis to remove potentially infectious viral RNA contaminants from DNA". *Journal of Virology* 13.88 (2016).

Volume 16 Issue 3 March 2021

© All rights reserved by Turski Wojciech Antoni.