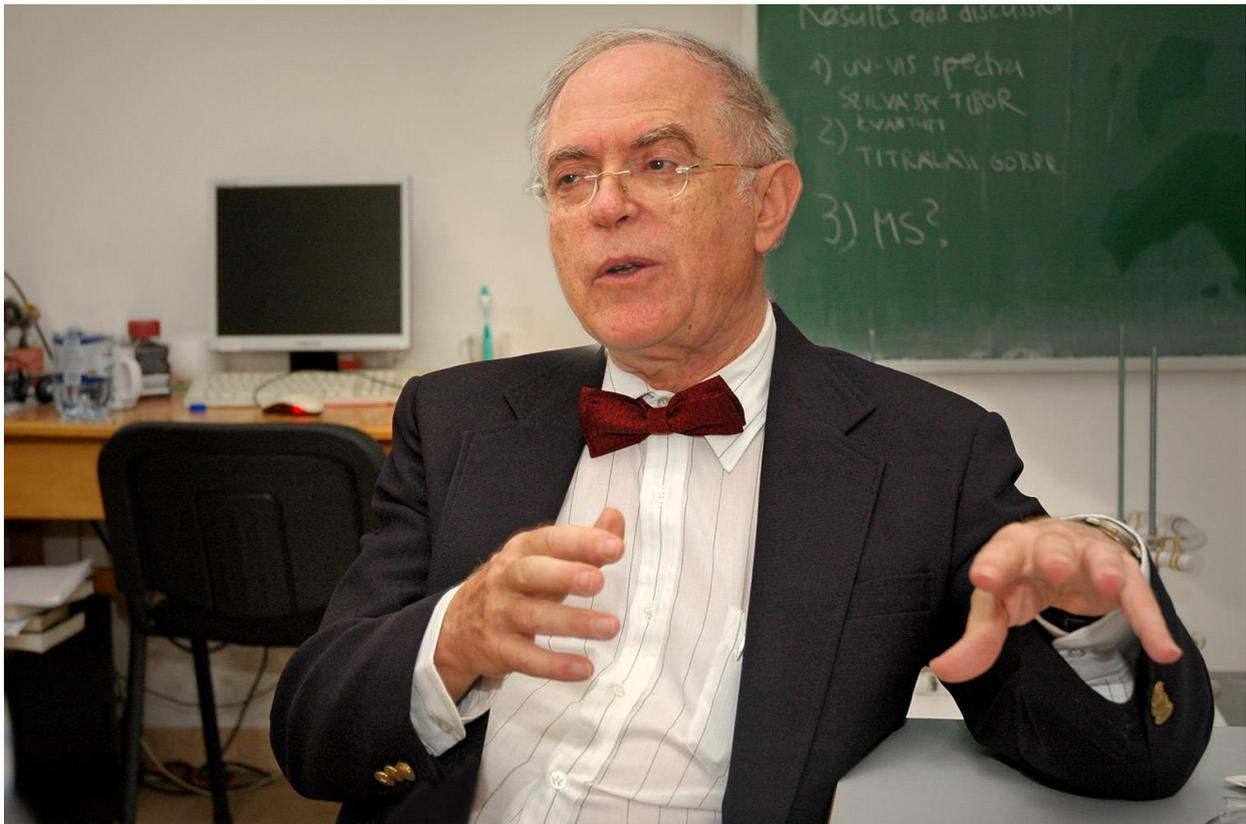


# COVID-19: TREATMENT BY GARGLING?

**Chlorine dioxide against viruses: that is the subject of a study recently published by two Budapest universities: the Budapest University of Technology and Economics, and Semmelweis University. The article has quickly gained great international interest. We talked about the study, the coronavirus, and the possibilities of the near future with one of the authors, Professor Zoltán Noszticzius.**

"Chlorine dioxide is a chemical substance with unique characteristics, capable of combating all known viruses, while harmless to the human body when used topically", Zoltán Noszticzius, professor emeritus at BME's Faculty of Natural Sciences revealed to bme.hu. "Gargling with a high purity aqueous chlorine dioxide solution has already proven to be useful against viral infections in the throat, and we hypothesise that the same technique will inhibit the spread of coronavirus infections in the pharynx, thus helping in the prevention of the COVID-19 illness. This hypothesis is currently being tested."

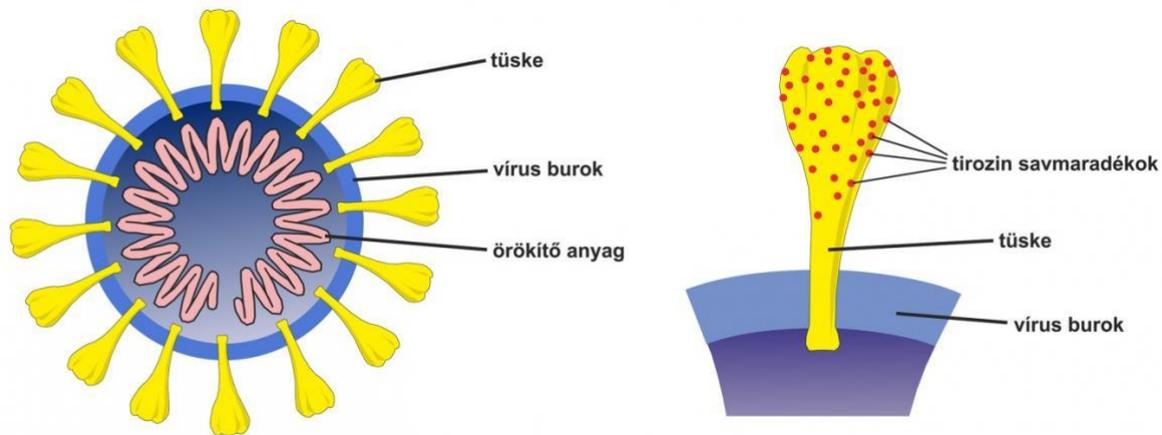
"I have many anecdotal stories of the compound's effectiveness against viruses, but a rigorous clinical study is also required to demonstrate its efficacy against COVID-19. That study is currently being prepared at the National Korányi Institute of Pulmonology using our product called Solumium. The active ingredient in Solumium is the said high purity chlorine dioxide."



The [article](#) was published in Physiology International of AKJournals. The authors are professor Zoltán Noszticzius, assistant professor Kristóf Kály-Kullai, and associate professor Mária Wittmann, as well as László Rosivall, professor emeritus at Semmelweis University.

"The article came out in March, just as we saw a sharp rise in new coronavirus infections in Hungary", says professor Noszticzius.

The article has received worldwide attention: according to ResearchGate it was the most widely read publication from Hungary for one week in July, and was the most widely read in the fields of Chemical Kinetics and Veterinary Medicine worldwide.



Cross-section of coronavirus (officially called SARS-CoV-2), which causes the illness COVID-19. The diameter of the virion is approximately 100 nm (1/10 000 millimeter). The virus uses its spike proteins to penetrate and infect human cells. The spike protein binds to one of the receptors in human cells (the so-called ACE2 receptor) just as a key fits into a lock.

When chlorine dioxide ( $\text{ClO}_2$ ), the active ingredient in Solumium, is applied, it rapidly reacts with the tyrosine amino acid residues of the spike (represented by red dots above). Thus the 'key' is destroyed and no longer able to 'open the lock', which means that the virus is inactivated.

"Why is it that COVID-19 causes only minor symptoms in some people, while proving to be deadly to others?", said the professor asking the question that worries millions of people, answering it straight away: "We have a natural or so-called native immunity which is stronger in younger people and is able to fight virus infections by itself. In most people, however, that is not sufficient during an intensive virus attack, so the body needs to develop its adaptive, or learned, immunity. This learning process takes 8-12 days and if during this critical phase too many coronaviruses reach the lungs, reproducing rapidly on its mucous membrane, this may induce a strong and often fatal immune response, called the cytokine storm". He added that people infected with coronavirus not only endanger others when they cough, but may also inhale the aerosol particles again, since during coughing the virus is released from the throat in the form of an aerosol, which can re-enter the body, cause re-infection and reach the lungs. (That risk has recently been pointed out by a research group from Semmelweis University.) "If the patient survives this previously mentioned cca. 2-week period without getting pneumonia the chances of avoiding serious complications are good. By then antibodies able to inactivate the virus will have been produced. Although our hypothesis is based on natural science, the real question requiring further research is whether decimating the virus in the mucous membrane of the pharynx is enough to stop the virus reaching the lungs and causing pneumonia during the critical phase. Another important aspect is that Covid patients treated with chlorine dioxide are less able to spread the virus. We also wish to examine how the solution could be used by healthcare workers for preventive purposes."

As to the mode of action of chlorine dioxide, the professor explained that the compound successfully combats infections on the surfaces of the human body, but will not penetrate the body itself. "Our research has proven that chlorine dioxide is a so-called size-selective antimicrobial agent. That means it destroys the relatively small pathogens rapidly, while human and animal cells, which are larger than the pathogens, are damaged much more slowly, and thus chlorine dioxide poses practically no harm to a multicellular organism like ours"

"Five years ago, [we were awarded](#) the Swedish Chamber of Commerce's "Gran Prize" for creating an antimicrobial solution containing high-purity chlorine dioxide called Solumium, which can kill all microbes (ie bacteria, fungi and viruses) alike. It also affects antibiotic-resistant bacteria: pathogens are unable to develop resistance to it.

We are also aiming to take part in the fight against coronavirus: we hope that high-purity chlorine dioxide can be used against any virus that causes upper respiratory disease. Until a vaccine or drug targeting a particular virus is developed, Solumium may be the first step in protection", Professor Noszticzus concluded.

(based on the [article](#) published on the BME website on September 9, 2020)