

Environment and Virus Interactions: Towards a Systematic Therapy of SARS-CoV-2

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ABSTRACT

The truth about SARS, why the virus spreads, China's coverup, how scared should we feel and other details are reported in summary. The main purpose of the paper is to compare the previous coronavirus epidemics with the one occurring since 2019 and to report the main preventions and therapies on the actual problem that is finally approaching the end. Hydrossylchlorochine, remdesivir, ivermectin, molnupiravir and other therapeutic drugs are taken in consideration including the monoclonal antibodies. After the mRNA vaccine approach and the vaccines with adenovirus vector, the Novavax and the Valneva are taken in consideration as perspectives.

Key words: COVID-19, SARS, CoV2 drugs, vaccines, monoclonal antibodies.

INTRODUCTION

On March 2022 a severe acute respiratory syndrome (SARS) appeared in Hong Kong (Figure 1). It was caused by a coronavirus, named the SARS-CoV1 (Figure 2)¹. Table 1 reports the proportion of patients with a positive RT-PCR result for coronavirus².

A new dangerous disease has gone global in 2012, named the SARS of the Middle East (MERS), also in this case caused by another coronavirus (Figure 3). Protecting yourself is the rule of CDC-USA (Table 2).

In figure 4 there are reported the cases of coronavirus outside China in March 2020 by the COVID-19. In table 3 it is reported what we know how the coronavirus spreads around. The figure 5 shows the reduction of the epidemic pick over a longer period. The diffusion and the percentage of lethality concerning the main viruses found since the 2000 are described in table 4. Replication of COVID-19 and its pathology are referred in figure 6 and main strains of coronavirus are found in figure 7.

METHODS

The Italian management of the coronavirus epidemic by the technical scientific committee (CTS) was a failure according to an editorial in the prestigious English magazine NATURE as reported in the first days of March 2021³. We have reached a lethality rate which is linked to the poor management of the emergency, to the wrong treatments, to intensive care beds cut in recent years. Here to use hydroxychloroquine we had to wait for the State Council! One concept must be clear: Covid is cured⁴.

RESULTS

Already in March 2020 some studies suggested the use of hydroxychloroquine at the onset of symptoms^{5, 6}. To popularize this drug was certainly Didier Raoult, head of the IHU Méditerranée Infection Hospital University in Marseille, who, after healing countless patients with hydroxychloroquine found the boycott by the academic world regarding this cheap drug, was forced to put on Youtube a video denouncing this situation⁷.

In an order, the Council of State obliged AIFA to remove the ban on prescribing hydroxychloroquine for the home care of Covid patients. The same risk of heart failure related to the intake of hydroxychloroquine was emphasized and proclaimed everywhere. As with all drugs, hydroxychloroquine also entails, in addition to benefits, some risks. But it would have been enough to analyze the clinical status of the 65 thousand Italians suffering from rheumatoid arthritis and lupus (all included in a national register with code Icd9 714) who take hydroxychloroquine every day to ascertain the very low risk of this drug^{8, 9}.

We have seen the importance of the use of monoclonal antibodies to neutralize the COVID-19 infection, also in this field the Italy health care has not been up to the situation on their use linked to bureaucracy and inefficiency as we had already seen for the use of serotherapy. The Food and Drug Administration (FDA) has granted authorization for the use of the Lilly neutralizing IgG1 monoclonal antibody (Bamlanirumab) in the experimental phase for the treatment of COVID-19 in patients aged over => 12 years. The mechanism of action consists in binding to the SARS-CoV2 spike protein, unblocking the adhesion to the human ACE2 receptor. The FDA has issued authorization for the use of the monoclonal antibodies of Regeneron, Casilivimab and Idevimab to be administered like Bamlanirumab with the same mechanism³.

DISCUSSION

Antivirals such as Remdesivir have finally found space, although there has been no determination of the use of chlorine dioxide in antiviral treatment as in Central South America. The effect of Ivermectin has also been recognized as effective in resolving symptoms among adults with mild disease, like the drug found by the Israelis. Israel is experimenting with a drug against Covid which, at first results, is declared effective over 90%. The Israeli press writes it. Ichilov Medical Center in Tel Aviv has successfully completed phase one studies of the research project on this new medicine, which is giving very encouraging responses. American pharmaceutical company Pfizer, which makes the most sought-after COVID vaccine, is also testing an oral drug, a protease inhibitor the richest the okay by the FDA¹⁰. This was announced in a note by the same American pharmaceutical company which clarified that "the clinical candidate is an oral antiviral (PF- 07321332), a SARS-CoV2-3CL protease inhibitor, which has demonstrated potent antiviral activity in vitro against SARS. -CoV-2, as well as activities against other coronaviruses, suggesting potential use in the treatment of COVID-19 and potential use to address future coronavirus threats"¹⁰.

Since the beginning of the Italian epidemic, we have been dealing with suggesting vitamins C and D, lactoferrin, and in the case of contact with a positive patient, also plaquenil as prophylaxis. For the initial therapy of the subjects we suggest the same plaquenil at increased doses with the combination of azithromycin. Also based on the possible criticality of the febrile trend, we suggest the prescription of cortisone and heparin. Finally, without necessarily waiting

for a critical phase, we recommend serotherapy. The UK drug regulatory agency (MHRA) has approved in advance of everyone else in Europe - Molnupiravir, the first indicated Covid pill to be registered. The medicine, created and illustrated in recent weeks by the American giant Merck Sharp & Dohme in partnership with Ridgeback Biotherapeutics, can be prescribed to anyone who is tested positive for Covid and has at least one risk factor linked to a possible serious contagion such as obesity, a heart disease, diabetes or generally over 60 years of age. For MHRA, Molnupiravir is a "safe and effective" drug, capable of reducing the danger of hospitalization for people affected by even moderate forms of Covid-19 who have at the same time a condition of extra risk.

Finally in Science is reported the action of the new antiviral pills that reduce the number of people who need hospitalization after diagnosis with COVID-19¹¹.

CONCLUSION

The new vaccine is represented by the administration of recombinant proteins for the production of spikes and adjuvants by Novavax (USA). The EMA is already taking care of this one and therefore it was passed to AIFA for its distribution.

The Valneva has been approved and presumably it will be distributed in May. It consists of an anti-COVID-19 vaccine with inactivated virus to be administered in two doses, 4 weeks apart, and reinforced by two adjuvants consisting of an aluminum salt and a synthetic DNA of 22 nucleotides already used for the vaccination of hepatitis B. The manufacturer is located in France, the patent is American and previously the same industry has produced a vaccine for Japanese encephalitis. Only local symptoms on intramuscular injection (pain, redness and swelling) and general symptoms such as fever, headache, muscle and joint pain, asthenia, nausea, general malaise, less than 1% serious adverse effects are described⁹.

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Table 1. Propotion of patients with a positive RT-PCR for coronavirus

Proportion of Patients with a Positive RT-PCR Result for Coronavirus.*			
Group	Mean No. of Samples per Patient	Fraction of Patients Testing Positive	
		IN-6/IN-7 and Nested SARS/ SAR1As	BNloutS2/ BNloutAs and Nested BNlinS/BNlinAs
Patients with probable SARS †	2.2	5/5	5/5
Patients with suspected SARS‡	1.3	3/13	3/13
Contacts	1.0	0/21	0/21

* RT-PCR denotes reverse-transcriptase polymerase chain reaction.
† Samples were from the lower respiratory tract in five patients and nasopharyngeal swabs in one patient (all positive); samples were obtained 3 to 13 days after the onset of illness.
‡ Nasopharyngeal samples from 13 patients were used; they were obtained 3 to 12 days after the onset of illness.

Table 2. CDC recommendations for personal protection
Table 3. News on coronavirus spreading to be known

Going Around

What we know about how coronavirus spreads – and what you should do about it:

How does coronavirus compare to the flu?

Like the seasonal flu, the virus spreads through airborne droplets. Currently, Americans are far more likely to get the flu, which affects millions each year.

What is R0

«R-naught» is the number of people one patient will infect, on average. Coronavirus estimates vary from 1.4 to 4.8 people. SARS is in the 2-to-4 range, while measles estimate are as high as 18.

Can masks Keep us healthy?

Surgical masks can block large droplets, but viruses can be small enough to slip through gaps. The CDC recommends that sick patients and their caretakers wear them.

What about the rest of us

The best ways to fend off coronavirus, the flu and other airborne illnesses are to wash hands and avoid sick people

Table 4. Last 20 years of world virus epidemic

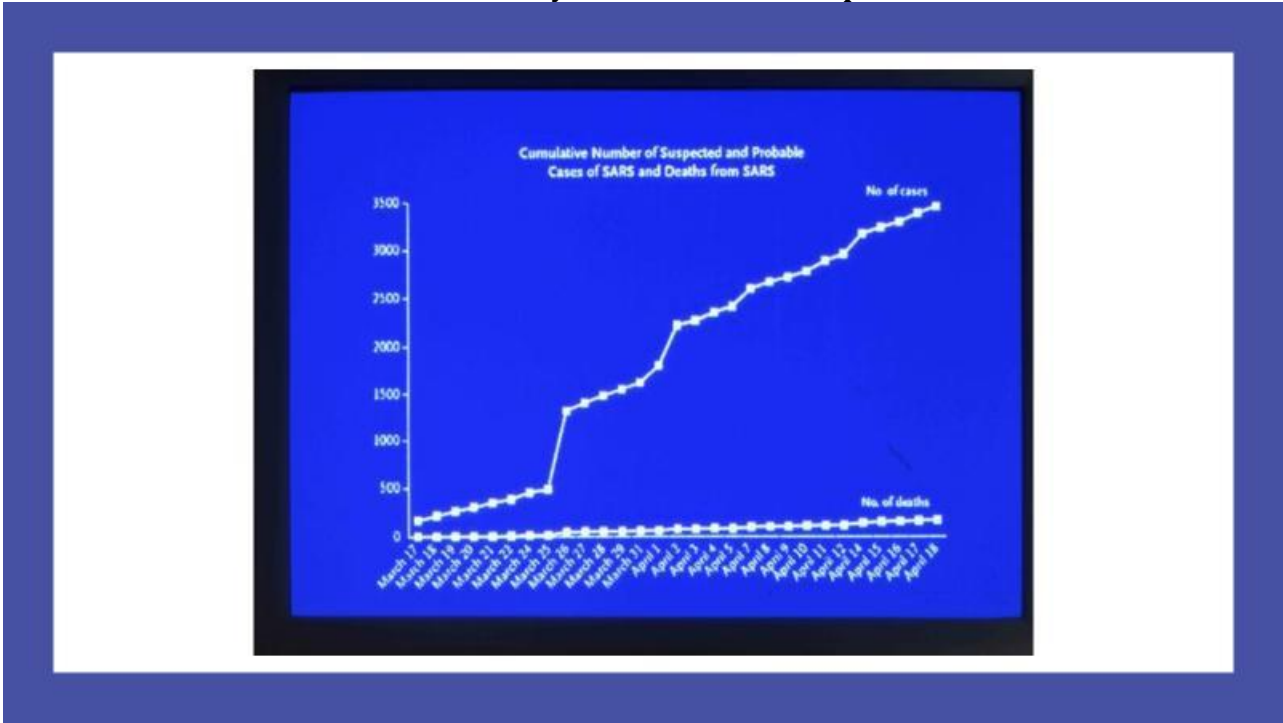




Figure 1. The first SARS (2002-2003)

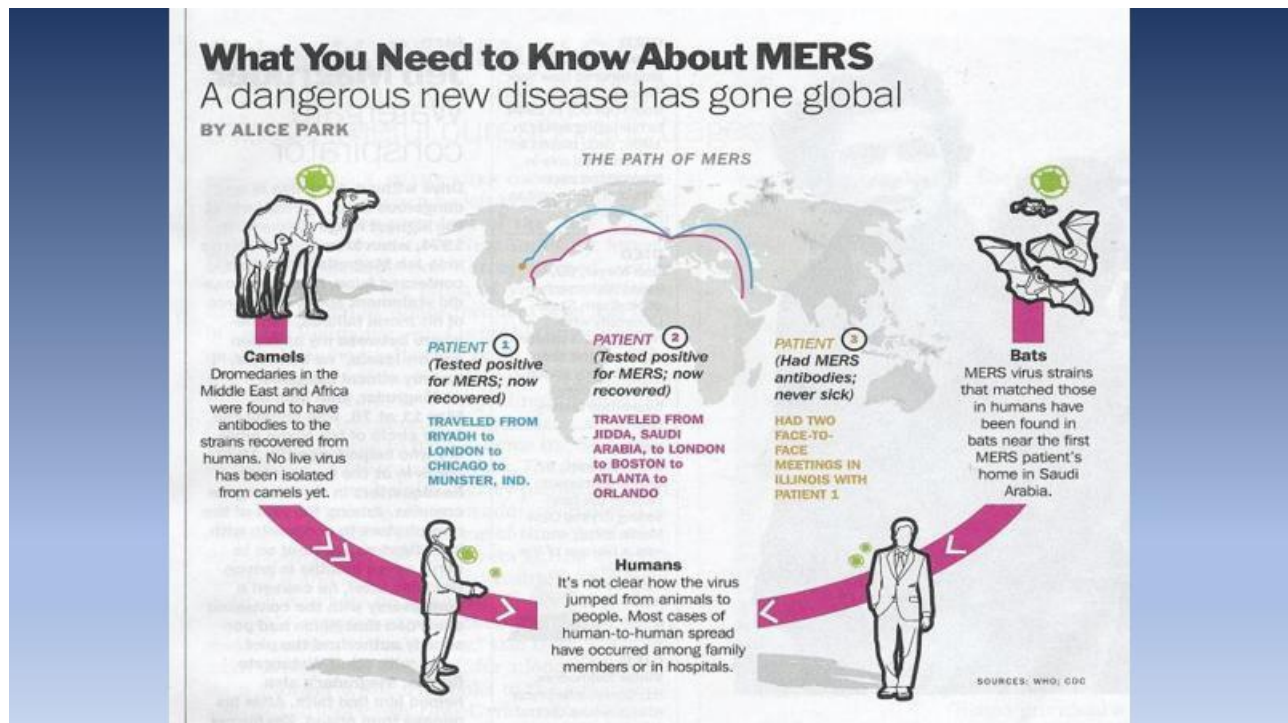


Figure 2. The SARS-CoV1

Cases of coronavirus outside China

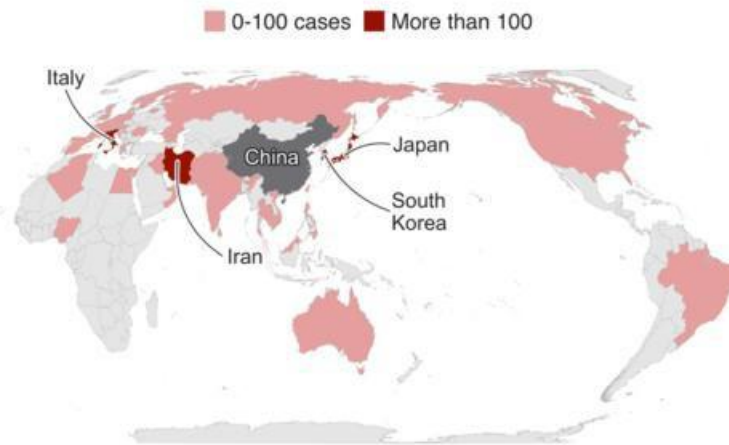


Figure 3. The SARS of the Middle East

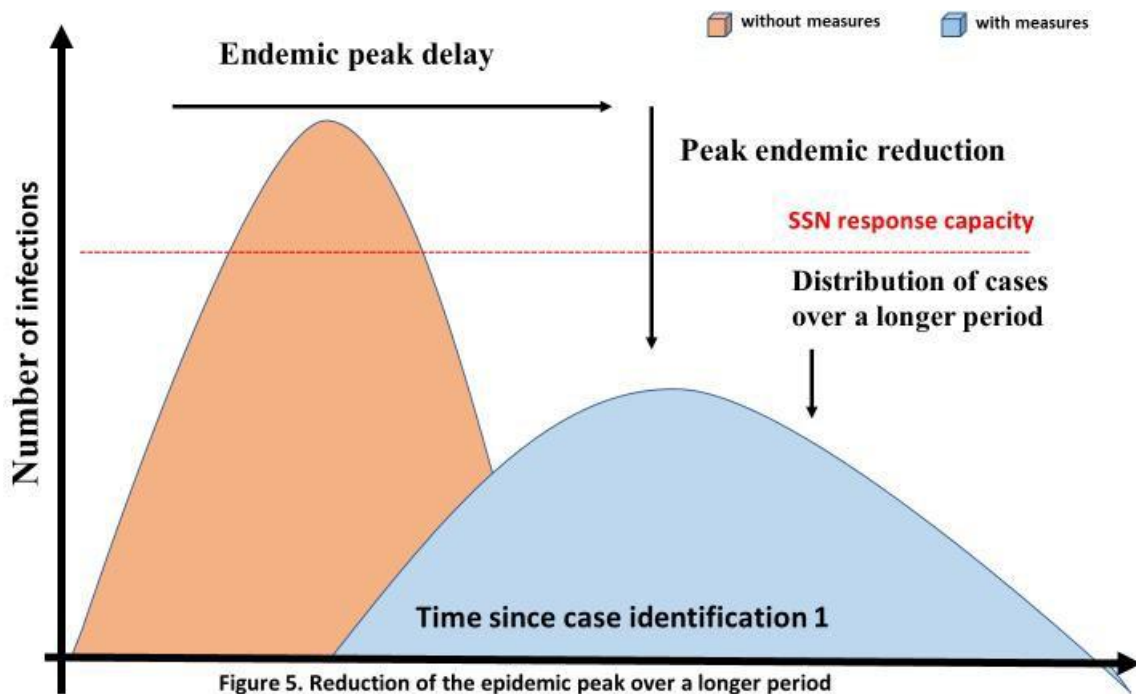


Figure 4. COVID-19, March 2020

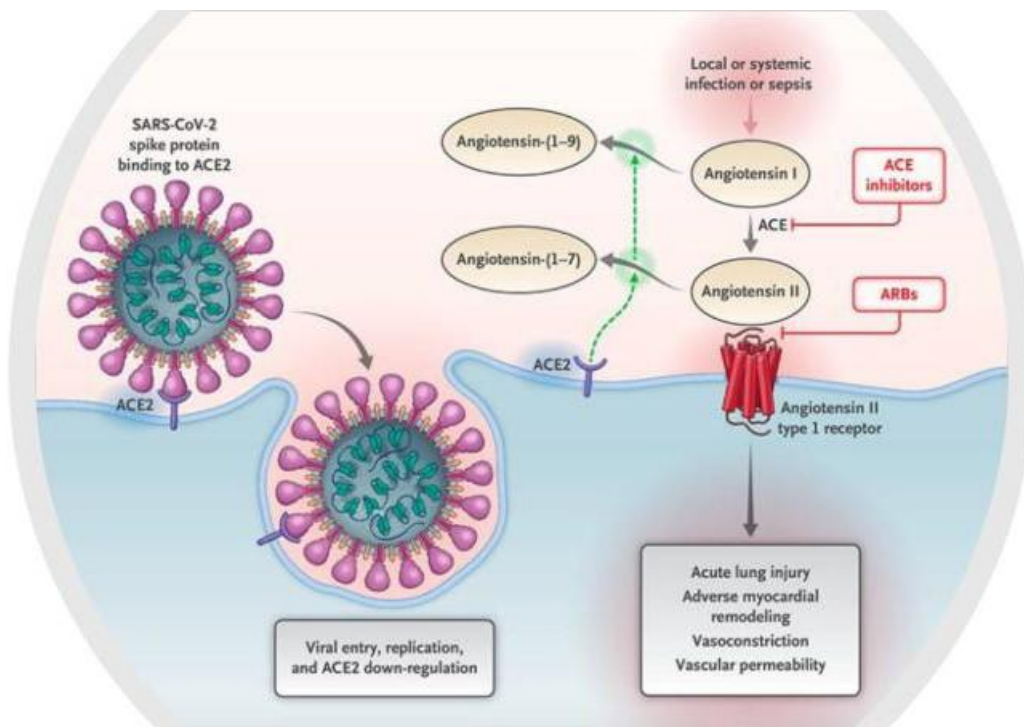


Figure 6. Replication of COVID-19 and pathology

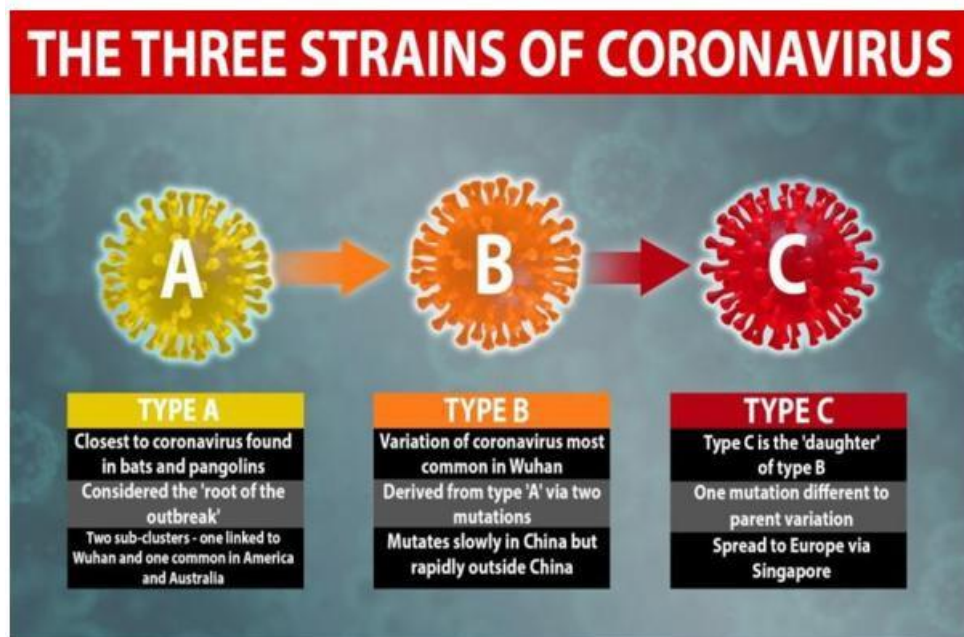


Figure 7. Strains of coronavirus