

COVID 19. A Flash in Mid-March

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It is called **SARS-CoV-2, or COVID 19, or 2019-nCoV.**

It has caused the most severe pandemic known since we have clear documents.

It began with a lot of “**Why’s**” and these questions continue after several months since the beginning.

Why has this virus attacked humanity just today?

Why does it spread so quickly?

Why apparent healthy people are so contagious?

Who among young healthy adults is attacked to death? Do we have a genetic answer?

Why any of the known antiviral agents do not act on it?

What do people have to do?

There are two theoretical answers for the last question: first, **prevention**, and then, **therapy**.

For prevention, social and individual measures are used.

Social measures were taken by the administrations of countries in an appropriate time interval or not, in an efficient way or not.

In China, the army was used. It seemed to be an efficient approach.

In Italy, festivals continued a long period after the alarm sound. It had a bad outcome.

In the United States, the President locked the country against some Europeans. Not against the British. One day later, he closed the USA against the British as well.

Individual measures mean to stay isolated even if you are only suspected or you were in the vicinity of a sick person. But what happens if, for a period of approximately five days, hundreds of persons around you seem to have an apparent very good health but may transmit the illness? How do you know whether you should protect yourself?

Individual measures are efficient according to the social discipline of people in each country. In Europe, latins, who are generally rebels, are the most affected populations. But Germans are very close to French people in their epidemio-

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logic figures. Why, if the Germans are known to be far more disciplined?

The solution would be to stop everybody at home and bring them food and drugs as appropriate by persons equipped like aliens. Impossible! We do not have enough aliens. And who would produce food, drugs and energy if everybody is isolated? Not to say anything about the general production of goods and services, which brings money for a country.

The alternative is to isolate some of those deemed sick or suspect, while letting the others work and do their best to take care of themselves. It is an imperfect measure, but the only possible one. The rules to take care of oneself should be clear, simple and applicable. Which seems not to be the case.

What do we do for therapy today?

We put those people who are in a bad condition in Intensive Care Units. If the most seriously attacked organ, the lung, is aggressed, we put them on ventilation. In Italy there are so many cases that they do not have enough ventilators and even intensive care beds. And it happens in a country considered to have one of the best health care systems in the world.

Some countries ordered ventilators to complete their needs. Producers have stopped supplying ventilators to others when their own country needed them. Is this discrimination? Some ethic rules say you have first to protect yourself in order to protect others.

Now, before discussing possible therapies, let's have a look at the figures! Here are the main figures for one day in Middle March (the 15th of March) (1, 2) at the world level:

Confirmed: 145 480

Deaths: 5426

Recovered: 72 165

Countries: 123

These figures confirm a pandemic. Mortality is about 3.7%. Influenza mortality is usually 0.1%. And the great influenza pandemics from 1918 and 1957 had about half the mortality reported to date for the SARS-CoV-2 pandemic.

I can however see some light. Half of patients are already reported to recover (49.6%) and – if not dead, the recovery percentage for the survivors will be at the end more than 95%.

And, if we succeed to have **specific therapy**, the good figures could increase dramatically.

What can we say now about specific therapy?

Medicine is seriously agitating for finding solutions. Hundreds of patterns have been recorded these last days only for hypothetical therapies (3).

The main ways to apply therapy for SARS-CoV-2 are as follows:

- numerous candidate drugs
- four classes of biologics
 - therapeutic antibodies
 - cytokines
 - RNA therapies
 - vaccines.

Here is a hypothetical very short list of drugs which are taken into account for the therapy of SARS-CoV-2:

- lopinavir, ribavirin, remdesivir, arbidol, all of them being already tested in clinical trials for treating SARS-CoV-2!
- chloroquine, baricitinib, ritonavir, darunavir, favipiravir, galidesivir, nitadoxanide, tocilizumab – these are candidate drugs and some of them are either used in clinical experiments or already in clinical trials against other viral infections.

Some of the above cited molecules and probably others were selected using artificial intelligence, which is a very new way to develop knowledge in research. Artificial intelligence is developed by machines (computers) to maximize the chance to achieve the goals. This is added to the natural intelligence of humans.

It is beyond the purpose of this paper to develop the mechanisms of SARS-CoV-2 infections which may be attacked by the candidate therapy. We only note some observations.

The virus uses a glycosylated spike (S) protein to enter the host and this one binds to the well known ACE2 (Angiotensin Converting Enzyme) receptor protein. However, no drug already used in relation to this receptor is a candidate drug for this viral illness (3). Nevertheless, the relation of the virus with the AT1 and AT2 receptors is checked for therapeutic developments. The virus has a huge affinity for ACE2, which is thought to contribute to the very great contagiousness of SARS-CoV-2.

Some companies, like Al Cellera in collaboration with Lilly, have already screened millions of molecules in the blood of people who recovered from the illness to identify the molecules which contributed to recovery (2).

About 200 new patents for SARS-Cov-2 are directed to modify the anti-SARS and anti-MERS vaccines that are already tested for those illnesses (3). Vaccine development for SARS-CoV-2 to date includes attenuated virus vaccines, DNA-based vaccines, protein-based vaccines, virus-like particles vaccines and mRNA-based vaccines. A mRNA vaccine against SARS-CoV-2 is tested in a phase 1 clinical trial in the United States (3).

In a famous film of Stephen Spielberg, aliens had invaded the Earth and were ready to start exterminating humans. At that moment, all alien

invaders began to die, due to the mortal attack of terrestrial viruses.

Now we are in the opposite situation. Viruses, not aliens, attack humans. Stephen Spielberg, can you imagine a solution?

I myself think that the solution has already come from... the Italians. Kept in their houses by the authorities and the virus itself, they largely opened the windows, took their guitars, used their marvelous voices and began to sing from the windows. Over the empty streets. And laugh, and sing, and laugh again...

Viruses cannot resist finally to a healthy body protected by a healthy soul. □



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