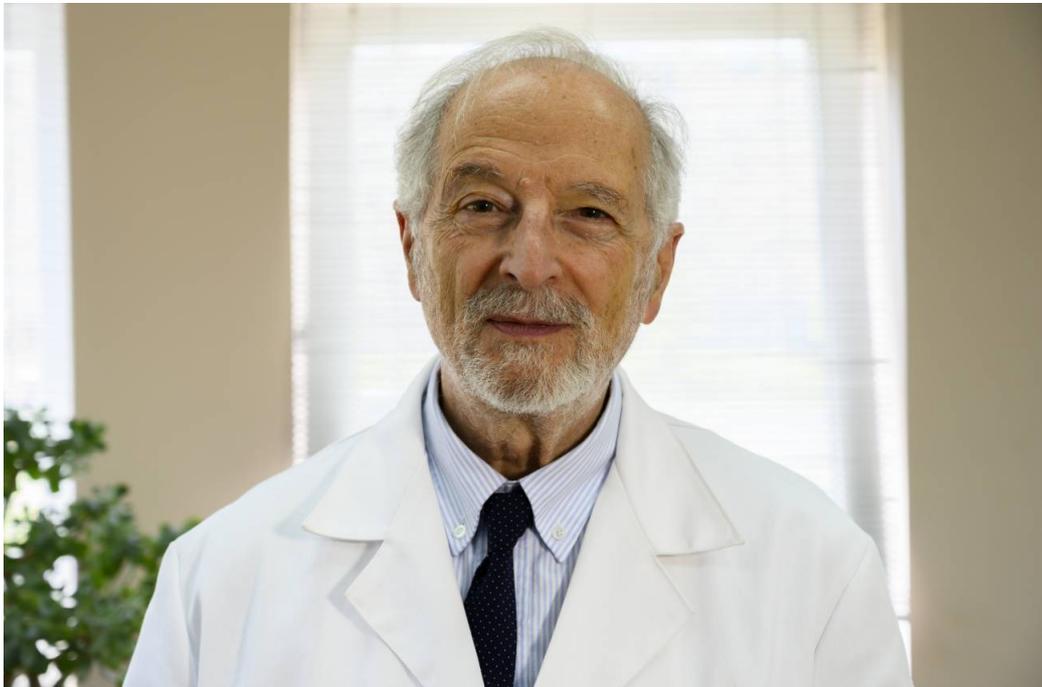


“SARS-COV-2 is very likely to fade and return every winter, like the flu”

Virologist Luis Enjuanes, Spain's foremost expert on coronaviruses, is working non-stop. From his laboratory at the CSIC's National Centre for Biotechnology, he is engaged in trying to find, in the shortest time possible, a vaccine to stop the COVID-19 epidemic.

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Luis Enjuanes, at the National Centre for Biotechnology (CNB/CSIC) / CSIC

You are working to find a coronavirus vaccine. What are the challenges and timeline for this?

To get the vaccine, we are working as we have done with SARS 2002 and MERS 2012. In fact, the one we are designing has already been applied to the MERS virus with a 100% protection. It is based on a fragment of DNA directly derived from the virus - from five genes of SARS-COV-2 - that has the capacity to amplify itself but cannot spread throughout the body, which makes it very safe.

The time frame for obtaining the **first prototype** for the new vaccine lies **within a range of about 4 months** . However, after then, it will be necessary to ask for permission to give it to people, which may take an additional 8 to 12 months for sure.

Is the infection mechanism of SARS-VOC-2 known?

Yes, the receptor it uses to enter the cell is known. There are already publications with some details of this entry. Therefore it is already known what could be blocked to stop it from causing infection.

One study (not yet peer-reviewed) mentions another entry point for the virus besides the ACE2 protein. How can these results have an impact?

I haven't read it in detail, but it's likely that - as it happens with other viruses - there is **more than one receptor**. In fact, traditionally there is a co-receptor and a receptor. The co-receptor helps viruses to attach to the cell, to bring them into the cell, and the receptor is what activates the entry mechanisms for the virus to invade the cell. But sometimes these co-receptors can also act as receptors.

Therefore, viruses using a possible second entrance door might be within the norm?

Yes. But the fact that the virus has more facilities to enter the cell is not good news because then, even if we can block one entrance door, the virus could use the other one. However, this wouldn't be the first case: sometimes viruses use, in addition to perfectly defined proteins, carbohydrates from the cell surface.

Some research says a weaker strain has come to Europe. Is that true?

Right now, the strain we have is not very attenuated. That is the news I have from those doctors directly involved with patients in Spanish hospitals.

Anyway, I have always said that, among viruses of this kind, it is common for the more attenuated ones to evolve and be selected highly positively. The reason for this is simple. If a virus is very deadly, it kills the patient quickly

and therefore removes itself from circulation before it can infect others in the population. On the other hand, if a virus is less deadly and infects a patient but does not cause clinical symptoms, the patient goes on with their normal life and spreads the virus. This way it is easier for the virus to become widespread and this is what generally happens with successful viruses.

With warmer weather approaching, is it too optimistic to begin saying goodbye to the pandemic?

High temperatures are excellent because coronaviruses are very sensitive to heat: every day at more than 37 degrees, they lose their infectivity tenfold. Therefore, after three warm days their infection capacity would have been lowered a thousand times.

Good weather could also help because of the ultraviolet radiation in sunlight, to which viruses are very sensitive and are inactivated by. As well as this, with pleasant temperatures people are more likely to spend time outside and are less likely to spend time in confined spaces, meaning less contamination.

Obviously, with the state of alert these days, people must stay at home. But that does not mean that they cannot open the windows and air their homes to reduce the potential presence of the virus to much lower concentrations.

There is speculation about cases of reinfection in some patients. How could these cases be explained?

The truth is that they are not normal. If a patient has recovered from a virus and has become seropositive, meaning that they have developed immune defences which are found in their blood, they normally should not be able to become re-infected.

That being said, there are many potential explanations for this observation. The simplest is that those patients who tested negative received this result because although the body tissue sampled no longer contained the virus, it did persist elsewhere in other tissues. Indeed it is known that within the family of coronaviruses, the virus can sometimes last up to three months.

Additionally, when the presence of the virus decreases, the immune response

also decreases, and so a reservoir may be present in a certain tissue in which less blood and defence lymphocytes circulate, allowing the virus to reactivate later.

Another explanation is that the virus has evolved and successfully escaped from the immune system. Simply put, with virus 1, antibody 1 would be produced. Then all of the virus would be neutralised except for the mutated ones, which are variant 2. These would spread, escaping antibody 1 response, and so antibody 2 would be produced. Then, variant 3 of the virus would in turn spread. What we call 'escape of the virus from the immune system' is due to the evolution of the virus' surface antigens to evade detection by the immune system.



The CNB laboratory working on a vaccine against SARS-COV-2.

What do you think of the UK's strategy of confining people over 70 and letting the rest of the population get infected?

I don't see it as viable. It is better for older people to stay close to their close relatives and for them to be cared for, taking all the necessary precautions, constantly disinfecting the environment, etc. This can only be an idea of the 'very clever' Boris Johnson (irony).

They say that this would secure the economy...

Yes, of course, by letting the old people die and thus save on social security. We can't give this man any ideas. I see no advantages in this decision. There are fascist systems that may promote operations of a certain kind, such as eliminating the weakest and those who produce the least, but I don't find this advisable.

Is the profile of those affected in Spain known?

The news that has been directly conveyed to me by Spanish doctors who are working on it is that it does indeed have a much more serious effect on those over 65 and, above all, those who have other associated medical problems, such as diabetes, kidney failure, heart problems or respiratory tract infections from other viruses, such as the flu.

Is it true that young people are being affected more and more?

We know that all coronaviruses that are deadly to humans are age-dependent, which means that they affect older people much more. Normally, it does not affect children under 15 much, and within the age range of 15 to 55, people do become infected, but normally these people manage to fight off the infection. Then there is the older group, which is more susceptible to suffering from a serious illness.

Why in Spain, unlike other countries, no information is given on the profiles of those that become infected and die?

I don't think there is any obscurantism about this at all. The problem is that there is no time to make calculations at the moment.

Was it possible to foresee the current scenario?

I believe that everything that is happening is what epidemiologists had foreseen, as they know how these epidemics usually evolve. Naturally this virus has a personality of its own and possesses the characteristic of proliferating in people without producing clinical symptoms. As a hidden virus, it spreads very easily. This means that we usually arrive a little late and

that, at present, we don't know which mammal has been the intermediate vector. It's no more special than that.

Once this crisis is over, will the worst case scenario be that COVID-19 becomes a seasonal virus?

Yes, that's what I foresee. The good news is that the virus with its transmission will fade away. Currently, we know of seven human coronaviruses and four of them are attenuated viruses, which are the ones that infect almost all of us. Active human coronaviruses are all already very much attenuated and hardly cause more than a common winter cold. I hope that it will be the same with this one. If the virus is attenuated, it spreads very easily and can then return each winter, as does the flu virus, which is seasonal. I think this is quite likely to happen.

But this would mean a significant cost to Spanish society, as is already the case with the flu...

Indeed, but the flu virus is much worse than this, for the time being. In the US alone, in the winter of 2017 and 2018, the seasonal flu virus infected 32 million people. Some 350,000 people needed hospitalisation, and 18,000 of them died. In Spain, the number of patients who died from the flu in recent winters has been 6,000. This means that both viruses are dangerous, but right now the flu virus would beat the other one for seriousness.

Speaking of time, how long do you think this crisis can last?

According to theoretical epidemiologists who base their predictions on previous experiences and the evolution of the virus (how the growth curves are going, the number of new cases per day, etc.), the prediction is that the peak of the wave we are in now will last from two to four weeks. It is likewise predicted that towards June, approximately, the virus could already be at very low levels. I think this is a reasonable forecast, we are all very alarmed now - especially because of the hyper-congestion in hospitals - but epidemics usually come and go, and this one will be no exception.

TAGS COVID-19 | VIRUS | EPIDEMIC | PANDEMIC |

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