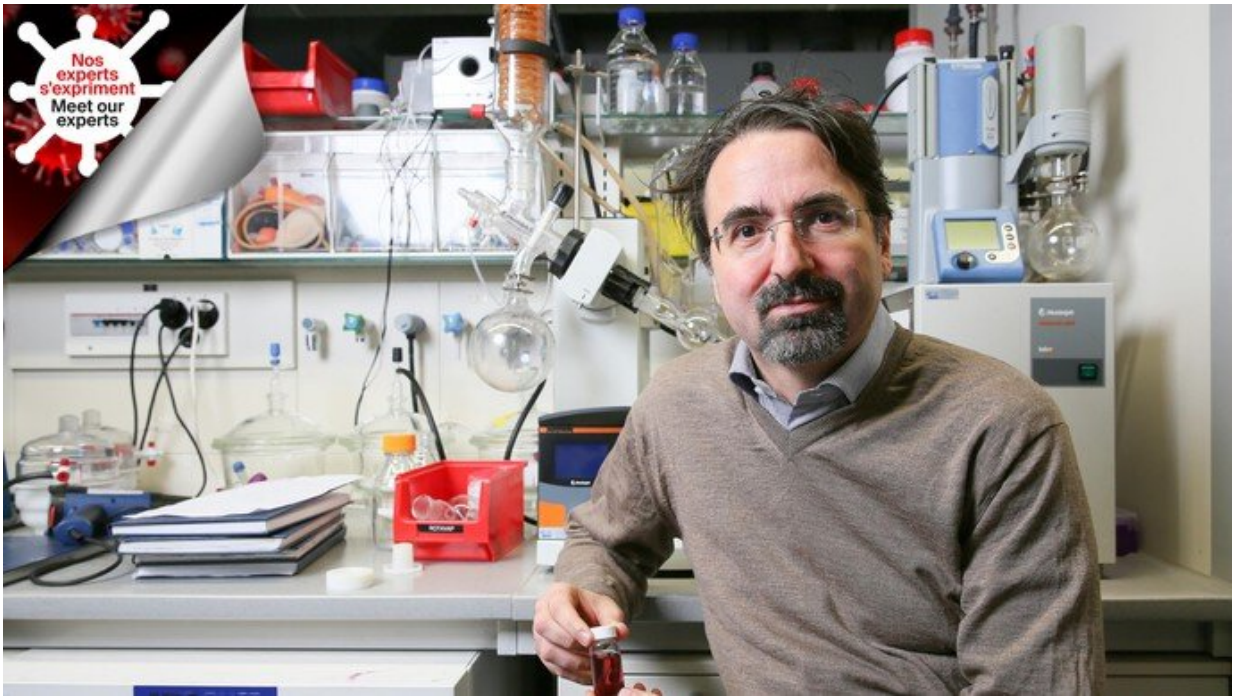
# 'In a crisis like this, an antiviral drug could buy us some time'

March 27 2020, by Julie Haffner




Credit: EPFL

Francesco Stellacci, a professor in EPFL's School of Engineering, discusses his research in the field of nanomedicine and how it could help us get past the coronavirus crisis.

As the COVID-19 outbreak rages on, researchers are in a race against the clock to find some way to combat the coronavirus. Francesco

Stellacci, the professor who heads the Supramolecular Nano-Materials and Interfaces Laboratory (SuNMIL), has spent ten years working on a broad-spectrum drug that could slow the spread of viruses like this one until a vaccine is available.

## What's your lab's role in the quest for a COVID-19 vaccine?

We're developing a drug, not a vaccine. A vaccine is what you get before you've been infected. It stimulates your body's immune response so you can ward off the disease. A drug is something you take either preventively—just before being exposed to a virus—or when you're already showing symptoms.

## What sort of drug are you working on?

For the past ten years, my lab has been trying to develop a broad-spectrum antiviral drug. Just as some antibiotics are effective against numerous types of bacteria, our drug would work on numerous viruses—including, potentially, the SARS-CoV-2, which causes COVID-19. Of course, we're all dreaming of finding a miracle cure that can be taken to clear up the infection. But a less effective drug would also be beneficial to society. Current data show that every person who catches the virus infects 2.6 other people on average. So a drug with an efficacy of 50% would reduce this figure to 1.3, and that would slow the virus's spread considerably. The best defense against viruses is vaccinating people, but since it takes at least 18 months to develop a vaccine, a broad-spectrum antiviral could buy us some time.

We already have a molecule that can block a wide range of viruses in vitro, such as HIV, dengue, Zika, HRSV (human respiratory syncytial virus) and herpes. Because of the COVID-19 outbreak, we've included

coronavirus in the battery of tests that we're running, and we hope it'll work out

## What are the challenges in developing this type of drug?

We're intent on developing a broad-spectrum antiviral, in part because we've always said we want to be prepared for a pandemic. It also costs much less to develop one drug rather than several, which is important since so many people die from viral infections in poor countries. And this drug must be broad enough to work on new viruses like SARS-CoV-2.

Now that we have the molecules we need to develop this type of drug, the challenge lies in finding sufficient funding and determining the best way to get through the subsequent phases: running toxicity tests, producing the molecules in sterile conditions, and so forth. And then we'll need to figure out how to get the drug out of the lab.

**How long would it take for the drug to be widely available?**

That depends on whether we can find funding to continue our research. Let's say we had unlimited funding and everything ran smoothly: I think we'd be able to do it in 12 to 18 months.

And by "everything ran smoothly" I mean we make it through the various phases without a hitch. First we test the drug in vitro, then ex vivo, and then on mice. We can do those things in our lab. At that point, we'll have to determine whether the compound is toxic, set up procedures to mass produce it in sterile conditions, and then run toxicity and efficacy studies in large animals. Once all that has been done, we can conduct studies in humans. It's a long process.

## How will this pandemic contribute to your research?

It hasn't changed what we're doing, but it does show that the broad-spectrum approach is the right one. What it has changed is my team's attitude—we all feel a greater sense of urgency now.

## How will this crisis affect the scientific community?

One upside of this crisis—and there aren't many—is that it has shown that people around the world are intent on opening up science more and more. The scientific community has responded much more effectively to the COVID-19 outbreak than to the SARS outbreak. Data have been shared very quickly and everyone has helped each other out. The scientific community truly grasped the importance of expanding the scope of research and sharing everything openly

That said, we still need to communicate better with the public. We have to be clearer about what we're doing, the challenges we face and the time it will take. Otherwise we may be selling false hope.

## Do you think this crisis could change the views of anti-vaxxers?

I think the anti-vaccination movement is going to take a hit from all this. Given the problems faced by people in developing countries, I think the question of whether or not to vaccinate is a debate for rich countries. If you lived in Africa, you'd wait in line for a vaccination and you'd be lucky to get one. Once a coronavirus vaccine is developed, people will be lining up for it.

More broadly, I hope people's attitude towards science will improve. In crises like this one, science is the only solution.

Provided by Ecole Polytechnique Federale de Lausanne