



Where I work Hector Aguilar-Carreno

Photographed for *Nature* by
Jesse Winter.

I research emerging viruses at Cornell University in Ithaca, New York – but I've not set foot in my office or laboratory since mid-March, when everything on campus shut down because of the COVID-19 pandemic. I applied immediately for a permit so that my team could keep working in our lab – but only on antivirals and vaccines for COVID-19.

Although I have a team of 12, we reopened about a week after lockdown – with strict social-distancing rules, and with only a postdoc, two graduate students and a technician, working in staggered shifts. I quickly set up a home office in my basement, filled with the art that my partner and children produce. He does most of the homeschooling, but we take turns. As in this picture, I direct and coordinate my lab's activities virtually and through Zoom meetings. For now, I'm continuing to work at home, to keep numbers in the lab low.

My team and I work on antivirals that kill envelope viruses – ones that are contained in a lipid membrane. These viruses, which include Ebola and coronaviruses, are on the

World Health Organization's list of likely causes of future pandemics.

Even before the discovery of SARS-CoV-2, the coronavirus that causes COVID-19, we'd been working on a new vaccine approach – and had found that treating a virus with an antiviral compound enabled us to use the inactivated virus as a vaccine. We'd tested this approach with the influenza virus and it had produced an amazing immune response in our test animals. The antiviral compound kills the virus, keeps intact the proteins that elicit the immune response and alters the cell-membrane lipids in a way that boosts that response.

Now we are trying to find out whether this method can be used to develop a COVID-19 vaccine. We have approval to test it in hamsters. If it works, we'll form a collaboration to test it in humans, probably with a company that can produce vaccines on a mass scale. That would be my dream.

Hector Aguilar-Carreno is a virologist at Cornell University in Ithaca, New York.
Interview by Virginia Gewin.