



# Cold Spring Harbor Laboratory

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Dear Friend of CSHL,

I hope that you and your loved ones are safe and healthy. We care deeply about the well-being of our employees, friends and neighbors and wanted to update you on the steps Cold Spring Harbor Laboratory is taking in this regard. As part of our response to the COVID-19 pandemic, 90% of our administrative staff are working remotely, and our scientists are conducting their important experiments related to cancer, brain and other research in shifts around the clock to adhere to social distancing guidelines. We are also providing our world-class science meetings and DNA Learning Center public education programs virtually.

Now, we are focusing our research and education expertise to help combat COVID-19. At this time, a number of CSHL laboratories and resources are active in the worldwide effort to defeat this infectious disease and help those who are suffering.

## COVID-19 Efforts at CSHL

1. Coronaviruses have a particularly potent way to infiltrate cells in your body by special protruding proteins on its surface known as “spike” proteins. The availability of coronavirus proteins is a desperate need for the community, since they will help scientists and physicians develop important diagnostic tests for COVID-19 patients. Therefore, multiple laboratories at CSHL, including those of Leemor Joshua-Tor and myself, have repurposed our research facilities to produce large amounts of the SARS-CoV-2 coronavirus spike and its partner proteins from human cells. Plant biologists David Jackson, Ullas Pedmale and Rob Martienssen are also applying their expertise to express and extract large amounts of SARS-CoV-2 spike proteins from tobacco and duckweed plants. We have already produced significant quantities of these coronavirus proteins, and have sent them to clinical labs to test patients for the presence of antibodies, a sign of COVID-19 infection. The proteins will also be used to develop therapies and preventative treatments, such as identifying antibodies from convalescent patients that may be used for treatment and prevention of infection. Finally, we are doing research to develop potential diagnostic tests to identify those patients who are the sickest with COVID-19, as this information could assist in determining which patients should go to the hospital.

2. Newly appointed CSHL chemist John Moses is investigating a drug that is already clinically approved for other indications to assess whether it could be beneficial for treating COVID-19 infection. John realized that the chemical structure of this drug has the potential to block the activity of an essential virus enzyme. He is now directing the synthesis of chemical derivatives of this compound to develop drugs that block the COVID-19 infection. In addition, CSHL cancer scientist Nick Tonks is in contact with the FDA about re-purposing a cancer drug for treatment of inflammation in COVID-19.

3. There is an urgent need for treatments to aid the most critical cases of COVID-19 in which patients undergo severe respiratory distress, and to prevent milder cases from requiring ventilation. CSHL cancer biologist Mikala Egeblad previously discovered that smoking and other lung inflammation cause neutrophil blood cells to form 'neutrophil extracellular traps' (NETs). These spider-web-like structures catch bacteria, but in excess NETs can help cancer spread and can also cause organ damage in other diseases. Mikala believes that NETs play a key role in COVID-19 lung damage and has organized a global network of clinicians and scientists to focus on whether NETs cause death in COVID-19 patients. Mikala plans to target the NETs by adapting existing drugs for other diseases (particularly cystic fibrosis) to COVID-19, and she is in the process of applying for expedited clinical trials in collaboration with a number of hospitals.

4. In collaboration with Joan Smith at Google, CSHL cancer geneticist Jason Sheltzer has shown that smoking increases the number of cells in the lungs that make the key human protein to which the COVID-19 virus attaches. This attachment is an essential part of the infection process. Conversely, they have shown that quitting smoking decreases the number of these cells. This observation potentially explains why smokers are particularly likely to develop severe COVID-19 infections.

5. Researchers traditionally disseminate their work through scientific journals, but the peer-review publication process takes a long time, up to a year or more. This time lag is a great hindrance to a rapidly evolving field, like COVID-19 research. CSHL launched preprint servers *bioRxiv* and *medRxiv* to allow scientists and clinicians to post their results immediately for free to the global scientific community. CSHL has created special COVID-19 sections of *bioRxiv* and *medRxiv* and, to date, 1251 articles (972 *medRxiv*, 279 *bioRxiv*) have been posted since January. These papers report, in real time, important basic and clinical developments on COVID-19 from researchers and to governmental agencies around the world so that clinical trials and new policies can be based on sound science.

Our DNA Learning Center has rapidly developed online courses for students and their parents who are sequestered at home. They can be found at [dnalc.cshl.edu](http://dnalc.cshl.edu).

Because of our diverse and world-leading faculty and trainees, and our outstanding support staff, CSHL has been able to rapidly respond to this global pandemic and is collaborating with many other laboratories and clinical centers. In addition to these immediate COVID-19 efforts, CSHL continues to pursue our fundamental research in cancer, brain disorders, plant research and genomics. It is absolutely essential to forge ahead with these programs in order to advance the world's health and sustainability beyond the current crisis.

CSHL depends on philanthropy to support our important work, but our fundraising efforts have been curtailed. I therefore ask that you consider donating to CSHL at [give.cshl.edu](http://give.cshl.edu) during this critical period to enable us to direct our research against fighting COVID-19 and to continue our ongoing essential research mission. Any support you are able to provide will be very much appreciated.

Thank you for your commitment to the Laboratory. Together, we will get through this difficult time.

Warmest regards,



Bruce Stillman