

LJI and Charles River Laboratories to collaborate on COVID-19 research

New agreement paves the way for better mouse models to study how the human immune system fights SARS-CoV-2

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LA JOLLA, CA—Scientists at La Jolla Institute for Immunology (LJI) and Charles River Laboratories International, Inc., are launching a new project to uncover exactly how different cells in the human immune system respond to SARS-CoV-2, the virus that causes COVID-19. Their new research will allow scientists around the world to better capture how the body responds to the virus—from day one of infection.

The work at LJI will be led by [Professor Sujan Shresta, Ph.D.](#), a member of the LJI Center for Infectious Disease and Vaccine Research. Shresta's laboratory will provide the first in-depth characterization of an ACE2ihumanized mouse model of SARS-CoV-2 infection, made available by Charles River in conjunction with Gempharmatech, LTD., including a close look at human immune responses. Her lab will be working closely with Kenneth Kim, Dipl. ACVP, director of the LJI Histopathology Core.

This new mouse model has been engineered to express human ACE2, the receptor that SARS-CoV-2 uses to infect human cells, and include the same immune cells made by the human body. As Shresta explains, these mice may give us a window into COVID-19 that we cannot get in human studies.

Researchers have found that the incubation period for SARS-CoV-2—the period when the disease is getting a foothold in the body but symptoms haven't started yet—is usually four to five days. For severe cases, patients tend to show signs of the disease for 10 to 12 days before they are hospitalized. "At the time of hospitalization, people have already been infected for two weeks," explains Kim.

"With human patients, we can only look at the immune response after there have been signs of infection," adds Shresta. "So we need these animal models to understand the early time points in infection and get a window into the human immune response in tissues such as the lungs."

The Shresta Lab will investigate how susceptible these mice are to SARS-CoV-2. The researchers will also measure viral loads in the mice and analyze lung tissues with help from the LJI Histopathology Core.

The goal for Charles River's Research Model and Services business was to obtain and develop a model to solve the problem of understanding the role of human immune cells in early, acute SARS-CoV-2 infection. The best solution was to increase the susceptibility of the NCG mouse model, which is capable to be immuno-humanized, by engineering human ACE2 receptor (known now to be the receptor of many variant strains of SARS-COV-2) into the mouse ACE2 locus of NCG, named hACE2-NCG⁽¹⁾ leading to a scientific partnership and collaboration with Dr. Shresta's lab to better define the utility of the model and to understand better mechanisms of early infection in a immuno-humanized mouse.

“We were fortunate to be able to work with Dr. Shresta’s lab. Her lab is well known for its reputation as a persistent and relentless team committed to understanding emerging infectious diseases using mouse models”, says Dr. Steve Festin, Senior Director of Scientific and Commercial Development at Charles River.

Colin Dunn, Corporate Senior Vice President of Charles River’s’ Research Models and Services, stated, “It is a true honor to collaborate with LJI where such a dedicated team of scientists, professionals and individuals are committed to advancing our understanding of infectious disease at a time when this work is so critical.”

Shresta is an expert in using mouse models to study immune responses to infectious diseases. Her laboratory has led research into virus-host interactions in diseases such as dengue, Zika and Japanese encephalitis. [This work](#) has shed light on the precise balance of immune cell types needed to fight off these potentially deadly viruses.

Shresta is also a member of the [LJI Coronavirus Task Force](#) and has worked to establish COVID-19 research partnerships in Nepal, Vietnam and the Philippines. She thinks the new mouse models from Charles River Laboratories will provide a critical window into what is happening in human patients.

"I'm really excited about this collaboration," says Shresta. "This brand new mouse model is a tremendous opportunity for my lab to study the human immune response on a timescale which is just not possible with clinical studies."

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(1) hACE2-NCG is licensed to Charles River from Gempharmatech, LTD, Nanjing PRC.

About La Jolla Institute for Immunology

The La Jolla Institute for Immunology is dedicated to understanding the intricacies and power of the immune system so that we may apply that knowledge to promote human health and prevent a wide range of diseases. Since its founding in 1988 as an independent, nonprofit research organization, the Institute has made numerous advances leading toward its goal: *life without disease*.

About Charles River

Charles River provides essential products and services to help pharmaceutical and biotechnology companies, government agencies and leading academic institutions around the globe accelerate their research and drug development efforts. Our dedicated employees are focused on providing clients with exactly what they need to improve and expedite the discovery, early-stage development and safe manufacture of new therapies for the patients who need them. To learn more about our unique portfolio and breadth of services, visit www.criver.com.

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