🌐 Translate

UCLA Health (https://uclahealth.org)

Connect. Share. Transform. (https://connect.uclahealth.org/)

🏠 (https://connect.uclahealth.org/) / Coronavirus (https://connect.uclahealth.org/category/coronavirus/)

/ To combat COVID-19, UCLA researchers develop method to produce 'off-the-shelf' immune cells on massive scale

To combat COVID-19, UCLA researchers develop method to produce 'off-the-shelf' immune cells on massive scale

By uclahealth • April 11, 2022

Share this:

f (https://www.facebook.com/sharer/sharer.php?u=https%3A%2F%2Fconnect.uclahealth.org%2F2022%2F04%2F11%2Fcovid-19-immune-cells%2F)

🐦 (https://twitter.com/intent/tweet?url=https%3A%2F%2Fconnect.uclahealth.org%2F2022%2F04%2F11%2Fcovid-19-immune-cells%2F)

in (https://www.linkedin.com/shareArticle?mini=true&url=https%3A%2F%2Fconnect.uclahealth.org%2F2022%2F04%2F11%2Fcovid-19-immune-cells%2F)

📌 (https://pinterest.com/pin/create/button/?url=https%3A%2F%2Fconnect.uclahealth.org%2F2022%2F04%2F11%2Fcovid-19-immune-cells%2F&description=To combat COVID-19, UCLA researchers develop method to produce "off-the-shelf" immune cells on massive scale&media=https://cdn.prod-carehubs.net/n1/b3bc3802e94679e5/uploads/2022/04/covid-generic-1200.jpeg)

English   Español   中文   ةيبرعلا   한국어   日本語

This normally uncommon type of immune system cell can safely and effectively destroy SARS-CoV-2.

COVID-19 vaccines — which were developed, manufactured, and brought to the public with unprecedented speed (https://connect.uclahealth.org/2020/12/10/the-fastest-vaccine-in-history/) — have undoubtedly saved the lives of millions of global citizens, and reduced the severity of symptoms and the aftereffects of the disease in countless millions more.

But while vaccinations are critical for controlling COVID-19, a percentage of vaccinated individuals can become infected with the virus, especially as it evolves (https://connect.uclahealth.org/2022/01/13/when-does-a-pandemic-become-endemic-and-what-is-the-difference/). The situation is compounded by the continual emergence of new variants and subvariants with the ability to evade (https://connect.uclahealth.org/2022/03/18/how-dangerous-is-ba-2-the-new-covid-19-variant/) even a vaccination-primed immune response. (And, of course, not everyone can, or is willing to, get the shot in the first place).

What's needed are novel treatments for combatting SARS-COV-2 infection after the virus takes hold in the body. To that end, a team of UCLA Health researchers has genetically engineered a normally uncommon type of immune system cell — one that can safely and effectively destroy SARS-CoV-2, the virus that causes COVID-19 — so that the cell is produced in vast quantities.

A paper describing the work was published in the open-access journal *Stem Cell Research & Therapy* (https://stemcellres.biomedcentral.com/articles/10.1186/s13287-022-02787-2) on March 21. The work was led by Lili Yang, PhD, associate professor in the Department of Microbiology, Immunology & Molecular Genetics, and a member of the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research.

Dr. Yang and her team focused on a rare subpopulation of the immune system's T cells known as invariant natural killer T cells, or iNKT cells. Invariant natural killer T cells are like the super soldiers of the immune system: they are exceedingly effective at targeting and destroying viruses and other foreign invaders, but they are found in vanishingly low numbers.

Notably, iNKT cell populations are reduced even further in patients with severe COVID-19 infection. Indeed, significantly reduced numbers of iNKT cells (and whether or not they are activated) is predictive of disease severity in a patient, which indicates that these cells are involved in COVID-19 control. That suggested to the researchers that increasing the number of iNKT cells might help patients eliminate virus-infected cells and mitigate disease progression.

Unique properties

In their work, Dr. Yang and her team genetically engineered hematopoietic stem cells (HSCs) — stem cells that give rise to all blood cells — so that they would preferentially differentiate into iNKT cells, and in very high numbers. From a single cord blood donor, more than 1,000 therapeutic doses of HSC-iNKT cells can be generated.

In cell cultures and in animal models, these new HSC-iNKT cells "selectively killed cells infected with SARS-CoV-2, and they also eliminated inflammatory immune cells that are associated with the immunopathology of severe COVID19," says molecular biologist and immunologist Dr. Yanruide (Charlie) Li, a postdoc in Dr. Yang's lab.

The engineered cells, Dr. Yang says, "have unique properties that make them promising for 'off-the-shelf' therapy, meaning they can be given to any patient, regardless of their genetic makeup." In contrast to other T-cell therapies, HSC-iNKT cells do not cause graft-versus-host disease and are resistant to host rejection, and thus provide a key therapeutic window to effectively prevent viral spread in all patients.

"The most exciting result of this work is that HSC-iNKT cells can be produced on a massive scale and administered to many patients in need of new treatments," says immuno-engineer and study co-author Zachary Dunn of USC, a visiting graduate researcher in Dr. Yang's lab.

The researchers next plan to test their HSC-iNKT cells in preclinical animal models and in early-stage clinical trials — but note that, given the novelty of the therapy, full approval from the U.S. Food and Drug Administration could be many years down the road.

The research was funded by the California Institute for Regenerative Medicine, a UCLA DGSOM-BSCRC COVID-19 Research Award, and an Ablon Scholars Award.

Learn more about the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research (https://stemcell.ucla.edu/).

Related:

Should I get a second booster shot? (https://connect.uclahealth.org/2022/02/23/should-i-get-a-second-booster-shot/)

Lessons of COVID-19, two years on (https://connect.uclahealth.org/2022/01/20/lessons-of-covid-19-two-years-on/)

Natural immunity vs. vaccine-induced immunity to COVID-19 (https://connect.uclahealth.org/2022/01/20/natural-immunity-vs-vaccine-induced-immunity-to-covid-19/)

🏷Tags: coronavirus (https://connect.uclahealth.org/blogtag/coronavirus/), Coronavirus (https://connect.uclahealth.org/category/coronavirus/), COVID-19 (https://connect.uclahealth.org/blogtag/covid-19/), featured (https://connect.uclahealth.org/blogtag/featured/), Innovation (https://connect.uclahealth.org/category/innovation/), Research (https://connect.uclahealth.org/category/research/), stem cells (https://connect.uclahealth.org/blogtag/stem-cells/), T cells (https://connect.uclahealth.org/blogtag/t-cells/), UCLA Broad Stem Cell Research Center (https://connect.uclahealth.org/blogtag/ucla-broad-stem-cell-research-center/), Wellness (https://connect.uclahealth.org/category/wellness-2/)

Related Posts

Cryolipolysis is the process of freezing fat
(https://connect.uclahealth.org/2022/04/08/cryolipolysis-is-the-process-of-freezing-fat/)

While cryolipolysis is FDA-approved and considered to be a safe alternative to surgery, adverse effects can occur

PE classes vital to children's physical and mental health
(https://connect.uclahealth.org/2022/04/08/pe-classes-vital-to-childrens-physical-and-mental-health/)

Statistics show collectively that increased physical activity leads to better academic performance among elementary, middle, and high school students

A welcoming face at the Ukraine border
(https://connect.uclahealth.org/2022/04/07/a-welcoming-face-on-the-ukraine-border/)

UCLA Health therapist Christie Nelson was compelled to aid war refugees

Find a Doctor (https://www.uclahealth.org/providers)

Book an Appointment (https://e.uclahealth.org/new-patient-appointment-request?utm_campaign=global&utm_source=uclahealth&utm_medium=connect)

Share Your Story (/share-your-story)

Send a Care Compliment (/send-a-care-compliment/)

Read Vital Signs eNewsletter (https://www.uclahealth.org/vitalsigns/) | Start a Fundraiser (https://spark.ucla.edu/g/health) | Subscribe to our Health Publications (https://www.uclahealth.org/subscribe) | Search our Health Encyclopedia (http://healthinfo.uclahealth.org/)

(https://www.uclahealth.org/best-hospitals)

UCLA Health (https://www.uclahealth.org)
Find a Doctor (https://www.uclahealth.org/providers)
School of Medicine (http://medschool.ucla.edu)
School of Nursing (https://www.nursing.ucla.edu)
UCLA Campus (http://www.ucla.edu)
Directory (http://www.directory.ucla.edu)

Newsroom (https://www.uclahealth.org/newsroom)
Subscribe (https://www.uclahealth.org/subscribe)
Giving (https://www.uclahealth.org/giving)
Careers (http://www.uclahealthcareers.org)
Volunteer (https://www.uclahealth.org/volunteer)
International Services (https://www.uclahealth.org/international-services)

Privacy Practices (https://www.uclahealth.org/privacy)
Nondiscrimination (https://www.uclahealth.org/nondiscrimination)
Billing (https://www.uclahealth.org/billing)
Health Plans (https://www.uclahealth.org/health-plans)
Emergency (https://www.uclahealth.org/emergency)
Report Broken Links (https://myforms.uclahealth.org/s3/Broken-Links-Submission)
Terms of Use (http://www.ucla.edu/terms-of-use)

1-310-825-2631 (tel:1-310-825-2631)
Maps & Directions (https://www.uclahealth.org/directions-parking)
Contact Us (https://www.uclahealth.org/contact)
Your Feedback (https://www.uclahealth.org/feedback)
Report Misconduct (https://www.uclahealth.org/reporting-misconduct/)
Get Social (https://www.uclahealth.org/social-media)
Sitemap (https://www.uclahealth.org/sitemap/)