2019 — 2020
Biennial Report

National Center
for Advancing
Translational Sciences

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Director's Introduction

Christopher P. Austin, M.D.

The last two years (2019–2020) have been momentous for NCATS and the field of translational science. The country has confronted two historic health challenges: the opioid epidemic and the COVID-19 pandemic. Both painfully underscored limitations in scientists' ability to rapidly find solutions for human disease. But both also demonstrated the effectiveness of NCATS' innovative translational science approach.

The core problem NCATS seeks to solve is that it takes far too long to develop treatments and deliver them to all the people who need them. This delay is largely due to the extraordinarily high failure rate — more than 95% — of such projects. Because more than 20 tries are needed for every one success, researchers often call the translation of scientific discoveries into medical treatments the "Valley of Death." Most research organizations avoid the Valley of Death as much as possible, leaving treatments undeveloped and, more significantly, people untreated.

NCATS is unique in that it deliberately lives in the Valley of Death. In the short term, our goal is to shepherd therapies safely and successfully through that shadowy landscape and on to patients. In the long term, we work to create translational "climate change," making the process of translation more sustainable and, ultimately, eliminating the fateful Valley entirely. Translation fails when we fail to understand the underlying science and operational principles that would allow us to better predict the paths to success. NCATS' translational science drives scientific, organizational, cultural and operational innovations that make the development and delivery of diagnostics and health solutions more predictable and therefore less failure-ridden, less time consuming and less expensive.

NCATS' approach works. Outlined in this report are examples of how our translational science initiatives are accelerating medical research progress and shortening the journey from scientific discovery to better health. Within these pages are examples of how NCATS has —

- enabled data sharing and clinical trials to address the COVID-19 pandemic
- developed and disseminated tools and technologies to speed treatments for rare diseases
- launched innovative programs to cut the risk of promising therapies' failing when they move into human testing
- worked hand in hand with community partners to ensure our translational science answers meet the needs of those for whom they're created

This report showcases how NCATS is transforming the translational process and the science of translation to deliver more treatments to more patients more quickly. It is organized around the six strategic principles that guide NCATS' innovative approach: catalytic, generalizable, innovative, collaborative, patient-focused and measurable.

Moving forward, our challenge is to apply the tools, technologies and approaches we and our many partners successfully employed to address COVID-19 and the opioid epidemic to other diseases. After all, every patient who has a disease with no treatments — or treatments that don't work well enough — deserves the best that science can deliver.

If you want to learn how you can work with us and get involved, visit https://ncats.nih.gov/workwithus.

Christopher P. Austin, M.D.
Director (Sept. 2012 to April 2021)
National Center for Advancing Translational Sciences

Note: At the time of printing, Joni L. Rutter, Ph.D. is Acting Director, NCATS

Catalytic

NCATS is a catalyst that enables others to more efficiently and effectively translate scientific discoveries into medical interventions.

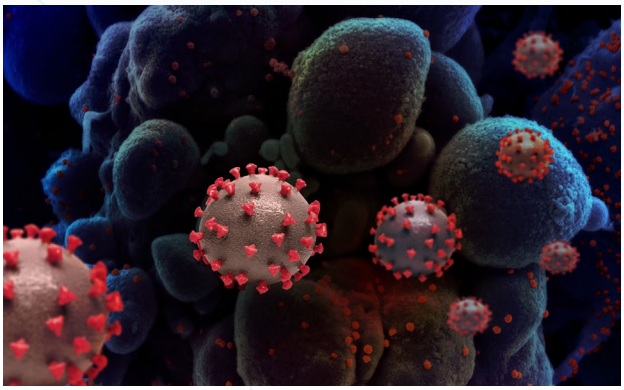
Easing Data Sharing to Speed COVID-19 Therapies

As the COVID-19 pandemic evolved, millions of people were tested and treated, generating vast amounts of valuable health data — as well as a vast number of vital research questions. Who was most susceptible? How did health disparities affect risk and outcomes? Which treatment strategies were being utilized, and which were effective?

Patients' health records often are incompatible across different databases, however, and health databases frequently aren't designed to be able to connect to other systems. The clinical information that could speed the search for COVID-19 answers stops short at the multiple walls of incompatible systems.

Enabling the creation of a platform to access siloed health data is a key goal of NCATS' efforts to advance research across many diseases, including COVID-19. Building on existing collaborative relationships, NCATS and our partners pivoted quickly to break down the barriers preventing data sharing during the pandemic.

Together, we launched the National COVID Cohort Collaborative, or N3C, to build a centralized national resource of clinical data — the N3C Data Enclave — and powerful analytics platform. Through the N3C, the research community can study COVID-19 in a collaborative environment and identify potential interventions as the pandemic evolves. The N3C systematically collects information contributed by participating health organizations. The data are derived from the electronic health records of people tested for the coronavirus or who had related symptoms. The N3C harmonizes that information to allow comparison with data provided by all



Through the N3C, the research community can study COVID-19 collaboratively to identify potential interventions. Credit: NIAID.

participating organizations, all while maintaining its validity and protecting patient privacy.

By the end of 2020, the N3C Data Enclave contained health data from more than half a million COVID-19-positive patients who received care at more than 40 contributing sites nationwide, and researchers were using the data in more than 90 COVID-19 research projects.

"The N3C helps dramatically by improving our understanding of the clinical trends, risk factors, socioeconomic status and health disparities associated with COVID-19," says Hongfang Liu, Ph.D., program director for informatics at Mayo Clinic, an N3C partner. "Such findings can quickly translate into better health care treatments."

NCATS' N3C approach is a model that can be used again to enable health data sharing for future public health emergencies, and it could become a powerful translational science tool to meet public health needs.

The N3C is a partnership among the NCATS-supported Clinical and Translational Science Awards (CTSA) Program hubs, the National Center for Data to Health, and the National Institute of General Medical Sciences–funded Institutional Development Award (IDeA) Program Networks for Clinical and Translational Research (IDeA-CTR) networks, with overall stewardship by NCATS.

> **Such findings can quickly translate into better health care treatments.**

Learn more about how NCATS is catalyzing the translation of health data into COVID-19 solutions through the N3C (https://ncats.nih.gov/n3c), and explore the N3C dashboard (https://covid.cd2h.org/dashboard/) for program updates.

More Catalytic Stories

NIH Expands Clinical Trials to Test Convalescent Plasma Against COVID-19

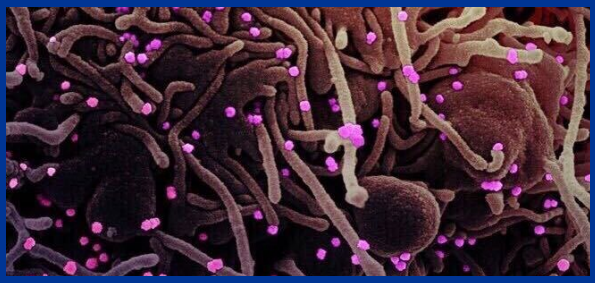
https://ncats.nih.gov/news/releases/2020/nih-expands-clinical-trials-to-test-convalescent-plasma-against-covid-19

ASPIRE Winners Seek New Solutions for Pain, Opioid Use Disorder and Overdose

https://ncats.nih.gov/aspire/funding/2018ChallengeWinners

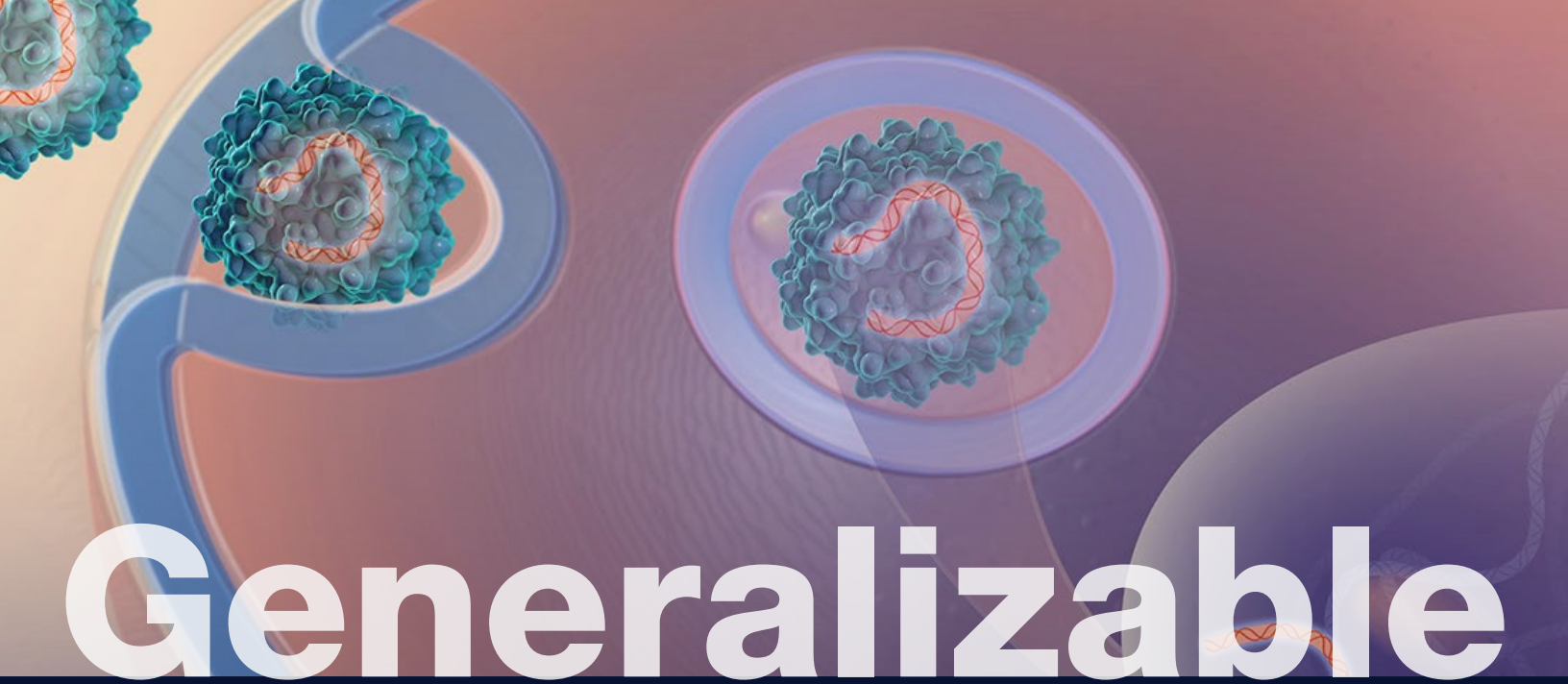
NCATS' Role in the NIH HEAL Initiative

https://ncats.nih.gov/heal/about



OpenData Portal Shares COVID-19 Drug Repurposing Data

https://ncats.nih.gov/expertise/covid19-open-data-portal



Generalizable

NCATS is leveraging commonalities among disease and translational processes to speed the translation of discoveries into medical interventions.

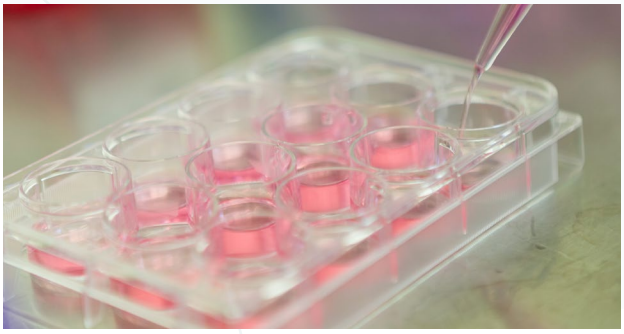
Standardized Gene Therapy Tools Spur Hope for Rare Diseases

About 7,000 rare diseases affect roughly 30 million Americans, and drug therapies to treat those rare diseases are themselves rare — only about 5% of rare diseases have a treatment approved by the U.S. Food and Drug Administration (FDA). NCATS is working to change this calculus by finding and implementing principles that can be generalized across diseases and research processes.

Many rare diseases are caused by a mutation in a single gene. This makes gene therapy a potentially powerful treatment approach to edit cellular DNA to correct the genetic misspellings that drive so many rare diseases. But developing a gene therapy for each rare disease is time consuming and costly.

NCATS' Platform Vector Gene Therapy (PaVe-GT) (https://pave-gt.ncats.nih.gov/) is testing whether it is possible to develop a standard set of gene therapy tools that researchers everywhere can use to make treatments for a range of rare diseases.

"PaVe-GT is akin to creating a generic gene therapy," explains Donald Lo, Ph.D., an NCATS translational scientist. "Rare disease groups and scientists will be able to use this playbook and adapt it to their needs, avoiding having to raise the many millions of dollars it currently takes to access proprietary gene therapy technologies. If PaVe-GT works, it potentially will be transformational for the field."



NCATS' Platform Vector Gene Therapy (PaVe-GT) initiative will develop a standard set of gene therapy tools that researchers everywhere can use to make treatments for a range of rare diseases. Credit: Daniel Soñé Photography, LLC.

PaVe-GT researchers are using a common gene delivery vehicle, adeno-associated virus (AAV), and uniform manufacturing methods. The therapeutic targets are four rare genetic diseases: two inherited muscle weakness/neuromuscular junction disorders and two inherited metabolic diseases. All four studies will utilize the same AAV

delivery system, but for each disease, the AAV system will carry different cargo — a correct copy of the gene.

The PaVe-GT researchers will share their tools, techniques and data across the scientific community, and they will work closely with FDA officials, charting preclinical studies' progress and discussing gene manufacturing, gene delivery, and clinical trial design. These conversations and subsequent FDA feedback — normally considered proprietary by companies — will be available to the public on the PaVe-GT website to help researchers worldwide who are working to develop gene therapies.

NCATS' partners on PaVe-GT are NIH's National Human Genome Research Institute, National Institute of Neurological Disorders and Stroke, and *Eunice Kennedy Shriver* National Institute of Child Health and Human Development.

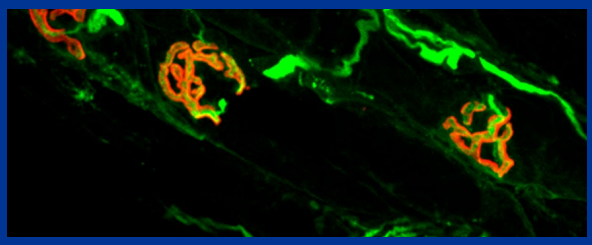
> **If PaVe-GT works, it potentially will be transformational for the field.**

Learn more about how the NCATS PaVe-GT initiative (https://pave-gt.ncats.nih.gov) could help gene therapy transform the lives of people with rare diseases.

More Generalizable Stories

Workshop Helps Boost Production of Vital Gene Therapy Tool

https://events-support.com/events/NCATS_Gene_Therapies_January_2020

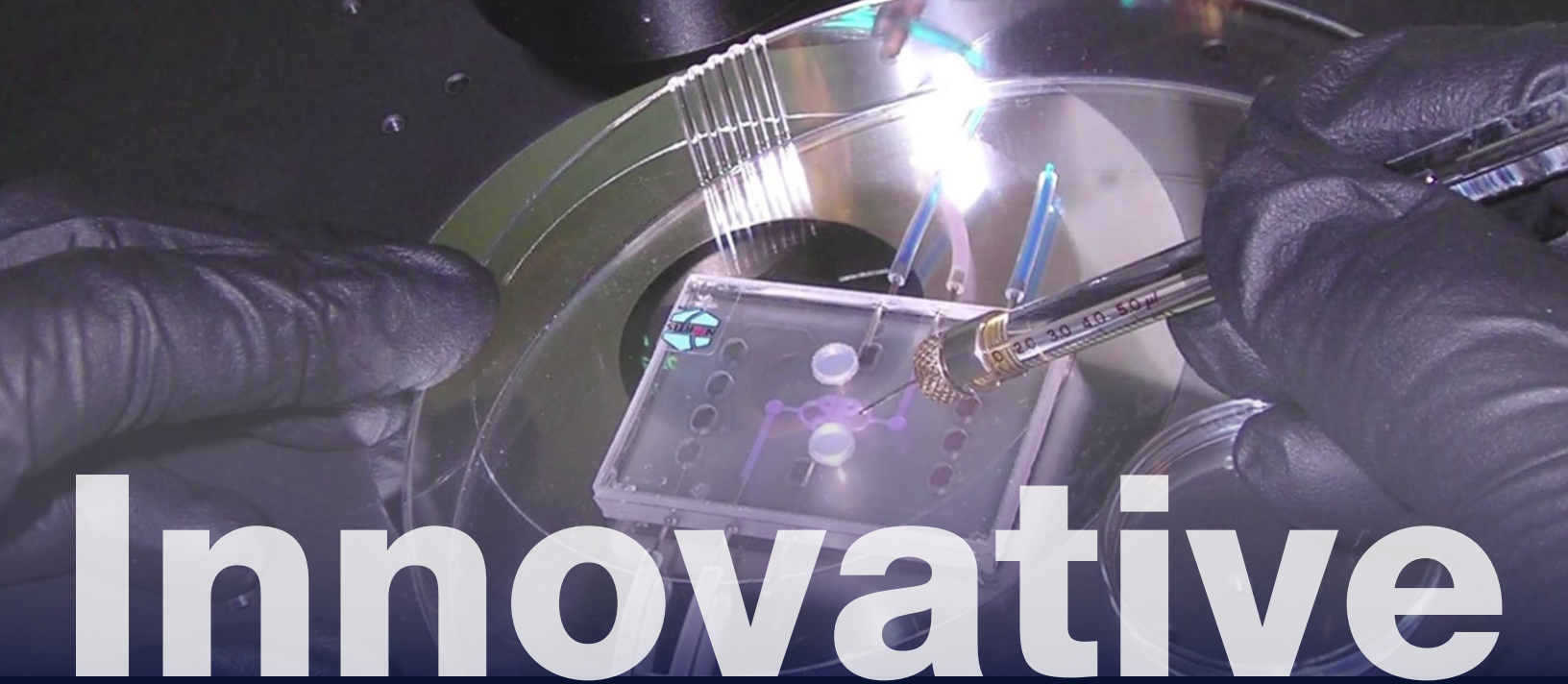


NCATS Funding Bolsters Rare Diseases Research Collaborations

https://ncats.nih.gov/news/releases/2019/rdcrn-funding

NCATS Day 2019 Showcases Responsible Data Sharing

https://ncats.nih.gov/news/events/ncats-day-2019



Innovative

NCATS establishes new ways of translating scientific discoveries into treatments for patients who need them.

Sharpening Clinical Trials' Success with Tissue Chip Technology

The potential is tantalizing: new therapeutic compounds for treating human diseases that shine in laboratory testing, excel in animal models, then advance to clinical trials in humans — where they fail, in large numbers.

About 85 percent of the promising drugs that make it all the way to rigorous, costly clinical trials in people fizzle out, doomed because they either show no therapeutic benefit or prove to be too toxic in humans.

NCATS is developing innovative approaches to overcome these clinical research challenges and ultimately accelerate the development of therapies for patients.

Tissue chips are a promising example. Also known as organs-on-chips, they are 3-D platforms roughly the size of a USB drive that are engineered to support living human tissues and cells. Tissue chips model the structure and function of human organs, such as the lungs, kidney and heart. Researchers can use them to observe the effects of experimental drugs, vaccines or biologic agents on the different systems — and potentially cut the risk of having promising therapies fail when they move into human testing.

Tissue chips (pictured on the International Space Station) model the structure and function of human organs, allowing researchers to observe the effects of experimental drugs, vaccines or biologic agents before promising therapies move into human testing. Credit: NASA.

In collaboration with other NIH Institutes and Centers and the FDA, NCATS is leading the Tissue Chip for Drug Screening program (https://ncats.nih.gov/tissuechip/projects). The program funds dozens of tissue chip projects by centers and research groups, including research supporting the Helping to End Addiction Long-term℠ Initiative (https://ncats.nih.gov/tissuechip/projects/pain-addiction-overdose), or NIH HEAL Initiative℠.

In the last two years, NCATS has pushed tissue chips into two new frontiers: clinical trials and the microgravity environment of the International Space Station U.S. National Laboratory (ISS National Lab).

> The Tissue Chips program is the essence of translational science.

Working with other NIH Institutes and Centers, NCATS awarded 10 inaugural grants (https://ncats.nih.gov/tissuechip/projects/clinical-trials) to support researchers' creation of tissue chips to inform clinical trial design. The Clinical Trials on a Chip initiative will lead to more informative and efficient clinical trials for both common and rare diseases — from a rare inherited arrhythmia and a genetic disorder that causes premature aging to nonalcoholic fatty liver disease and treatment-resistant cancers.

NCATS also is exploring the use of tissue chips in space to speed researchers' understanding of diseases and their search for potential treatments. On Earth, certain diseases and aging processes take years to develop. In microgravity, those same health conditions progress in only weeks or months. So, the ISS National Lab offers a unique environment to study diseases and potential treatments on a faster timeline.

NCATS joined forces with the ISS National Lab and NIH's National Institute of Biomedical Imaging and Bioengineering to literally launch the Tissue Chips in Space initiative (https://ncats.nih.gov/tissuechip/projects/space). As of December 2020, NCATS had supported nine tissue chip research projects in space to accelerate scientists' exploration of everything from why immune systems change with age to how muscle fibers weaken over time, which may speed the delivery of effective prevention and treatment options to patients in need.

"The Tissue Chips program is the essence of translational science," shares Lucie A. Low, Ph.D., scientific program manager with NCATS' Office of Special Initiatives. "We use innovative technology and collaborative team science to overcome research challenges and accelerate the development of therapies for patients."

Learn more about how NCATS is advancing innovative tissue chips (https://ncats.nih.gov/tissuechip/projects) to hasten delivery of new medical interventions.

More Innovative Stories

Innovative Pill Technology Improves Medication Adherence

https://ncats.nih.gov/pubs/features/changing-the-pill-tackling-medication-adherence-through-innovative-technology

NCATS Funds Consortium to Advance Its Biomedical Data Translator Project

https://ncats.nih.gov/translator/about

MEDI 501 Course Teaches Principles of Preclinical Translational Science

https://ncats.nih.gov/training-education/resources

Collaborative

NCATS approaches translation as a "team sport," because translational research requires the expertise of multiple people and groups on the journey from discovery to medical therapy.

Collaborations De-Risk Drugs' Journey Along the Preclinical Pathway

Risk. It's researchers' inevitable traveling companion on their journey to translate scientific discoveries into medical interventions.

Risk of failure is particularly great during the preclinical stage of research, when scientists look for ways to transform basic scientific discoveries into potential therapies ready to be tested in humans. But preclinical research is a particularly failure-prone stage of translation.

Finding ways to "de-risk" preclinical research — to avoid dead ends, shorten time delays and reduce costs — would bring more safe, effective treatments to more people sooner.

NCATS scientists collaborate with academic, nonprofit and industry investigators, as well as patient groups, to turn promising yet uncertain preclinical compounds into viable therapeutic candidates. NCATS reduces the failure risk of preclinical therapeutics development by sharpening research processes, improving efficiencies and applying innovative technologies. For example, NCATS establishes cross-disciplinary teams companioned with close project management to reduce, remove or bypass significant bottlenecks across the preclinical stage. NCATS scientists also employ such advanced tools as high-throughput screening to rapidly assess thousands of potential therapeutic compounds and machine intelligence to reveal patterns in research data.

NCATS scientists collaborate with academic, nonprofit and industry investigators, as well as patient groups, to turn promising yet uncertain preclinical compounds into viable therapeutic candidates. Credit: Daniel Soñé Photography, LLC.

Working with its partners, NCATS delivers the expertise and tools that render the preclinical research stage more predictive and efficient, thus taming risk and making successful therapeutic targets and disease projects more attractive to potential new partners for clinical development and testing.

But how does NCATS leverage collaboration to de-risk research and bring more treatments to the clinical trial stage? Consider rare diseases. More than 7,000 rare diseases have been identified, yet only a few hundred of those diseases have any available treatments.

The NCATS Therapeutics for Rare and Neglected Diseases (TRND) program uses the power of collaboration to reduce the risk of developing therapeutic candidates for rare or neglected disorders. The program's goal is to enable its partners to bring investigational new drug (IND) applications for rare diseases to the FDA.

Since its inception in 2009, TRND has worked with partners on more than 30 preclinical research projects — from gene therapies for rare muscle diseases and inherited neurologic disorders in infants to promising compounds for leukemia, eye diseases and rare pulmonary disorders.

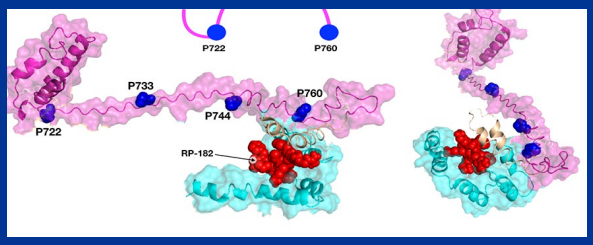
All told, NCATS' collaborative approach has produced impressive research results and accelerated potential new therapies for patients who need them. Between October 2018 and July 2020, 22 patents (https://ncats.nih.gov/pubs/features/patent-book-showcases-opportunities-for-collaboration-and-licensing) were awarded to scientists of the NCATS Division of Preclinical Innovation (DPI). In 2020, NCATS and its preclinical partners brought 10 INDs to the clinical trial stage. "These patents are a testimony to the innovative team science of NCATS staff and our collaborators," explains Lili M. Portilla, M.P.A., director of NCATS' Office of Strategic Alliances.

The risk of failure for preclinical researchers can be great. But when NCATS applies the power of collaboration to streamline and de-risk the therapeutic development process, the rewards for patients are so much greater.

> **These patents are a testimony to the innovative team science of NCATS staff and our collaborators."**

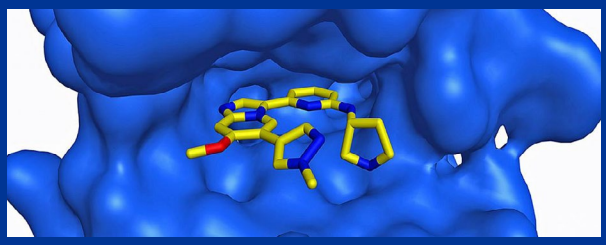
Learn more about how NCATS harnesses the power of collaboration to advance more treatments successfully (https://ncats.nih.gov/translation/issues/derisk) through the preclinical research stage.

More Collaborative Stories



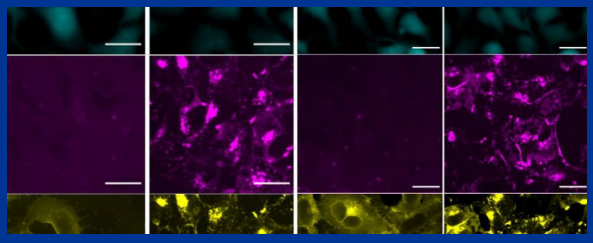
Tuskegee Researchers and NCATS Develop New Immunotherapy Approach Across Cancers and Other Diseases

https://ncats.nih.gov/news/releases/2020/nih-tuskegee-researchers-develop-potential-new-type-of-immunotherapy-across-cancers-and-many-other-diseases



Cincinnati Children's and NCATS Develop Potential Strategy Against Leukemia Drug Resistance

https://www.nih.gov/news-events/news-releases/nih-cincinnati-childrens-scientists-develop-potential-strategy-against-leukemia-drug-resistance



Nanoparticle SARS-CoV-2 Model May Speed Drug Discovery for COVID-19

https://ncats.nih.gov/news/releases/2020/ncats-nrl-create-nanoparticle-sars-cov-2-model-to-speed-drug-discovery-for-covid-19

Patient-Focused

NCATS always looks for opportunities to include patients and communities in all phases of translational science because the ultimate goal of translation is to develop real-world solutions for those in need.

Community Engagement Brings Benefits of Discovery to Those in Need

Each translation journey has the same destination: people who need safe, effective and approved health interventions.

A bedrock NCATS principle is that translation is complete only when interventions reach and benefit all the individuals and communities that need them. This critical late-stage step in the translation journey is known as dissemination and implementation.

But that critical step often is stalled within racial and ethnic minority communities and rural populations by a lack of their inclusion in clinical trials. This exclusion hinders the development of effective new interventions and prevents existing ones from reaching the people for whom they were created.

Roadblocks at the dissemination and implementation step posed particular challenges as the nation grappled with the COVID-19 pandemic. Members of racial and ethnic minority groups and rural communities suffered disproportionately high infection and death rates, making inclusion of these groups in studies of potential treatments and vaccines especially crucial. For many racial and ethnic minority communities, however, trust in medical research historically has been broken. Restoring it requires commitment and a track record of including underserved populations, respecting community values and aligning with their goals.

At every point along the path from scientific discovery to medical intervention, NCATS pursues the patient perspective to ensure our translational science answers are the right solutions for the people we serve. Credit: Children's National Medical Center.

To establish confidence, the NCATS Clinical and Translational Science Awards (CTSA) Program hubs worked hand in hand (https://ncats.nih.gov/ctsa/projects/community-engagement-at-CTSA-hubs-during-the-COVID-19-pandemic) with community partners on a range of initiatives to speed the discovery and delivery of COVID-19 treatments and vaccines to those in greatest need of them.

The CTSA Program hubs have long prioritized engaging communities in the research process. As trusted community partners, those hubs are supporting the Community Engagement Alliance (CEAL) Against COVID-19 Disparities

initiative (https://covid19community.nih.gov/) to raise awareness about COVID-19, educate people about the pandemic, and continue to build trust and understanding. They're working to reduce barriers to COVID-19 testing through the NIH RADx Underserved Populations (RADx-UP) (https://www.nih.gov/research-training/medical-research-initiatives/radx/radx-programs#radx-up) program. The CTSA Program hubs also are expanding nationwide clinical trials of COVID-19 therapies — such as clinical trials to test convalescent plasma (https://ncats.nih.gov/news/releases/2020/nih-expands-clinical-trials-to-test-convalescent-plasma-against-covid-19) against COVID-19 — into communities most at risk during the pandemic.

NCATS' response to COVID-19 is just the latest example of our ongoing commitment to patients and their communities. The Rare Diseases Registry Program (RaDaR) website (https://ncats.nih.gov/radar) provides the rare diseases community with easily accessible guidance on how to set up and maintain high-quality registries, and the Toolkit for Patient-Focused Therapy Development (https://ncats.nih.gov/toolkit) offers online resources to help patient groups advance through the process of therapeutic research and development.

"These efforts have been remarkably successful and demonstrate effective approaches to address long-standing inequities," explains NCATS Director Christopher P. Austin, M.D. "But they require resources and a different way of thinking and acting than the biomedical research model traditionally has supported."

At every point along the path from scientific discovery to medical intervention, NCATS pursues the patient perspective to ensure our translational science answers are the right solutions for the people we serve.

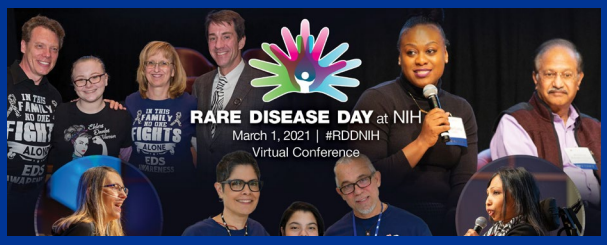
> **These efforts have been remarkably successful and demonstrate effective approaches to address long-standing inequities.**

Learn more about how NCATS listens to patients' voices (https://ncats.nih.gov/engagement), ensures inclusion in clinical trials and adapts translational science to community needs.

More Patient-Focused Stories

Rare Diseases Are Not Rare! Challenge Showcases Rare Disease Community's Awareness Messages

https://ncats.nih.gov/funding/challenges/rare-diseases-challenge-2020/winners

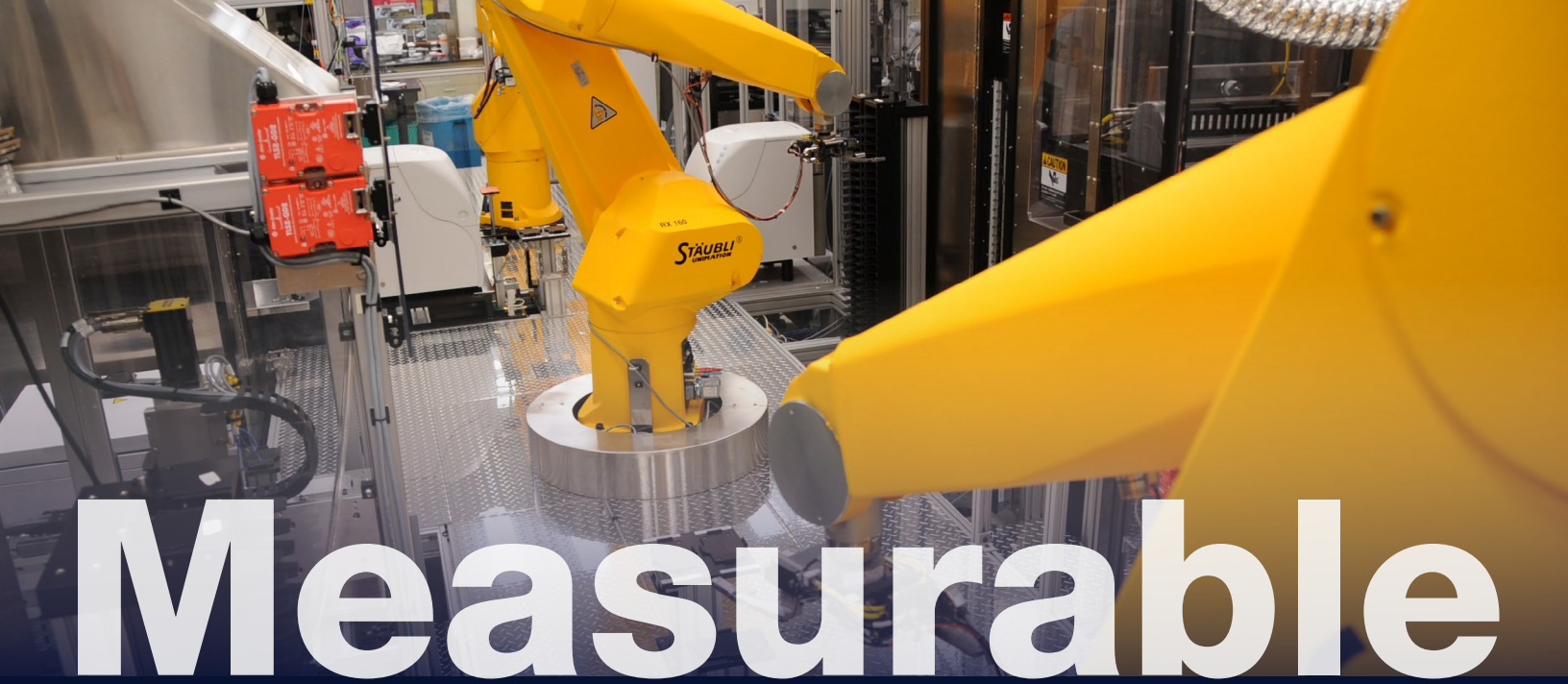


Annual Rare Disease Day Highlights Impact on Patients' Lives

https://ncats.nih.gov/news/events/rdd

CTSA Program Hubs Strengthen Rural Communities' Health

https://ncats.nih.gov/ctsa/projects/RuralHealth



Measurable

NCATS works to continuously improve the effectiveness of the translational science process, so programs must be designed and implemented with explicit indicators of success.

NCATS Pharmaceutical Collection Helps Systematize Serendipity

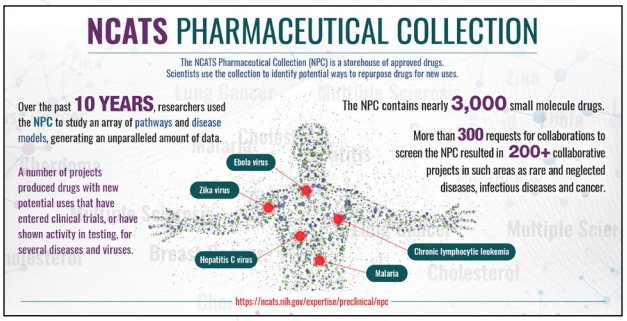
The creation of a signature translational science tool began not with a scientist but with the mother of a child with a rare disease.

The woman came to NCATS in search of a treatment for her son, whose life expectancy was less than five years. On a tour of the NCATS labs, she saw the robotic wizardry that gave scientists a jump-start on the approximately 15-year process of making a new drug.

But instead of being carried away by the extraordinary science, she was perplexed. Her son didn't have 15 years to wait for a drug. The only alternative to creating a new drug was to find a currently approved one that worked for her son's disease — a process called repurposing. At that time, repurposing was a serendipitous affair, subject to chance clinical observations by clinicians.

Her son's plight presented NCATS with a challenge: Could serendipity be systematized? The solution was to test the effectiveness of every drug currently approved to find ones that might be effective against her son's disease, but no such comprehensive collection of drugs had ever been created. So NCATS decided to create one.

The result was the NCATS Pharmaceutical Collection (NPC) (https://ncats.nih.gov/expertise/preclinical/npc), a compilation of 2,900 drugs — nearly every drug approved for human use by major regulatory agencies worldwide. NCATS developed the NPC to enable drug repurposing. Repurposing identifies potential new treatments more rapidly and, on a broad scale, expands understanding of how the human body works by identifying all the drugs that can affect a given physiological process.



The NCATS Pharmaceutical Collection of 2,900 drugs includes nearly every drug approved for human use by major regulatory agencies worldwide, and it enables drug repurposing to find potential new treatments more rapidly.

NCATS celebrated the NPC's 10th anniversary in 2019. In its first 10 years, the NPC had been used in more than 200 projects in such diverse areas as rare diseases, infectious diseases and cancer.

For example, researchers have used the NPC to devise a new plan of attack (https://ncats.nih.gov/news/releases/2019/childhood-brain-cancer) against a group of deadly childhood brain cancers collectively called diffuse midline gliomas. They identified a drug duo that worked together to both kill cancer cells and counter the effects of a genetic mutation that cause the diseases. The NPC also has played a key role in the search for answers against idiopathic inflammatory myopathy, also known as myositis — a rare muscle disease with no effective therapies and few experimental treatments in development. NCATS scientists used the NPC to swiftly test thousands of existing drugs to find therapeutics that may target a key trigger in myositis (https://ncats.nih.gov/news/releases/2020/ncats-teams-rapid-test-finds-promising-therapies-for-myositis).

Examining the patterns of response across these projects provides researchers insights into fundamental biology and identifies connections among diseases previously thought to be unrelated. Several projects produced drugs with new potential uses that have entered clinical trials.

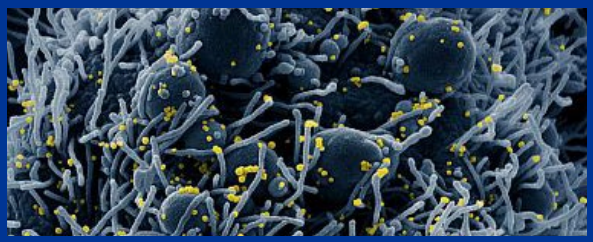
"The NPC has been an indispensable resource for the urgent unmet need of repurposing therapeutics for rare and neglected diseases", explains Travis Kinder, Ph.D., a postdoctoral fellow with NCATS' Assay Development and Screening Technology laboratory.

> **The NPC has been an indispensable resource…for rare and neglected diseases.**

The NPC data are now a part of a suite of resources at the NCATS Inxight: Drugs (https://drugs.ncats.io/), a web portal that aggregates reliable, curated drug development data from multiple existing sources in one place. All the data are available for public use in PubChem.

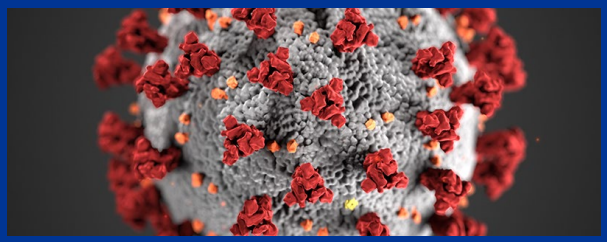
Learn more about how the NPC (https://ncats.nih.gov/expertise/preclinical/npc) is transforming the process of scientific serendipity into a more measurable, standardized path toward new treatment options.

More Measurable Stories



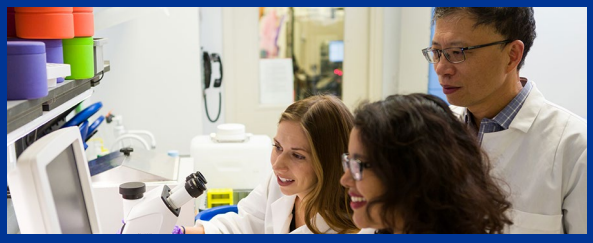
NCATS Starts Study to Quantify Undetected Coronavirus Infection Cases

https://www.nih.gov/news-events/news-releases/nih-begins-study-quantify-undetected-cases-coronavirus-infection



Research Survey Examines Impact of COVID-19 on Rare Diseases Community

https://ncats.nih.gov/news/releases/2020/nih-supported-research-survey-to-examine-impact-of-covid-19-on-rare-diseases-community



NCATS Translational Science Training Program Sets Young Scientists on Paths to Career Success

https://ncats.nih.gov/news/releases/2020/ncats-translational-science-training-program-sets-young-scientists-on-paths-to-career-success

Appendix

Appendix: Statutory Language on Biennial Report

Public Health Service Act

Section 479 NATIONAL CENTER FOR ADVANCING TRANSLATIONAL SCIENCES

(c) BIENNIAL REPORT.—The Center shall publish a report on a biennial basis that, with respect to all research supported by the Center, includes a complete list of—

(1) the molecules being studied;

(2) clinical trial activities being conducted;

(3) the methods and tools in development;

(4) ongoing partnerships, including—

(A) the rationale for each partnership;

(B) the status of each partnership;

(C) the funding provided by the Center to other entities pursuant to each partnership, and

(D) the activities which have been transferred to industry pursuant to each partnership;

(5) known research activity of other entities that is or will expand upon research activity of the Center;

(6) the methods and tools, if any, that have been developed since the last biennial report was prepared; and

(7) the methods and tools, if any, that have been developed and are being utilized by the Food and Drug Administration to support medical product reviews.

(d) INCLUSION OF LIST.—The first biennial report submitted under this section after the date of enactment of the 21st Century Cures Act shall include a complete list of all of the methods and tools, if any, which have been developed by research supported by the Center.

(e) RULE OF CONSTRUCTION.—Nothing in this section shall be construed as authorizing the Secretary to disclose any information that is a trade secret, or other privileged or confidential information subject to section 552(b)(4) of title 5, United States Code, or section 1905 of title 18, United States Code.

Responses to Required Information

(1) the molecules being studied	The NCATS Pharmaceutical Collection (NPC) is a comprehensive collection of approved and investigational drugs for high-throughput screening that provides a valuable resource for both validating new models of disease and better understanding the molecular basis of disease pathology and intervention. The NPC consists of a physical collection of drugs and an information browser and database. Access to the collection is provided through both the TRND program and Tox21 initiative and instructions are available at https://tripod.nih.gov/npc/. Sources for the current collection include traditional chemical suppliers, specialty collections, pharmacies and custom synthesis. All data generated through this effort are deposited in PubChem (within the NIH's National Library of Medicine). PubChem consists of three dynamically growing databases: 1. PubChem Compound: Contains pure and characterized chemical compounds. 2. PubChem Substance: Contains mixtures, extracts, complexes and uncharacterized substances. 3. PubChem BioAssay: Contains database results from high-throughput screening programs with several million values. For a list of NCATS-utilized compounds, go to https://www.ncbi.nlm.nih.gov/pccompound/?term=NCGC%5Bsourcename%5D
(2) clinical trial activities being conducted	ClinicalTrials.gov is a database of privately and publicly funded clinical studies conducted around the world. Studies for which NCATS is a sponsor/collaborator are available at: https://clinicaltrials.gov/ct2/results?cond=&term=&type=&rslt=&age_v=&gndr=&intr=&titles=&outc=&spons=NCATS&lead=&id=&cntry=&state=&city=&dist=&locn=&fund=0&strd_s=&strd_e=&prcd_s=&prcd_e=&sfpd_s=&sfpd_e=&lupd_s=&lupd_e=&sort= For a list of clinical research studies being supported by NCATS Rare Diseases Clinical Research Network (RDCRN), go to: https://www.rarediseasesnetwork.org/research-groups
(3) the methods and tools in development	This biennial report highlights many of the ongoing efforts of NCATS to develop methods and tools that will improve the translational research process. For a complete list of all of the active projects funded by NCATS, go to https://projectreporter.nih.gov/Reporter_Viewsh.cfm?sl=15E8C1094A85C3D47598B8961CAA4A01A2FFCEB861BF.
4) ongoing partnerships, including— (A) the rationale for each partnership; (B) the status of each partnership; (C) the funding provided by the Center to other entities pursuant to each partnership, and (D) the activities which have been transferred to industry pursuant to each partnership;	A and B) The NCATS Division of Preclinical Innovation develops approaches that improve the efficiency and effectiveness of translation. To do so, NCATS intramural scientists leverage state-of-the-art laboratories and collaborations among government, industry, academia, and patient and rare disease communities to advance new technologies to make preclinical research more predictive and efficient. C) Investigators do not receive grant funds through the NCATS intramural program. Instead, selected researchers partner with NCATS experts to generate pre-clinical data and clinical-grade material through government contracts for use in Investigational New Drug (IND) applications to a regulatory authority such as the U.S. Food and Drug Administration (FDA). For a list of NCATS intramural projects, please visit: https://intramural.nih.gov/ D) For information on any activities which have been transferred to industry, please inquire with NCATSPartnerships@mail.nih.gov.
(5) known research activity of other entities that is or will expand upon research activity of the Center	NIH investigators frequently conduct PubMED searches on areas of research interest. However, NIH does not conduct competitive intelligence on for-profit entities.

(6) the methods and tools, if any, that have been developed since the last biennial report was prepared	Small molecule chemical compounds, which can be used to test or "probe" the effects of increasing or decreasing the activity of a biological target in cells or animals, are some of the most powerful tools for target validation, which is the process of demonstrating that engaging a target provides meaningful therapeutic benefit. Probes enable researchers to investigate protein and cell functions and biological processes. If appropriate, probes can be optimized to become potential drug candidates. Generating these chemical probes requires specialized expertise and facilities, and the NCATS Early Translation Branch (ETB) provides world-leading collaborative services to meet these needs. Collaborators work with ETB scientists to develop screens against promising drug targets and to refine these results into small molecule probes and potential therapies. For a list and descriptions of the assays (tests) developed through the ETB, go to https://www.ncbi.nlm.nih.gov/pcassay?term=NCGC%5Bsourcename%5D&cmd=search
(7) the methods and tools, if any, that have been developed and are being utilized by the Food and Drug Administration to support medical product reviews.	https://ncats.nih.gov/expertise/preclinical/ginas Global Ingredient Archival System (ginas) The ginas resource is a registration system for the ingredients in medicinal products. This project, developed by NCATS scientists, makes it easier for regulators and other stakeholders to exchange information about substances in medicines, supporting scientific research on the use and safety of these products. While the main goal of production software, called the Global Substance Registration System (G-SRS), is to assist agencies in registering and documenting information about substances found in medicines, a collaboration with the FDA has also enabled NCATS to publish a public data set of substance records, which is updated on a regular basis and used by collaborators in regulatory science as well as industry. EU-SRS is sponsored by EMA and BfArM (Germany). They will use the GSRS software and load the NCATS hosted FDA public GSRS data to EU-SRS for "production" use in order to support their substance curation processes in mid-2022. The link to ginas is available at https://gsrs.ncats.nih.gov/#/. CURE ID, created through a collaboration between NCATS and the FDA, enables the crowdsourcing of medical information from health care professionals to facilitate the development of new treatments using repurposed drugs for difficult-to-treat infectious diseases, including COVID-19. CURE ID is accessible through a website, smartphone or other mobile device. The CURE ID app, which was developed with NCATS' support, includes information on most clinical trials for COVID-19 drugs, biologics and vaccines.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