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Innovations

New NIH Center to Streamline Translational Science

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On December 23, 2011, the National Institutes of Health (NIH) expanded its research body with the launch of its 27th center, the National Center for Advancing Translational Science (NCATS). Its mission is to "…catalyze the generation of innovation methods and technologies that will enhance the development, testing, and implementation of diagnostics and therapeutics across a wide range of human diseases and conditions."

On that day, NIH Director Francis Collins wrote on the Feedback NIH blog (http://feedback.nih.gov/ncats/ncats_established):

"…NCATS is coming at just the right time—we have an abundance of scientific advances and new technologies, but we are using old tools for many steps in therapeutic development. The goal of NCATS will be to develop new ways of doing translational research that the public and private research and development communities can adopt. Innovations that come out of NCATS are intended to cut down the time or expense needed to develop a new drug, or allow us to predict which compounds will work best and be safe earlier in development."

In December, 2010, the NIH Scientific Management Review Board (SMRB), a group of senior scientists who look at the operations of the NIH and make recommendations about organizational changes, issued its "Report on Translational Medicine and Therapeutics" (http:/smrb.od.nih.gov/documents/reports/TMAT_122010.pdf). "The bottom line was that the report asked the NIH to look more carefully in what we do in the area of translational science and to consider a reorganization that would result in the NIH having a bigger impact on the process of translation—bringing discoveries made in basic science forward into new diagnostics and medicines," says Thomas Insel, Director of the National Institute of Mental Health (NIMH) and Interim NCATS Director. "In short, it asked us to find ways of doing translational science better at NIH."

NCATS's long-term effort is to re-engineer the process of translational science within NIH to make the development of diagnostics and therapeutics much more efficient. "There are 26 other centers and institutes at NIH and virtually every one of them is committed to translational research," says Insel. "At the end of the day, we'd like to serve all of them and their partners to make sure they all succeed in their missions."

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Insel sees NCATS as having a central role in helping NIH advance fundamental discoveries to develop tools, resources, and innovations that will result in the development of diagnostics and therapeutics. To do so, NCATS has the task of figuring out how to re-engineer that effort to avoid many of today's bottlenecks that slow down translational of discoveries to applications.

Key Bottlenecks

Insel and other NCATS directors are focusing on addressing a few top priorities or areas of known bottlenecks. "Certainly, identifying therapeutic targets and validating them is a key area…to be thinking [about]…," he says. Today's explosion of genomics-based information is offering up details about potential pathways in a variety of disease areas. Finding and confirming new ways for intervening in these pathways is the next step in advancing these discoveries towards a clinical use.

Along with advancing new biology, NCATS hopes to weigh in on novel chemistry development. Insel explains, "This means improving capabilities in medicinal chemistry and drug design." Once biology and chemistry meet, Insel points out that there is a gaping problem regarding preclinical toxicology testing. "We know that so many compounds fail because of toxicity," he explains. A major problem is that animal research has not been entirely predictive of the toxic effects that surface in human testing, often after years of time and money developing a particular compound. "This is a major problem in the biotechnology and pharmaceutical industries and we want to improve predictive toxicology methods," Insel says.

NCATS will also take on the challenge of findings new ways of developing reliable biomarkers in the areas of diagnostics and in tracking clinical responses to therapy.

One of Dr. Insel's greatest interests is in "rescuing and repurposing" existing compounds that now sit unused or untested in the freezers of academicians and private companies. If NCATS can devise template agreements to allow this to happen, it could enable external bodies and companies to contribute dormant compounds. Insel also explains that NCATS might become the gateway for academic investigators to learn about what is available for study. "Those kinds of things would be enormously helpful for me within NIMH, and I imagine I would not be alone among my fellow NIH directors," Insel adds.

Contributions to Industry

After the SRMB report was issued, the proposed NCATS governing body sought the input of many potential stakeholders, including those from biotechnology and related industries as well as academic investigators, to identify their key issues.

From industry, NCATS is taking on at least three concerns. One is investigating

the process of regulatory science at the Food and Drug Administration (FDA) to ensure drug safety and efficacy. Industry also wants NCATS to help develop better predictive toxicology methods to improve the odds of success in the drug development process. ''And we have been asked to work on workforce training issues so that doctoral and postdoctoral scientists receive some of the fundamental skills of clinical pharmacology required by those hiring in the industrial setting,'' adds Insel.

NCATS also hopes to aid in the increasing demand for new diagnostics and therapies for rare and neglected diseases—an area of increasing interest from public health advocates and as well as those in private industry. To answer this call, NCATS will be the new home of the Therapeutics for Rare and Neglected Diseases (TRND) program, which focuses on not just finding new therapeutics but also on re-engineering the entire process for developing therapeutics for these diseases.

New Home for Existing Programs

Though NCATS is a new NIH center, it will primarily be home to programs and efforts that already operate elsewhere within NIH. (A complete list of NCATS's components can be found on the NCATS website.) ''They have been reorganized into this new center essentially to create some new adjacencies and improve interaction,'' says Insel.

The only new NCATS entity is the newly funded Cures Acceleration Network (CAN), set to launch with a modest $10 million budget. CAN is intended to advance the development of ''high need cures,'' particularly in areas that private companies are unlikely to pursue.

The first priority on NCATS's agenda is to find a permanent director to guide the center's 250 person team. A portion of this group will be devoted to grant review and overseeing administration of the center's clinical translational science awards (CTSA program) that fund about 60 research sites across the company with grants totaling nearly $500 million.

A sizable group of about 140 people within NCATS will do hands-on intramural research within NIH, including small-molecule screening and drug development for rare diseases. ''However, most of those projects are collaborative with external scientists both in academia and industry,'' Insel explains. One example includes the TRND team, which is working with scientists at various external sites to find new treatments for sickle cell anemia, CLL, Neimann-Pick disease, and other disease targets.

''An effort like NCATS, which is fundamentally focused on innovation, is going to serve both basic and more applied translational science,'' adds Insel. ''What we hope to do is blur or bridge the division between the two for the benefit of all—it's a great opportunity.''

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