Department of Health and Human Services
National Institutes of Health
National Center for Advancing Translational Sciences

13th Meeting of the
Cures Acceleration Network Review Board

Minutes of Virtual Meeting
December 11, 2015

The National Center for Advancing Translational Sciences (NCATS) Cures Acceleration Network (CAN) Review Board convened a virtual meeting, in open session, at 11:00 a.m. ET on December 11, 2015. Freda C. Lewis-Hall, M.D., CAN Review Board chair, led the meeting. In accordance with Public Law (P.L.) 92-463, the session was open to the public.

CAN REVIEW BOARD MEMBERS PRESENT

Chair

Freda C. Lewis-Hall, M.D., Executive Vice President and Chief Medical Officer, Pfizer

Vice Chair

Geoffrey S. Ginsburg, M.D., Ph.D., Director of Genomic Medicine, Duke University Health System

Executive Secretary

Anna L. Ramsey-Ewing, Ph.D., Director, Office of Grants Management and Scientific Review, NCATS

Board Members

Jorge L. Contreras, J.D.
Pamela B. Davis, M.D., Ph.D.
Louis J. DeGennaro, Ph.D.
Mary L. Disis, M.D.
Eric D. Kodish, M.D.
Ankit A. Mahadevia, M.D., M.B.A.
Bernard H. Munos, M.B.A.
Harry Selker, M.D.
Anantha Shekhar, M.D., Ph.D.
Todd B. Sherer, Ph.D.
Myrl Weinberg, M.A.
Scott J. Weir, Pharm.D., Ph.D.

NCATS REPRESENTATIVES

Hosts

Pamela M. McInnes, D.D.S., M.Sc.(Dent.), Deputy Director, NCATS
Danilo A. Tagle, Ph.D., M.S., Associate Director for Special Initiatives, NCATS

Webinar Technical Lead: Christine M. Cutillo, Special Assistant to the Director, NCATS

OTHERS PRESENT

Caitlin Leach
Michael Shane
Lawrence A. Soler, J.D., Partnership for a Healthier America
Ken Taymor
NCATS leadership and staff

I. CALL TO ORDER AND OPENING REMARKS

Freda C. Lewis-Hall, M.D., Chief Medical Officer, Pfizer, Chair, CAN Review Board; Geoffrey S. Ginsburg, M.D., Ph.D., Director, Center for Applied Genomics & Precision Medicine, Duke University Medical Center, Vice Chair, CAN Review Board

Freda C. Lewis-Hall, M.D., and Geoffrey S. Ginsburg, M.D., Ph.D., opened the meeting and welcomed participants.

II. MEETING RULES AND CONFIRMATION OF DATES FOR FUTURE NCATS ADVISORY COUNCIL AND CAN REVIEW BOARD MEETINGS

Anna L. Ramsey-Ewing, Ph.D., CAN Executive Secretary

Anna L. Ramsey-Ewing, Ph.D., reviewed the procedures for the meeting: In the discussion sections that followed the presentations, only CAN Review Board members would be able to participate verbally, and they were required to dial in following the correct protocol to participate via phone. Dr. Ramsey-Ewing said other participants could submit a question or comment by typing it in the Q&A box and sending it to Christine M. Cutillo, technical host of the virtual meeting.

Dr. Ramsey-Ewing confirmed the 2016 meeting schedule for the NCATS Advisory Council and CAN Review Board meetings:

- January 14
- May 12
- September 15
- December 9 (CAN Review Board-only virtual meeting)

III. UPDATE ON NCATS

Pamela M. McInnes, D.D.S., M.Sc.(Dent.), Deputy Director, NCATS

Pamela M. McInnes, D.D.S., M.Sc.(Dent.), delivered this update for NCATS Director Christopher P. Austin, M.D., who was on travel. The primary update concerned the fiscal year (FY) 2016 budget request.

The FY 2016 budget request, which President Obama released on Feb. 2, 2015, requested $31.3 billion for the National Institutes of Health (NIH), an increase of $1 billion over FY 2015. For NCATS, the request was for $660.1 million, an increase of $27.4 million over FY 2015. NCATS' congressional justification and appropriation status is

available online. The budget request highlighted the Tissue Chip for Drug Screening program and the Therapeutics for Rare and Neglected Diseases (TRND) program.

House and Senate appropriations bills are approved by committees, but the full chambers did not vote on the bills. At the end of October, Congress passed the Bipartisan Budget Act of 2015 (P.L. 114-74), which raised the sequester caps for the appropriation bills. Congress is working on revised appropriation bills, which could be included in an omnibus bill for FY 2016. The federal government was operating under a continuing resolution through December 11. An additional continuing resolution, lasting through Wednesday, December 16, had been introduced.

On July 10, 2015, the House of Representatives passed the 21st Century Cures Act by a vote of 344 to 77; it provides for $8.75 billion for an NIH Innovation Fund over five years. The Senate is considering an Innovations for Healthier Americans bill, but it has not yet released a draft bill.

IV. PREVIOUSLY APPROVED CAN CONCEPT CLEARANCES

Danilo A. Tagle, Ph.D., M.S., Associate Director for Special Initiatives, Office of the Director, NCATS

Danilo A. Tagle, Ph.D., M.S., said that he would review seven CAN concept clearances, three previously approved concepts and four new ones. NCATS wants to be able to move forward if additional funding for CAN is approved. The next steps will depend on the funding appropriation.

Increasing Access to Compounds and Toxicity Data

Dr. Tagle said this concept could lead to understanding the mechanisms of toxicity. The goals are to access compounds that did not have a safety signal in pre-clinical studies but later were shown to have toxicity in humans, to investigate underlying mechanisms for human toxicity and why pre-clinical tools failed, and to incorporate this information into predictive modeling to benefit drug development. The outcome will be to develop new assays to fill gaps in the current predictive toolbox. To assess potential impact, Dr. Tagle said NCATS will work with multiple pharmaceutical companies, the Food and Drug Administration (FDA) and companies that develop predictive toxicology tools. Understanding the mechanisms of toxicity will have implications for all drug development.

Criteria for evaluating success will be the number of compounds in the program and the number of mechanisms elucidated. A major obstacle is that the underlying mechanism of toxicity discovered in or after Phase I trials often is not investigated. Ongoing activity in this area includes the Discovering New Therapeutic Uses for Existing Molecules (New Therapeutic Uses) program, through which NCATS already has relationships with companies in place and a validated process for establishing collaborations between

academic researchers and pharmaceutical companies. The program could gain access to compounds and data.

Discussion

Freda C. Lewis-Hall, M.D., said the question is whether the CAN Review Board thinks the advance in technical capabilities is significant enough to meet the goals of the program or whether this concept would be at the mercy of the state of the technology. Geoffrey S. Ginsburg, M.D., Ph.D., said the value is the same as it was a year ago. NCATS should encourage this type of initiative so that investigators can demonstrate new technologies. He encouraged linking this concept to the tissue chip platform. Dr. Lewis-Hall endorsed the concept and agreed that tissue chip technology could elucidate toxicity mechanisms.

Todd B. Sherer, Ph.D., asked how to confirm that a company actually conducted pre-clinical experiments. Dr. Ginsburg said that was a good point, adding that through the program, researchers would examine not only where toxicities have emerged but also the models used to predict toxicity. Better predictive tools might be needed.

Dr. Sherer asked whether there was any knowledge of specific organs that might be more relevant to examine. It is important to ensure that the program is not chasing down an obscure characteristic of a single compound but is in fact posing a more holistic challenge. Ginsburg said that would be taken into consideration as the program is moved forward and is discussed with pharmaceutical partners.

It was motioned and seconded to move this concept forward. The CAN Review Board unanimously approved this action, noting the comments and suggestions.

Proof of Principle (POP) Awards

Dr. Tagle presented the goal for the POP Awards: to support promising pre-clinical research projects that were not previously funded due to the lack of a specific piece of translational data. The outcome would be to generate the specific piece of pre-clinical data to make a project more competitive for subsequent funding or otherwise move a project forward. The potential impact is to strengthen applications for programs across NIH, and perhaps at a future stage, across the entire translational research enterprise. Funded applications will be those with a potentially broad and significant impact. Each project will be completed in a relatively short time.

Criteria for evaluating success are obtaining the critical piece of translational data, reports from awardees about subsequent progress (including any advancements such as creating intellectual property, obtaining funding and preparing an investigational new drug application package) and outcomes of subsequent applications for NIH support. One major obstacle to address is that many applications that lack a critical piece of data would otherwise be strong candidates for other NIH programs. Ongoing research and activity in this area include a number of NIH grant programs for limited amounts and for

research projects to be completed in a relatively short time. However, most of these programs are not focused on projects that develop, demonstrate or disseminate interventions to improve human health and are not aimed at projects that already have undergone the NIH review process and received feedback, indicating a lack of a limited, yet critical, piece of data.

Discussion

Bernard Munos, M.B.A., was the primary discussant.

Dr. Tagle said projects will be identified by working through partnerships and collaborations with other NIH Institutes and Centers (ICs). The projects chosen would be staff decisions that would go through a review process and would draw on expertise in the particular area. It would be relatively quick and feasible to accomplish in a short time.

Dr. Lewis-Hall questioned how many potential opportunities there might be that could be funded with $100,000 for less than one year and generate meaningful translational data. Is there a sufficient pool? Dr. Tagle responded that there was a sufficient pool for both NCATS and other ICs, some of which have smaller translational programs, such as the Innovation Grants to Nurture Initial Translational Efforts (IGNITE) program administered by the National Institute of Neurological Disorders and Stroke.

Mr. Munos said this concept relates to the type of science that NCATS supports through CAN. He has been concerned in the past that programs such as this one support projects that are too incremental. He said he understood why this was done, but perhaps there should be a collective push to change that. He added that he could support some of the awards, but some criteria seem to be missing. Dr. Tagle suggested that Mr. Munos submit any criteria that he thought might be beneficial. NCATS will need to coordinate with other ICs and look critically at summary statements.

Scott Weir, Pharm.D., Ph.D., said he was on the subcommittee that developed this concept. NCATS staff members said they were looking for proposals or collaborations with other ICs that had promise but were missing a key piece of data that could be developed with experiments that cost no more than $100,000. One example would be a TRND or Bridging Interventional Development Gaps application. He agreed with the staff that POP Awards should not require a cumbersome review process.

Ginsburg said that a small POP investment could result in a big reward, and he noted that the comments had been about the process. This concept offers a way to look across ICs for types of programs that have stalled in the review process but could be accelerated with a quick and timely review. If those criteria could be met, he would affirm approval of the concept at this time.

It was motioned and seconded to move the POP Award concept forward. The CAN Review Board unanimously approved this action, noting the comments and suggestions.

Sensors and Devices to Detect Clinical Outcomes

Dr. Tagle said the goal of this program is to advance the integration of real-time data from multiple devices and sensors to meaningfully inform the assessment of clinical outcomes. This requires diverse collaborations of a multidisciplinary team (e.g., technology leaders, patients and data scientists) to uniformly collect and analyze data from sensors and/or devices for assessing clinical outcomes. The potential impact could be the resolution of engineering, technical, computational, social and cultural barriers to adopting sensor and device data and making it useful.

Criteria for evaluating success are use of integrated data for assessing clinical outcomes and biological endpoints, as well as public dissemination of lessons learned and related data. The major obstacle to address is that although many sensors and devices are available to measure physiologic, environmental and patient-reported information, their clinical utility is limited by the lack of integration of data from multiple sources. This problem includes the collection, transfer and management of data, as well as various environmental measurements. There are many ongoing activities in this area, including wearable technologies, but they are not standardized and are not interoperable, and no concerted efforts are being made to warehouse data. The concept could provide an opportunity to synchronize with efforts in electronic medical records (EMRs) and the NIH Precision Medicine Initiative (PMI).

Discussion

Dr. Sherer said the risk is being late to the game on this concept. As more academic groups become involved with sensors and devices to detect clinical outcomes, through CAN, NCATS could show leadership and demonstrate how to integrate this concept into clinical trials. Many companies are moving into this area, but it remains "uncontrolled" and requires coordination and leadership. Dr. Ginsburg agreed that the field is moving; examples include a research kit launched by Apple, a $10 million grant from the National Heart, Lung, and Blood Institute to the University of California, and the NIH PMI. Through CAN, NCATS should be involved in the PMI. Trial design and recruitment are not well defined. This concept clearance could call out specific roles for these technologies. He would be enthusiastic, but the outcomes, as stated, are too broad.

Eric Kodish, M.D., said he could connect this topic with the concept clearance related to ethics that the CAN Review Board discussed earlier in the year. Moving this concept forward will add an understanding of the ethics related to technology. Harry Selker, M.D., said other important projects, such as the PMI, are designed to address this. Independent efforts at different ICs are not well linked, and work is going on in inefficient parallel tracks. Even companies such as Google and Apple have much to bring to the table. NCATS could coordinate that.

Dr. Lewis-Hall said this concept could provide NCATS with a unique opportunity to apply technology to advance the development of diagnosis and treatment. Through CAN, NCATS could play a pivotal role in coordinating these efforts. Jorge L. Contreras, J.D., agreed and emphasized that legal and social issues and ethics should be included in the concept. Dr. Sherer added that because the field is moving so quickly, the idea of convening and leading might not involve significant research funding and should be integrated into the initiative. Considerable disease-specific work at the ICs is related to these technologies, as is work outside NIH. There is a real need for coordination. It is not necessary to become involved in the process itself.

Dr. Ginsburg said the points were well taken. The concept provides the opportunity to coordinate across many agencies. This is paramount in the minds of many government and industry agencies, with the Federal Communications Commission being a key one. Dr. Tagle suggested refining the concept to focus on specific aspects of clinical trial design and taking a leadership role in coordination and in bringing parties together, including on ethical, legal and other policy issues.

It was motioned and seconded to move forward the concept clearance about sensors and devices to detect clinical outcomes. The CAN Review Board unanimously approved this action, noting the comments and suggestions.

V. NEW CAN CONCEPT CLEARANCES

Danilo A. Tagle, Ph.D., M.S., Associate Director for Special Initiatives, Office of the Director, NCATS

Danilo A. Tagle, Ph.D., M.S., reviewed four new concept clearances.

SaME Therapeutics: Targeting Shared Molecular Etiologies Underlying Multiple Diseases to Accelerate Translation

The goals of this concept are to develop a matrix of diseases and molecular etiologies to identify shared molecular etiologies (SMEs) underlying multiple diseases and to stimulate the identification of SME-targeted drugs and ultimately conduct clinical trials of these agents. The outcome would be a fundamental change in therapeutics development to focus on SMEs rather than clinical phenotypes of individual diseases. The potential impact would be to maximize the translation of NIH-funded research and increase the number of effective treatments for patients.

The criteria for evaluating success would be developing a matrix of SMEs and diseases, the number of SME-targeted therapeutics, and ultimately the number of clinical trials of SME-targeted drugs. The major obstacle is the large number of human diseases that have too few effective treatments. SaME therapeutics can provide a solution to this problem, a solution that is consistent with the NCATS mission to bring more treatments to more patients more quickly. In ongoing research in this area, druggable SMEs already have been identified in rare diseases (e.g., those involving misfolded proteins,

premature termination codons, lysosomal dysfunction, or an mTOR [mechanistic target of rapamycin] pathway). Also, a conceptually similar approach is being used in clinical trials of drugs that target SMEs underlying multiple cancer types.

Discussion

Scott J. Weir, Pharm.D., Ph.D., commented that the concept grew out of a discussion about drug repurposing and the need to develop a systematic approach that integrates systems biology and pharmacology and then overlays the disease characteristics. This might help identify new uses for FDA-approved and abandoned drugs for rare diseases.

Freda C. Lewis-Hall, M.D., endorsed the concept enthusiastically. While much is being done in a serendipitous way, this would be a more systematic approach to find linkages across pathways, mechanisms and diseases.

Dr. Weir asked whether this would involve a database and what it would look like. Who would curate the data? Dr. Tagle said he envisioned an initial crowdsourcing approach, an exercise in matrix formation that eventually would create a database with already identifiable pathways, existing therapeutics and the possibility of combination therapies. Dr. Weir asked whether a request for applications that might come out of this would include a component to host and track down data and another to have a competition to prove the concept of moving molecules from one indication to another.

Pamela B. Davis, M.D., Ph.D., noted a strategy that was recently funded by an investigator at her institution. It was based on using big data to look through millions of EMRs for side effects, adverse effects or unintended effects of existing drugs and then cycling back to diseases in which control of those types of effects is a feature. Dr. Tagle said NCATS could work with the community on this approach.

It was motioned and seconded to approve the SaME Therapeutics program concept. The CAN Review Board unanimously approved moving this action.

3-D Bioprinting of Human Tissues for Drug Screening

Dr. Tagle reviewed the background of this concept. One goal is to establish a multidisciplinary NIH-based Center that uses 3-D bioprinting to generate high-throughput screenable assay models of human tissues for drug discovery. Another goal is to enable extramural investigators to access the NIH 3-D bioprinting core group to establish human tissue models and protocols for the generation and differentiation of human induced pluripotent stem cells (iPSCs) for the tissue cells of interest. The outcome would be a catalog of reproducible, disease-relevant and screenable living human tissues using 3-D bioprinting with iPSC cells from human patients that could be used for efficient drug discovery and development. The potential impact could be 3-D bioprinting of human live tissues derived from human patient stem cells to provide drug efficacy data that is more predictive than current models. Other potential impacts

would be a decrease in the failure rates of clinical trials and faster development times than those using the current simplistic *in vitro* and *in vivo* models.

Criteria for evaluating success are (a) whether a catalog of 3-D bioprinted human tissues that are robust and disease relevant for drug discovery and development is created and made available to the scientific community, and (b) the reduction, removal or bypassing of system-wide bottlenecks in the translational drug discovery process by creating highly predictive assays for efficient, high-throughput efficacy testing of new drugs. The major obstacles to address include the need for rapid, scalable and reliable fabrication of architecturally, physiologically and functionally defined human tissues using 3-D bioprinting technologies. Other obstacles are quantitative validation of 3-D bioprinted tissues in a screening format and the need to foster effective multidisciplinary collaborations to leverage cutting-edge tissue bioengineering, iPSC and imaging technologies worldwide. There is an ongoing research collaboration between NIH and Organovo, and NIH is developing tissue models of the retina and skin using Organovo's NovoGen MMX Bioprinter®.

Discussion

Geoffrey S. Ginsburg, M.D., Ph.D., said this was a fascinating concept of which he previously was largely unaware. He asked whether the technology was sufficiently advanced to move in one step from the printing of tissues to screening. Would there be a series of steps between printing and screening, or would that be unnecessary to test feasibility against biological benchmarks for those tissues? Would this process be similar to what is being done in the Tissue Chip for Drug Screening program? He added that it is exciting to use iPSC cells to develop not only a catalog of tissues but also a catalog of genetic backgrounds. He said he certainly would be in favor of NCATS leading that effort.

Dr. Tagle noted that one of the concepts that the CAN Review Board cleared this past summer was SmartPlate technology. In fact, 3-D bioprinting already is happening within a microwell format. In terms of printing technology, bioprinting has advanced to the point where it cannot only bioprint laminar tissue architecture, but it also can print tissues of tubular and various cytoarchitectures that mimic cell composition. This is an opportune time to be able to capitalize on the technologies that are converging, both for bioprinting and iPSC technology.

Dr. Lewis-Hall asked whether the environment for pivoting this technology to a drug development paradigm is mature enough to establish the necessary partnerships. This means not only having organizations and institutions focused on tissue printing but also being able to encourage, establish or facilitate partnerships around bioprinting of the tissue for the purpose of drug screening. Dr. Tagle said the environment was ready for this pivot. Part of the proposal is to create a resource-rich facility that goes beyond NCATS' Division of Pre-Clinical Innovation and the recently established stem cell resource facility.

It was motioned and seconded to move forward the concept of 3-D bioprinting of human tissues for drug screening. The CAN Review Board unanimously approved this action, noting the comments and suggestions.

Proteomic Profiling for Clinical Applications

Dr. Tagle said the goals of this program are to establish new clinical tests and protein biomarkers based on quantitative proteomics, phosphoproteomics and validated antibodies; to optimize technical and analytical tools and easy-to-use resources and databases for physicians and other clinical staff; to integrate analysis of genetic and proteomic data for decision making in personalized health care; and to achieve better understanding and longitudinal monitoring of pathophysiology and drug effects by quantitative proteomic readouts.

There would be two types of outcomes. The first would include new, sensitive clinical tests, reliable panels of protein biomarkers, and quantifiable assays reflecting dynamically regulated proteins as the functional effector molecules in cellular systems to directly define phenotypes in both monogenic and complex diseases. The second would be mass-spectrometry-based quantitative proteomics as a tool for evidence-based precision medicine and its potential use in analysis of cellular biopsy material and bodily fluids. The potential impact is in routine clinical analysis of human proteins and their post-translational modifications to open up new opportunities for health care and precision medicine and in quantitative clinical proteomics that will reduce human bias and increase success in the diagnostic and therapeutic processes.

Criteria for evaluating success will be routine analysis of selected protein markers or proteome-wide approaches in the clinic, more clinicians using proteomics for decision making and patient care, and bringing proteomics technology to the bedside. A number of major obstacles must be addressed. They include the need to standardize and simplify technical and analytical tools, to make clinical proteomic analysis as affordable and robust as genomic analysis and other clinical tests, and to develop new high-throughput screening platforms to process many clinical samples in parallel. Another obstacle is the need to characterize disease biology and drug effects by proteomics. A big challenge is the inability to assess post-translational modifications by genomic methods, as is the need to increase the efficiency of translation by integrating genomic and proteomic data.

In ongoing research, mass spectrometry-based precision proteomics has dramatically improved over the past 10 years. Increased sensitivity and faster mass spectrometry enable reproducible and robust analysis of multiple clinical samples within a few hours. The Human Proteome Organization already has established useful resources and guidelines, which can be further developed for clinical applications.

Anantha Shekhar, M.D., Ph.D., noted that this is an area where NCATS, with its agnostic approach to disease, could take a lead. Many discoveries in this area could be broad enough to affect multiple disease states. It is a perfect fit for the NCATS mission. Dr. Lewis-Hall agreed, adding that this is an interesting time and opportunity to pivot to the proteome. Dr. Ginsburg said this could be a bold step, and he could envision NCATS taking on a human proteome project that complements gene projects. The proteome offers opportunities for partnerships across disease states and therapeutic areas. He urged consideration of the standardization of methodologies, which is still an open question in this area, and moving from the laboratory to clinical application.

Dr. Lewis-Hall said she was intrigued by the reach that Dr. Ginsburg described, and having the farthest reach possible should be articulated in this aspirational approach. Dr. Tagle observed that this will be a huge trans-NIH effort, and NCATS certainly will not have the budget to do it alone. Dr. Ginsburg said the concept clearance could state that the goal is to begin with a clinically relevant set of proteomic tools that could evolve into a larger initiative once it is in place. There is flexibility to grow the program. It could be compared to how the metabolomics community identified clinically relevant metabolomic markers.

It was motioned and seconded to move forward the concept of proteomic profiling for clinical application. The CAN Review Board unanimously approved this action, noting the comments and suggestions.

Tissue Chip Testing Centers: Validating Microphysiological Systems

Dr. Tagle said the final concept for consideration was part of the Tissue Chip for Drug Screening program but merited being handled individually. The goal of this concept is to create a tissue chip validation center that will be responsible for testing a select group of compounds, using predefined assays and according to FDA and pharmaceutical industry standards. Outcomes would be the independent validation of tissue chips to demonstrate their functionality and utility and the dissemination of data through the creation of a public tissue chip database. The potential impact would be the possibility of being able to more accurately reflect human responses as compared with current *in vitro* and animal models. This also could have a substantial impact in testing candidate therapeutics for safety and efficacy and would be congruent with NIH efforts in increasing reproducibility, rigor and robustness.

The criteria for evaluating success would be widespread use and adoption of tissue chips as tools for predictive toxicology and for assessments of the efficacy of candidate therapeutics. The major obstacle to address is the lack of better predictive tools in evaluating the safety and effectiveness of promising candidate drugs. Activity in this area includes ongoing efforts across NIH, the Defense Advanced Research Projects Agency and the FDA to develop tissue chip technology through a consortium approach. The first tissue chip partnership workshop, held in August 2015, brought together consortium investigators with representatives from pharmaceutical companies and

elsewhere in industry. A private-public partnership with individual pharmaceutical partners and the IQ Consortium has the goal of developing a validation set of compounds and standardized assays and biomarkers.

Discussion

Dr. Ginsburg, the primary discussant, expressed his strong support for the Tissue Chip for Drug Screening program, noting that this concept is not really new. He asked whether some policy agendas should be incorporated. For example, controversial issues might arise from gene-editing technologies. Also, some specific targets initially might be useful for disease modeling, such as modeling Mendelian cardiomyopathies for cardiac disease, as a benchmark for the way the technology could be used. Dr. Lewis-Hall said this was an exciting concept and that tissue chip testing has evolved into NCATS' signature program.

Eric D. Kodish, M.D., said he thought it would be important to have an empirical ethics research approach to this topic and the concept of putting personal information on a chip. He was in favor of moving the concept forward, but he suggested gathering input from outside the scientific community and anticipatory work to understand the views of the public.

It was motioned and seconded to move forward the concept of tissue chip testing centers to validate microphysiological systems. The CAN Review Board unanimously approved this action, noting the comments and suggestions.

VI. DISCUSSION OF ALL CONCEPTS

Geoffrey S. Ginsburg, M.D., Ph.D., Director, Center for Applied Genomics & Precision Medicine, Duke University Medical Center, Vice Chair, CAN Review Board; Pamela M. McInnes, D.D.S., M.Sc.(Dent.), Deputy Director, NCATS

On behalf of the NCATS staff, Pamela M. McInnes, D.D.S., M.Sc.(Dent.) thanked participants for their wise counsel and for being respectful of time constraints while still having good discussions. She said she looked forward to seeing everyone at the January 2016 meeting.

Myrl Weinberg, M.A., said she supported all of the concepts, but she reiterated Dr. Eric D. Kodish's caveat to anticipate any potential perceptions or reactions that could be addressed ahead of time to avoid creating new barriers.

Ms. Weinberg said she also was unclear about the process to prioritize all seven of the concepts. Dr. McInnes said that program staff would assess the feasibility of each program with regard to science, required funding and timing; some are more amenable to "scaling" than others. CAN Review Board members certainly can express opinions about what concepts they would prioritize. Dr. Ginsburg asked whether the CAN Review Board would be convened specifically for prioritizing if funding is not sufficient for all of

the topics. Dr. McInnes said that is not the usual procedure. A possibility might be dividing the topics into priority tiers rather than rank order. Anna L. Ramsey-Ewing, Ph.D., said it would not be appropriate to try to fit a discussion of tiers of priorities into this meeting but that she will contact CAN Review Board members to get their thoughts on priorities before the January NCATS Advisory Council and CAN Review Board joint meeting. Ms. Weinberg said she liked the idea of tiers.

ADJOURNMENT OF THE CAN REVIEW BOARD MEETING

Freda C. Lewis-Hall, M.D., thanked the CAN Review Board members and NCATS staff for their time, energy and commitment, noting that these are important times to advance the science. She adjourned the meeting at 12:40 p.m. ET.

CERTIFICATION

We hereby certify that, to the best of our knowledge, the foregoing minutes and supplements are accurate and complete.

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Freda C. Lewis-Hall, M.D. Date
Chair, Cures Acceleration Network Review Board
and
Executive Vice President and Chief Medical Officer, Pfizer

_____ _____

Anna L. Ramsey-Ewing, Ph.D. Date
Executive Secretary, Cures Acceleration Network Review Board
and
Director, Office of Grants Management and Scientific Review, NCATS