NIH-Industry Roundtable:
Exploring New Uses for Abandoned and Approved Therapeutics
April 21 – 22, 2011

Executive Summary

Drug rescue and repurposing has been broadly accepted as a valuable approach to speed the development of new drugs.[1] At this time of unprecedented challenge and opportunity in translational science, NIH has an important role to play in accelerating and advancing therapeutics development,[2] and drug rescue and repurposing efforts are a priority area with the potential to yield tangible and significant progress in the short term.

While the private sector holds many of the assets and data that are needed for efficient rescue and repurposing, innovative ideas for new uses of these resources come from a variety of organizations, including NIH. As such, partnerships and collaborations are critical to enable this research to proceed. On April 21 – 22, 2011, NIH convened a group of senior leaders and experts from the pharmaceutical industry, government, academia and the nonprofit sector to explore opportunities to foster new NIH-industry partnerships that facilitate drug rescue and repurposing. The specific goals of the meeting were to:

- Cultivate a better understanding of the landscape of rescue and repurposing research, including challenges and opportunities on the horizon;
- Explore opportunities and challenges to expanding and forging new NIH-industry partnerships that enable access to abandoned and approved therapeutics; and
- Identify core elements of a framework agreement for rescue and repurposing agreements.

Major Findings

All participants generally agreed that more can and should be done to increase engagement and partnerships in rescue and repurposing and to enhance the success of these efforts. They also saw great value in raising individual and organizational consciousness about the importance of drug rescue and repurposing.

Challenges

In addition to general challenges facing any collaborative research and development effort (e.g., the need for incentives for participation, necessary expertise and bioinformatics infrastructure for data sharing across sectors), there are challenges and concerns that are unique to rescue and repurposing.

- *Resource implications.* It is complex for pharmaceutical companies to maintain, update and organize their full drug libraries, making it difficult to share information easily. There are also time and resource implications for industry investigators with the experience and expertise needed to contribute to the rescue and repurposing project. Such relationships also necessitate management and governance.

[1] Drug "rescue" refers to research involving abandoned small molecules and biologics and others that have not been approved, whereas "repurposing" refers to research on approved small molecules and biologics for new indications.
[2] Collins FS. Opportunities for Research and NIH. *Science*. 1 January 2010. Vol. 327 no. 5961 pp. 36 – 37. Available online: http://www.sciencemag.org/content/327/5961/36.full

- *Need to repeat certain studies to collect additional data.* The original toxicity assessments may not be relevant for the secondary indication, and additional data may need to be collected.

- *Patent considerations.* Off-patent drugs, or drugs whose patents are close to expiring, may not be attractive to industry because the financial return and market incentives for the product may be limited. Companies also are concerned about losing freedom to operate for their proprietary drugs if new inventions are made.

- *Concerns regarding liability.* Sharing drugs can involve liability risks for a company. Pharmaceutical companies may be especially concerned about sharing drugs abandoned for toxicity reasons, and they may need assurances regarding how their drugs will be used. This concern could be addressed by maintaining a collaborative relationship, selecting investigators with an established relationship with the company or setting limitations on the use of the drug.

Opportunities and Needs

Roundtable participants identified a range of opportunities and needs to advance drug rescue and repurposing.

- *Identifying projects and accessing drugs and data.* Targeted and hypothesis-driven projects, as well as projects addressing compelling public health needs, may initially provide a more attractive foundation for partnerships. Even absent an attractive commercial market or a clearly defined development pathway, projects driven by concrete clinical and public health needs may generate the goodwill needed to bring people and resources to the table.

  In addition to targeted approaches, approaches for identifying and accessing truly "abandoned" drugs for rescue efforts include:

  - Obtain drugs and data from small pharmaceutical companies that go bankrupt.
  - Approach companies as they go through organizational changes and/or abandon therapeutic areas to see if sets of drugs may become available.
  - Work with the FDA to identify drugs that are no longer being pursued; then, approach sponsors to see whether they are abandoning these drugs and would be willing to make the data available.
  - Approach companies periodically regarding patents they are releasing and/or expiring patents.
  - Establish a clearinghouse of data and drugs at NIH which could receive donations of resources.

- *Making better agreements.* Establishing long-term agreements and relationships between two organizations is important, and it is helpful to use common/template agreements. In addition, senior leaders and project champions should be involved in decision-making and crafting the major features of the agreement.

- *Incentives.* Incentives for industry participation are critical, but especially challenging when the market is small or the patent life on the drug short. Potential solutions may lie in changes to IP or data exclusivity, financial incentives or innovative approaches (e.g., patent pools, cross-licensing arrangements, dual markets).

- *Visibility and access.* Centralized visibility and access will help when it comes to resources, expertise, data and information needed to conduct rescue and repurposing. The wealth of publicly

available information could be exploited for rescue and repurposing if it was centrally organized and made broadly available.

Next Steps

To advance and sustain rescue and repurposing efforts and to lay the foundation for future partnerships, the following next steps were identified.

- ***Incorporate rescue and repurposing capabilities in planning for the proposed National Center for Advancing Translational Science (NCATS):*** In developing and implementing plans for NCATS at NIH, ensure the Center is able to match partners, serve as a clearinghouse for drugs and data, and provide a portal through which outside investigators can approach NIH and access resources and expertise.

- ***Augment the NIH Center for Translational Therapeutics (NCTT) Pharmaceutical Collection (NPC)[3]:*** The NPC is a one-of-a-kind, comprehensive, publicly-accessible collection of approved and investigational drugs. The NPC should be expanded to include the following:

    - List of all human diseases, information on relevant organ systems, pathways, genes, etc.
    - More data on investigational drugs in the NPC and inclusion of additional investigational drugs
    - Information from FDA's Rare Disease Repurposing Database

- ***Fund pilot projects:*** NIH should issue an RFA for drug rescue and repurposing pilot projects to implement and allow evaluation of new resources and master agreements.

- ***Identify points of contact from each industry partner:*** NIH will identify points of contact from each industry partner. NIH can approach these representatives to identify investigational drugs that could be made available, access expertise within the company, and identify potential projects. The industry representative will also serve as an initial contact for forging agreements.

- ***Work with FDA to facilitate and enable drug rescue and repurposing — including through efforts of the NIH-FDA Leadership Council:*** FDA has a large volume of data regarding failed and abandoned drugs, and could work with NIH and industry sponsors to identify promising rescue and repurposing opportunities. FDA could also explore the possibility of making more data publicly available at the time of drug approval. Finally, FDA could work with NIH and industry partners to develop guidance for investigators on the regulatory pathways for rescue and repurposing.

- ***Establish a standing cross-sector roundtable on translational science:*** Expanding on this meeting, NIH will continue to periodically convene experts from industry, academia, the non-profit sector, and government to explore other challenges and opportunities in translational science. NIH will also convene a sub-group of this roundtable to 1) develop common platforms for establishing rescue and repurposing agreements and 2) explore legislative provisions that might be needed to incentivize participation in these public-private collaborations.

[3] Huan R et al. The NCGC Pharmaceutical Collection: A Comprehensive Resource of Clinically Approved Drugs Enabling Repurposing and Chemical Genomics. *Sci Transl Med*. 27 April 2011. Vol. 3 no. 80ps16. Available online: http://stm.sciencemag.org/content/3/80/80ps16.full