

May 2010

Memorandum of Understanding

The Learning Collaborative

among

National Institutes of Health (NIH) Chemical Genomics Center ("NCGC"), National Human Genome Research Institute (NHGRI),

The Institute for Advancing Medical Innovation, University of Kansas ("KU-IAMI"), and

The Leukemia & Lymphoma Society ("LLS")

This MEMORANDUM OF UNDERSTANDING (MOU) is for The Learning Collaborative (TLC) and is made and entered into by NCGC, KU-IAMI and LLS (each, individually, a "Party," and collectively, the "Parties") to form The Learning Collaborative as of the dates provided below and effective as of March 15, 2010.

RECITALS:

WHEREAS The Learning Collaborative concept is aimed at targeting repurposed drugs as well as novel, new drugs for the treatment rare blood cancers;

WHEREAS the Parties bring a shared commitment to accelerate drug therapies to human and/or clinical proof of concept employing best practices and recognition of mutual benefit in moving the TLC concept forward through a series of short term, commercially-focused go/no go decision points to execute jointly a high impact project in rare blood cancers;

WHEREAS the TLC will empower high performance project teams comprised of scientists from NCGC, KU-IAMI, LLS and other academic/industry collaborators;

WHEREAS the Parties bring a shared commitment to creating and developing intellectual property (IP) interests essential to ensure the development of new drug therapies to non-profit and/or for-profit entities for completion of late stage drug development activities, registration, commercialization and incorporation into state of the art patient care; and

WHEREAS the Parties envision the TLC concept as an optimal public-private partnership model for government, philanthropy, academia, and industry collaboration.

NOW THEREFORE the Parties agree as follows:

1. This MOU shall be non-binding on the Parties; provided however: (i) the Confidentiality Agreement ("CA") entered into separately by the Parties and referenced in this MOU as Addendum C shall remain in full force and effect in accordance with its terms; and (ii) any and all

other project-specific mutual non-disclosure agreements (NDA), entered into prior to or after the execution of this MOU shall remain in full force and effect according to their terms.

2. TLC Initiation. Following execution of the CA by all Parties, the Parties will form the TLC Management Committee ("Management Committee"), with one representative from each of the Parties serving on the Management Committee.
3. TLC Project Selection Process. The Management Committee will:
 - a. Develop TLC Project selection criteria;
 - b. Engage in mutual review of potential projects, listed in Section 4 below, against such TLC Project selection criteria; and
 - c. Select TLC Project(s) through a transparent process and subject to approval by the Management Committee.
4. Project Portfolios. The TLC Projects selected by the Management Committee in accordance with Section 3 above, and subject to the approval of any involved/essential non-TLC parties, will be selected from the following project portfolios:
 - a. For NCGC: Internal NCGC projects; NCGC collaborative projects conducted within NIH; NCGC projects conducted with external parties; and projects identified and approved through the Molecular Libraries Probe Centers Network (MLPCN).
 - b. For KU-IAMI: Internal KU projects; and projects identified through collaborations with KU and external parties.
 - c. For LLS: LLS funded research projects; and projects available for consideration through the LLS Therapy Acceleration Program (TAP).
5. TLC Milestones. Upon selection of a TLC Project(s) for joint discovery and development, the Parties will agree to a set of TLC Project(s) Milestones based on the nature of the specific TLC Project(s) selected. The Parties recognize that establishing and reaching such TLC Project Milestones is essential to successful accelerated drug discovery and development. The Parties understand that potential future investors will likely require achievement of these Milestones for subsequent development and commercialization.
6. TLC Project Execution. Upon selection of a TLC Project(s), the TLC Management Committee will form TLC Project Teams with membership from NCGC, KU-IAMI, LLS and academia/industry partners. KU-IAMI will provide industry experienced TLC Project Team leadership for each Team formed by the Management Committee. TLC Project Teams will be empowered to define go/no go decision points, define go/no go decision criteria, project activities, cost and timing. [REDACTED]
[REDACTED] will be retained to provide drug development and regulatory support [REDACTED]. The TLC Management Committee will approve the TLC Project plan, budget, scope, and any changes thereto. KU-IAMI

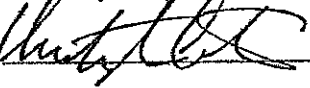
project team leadership will be accountable for providing TLC Project Team status reports. The content, format and frequency of such status reports will be defined by the TLC Management Committee.

7. Mechanism for collaboration with NCGC. The Parties recognize that a mechanism for collaboration with and contribution of TLC Project funds to NCGC needs to be confirmed. This mechanism, which may include entering into a Collaborative Research and Development Agreement (CRADA), will confirm, *inter alia*, the relative responsibilities of the parties, the level of funds to be contributed by LLS and KU-IAMI, the nature and scope of in-kind contributions by NCGC (NCGC will not be providing any direct funding of TLC-related activities), mechanisms for transfer of such funds to support the TLC, mutual technology and material transfer arrangements, intellectual property protections and sharing, etc.
8. Financial and In-Kind Support. Each Party intends to provide in-kind and/or financial support to the TLC in each of the general areas described below, with the specific elements of such support as related to each Party to be determined.
 - a. Direct, indirect and in-kind support to the TLC for the purpose of conducting small molecule drug discovery and development and with the intent of advancing new drug therapies for rare blood cancers;
 - b. Direct and indirect support for the TLC through appropriate in-kind contributions of space, equipment, personnel or services; and
 - c. Other direct financial support, as negotiated and permissible, to support the mission, purposes and successful operation of the TLC.
9. Notices. All notices, requests, demands, and other communications under this MOU shall be in writing and shall be deemed to be given if hand-delivered, faxed, or mailed by certified mail, return receipt requested. All notices delivered by hand shall be effective upon delivery and all notices mailed by certified mail, return receipt requested, or faxed shall be effective when received, as shown on the return receipt of facsimile transmittal.
10. Term and Termination. The term of this MOU will begin on April 1, 2010 and will continue for a period of two (2) years. Thereafter, this MOU may be renewed upon mutual agreement of the Parties. The Parties may terminate this MOU for any reason upon 180 days written notice.
11. Entire Understanding. This MOU is intended as the complete integration of all understandings between the parties insofar as these pertain to the TLC. Nothing in this MOU nor this specific provision is intended to affect, address, limit, expand or negate any other understandings the Parties may have with each other or otherwise.
12. Severability. Invalidity or unenforceability of one or more provisions of this MOU shall not affect the validity and enforceability of the remaining provisions of this MOU.

13. Execution in Counterparts. This MOU will be executed in multiple original counterparts, each of which shall constitute a separate agreement.

14. Publicity. For press releases, and any other communications to the public, the Parties will develop pre-approved language to describe the collaboration under this MOU. The Parties recognize that the pre-approved language may be changed from time to time by mutual written agreement of the Parties. Further, the Parties will develop mutually agreed upon terms and conditions for public announcements and publications regarding the MOU or TLC activities, outcomes, milestones, or other announcements resulting from or relating to the collaboration.

IN WITNESS WHEREOF, the Parties have executed this MOU on the dates provided below, to be effective as of the day and year first above written.

By 

Christopher Austin, MD, (NCGC)

TITLE: Director, NCGC

Date June 7, 2010.

By 

Scott Weir, PharmD, PhD (KU-IAMI)

TITLE: Director, Institute for Advancing Medical Innovation, University of Kansas

Date 07 Jun 2010

By 

Lou DeGennaro, PhD (LLS)

TITLE: EV, Mission

Date 6/7/10

ADDENDUM A

Step-By-Step Description of Each Party's Roles and Responsibilities

Step 1: The Management Committee will be established and shall include one representative from each Party.

Step 2: TLC Project Team(s) will be formed by the Management Committee based on nature of the TLC Project(s).

Step 3: Upon selection, drug target assay will be translated into high-throughput screening ("HTS") ready assays. Assay development and validation to ready a drug target assay for HTS may be performed by NCGC, KU-IAMI, and/or an LLS academic investigator.

Step 4: The HTS screen to be performed exclusively by NCGC, along with active confirmation and hit validation studies.

Step 5: Medicinal chemistry synthesis of novel compounds with either the goal of providing probe compounds for further target validation and/or discovery of novel, new compounds active against the drug target will be performed by NCGC, KU or both organizations. Expertise in medicinal chemistry is essential to this process. [REDACTED]

[REDACTED] This work will lead to the selection of chemical lead candidates.

Step 6: Chemical lead candidate activity against the drug target will be evaluated. Activity screens will be performed by NCGC, KU or academic collaborators.

Step 7: All Parties will collaborate to define structure-activity relationships (SAR), biological mechanistic studies as well as chemical lead candidate optimization strategies.

Step 8: KU-IAMI to perform lead optimization studies to characterize physical and chemical properties of chemical lead candidates, and early ADMET properties (i.e., in vitro drug safety, in vitro absorption, distribution, metabolism and excretion properties). These studies may also be outsourced to contract research organizations that have existing relationships with NCGC, KU, or LLS.

Step 9: KU-IAMI will be responsible for synthesizing milligram to gram quantities of non-GMP drug substance required to support formulation development, in vivo pharmacokinetics, preclinical proof of concept, and preliminary in vivo toxicology studies.

Step 10: Preclinical in vivo formulation development, preformulation studies and supporting analytical methods will be performed by KU-IAMI.

Step 11: KU-IAMI will conduct in vivo preclinical pharmacokinetics studies to establish relationship between dose, route, frequency and systemic exposure.

Step 12: In vivo preclinical proof of concept studies will be conducted by KU-IAMI and/or other academic investigators based on access to specific models, capacity and capability.

Step 13: KU-IAMI will conduct in vivo preliminary toxicology assessment to estimate initial safety margin through contract research organizations identified by KU-IAMI, NCGC or LLS.

Step 14: The TLC Project Team will recommend development candidate(s) to the Management Committee for selection.

Step 15: All Parties support and participate in a pre-investigational new drug ("IND") meeting with the Food and Drug Administration (FDA). [REDACTED] will schedule pre-IND meetings, prepare briefing documents, work with the TLC to define the goals and objectives of pre-IND meetings, facilitate pre-IND meetings, and obtain written confirmation of decisions resulting from pre-IND meetings.

Step 16: KU-IAMI and [REDACTED] will be responsible for designing and executing Good laboratory practice ("GLP") and Good Manufacturing Practice ("GMP") IND-enabling activities required to successfully complete IND requirements. These activities will be performed at GLP and GMP qualified facilities. KU-IAMI will be responsible for establishing contract agreements, monitoring, and managing GLP and GMP activities. [REDACTED] may perform GLP and GMP qualifying audits of potential facilities prior to study initiation.

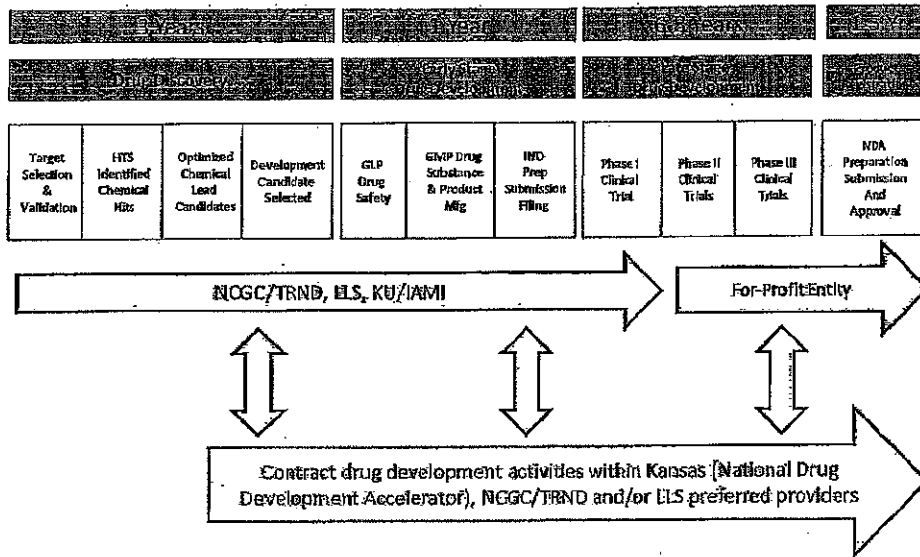
Step 17: [REDACTED] will compile, prepare, and submit IND applications as directed by the TLC Management Committee. [REDACTED] may also be required to maintain open IND's until transfer of drugs and drug products to non-profit and/or for-profit commercial partners.

Step 18: Human and/or clinical proof of concept studies will be conducted at the University of Kansas Cancer-Center and other clinical sites to be determined by TLC Management Committee.

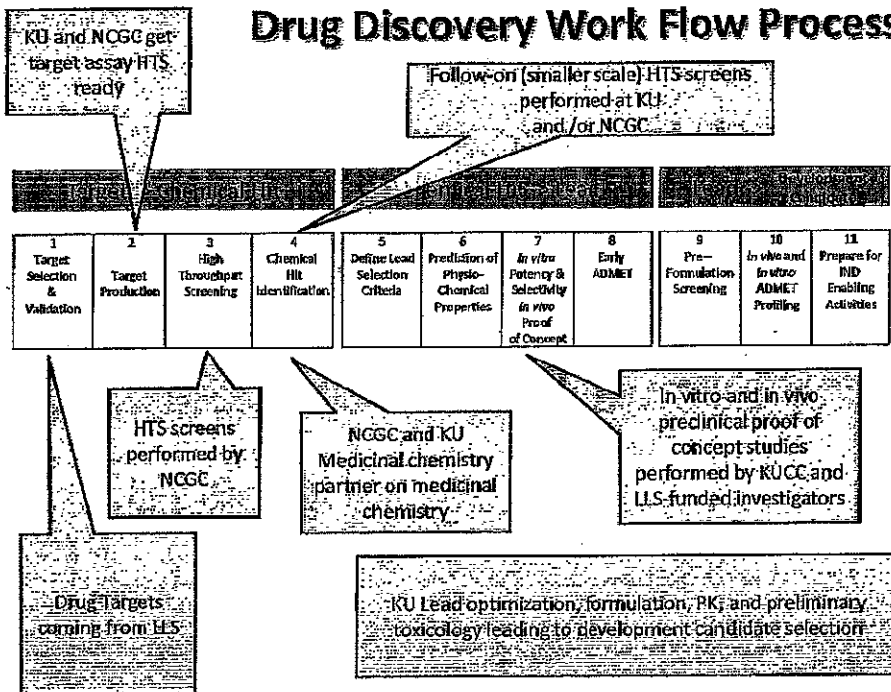
Note: This list outlines drug discovery projects of novel, new compounds only. TLC Projects created around repurposed drugs will skip steps 3-8 to start at step 9 and continue as outlined above.

ADDENDUM B

The Learning Collaborative
Big Picture Collaboration Model



Drug Discovery Work Flow Process



ADDENDUM C
Confidentiality Agreement

Confidentiality Agreement
2010

Effective Date: March 15,

In order to protect confidential information, relating to research, development, business plans, and other technology including materials ("information") which may be disclosed among them, the NIH Chemical Genomics Center, National Human Genome Research Institute (NHGRI), National Institutes of Health (NIH) ("NCGC"), the University of Kansas and its Institute for Advancing Medical Innovation ("KU-IAMI") and the Leukemia & Lymphoma Society ("LLS"), intending to be legally bound, agree that:

1. The Disclosers and Receivers are: NHGRI, KU-IAMI and LLS, as all of the Parties will be disclosing and receiving confidential information.

2. A Party ("Disclosing Party" or "Disclosing Parties") may disclose information to the other(s) ("Receiving Party" or "Receiving Parties"). The Parties' representatives for disclosing or receiving information (is known):

For NHGRI: Christopher Austin, M.D., James Ingles, Ph.D.

For KU-IAMI: Scott Weir, PharmD, Ph.D., Sitta Sittampalam, Ph.D.

For LLS: Louis J DeGennaro, Ph.D.

3. The Parties intend to enter into a research collaboration or other formal collaborative arrangement for the purpose of conducting small molecule drug discovery and development and with the intent of advancing new therapeutics for rare blood cancers ("The Learning Collaborative" or "TLC"). To advance the Learning Collaborative the Parties will bring selected, potential projects forward for joint review, consideration and selection and will share information pertaining to the proposed and ultimately selected projects under the terms of this Agreement. The Parties recognize that in certain events the consent or waiver of confidentiality by third party collaborators or funded investigators may be required in order to bring a project forward for such review and consideration. The projects that will be brought to the Learning Collaborative for consideration will be selected from the

shall be informed of this Agreement. The Receiving Party/ies shall protect the Information by using the same degree of care, but no less than a reasonable degree of care, as the Receiving Party/ies uses to protect its own confidential information.

5. The Receiving Party/ies' duties under this Agreement shall apply only to Information in any written document, memorandum, report, correspondence, drawing, or other material, or computer software or program, developed or prepared by the Disclosing Party/ies or any of its representatives which have been clearly marked "Confidential." Oral disclosures must be reduced to writing and marked "Confidential" within fourteen (14) days after disclosure to be considered confidential information. Disclosures in the form of tangible products or materials (including biological materials) must be transmitted to the Receiving Party/ies under NIH's Material Transfer Agreement and a written memorandum must be attached to this Agreement to be considered confidential under this Agreement.

6. Notwithstanding any other provision of this Agreement, Information shall not include any item of information, data, patent or idea which: (a) is within the public domain prior to the time of the disclosure by the Disclosing Party/ies to the Receiving Party/ies or thereafter becomes within the public domain other than as a result of disclosure by the Receiving Party/ies or any of its representatives in violation of this Agreement; (b) was, on or before the date of disclosure in the possession of the Receiving Party/ies; (c) is acquired by the Receiving Party/ies from a third party not under an obligation of confidentiality; or (d) is hereafter independently developed by the Receiving Party/ies, without reference to the information received from the Disclosing Party/ies.

7. The Receiving Party/ies agrees to return all information, including materials, received from the Disclosing Party/ies at the request of the Disclosing Party/ies except that the Receiving Party/ies may retain in its confidential files one copy of written information for record purposes only.

8. In the event that the Receiving Party/ies or anyone to whom it transmits the Information pursuant to this Agreement becomes

following project portfolios:

For NHGRI: Internal NCGC projects; NCGC collaborative projects conducted within NIH; NCGC projects conducted with external parties; and projects identified through the Molecular Libraries Probe Centers Network (MLPCN); ;

For KU-IAMI: Internal KU projects; projects identified through collaborations with KU and external parties;

For LLS: LLS funded research projects and projects available for consideration through the LLS Therapy Acceleration Program (TAP).

4. This Agreement controls only information that is disclosed to the Receiving Party/ies between the following dates: March 15, 2010 and March 15, 2012.

The Receiving Party/ies will not disclose the Information of the Disclosing Party/ies to any person except its employees, consultants, or subcontractors to whom it is necessary to disclose the information for the purposes described above, and any such disclosures shall be under terms at least as restrictive as those specified herein. Any of the persons mentioned above who are given access to the Information

legally required to disclose any such Information, the Receiving Party/ies shall provide the Disclosing Party/ies with prompt notice and consult with the Disclosing Party/ies prior to any disclosure.

9. This Agreement constitutes the entire understanding between the Parties hereto with respect to the subject matter hereof and merges any and all prior agreements, understandings and representations. The Agreement may not be superseded, amended or modified except by written agreement between the parties hereto. This Agreement will remain in effect for three years.

10. The Parties hereto have caused this Agreement to be executed on its behalf in triplicate (each of which shall be deemed to be an original) to be effective on the Effective Date.

UNIVERSITY OF KANSAS

Authorized Signature:

[Redacted Signature]

KU Mailing Address for Notices/Correspondence

[Redacted Address]

NHGRI

Authorized Signature

DATE _____

Date: _____

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The Leukemia & Lymphoma Society (LLS)

LLS Authorized Signature:

Date: _____

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