NCCN Request for Proposals (RFP): Phase I/II Clinical and Correlative/Preclinical Trials of Decitabine and Cedazuridine for Hematologic Malignancies and Solid Tumors

1.0 Purpose

The National Comprehensive Cancer Network (NCCN) has received a $2 Million Dollar research grant from Taiho Oncology, Inc. (hereafter, “Grantor”) to support NCCN Member Institution faculty for the performance of clinical and correlative studies of decitabine and cedazuridine (DEC-C) in the treatment of hematologic malignancies and solid tumors. NCCN will serve as the funding organization. Grants are available only to investigators from NCCN Member Institutions.

2.0 Background

Mechanism of Action

Decitabine is a nucleoside metabolic inhibitor that is believed to exert its effects after phosphorylation and direct incorporation into DNA and inhibition of DNA methyltransferase, causing hypomethylation of DNA and cellular differentiation and/or apoptosis. It is administered intravenously. Cytidine deaminase (CDA) is an enzyme that catalyzes the degradation of cytidine, including the cytidine analog decitabine. High levels of CDA in the gastrointestinal (GI) tract and liver degrade decitabine and limit its oral bioavailability. Cedazuridine is a CDA inhibitor such that administration of cedazuridine with decitabine increases systemic exposure of decitabine and improves oral bioavailability.

Preclinical Data

Pronounced increases in oral decitabine exposures were achieved when combined with the novel cytidine deaminase inhibitor cedazuridine in cynomolgus monkeys, who have similar circulating serum cytidine levels and cytidine deaminase status compared with humans.(1) These data supported the initiation of clinical first in human clinical trials using oral oral decitabine with cedazuridine.

Clinical Data

In a phase I study of 43 evaluable patients with myelodysplastic syndromes (MDS) or chronic myelomonocytic leukemia (CMML) were administered cedazuridine (100 mg) and oral decitabine (30 mg to 40 mg) as well as conventionally dosed IV decitabine, the pharmacokinetic (PK), pharmacodynamic, and safety profiles were similar, with AUC 5-day exposures of decitabine oral/IV ratio between 81% and 128%. The recommended phase II dose was cedazuridine 100 mg and decitabine 35 mg PO.(2) Guided by these encouraging results, two studies evaluated this fixed-dose preparation (administered daily for 5 days every 28 days) for patients with MDS or CMML. In both studies, either the first or second cycle of therapy substituted IV decitabine 20 mg/m² for the oral agent to enable PK comparison(3). In the ASTX727-01-B study of 80 patients, 35 had lower-risk MDS. After a median follow up of 24 months, the rate of complete response (CR) was 21 percent (13.3-month median duration of CR) and 49 percent of patients with baseline transfusion needs converted to red blood cell and/or platelet-transfusion...
independence for ≥56 days. Twelve (15%) of the 80 patients went on to stem cell transplantation following DEC-C treatment. (3)

Similarly, the phase III ASCERTAIN trial was an open-label, randomized, 2-cycle, 2-sequence, crossover study (NCT03306264) that included 133 adult patients with MDS or CMML, including all French-American British (FAB) classification criteria and IPSS Intermediate-1, Intermediate-2, or high-risk prognostic scores. (3) Similar to ASTX727-01-B trial, patients were randomized 1:1 to receive DEC-C orally in Cycle 1 and decitabine 20 mg/m² intravenously in Cycle 2 or the reverse sequence. Both DEC-C and intravenous decitabine were administered once daily on days 1 through 5 of the 28-day cycle. Starting with Cycle 3, all patients received DEC-C orally once daily on days 1 through 5 of each 28-day cycle until disease progression or unacceptable toxicity. No stratification was performed. Twenty-seven (20%) of the 133 patients went on to stem cell transplantation following DEC-C treatment. The primary outcome measure was comparison of the 5-day cumulative decitabine AUC between DEC-C and intravenous decitabine, and this was reported as oral/IV AUC ratio of 98.9% (90% CI of 92.7-105.6%). Comparison of hypomethylating activity as measured by LINE-1 demethylation showed difference between oral DEC-C and IV decitabine demethylation of <1% and the 95% CI of the difference included zero. Safety findings were consistent with those anticipated for IV-decitabine (related Grade ≥ 3 AEs in more than 5% were thrombocytopenia, neutropenia, anemia, febrile neutropenia, and leukopenia). For all patients in this study, 21 percent achieved CR and 53 percent become transfusion-independent, with median follow-up time of 12.6 months (range: 9.3 to 20.5) and median treatment duration of 8.2 months (range 0.2 to 19.7). Pooled safety data suggested a risk of serious myelosuppression and infectious complications. Pneumonia occurred in 21% of patients with Grade 3 or 4 occurring in 15%. Sepsis occurred in 14% of patients, with Grade 3 or 4 occurring in 11% and fatal pneumonia occurred in 1% of patients, fatal sepsis in 1%, and fatal septic shock in 1%. (3) Adverse events led to dose reduction in 19%, interruptions in 41% and permanent discontinuation in 5% of patients.

Based on these data, DEC-C is indicated for treatment of adult patients with MDS, including previously treated and untreated, de novo and secondary MDS with the following French American-British subtypes (refractory anemia, refractory anemia with ringed sideroblasts, refractory anemia with excess blasts, and CMML) and intermediate-1, intermediate-2, and high-risk International Prognostic Scoring System groups. Approved dosing is orally daily on days 1-5 every 28 days for a minimum of 4 cycles until disease progression or unacceptable toxicity. (3)

3.0 Scope and Aims

The overall aim is to develop innovative studies to help determine the role of DEC-C in the treatment of hematologic malignancies and solid tumors. It is hoped proposals submitted in response to this RFP will be useful in guiding further development of DEC-C. Concepts to assist in rationally justified patient selection or improved understanding of disease biology are of special interest. Studies including strong correlative endpoints are encouraged.

Collaboration between NCCN Member Institutions is strongly encouraged in order to foster the interactive sharing of knowledge and expertise, and to utilize the combined clinical strengths of members, particularly in the case of uncommon tumors. Although the submitting investigator must be from an NCCN Member Institution, participating co-

CONFIDENTIAL
investigators do not need to be at an NCCN Member Institution. This can also include cross-institutional collaboration for the conduct of correlative studies.

The NCCN Request for Proposals Development Team (RFPDT) has developed a Request for Proposals (RFP) with a formalized review procedure to accept applications and select the proposals of highest scientific merit. The NCCN RFPDT has overseen the development of the RFP and a NCCN Scientific Review Committee composed of some members of this group and other NCCN clinical leaders will perform the review of applications.

Preference may be given to proposals for specific patient subsets of high unmet need. At least one of the funded proposals will involve an underrepresented minority researcher and/or a minority patient population.

The areas of special research emphasis identified for this RFP include but are not limited to:

- Phase I/II studies in the identified tumor types:
  - Chronic myeloid malignancies (e.g. MDS, MDS/Myeloproliferative Neoplasms (MPN) Overlap Syndromes, etc.);
  - Accelerated phase/blast crisis MPN:
    - Single agent or combinations strategies based on strong scientific rationale;
  - Acute myeloid leukemia: Populations of interest include patients who have newly diagnosed disease, in special populations, maintenance after induction therapy as well as stem cell transplantation or relapsed/refractory disease. Frontline combination strategies are encouraged for elderly or special population. Similarly, in relapsed/refractory setting, novel combination strategies with new or existing agents for special subgroups of patients;
- GI cancers:
  - Cholangiocarcinoma: Biomarker selected population;
  - Pancreatic and colorectal cancer: Biomarker selected populations or combinations that can predict susceptibility to hypomethylating agents or improve efficacy of currently approved therapies;
  - Tumor agnostic approach: Single agent or combinations will be considered for novel research ideas in biomarker selected populations (e.g. in tumors with DNA repair damage pathway alterations or combinations with immunotherapeutic agents);
- Drug combination studies in any tumor type are acceptable if the toxicity profile of the agent is appropriate for combination with DEC-C and there is sufficient data in the literature regarding the single agent activity of the combining drug so that the contribution of DEC-C can be determined;
- Non-clinical correlates are appropriate - PKs for combination chemotherapy studies, mechanisms of action, mechanisms of resistance, etc. Examples include:
  - Correlative work to identify predictive markers;
  - Correlative work with endpoints studying cedazuridine effect rather than decitabine will be considered strongly; and
- Health services research including access to care, cost effectiveness, and patient reported outcomes are also of particular interest.

Proposals duplicative of completed, ongoing, or planned studies will not be considered. Previously completed trials utilizing DEC-C are included in section 2.0.

**Ongoing or planned studies in hematologic malignancies include:**
- ASTX727-03, a phase I/II study evaluating low dose regimens in low risk MDS requiring therapy (NCT03502668);
- ASTX727-07, exploring a combination of DEC-C with venetoclax in acute myeloid leukemia - relapsed/refractory disease or elderly untreated patients;
- Early phase trial of pre-emptive therapy with DEC-C to improve outcomes in MDS Patients with measurable residual disease post allogeneic hematopoietic cell transplant;
- Early phase study exploring role of DEC-C as maintenance therapy following allogeneic hematopoietic cell transplantation for patients with high-risk myeloid neoplasms;
- Study evaluating DEC-C in combination with venetoclax versus standard of care cytarabine and anthracycline induction chemotherapy for younger FLT3WT patients with acute myeloid leukemia (ELN high risk);
- Early phase trial studying venetoclax + DEC-C in patients with treatment-naïve high risk MDS or CMML with bone marrow blasts >5%; and
- A study evaluating DEC-C in combination with itacitinib in patients with MDS/MPN overlap syndrome.

**The following studies are ongoing/planned in solid tumors:**
- A multi-center phase IB/II study of oral ivosidenib and decitabine as subsequent line therapy for patients with advanced unresectable biliary tract cancer;
- A trial studying the benefit of DEC-C in recurrent and progressive IDH1/2 mutant glioma;
- A Phase 1 dose-escalation study in all solid tumors;
- A study evaluating the role of DEC-C in triple-negative breast cancer, in combination with talozaparib; and
- A study evaluating the role of DEC-C in combination with durvalumab in head & neck squamous cell carcinoma.

If you need additional information or have specific questions regarding this RFP, please e-mail Nicole Kamienski at Kamienski@nccn.org with the subject line “Decitabine and Cedazuridine Project.”

**4.0 Study Time Frames**

All approved clinical studies are expected to commence, which is defined as the first patient receiving the first dose of study drug(s), no later than ten (10) months after notice of study approval and are to have complete accrual within two (2) years of commencement. A manuscript must be submitted to NCCN for review no later than nine (9) months after the study endpoint has been achieved. Studies will be funded as described in Section 9.0 and should be designed with a subject number commensurate with these study time frames and funding.
Studies for rarer cancers or those that require a large number of patients for statistical power must be multi-institutional. Network appropriate studies will be considered if the submitting PI is from an NCCN Member Institution.

Accepted studies will be held to the following time frames:

**Phase I studies** are expected to meet primary objective within 2 years of commencement.

**Single-arm Phase II studies** are expected to explore new approaches that can be tested in larger confirmatory studies if positive results are obtained. It is expected that these studies will meet the primary objective within 2 years of commencement. To meet this goal, single-arm Phase II trials are encouraged to be multi-institutional. Data management and monitoring of studies should be coordinated by the applying institution. Additional funding for the applying institution may be requested to support the additional resources required for this activity, if the study involves multi-institutional participation.

**Correlative laboratory studies** are expected to be completed within the same time frame as the corresponding clinical trial.

**Larger randomized Phase II studies** already supported through other mechanisms which will be completed within 2 years (i.e. cooperative group) will be considered for support where the support requested will be for correlative laboratory studies that are unfunded and enhance the evaluation of the patient data.

**Randomized Phase II multi-institutional studies** are expected to be completed within a 2-year time frame. Multi-institutional data management and monitoring of these studies should be coordinated by the applying institution. Additional funding for the applying institution may be requested to support the additional resources required for this activity.

All studies will require documentation of the feasibility of accruing the targeted study population; studies may be multi-institutional.

### 5.0 Proposals

In order to respond to the RFP, investigators will submit a proposal in the format delineated below to NCCN, which will be evaluated by the NCCN Scientific Review Committee (SRC).

**Proposals are required to be submitted electronically to the NCCN research portal at** [https://nccn.envisionpharma.com/ienv_nccn](https://nccn.envisionpharma.com/ienv_nccn) **and include a letter of support from the governing groups of the institution verifying:**

1) Office of Sponsored Research approval
2) Department Chair/Division approval
3) Institutional budgetary review and approval
4) For clinical trials, the priority status of the research stating if there are competing trials. If there are competing trials, please verify that this trial will have a higher priority.
5) Documentation to support feasibility of clinical trials with at least one of the following:
   - Letter from institution’s Feasibility Committee if applicable
• Documentation by previous studies and accrual (if available, publications and abstracts)

6) Letter(s) of support from participating institutions including name of PI at participating institution and their feasibility

Letters should be addressed to Wui-Jin Koh, MD, CMO, National Comprehensive Cancer Network, 3025 Chemical Road, Suite 100, Plymouth Meeting, PA 19462

Proposals will provide concise documentation of the research plan. The proposal is expected to contain sufficient information to allow the reviewers to fully assess the scientific rigor of the proposed study. A full research project plan may be submitted as an attachment, but the required information in iEnvision must also be completed. A robust review of the statistical plan will be conducted.

Proposals should contain detailed information regarding the following areas:

5.1 Clinical Trials

A. General Information: Title/Type of Support/Subsite(s)
B. Investigators and institutional affiliations
C. Concept information
   i. Enrollment/Design/Phase
   ii. Estimated time of completion
   iii. Overview/Hypothesis
   iv. Background/Rationale
D. Scientific summary
   i. Primary/Secondary objectives
   ii. Inclusion/Exclusion criteria
   iii. Study population
   iv. Statistical analysis
   v. Treatment plan
   vi. References
E. Oncology analysis
   i. Tumor Type/Stage
   ii. Correlative study information
   iii. Outcome measures
   iv. Feasibility documentation
F. Request for product: Formulation Dosage/Quantity
G. Planned publications: Journal/Congress/Anticipated Dates

5.2 Budget using NCCN (within iEnvision) template (Exhibit A)

A. Breakdown by major cost categories
B. Justification of major costs with enough detail to demonstrate how funding for major elements in the study will be allocated
C. Salaries are capped at the current NIH salary cap
D. No travel or publication costs will be covered

5.3 Ancillary Documentation

A. An NCI format BioSketch of the Principal Investigator
B. An appendix of supportive literature may be provided
C. If DEC-C is studied in combination with an investigational agent from another pharmaceutical company, or an agent used outside of its indication, the investigator must provide documentation of that company’s commitment to provide drug for the investigation as well as the agreement of that company to allow presentation and publication of results and allow cross-filing or filing of a new IND. If the combination drug is to be obtained as standard of care, please document this in your proposal. **This documentation must be provided to NCCN along with the proposal or it will not be considered for funding.**

6.0 Proposal Requirements

6.1 Submission

All proposals must be submitted electronically using the directions below and are due by **11:59 PM (EST) on Tuesday, January 19, 2021.** No exceptions will be granted.

1. Please use the link below to register in the system: https://nccn.envisionpharma.com/env_nccn
2. Select “Register for New Account” in the upper right corner of the page, above the “Log In” button
3. Complete all fields (Note: Fields with an asterisk are required)
4. You will receive a confirmation email. Click on the link in the email to activate your account.
5. Enter your username and password (Note: Your user name is your email address. Do not copy and paste.)
6. Set up your security questions
7. Submit your study

For technical assistance with the iEnvision system, please contact iEnvision_general_request@envisionpharmagroup.com.

**Studies that have safety issues, are already well-funded concepts, or are not consistent with the strategy for investigation as written in this RFP will not be reviewed by the SRC.**

For questions or issues, please e-mail Nicole Kamienski at Kamienski@nccn.org with the subject line “Decitabine and Cedazuridine Project.” NCCN will seek to provide information to potential investigators regarding ongoing or completed studies of DEC-C in order to avoid the submission of a proposal that is already a well-studied concept.

6.2 Requirements

6.2.1 **Human Biological Specimens:** All specimens must be obtained under informed consent and IRB approval appropriate for the study. Compliance with all federal regulations is required.
6.2.2 IRB:

6.2.2(a) Draft protocols will be reviewed by NCCN and the Grantor prior to IRB review. A copy of the draft protocol must be submitted to NCCN within 4 weeks after the study approval letter. The protocol must be consistent with the approved proposal and all reviewer comments must be addressed.

6.2.2(b) All investigators will submit protocols for IRB review and document approval to NCCN prior to study activation and all collaborators will furnish evidence of IRB approval. It is expected that IRB review and approval be completed within 150 days following NCCN notification of funding for the project.

6.2.3 IACUC review and approval: All investigators conducting animal experiments will submit research project plans for IACUC review and document approval to NCCN prior to study activation. It is expected that IACUC review and approval be completed within 90 days following NCCN notification of funding for the project.

6.2.4 Serious Adverse Event Reporting: All serious adverse events will be reported to NCCN and the Grantor in addition to local regulatory authorities.

6.2.5 Institutional Monitoring: All studies will be internally monitored in accordance with appropriate committees (e.g. institutional Data Safety and Monitoring Plan in the case of human studies). A copy of the Data Monitoring Plan for the study must be submitted to NCCN prior to NCCN approval of study activation.

6.2.6 IND:

6.2.6(a) Investigators are required to hold INDs for studies but will be allowed to cross-reference a filing to Grantor’s IND. Investigators are encouraged to apply to the FDA for IND exemption if studies meet all criteria according to 21 CFR 312.2(b). A copy of the FDA approval letter for IND exemption must be submitted to NCCN before study drug will be released.

6.2.6(b) If DEC-C is studied in combination with an investigational agent from another pharmaceutical company, or an agent used outside of its indication, the investigator must provide documentation of that company’s commitment to provide drug for the investigation as well as the agreement of that company to allow presentation and publication of results and allow cross-filing or filing of a new IND. If the combination drug is to be obtained as standard of care, please document this in your proposal. This documentation must be provided to NCCN along with the proposal or it will not be considered for funding.

6.2.6(c) Proposals using an experimental diagnostic imaging agent that will require an IND must outline how regulatory issues will be handled in order to meet the required study time frame.
6.2.7 **Progress Reports:** Investigators will provide interim progress reports to NCCN detailing the progress of studies quarterly, and upon study completion. These reports will be used administratively for funding purposes. If study progress or accrual lags behind the expected rate, the SRC may be asked for suggestions to improve study progress, or alternatively, to terminate the study and any further funding.

6.2.8 **Specimen Transmittal:** If specimens are to be transported extramurally for collaborative laboratory studies, all institutional requirements for safety and confidentiality will be met.

6.2.9 **Abstracts and Publications:** Abstracts for presentation at scientific meetings and all publications of study results will be submitted to NCCN and Grantor for review related to protection of company’s intellectual property and confidential information **prior to any submission.** Abstracts must be submitted at least 10 days prior to submission and manuscripts at least 30 days prior to submission. Grantor may delay publication and disclosure of the manuscript or abstract for up to an additional sixty (60) days so as to seek patent protection of intellectual property rights.

6.2.10 **NCCN Multi-Institutional Studies:** Collaborative studies between NCCN Member Institutions are encouraged. For these studies, the proposal feasibility section should provide information about data management, statistical analysis, and specimen handling issues. Additional funding may be provided for centralized data management and monitoring by the applying institution.

6.2.11 **NCCN institutions and investigators will be responsible for conducting all studies in accordance with the applicable research plan, GCP Guidelines, and all applicable laws and regulations. NCCN institutions and investigators will be responsible for all data collection, statistical analysis and safety reporting.**

6.2.12 Investigators must provide reasonable assurance that submitted studies will be able to reach completion within the time frames specified in Section 4.0.

6.2.13 Final protocols must be consistent with approved proposals. Funds will be rescinded if there are significant changes without prior NCCN approval. There will be no exceptions.

6.2.14 The Principal Investigator (PI) listed on the protocol must be the same PI listed on the proposal submission unless approved by NCCN.

### 7.0 Drug Supply

Decitabine (35 mg) and cedazuridine (100 mg) tablets will be supplied for all approved and funded studies by the Grantor.
If DEC-C is studied in combination with an investigational agent from another pharmaceutical company, is standard of care, or an agent is used outside of its indication, the investigator must provide documentation of how they will obtain the combination drug. If a company agrees to provide drug for the investigation, please obtain documentation from the company as well as the agreement of that company to allow presentation and publication of results, and allow cross-filing or filing of a new IND. If pharmacokinetic studies of investigational agents other than DEC-C are planned, the investigator must provide documentation of that company’s commitment to or alternative mechanism for performing PK studies for that agent. This documentation must be provided to NCCN along with the proposal or it will not be considered for funding.

8.0 Selection Criteria

Proposals will be judged based on the following criteria:

1. Scientific value
2. Research experience of the Principal Investigator
3. Soundness of study design
4. Feasibility including reasonable assurance of achieving intended and full Accrual
5. Budgetary reasonableness
6. Statistics

The GRANTOR can reject any study with safety issues or if it is an already studied concept.

9.0 Funding

NCCN and its member institutions have an agreement to include a maximum of 25% indirect costs for trials funded by the NCCN. Direct funding will include all costs including investigators’ salaries. For example, $80,000 direct costs and $20,000 indirect costs for a total grant of $100,000. Any funds in excess of the limits stipulated in this section for direct funding will require detailed justification and review.

Phase I and Single-arm Phase II clinical trials will be funded at a cost of up to $300,000 (total costs including direct costs and 25% indirect costs) per trial. Multi-institutional data management and monitoring of these studies should be coordinated by the applying institution. Additional funding for the applying institution may be requested to support the additional resources required for this activity.

The Correlative Laboratory studies section of the clinical trial will be funded up to a total cost of $100,000, including up to 25% indirect costs.

Larger Randomized Phase II trials already supported through other mechanisms (i.e. cooperative group) will be considered for support where the support requested will be for correlative laboratory studies that are unfunded and enhance the evaluation of the patient data. Correlative studies for larger randomized trials will be funded up to $100,000.
Funding should not exceed $500,000. Clinical study maximum $300,000 + correlative study maximum $100,000 + multi-institutional funding maximum $100,000 = $500,000 MAXIMUM funding

Funding will be disbursed to approved studies as follows:

Phase I trials:
- 15% of total award for such study after IRB approval and dosing of first study subject;
- Based on the per Study Subject costs, after the initial 15% of funding has been accounted for based on Study Subject accrual, funds will be awarded on a quarterly basis for eligible Study Subjects enrolled in a study, based on the per Study Subject rate up to a maximum of an additional 65% of the funding; and
- 20% of funds will be awarded after submission of a final report or manuscript for publication.

Phase II trials and correlative Study(ies):
- 15% after IRB approval and dosing of first Study Subject;
- Based on the per Study Subject costs, after the initial 15% of funding has been accounted for based on Study Subject accrual, funds will be awarded on a quarterly basis for eligible Study Subjects enrolled in a Study, based on the per Study Subject rate up to a maximum of an additional 65% of the funding; and
- 20% after submission of a final report or manuscript for publication.

Phase II trials with 2-Stage Design with Early Stopping Rules:
- 15% of total requested funding (based on maximum number of anticipated Study Subjects) after IRB approval and dosing of first Study Subject;
- Remainder of per Study Subject funding for the number of Study Subjects in the first stage after all Study Subjects are accrued to the first stage of a Study (total funding for the number of Study Subjects in first stage less the initial payment) up to a maximum of an additional 65% of the funding;
- Total per Study Subject funding for the number of Study Subjects in the second stage less final payment after all Study Subjects are accrued to the second stage; and
- 20% of total requested funding (based on maximum number of anticipated Study Subjects) after submission of a final report or manuscript for publication.

Multi-center Randomized Phase II Study(ies):
- 15% after IRB approval and dosing of first Study Subject;
- Based on the per Study Subject costs, after the initial 15% of funding has been accounted for based on Study Subject accrual, funds will be awarded on a quarterly basis for eligible Study Subjects enrolled in a Study, based on the per Study Subject rate up to a maximum of an additional 65% of the funding;
- 20% after submission of a final report or manuscript for publication; and
- Any additional funding will be disbursed to the coordinating center for data management and monitoring. These funds will be delegated at the discretion of the lead Principal Investigator and may include outsourcing of data management and/or monitoring to an independent research organization.
The goal is to have rapid submission of a manuscript so as to have the data available to the wider scientific community.

Studies that do not meet the time frame requirements as stipulated in Section 4.0 may have funds rescinded and will be required to return any and all unused funds previously disbursed.

10.0 Study Agreement

A study agreement will be signed between NCCN and each participating institution.

If an institution requires a separate contract with another pharmaceutical company for a study, that contract must be fully executed by the time of final contract execution with NCCN.

All aforementioned points between NCCN and the participating institution must be strictly adhered to.

11.0 References

