NIH **NATIONAL CANCER INSTITUTE**
Technology Transfer Center

Synthetic Lethality-mediated Precision Oncology via the Tumor Transcriptome

Summary

Scientists at the National Cancer Institute (NCI) have developed SELECT (synthetic lethality and rescue-mediated precision oncology via the transcriptome), a computational precision-oncology framework harnessing genetic interactions to improve treatment options for cancer patients. NCI seeks collaborators or licensees to advance the development of this technology into precision diagnostics.

NIH Reference Number

E-150-2020

Product Type

- Diagnostics

Keywords

- Precision Oncology, Synthetic Lethality, Transcriptome, Genetic Interactions, Precision Diagnostics, Patient Stratification, Ruppin

Collaboration Opportunity

This invention is available for licensing.

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Description of Technology

The use of tumor transcriptomics for precision oncology has made significant advances, mainly by identifying cancer driver genes or actionable mutations for treatment with targeted therapies. However, this strategy misses out on broader genetic interactions that could reveal additional biologically testable biomarkers for therapy response prediction and inform the selection of more effective drugs for targeted treatment.

Scientists at the National Cancer Institute (NCI) have developed SELECT, a computational, precision-oncology framework that uses the tumor's whole transcriptome to identify synthetic lethal and synthetic rescue genetic interactions. These genetic interactions provided actional information predicting therapeutic response in 28 of 35 published targeted and immunotherapy trials from 10 different cancer types. Also, it was predictive

of patients' response in 80 % of these clinical trials. SELECT, an excellent tool in developing new targeted therapies or enhancing patient stratification in transcriptomic multi-arm trials, is available for co-development or licensing opportunity.

Potential Commercial Applications

- Patient stratification in clinical trials
- Identifying new actionable drug targets and treatments
- Analysis of genetic interactions that can provide actionable information for selecting effective treatment options for cancer patients

Competitive Advantages
- Predictive accuracy of patients' response in many treatment options, including chemotherapy, targeted drugs and immunotherapy
- Predictive accuracy of patients' response across cancer types
- Enhancing patient stratification for clinical trials and improved therapeutic strategies
- Increasing the number of patients that could benefit from precision-based treatments

Inventor(s)

Eytan Ruppin MD PhD (NCI), Joo Sang Lee PhD (NCI and currently at Sungkyunkqan University, South Korea)

Development Stage
- Pre-clinical (in vivo)

Publications
- Lee JS, et al. Synthetic lethality-mediated precision oncology via the tumor transcriptome. (PMID 33857424)
- Lee JS, et al. Harnessing Synthetic Lethality to Predict the Response to Cancer Treatment. (PMID 29959327)
- Sahu AD, et al. Genome-wide prediction of synthetic rescue mediators of resistance to targeted and immunotherapy.

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Patent Status
- **U.S. Provisional:** U.S. Provisional Patent Application Number 63/107,737, Filed 30 Oct 2020

Therapeutic Area
- Cancer/Neoplasm

Updated

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