Docket #: S19-474

Predicting immunotherapy outcomes in cancer

Immunotherapies like Keytruda (pembrolizumab) had have an enormous impact on patient outcomes, improving survival in a variety of cancers. However, the inability to predict which patients will respond to checkpoint inhibitors- only about 30% of the total treated- results in significant waste, causing unnecessary clinical and financial toxicity.

Researchers at Stanford have developed a model called SpatialScore, which can predict outcomes from immunotherapy treatment in cancer patients. Using histological samples from patients with cutaneous T-cell lymphoma (CTCL), inventors in the Nolan lab have developed a technique to assess both the identity and spatial location of a variety of immune cell types, and developed a model of cellular 'neighborhoods' that are predictive of patient responses. In a 14-pateint cohort, the inventors have demonstrated that proximity of tumor cells to activating and suppressive immune cell populations are important predictors of patient outcomes.

Stanford researchers have validated their model in a cohort of patients with CTCL, and have further identified genetic signatures associated with responses to checkpoint inhibition.

Applications

- In vitro diagnostic/prognostic to predict patient responses to checkpoint inhibitors
- Monitoring/theranostic method for immunotherapies to gauge responses during treatment

Advantages

- Minimized opportunity cost and reduced side effects from ineffective cancer treatments
- Reduced cost to healthcare systems
- Improved risk stratification for cancer patients
- Provides additional clinical guidance beyond PD-(L)1 status

Publications

- Phillips, D., Matusiak, M., Gutierrez, B.R. et al. [Immune cell topography predicts response to PD-1 blockade in cutaneous T cell lymphoma](). Nat Commun 12, 6726 (2021).

Patents

- Published Application: [WO2021158806]()
- Published Application: [20230065757]()

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