Measurement and Modeling System Using Cell Signaling Networks

Drug Resistance in Patients

One of the main issues within cancer treatment regiments is drug resistance. A well-known example is in the case of the drug Osimertinib. The drug has been shown to be highly effective in treating non-small cell lung cancer with epiderma growth factor receptor gene mutations, however most patients acquire a resistance to it during treatment.

The standard approach for identifying and assessing drug resistance is through bulk molecular assays and single-cell RNA sequencing. This is expensive and time consuming, driving the need for a fast and accurate way to assess cell susceptibility and resistance to treatments. With an increased appreciation of the effectiveness of personalized medicine, the demand for quickly identifying treatment targets for an individualâ??s disease is growing.

Measuring Drug Resistance

The Coskun Lab has developed a way to measure drug resistance and susceptibility through the screening of cell signaling pathways using rapid multiplexed immunofluorescence and protein interaction assays. Utilizing protein-protein interactions, spatially resolved signaling networks can be reconstructed to visualize cell-cell communication in tissues. Through this and cell signaling pathways active using patient xenografts, this assay can clarify which precision signaling therapies will be the most effective treatment. Using an automated microfluidics-based cycle of labeling the targets, then stripping and relabeling allows the method to test 30 up to 100 potential target pathways. This helps in understanding the cell signaling landscape and identify heterogeneity among cell type populations. This method can also be used to assess drug response, as cultures can be exposed to the treatment and then measured to predict the effectiveness of the treatment in the patient.

Summary Bullets

- The technology quickly identifies cell signaling pathways from a patient biopsy, allowing for personalized treatment approaches to be identified.

- Measurements can be used to study potential tumor response to drug treatment, through the use of xenografted cells from the patient.
- 30-100 potential protein pathways and interactions can be measured using a single sample through multiplexing of rapid immunofluorescence.

Solution Advantages

- **Quick Identification:** Quickly identifies cell signaling pathways from a patient biopsy, allowing for personalized treatment approaches to be identified.
- **Efficient:** 30-100 potential protein pathways and interactions can be measured using a single sample through multiplexing.

Potential Commercial Applications

- Identification of cell types in a mixed population
- Cell signaling analysis
- Analysis of drug response

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IP Status

Patent application has been filed : US63/399427

Publications

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Images

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