Single-cell Integration and DrUg Response PrediCtion (scIDUC)

A computational pipeline that predicts drug response scores for individual cells using single-cell RNA sequencing data.

IP Status: US Patent Pending; Application No. 18/802,941

Applications

- Precision medicine
- Drug discovery
- Research tool

Key Benefits & Differentiators

- **Validated method:** scIDUC predictions closely agree with measured drug efficacies at the single-cell level and offers a rapid, versatile, user-friendly tool to precisely predict large of drug responses at the single-cell level.
- **Superior performance:** scIDUC prediction accuracy surpasses existing methods.

Technology Overview

The accurate prediction of drug response scores for cells in single-cell RNA sequencing (scRNA-seq) data represents a pressing challenge in precision medicine. Existing technologies often rely on traditional approaches, such as bulk RNA-seq data or gene expression signatures, which fail to capture the heterogeneity and complexity of individual cells. This limitation results in suboptimal treatment outcomes, prolonged treatment times, increased healthcare costs, and unnecessary side effects for patients. The inability to accurately predict cellular drug responses at the single-cell level hampers the development of personalized treatment plans and targeted therapies, ultimately hindering progress in the fight against cancer and other complex diseases.

Researchers at the University of Minnesota have developed Single-cell Integration and DrUg Response PrediCtion (scIDUC), a computational pipeline aimed at addressing the shortcomings of existing technologies. Through a multifaceted approach, scIDUC integrates scRNA-seq data with current cancer cell line bulk RNA-seq data, conducts informative feature selection, and employs transfer learning techniques to predict drug response scores at the single-cell level. By leveraging these advanced methodologies, scIDUC demonstrates superior accuracy, scalability, and efficiency compared to traditional approaches. This innovative technology has commercial potential for guiding personalized treatment strategies, facilitating the development of targeted therapies, and ultimately improving patient outcomes in the field of precision medicine.

Phase of Development

TRL: 4-5
A functional prototype for scIDUC is currently accessible.

Desired Partnerships

This technology is now available for:

Technology ID
2023-283

Category
Life Sciences/Biochemicals & Small Molecules
Life Sciences/Human Health
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools
Life Sciences/Therapeutics
Software & IT/Algorithms
Software & IT/Bioinformatics
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Researchers

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