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Artificial Intelligence-Based Evaluation Of Drug Efficacy

Tech ID: 33410 / UC Case 2023-507-0

CONTACT

Raj Gururajan
rgururajan@ucdavis.edu
tel: 530-754-7637.

ABSTRACT

Researchers at the University of California, Davis have developed a method of using artificial intelligence for assessing the effectiveness or efficacy of drugs that is cheaper, faster, and more accurate than commonly used assay analyses.

FULL DESCRIPTION

As a measure of cytotoxic potency or efficacy of a drug, half-maximal inhibitory concentration (IC50) is the concentration at which a drug exerts half of its maximal inhibitory effect against target cells. Some methods of determining IC50 require applying additional reagents or lysing the cells,and may require significant time and effort. In many methods, cells are destroyed by the reagents, preventing repeated measurements over time. Therefore, there is need for an efficient, non-toxic and label-free method to measure the efficacy of a drug.

Researchers at the University of California Davis have developed an artificial intelligence system, called SIC50, for testing the efficacy of drugs and chemicals by classifying phase-contrast images and process those images with convolutional neural networks. Researchers used deep learning to analyze and classify histological images in which they observed a high level of accuracy associated with binary classification of cancer cells and pluripotent stem cells. With a visional transformer and convolutional neural networks, this system can very accurately assess the efficacy of a drug.

Current methods for testing a drug's efficacy, involve a multi-step screening process including reagent additions, timed incubation, and evaluation of the effects of chemical compounds. Compared to commonly used cell viability assays, such as MTT assay or CCK-8 assays, this label-free method has the following features-1) It avoids operational errors and saves time associated with adding the reagents. 2) It saves costs associated with MTT, balancing buffer, filters, and dissolving solutions. 3) It does not require incubation time. 4) It can be used for screening a broader range of chemicals because compounds with absorbance from 450nm to 600nm or with antioxidant properties will interfere with the MTT or CCK-8 absorbance measurement. 5) The cells do not need to be in the log phase using this method.6) It does not induce cytotoxicity, permitting multi-time-point measurements.

APPLICATIONS

▶ Drug discovery

▶ Research in pharmacology

FEATURES/BENEFITS

▶ Does not require incubation period for use

▶ Cheaper to use than MTT and CCK assays

▶ Method is not cytotoxic

▶ Can screen a broad range of chemicals

PATENT STATUS

Patent Pending

RELATED MATERIALS

▶ SIC50: Determination of IC50 by an optimized Sobel operator and a vision transformer - 01/24/2024

INVENTORS

▶ Lam, Kit S.

▶ Wang, Aijun

▶ Wang, Yongheng

▶ Zhang, Weidi

OTHER INFORMATION

KEYWORDS

IC50, binary classification, drug efficacy

CATEGORIZED AS

▶ **Biotechnology**
  ▶ Bioinformatics
  ▶ Health

▶ **Imaging**
  ▶ Medical

▶ **Medical**
  ▶ Imaging
  ▶ Research Tools
  ▶ Screening

▶ **Research Tools**
  ▶ Screening Assays

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