Real-Time Drug Response Analysis of A549 Cells to Cisplatin with the CIMS-32 System

Purpose

The purpose of this experiment is to evaluate the dose-dependent cytotoxic effects of cisplatin on A549 cells by monitoring impedance changes and determining the IC_{50} value using the CIMS-32 system.

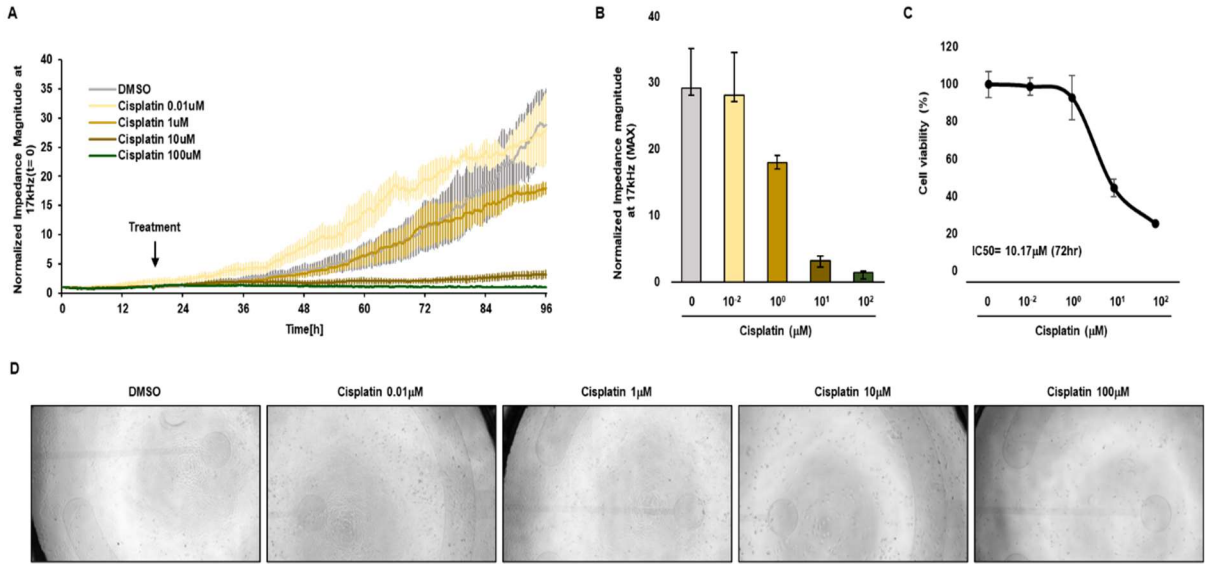
Experiment Overview

Cell Name	A549 cell line	**Seeding quantity**	3,000 cells/well
System	CIMS-32	**Cell chip**	CITO-16W01E-SGL
Coating	Poly-L-Lysine (PLL)	**Treatment**	Cisplatin

Workflow

DIV0	DIV1-DIV3
- Coat the CFPS plate - After seeding the cells, incubate for 1 hour and then add the media	- Impedance recording - Treat drug and record drug effects

Results



Cisplatin-Induced Cytotoxicity in A549 Cells Monitored by Impedance Measurements

(A) Normalized impedance magnitude was measured at 17 kHz over time to evaluate the dose-dependent cytotoxic effects of cisplatin in A549 cells. Treatment was initiated at 24 hours, as indicated by the arrow, with concentrations ranging from 0.001 to 100 μM. (B) The

maximum normalized impedance magnitude decreased in a dose-dependent manner, reflecting the cytotoxic effects of cisplatin. (C) Cell viability, determined using the MTT assay, was plotted against cisplatin concentration, yielding an IC_{50} value of 10.17 μM. The IC_{50} value, calculated from impedance measurements, was 7.73 μM, demonstrating close agreement with the IC_{50} value and confirming the consistent and reliable cytotoxicity measurements between the two methods. (D) Microscopic imaging further validated these findings by revealing dose-dependent morphological changes in A549 cells, consistent with the cytotoxic effects observed in both assays.

Summary

- ✓ Cisplatin treatment induced dose-dependent cytotoxicity in A549 cells, as demonstrated by reduced impedance measurements with a IC_{50} value of 7.73 μM, an IC_{50} value of 10.17 μM determined by the MTT assay, and corresponding morphological changes observed microscopically. Compared to the MTT assay, the impedance-based method offers the added advantage of non-destructive, real-time monitoring. This measurement technique enables continuous observation of time-dependent cytotoxic effects and dynamic cellular responses to cisplatin treatment, effectively complementing the endpoint data provided by the MTT assay.