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.

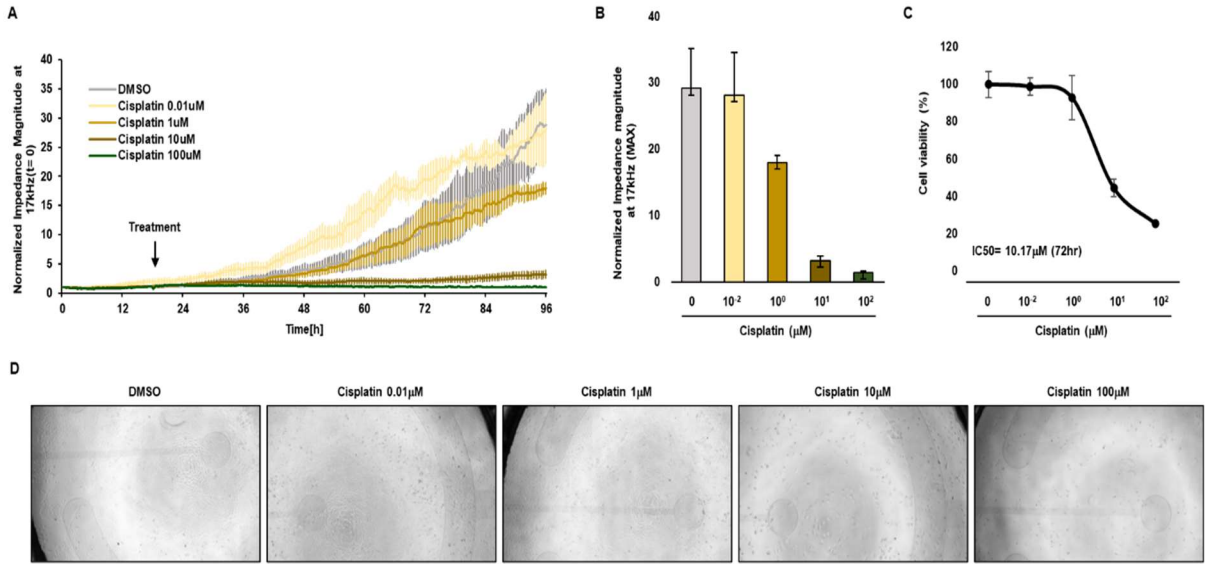
Experiment Overview

Cell Name	A549 cell line	**Seeding quantity**	3,000 cells/well
System	CIMS-32	**Cell chip**	CFPS-ITO-16W2E
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

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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.