Using Impedance-Based Approaches for Measuring Cell-Mediated Cytotoxicity; Antibody-Dependent (ADCC) and Chimeric Antigen Receptor – T (CAR-T)

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T Cells Non-Adherent Property is Useful in Cytolytic Assay

Determining optimal cytotoxic activity of human Her2neu specific CD8 T cells by comparing the Cr51 release assay to the xCELLigence system.

Erskine CL, Henle AM, Knutson KL. Mayo Clinic, USA.
Background

• CMC assays - typically performed using radioactivity (Cr 51) or other label-based assays.
• Target cell is labeled and then exposed to different densities of effector cells.
• The label is released into the supernatant when target cells are killed.

Drawbacks

• Sample processing is complex, tedious and time consuming, or involves handling of radioactivity.
• The label has a tendency to leach out of the cell, thus limiting the possible assay window.
• Necessary washing steps may damage or kill (already knocked) target cells, thus falsifying the results.
Immune-Mediated Tumor Cell Killing

Cell Migration

T-Cell Activation

NK Assays

ADCC

CAR-T
Killer T cell Activity is Dose Dependent

Determining optimal cytotoxic activity of human Her2neu specific CD8 T cells by comparing the Cr51 release assay to the xCELLigence system.
Erskine CL, Henle AM, Knutson KL. Mayo Clinic, USA.
Detection of Antibody Dependent Cell-mediated Cytolysis (ADCC)

Dynamic detection of natural killer cell-mediated cytotoxicity and cell adhesion by electrical impedance measurements.
Glamann J and Hansen AJ., Novo Nordisk A/S, Denmark
Key Benefits:

• **Label-free** - no secondary assays required, and no interference with cell function

• **Time saving** - no tedious, time-consuming sample processing at each time point, no handling of radioactivity

• **Short to long term monitoring** - there is no label to leak out of the cells and therefore No requirement for sample processing at unsociable hours (either costly or you are missing valuable data points)

• **Can obtain kinetic data** – continuous, uninterrupted monitoring
Key Benefits:

- **Continuous QC** – Quality assurance for cell viability
- **Quantitative** – cell number, morphology, viability
- **Assays at Physiological conditions** – can be placed in a standard incubator
- **Broad applications** – cell cytotox, invasion, migration, proliferation, etc.
Some Applications

- Compound-mediated Cytoxicity
- Cell Invasion and Migration
- Cell proliferation
- Cell Adhesion and Spreading
- Functional Monitoring of Receptor Tyrosine Kinase Signalling
- Functional Monitoring of GPCR Signalling
- IgE Receptor Function
- Cell Quality
- Barrier Function
- Viral Quantitation
Drug Discovery Pipeline

Throughput

RTCA-HT384
- 4x 384 well

RTCA-MP
- 6x 96 well

RTCA-SP96
- 96 well

RTCA-iCelligence
- 2x 8 well

RTCA-Cardio
- 96 well

Specially for Migration studies

RTCA-DP
- 16 well
• xCelligence is ideal for handling assays involving T cells targeted at tumour cell
• xCELLigence will detect adherent cells as they attach to the electrodes on the culture plates, but it cannot detect T-cells since they are suspension cells
• = a very simple, label-free assay where we can detect tumour cell death, and can easily separate out the T-cells
Say NO to Cr\textsuperscript{51}!

Removing Cr\textsuperscript{51} from ADCC and CDC assays has never been easier. Switch to xCELLigence\textsuperscript{®} today!
Come and See us at booth:

F1

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Thanks for Listening