

Characterization of Antibody-Drug Conjugates

Introduction

Antibody-drug conjugates (ADCs) are a class of structurally complex molecules consisting of a monoclonal antibody linked to a cytotoxic compound to produce a highly specific chemotherapeutic agent, combining the benefits of both immuno- and chemotherapy by reducing off-target toxicities while improving therapeutic efficacies.



Biophysical and Functional Characterization of ADCs

ADCs target receptors on cell surfaces to initiate receptor internalization that enables the delivery of the cytotoxic payload to the cancer cells. Crucial to the mechanisms of action (MOA) is the ADCs binding to the target receptors which may be affected by its structural complexity. As a result, appropriate characterization of candidate molecules using different analytical techniques is often required to select optimal ADCs and to obtain a complete characterization profile during development. Sartorius offers a suite of products that enable a combined approach for quantifying biophysical and functional characteristics of ADCs.

Incucyte® Live-Cell Analysis System



What is the Incucyte® Live-Cell Analysis System?

An imaging system placed within an incubator that performs real-time continuous analysis of cellular events.

Applications in ADC Characterization

- Target cell apoptosis
- Cell proliferation, health and cell cycle
- ADC internalization and cytotoxicity
- Antibody-dependent cell-mediated cytotoxicity (ADCC)
- Antibody-Dependent Cellular Phagocytosis (ADCP)
- Bystander killing

iQue® High-Throughput Screening Cytometer



What is the iQue® HTS Platform?

A platform for multiplexing high-throughput measurement of cell-specific parameters, immunophenotyping, functional assessments and profiling.

Applications in ADC Characterization

- Antigen binding
- Cell viability, proliferation
- Immune effector cell marker expression and activation
- Secreted effector proteins and cytokines profiling
- ADC internalization and cytotoxicity
- Antibody-Dependent Cell-mediated Cytotoxicity (ADCC)
- Antibody-Dependent Cellular Phagocytosis (ADCP)
- Complement-Dependent Cytotoxicity (CDC)
- HTP analysis of bystander activity

Octet® Biolayer Interferometry (BLI) and Surface Plasmon Resonance (SPR) Platforms



What are the Octet Biolayer Interferometry (BLI) and Surface Plasmon Resonance (SPR) Platforms?

Systems that enable real-time, label-free analysis for determining antibody/protein kinetics, affinity and quantification.

Applications in ADC Characterization

- Antigen binding
- FcR-IgG interactions
- ADC binding kinetics and affinity
- Structural effect of ADC linker on target binding
- Drug potency measurement
- Cytokine quantitation

Other Featured Products

CellCelector Automated Cell Imaging and Retrieval Platform



What is the CellCelector?

A fully automated cell imaging and picking system developed for the screening, detection, selection and isolation of single cells, clusters, spheroids and organoids, as well as single cell clones and adherent colonies.

ADC Applications

- Single cell isolation, picking and cloning
- Hybridoma and CHO clone picking
- Antibody discovery
- Cell line development

Sartoclear Dynamics® Lab series of diatomaceous earth and Sartolab® RF50 vacuum filtration units



What is the Sartoclear® Dynamics Lab?

Designed for the rapid harvesting of cell cultures in the lab, enabling clarification and sterile filtration to be performed in one single step.

ADC Applications

- Centrifuge-free clarification of antibodies

Sartobind® Lab Membrane Adsorbers



What are the Sartobind® Lab Membrane Adsorbers?

Fast and easy macromolecule purification for your R&D projects, using process-ready Sartobind® membranes.

ADC Applications

- **Sartobind Protein A Lab:**
Rapid affinity purification for IgGs and mAbs, with a process-ready protein A membrane.
- **Sartobind IEX Lab:**
Rapid, economical IEX for parallel screening and small-scale contaminant removal after affinity chromatography.

Complementary Analytical Techniques Can Help Build a Comprehensive Functional Profile of ADCs

1. The use of the Incucyte® Live-Cell Analysis System and the iQue® HTS Platform provides both temporal and short-term phenotyping data
2. Assessing antibody-antigen interactions using the iQue® HTS Platform and the Octet® BLI platform offers insights on binding to antigen on both live cells and kinetic analysis of protein interactions

References

1. Cross-Platform Analysis of the Binding and Function of Anti-HER2 Antibody Drug Conjugates (ADCs)
2. Characterization of Trastuzumab Antibody-Drug Conjugates Using Bio-layer Interferometry and Advanced Flow Cytometry

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