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BioSpot® for Plaque and Colony Counting

Automated colony counting with the BioSpot® line of instrumentation and software.

The CTL BioSpot® platform contains a wide range of automated image capture and analysis systems for microbial and mammalian colony formation assays. The BioSpot® line of instrumentation and software is highly adaptable and meets the needs of a broad range of colony counting applications. These include microbial load and bioburden testing, clonogenic assays, stem cell assays, Ames test, mouse lymphoma assays, viral plaque assays, and more.

BioSpot® Main Features:

- Compatible with all plate formats from 100mm Petri dish to 384-well microplates.
- Proprietary illumination enables detection of colonies as small as 25 micrometers in diameter.
- Ideally suited for rapid, high-throughput operations.
- Compliant with 21 CFR part 11 regulations when operated with BioCompliance™.

BioSpot® Colony Counters vs. Manual Microbial Colony Counting

Compendial methods for microbial load and bioburden testing specify the determination of colony forming units (CFU) per gram of sample. Traditionally, plate counts have been determined by manually counting colonies within 60-100mm Petri dishes. This is naturally a tedious, error-prone, and time consuming process.

BioSpot® colony counters enable automation and/or miniaturization, transforming CFU determination into a quick, easy and accurate process. This provides an easily validated adaptation of compendial methods.

BioSpot® Colony Counting vs. FACS

The BioSpot® platform enumerates groups of cells growing as colonies and can readily distinguish colonies against a background of single cells. By definition, colonies are clusters of cells grown on or in a solid support. In contrast, fluorescence-activated cell sorting (FACS) can only enumerate single cells in suspension. This precludes the use of FACS/flow cytometry for counting colony formation assays. The ability to identify true colonies is critical for the analysis of both microbial and mammalian colony formation assays.

BioSpot® Applications***Microbial Assays***

The ability to rapidly and reliably enumerate bacterial colonies is paramount for microbial load and bioburden testing in product safety markets. These include the food and dairy industries, environmental screening (water and air), personal care product testing, toxicology screening, and pharmaceutical testing.

Conventionally, these tests have been conducted manually with minimal throughput and high error rates. Recently though, there has been an extensive effort to develop alternative (rapid) methods to replace the slow and tedious traditional methods. The BioSpot® product line enables miniaturization and automation of the standard plate count, thereby producing a dramatic increase in throughput and reproducibility:

Mammalian Colony Assays

Mammalian colony formation assays are an important tool in oncology and stem cell research, both of which rely on manual enumeration of colonies. Clonogenic assays, for example, are typically used for testing ionizing radiation and drug treatments for cancer therapeutic potential. Stem cell assays are used to identify multi-potent progenitor cells from bone marrow, cord blood and peripheral blood.

Mammalian colony formation assays rely on the ability to distinguish colonies from a background of single cells. The BioSpot® product line enables colonies to be size-selected for enumeration, thus only counting true colonies.

Viral Plaque Assays

Localized lysis of virus-infected cells in a confluent monolayer produces a plaque that can be detected through direct staining or by staining cells in the monolayer. Viral plaque assays utilize either a monolayer of mammalian cells or a bacterial lawn. The size and morphology of viral plaques is highly variable and notoriously difficult to detect and count.

The BioSpot® product line conducts multiple object-oriented morphometric measurements, enabling user-defined gating to separate plaques from a complex background. This compensates for the inherent variability in plaque assays and enables reliable enumeration.

Genotoxic Assays

Genotoxic assays are used to measure mutagenic potential by detecting forward or reverse mutations with selective media. Genotoxic assays use either mammalian cells (ie: mouse lymphoma assay) or microbes (ie: Ames test) and are easily imaged and counted using the BioSpot® system.

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