Guava Technologies

Guava CellHealth™ Profiling:

Establishing a baseline for functional performance of cell cultures prior to running bioassays

Cell cultures are dynamic populations that must be monitored frequently to identify changes in their conditions. Knowing the performance profile of your cell culture or primary cells prior to running your bioassay can mean the difference between valid assay results or wasted reagents, lost time, and discarded data.

Profiling key cellular performance indicators, such as the apoptotic fraction and stage of apoptosis, viability, cell cycle, cell counts, transfection efficiency, or target expression levels, will allow your lab to establish uniform standards of cellular performance. These standards can be applied to a wide range of bioassays. Whether you are establishing screen/no screen criteria for HTS, monitoring and optimizing bioreactor conditions, or eliminating sources of assay variability in Elispot assays, consistent monitoring of your cell culture can only improve your bioassay performance and productivity.

Guava Technologies provides the ideal solution for evaluating your cell cultures quickly and easily on a single platform, right in your own laboratory. Guava's optimized reagents, software, and instruments result in easy-to-use integrated systems for assessing the health of your cells.

Versatile Menu of Applications for CellHealth Profiling

CellHealth Parameter	Guava Application	Advantages
Absolute Cell Counts	All assays	Automated, direct absolute cell counts
Viability	Guava ViaCount® Guava EasyFit™	Viability and apoptotic assessment, debris index
Apoptotic Index	Guava Apoptosis Suite – Nexin™ – MultiCaspase™ – TUNEL	Early, mid-, late apoptotic fraction of cell culture populations
Antigen/ Antibody Detection	Guava Express™	Protein/Ag expression, sub-population analysis with CD or other markers, hybridoma screening
Cell Cycle Effector	Guava Cell Cycle	G0/G1-, S-, and G2/M- phases

Guava CellHealth System Advantages

Versatile menu. Accommodates user-defined reagents and methodologies in either 96-well or tube format.

On-demand, simplified workflow. Most Guava assays require minimal steps—translating to less time, less cost, and less required expertise.

Quantifiable, specific, and sensitive results. Single-cell assays with computer-assisted analysis routines improve data quality and provide unparalleled reproducibility, accuracy, and precision across multiple operators and laboratories.

Clear return on investment. Guava systems simplify workflow, reduce labor costs, conserve precious samples and reagents, and improve outcomes of expensive cell-based assays.

Automation. The Guava PCA-96 and EasyCyte™ systems accommodate 96-well plates and robots or liquid handling workstations.

Sheathless. No sheath fluid refills. No sheath fluid disposal.

Compact. Guava systems fit into even the tightest laboratory spaces.

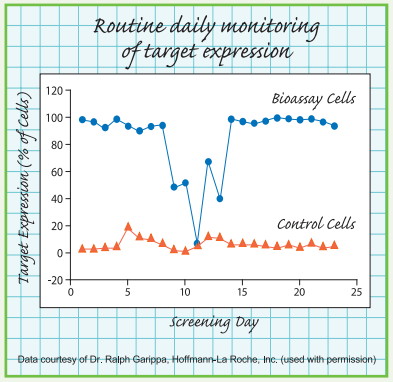
Accurate absolute cell counts. Proven to be equivalent or superior to other methods.

Microvolume. Requires <20 µL of suspended cells; <50 mL of waste generated each day.

GUAVA CELLHEALTH™ PROFILING

HTS: HIGH THROUGHPUT SCREENING

Substantial investments in time and money are required to conduct a successful drug screening campaign. Batch to batch variability and heterogeneity of cell cultures dramatically effect compound activity and skew assay results, possibly invalidating viable hits or even missing hits altogether due to false negatives. Monitoring cell cultures with Guava's CellHealth profiling system helps control the variability created by different cell culture operators, and creates a baseline for cell-based assays. For example, as shown below, target receptor expression dropped dramatically on days 9-13 of the campaign. Routine daily monitoring of target expression saved days worth of time, expense, and materials on what would have been compromised cells.

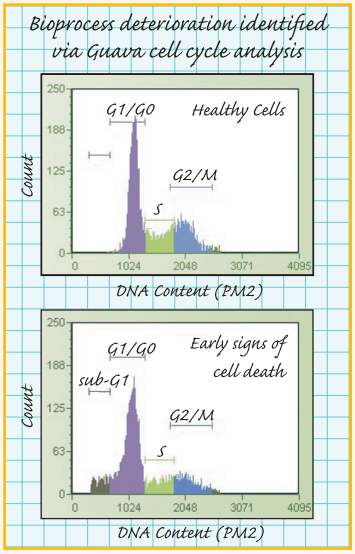


Advantages for HTS

- **Standardize cellular inputs**
- **Establish screen/ no screen criteria**
- **Increase confidence in your screening results**
  – ensure better outcomes
  – save time and money
- **QC your outsourced cell lines in your own lab**
  – results in <2 minutes
  – requires <50 µL of sample
  – rapid and accurate

BIOPROCESSING: R&D, PILOT SCALE-UP, MANUFACTURING

Cell counts and viability are traditional readouts used for monitoring bioreactor activity, which may not reveal mild perturbations in cellular behavior. Expanding the assay profile to include apoptosis and cell cycle analysis yields important information about the health of the culture and its correlation with bioreactor productivity. As shown below, cells from an early spinner culture show a typical cell cycle profile (A). However, cells tested days later show reduced cell proliferation and early signs of cell death (sub-G1) (B), as revealed in the histograms of cellular DNA content, below. The Guava Cell Cycle kit provides a simple two-step procedure that allows results to be read on the Guava instrument directly after incubation.

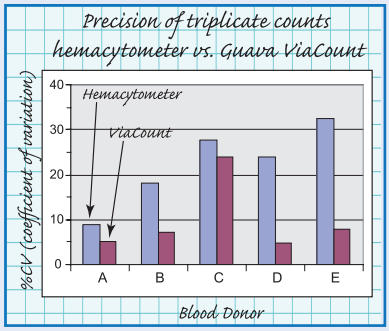


Advantages for Bioprocessing

- **Characterize cell line parameters**
- **Optimize cellular conditions at any stage of the bioprocess**
- **Use only microliters of bioreactor or cell line sample**
- **Maximize bioreactor yields by controlling and monitoring bioreactor conditions**
- **Immediate data feedback**
  – results in <2 minutes
  – easy to use

ELISPOT: FOR T-CELL ACTIVATION, VACCINES, ETC.

Elispot assays are used commonly to monitor T-cell activation and cytokine production. The Guava ViaCount Assay provides enhanced sensitivity and better precision for cell counting than optical tools such as the hemacytometer. The Guava ViaCount Assay also permits automated cell counting, thereby reducing the time and effort spent on analysis, as well as reducing a significant degree of operator judgment. In addition, it permits monitoring peripheral blood mononuclear cell (PBMC) sample integrity for platelet contamination, debris, and whether cells are apoptotic; these factors can cause variable results. As shown below, Guava ViaCount Assay cell count results (avg. CV<10%) are significantly (p=–0.042) more precise than the manual Trypan Blue method (avg. CV>22%). Using correct cell numbers in Elispot assays can ensure that outcomes are consistent when comparing multiple time points, donors, and operators.



Advantages for ELISPOT

- **High productivity**
- **Eliminate operator-dependent variability in cell counts and viability**
- **Increase confidence in Elispot results**
  – monitor sample integrity for apoptosis, platelet contamination, and debris
  – compare multiple time points, donors, or operators with increased accuracy

Guava Technologies®

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