

Dan Albert, Yong Song
Cellular Analysis Business Group, Beckman Coulter, Inc., Miami, FL

Introduction

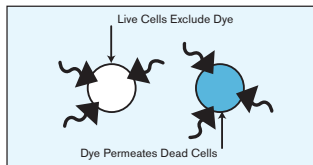
The Beckman Coulter Vi-CELL automates the widely accepted trypan blue vital dye exclusion method for the determination of cellular viability. In the past, this assay has been performed manually by an operator using a light microscope and a hemacytometer. Today, however, the Vi-CELL allows measurement of significantly more cells in a fraction of the time necessary for the manual technique. The instruments also provide significantly more parameters than can be obtained using the hemacytometer. The three Vi-CELL models offer automated viability solutions for the university researcher, government laboratories, translational assays, and Biopharma therapeutic protein production.

Systems



Determination of Cell Viability

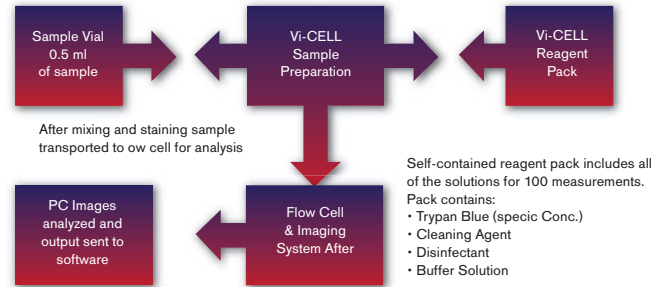
Trypan Blue Dye Exclusion



- Image Color (gray-scale) Analysis
 - Use 595 nm LED light-source to maximize b-w contrast
 - Thresholds on "color" and size of center spot

Flow Diagram of Measurement Sequence

Preparation unit Sample aspirated into Vi-CELL and automatically mixed with Trypan blue.

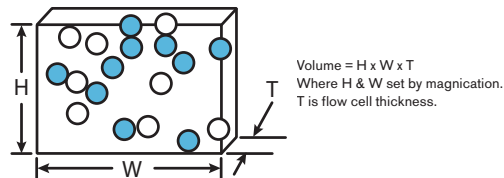


Self-contained reagent pack includes all of the solutions for 100 measurements. Pack contains:

- Trypan Blue (specif Conc.)
- Cleaning Agent
- Disinfectant
- Buffer Solution

Determination of Cell Concentration

Counting Cells in a Known Imaged Volume



- Counting and Summing Many Imaged Volumes for Statistical Accuracy and Precision.

21 CFR Part 11 Compliance Software

- Audit trail
- Electronic signature capability
- Secure user sign-on
- User-level permissions
- Administrative configuration tools

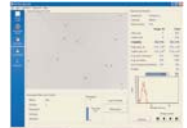
Specifications

	Vi-CELL XR	Vi-CELL AS	Vi-CELL S (Single-Position)
Auto Sample	Yes		
Size Range (µm)	2 - 70	5 - 70	
Sample Volume (ml)	0.5	1	
Analysis Time (min)	< 2.5	< 3.5	
Viability	0 - 100		
Imaging Technology	<ul style="list-style-type: none"> • Auto-focus routine • Firewire Camera • 1394x1040 CCD array 	<ul style="list-style-type: none"> • Manual-focus routine • Image frame grabber • 640x480 CCD array 	

Applications

WHITE BLOOD CELL VIABILITY MEASUREMENTS

- Procedure for sample preparation:
- Add 100 microliters whole blood to a tube or Vi-CELL cup
 - Add 1 ml VersaLyse™ (BCI Part number: IM 3648)
 - Vortex 5 seconds
 - Incubate for 10 minutes at room temperature
 - Load sample(s) onto the Vi-CELL or Vi-CELL

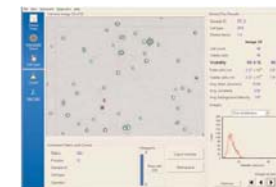


BIOPROCESS TRACKING (CHO cells)

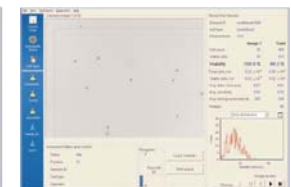


Bioprocess Tracking. Specific 'reaction' sequences can be created. These allow the user to monitor a bio-process over time. Individual runs are automatically appended to a named reaction via the auto-sampler login page.

SF9 INSECT CELL VIABILITY



CORD BLOOD STEM CELL VIABILITY



Conclusion

The Vi-CELL provides the following benefits:

- Automation of the standard trypan blue assay
- Ease of use software
- % Viability
- Total cell concentration
- Total viable cell concentration
- Mean cell size
- Real time cellular images
- Bioprocess tracking
- Validated reagents
- Convenient and standardized reagent pack
- V-Check program for cGMP facilities