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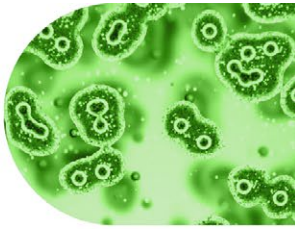

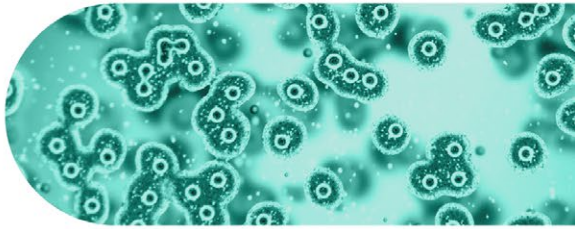

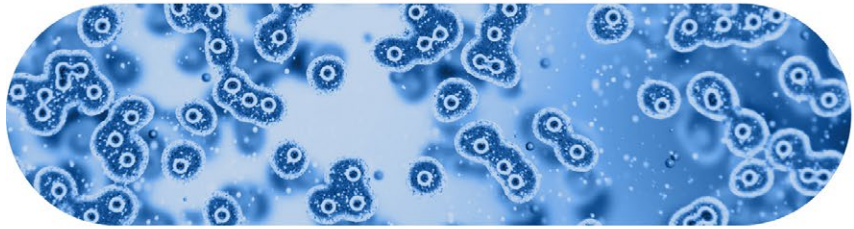

Your automated cell counter guide

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Cell counting introduction

To improve throughput, accuracy and standardisation when counting cells, many researchers are choosing to replace their haemocytometer with an automated cell counter.

Selecting the right cell counting instrument is a critical decision for any laboratory engaged in cellular research. With advancements in technology offering a multitude of options, choosing the most suitable instrument has become increasingly complex. However, the importance of this decision cannot be overstated, as the accuracy, reliability, and efficiency of cell counting directly impact research outcomes and downstream applications.

In this comprehensive guide, we delve into the significance of selecting the appropriate cell counting instrument tailored to your laboratory's specific needs. From enhancing throughput and accuracy to ensuring standardisation and reproducibility, the right instrument plays a pivotal role in advancing scientific discoveries and driving innovation in diverse fields such as molecular biology, immunology, and drug development.

Join us, the cell counting experts here at Cambridge Bioscience, as we explore the key considerations and factors that should inform your decision-making process when choosing a cell counting instrument. By understanding the importance of this choice and gaining insights into available options, you can empower your laboratory with the tools necessary to achieve optimal results and accelerate progress in cellular research.

Choosing the right method

When considering cell counting methodologies, it's crucial to align the chosen method with the specific requirements of your downstream application. Several methodologies offer distinct advantages depending on the complexity and characteristics of your samples.

Image-based counting utilising Trypan Blue staining is a well-established method, particularly effective in distinguishing between live and dead cells. While simple and suitable for routine cell culture samples, it may prove inadequate for samples with complexities such as clumping or low viability.

For greater accuracy, fluorescent image-based counting emerges as a preferred option, enabling clear differentiation between nucleated cells and non-nucleated entities. This method is particularly well-suited for analysing more intricate samples like primary cells or peripheral blood mononuclear cell (PBMC) samples, with cell counts comparable to Trypan Blue-based methods.

Alternatively, non-image-based methodologies offer enhanced reproducibility by automating the counting process, handling thousands of cells at a time. These methods, not reliant on optics or camera resolutions, are versatile enough to count various types of small and large objects, including bacteria, cell aggregates, yeast, algae, and microorganisms. Their capacity for detailed analysis significantly enhances the quality of cell counting, providing invaluable insights into your samples.

Methodology selection guide

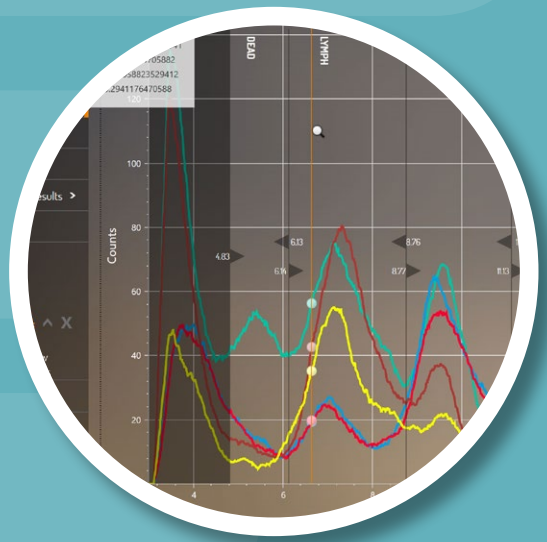
Assay	Type	Instrument / hardware	Viability count	High throughput	Cell culture	Primary cells	PBMCs	Yeast	Bacteria	21CFR compliance
Stain-free, Brightfield	Image based / Brightfield	C-chip haemocytometer CellDrop BF	No	No	Yes	No	No	No	No	Optional extra on CellDrop
Trypan Blue	Image based / Brightfield	C-chip haemocytometer CellDrop BF	Yes	No	Yes	No	No	No	No	Optional extra on CellDrop
AO/PI	Image based / Fluorescence	CellDrop FL ADAM-MC2	Yes	No	Yes	Yes	Yes	Yes	No	Optional extra on CellDrop, ADAM-CellT available as 21 CFR compliant version of ADAM-MC2
AO/DAPI	Image based / Fluorescence	EVE HT FL	Yes	Yes	Yes	Yes	Yes	No	No	Optional extra
Stain-free, impedance based	Electrical current exclusion (ECE)	CASY counter	Yes	No	Yes	Yes	Yes	Yes	Yes	Optional extra

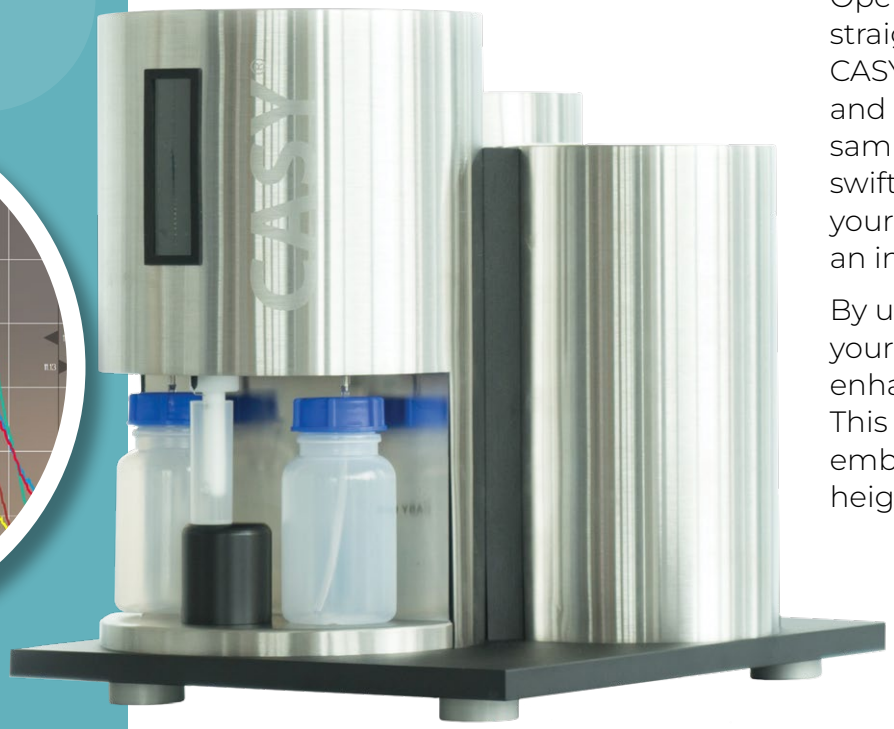
- **No dyes required**
- **Count free cells and cell clumps/biomass**
- **Fast flow-through measurement**
- **Sensor is immersed in the sample solution**
- **Optional extra: 21 CFR Part 11 compliant**

CASY

Our most advanced automated cell counting system, the CASY Cell Counter, employs electrical current exclusion to precisely determine cell number and viability. This technology ensures exceptional statistical accuracy and boasts the widest size measurement range (0.7-120µm) among all cell size analysis methods available.

The CASY Cell Counter excels in distinguishing between cell debris and live/dead cells, accurately calculating cell numbers within aggregates. It offers a non-invasive analysis suitable for various cell types, including cell lines, primary cells, bacteria, yeast, algae, and parasites.





Operating the CASY Cell Counter is straightforward: simply suspend your cells in CASYton, a conductive isotonic buffer solution, and immerse the instrument's sensor in the sample. Without the need for dyes, this system swiftly delivers comprehensive information on your cell culture's current status, supported by an integrated quality assurance (QA) system.

By utilising the CASY Cell Counter to assess your cells prior to seeding, you significantly enhance confidence in experimental success. This practice also offers valuable insights when embarking on long-term experiments with heightened resource requirements.

CellDrop BF and FL

Utilising patented DirectPipette™ Technology, the DeNovix® CellDrop™ simplifies cell counting by eliminating the necessity for disposable plastic slides. Cell counting has never been easier - simply introduce 10 µl of your cell suspension into the counting chamber, allow the CellDrop™ to analyse the sample, then wipe the chamber clean with a dry laboratory wipe.

The CellDrop™ features powerful live-view imaging, enabling immediate verification of successful cleaning. For applications requiring cell containment during reading, the CellDrop™ is compatible with most common slides, eliminating the need for an adaptor.

Available in two models, the brightfield-only version (CellDrop™ BF) and the model equipped with both brightfield and dual fluorescence optics (CellDrop™ FL), this instrument caters to diverse user needs.

Pre-installed applications facilitate intuitive analysis of various assays, while the variable height sample chamber automatically adjusts to ensure accurate counting across broad range of cell densities.

- **Fast, accurate cell count and viability measurements**
- **Pre-installed applications for a wide range of assays - brightfield, Trypan Blue, AO/PI, GFP, yeast**
- **Eliminates slide costs and reduces plastic use**
- **Effective reporting software**
- **Fits inside most flow hoods for hazardous sample processing**
- **Option for slide use when counting cells that require containment**
- **Optional extra: 21 CFR Part 11 compliant**

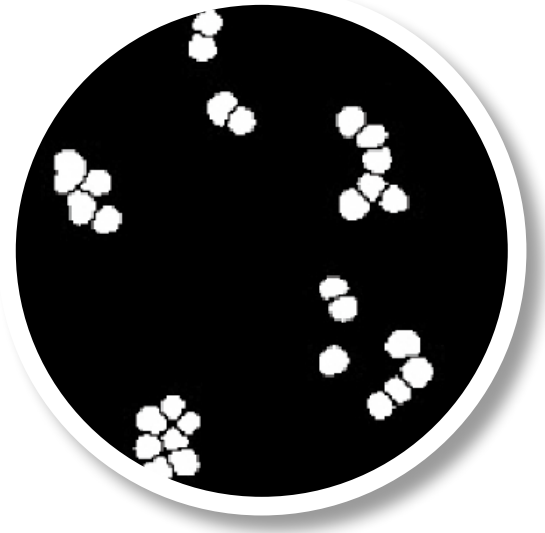
- **Accurate cell counts and viability measurement**
- **Results in less than 25 seconds**
- **PI staining combined with advanced image analysis**
- **Ideal for cell therapy quality control**
- **Count a wide range of cells including stem cells, CAR-T cells, CAR-NK cells, peripheral blood mononuclear cells (PBMCs) and primary cells**
- **Easy-to-use, built in tablet interface**
- **21 CFR Part 11 compliant version available: ADAM-CellT**

ADAM-MC2

ADAM™ MC2 (standing for Advanced Detection and Accurate Measurement) is an automated fluorescence cell counter performing viability and cell counting measurements using the AO (Acridine Orange) or PI (Propidium Iodide) staining method, combined with LED optics and CMOS detection making cell analysis more accurate and reliable than ever.

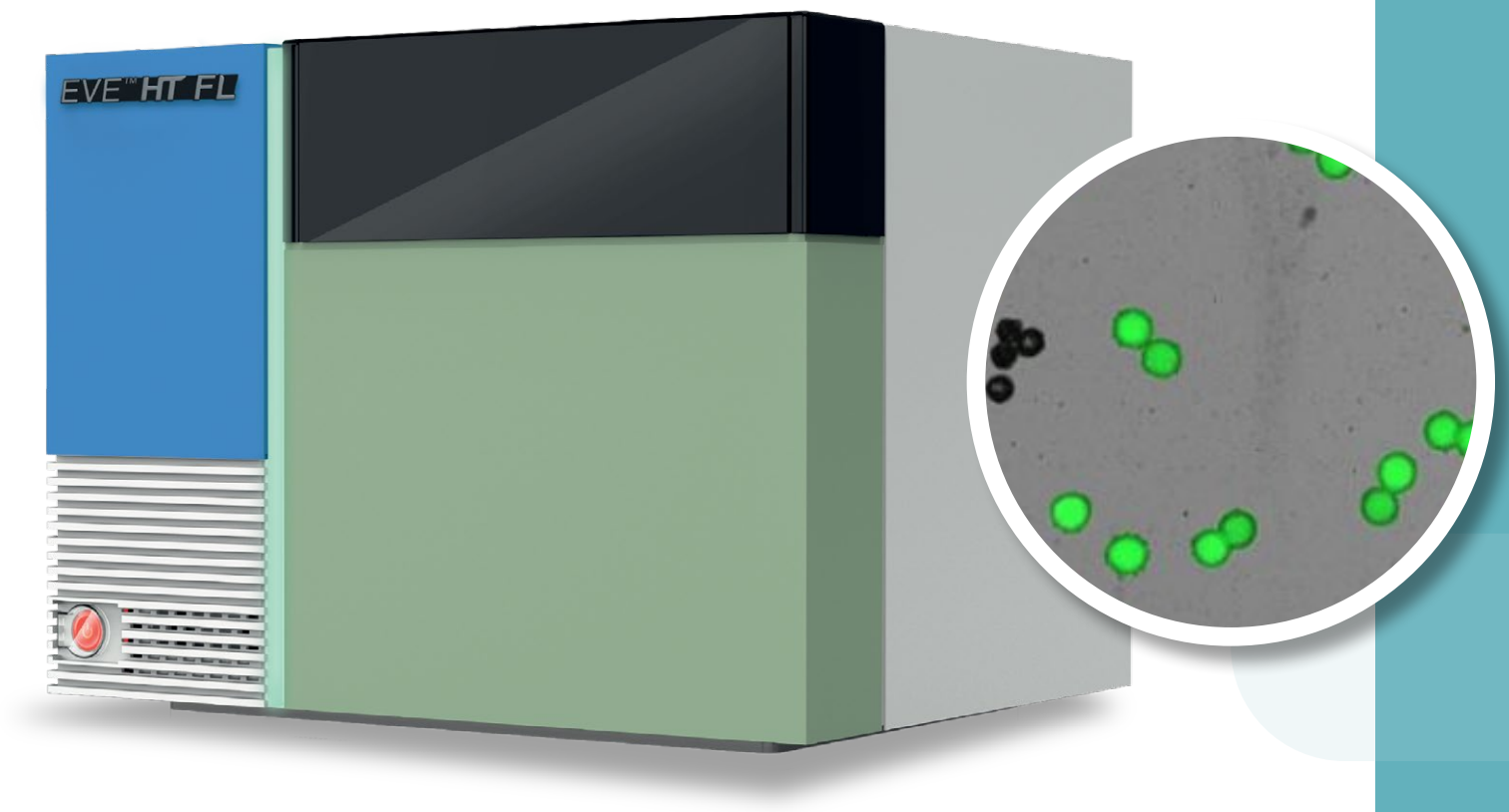
Capable of monitoring cell numbers and viability during cell manufacture (CAR-T cells, stem cells, etc.) with a data processing time of just 25 seconds, this easy-to-use automated counter is the perfect tool for cell therapy quality control.

If you require your instrument to be 21 CFR Part 11 compliant, the ADAM-CellT is also available with the features described above.



EVE-HT FL

The EVE HT FL™ is a high-throughput automated multiple cell counter, offering the ability to count 48 samples in a mere 3 minutes for the analysis of cell lines and primary cells. With its capability to process small 20 µl sample volumes and accommodate extended capacity, the EVE-HT ensures precise cell counting and viability assessments.



- **Up to 48 samples at a time**
- **3 minutes of counting**
- **Only 20 µl of sample volume required**
- **User-independent consistency**
- **Optional extra: 21 CFR Part 11 compliant**

Instrument selection guide

	Sample range	Size range	Speed	Measurement technique	Required consumables	Viability measurements	Subpopulation analysis
CellDrop BF	7 x 102 to 2.5 x 107 cells/ml	4 - 400 µm	~3 seconds	Image based (brightfield)	None	By Trypan Blue	No
CellDrop FL	7 x 102 to 2.5 x 107 cells/ml	4 - 400 µm	~8.5 seconds	Image based (fluorescence)	None	By AO/PI	No
ADAM-MC2	5 x 10^4 – 2 x 10^7 cells/ml	5 - 80 µm	<25 seconds	Imaged based (fluorescence)	Disposable Slides	By AO/PI	No
CASY	in volume > 1:70,000 in diameter > 1:40	0.7 - 120 µm	30 seconds (for triplicate measurement)	Electrical Current Exclusion	CasyCups	Stain free (size gating)	Yes
EVE HT FL	5 x 10^4 – 2 x 10^7 cells/ml	5 - 80 µm	3 minutes for 48 samples	Image based (brightfield and fluorescence)	Disposable Slides	By Trypan Blue and AO / DAPI	No

Slides

C-Chips:

Disposable plastic haemocytometer for manual microscope cell counting. Each slide contains 2 chambers. Made of sturdy and strong quartz grade plastic. Available in 5 grid patterns.

- **No coverslip required**
- **No need to wash for reuse**
- **No more contact to hazardous materials**
- **Accurate and reliable**

C-Slides:

Disposable cell counting chambers for use with automated cell counters. Eliminates the need for coverslips and washing of reusable slides. Excellent reproducibility and reliability. Compatible with the CellDrop if the sample needs to be contained within a slide.

- **No need for coverslips**
- **No need for washing (Disposable)**
- **Reduce exposure to infectious samples and contamination**
- **Reproducibility and reliability guaranteed**

Testimonials

CellDrop

My PI recently got this device to our lab. I use this DeNovix CellDrop to check the concentration of my Protoplast isolation. Using this device has saved so much time for me in the lab. Bye-bye to old haemocytometer. The device is user friendly. It's like an android tab with all the cell biology features I need in one place.

Researcher, North Carolina State University

ADAM-MC2

I am currently working in the immuno-oncology department. In general, cell counting is a part that cannot be overlooked in conducting experiments. ADAM-MC2 is the best product in that area! First of all, I think it's better because it's easy to use with a touch screen and the process of counting cells can be seen in high quality on the screen, so you can compare the results with your eyes. Via T/N solution, it is possible to directly compare live and dead cells. Above all, there are two functions that I like the most: being able to enter information about which cells I am counting, and being able to search at any time as past records remain. I would recommend this product to anyone struggling with cell counting issues.

INNOBATION BIO

EVE-HT FL

Using 48 channels for cell counting allows for the rapid completion of experiments, making it a practical and revolutionary approach. I believe this method will be widely used in the future, as it offers a revolutionary advantage of completing the experiment in just 20 minutes instead of the previous 2 hours. Thank you.

CORESTEMCHEMON.Inc

CASY

The CASY counter has been a key piece of equipment for the Oxford COVID-19 vaccine trial. We needed a reliable way to count cells from hundreds of blood samples on a daily basis. The CASY counter is a fast and accurate way of counting PBMCs. It is easy to use as it requires no sample preparation or staining, just add your sample to the CASYton buffer solution and it is ready to go! It is the gold standard of cell counting and we felt confident using it in our clinical trial due to its high reproducibility and accuracy.

Lead research assistant,
Jenner Institute at Oxford University.

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