



MEET THE LEGEND

in cell-based research

www.cellcounting.de

OLS[®] 
OMNI Life Science

Comprehensive Cell Status Monitoring label-free, with outstanding precision and reproducibility

The main actors in your cell-based assays are your cells.

Performing reproducible cell-assays requires comprehensive knowledge of your cells' condition – including absolute cell count, viability and aggregation status.

It is also time-sensitive: This information is needed precisely at the moment your cells appear to be ready for an assay or for further processing.

Here, CASYs legendary precision and reliability comes into play.

For years, CASY has been a reliable workhorse in cell-culture laboratories. CASY is referenced in more than 2,000 publications, you'll find it in a myriad of diploma- and PhD theses and on laboratory benches around the world. CASY systems are essential tools in academic & industrial research and in process control: CASY delivers precision with outstanding reliability. Thousands of satisfied users prove the robustness, reproducibility and reliability of the system, even in scenarios with poorly trained multiple users.

CASY tracks all relevant aspects of the status of your cell cultures

+ Label-free cell status, instantly.

Within seconds, measurement is performed non-invasively without using distorting dyes.

+ Statistically relevant data

Analysis of more than 4,000 cells per run enables statistically significant results.

+ Get the full picture

CASY quantifies all relevant parameters of cells including cell viability, cell size and aggregation – at extremely low running costs.



What stands behind CASYs legendary reliability

- + Certified life time calibration: guaranteed maximum +/- 2 % variation comparing measurements and instruments.
- + Automatic electronic surveillance of all relevant parameters of the system
- + Integrated QA system
- + GLP/GMP compliance
- + 21 CFR Part 11 optional available

Cell Concentration + Cell Number + Cell Viability + Cell Volume



How it Works.

Viable / dead cells differentiation

CASY quantifies cells and particles passing a measuring pore exposed to a low voltage electrical field. Based on a cell's size and conductivity, a resistance signal is generated and recorded. Living cells generate high resistance signals due to their intact membrane structure. Dying or dead cells cause much lower resistance due to their increased membrane permeability: they are measured by the size of their cell nuclei.

Cell viability

Furthermore, cell viability is determined by automatically quantitatively comparing viable cells with dead cells, the latter being represented by the size of their nuclei in the measurement chart.

Maximum information from flow-through measurement

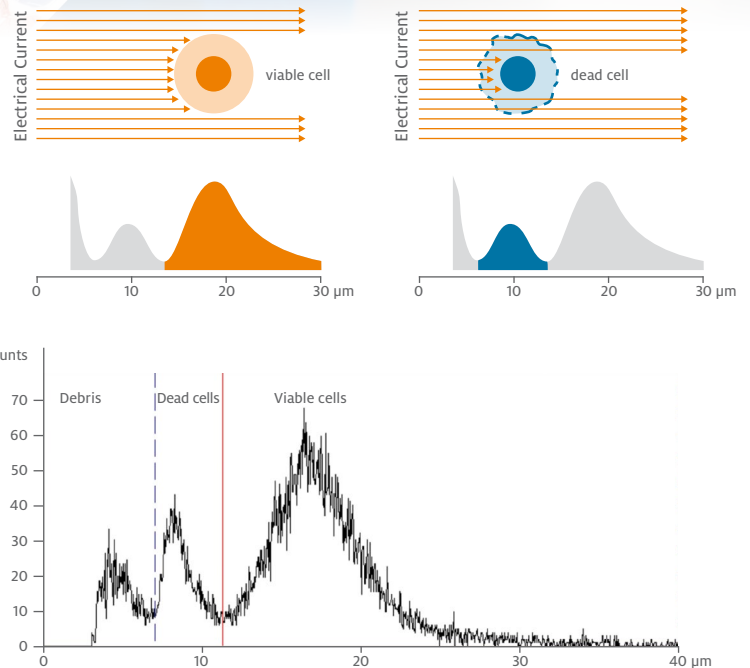
Objects passing the measuring pore are scanned with a high frequency of 1 MHz. This allows a precise recording of cell number and cell volume.

Huge dynamic measuring range

1 MHz sampled Pulse Area Analysis leads to an unsurpassed dynamic measuring range visualizing the whole range of particles from cell debris to large cellular aggregates in a single measurement.

Get the full picture of your cells

In a simple, fast and dye-free measurement, the huge dynamic measuring range provides you with all aspects of the current status of your cell culture: Monitor **cell debris**, distinguish **viable cells** from **dead cells**, and readily observe cell clusters / **aggregates** – all at a single glance.



CASY's measuring principle to discriminate between debris, dead and viable cells – and how it is graphically represented during measurement (Mixture of chondrocyte primary culture).

Biomass-determination or aggregates?

CASY delivers accurate volumes

High-frequency scanning of objects and the high dynamic measuring range, enable CASY to precisely measure volumes of cells or objects. Thus, cell aggregates and the entire biomass content of each sample are immediately available.

Accurate total cell count includes aggregates

Mathematically breaking down aggregates into single cells, CASY optionally counts all cells hidden in aggregates – and thus provides an accurate total cell count.

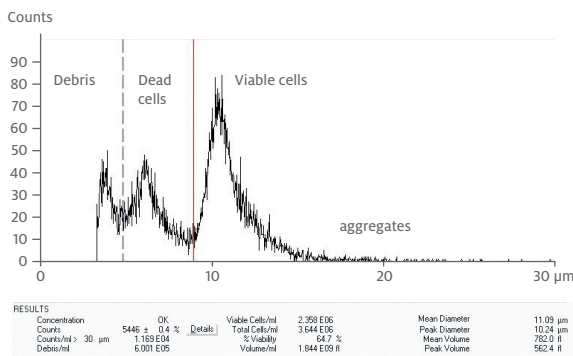
No limits. CASY measures cell lines, primary cells, bacteria, yeast, algae, parasites ... – you name it

With a detection range of 0.7 – 120 μm , CASY measures all types of mammalian cells and stem cells, as well as bacteria, yeast, algae, parasites, pollen, sperm and more. Any particle in the size range might be measurable – and a lot of various samples have been readily measured.

GET THE WHOLE PICTURE **stay up-to-date with your cells**

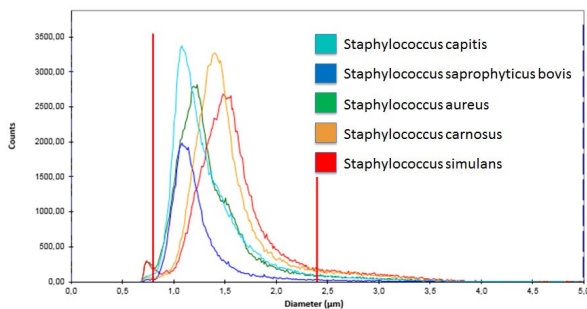
Mammalian Cells. Precise Counting & Cell Seeding Control

The success and reproducibility of cell culture experiments depend on the concentration and the health status of the cells. Thus, a CASY evaluation of your cells just before seeding is indispensable to set up experiments. Particularly, if you are about to start long-term experiments with enhanced resource requirements. A quick CASY measurement provides comprehensive insights in cell health, viability and aggregation with a single short and simple measurement.

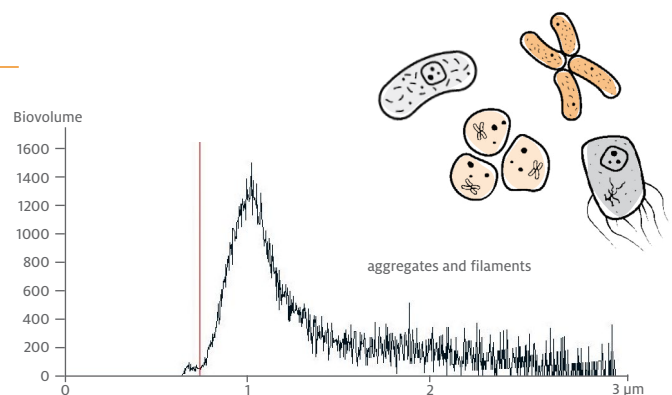


CASY measurement results of human stem cells from cord blood. A high resolution size distribution differentiates cell debris, dead cells, viable cells and cell clusters (aggregates). Results include cell counts, cell concentration, viability, aggregation factor, biomass volume, cell diameter and cell volume.

Bacteria. Monitoring Cells, Debris and Aggregates



CASY, equipped with a 45 µm capillary, is ideally suitable to monitor bacterial proliferation and aggregation. For example, during fermentation CASY allows you to plot changes in cell volume and cell number and provides an easy dye-free tool to monitor bio volume.



Counting of various strains of *Staphylococcus* (left) and plotting of *E. coli* biovolume against cell diameter (right) using CASY. All results automatically include cell counts, cell concentration, aggregation factor, cell volume and cell diameter.

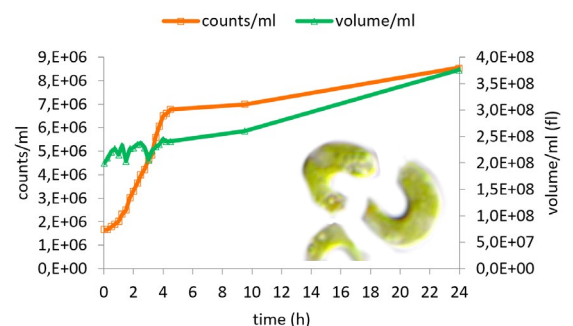
Biomass Determination. Cell Proliferation & Biovolume, simultaneously.

During the cell proliferation process, what's going on regarding cell size and biovolume? CASY provides the answer due to its unique measuring principle – monitoring cell volume automatically with cell counts. Precisely including even the volume of large aggregates, CASY adds further benefit to your experiments.

Cell counts increase during cell division, while biovolume remains relatively stable.

Taken from CASY Application Note: Growth-inhibiting effects of the antibiotic ciprofloxacin on the unicellular green alga *Raphidocelis subcapitata*

(<https://algaegrowth.ols-bio.de>)



Cell Proliferation, Cytotoxicity and Infection Monitoring

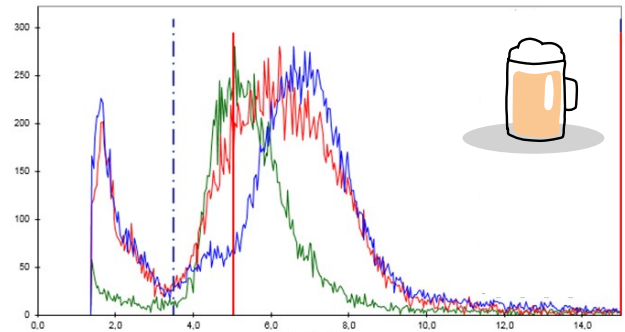
Yeast. Cell Quality Monitoring & QC

Cell proliferation strongly depends on various environmental factors. Thus, live monitoring of cell counts and viability is mandatory during yeast fermentation. An easy-to-use and dye-free system, such as CASY, allows full insights with only little disturbance.

*CASY results of Lager Yeast *Saccharomyces cerevisiae* measurements.*

High resolution size distribution not only differentiates cell debris, viable cells

and cell clusters. CASY analysis also allows to differentiate Yeast (Lager Yeast, blue) from its petite mutants (green). Red: Mixture of both.

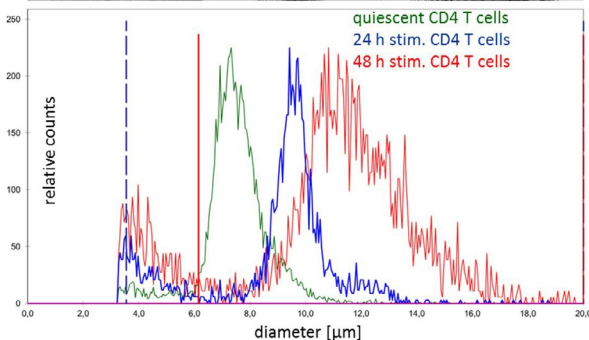
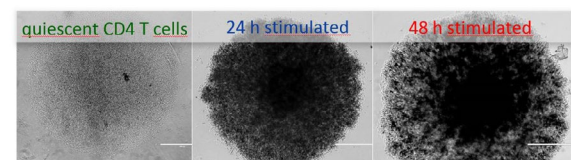
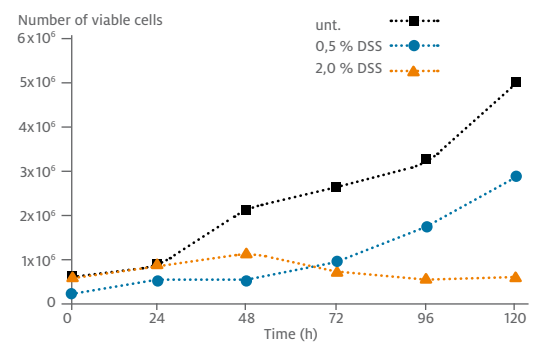


Cytotoxicity.

Monitor Proliferation Inhibition and Cell Death

Performing Cytotoxicity Assays with CASY implies measurement of cell proliferation inhibition and cell death independently. While counting viable cells leads to insights into cell proliferation inhibition, the option to additionally monitor dead cells allows conclusions about cell viability.

DSS, dextran sodium sulfate, inhibits cell proliferation of Caco-2 cells in a dose-dependent manner. Dead cells were not detectable in the experiment (data not shown). For details read Application Note: »How Chemicals influence Cell Proliferation – Straightforward Cell Culture Monitoring using CASY« (<http://proliferation.ols-bio.de>).



T-Cell Monitoring

A fascinating application, indeed: Recently, researchers used CASY to monitor T-cell cultures for immunotherapeutic approaches. Their simple and yet ingenious concept utilizes CASY to determine cell size and cell proliferation during T-cell stimulation.

Moreover, CASY was employed to easily monitor elutriation of human T-cells from PBMC based on cell size. Imagine the multitude of possible uses based on CASY's high resolution size distribution and cell count measurements capabilities.

Cluster formation and cell size distribution during CD4 T-cell stimulation.

For details, please refer to Application Note: <http://t-cellsizes.ols-bio.de>.

Application Support

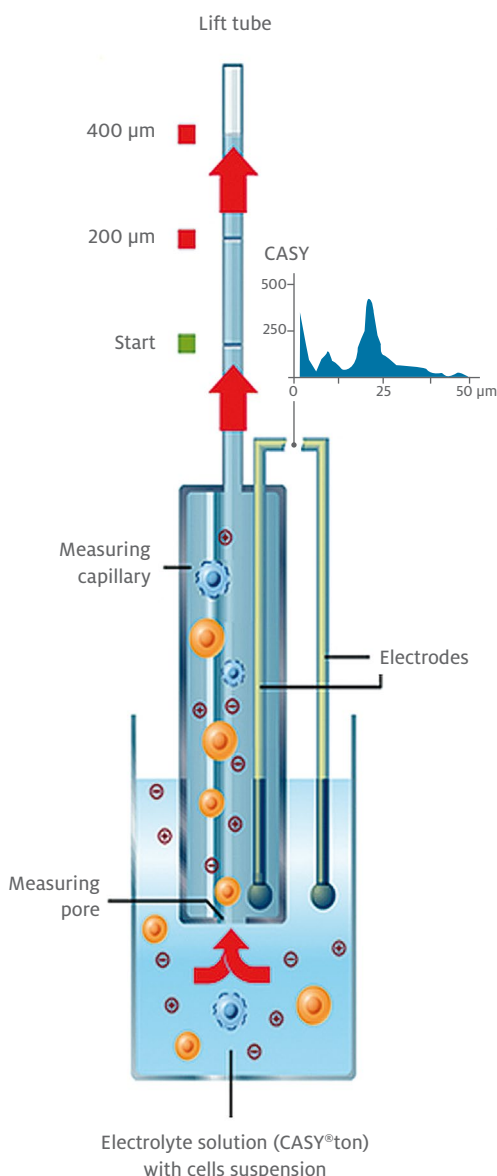
Challenge us with your application or analytical problem! Our highly trained application specialists are ready to help you in establishing new solutions. A huge database of measured samples is already available to serve as a reference.

CASY | MAKING IT POSSIBLE

All Important Markers of Cell Condition + In a Single Measurement + In Seconds

Counting Cells in just Seconds

Cells suspended in CASYton, a conductive isotonic buffer solution, are drawn through a measuring pore. This pore is defined in size and housed inside the capillary which separates two platinum electrodes, the inner and outer electrode. Here, a low voltage field is cycling with 1 MHz. Each cell or particle passing the measuring pore generates an individual electrical pulse by displacing buffer electrolyte in the measuring pore. This pulse is measured as a cell count.



Cell Viability – Keep Tabs on Membrane Degradation

As CASY takes the whole pulse area into account, including amplitude and pulse width, high resolution measurements are enabled, allowing to detect slightest changes of the cell membrane's electrical properties. The permeable membrane of dying and dead cells thus allows to identify dead cells by a change in electrical resistance, finally indicating the size of the nucleus.

Accurate Cell Volume

The combination of amplitude and width of the electrical pulse is proportional to the individual volume of the cell or particle passing the pore. Thus, cell volume can be directly deduced from the change in electrical resistance.

Biomass & Cell Aggregation – The True Cell Count

Biomass concentration and cell aggregation are essential parameters in any cell culture- and fermentation setting. CASY's measuring principle, including accurate cell volume determination, enables CASY to calculate aggregate volumes. This delivers extremely precise and reliable information on biomass content and aggregation status of your cells in culture. Furthermore, by taking account of cells hidden in aggregates, the true cell count is determined. Thereby drastically improving the accuracy of counting results.

Cell Debris and the »Comfort Zone« of Your Cells

Cellular debris may dramatically influence cell-based assays and its absence is an excellent indicator verifying that your cells are in the »comfort zone«. The huge dynamic size range of each CASY measurement provides you with a significant criterion for the usability of the cells in any critical follow-up experiment – at a single glance. And it does so quickly: typical measurement time of mammalian cells is around 10 seconds.



A NEW CONTROL AND ANALYSIS SOFTWARE

Developed with the user in focus

- + Intuitive instrument control.
- + Expanded and simplified measuring routines.
- + Enabling evaluation and data organization tools.

Hardware

Choose between Surface-PC and Laptop or use your own Windows-based Computer*.

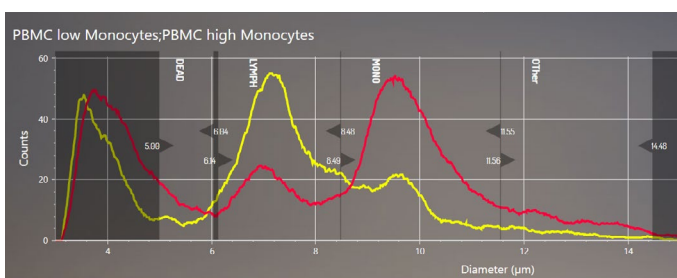
Software

Encounter a wealth of new possibilities in data organization and data evaluation, such as:

- + viability - live / dead evaluation
- + differentiate up to 5 cell populations for each sample
- + detect and analyze cell aggregates
- + overlay multiple samples plots
- + calculate mean values and a mean value graph
- + intuitive control, wizard-based routines
- + easy data export and customization tools
- + a dashboard provides fast access to all relevant functions of CASY
- + user management and experiment organization

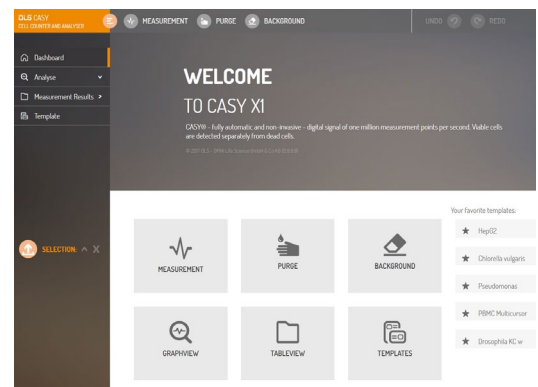
Renowned superior precision with enhanced control

Example: Compare PBMC Monocytes from different donors

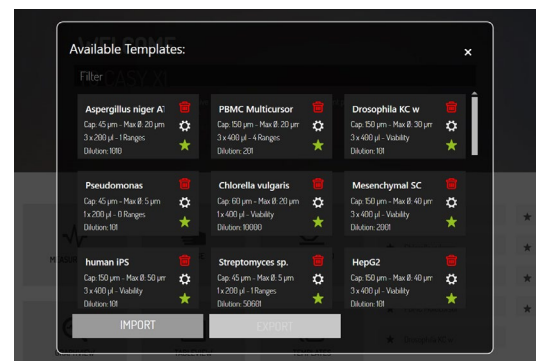


PMBC are not the same: depending on donor, the ratio between Monocytes and Lymphocytes can vary significantly, having a major impact on downstream steps.

* Minimum requirements will be provided



Within easy reach: the new CASY dashboard provides 1-click access to all central functions



Easy and lucid template management



CASY Software is also available for selected existing systems. Please contact us for update options: casy.ols-bio.de

TECHNICAL DATA

Measurement principle	Electronic pulse area analysis with 1 million measurements per second acc. to ISO 13319
Viability determination	Electrical Current Exclusion (ECE)
Dynamic range	in volume > 1:70,000 in diameter > 1:40
Measured size channels	512,000
Displayed size channels	1,024
Measurement range	0.7–120 µm
Volume Resolution	1 in 512,000
Typical analysis time	10 seconds
Typical sample volume	10 –100 µl

CASY

**cell count, cell viability, cell volume,
cell aggregation & biomass
in less than 10 seconds. Label free.**

- + intuitive, ease to use
- + GLP / GMP compliant
- + 3 user levels
- + analytical tools
- + 2 licences included (control / desktop)
- + unlimited templates (cell specific setups)
- + various export options, including raw data
- + database system
- + optional 21 CFR part 11
- + optional active directory

Comprehensive Cell Status Monitoring. Enabled by CASY.

More about CASY

Manuals, Application Notes & Support:
Visit www.casy-support.com

Watch CASY hands-on Videos:
bit.ly/cellcounting

Stay updated: register for our
newsletter **ols-bio.de/newsletter**

**For Life Science research only.
Not for use in diagnostic procedures.**

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