Confocal Quantitative Image Cytometer CQ1

The CQ1 can quantitatively measure the biological information from image data of each cell with good reproducibly.

A variety of information such as that about cell functions, intracellular signal transduction mechanisms, invasion regarding cell mobility, and morphology of cells can be obtained from the data quantified through image processing that were difficult for a flow cytometer to obtain. Unlike a flow cytometer, the CQ1 does not flush cells away, so it can follow time-based changes in the same sample simply by continuing the measurement or even after incubating the sample.

CQ1

MAJOR FEATURES

■ Precise quantification of morphological information without peeling cells apart

The morphological features of cells can be quantified without having to separate individual cells or remove them from the culture. Since the CQ1 does not interfere with the biological functions of cells or alter their features, more accurate measurements are possible. In addition to two-dimensional data, various types of three-dimensional data such as surface area, volume, number of cells, cell position, position of particles in cells, and fluorescence intensity can be displayed in tables or graphs.

■ Live cell observation functions

Yokogawa's confocal scanner unit (CSU) can constitute a confocal microscope system by connecting it with an optical microscope. The CSU can obtain slice images of cells at a high speed while minimizing the damage to cells caused by laser irradiation, i.e., the damage by phototoxicity, and minimizing fluorescence photobleaching. Equipped with the CSU, the CQ1 can observe live cells in three dimensions and multiple colors. Because the CQ1 can effectively make use of cells without disposing of cells used for research or inspection, it is well suited for quality management, inspection and experimentation of cells for regenerative medicine.

■ Highly reproducible measurement

In the CQ1, stable laser power is maintained by using an excited laser power monitoring function, and the influence due to fluctuation factors other than laser power is corrected by performing periodic internal calibration. Thus, the CQ1 offers highly reproducible measurement.

MAJOR SPECIFICATIONS

■ Optics

Confocality: Using microlens-enhanced wide-view Nipkow disk
Laser wavelength: 405 nm, 488 nm, 561 nm, 640 nm
Transillumination: Phase contrast
Objective lens: 2× to 40× (including phase contrast, long working distance)
Camera: Using sensitivity sCMOS

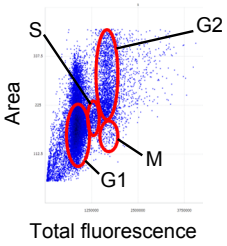
■ Data format

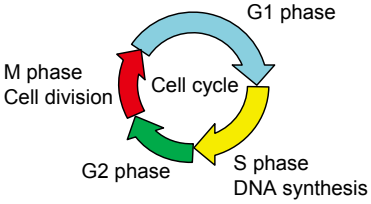
Image data: OME-TIFF, PNG
Numerical data: FCS, CSV, ICE

APPLICATION EXAMPLES

■ Cell cycle analysis

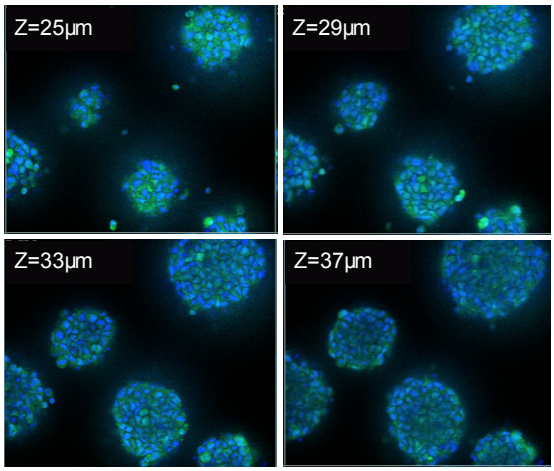
By using fluorescent-labeled DNA, the CQ1 measures the number of cells, areas of their nuclei and total fluorescence reflecting the volume of DNA, and then determines the cell cycle.





■ Spheroid analysis

By stacking the slice images obtained through confocal scanning, the CQ1 can observe three-dimensionally cultured cell clusters like spheroids. It can clearly show the difference between the morphology of the nuclei in the outer area and inner area in a spheroid.



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