Sony announces the development of the 'Spectral' cell analyzer prototype

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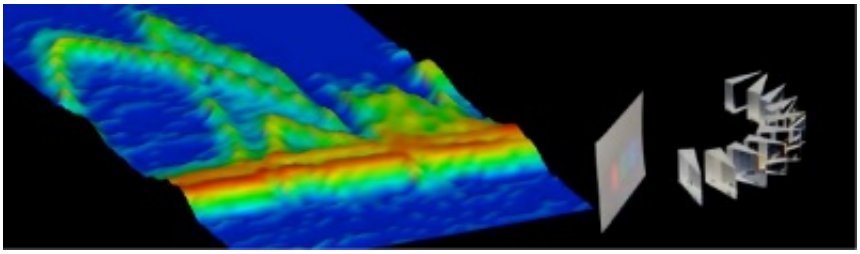


Concept figure: Dividing the fluorescence emissions of all the fluorophores with Sony's uniquely designed prism array, in combination with a newly-developed '32-channel photomultiplier tube.'

Sony Corporation today announced the development of 'Spectral' cell analyzer, its second 'flow cytometer' cell analysis instrument for the optical analysis of cells. Sony will also exhibit its prototype at ISAC (the International Society for Advancement of Cytometry) in Leipzig, Germany, from June 23 - 27.

This high-end cell analyzer adopts a newly-developed 'spectral' cytometry method to detect full spectrum fluorescent emissions, making highly complex analysis a simple task. By introducing this method, Sony aims to propose a novel method of cell analysis to researchers in advanced research fields such as immunology, oncology, and regenerative medicine.

‘Flow cytometer’ cell analysis instrument

The flow cytometer is a cell analysis instrument that applies optical measurements to analyze and sort various kinds of cells based on their size, number, exterior surface, and interior content (such as their structure, function, and biomarkers).

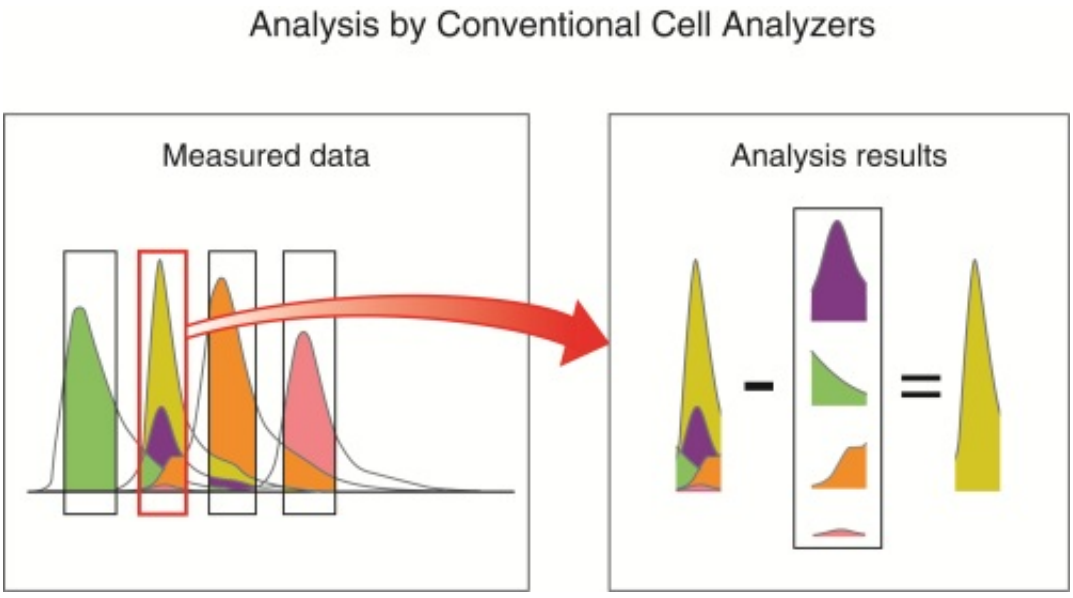
There are two types of flow cytometers: ‘cell analyzers’ exclusively for analyzing cells, and ‘cell sorters’ for both analyzing and sorting cells. Both types of flow cytometers are used by university laboratories, research institutes, and pharmaceutical companies in studies involving immunology and oncology, as well as research for regenerative medicine and stem cells, such as iPS (induced pluripotent stem) and ES (embryonic stem) cells. Flow cytometers are expected to further proliferate as research in these and other clinical areas continues to expand.

‘Spectral’ cell analyzer

The main features of Sony's cell analyzer

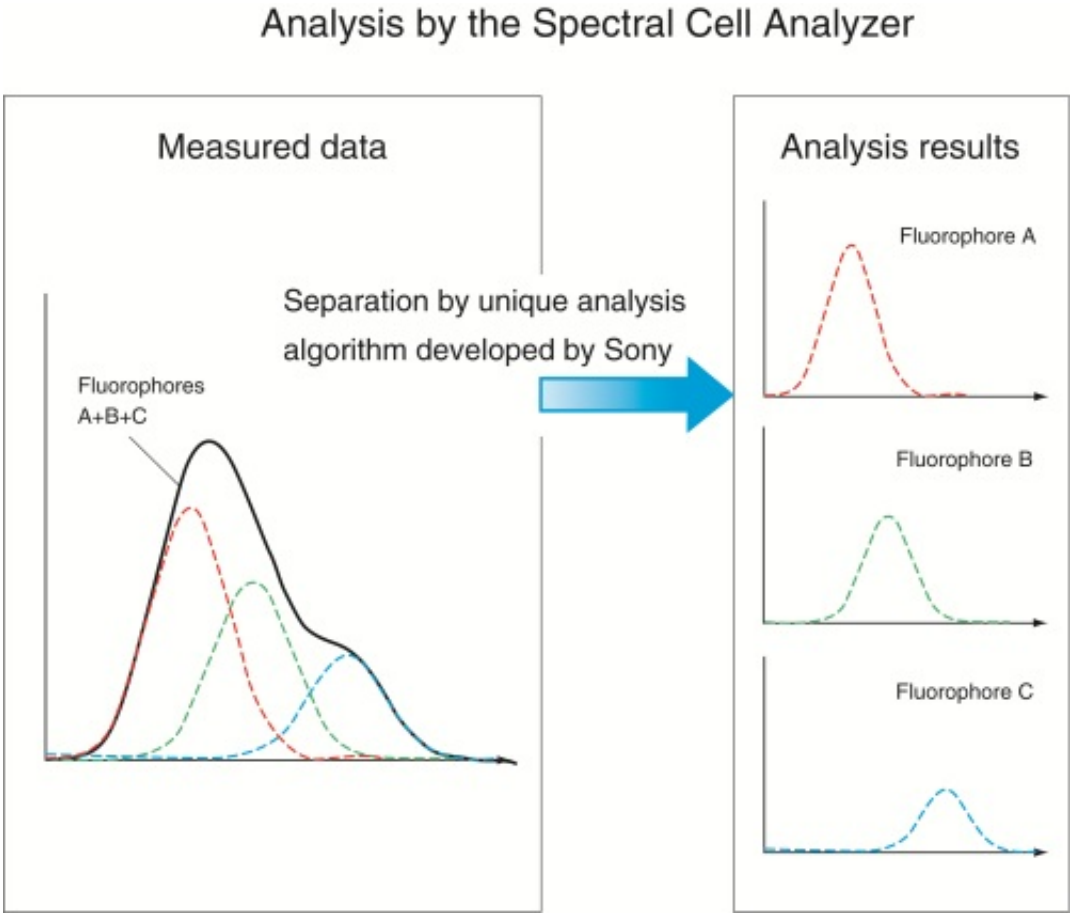
Conventional cell analyzers analyze characteristics of cells by staining cells with a reagent (known as a fluorophore) that becomes fluorescent under certain conditions, and then detecting the light (fluorescence) emitted from cells when they are hit by a laser beam (known as fluorescence detection). This methodology allows researchers to analyze the size, internal structure, and surface structure of tens of thousands of cells per second.

In order to detect fluorescence, conventional cell analyzers use optical filters to divide the fluorophores based on the fluorescence wavelength range (channel), which enables isolated measurement of only an intensity of fluorescence. Therefore, in order to detect multiple colors a corresponding number of optical filters, detectors, and fluorophores are required.



However, by this method, multiple fluorophores can overlap in a single channel (Figure 1), leading to additional spectral compensation or correction work. Consequently, the increase in the number of fluorescent reagents has posed various problems in analysis accuracy, reproducibility, and workefficiency.

The 'Spectral' cell analyzer developed by Sony adopts a new method to measure the full spectrum of fluorescence with a high degree of accuracy. This is achieved by dividing the fluorescence emissions of all the fluorophores with Sony's uniquely designed prism array, in combination with a newly-developed '32-channel photomultiplier tube' (Figure 2). As such, the spectral analyzer technology enables the analysis of the spectral emissions of virtually any overlapped fluorophores by dividing them into individual fluorophore emissions with Sony's independently developed analysis algorithm. This approach eliminates the need for spectral compensation required on other systems and expands the total number of fluorophores that can be analyzed simultaneously. The spectral analyzer provides rapid analysis of highly complex fluorescence emissions with high accuracy and reproducibility.



Furthermore, this method can detect the weak intrinsic fluorescence from unstained cells (autofluorescence) with a high degree of accuracy, revealing the detailed shape of its entire waveform. Thus, this instrument is ideal for analyzing unstained cells or cells that are very sensitive to staining.

Sony aims to achieve mid- to long-term growth in its medical business, and will strive to expand and strengthen its range of flow cytometers to deliver high-quality, innovative products.

Source: Sony Corporation