

# Novel Cell-Array Technology Combined with the Power of Laser Scanning Cytometry (LSC) in High-Throughput DNA Content and FISH Analysis

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## Abstract

The characterization of cellular properties has become important both in research and in clinical applications, where phenotypical or genotypical classification of tumors is routinely required for personalized treatment. To address this need, technologies that allow qualitative and quantitative analysis of molecular markers on a cell have been developed, among which is imaging cytometry combined with immunocytochemistry. However, imaging cytometry requires that multiple slides be prepared when a large number of samples are to be examined, which can be a cumbersome and time-consuming process. In addition, the one-by-one analysis procedure can make it difficult to compare cellular data among the numerous samples.

Laser scanning cytometry (LSC), a representative imaging cytometry, is a useful and versatile technology which allows quantitative analysis of cellular properties and observation of cellular morphology. LSC becomes even more powerful and efficient when combined with additional technologies. A device called a cell array permits measurement of cellular properties like nuclear DNA content for up to 50 samples in a single experiment. Since these 50 samples are examined on a single slide, data from each sample can be easily compared. In addition, another device, called a multiplex-immunostain chip, permits measurement of up to 50 cellular antigens for a sample in a single experiment, facilitating multi-parameter analysis by LSC.

These novel but simple devices increase the power and function of LSC in tumor cell analysis. They also facilitate the use of LSC in the clinical laboratory by allowing an automatic count of FISH signals in clinical materials such as cancer tissue specimens, thus making LSC more efficient in cytogenetic analysis using FISH.