Flow Cytometry: From Basic Concept to Advanced Sorting

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Abstract

Flow cytometry and cell sorting are well-established technologies in clinical diagnostics and biomedical research. Heterogeneous mixtures of cells are placed in suspension and passed single file across one or more laser interrogation points. Light signals emitted from the particles are collected and correlated to entities such as cell morphology, surface and intracellular protein expression, gene expression, and cellular physiology.

Based on user-defined parameters, individual cells can then be diverted from the fluid stream and collected into viable, homogeneous fractions at exceptionally high speeds and a purity that approaches 100%. As such, the cell sorter becomes the launching point for numerous downstream studies.

Flow cytometry is a cornerstone in clinical diagnostics, and cheaper, more versatile machines are finding their way into widespread and varied uses. In addition, advances in computing and optics have led to a new generation of flow cytometers capable of processing cells at orders of magnitudes faster than their predecessors, and with staggering degrees of complexity, making the cytometer a powerful discovery tool in biotechnology.