

Flow Cytometry Fundamentals, Cell Sorting, and Advanced Approaches for Microparticle Analysis

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Flow cytometry is a powerful technology that enables the rapid multiparametric analysis of cells and particles at the single-event level, providing critical insights across basic research, translational science, and clinical applications. This session will introduce the fundamental principles of flow cytometry, including fluidics, optics, detectors, and signal processing, and explain how these components work together to measure the physical and fluorescent properties of individual particles in suspension.

Unique characteristics of the cell sorters, highlighting how cell sorters extend conventional flow cytometry capabilities by enabling the physical isolation of specific cell populations with high purity and viability.

Special attention will be devoted to the analysis of microparticles and extracellular vesicles, an area that presents unique technical challenges due to the small size and low signal intensity of these biological particles. Participants will gain an understanding of the technological innovations incorporated into dedicated microparticle analysis instruments, including enhanced light-scatter sensitivity, optimized optical configurations, advanced triggering strategies, and specialized calibration approaches.

By the end of the session, attendees will have a comprehensive overview of flow cytometry and cell sorting technologies, as well as a practical understanding of the instrumentation requirements necessary for accurate cellular and microparticle characterization.