Levitation Technology for Unperturbed Cell Isolation

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The successful analysis and characterization of primary samples depend \ on the methods used to prepare those samples for downstream analysis. These methods enrich viable cells and often include enrichment of subpopulations. Conventional enrichment methods include fluorescence activated cell sorting and positive or negative selection with magnetic beads. However, these methods alter native cell phenotypes during the enrichment process by the application of pressure, binding of antibodies, extensive manipulation and centrifugation, among other perturbations. This results in altered gene expression, generating molecular profiles that are not representative of true biological significance.

LevitasBio, Inc. has developed the LeviCell™ platform to address these challenges in working with primary cell samples. Hands-free cell enrichment with LeviCell utilizes magnetic fields to levitate viable, healthy cells away from unwanted contaminants. Unlike other cell separation methods, LeviCell does not require mechanical force, labeling, or staining to achieve viability enrichment. This results in a single-cell suspension that is ready for immediate downstream analysis, producing molecular profiles free of isolation-induced gene expression artifacts. In addition, we have developed reagents to extend the benefits of this technology to the immuno-oncology research field. These reagents enhance the enrichment of all B cells, T cells, and CD4+ or CD8+ subsets of T cells, with additional target populations in development. In all cases, unwanted cells are specifically tagged, pulled to the edges of the levitation chamber and captured, depleting them from the sample. In parallel, target cells undergo viable cell enrichment to yield a cell population enriched in the desired cell type with higher viability. Depletion rates are consistently greater than 98%, resulting in a final targeted population with ≥90% purity in most cases. Here we demonstrate LeviCell platform performance in the enrichment of targeted cell populations relevant to the immuno-oncology research community.