RESEARCH SNAPSHOT

LeviCell vs. FACS: Increased Viability in Three Sample Enrichments Using Levitation

Overview

Isolating intact, viable cells from tissue samples can be challenging. Whether cells from resections and biopsies are used for diagnostic or research purposes, it is critical to maintain cell population representation ratios from the original sample while separating live cells from dead cells and debris. Cells in solid tissues must first be dissociated from their neighbors by disrupting the extracellular matrix that holds cells together. This can be done either mechanically or using proteolytic enzymes such as collagenase and trypsin, but each approach has the potential to damage cells or decreasing yield. The dissociated cells must then be collected and removed from the resulting debris, and live cells enriched by removing them from dead cells.

Cells may be collected based on size or density by centrifugation, by binding to specific antibodies immobilized on beads or other matrix, or by using label-based sorting with fluorescently labeled antibodies bound to the cells of interest. These enrichment and debris removal processes typically involve multiple complex steps and expose sensitive cells to harsh physical and chemical conditions, resulting in low viability and yield. In some instances with highly sensitive cell types within the tissue, some of these methods are completely incompatible.

In addition, harsh dissociation and enrichment protocols can selectively damage more fragile cell types, changing the population distribution relative to the original population. Treatments can also stress the cells, potentially changing gene expression or altering cell surface markers.

The **LeviCell system** presents an alternative to traditional enrichment protocols that provides high yields of viable cells, while preserving cell distributions and characteristics for downstream applications and analysis.

KEY HIGHLIGHTS

- LeviCelll delivers increased viability compared to FACS data in three cell types (bladder, colorectal carcinoma, renal cell carcinoma) over FACS.
- Enrichment viabilities of 68 - 92% in four tissue samples
- Recovery of more than 50% of viable cells from original preparation

Gentle, Efficient Cell Preparation with the LeviCell System

The groundbreaking **Levitation Technology** efficiently removes dead cells and debris while producing high yields and viabilities of even fragile cell types from a variety of tissue types. The gentle LeviCell platform enriches viable cells from tissues without the use of dyes or antibodies or cell surface markers, avoiding cell activation and cell damage and maintaining unaltered gene expression profiles. The 20 minute, three-step protocol minimizes cell manipulation and associated stressors.

High Yields and Viabilities from Liver Tissue

Four digestion conditions were tested on mouse liver samples. Initial viabilities from each preparation were quite low, ranging from 16% to 45%. As shown in Figure 1, enrichment using the LeviCell system produced viabilities of 68% to 92%, with three of the four samples having viabilities near 90%. As shown in Figure 2, more than 50% of viable cells from the initial preparations were recovered from each experiment.

Gentle Enrichment

Conventional cell enrichment protocols rely on labeling or antibody binding and often involve high pressure or ultracentrifugation. These manipulations can stress cells or trigger cell death and have the potential to alter cell physiology or introduce bias.

The LeviCell system resulted in higher viability cell populations when compared with a bead protocol to enrich dissociated tumor cells. Figure 3 compares the starting (blue) and final (green) viabilities of bladder tumor, colorectal carcinoma, and renal cell carcinoma cells obtained using bead-based enrichment versus the LeviCell system. The LeviCell significantly increased the viabilities, while the bead-based protocol reduced viability for each sample.

The LeviCell's innovative Levitation Technology platform uses less than 1 psi of pressure in a completely touchfree, label-free, gentle sorting process that takes only 20 minutes to complete. The system provides a simple, fast and reliable method for working with cells isolated from tissue and dissociated tumor samples for live-cell enrichment and debris removal. The enriched samples are ready for input to a variety of downstream applications such as NGS, single-cell analysis, and compound testing. Successfully accessing cells and garnering data from tissue types like brain, liver, lung, heart, kidney can potentially unlock key answers to cancer, age related diseases or general biological questions.

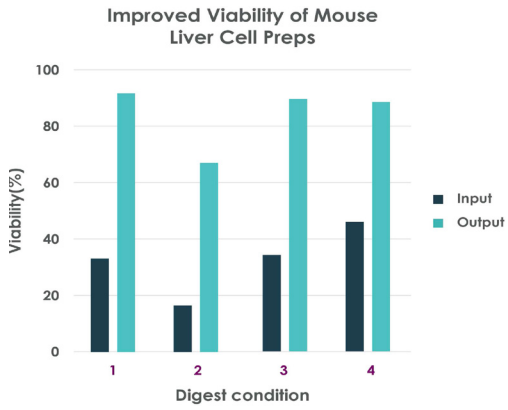

Figure 1.

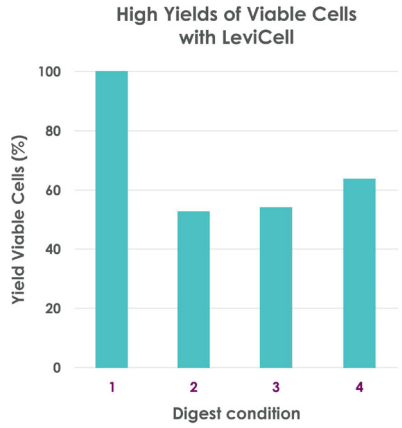

Figure 2.

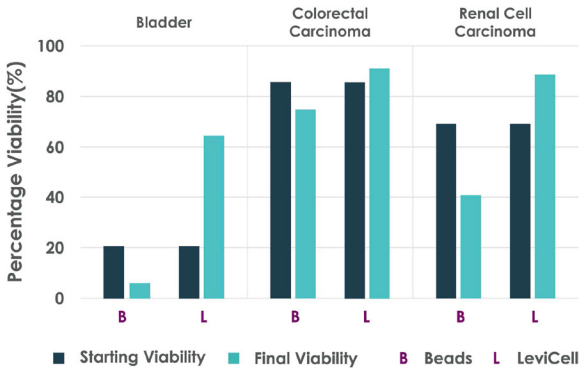

Figure 3.

For more information, visit **levitasbio.com** or contact **sales@levitasbio.com**.