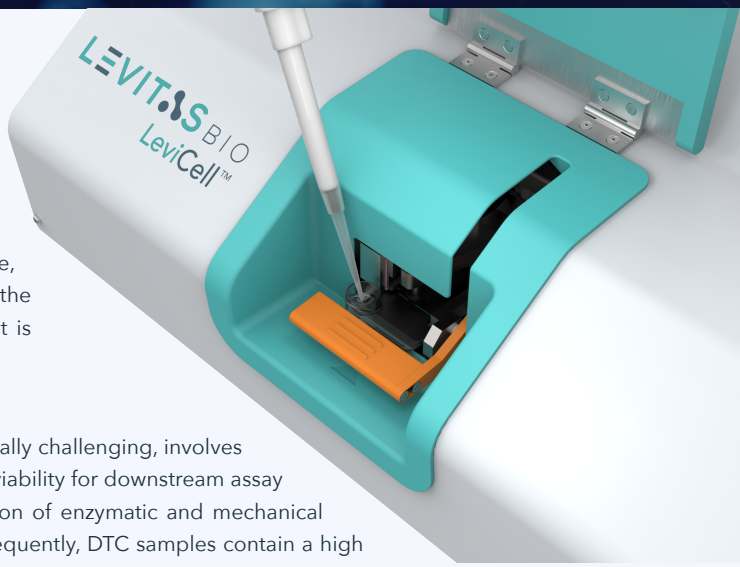
LEVITAS BIO

Dissociated Tumor Cells

The LeviCellTM Demonstrates Robust Live Cell Enrichment from Dissociated Tumor Cell Samples



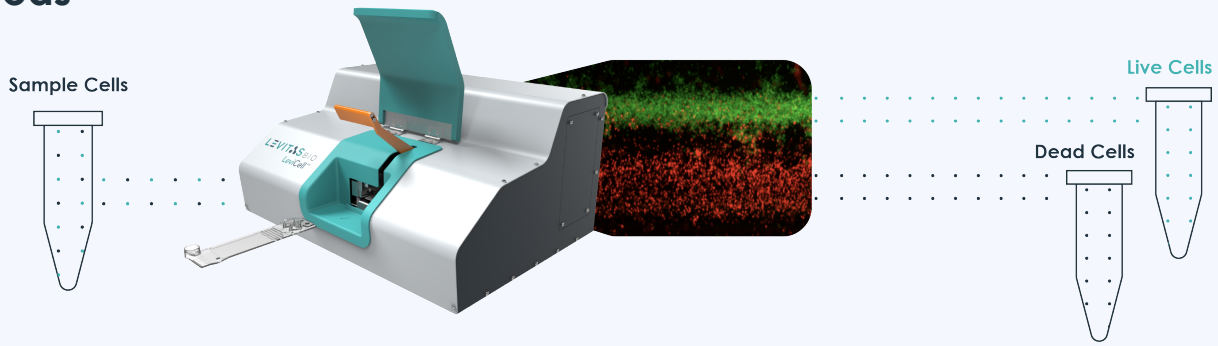
Introduction

The key to unlocking targeted cancer therapies that will improve patient survival lies in the isolation and analysis of live cells in the tumor microenvironment. As primary cells that offer the closest representation of the original cancerous tissue, dissociated tumor cells (DTC) contain tumor, immune, and support cells. Each cell type plays a distinct role in tumorigenesis. Thus, the preservation of each cell type's population ratio from the microenvironment is vital to the integrity of any downstream application and analysis.

However, working with dissociated tumor cell samples is known to be technically challenging, involves rigorous incubation periods, and is associated with low cellular integrity and viability for downstream assay use. Traditionally, the dissociation process is performed using a combination of enzymatic and mechanical separation, which often result in the damage and degradation of cells. Consequently, DTC samples contain a high percentage of debris that interferes with post-processing analysis.

The LeviCell, when used to sort DTCs, has proven to remove distracting debris and enrich for live cells while preserving each unique cell type's population ratio within the original tumor microenvironment. The aggravating issue of contamination is eliminated by having the entire enrichment process occur in the LeviCell's closed, touch-free, self-contained environment. Furthermore, the LeviCell's ability to produce robust, viable cells along with high yield removes the tedious need for serial subculturing to enrich the tumor cells, thus reducing the overall financial burden and time investment associated with processing dissociated tumor cells and reducing experiment artifacts associated with culture.

Methods



1 Sample Introduction

Sample pipetted into the LeviCell cartridge.

2 Automated Label-Free Sorting

Magnetic force drives levitation based on cells' physical properties.

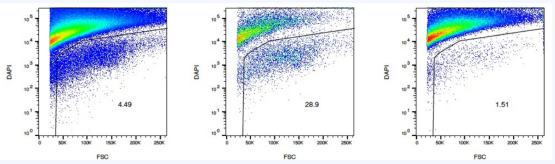
3 Sample Collection

Levitated cells transition into separate collection ports for removal.

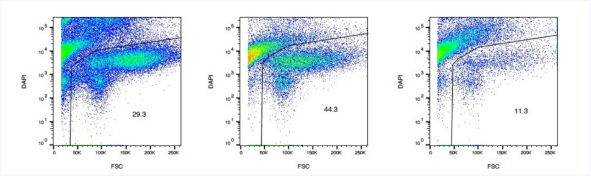
Levitas Bio has developed a revolutionary levitation technology platform that uses less than 1 psi of pressure to enable a completely touch-free, label-free, enzyme-free, three-step workflow that produces high DTC yield without compromising or biasing cell type populations of the original microenvironment.

Results

The following results illustrate how the groundbreaking LeviCell technology platform removes debris while enriching for live cells, all while maintaining cell population representation.

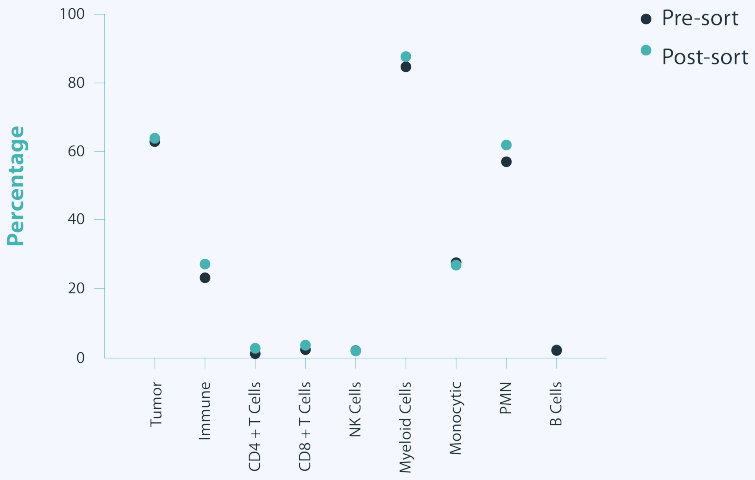


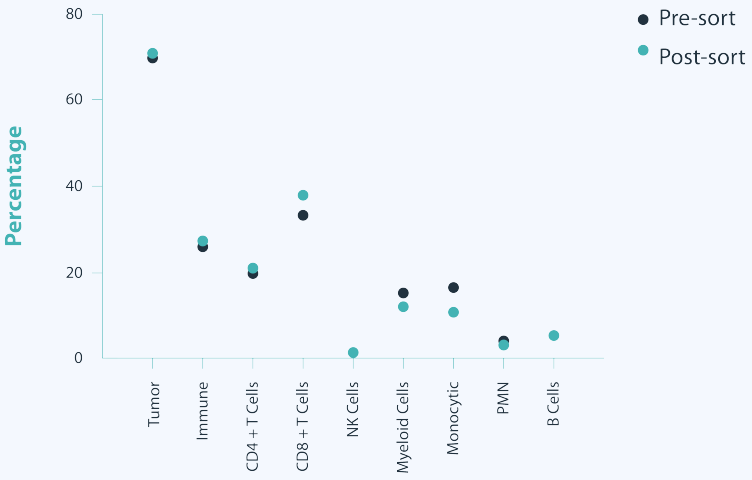
Condition	Total Cells	Live Cells	Dead Cells	Viability	Yield
Input	2.00E+05	5.50E+04	1.45E+05	27.50%	
Channel Run 1	2.008E+04	1.52E+04	5.61E+03	73.08%	27.64%
Channel Run 2	9.16E+03	8.11E+03	1.05E+03	88.54%	14.75%



Condition	Total Cells	Live Cells	Dead Cells	Viability	Yield
Input	2.00E+05	1.38E+05	6.24E+04	68.80%	
Channel Run 1	2.37E+04	2.09E+04	2.78E+03	88.19%	15.19%
Channel Run 2	2.45E+04	2.21E+04	2.43E+03	90.20%	16.06%

The above plots and tables show pre- and post-LeviCell FACS and Cellometer results indicating increased viability in the live channel following sorting with the Levicell. The plots and tables on the left were generated from Endometrial DTCs, while the data on the right is from Bladder DTCs. Samples that were or were not sorted with the LeviCell were stained with DAPI and analyzed by flow cytometry and the results are shown in the FACS plots above. Samples were also quantified using a Cellometer which is reported in the tables.





The above graphs show pre- and post-LeviCell FACS runs showing that unique populations are maintained at the same ratios. The graph on the left indicates results from Endometrial DTCs and the graph on the right indicates results from Bladder DTCs.

This graph shows the LeviCell removes a considerable amount of dead cells and debris from Bladder and Endometrial DTC samples. Blue denotes starting viability, pink denotes viability in the live output from the LeviCell, and green shows the viability in the dead cell output.

Conclusion

Viable dissociated tumor cells are an integral component of therapeutic, diagnostic, and preclinical cancer research. Current methods used for sorting dissociated tumor cells take a certain level of finesse and technical expertise, time, and ample funding to produce sufficient yield and DTC viabilities that enable the analysis of these rare and sensitive cells.

The LeviCell's 3-step, hands- and label-free platform enables the enrichment of dissociated tumor cells while maintaining their gene expression and original sample representation ratio for accurate downstream analysis, thus enabling scientists and researchers to focus their effort and expertise on advancing their life-saving scientific knowledge and discoveries.

1455 Adams Drive
Menlo Park, CA 94025
contact@levitasbio.com

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