Advancing Translational Leukemia Research Through First In Class Magnetic Levitation (LeviCell)

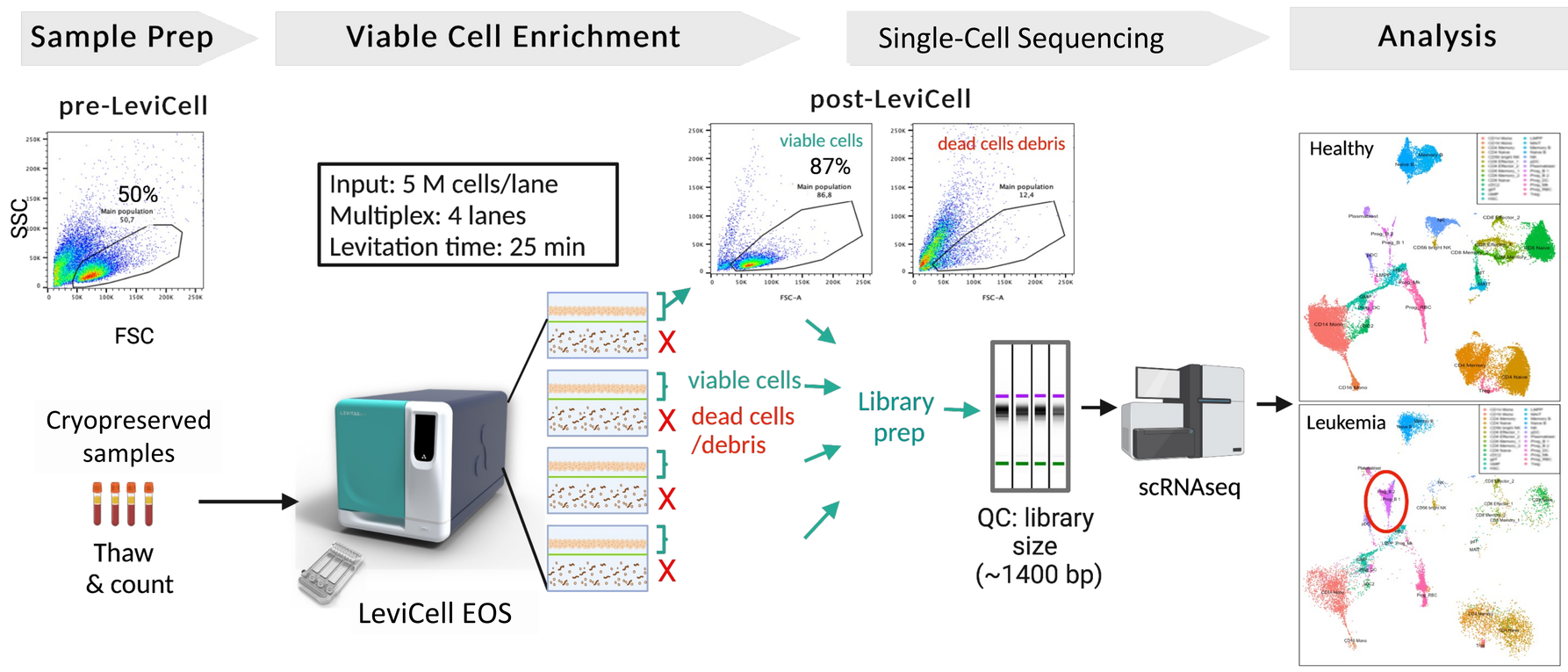
Ernesto Diaz-Flores, PhD[1], Debia Wakhloo, PhD[2], Matt Witkowski, PhD[3]

[1]University of California at San Francisco, San Francisco, CA, [2]LevitasBio, Inc., Menlo Park, CA, [3]University of Colorado, Aurora, CO

LeviCell™ Use Case: scRNA seq Workflow For Enhanced Purity

1) Optimizing scRNAseq workflow using the LeviCell system for enhanced purity.

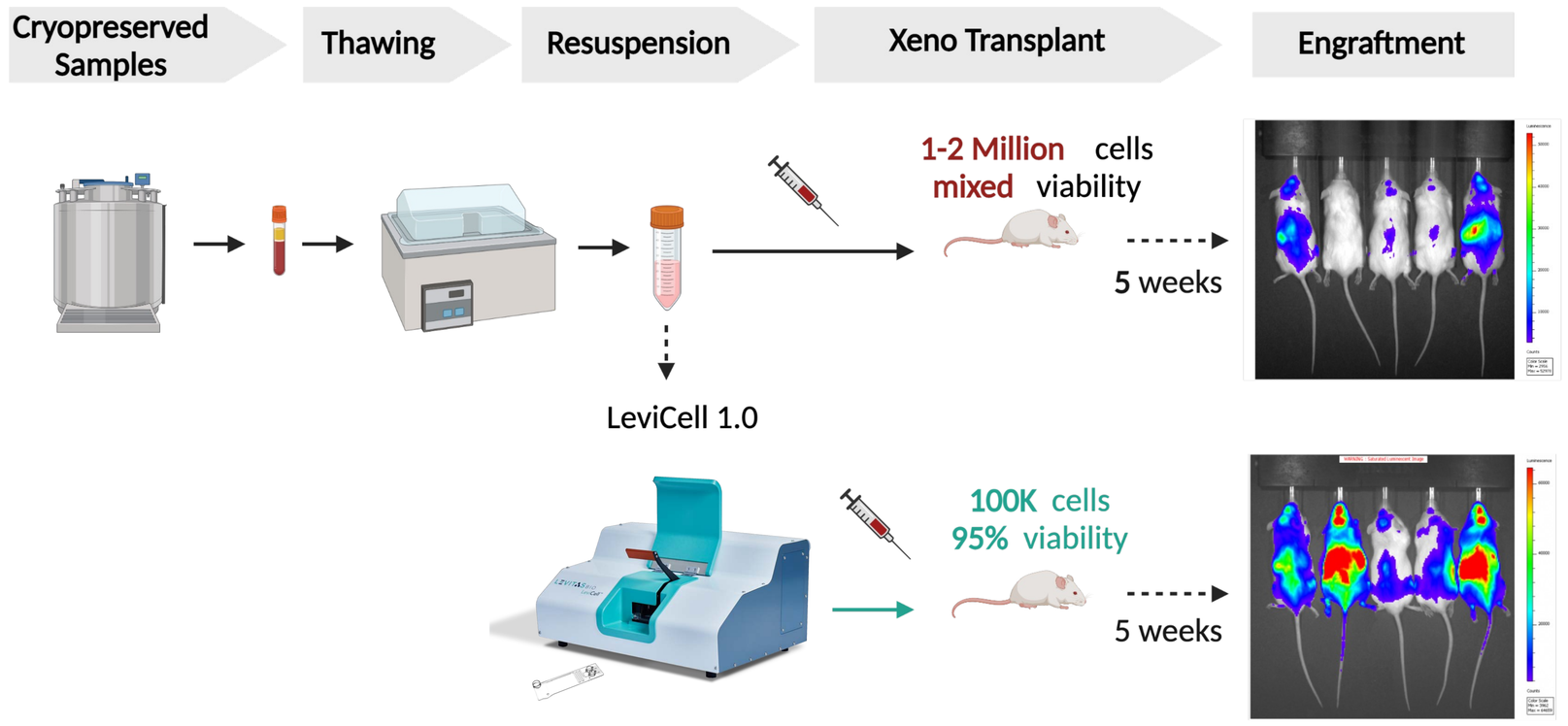
4 cryopreserved samples were thawed (49-80% viability), and 5 M cells loaded in each lane of the LeviCell EOS 4-lane cartridge. Magnetic levitation was applied for 20 minutes, and all 4 samples were collected in 5 minutes. The **top fractions containing only viable cells (87-95% viability**) devoid of debris were counted and used to prepare high QC single-cell RNAseq libraries**.** Single cell cluster data shows the comparison between healthy cells and B cell leukemia.



LeviCell Use Case: Patient Derived Xenograft Optimization

2) Optimizing primary cell harvest to generate patient derived xenograft (PDX) models.

Primary samples may be stored for years prior to analysis. Upon thawing, viability is highly variable and often poor. PDX generation requires 1-2 M cells for tail vein injection to achieve up to 80% engraftment efficiency after 10 weeks. However, after **viable cell enrichment of the primary sample with the LeviCell system, we were able to obtain >95% engraftment using 10-20x fewer cells per injection within a shorter period of 5 weeks.**



LeviCell Use Case: Lentiviral Transduction Optimization

3) Enhancing efficiency of lentiviral transduction.

During lentiviral transduction, puromycin selection induces massive cell death of non-transduced cells which can indirectly induce cell death of successfully transduced cells. This can negatively impact cell recovery time. We used the LeviCell system 24h after puromycin selection to purify the highly viable cells and remove the dead/dying cells and the "cell death milieu". **Cell recovery time was significantly accelerated by 3x to 5 days compared to the conventional method of 15 days.**