
*Figure 1. LE-C32 series microfluidics chips are available in 70-µm, 100-µm, and 130-µm sizes.*

# Optimal Purification of a Variety of Cells using Chip-based Cell Sorters

## Background

Accurate purification of target cells derived from complex heterogeneous samples is a critical requirement in many scientific disciplines. Microfluidics chip-based cell sorters such as the Sony SH800 and MA900 can reliably and efficiently process diverse cell types by targeting specific physical properties of cells to actively purify them. The microfluidics sorting chip acts as an integrated flow cell nozzle that provides numerous advantages over conventional sorting systems. The Sony SH800 and MA900 combine sorting chips with other modern technologies and automation to provide precise, consistent sort setup on a daily basis.

LE-C32 series sorting chips enable sorting of a variety of cell types, including large cells that are susceptible to deformation. The flow channel geometry of these chips is optimized to maintain consistent pressure and minimize stream perturbances during the acceleration and deceleration of cells that occurs in the stream. LE-C32 chips offer superior sorting performance as well as high thermostability and an extended shelf life.

## Sorting Performance

In a cell viability test, HeLa cells (~18 µm) and Jurkat cells (~10 µm) were stained with propidium iodide, and live cells were sorted with the Sony SH800 cell sorter using both the 100-µm LE-C31 chip and LE-C32 sorting chip (standard and targeted setting). Cells were grown for 24 hours post sort, and the viability of the cells was determined using Trypan blue. Comparable viability was seen post sorting with LE-C31 and LE-C32 series chips as shown in Figure 2.

To test single-cell sorting, HeLa and TIG-1 human cell lines were sorted on the Sony SH800 cell sorter using the 100-µm LE-C32 chip. Sixteen cells/well were deposited on a 96-well plate using the normal and single-cell modes. Cells were grown in ambient growth conditions for 10 days, and cell proliferation was determined by count of colony formation units (CFU). As shown in Table 1, most optimal CFU was observed using the targeted (single-cell) setting of the 100-µm LE-C32 chip.

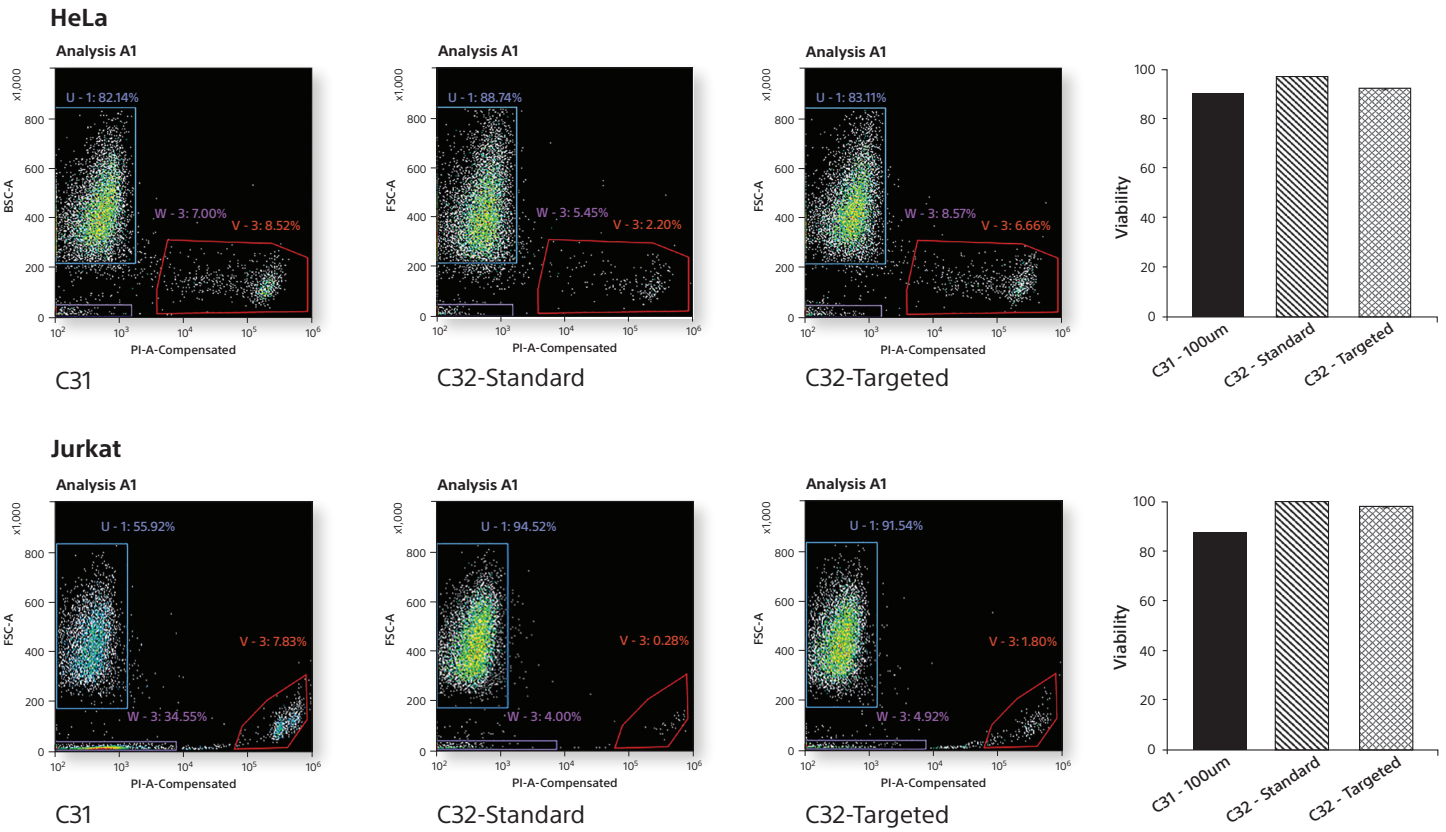


*Figure 2. Two types of cells sorted with the SH800 using the LE-C31 and LE-C32 sorting chips demonstrate comparable viability post sorting.*

| | HeLa | |
|---|---|---|
| Sort Mode | Normal | Single Cell |
| CFU | 9 | 14 |
| Yield | 56% | 88% |

| | TIG-1 | |
|---|---|---|
| Sort Mode | Normal | Single Cell |
| CFU | 10 | 14 |
| Yield | 58% | 88% |

*Table 1. Large cells sorted with the LE-C32 chip demonstrated high cloning efficiency.*

To test sorting of large cells, U-2 OS cells (~18-µm cell size, human osteosarcoma cell line) expressing mCherry were sorted on the Sony MA900 cell sorter using the 100-µm LE-C32 sorting chip. Single cells were sorted onto a 384-well plate. Index sort analysis was used to identify mCherry expression for individual cells.

SF9 (*Spodoptera frugiperda*, isolate) cells (~25-µm size) infected with baculovirus and expressing I-CAM and MHC II were sorted on the Sony MA900 cell sorter using the 100-µm LE-C32 sorting chip.

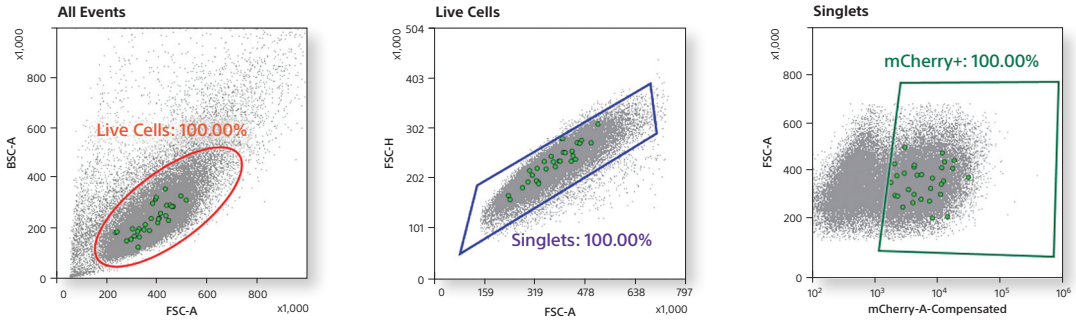


*Figure 3. Large deformable cells were sorted successfully using the LE-C32 sorting chip.*

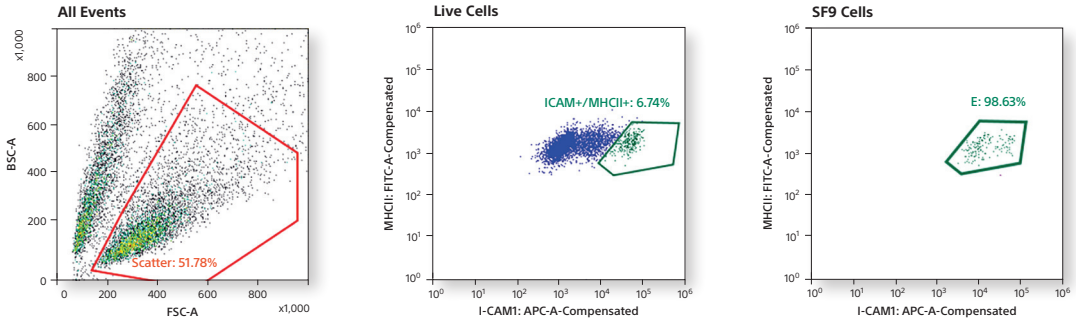


*Figure 4. Post-sort analysis showed that SF9 cells were sorted at a high purity.*

The LE-C32 series 100-µm sorting chip can be successfully used for sorting diverse cell types, including large deformable cells that are typically challenging to sort. Using this chip, high sort performance measured by purity, yield, single-cell deposition accuracy, and cloning efficiency can be obtained.