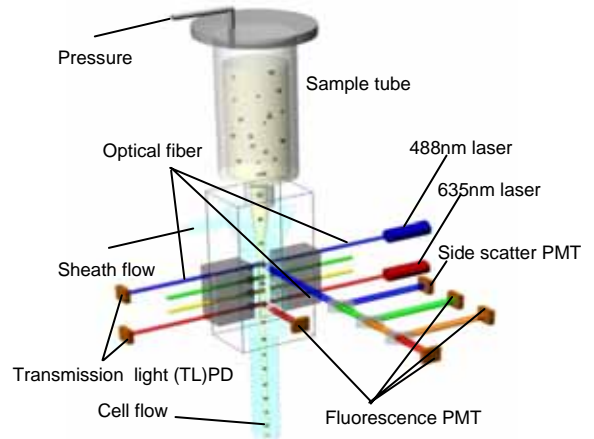


A novel flowcytometer for **damage-less** sorting!

Furukawa Electric is devoted to technical innovation of cell analysis for the forefront researches such as Human iPS (induced Pluripotent Stem) cells research.



PERFLOW® Sort



The optical fiber array-coupled flow cell design

【PERFLOW® Sort】

- The optical fiber array-coupled flow cell design delivers high sensitivity.
- High-precision measurement of cell size using transmitted light(TL) signal .
- Damage-less sorting based on mechanical changeover mechanism without ultrasonic wave, charge and high pressure.
- Sort single cell as well as cell mass into up to 384 multi-well plates.
- Easy aseptic setup and cleaning.
- Suitable for sorting delicate living cells such as Human iPS cells.
- No optical axis adjustment is required.
- Measurement data are provided in the format corresponding to FCS3.0 date format.
- Excitation laser option available.

【Specifications】

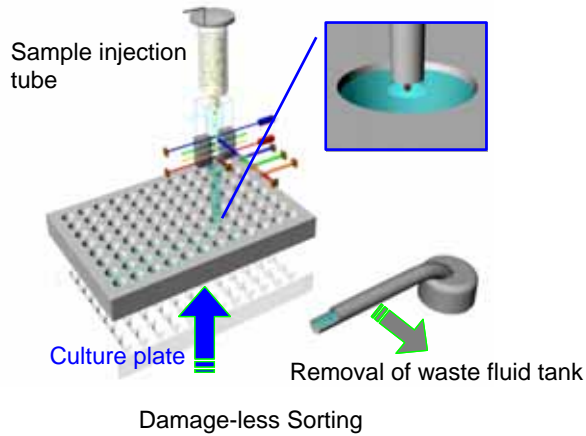
| Specifications | PERFLOW® Sort |
|---------------------------------|---|
| Accommodated Laser | Semiconductor laser: 488nm(20mW) , 635nm(15mW), 405nm or 560nm(Option) |
| Optical Parameters | 2 transmitted light(TL), 1 side scatter and 4 fluorescence (up to 11 fluorescence with 3 laser) |
| Fluorescence | FITC, PI (PE), PeCy5 (7-AAD), APC, and DAPI etc.(Option) |
| Sensitivity | <200 MESF FITC(when Spherotech Rainbow Beads used) |
| Data Resolution | 4 decades (Up to 5 decades) |
| Coefficient of variation | CV: below 3% (when BD QO Particles used) |
| Sensitivity of scatter detector | < 1μm to 99 μm |
| Analysis Rate | 20,000 events/second |
| Adjustment of light axis | No need |
| Sort Method | Mechanical flow changeover |
| Sort Rate | 3 cells/second (for single cell sorting)* |
| Plate Deposition | Suitable for 6-384 multi-well plates and tube |
| Sort mode | Single or Enrich |
| Analysis Gates | 15 gates (Extensible) |
| Sort Purity | > 95%(single mode) |
| Standard parameter | Main : 10 parameters (Total : 30 parameters) All parameters available can be saved |
| Original parameter | Flow velocity |
| Compensation | All fluorescence |
| Available Signal | Height(log/lin), Area (log/lin) , Width (lin) , Time |
| System Pressure | 2 PSI |
| Other | Available to sort under sterile conditions |
| Software | Standard control-analysis software (correspondent to FCS3.0 date format) |
| Operating System | Microsoft Windows 7 |
| Power | 100 ~ 240V AC |
| Size | 690 x 675 x 520mm WDH (3 lasers option:845 x 675 x 520mm WDH) |
| Weight | About 90kg |



- Sorting single rare cells from a large cell population in a short time is feasible by using our two-step sorting method.
- The ® mark shows a registered trademark in Japan owned by Furukawa Electric Co, Ltd.
For research use only

Working Mechanism of PERFLOW® Sort

Different from the conventional sorting methods using ultrasonic wave, charge and high pressure, which bring physical damage and/or stress to cells, PERFLOW® Sort adopts the optical fiber array-coupled flow cell to obtain transmitted light signals and precisely monitor flow speed of target cells. This flow cell design achieves cell sorting almost without any physical damage through the mechanical changeover of the culture plate.



Comparison of Sorting Conditions

| Damage-causing factors | Conventional technology | PERFLOW® Sort |
|------------------------|-------------------------|---------------|
| Pressure (Psi) | 10 ~ 100 | 2 |
| Supersonic wave (kHz) | 20 ~ 200 | 0 |
| Droplet-charge (kV) | 2 ~ 7 | 0 |
| Shock kinetic energy*1 | > 2500 | 1 |
| Shear power by fluid*2 | + | - |

*1: Comparison of kinetic energy(J). Shock kinetic energy was calculated using that received by cells at the time of touching on water by the No-drop-no-charge method as 1 (calculated assuming a drop velocity of 10m/sec.).

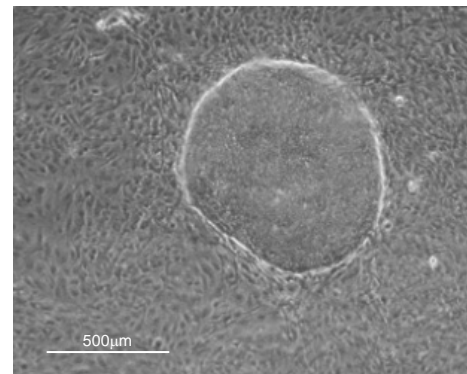
*2: Shear power by the fluid refers to the shear power the cells received when they pass through the flow with flexion, where secondary flow occurs and causes cells to move in a spiral course.

Examples of Application

Example Monocloning of human iPS cells

Human iPS (induced Pluripotent Stem) cells are becoming a useful tool in approaches to human diseases and regeneration medicine. To prove strictly the security and pluripotency of iPS cells, it is essential to employ a cell population generated from a single iPS cell in the study. However, due to its weakness to physical damage, sorting single iPS cell by conventional sorting methods causes severe cell death.

Sorting a single human iPS cell into one culture well has for the first time succeeded with PERFLOW® Sort, a novel damage-less sorter. The sorted single iPS cell formed a colony (High survival rate more than 60%).



Colony of human iPS cells formed by a single iPS cell

Example Single cell sorting of megakaryocytes

Megakaryocytes, one kind of the most delicate hematopoietic cells which cannot flow through the conventional cytometers because of their big size (40-100µm), was sorted by PERFLOW® Sort successfully and grew well after sorting (High survival rate more than 95%).



Just after sorting



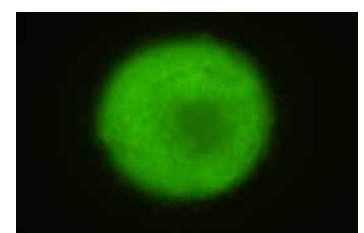
3 days after sorting

Example Single cell sorting of nerve crest cells derived from transgenic mice

GFP-expressing candidate nerve crest cells were sorted from transgenic mouse embryos as a single cell in one well. These sorted cells formed neurospheres after 20 days culture.



Embryo at 9.5 day from transgenic mice



Fluorescent observation of Neurosphere



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