Droplet Selection and Single Plating

Droplet technology is a next-generation method that significantly enhances efficiency of conventional screening

MADE IN JP

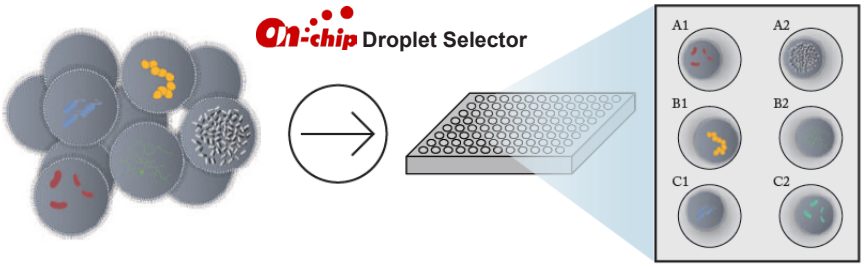
On-chip Droplet Selector

Lasers	405nm, 488nm, 561nm, 638nm
Measurement Parameters	Forward scattered light (FSC), side scattered light (SSC), and 6 PMT
Stage	0.5 - 125 μm

A device that combines the sorting of desired droplets with microfluidic chip technology and dispensing of single sorted droplets into a 96- or 384-well plate. Droplets can be dispensed without breakage, with accuracy of over 90%.

Specifications

Model	Droplet Selector
Laser	Three lasers can be selected (405 nm, 488 nm, 561 nm, 638 nm)
Laser class	Class 1 (IEC 60825-1:2014)
Measurement parameters	Forward-scattered light (FSC), side-scattered light (SSC), and 6 PMT
Detection wavelength	FL1: 445/20 nm, FL2: 543/22 nm, FL3: 591.5/43 nm (607/36 nm when 561 nm laser is used), FL4: 676/37 nm, FL5: 716/40 nm, FL6: 775/46 nm
Sample size for analysis	0.5 – 125 μm
Sorting mode	1,000 events/sec
Dispensing speed	96 well/10 min (dependent on the target ratio)
Despensing accuracy	> 90% (depends on the samples)
Time to start operation	5 mins.
Shutdown	10 sec (no need for cleaning)
External dimension (W×D×H)	29.9 × 19.7 × 31.5 in (760 × 500 × 800 mm)
Weight	165 lb (75 **kg**)
Control	Laptop PC (Windows 10)
Power input (main unit)	AC 100 – 240 V, 50/60 Hz
Power consumption (main unit)	240 VA
Power input (HEPA filter)	AC 100 V, 50/60 Hz
Power consumption (HEPA filter)	35 W



Hundreds of thousands of droplets

High-throughput analysis of droplets and single plating of target droplets only: 96-well dispensing in 10 min

Consumables

Part No.	Description	Packing unit
ONC-1004001	2D Chip-SD1000 Material: COP Channel size: 80 x 80 μm	10 chips / box
ONC-1004002	2D Chip-SD1000w150 Material: COP Channel size: 150 x 150 μm	10 chips / box
ONC-40030	Seal for Droplet Selector chips	1 piece / box
ONC-1007011SF	DS Dispensing Tip 96SF	96 tips/rack

ONC-1004001

ONC-1004002

ONC-1007011SF

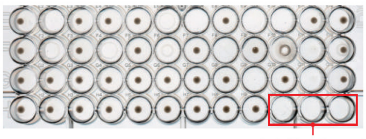
On-chip Droplet Selector

Part No.	Description	Specifications	Laser	Detectors
ONC-362DS001	On-chip® Droplet Selector HS	Laser 3, FS, SS, FL (6 colors)	488 nm, 638 nm, 405 nm	FL1, FL2, FL3, FL4, FL5, FL6
ONC-362DS001G	On-chip® Droplet Selector HSG	Laser 3, FS, SS, FL (6 colors)	488 nm, 561 nm, 405 nm	FL1, FL2, FL3, FL4, FL5, FL6
ONC-362DS001GR	On-chip® Droplet Selector HSGR	Laser 3, FS, SS, FL (6 colors)	488 nm, 638 nm, 561 nm	FL1, FL2, FL3, FL4, FL5, FL6

Application Notes

Single plating of droplets containing rhizobia

Rhizobia were encapsulated in approximately 5% of the total droplet population and cultured and droplets containing the grown rhizobia were dispensed into 96-well plates using On-chip® Droplet Selector. After incubation in the well plate, growth was confirmed in 32 out of 45 wells where rhizobia were dispensed.



Control (not dispensed)

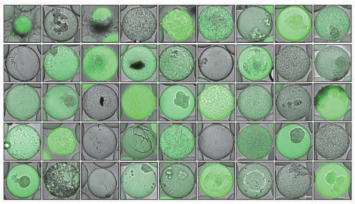
Well plate culture, 14 days later

Number of wells with dispensed rhizobia: 45
Number of wells with rhizobial growth : 32
Growth rate : 71.1%

Demonstrates that droplets containing microorganisms can be dispensed with high precision and the microorganisms can be re-cultured

Screening of enzyme-producing microorganisms from the soil environment

Microorganisms collected from soil were enclosed and cultured in droplets with substrates that react with enzymes (peptidases). As a result, various growth forms and enzyme activities of the microorganisms were observed. Droplets showing the target enzyme activity can be isolated at high throughput using On-chip® Droplet Selector, which is expected to lead to the discovery of new microorganisms.



Droplet culture of environmental microorganisms and evaluation of fluorescence intensity

Enables targeted screening of target activity from a variety of environments

** Collaboration with Prof. Ogasawara Nagaoka University of Technology*

Features & Process

CLEAN WORK ENVIRONMENT

- HEPA filter keeps the air inside the device clean
- Use of disposable microfluidic chips eliminates the risk of cross-contamination
- Can fit inside an anaerobic chamber

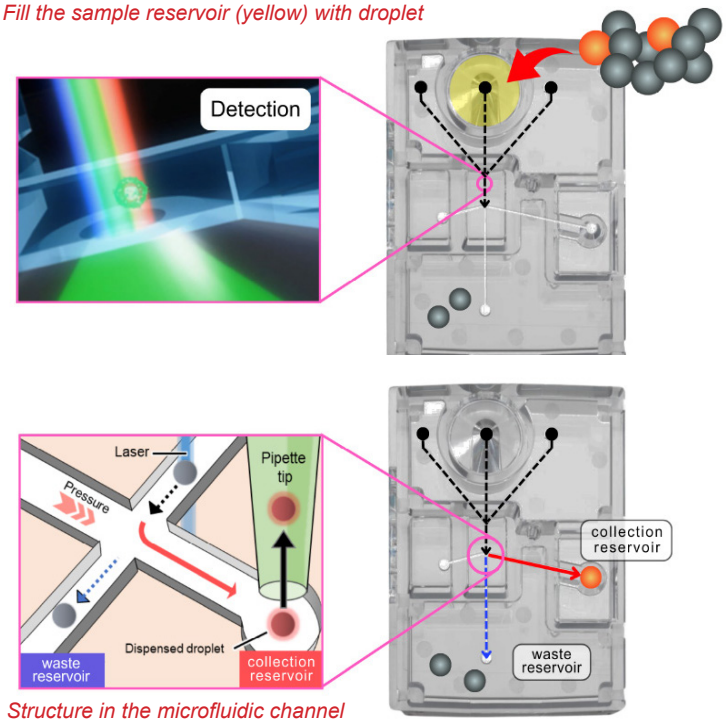
EASY OPERATION AND MAINTENANCE FREE

- Analysis and sorting can begin in under five minutes after startup
- No maintenance required – eliminates the need for complicated instrument cleaning

DETECTION AND SEPARATION IN A MICROFLUIDIC CHANNEL

- Acquisition of forward and side scattered light (FSC/SSC) and fluorescence information of all droplets using the principle of flow cytometry
- Target droplets are separated one by one by pneumatic control (patent Nos. US10101261, US10222317, US10724938, and US10648899)
- In addition to droplets, cells and gel microdrops (GMDs) can also be analyzed and sorted

Fill the sample reservoir (yellow) with droplet

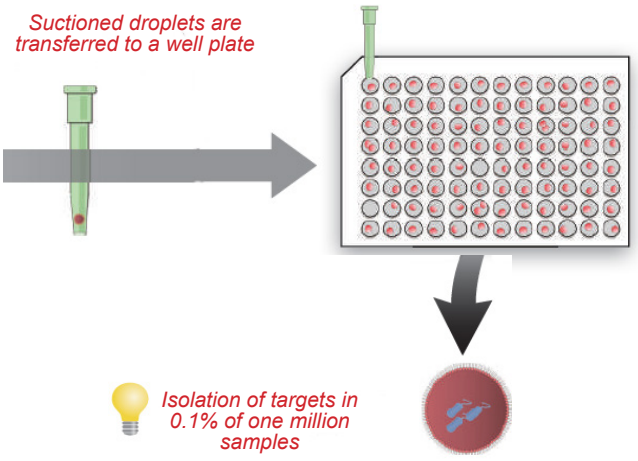


Structure in the microfluidic channel

DISPENSING ONE BY ONE INTO A WELL PLATE

- Droplets collected on the microfluidic chip are dispensed
- Dispensing on to a 96-well plate can be completed smoothly
- Up to three 96-/384-well plates can be placed
- Culture can be carried out immediately by dispensing medium in advance

Suctioned droplets are transferred to a well plate



Isolation of targets in 0.1% of one million samples