Digital Colony Picker

DCP 160 | **Brochure**



eCyte

| eCyte, Inc. | Functional Single Cells at your fingertips |

Digital Colony Picker

Digital Colony Picker (DCP) enables large-scale, parallelized physical separation of target single cells with specific functions from a genetically heterogeneous cell population. It supports microdroplet-based cultivation, phenotypic monitoring of each microdroplet during the cultivation process, and fully automated selection of droplets containing pure cultures that exhibit desired phenotypes. This instrument can be widely applied to parallelized cultivation of various cell types, as well as the intelligent, automated selection of desired clones.

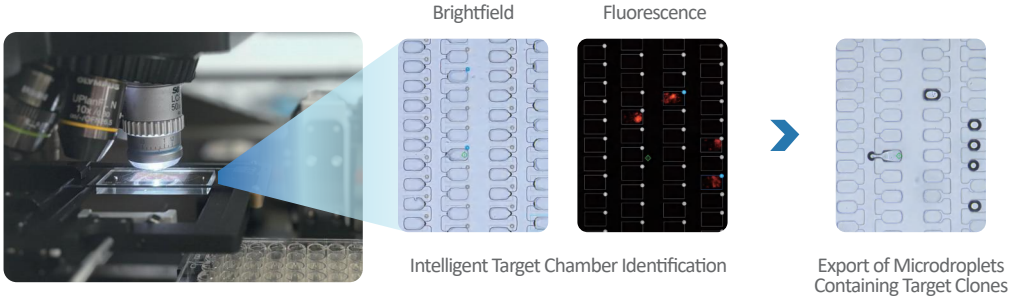


- Microdroplet Cultivation
- Microscopic Imaging
- Fluorescence Screening
- Non-Contact Colony Picking

Technological Innovation Opens a New Era in Microscopic Colony Selection

Static Droplet Array Cultivation Technology

The device is equipped with a static droplet array chip that houses tens of thousands of cultivation microchambers, each with a picoliter-scale volume. When a sample suspension is introduced into the chip, individual cells are gently distributed into the microchambers according to Poisson distribution. This is followed by mass parallelled cultivation, bright-field imaging for cellular growth and multiplication, fluorescence imaging (when necessary), A.I. based selection of targeted clones and their individualized non-contact exportation, all at single-cell resolution and for each of the selected microchambers.



AI-Assisted Image Processing Technology

The device integrates an autofocus imaging system capable of capturing high-resolution images for each microchamber. Using advanced image processing algorithms, it automatically analyzes individual clones within the chambers and intelligently identifies the desired target chambers. All imaging data and the spatial coordinates of the clones are automatically recorded and stored for subsequent traceability and data analysis.

Non-Contact Optical Manipulation of Microdroplets

Built on a high-precision automated platform, the device allows for precise localization of target microscopic clones. Using optical manipulation technology, it remotely captures these clones and encapsulates them in microdroplets for efficient recovery. The entire clone picking process is non-contact, significantly reducing the risk of contamination.

Features

High-Efficiency Intelligent Screening

AI-based image recognition (brightfield/fluorescence) enables automatic and precise targeting of desired chambers, and one-click export of target clones

Flexible Reagent Exchange

Streamlined reagent exchange within chambers enables a wide range of experimental designs

Ultra-Low Consumable Usage

5,000+ single clones (equivalent to 50+ agar plates) can be recovered from each chip, with significant reduction in experimental costs

Intuitive Data Visualization and Traceability

Offers multiple data visualization options, field-of-view toggling capability, and high-magnification imaging to observe cultivation chambers

Cultivation in Independent Chambers

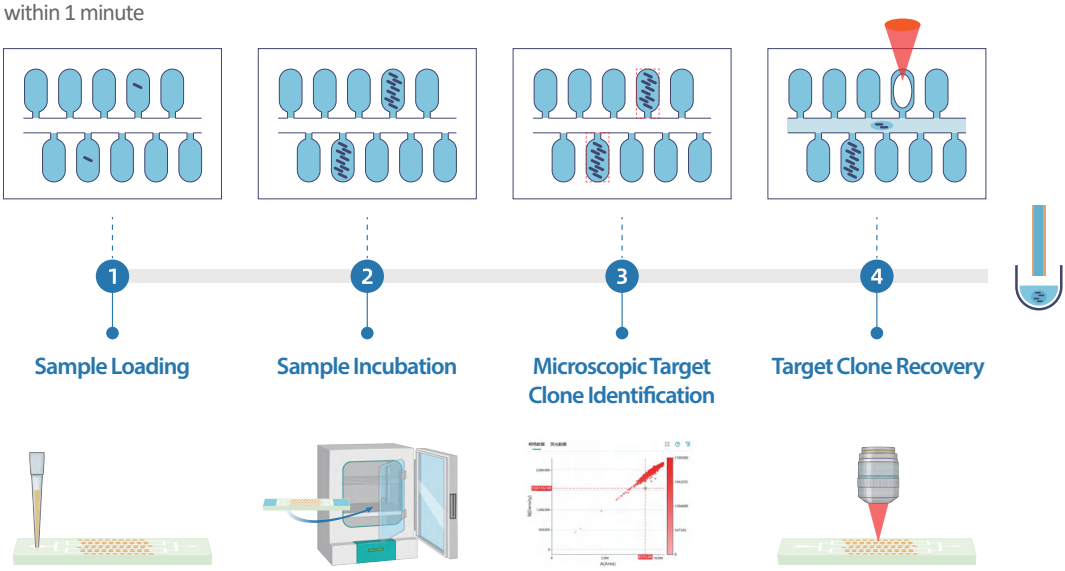
Cultivation of single cells in independent chambers culturing effectively minimizes interference from fast growing cells

Reduced Contamination Risk

Non-contact colony recovery and water-in-oil microdroplet collection reduce the need for frequent consumable changes and minimize aerosol contamination

Simple and Intelligent Workflow

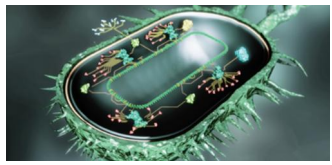
1. Once a sample is loaded into the chip, single cells within the sample automatically disperse into microchambers within 1 minute
2. The chip is placed in an incubator for cultivation
3. Autofocus and high-speed brightfield/fluorescence imaging facilitate the intelligent identification of target microchambers
4. Target clones are intelligently selected and subsequently recovered into a collection plate as microdroplets



Sample Loading | **Sample Incubation** | **Microscopic Target Clone Identification** | **Target Clone Recovery**

Applications





- **High-throughput screening of lactic acid-producing strains**

  a) Product produces fluorescent signal
  b) Fluorescence intensity as the sorting criterion
  c) Target cell proportion: approx. 1%
  d) After one round of screening, a strain with a 17.6% increase in lactic acid production compared to the original strain was obtained

- **Cultivation of low-abundance microorganisms**

  a) Environmental microbiome samples
  b) Compartmentalized cultivation in microchambers
  c) Multiple low-abundance strains were successfully recovered from screening, reducing the cultivation time by two-thirds compared to conventional agar plate approach

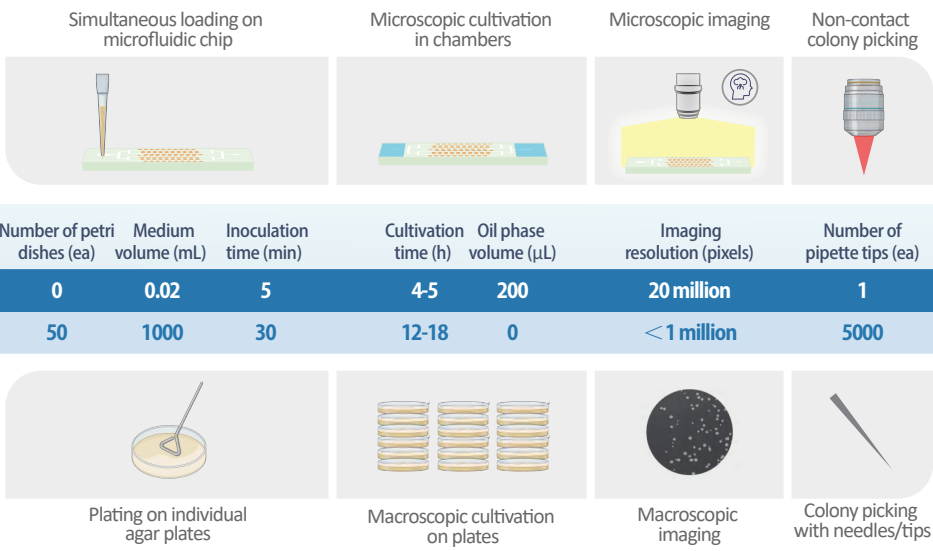
- **Screening of fast-growing strains**

  a) Stress conditions
  b) Plaque size under brightfield as the sorting criterion
  c) After four rounds of screening, a fast-growing strain was obtained, with a growth rate 69.6% higher than the original strain

- **De-duplication of clones by microscopic imaging**

  a) Environmental microbiome samples
  b) Morphology of individual cells and their spatiotemporal pattern of growth, development, and multiplication in each chamber as sorting criteria
  c) Seven different morphologies were observed on chip, and sequencing of sorted strains revealed seven distinct strains in an efficient microbiome screening

Comparison of Digital Colony Picking (DCP) with Conventional Colony Picking (CCP)*



	Number of petri dishes (ea)	Medium volume (mL)	Inoculation time (min)	Cultivation time (h)	Oil phase volume (μL)	Imaging resolution (pixels)	Number of pipette tips (ea)
DCP	0	0.02	5	4-5	200	20 million	1
CCP	50	1000	30	12-18	0	< 1 million	5000

*Estimate for screening 5,000 *E. coli* clones

Digital Colony Picker - Product Specifications and Product Catalog

Product Specifications

Cell types	Bacterial, archaeal, and fungal cells; expandable to microalgae, plant, animal, and human cells
Sample volume requirement	Sample volume ≥ 20 μL
Excitation wavelength	Blue-green light with center wavelengths of 470 nm and 530 nm
Number of microchambers on chip	16,000 microchambers (expandable), pL-volume for each microchamber
Colony identification approach	AI-assisted image recognition (brightfield/fluorescence)
Colony identification speed	800 chambers per minute
Colony recovery speed	1,000 single colonies per hour
Collection plate	96-well culture plates and 96-well PCR plates
Weight	60 kg
Dimensions	900 × 535 × 425 mm (W × D × H)

Product Catalog

Catalog number	Product name	Specifications
SCD006001	Digital Colony Picker	ea
SCC008101	Colony cultivation and recovery reagent kit	4 chips/box
SCC008102		4 chips/box
SCC008103		4 chips/box

About Us

eCyte, Inc. is dedicated to advancing single-cell analysis and sorting through its innovative Ramanome Technology, which characterizes the metabolic phenotypic information of individual cells, and detects metabolic functional heterogeneity. This technology provides a panoramic view at single-cell resolution that links metabolic phenotype information with genomics, transcriptomics, proteomics, and metabolomics for multi-omics studies.

eCyte has pioneered the concept of Ramanome, independently developed key components, core algorithms, application-specific databases, and intelligent data analysis software, culminating in high-precision life science instruments and microfluidic chip consumables. Additionally, the company has created a metabolically targeted live single-cell analysis and sorting technology platform, offering a powerful tool for rapid functional detection, resource mining, and mechanistic analysis of cells from humans, animals, plants, and microorganisms.

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