





ALIT LifeTech Inc.





High-throughput Intelligent 3D Cell Analyzer



INNOVATIVE HARDWARE

- Advanced image acquisition
- Z-stack imaging and projection
- Wide consumable compatibility
- Ready for integration in automated environments

INTELLIGENT SOFTWARE

- Al-based image analysis algorithms
- Intuitive user interface
- Customizable reports in MS-Excel, PDF or image JPG
- Compliant with FDA's 21 CFR Part 11 and cGMP regulations



- Organoid culture quality control
- Label-free organoid drug response test
- Organoid quantity and viability monitoring using fluorescence stains
- Cytotoxicity analysis for tumor organoid-based IO co-cluture assay

ADVANCED LIGHT PATH DESIGN

Innovative Imaging Technology

The concave meniscus formed in the wells of a microtiter plate causes significant light refraction near the edge of a well, resulting in an image with dark ring section when using common imaging technology. This makes it challenging to identify and quantify cells seeded near the edges. The Countstar Castor's innovative imaging technology solves this issue, captures bright and clear images of the entire well area, enabling confident identification of single cells near the well's edge.



Conventional image of a well with a broad and dark edge affecting cell recognition.



Well image acquired on a Castor S1 showing a bright image of the entire well, including its edge.



Concave meniscus results in light aberrations at the edges of a well.

HIGH-SENSITIVITY PELTIER-COOLED CAMERA

The advanced optics of the Countstar Castor S1, consisting of a cooled CMOS high-resolution camera at 10MP, and high NA objectives at 4x and 10x, captures images with rich details, enabling precise phenotyping of various types of organoids.



Exemplary image of mouse small intestinal organoids on day 5 was acquired with 10x magnification. The structure of intestinal crypts is clearly visible.

PRODUCT FEATURES

LASER RANGING AUTO FOCUSING

There can be significant differences in the focus layer of well bottoms among microtiter plates, depending on different suppliers or even different production batches from the same manufacturer. In rare cases, different wells on the same plate may have different focus layers, leading to inconsistent image definition if the focus isn't adjusted accordingly. The Countstar Castor S1 rapidly scans the bottom of each plate with a laser beam to automatically identify the correct focus distance for each well, ensuring sharp images of all samples on the plate. This advanced technology allows users to select from a broad range of multi-well plates.





Z-STACK IMAGING AND PROJECTION

The Countstar Castor S1 has a built-in Z-axis scanning feature to capture organoids grown in matrigel. Our imaging processing algorithm generates a Z-stack projection and stitching image of the whole matrigel dome, enabling a comprehensive phenotype analysis of each organoid.



Z-stack imaging

Z-stack projection

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TWO-CHANNEL, LED-BASED FLUORES-CENT LIGHT SOURCE COMBINED WITH MULTI-PASS FILTERS

- High-performance, solid-state multi-range fluorescent LEDs make the excitation of fluorophores more efficient and sensitive.
- Variable multi-pass filters allow for customizable combinations, enabling the application of a wider range of fluorescent dyes.

Excitation	Emission	Adaptive fluorescent dye
465-495	515-555	FITC/GFP
528-552	590-650	RFP/DsRed/mCherry/PE/PI

FL1 (Green) FL2 (Red) FL2 (Red)

AO/PI viability assay of mouse small intestinal organoids

Living cells are shown in green. Dead cells are shown in red.

PRODUCT FEATURES

WIDE CONSUMABLE COMPATIBILITY

- The Countstar Castor S1 contains a comprehensive consumable library with detailed geometric dimensions.
- Custom-made plates or newly launched consumables can be easily added to the consumable library.

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3	96-well plate	96-well transparer	NEST	701001					Detail	Edit	Сору	Delete
4	96-well plate	96-well transparer	Greiner	650180					Detail	Edit	Сору	Delete
5	384-well plate	384-well transpare	Corning	3701					Detail	Edit	Copy	Delete
6	96-weil plate	96-well transparer	Thermo	167008					Detail	Edit	Сору	Delete
7	6-well plate	6-well transparent	Corning	3516					Detail	Edit	Сору	Delete
8	10cm Petri dish	10cm Dish	Corning	430167					Detail	Edit	Copy	Delete
10	Slides	Countstar slides	Countstar	C0010101					Detail	Edit	Сору	Delete
11	T25	T25 Flask	Corning	430639					Detail	Edit	Сору	Delete
12	175	T75 Flask	Corning	430641					Detail	Edit	Copy	Delete
14	384-well plate	384-well blackboa	Greiner	781091					Detail	Edit	Сору	Delete
15	96-well plate	96-well whiteboar	Corning	3601					Detail	Edit	Сору	Delete
16	96-well plate	96-well blackboan	Corning	3603					Detail	Edit	Copy	Delete
17	12-well plate	12-well transparer	Corning	3513					Detail	Edit	Сору	Delete
18	48-well plate	48-well transparer	Corning	3548					Detail	Edit	Сору	Delete
19	24-well plate	24-well transparer	Corning	3524					Detail	Edit	Сору	Delete

- 1. 12 well plate
- 2. 24 well plate
- 3. 35mm/60mm/100mm petri-dish
- 4. 96 well plate
- 5. 384 well plate
- 6. 48 well plate
- 7. T75 culture flask
- 8. Countstar chamber slide and adapter
- 9. 6 well plate
- 10. T25 culture flask adapter



BUILT-IN BARCODE SCANNER



Sophisticated and distinct identification of consumables allows a convenient and traceable sample management of different consumables to avoid potential sampling errors.

AUTOMATION COMPATIBLE



The Countstar Castor S1 can be combined with various types of robotic platforms to allow a full integration into automated high-throughput analysis platforms.

AI-BASED IMAGE ANALYSIS

Organoids with diverse morphologies in a complex sample can be accurately identified and characterized, using Al-based image analysis algorithms.



Normal hepatocellular duct derived organoids, labeled in green, display a "vacuolar" structure formed by a single layer of epithelial cells. Hepatocellular-cholangiocarcinoma organoids, labeled in red, display irregular "cystic" and parenchymal structures.



Acquired image of colorectal cancer organoids



Pre-drug treatment of colorectal cancer organoids

Color Sca	ile Tabl	e										
Total No.	1	2	3	4	5	6	7	8	9	10	11	12
A												
B		359	384	397	330		153	276	262	165	104	
С		358	361	369	321		286	321	331	14	322	
D		231	203	244	236		342	408	345	369	378	
E		83	46	45	300		341	350	342	370	389	
F		102	48	70	86		323	338	290	319	288	
G		120	155	146	121							
Н												

Multiple analysis results presentation by heat maps, line and bar graphs.



Recognition image of colorectal cancer organoids



Post-drug treatment of colorectal cancer organoids







INTUITIVE GRAPHICAL USER INTERFACE (GUI)

Pre-defined "BioApps" for each type of organoid simplify image acquisition, review and analysis. New templates for varying types of organoids can be added easily to the BioApp library.



AUTOMATICALLY GENERATED COMPLIANCE REPORTS



Comprehensive display of data charts, diagrams, images, and quantitative statistical analysis results.

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Essential information	Smart Cell Analysis SHANGHAI RUIYU BIOTECH CO., LTD.
User ID: admin1 Department:	- Teleform of the second statement of the second state
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Instrument ID: RVBS3012 Objective information: 4	Avg diameter Avg compactness Profile roughness Hollowness
Consumble Type: 24-well plate Exposure parameters:	 Eccentricity — Long Axis/Short Axis
Channel information: #F Cell Type: Colorectal	
Review State: No audit required Measurement Time: 2023-04-18 13:56	
Experimental description:	1,500-
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transverse fungation (1)	e

Software supports a one-click report generation.

OPERATION COMPLIES WITH FDA's 21 CFR PART 11 AND ALL RELEVANT cGxP GUIDELINES

The Countstar Castor S1 provides a tamper-proof data management with a multi-level user access control, electronic signature, and all-encompassing audit tracking.

Hher	Compliance	management			×
8 Icon management	GMP enabled After opening, all edit	ting and deleting operations need to enter	the user, password and indicate th	he reason	
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	F01	User Management	100				Add, edit, and delete users
	F02	Icon management	10	2	2	2	Add and remove icons
	F03	Self-check management	92	8	2	2	Instrument status self-test
	F04	Audit management	82	2			View electronic records, and perform electronic record retrieval and export
	F05	Compliance management	t M		0		GMP enablement and shutdown, approval enablement and shutdown
	F06	Device management	10	8			Edit and modify the device number and device location
	F07	Cell Type	101	80	2		Editing, replication, and deletion of cell types
	F08	Consumables Managemen	e 19				Editing, copying, and deletion of consumables
	F10	Channel Management	60				Modification of channel information
	F12	Run the experiment	10	8	2	8	Run experiments with the Experiment Type List
	F13	Replicate the experiment	101 101	80	2		Copy the Experiment Type
	F14	Edit the experiment	81	8	2		Edit the Experiment Type
	F15	Delete an experiment	10	2			Delete the Experiment Type

ORGANOID CULTURE QUALITY CONTROL

Unlike classical 2D cell cultures, 3D-cultured organoids contain various cell types, can form functional "microorgans" that simulate the development process of whole organs and tissues, as well as their physiological and pathological states. Therefore, organoids are playing an increasingly important role in basic research and drug development. It is essential to monitor and analyze the growth status of organoids with high precision and high-throughput.



PRODUCT APPLICATION

GROWTH MONITORING OF LIVER CANCER-DERIVED ORGANOIDS



a. Plate view with thumbnail images of hepatic cholangiocarcinoma organoids over 7 days.
 b. Enlarged, processed image of the selected well D3 with identified organoids colored differently, according to their phenotypes.
 c. Result table listing analyzed values of organoid features.
 d. Time course plot of average organoids diameter development of the selected well.
 e. Heatmap showing the number of organoids per well.

LABEL-FREE ORGANOID DRUG RESPONSE ANALYSIS

Organoids derived from cisplatin-resistant primary cholangiocarcinoma tissues were cultured for 5 days, then treated with either cisplatin or gemcitabine for 3 days in replicates.

Samples were then analyzed in a Countstar Castor S1. Gemcitabine showed strong toxicity to the organoids, while cisplatin didn't stop the growth of the organoids.



Live organoids are labeled in green. Dead, degrading organoids are labeled in red.

ORGANOID FLUORESCENCE VIABILITY ANALYSIS

Cell viability in organoids and tumor spheroids can be measured using viability staining reagents (e.g. Acridin Orange (AO) / Propidium Iodide (PI). Fluorescence imaging in a Z-axis scan is carried out to obtain the titer, distribution, and spatial localization of dead and live cells. This is essential in evaluating the tissue penetration effect of drugs.

Mouse small intestinal organoids in bright field view



Same image section in fluorescent view



Live cells are labeled in green. Dead cells are labeled in red.

CYTOTOXICITY ANALYSIS FOR TUMOR OR-GANOID-BASED IO CO-CLUTURE ASSAY

Patient-derived organoids (PDO) are a powerful and effective model for drug screening and patient response prediction to treatment regimens, especially with immune cells co-cluture. The Countstar Castor S1 enables high-throughput imaging and effective data processing, accelerating the identification of an optimal, individualized treatment for the patients.





Proliferating hepatocellular carcinoma (HCC) organoids are labeled in green (CFSE); Dead and degrading HCC organoids and NK-92MI cells are labeled in red (EthD-1).

PRODUCT APPLICATION

CONTINUOUSLY EXPANDING CATEGO-RIES OF ORGANOID ANALYSIS

A comprehensive phenotype database of organoid morphologies has been established, will continue to expand due to extensive collaborations with many universities, research institutes, and well-known pharmaceutical companies. The data, shown below, were selected from this wide range of organoid experiments, including colorectal cancer organoids, breast cancer organoids, gastric cancer organoids, liver cancer organoids, and cervical cancer organoids.



cancer organoids

Hepatocellular carcinoma organoids

PRODUCT SPECIFICATIONS

Light source	High performance LEDs
Optical magnifications	4x objective lens (NA=0.2), 10x objective lens (NA=0.3)
Camera	16-bit, 10-megapixel, cooled color CMOS
Autofocus method	Laser and image-based autofocus
Compatible consumables	6-384 well plates, microscope slides, 35/60/100mm petri-dishes, T25/75 flasks
Consumable load	1 plate / tray per analysis
Maximum path length of X and Y axis of motor stage	X: 115mm Y: 220mm
Scope of Z-axis scanning	0-7.8mm
Fluorescence channels	EX:480/30nm EM:535/40nm EX:540/25nm EM:620/60nm
Fluorescence channels Power input	EX : 480/30nm EM : 535/40nm EX : 540/25nm EM : 620/60nm AC110-240V、50/60Hz、1.5A
Fluorescence channels Power input Monitor size	EX : 480/30nm EM : 535/40nm EX : 540/25nm EM : 620/60nm AC110-240V、50/60Hz、1.5A 23.8 inches
Fluorescence channels Power input Monitor size Computer configuration	EX : 480/30nm EM : 535/40nm EX : 540/25nm EM : 620/60nm AC110-240V、50/60Hz、1.5A 23.8 inches i7 processor, 64G RAM, 256G solid state hard drive + 4T hard drive, 1650S 4G graphics card
Fluorescence channels Power input Monitor size Computer configuration Computer size (W*D*H) Computer size (W*D*H)	EX : 480/30nm EM : 535/40nm EX : 540/25nm EM : 620/60nm AC110-240V、50/60Hz、1.5A 23.8 inches i7 processor, 64G RAM, 256G solid state hard drive + 4T hard drive, 1650S 4G graphics card 169mm × 300mm × 367mm
Fluorescence channels Power input Power input Monitor size Monitor size Computer configuration Computer size (W*D*H) Product size (W*D*H)	EX : 480/30nm EM : 535/40nm EX : 540/25nm EM : 620/60nm AC110-240V、50/60Hz、1.5A 23.8 inches i7 processor, 64G RAM, 256G solid state hard drive + 4T hard drive, 1650S 4G graphics card 169mm × 300mm × 367mm 5555mm × 540mm × 482mm

Product ordering information

Product Name: High-throughput Intelligent 3D Cell Analyzer Model: Countstar Castor S1 Product No.: IN100102(USA) / IN100103(EUR)







ALIT LifeTech Inc.

Countstar series product is for research purposes only and is not approved for diagnostic operation.



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