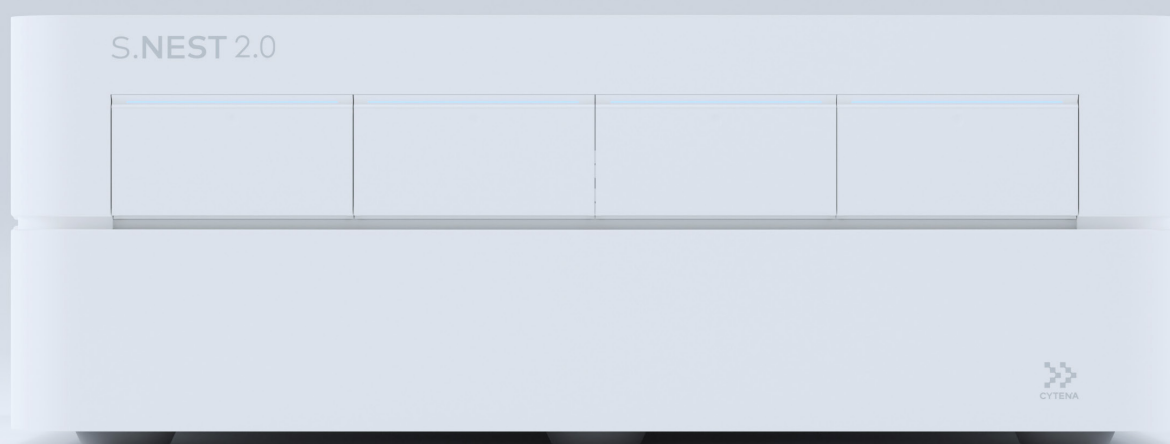


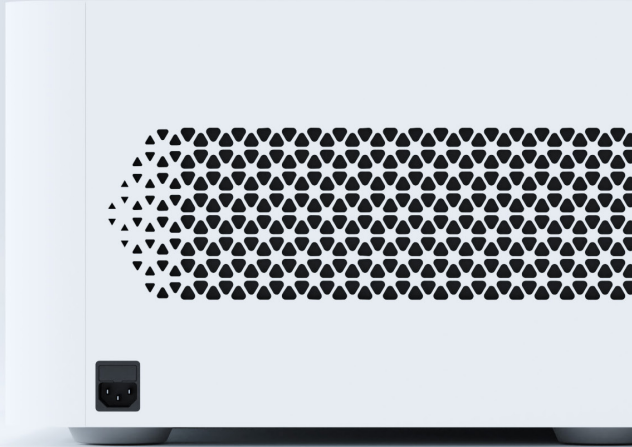
# S.NEST<sup>®</sup> 2.0

Enable cell  
metabolic  
monitoring and  
mixing in 96/24-  
well plates

At the smallest scale, for the  
highest throughput

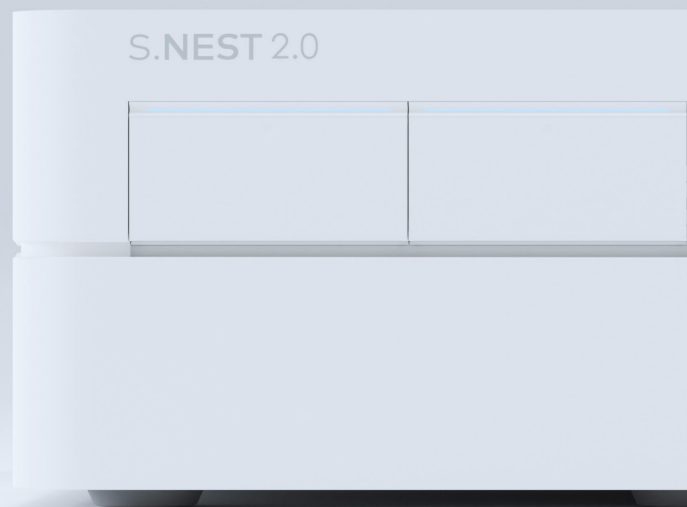


**CYTENA BPS**   
A BICO COMPANY



S.NEST is a cell culture incubator that monitors cell metabolism in real time while promoting optimal cell growth in 96/24-well plates.

Integrating monitoring, mixing, and incubating systems into a single instrument, S.NEST significantly reduces both the time and cost associated with cell culture R&D and manufacturing.



# ALL IN ONE S.NEST SYSTEM

Versatile enough to accommodate various cell types, including mammalian cells and microbes, S.NEST facilitates high-throughput screening and promotes increased cell proliferation.



Patented "in-well"  
mixing



Independent  
incubation



Cell metabolic  
monitoring

**COST-EFFECTIVE,  
TIME-EFFICIENT,  
LABOR-SAVING**

- Streamlined cell line development
- Early-stage cell clone selection
- Miniaturize model for process development
- High-throughput drug screening
- Analysis of cell metabolism
- Higher viability for primary cultures
- Automation-compatible for maximal productivity

S.NEST incorporates "in-well" mixing and data monitoring.

Functioning as an incubator itself, it streamlines your cell culture workflow. Our mixing and sensing technologies seamlessly operate throughout your cell culture process.



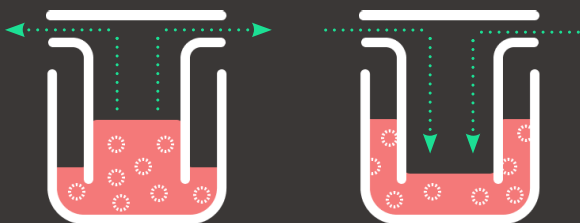
reddot winner 2022  
best of the best

## Mixing system

Air-induced suction or expulsion for efficient pneumatic mixing in 96/24 well plates

Suction

Expulsion

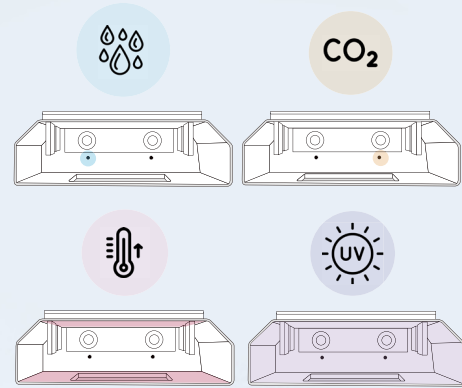


"in-well" mixing



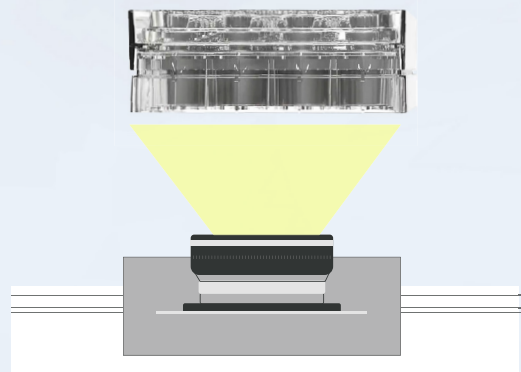
## Four independent incubation chambers

- Water reservoir
- Temperature control
- CO<sub>2</sub> level control
- Humidity monitoring
- UV light sterilization



## Camera module

Real-time detection of cell metabolism across the entire 96/24-well plate



# Patented Reciprocal Mixing Technology

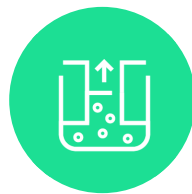
S.NEST applies suction or expulsion pressure through patented lids, enabling reciprocating “in-well” mixing for both 96 and 24-well plates.



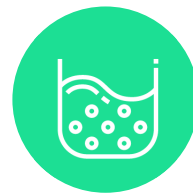
Homogeneous  
nutrient



Higher oxygen  
transfer rate



Maximum cell  
suspension

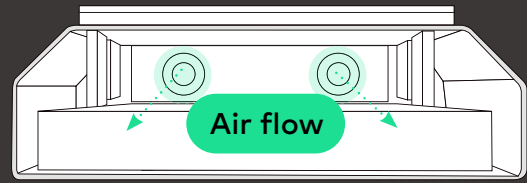


3D growing  
space

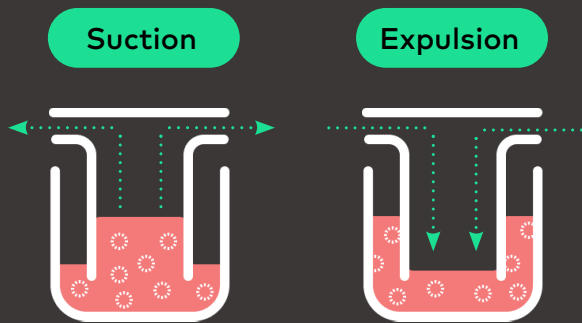
S.NEST 2.0



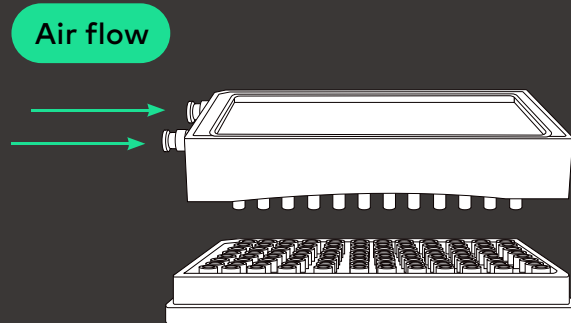
The oxygen transfer tubes connected to the lid provide cells with a consistent oxygen supply, maintaining a healthy environment. The mixing speed and mode can be customized to accommodate different cell lines.



NEST chamber



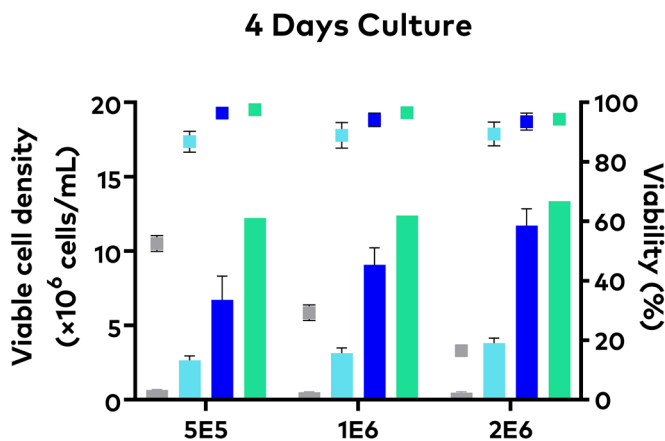
"in-well" mixing



Patented lid and plate

## Special feature – Suspension boost Best-in-Class Technology

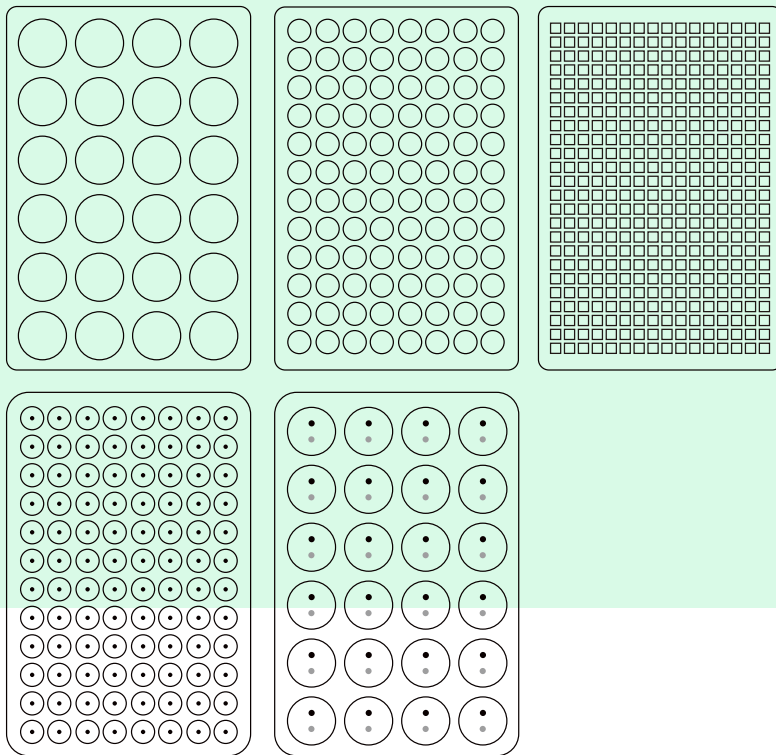
A vigorous mixing pattern specially designed to ensure that all cells are suspended to support even higher cell density and higher viability!



- Static
- 10s mixing
- 10s mixing with suspension boost
- Shake flask

**Culture condition:**

- Cell line: CHO-S cells P42
- Medium: BalanCD
- Working Volume: 1.4 mL/well



24  
96

384

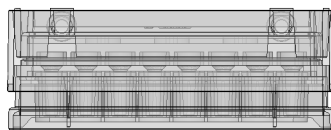
## Flexibility enabled by independent mixing control

Cultures in the four chambers can be independently configured with different mixing patterns. This allows for parallel execution of both mixing and static culture, providing enhanced flexibility.

### Mixing Culture



24-well plate  
with NEST lid

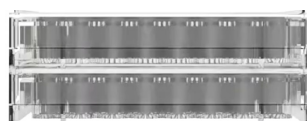


96-well plate  
with NEST lid

### Static Culture



24-well plate  
with standard lid

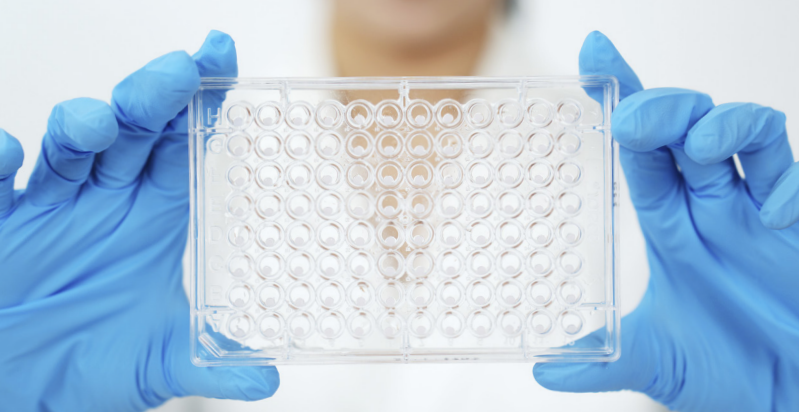


96-well plate  
with standard lid



384-well plate  
with standard lid





# Real-time cell metabolic monitoring

S.NEST monitors the DO and pH value of all wells simultaneously via the optical sensors attached to the bottom of the wells in commercial 96/24-well plates.

Using these data, the software then calculates OCR (oxygen consumption rate) and ECAR (extracellular acidification rate) for further enhanced sensitivity and even earlier detection of metabolic changes.

Measurements are taken non-invasively, allowing for the analysis of cell metabolism without disruption, manipulation, or contamination.

↳ Derive mitochondrial respiration and glycolysis insights from DO/pH/OCR/ECAR values

↳ Non-invasively assess real-time metabolic activity

↳ Obtain measurements every 10 minutes for each well



Dissolved Oxygen (DO)



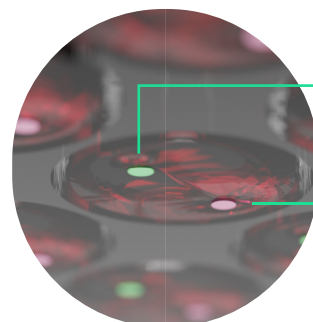
pH value



Oxygen Consumption Rate (OCR)



Extracellular Acidification Rate (ECAR)



Dissolved oxygen sensor tag

pH level sensor tag

# Intuitive software interface

The S.NEST software allows for convenient control of the four incubation chambers and displays real-time information on mixing status and environmental data.

## DO monitoring

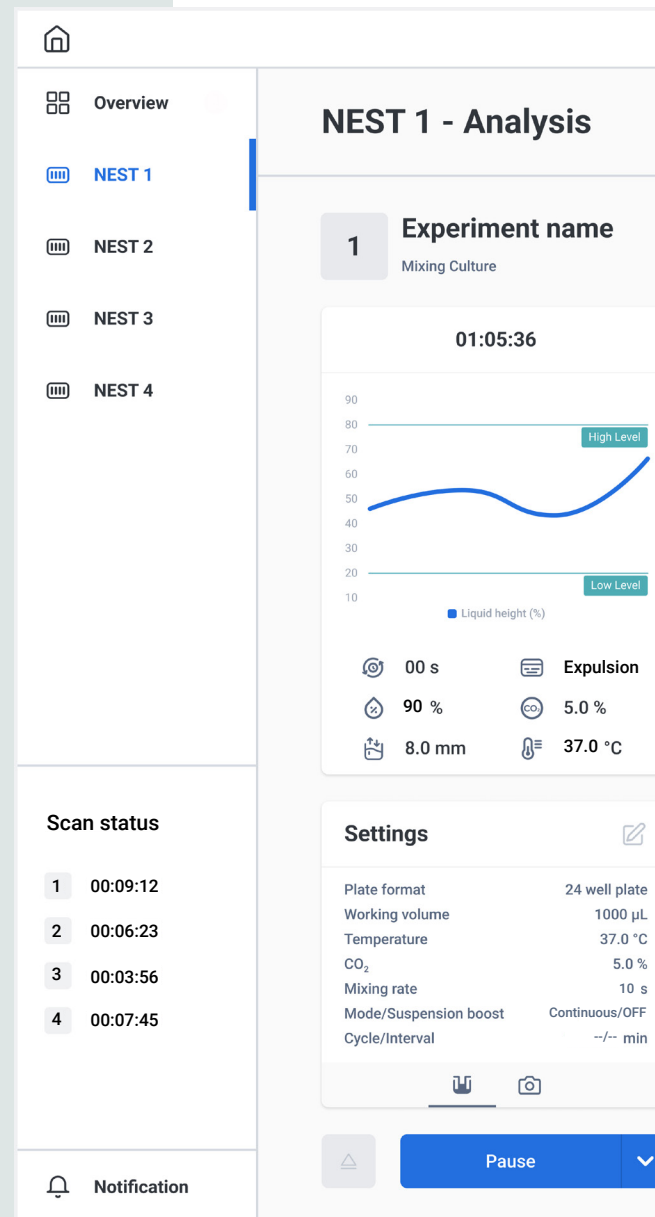


Cell growth rate &  
Cell viability  
↳ Cell growth profile  
Harvest time point

## pH monitoring



Lactate accumulation  
& Metabolic switch  
↳ Feed and pH  
control time point



## DO/pH/OCR/ECAR chart

DO/pH/OCR/ECAR values are displayed in real-time on the software interface, allowing for swift data visualization and detection of metabolic changes.

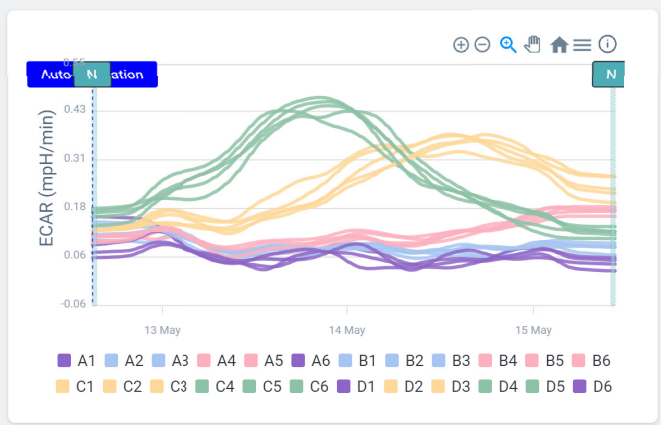
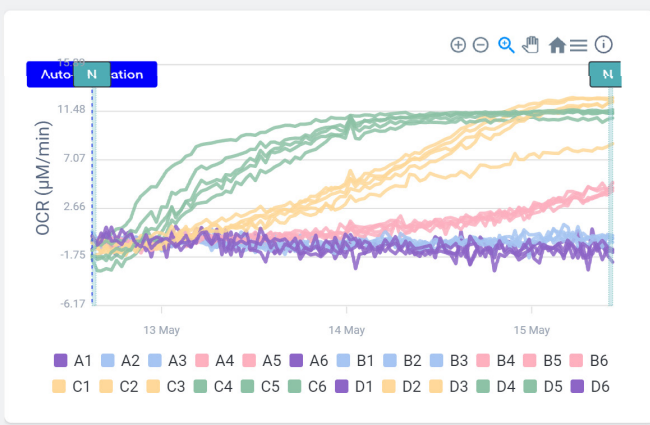
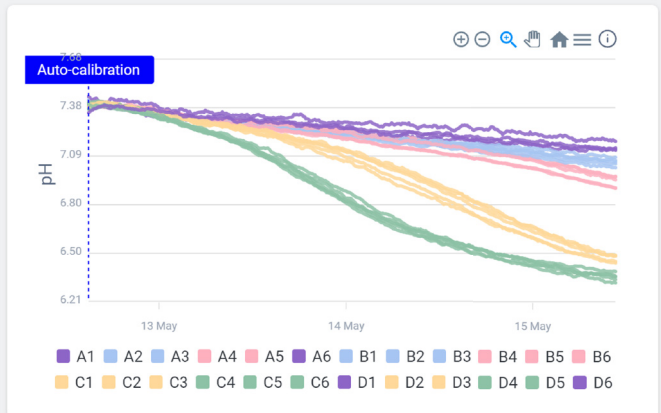
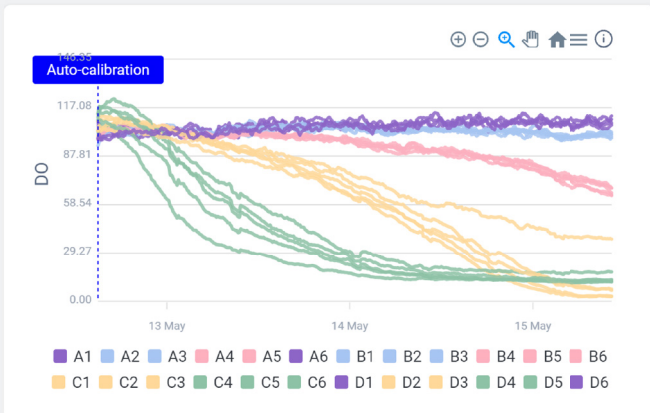
Export

Selected period: 21 Nov 00:00 — 22 Nov 15:45  
1 day 2 hours 15 mins

Moving average

	1	2	3	4	5	6
A	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
B	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
C	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
D	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5
	Group 1 2E4	Group 2 5E4	Group 3 1E5	Group 4 2E5	Group 5 5E5	Group 6 10E5

#	Group	Note
A1	Group 1	2E4
A2	Group 1	5E4
A3	Group 1	1E5
A4	Group 1	2E5
A5	Group 1	5E5
A6	Group 1	10E5
B1	Group 3	2E4
B2	Group 3	5E4
B3	Group 3	1E5

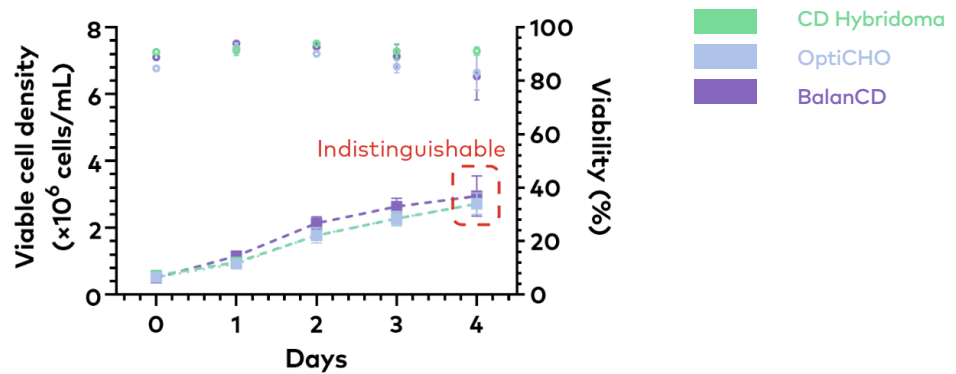


# Featured Applications

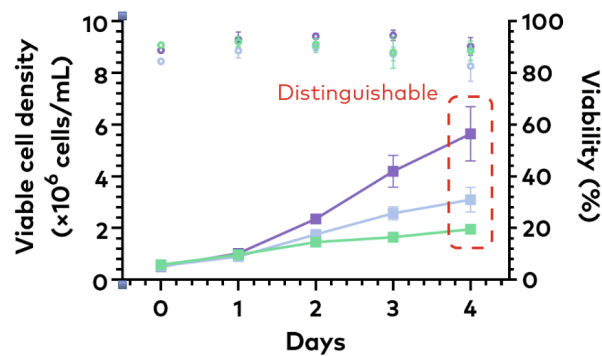
## From shake flask to 96/24 well plates - a scaled-down model for cell line and process development

↳ CHO cells medium screening in 24-well plate

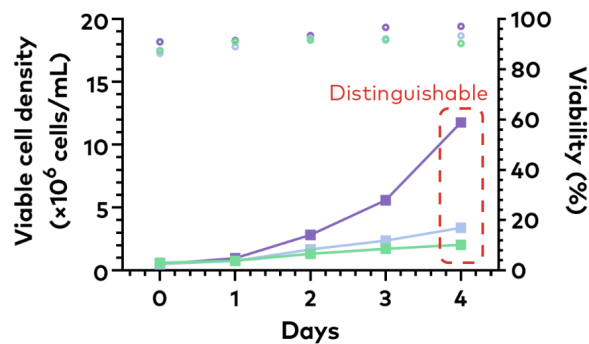
### 10s mixing



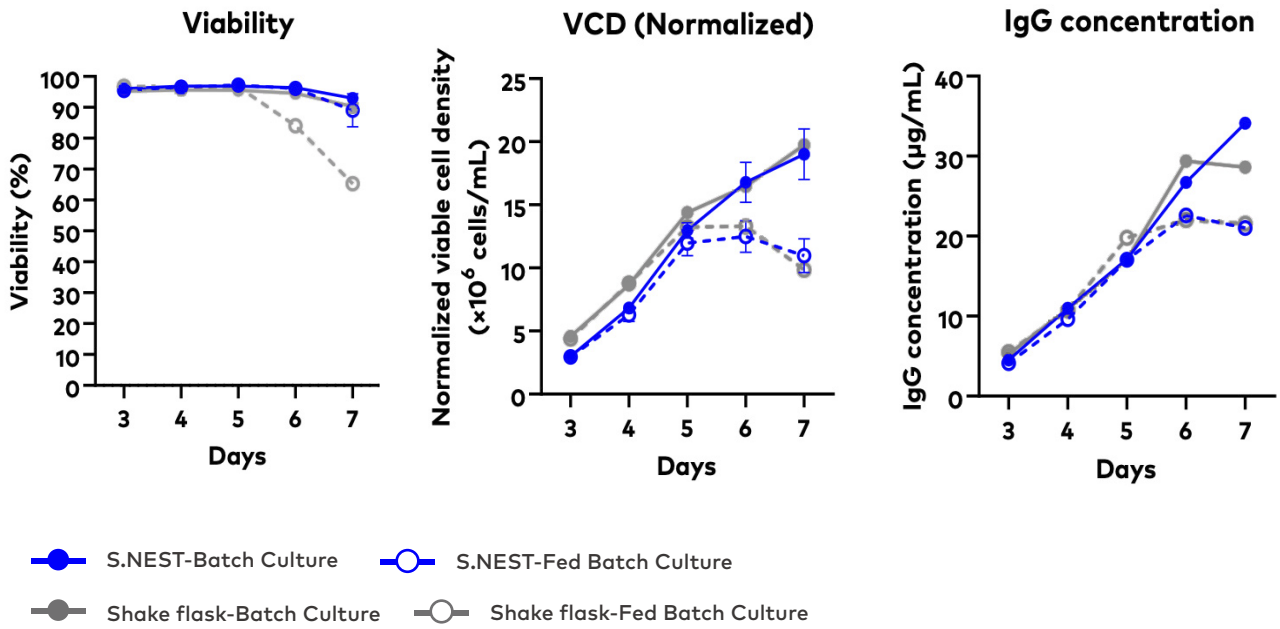
### 10s mixing with suspension boost



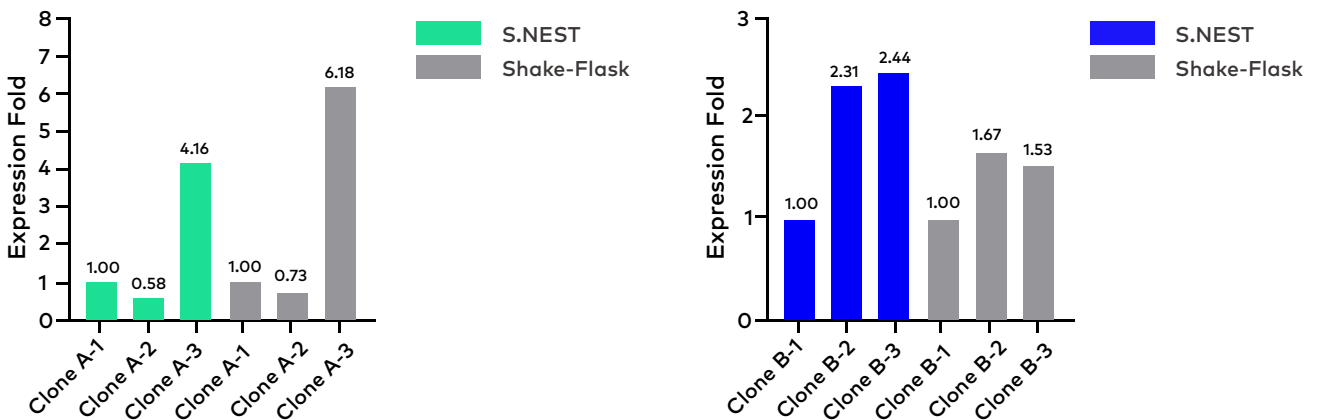
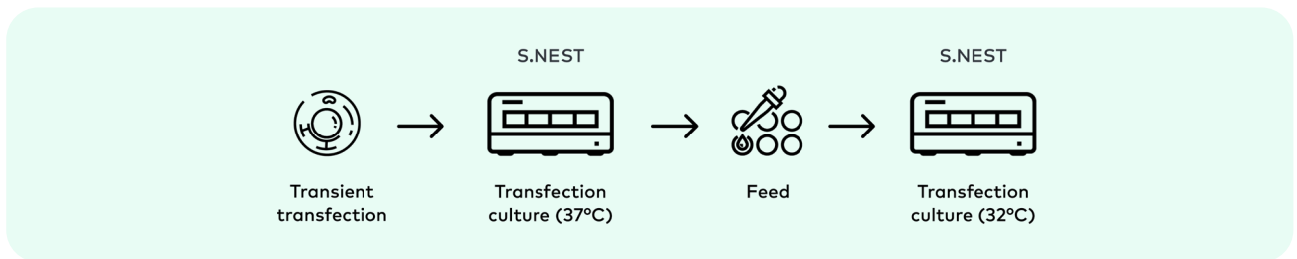
### Shake flask



↳ CHO cells batch v.s. fed batch culture in 96-well plate between S.NEST and shake flask

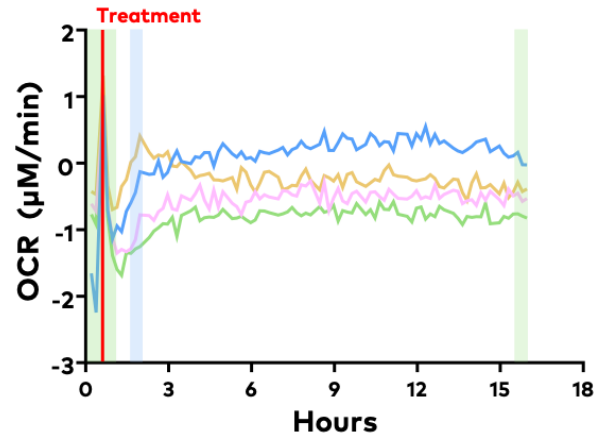
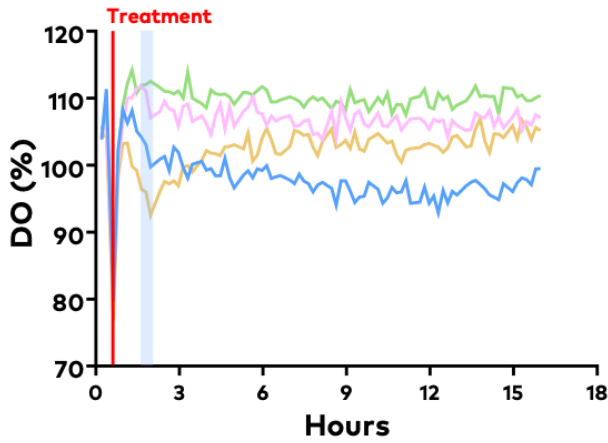


↳ CHO cells clone selection in 24-well plate between S.NEST and shake flask

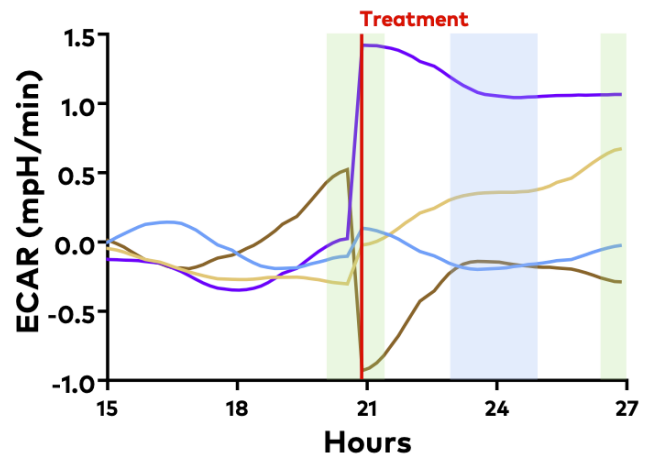
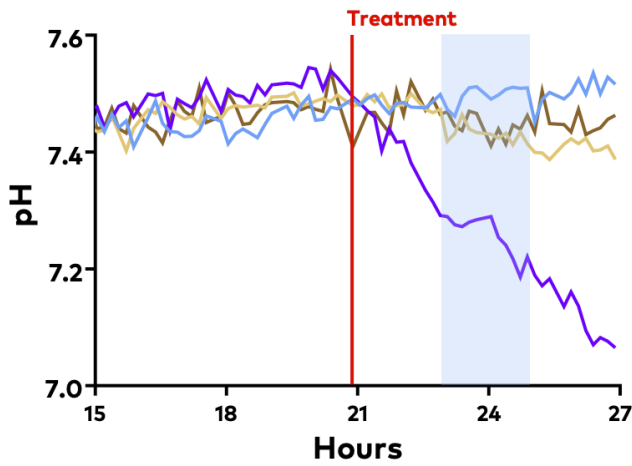


## Simultaneous metabolic analysis during cell culture

↳ A549 cells mitochondrial and glycolysis assay in 24-well plate

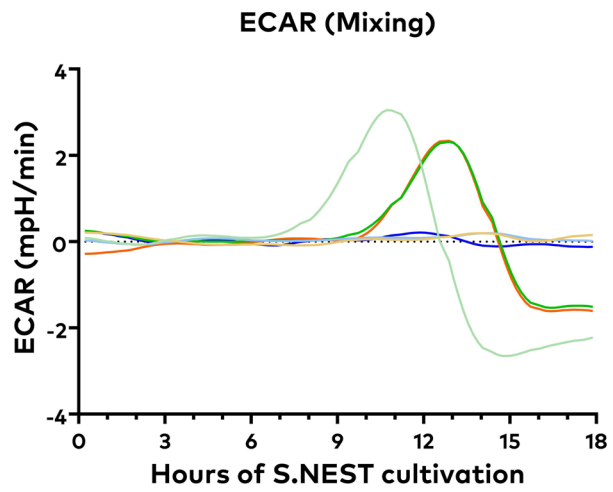
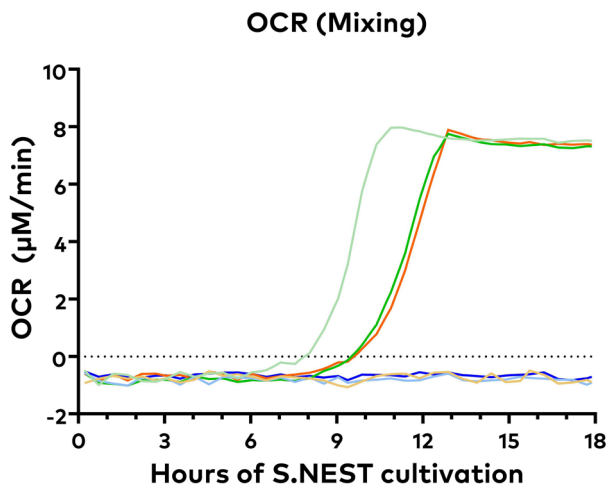
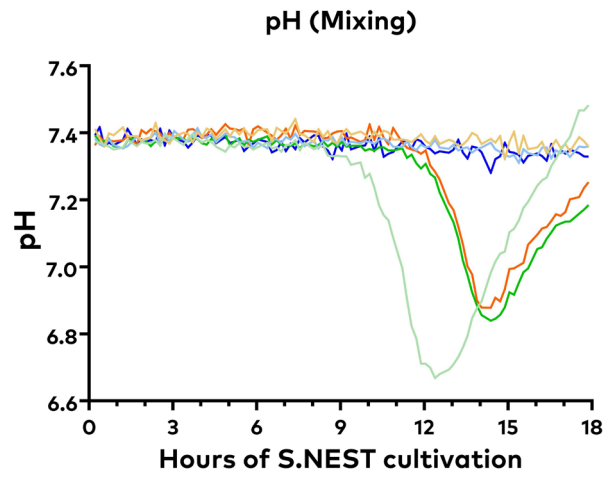
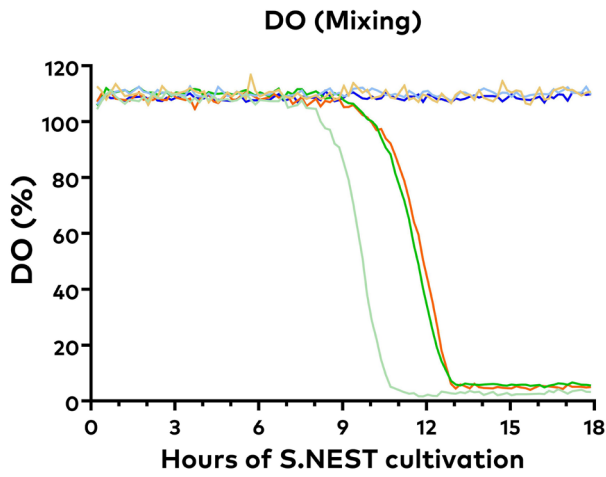


— Cell                      — +Oligomycin+FCCP  
 — +Oligomycin            — +Oligomycin+FCCP+R/A



— Cell                      — +Glucose+oligomycin  
 — +Glucose              — +Glucose+oligomycin+2-DG

↳ E. coli antimicrobial susceptibility testing in 24-well plate



# S.NEST 2.0

## Specifications

### General characteristics

Description	Value	Unit
<b>Dimensions</b>		
Width	785	mm
Depth	435	mm
Height	296	mm
Weight	49	kg
<b>Electrical characteristics</b>		
Input voltage	100-240	Vac
Input voltage net tolerance	±10	%
Input voltage frequency	50/60	Hz
Max. input current	11.8-5.4	A
Power mains supply voltage fluctuations	±10	%
Installation category	CAT II	-
Input fuse type	250VAC, 16A, time-lag	-

### Basic configuration

Description	Value	Unit
<b>Incubation</b>		
Temperature control range	RT+5 – 45 ± 0.2	°C
CO <sub>2</sub> level control range	1 – 20 ± 0.3	%
Humidity monitoring range	0 – 100 ± 5 (at 37°C)	%
<b>Culture</b>		
Mixing rate (24-well plate)	10 – 50 (± 5%)	sec
Mixing rate (96-well plate)	10 – 50 (± 5%)	sec
Working volume (24-well plate)	1,000–1,600	µl
Working volume (96-well plate)	150-200	µl
Working volume (384-well plate)	25-80	µl
<b>Sensing</b>		
DO measurement range	0 – 100 ± 5**	%
pH measurement range	6 – 8 ± 0.2	-
Sampling rate	≥ 10	min

\* Each value above is specified with one standard deviation from its mean (M±1SD)

\*\* Once the reference DO (defined as 100%) has been set, the DO readout may vary between 100 +/- 10% due to the fluctuation of oxygen levels in ambient air.



# S.NEST 2.0

## Ordering information

### S.NEST Instrument

Product No.	Product Name	Description
CBS161101018	S.NEST 2.0	<ul style="list-style-type: none"> <li>• 4 S.NEST 2.0 culture chambers</li> <li>• DO/pH real-time sensing module in 24-well / 96-well culture plate</li> <li>• S.NEST 2.0 Software</li> <li>• Standard warranty (12 months from date of installation)</li> <li>• Origin: Taiwan</li> </ul>
CBS161101020	S.NEST 2.0 Automation Compatible Version	<ul style="list-style-type: none"> <li>• 4 S.NEST 2.0 culture chambers with customized automation compatible format</li> <li>• DO/pH real-time sensing module in 24-well / 96-well culture plate</li> <li>• S.NEST 2.0 Software</li> <li>• Standard warranty (12 months from date of installation)</li> <li>• Origin: Taiwan</li> </ul>

### S.NEST Consumables

Product No.	Product Name	Description
D16110024309	S.NEST Cell Culture Kit - Greiner, 24 Well, 10 Sets	<ul style="list-style-type: none"> <li>• 10 Greiner CELLSTAR® Cell Culture Multiwell Plates, 24 Well, Single Packed (No.662102) with both DO and pH sensors</li> <li>• 10 S.NEST Lids, 24 Well, Single Packed</li> </ul>
CBS161101026	S.NEST Cell Culture Kit - Corning, 96 Well, Combination Pack, 10 Sets (5 DO and 5 pH)	<ul style="list-style-type: none"> <li>• 5 Corning® Cell Culture Multiwell Plates, 96 Well, Single Packed (No.3599) with DO sensors</li> <li>• 5 Corning® Cell Culture Multiwell Plates, 96 Well, Single Packed (No.3599) with pH sensors</li> <li>• 10 S.NEST Lids, 96 Well, Single Packed</li> </ul>
CBS161101027	S.NEST Cell Culture Kit - Corning, 96 Well, DO, 10 Sets	<ul style="list-style-type: none"> <li>• 10 Corning® Cell Culture Multiwell Plates, 96 Well, Single Packed (No.3599) with DO sensors</li> <li>• 10 S.NEST Lids, 96 Well, Single Packed</li> </ul>
CBS161101028	S.NEST Cell Culture Kit - Corning, 96 Well, pH, 10 Sets	<ul style="list-style-type: none"> <li>• 10 Corning® Cell Culture Multiwell Plates, 96 Well, Single Packed (No.3599) with DO sensors</li> <li>• 10 S.NEST Lids, 96 Well, Single Packed</li> </ul>

## Customer care services

Product No.	Product Name	Description
CBS10304	IQ/OQ document - X.NEST	<ul style="list-style-type: none"> <li>Documents for the end user to perform IQ/OQ for X.NEST</li> </ul>
CBS10305	IQ/OQ service - X.NEST	<ul style="list-style-type: none"> <li>IQ/OQ for X.NEST performed by a CYTENA-trained service engineer or FAS</li> </ul>
CBS161101007	Standard Customer Care Package S.NEST – 1 year	<ul style="list-style-type: none"> <li>Repairs, spare parts, and travel to site*</li> <li>Software/firmware upgrade</li> <li>Unlimited support and diagnosis</li> </ul>
CBS161101004	Premium Customer Care Package S.NEST – 1 year	<ul style="list-style-type: none"> <li>Repairs, spare parts, and travel to site*</li> <li>Software/firmware upgrade</li> <li>Unlimited support and diagnosis</li> <li>Annual Preventive maintenance</li> <li>Application support</li> <li>Priority response**</li> <li>Remote user refresher training, as requested***</li> </ul>

\*Warranty only applies to any instrument failure present at the time of installation/purchase. Repairs, spare parts, and travel to site are included.

Application support, normal wear and tear, and cleaning or preventive maintenance are not included.

\*\* Priority response guarantees responses to your service requests within 48 hours.

\*\*\*Up to 2 per year – 1-hour sessions.



## CYTENA BPS, A BICO COMPANY

©2024 BICO AB. All rights reserved. Duplication and/or reproduction of all or any portion of this document without the express written consent of BICO is strictly forbidden. Nothing contained herein shall constitute any warranty, express or implied, as to the performance of any products described herein. Any and all warranties applicable to any products are set forth in the applicable terms and conditions of sale accompanying the purchase of such product. BICO provides no warranty and hereby disclaims any and all warranties as to the use of any third-party products or protocols described herein. The use of products described herein is subject to certain restrictions as set forth in the applicable terms and conditions of sale accompanying the purchase of such product. BICO may refer to the products or services offered by other companies by their brand name or company name solely for clarity and does not claim any rights to those third-party marks or names. BICO products may be covered by one or more patents. The use of products described herein is subject to BICO's terms and conditions of sale and such other terms that have been agreed to in writing between BICO and user. All products and services described herein are intended FOR RESEARCH USE ONLY and NOT FOR USE IN DIAGNOSTIC PROCEDURES.

Edited version: April 2024 | CBS\_PUB\_SNEST\_Brochure\_Digital