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# THIS CHANGES EVERYTHING


## Introducing the **Velocyt®LP**
by BennuBio.

The Velocyt LP is a revolutionary acoustic-focused, parallel flow cytometer capable of high throughput analysis of a wide range of cellular structures.

# IMAGINE
## THE POSSIBILITIES

## The Velocyt® LP

A novel, multi-stream cytometer for high throughput analysis of a wide range of particles and cellular structures. Flow cytometry is the gold standard for many applications. The Velocyt LP utilizes core principles of traditional flow, while expanding the capabilities of analysis. This enables researchers to broaden their flow cytometery applications to include multicellular 3D structures, large cells and fragile particles.

## ADVANCING **MULTIPLE DISCIPLINES**

- **Drug Discovery**
- **Regenerative Medicine**
- **Cell Therapeutics**
- **Industrial and Environmental Monitoring**

# IMAGINE **THE POSSIBILITIES**

## Velocyt® LP **Key Features**:

**High Sample Volume**
samples rates up to 5 mL / min

**Extremely Gentle Processing**
samples remain viable after processing

**Total Sample Recovery**
samples returned undiluted, unaltered

**Images in all optical channels**
analyze data in context

**Analyze a wide range of particle sizes**
from single cells to intact 3D structures

## A WIDE VARIETY **OF APPLICATIONS**

An innovative solution capable of measuring:

- **Large Particle Analysis**
- **Fragile Objects**
- **Challenging Samples**

| **SAMPLE TYPES** | |
|---|---|
| velocyt LP | |
| **Large Particles** | **Fragile Objects** |
| • Spheroids | • Diffuse 3D Cell Models |
| • Organoids | • Cardiomyocytes |
| • iPCS Clusters | • Adipocytes |
| • Algal Colonies | |

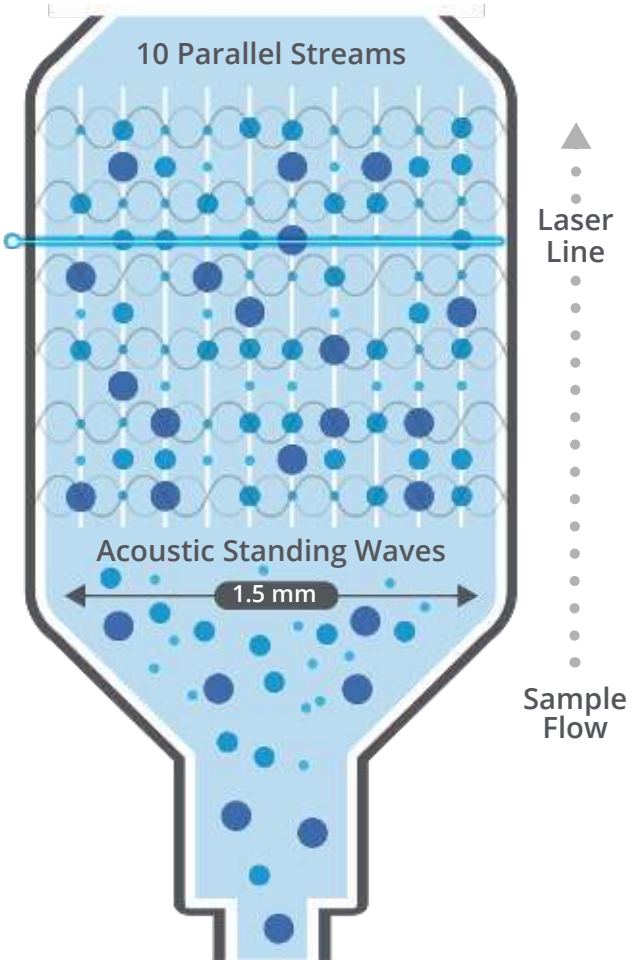
# EXPANDING
# ANALYTICAL CAPABILITIES

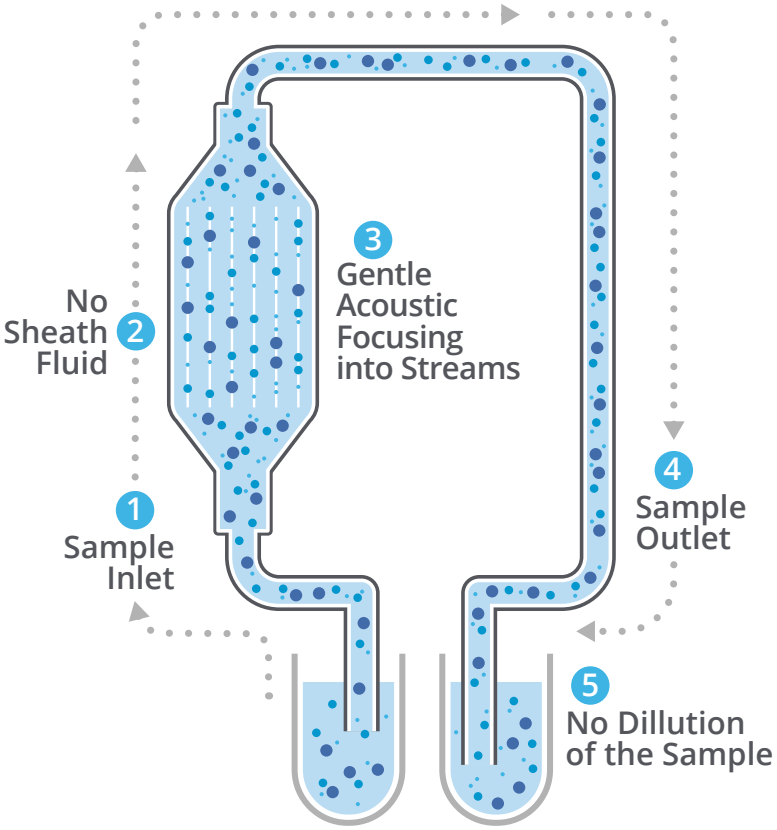
## TOTAL ACOUSTIC FOCUSING
### THE REVOLUTIONARY DIFFERENCE

**Acoustic Focusing**

Our powerful, yet simple technology deploys multiple, parallel focused streams created by multi-node acoustic focusing. That means there is no longer a compromise of data quality when higher analytical rates are desired.

- Enables precision alignment and rapid analysis
- Increased events per second
- No sheath fluid
- Lower coincidence rates



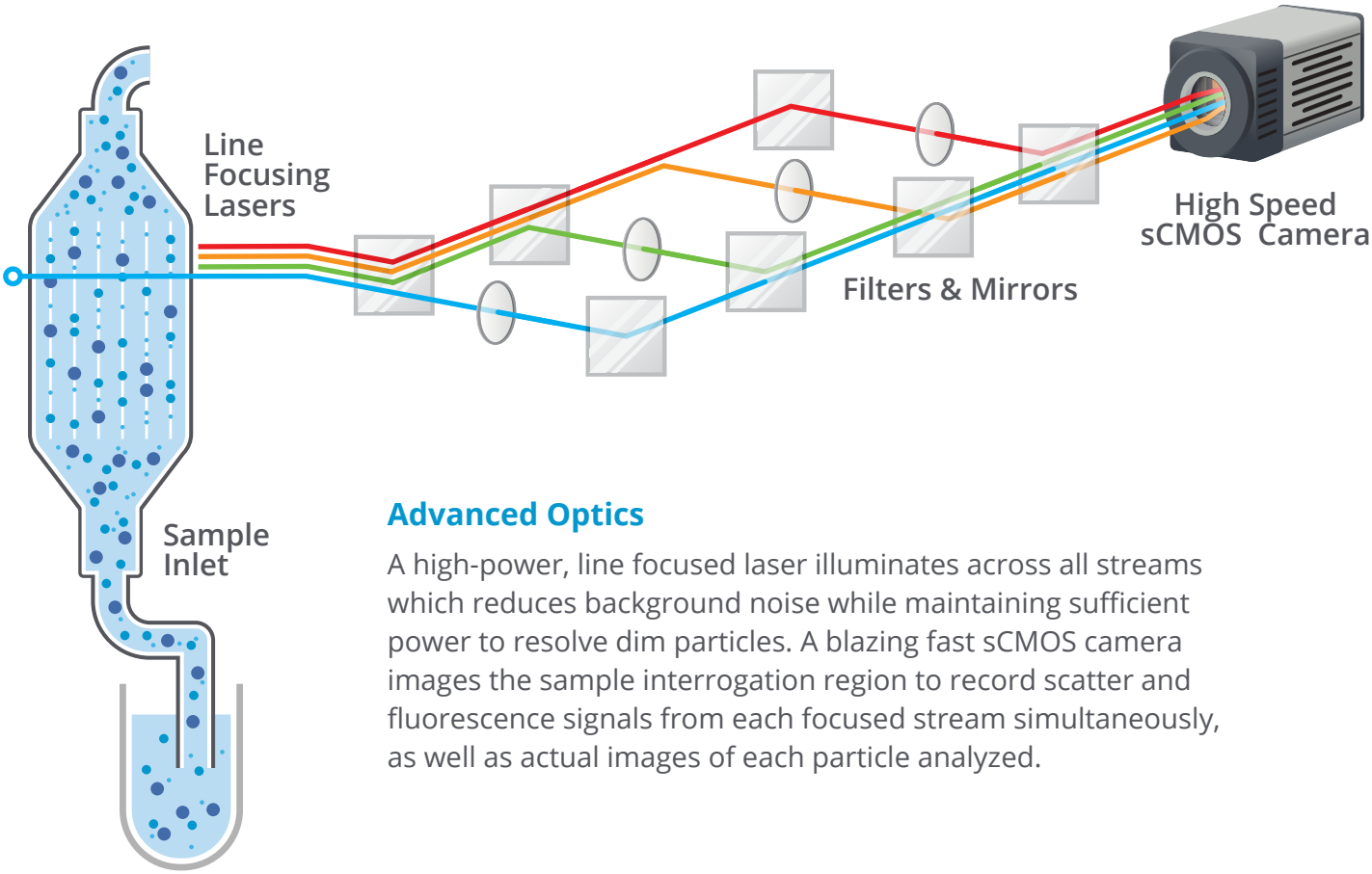



## Simplified Fluidics

Acoustic focusing eliminates sheath fluid, enabling complete recovery of unaltered sample. Our tests show high sample recovery which means precious samples are returned intact for additional downstream analysis.

Samples returned, unaltered

Up to 99% sample recovery rate




## Advanced Optics

A high-power, line focused laser illuminates across all streams which reduces background noise while maintaining sufficient power to resolve dim particles. A blazing fast sCMOS camera images the sample interrogation region to record scatter and fluorescence signals from each focused stream simultaneously, as well as actual images of each particle analyzed.

# TRANSFORMING DATA TO KNOWELDGE

All made possible with **Kytos software**. Kytos is a full suite of data analytics tools, allowing the user to analyze large data sets rapidly and confidently. This means actionable results, faster.

kytos live

## Instrument Operation & Experimental Setup

Intuitive and easy to use software for simple experimental and data acquisition setup. User friendly interface for instrument startup, calibration, QC, and automated instrument maintenance.

User friendly, powerful software

Customize, set up, and run experiments

Automated, one click access to FCS Express software

Provides Morphological Data

## Signal Extraction & Visualization

Advanced data analytics allow users to organize and manage large sets of data efficiently. Novel analytical tools provide morphological information not found on traditional flow cytometer software packages. With a single click, data is ready for analysis in FCS Express™ Image Cytometry.

## Spacial Imaging Mapping

Increase biological insight with event imaging tools not found with traditional cytometers. Kytos' imaging analysis toolbox dramatically broadens research applications to include rapid and large-scale measurements of spheroid viability drug and biologic uptake and cell penetrance into 3D particles. One-click access to FCS Express Image Cytometry, allows a seamless transition from data acquisition to answers.

Export data in standard flow cytometry file formats

View your data in context with cellular images

# SPATIAL IMAGE MAPPING

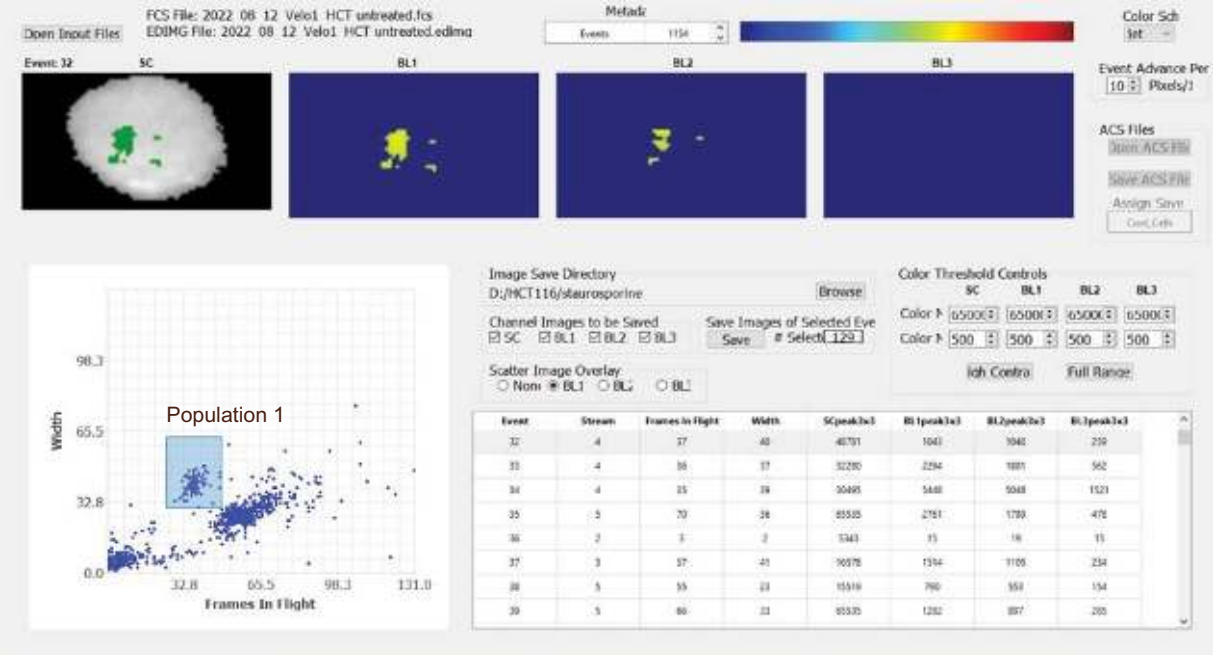
## IN ALL OPTICAL CHANNELS

kytos image

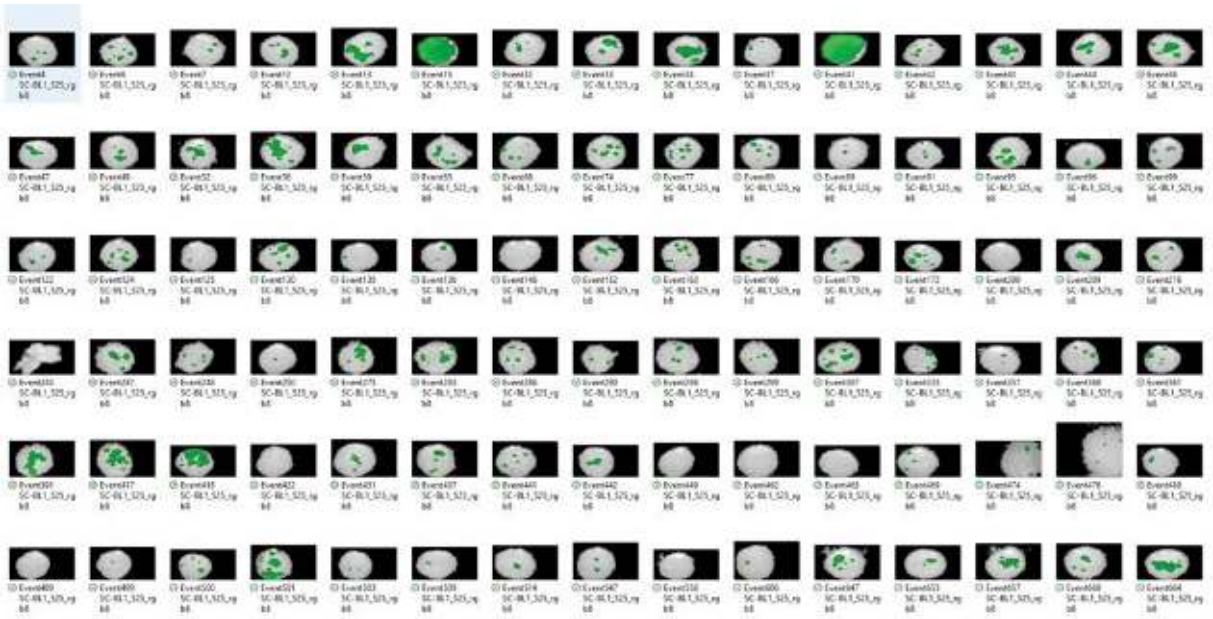
Combining the imaging of microscopy with the speed of flow cytometry

Images generated for all channels†

**A**




**B**



**A.** Veloview software allows you to choose images from individual particles simply by clicking on an event. The software provides morphological and fluorescent parameters for each image.

**B.** Saving images from a specific population *(population 1)* is as easy as drawing a gate around a specific population and hitting save button. Images are saved with text containing the particle number, parameter type and threshold information

*† check with your local representative on availability*

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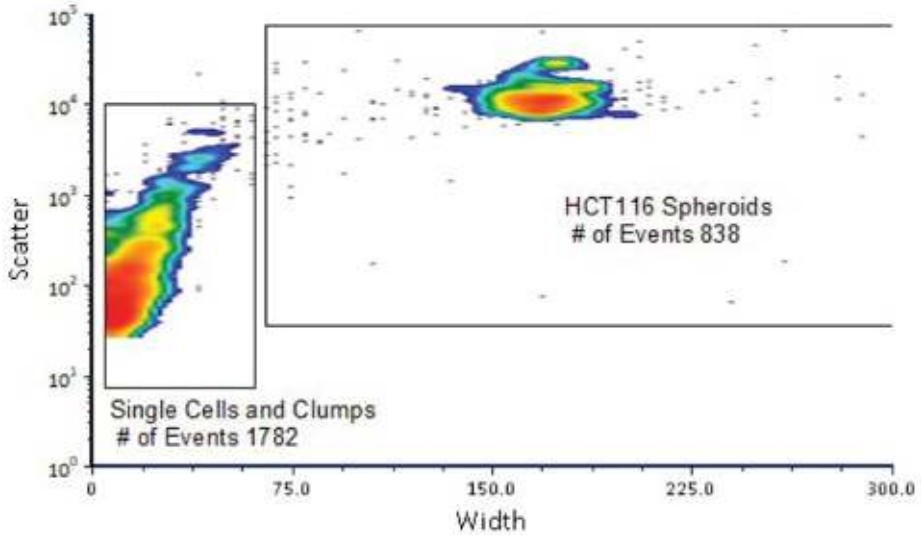
# TRUE RAPID, LARGE PARTICLE ANALYSIS

## BY FLOW CYTOMETRY

The patented technology of the Velocyt LP enables first of its kind, high speed analysis of large particles, including intact spheroids, up to 300 µm in diameter.

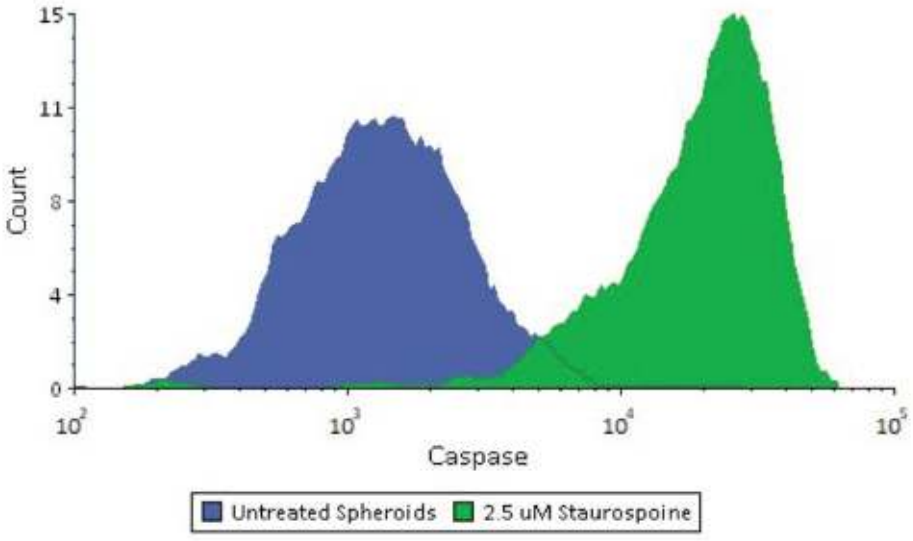
### A Spheroid Gating Strategy




**High speed analysis of large particles**

up to **300µm** in diameter

### B Staurosporine Treated HCT116 Spheroids




**HCT116 spheroid staurosporine study.**

**A.** The novel sizing parameters allows easy separation and gating of spheroids, and independent analysis of single cells and large particles, which is critical for immune cell killing applications.

**B.** To analyze apoptosis after staurosporine treatment, spheroids were stained using an optimized protocol with NucView 488 caspase substrate. Nearly all staurosporine treated spheroids contained caspase positive cells with a ~15-fold increase in median fluorescent intensity compared to control cells.

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# SIMPLIFIED WORKFLOWS

## LARGE PARTICLE ANALYSIS

Measuring intact 3D multi-cellular models means simplified workflows – no more dissociation or altering the micro-environment. The Velocyt LP provides accurate, statistically relevant insights with high throughput and gentleness.

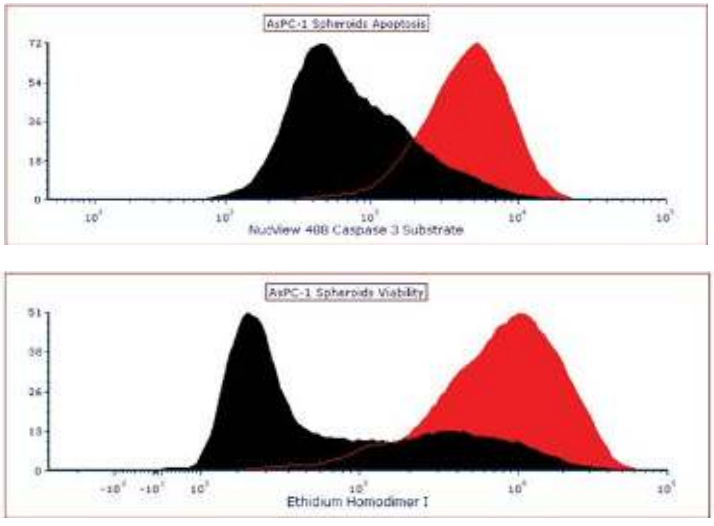
### Workflow example of Spheroid Analysis on the Velocyt®

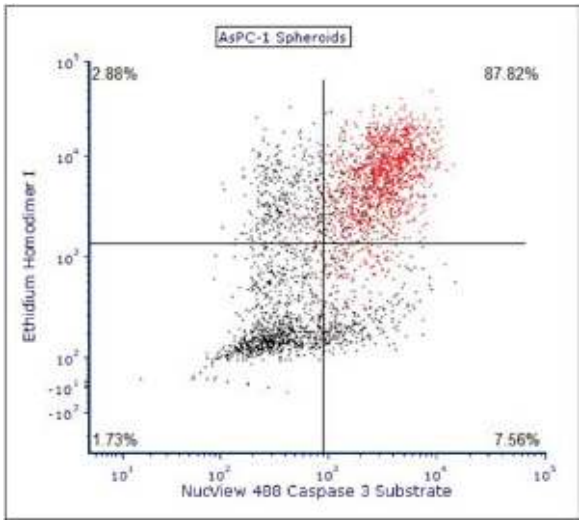

### Increased Biological Insight

Generate traditional flow cytometry data, morphological and imaging data from the same sample.

## Data Analysis

### A FCS File Formats




Untreated AsPC-1 Spheroids

Staurosporine treated AsPC-1 Spheroids

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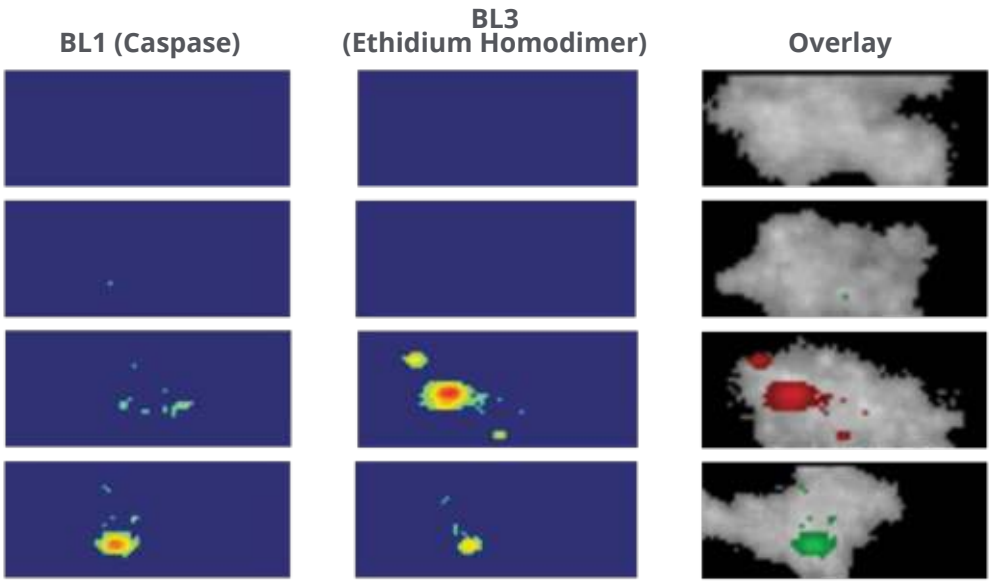
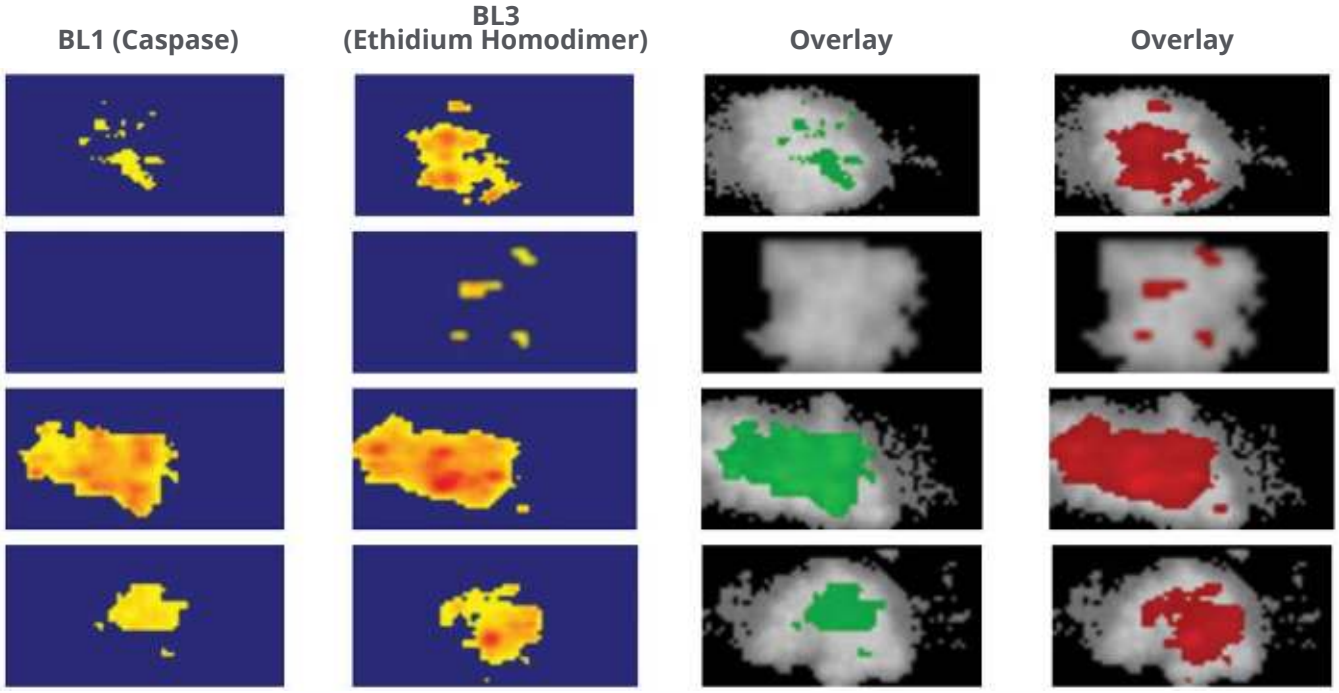
Morphological Data

## B Untreated ASCP-1 Spheroids




## C Staurosporine treated ASCP-1 Spheroids




Spheroids generated from the human pancreatic cancer cell line AsPC-1 were treated with staurosporine overnight. Spheroids were stained with both an active caspase 3/7 substate (green) and a cell viability marker (ethidium homodimer III in red). Spheroids without drug treatment were used as a control. **A.** Data generated by the Velocyt LP provided traditional FCS data analyzed by FCS Express showing that control spheroids (black) had low levels of caspase positive cells (lower right quadrant) and/or dead cells (upper left quadrant) within the spheroid structure whereas nearly all the treated cells (red) contained high numbers of both caspase positive and dead cells within the spheroid (upper right quadrant). **B.** Using Veloview, we generated images of control cells that were positive for either caspase positive cells, non-viable cells or negative for both markers. Notice that the morphology from the AsPC-1 spheroids show a more irregular structure than spheroids generated from many other cell types. **C.** Treated spheroids mostly contain cells that are positive for both cell health marker, but the spatial patterns are often different suggesting cells within the 3D structure are in different phases of apoptosis.

# KEY SPECIFICATIONS^

## Optics:

- **Laser:** 488 nm: 1 W (20mW to 1W) / 405 nm: 500 mW*
- Scatter = 460 / 60 nm
- BL1 = 525 / 30 nm
- BL2 = 590 / 36 nm
- BL3 = 675 / 70 nm
- **Detector:** sCMOS camera

## Performance:

- **FITC:** <70 molecules of equivalent soluble fluorochrome (MESF-FITC)
- **PE:** <40 molecules of equivalent soluble fluorochrome (MESF-PE)
- **PE-Cy5**: <65 molecules of equivalent soluble fluorochrome (MESF-PE-Cy5)

## Fluidics:

- Flow rates adjustable for different applications:
  **Low:** 1 mL/min
  **Med:** 3 mL/min
  **High:** 5 mL/min

**BennuBio Inc.** has greatly expanded the power of flow cytometry by developing an instrument that can use the flow cytometry paradigm to analyze samples regardless of particle size or sample volume. This technology simplifies workflows to save time and money. Our gentle approach retains sample viability and morphology while analyzing at considerably faster rates. Thereby, improving diagnostics, decreasing time to markets and accelerating fundamental health science research.

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*^ for a detailed list of specifications, please refer to the complete specification list*
**Coming soon*