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Scepter™ Flipchart

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Research. Development. Production.

Product Overview

System Components

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Handheld Pipette

- Easy to use
- Looks/works like a pipette
- On-screen instructions
- USB port for downloading data and charging
- Stores 72 histograms

Specifications:

•Operating range: 10, 000 – 500, 000 cells/mL

• Aspiration volume: 50 µL

• Detected cell size range: 8 – 25 µm

• Mammalian cell diameter range: 5 – 30 µm

Integrated Display

- Histogram data on cell populations
- Cell concentration
- Mean cell volume and size
- Can apply custom gating
- Gain insight into cell health

Plastic Consumable Tip

- Integrated sensing electrodes
- Precision molded sampling chamber
- Precision manufactured electronic sensing zone
- Discriminates cell sizes with sub-micron resolution
- Discriminates cell volumes with sub-picoliter resolution

The Histogram

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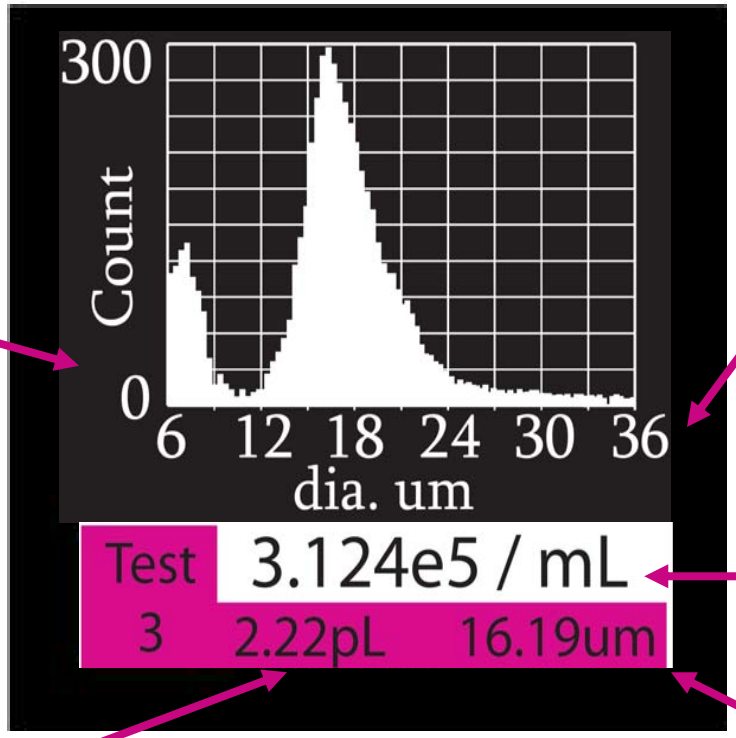
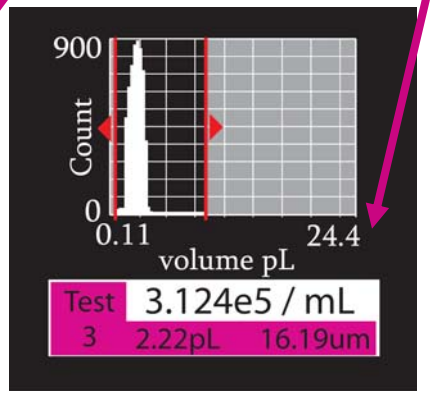
Scepter Counting Gives You More Information

X axis = Diameter or volume





Y axis = count

Concentration

Mean Cell Volume

Mean Cell Diameter

A New Window Into Your Cell Culture

Coulter Counting Principle

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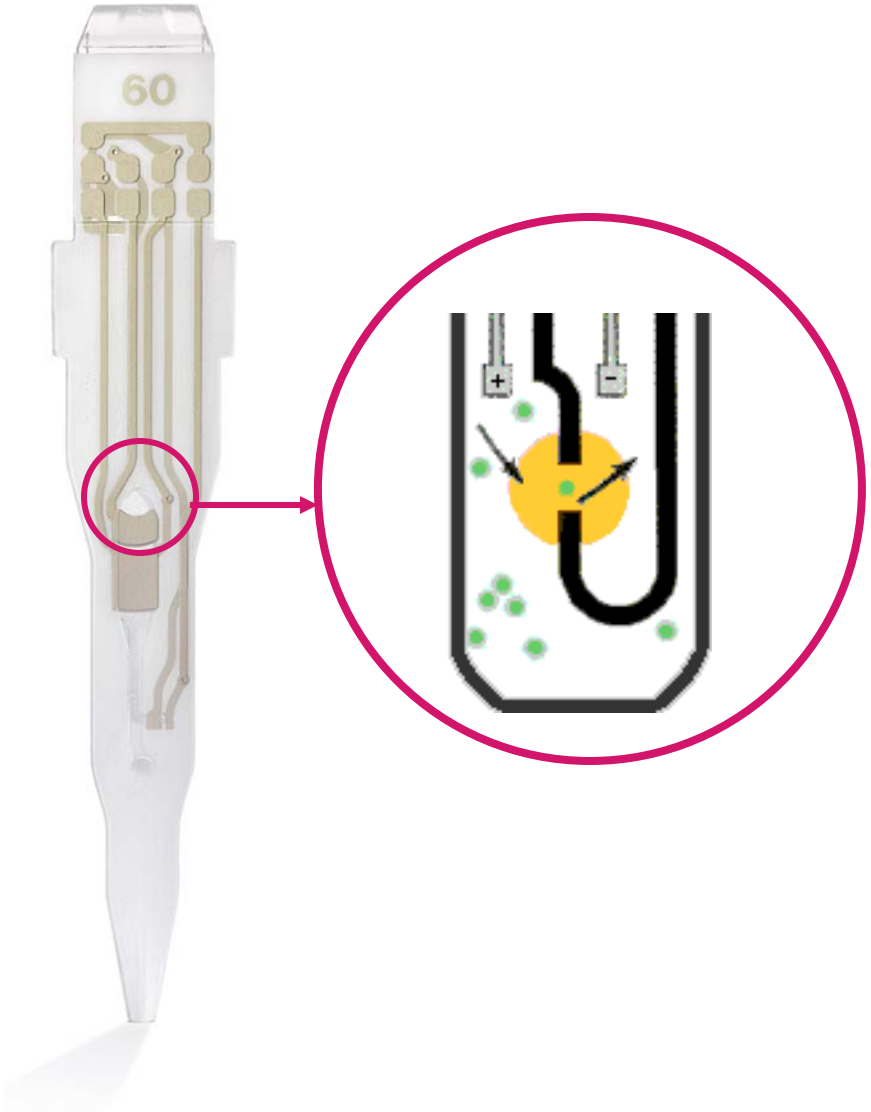
- As cells flow through the orifice, resistance increases → voltage changes
- Voltage changes (spikes) are recorded with each passing cell
- Spikes of the same size are bucketed into a HISTOGRAM

Voltage

$$V = I R$$

Current

Resistance



Advanced Cell Counting

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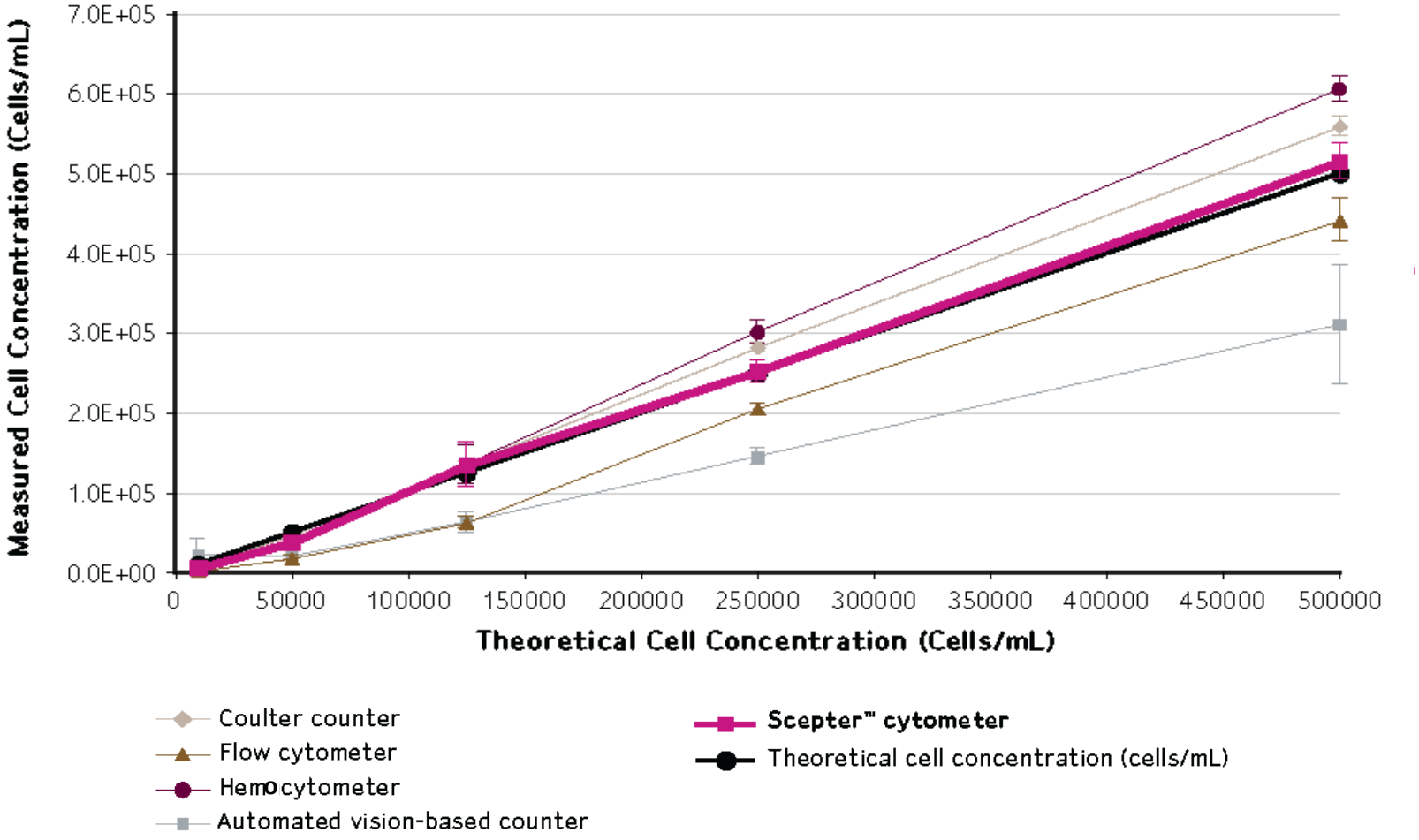
Scepter Cell Counter	Benefits
Pipette form factor	Intuitive to use. Behaves like a pipette.
Integrated on-screen instructions	Can be used without manual
Counts cells directly via electronic sensors	No need to strain through a microscope
Counts cells <20 sec	Rapid processing of multiple samples (Count 5 samples in 1.5 min vs. 15 min manually)
Stores 72 histograms	Can count multiple samples in a single session
Precision microfabricated sensing zone (60 μm +/- 3 μm)	Can discriminate sub-micron cell diameter and sub-picoliter volume differences
Volume sensing electronics for precision fluid sampling (50 μL +/- 2 μL)	Provides cell concentrations with lower CVs than hemocytometry (<6% vs. ~ 15%)
Upgradable firmware	New capabilities downloadable from the web

Scepter Counting vs. Other Counting Systems



More accurate and precise than other counting systems

Histogram Library of Cell Types

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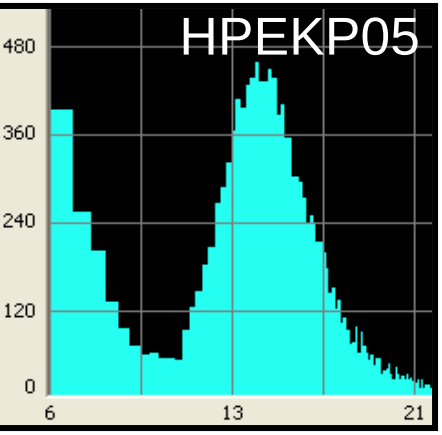
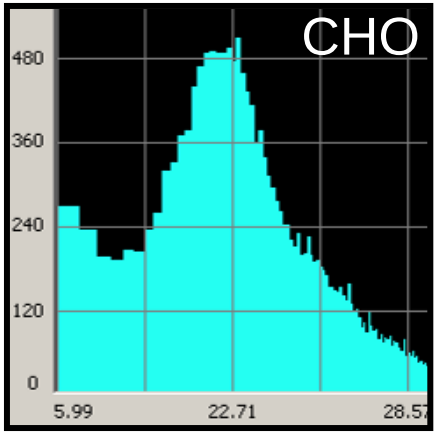
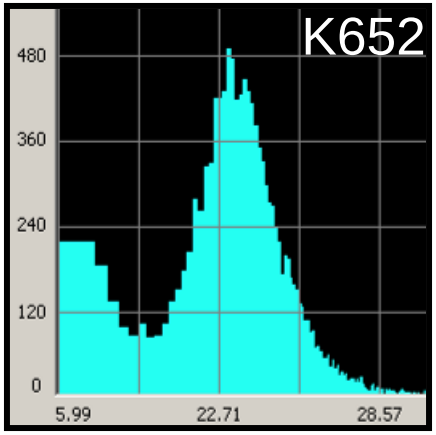
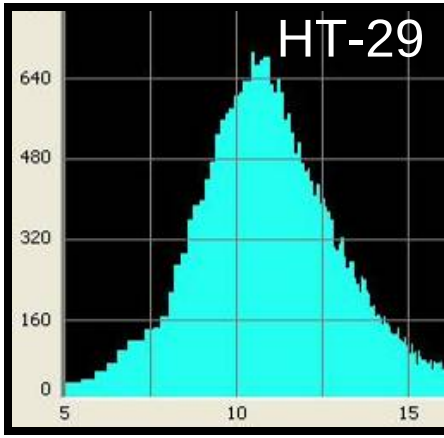
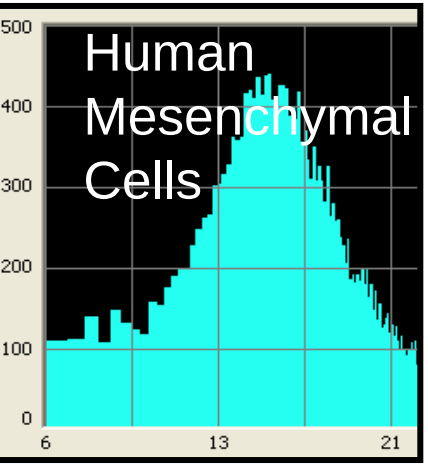
X axis = μm
Y axis = number of cells

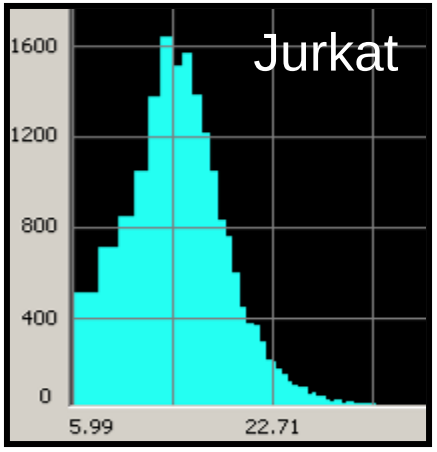


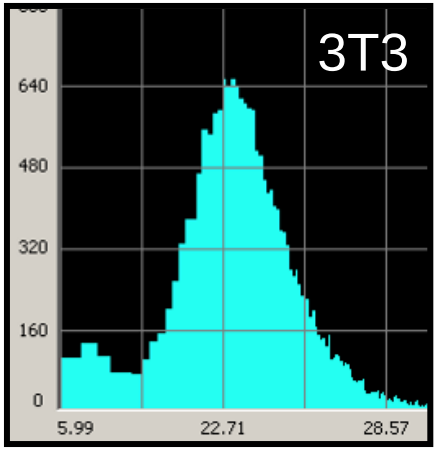


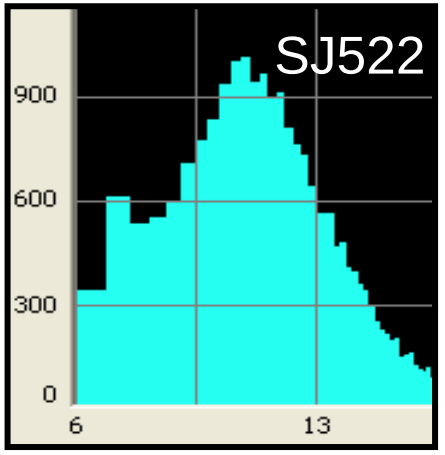












Diameters by Cell Type

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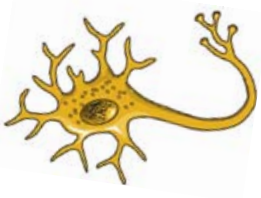
Cell Type	Diameter (μm)
Red Blood Cell	7-8
Dendritic Cell	25
MEF	15
Neuron	3-18
Astrocyte	10-20
Adipocyte	60
Hepatocyte	12
Monocyte	15-18
Neutrophils	10-16
Lymphocyte	7-15
Yeast	5
Bacteria	1-2



Measured by Scepter Cell Counter	
Cell Type	**Diameter (μm)**
3T3	15
K562	22
CHO	14-17
HEPG2	12
Jurkat	13
PC12	9-13
3T3	15
K562	22
CHO	14-17
HEP2G	12
S522	10-12
PC12	9-13
Hela	12-14
HEK293	11-15
HUVEC	14-15

A New Window Into Your Cell Culture

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With Scepter Counting You Can:

- Gate your histogram
- Look at whatever population you want!
- Provide additional information on cell volume and size
- Interpret your cell type specific histogram

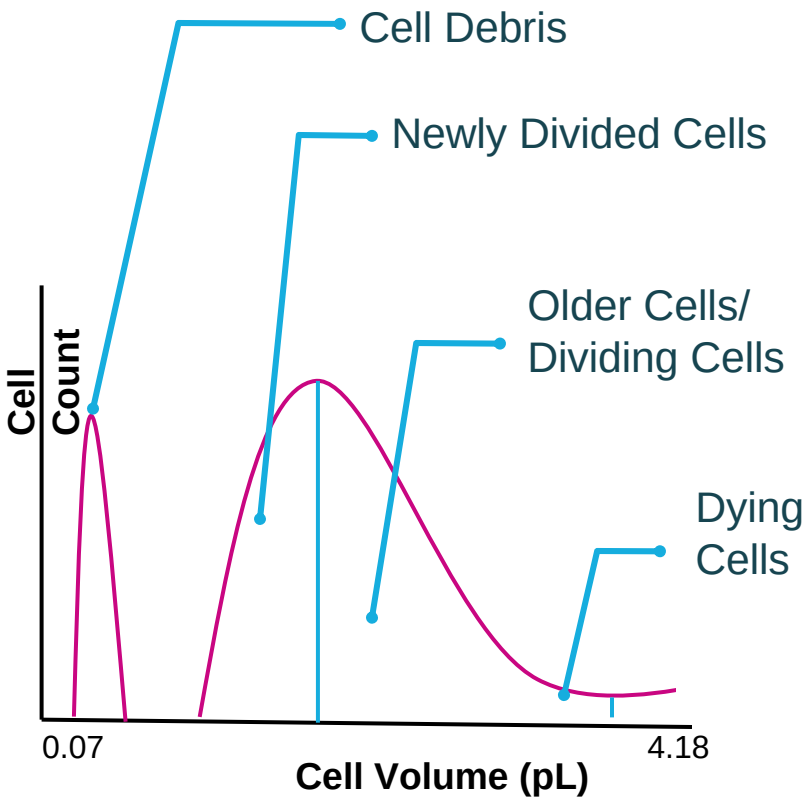
Limitations of Vision-Based Automated Cell Counting

- Can't detect volume
- Can't detect changes in cell size
- Calibration/focusing/sampling errors all leads to inaccurate counts of live and dead cells

Limitations of Microscopy

- Qualitative (do my cells look as I would expect?)
- Can't detect volume
- Human eye can't assimilate statistics
- Can't detect changes in cell size

Possible Interpretation



Detect Changes in your Culture:
Preliminary Histogram Data

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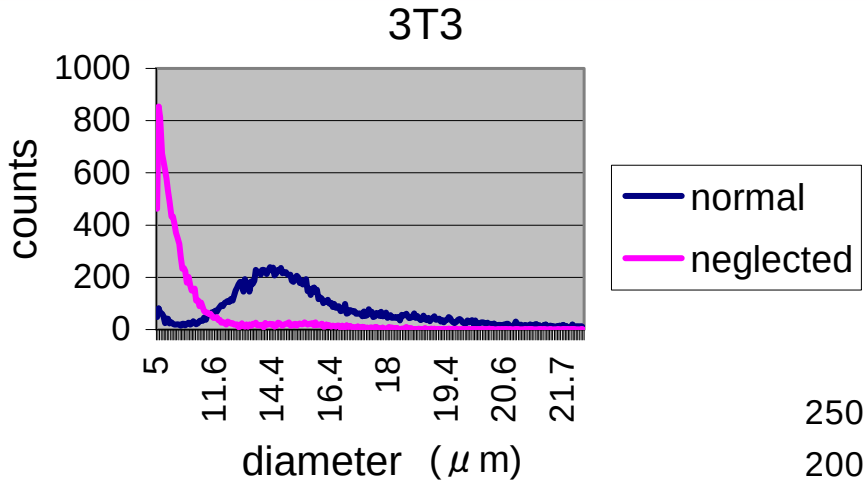
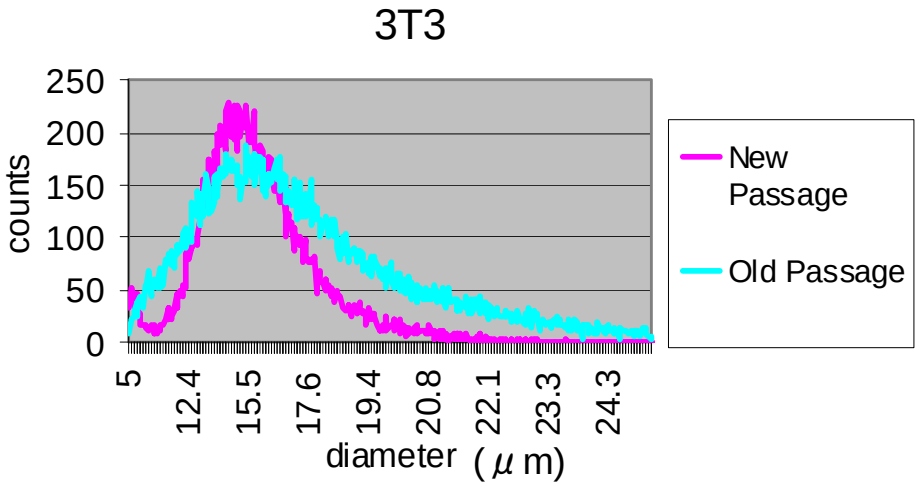
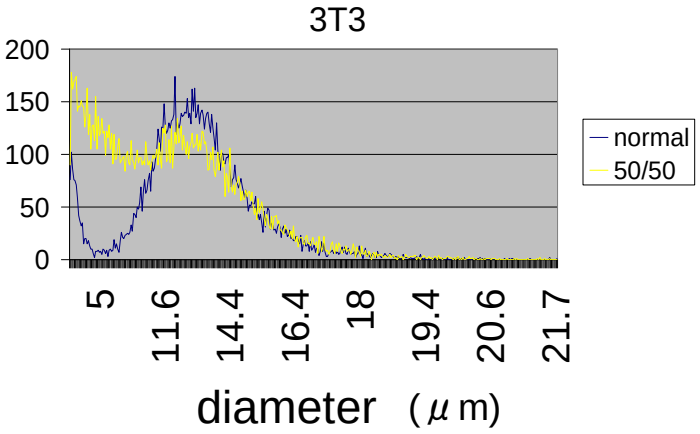


Well-maintained culture compared to neglected culture

Early passage compared to later passage





Normal cells compared to 50% dead/ 50% live cells

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Positioning, Troubleshooting and Selling

Additional Scepter Information

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Positioning

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For	Cell biologists performing >5 cell counts/week
who need	an easy-to-use, tedium-free, solution
the	Scepter
is an	affordable, automated, handheld cell counter
providing	direct cell counts with cutting-edge technology in an intuitive form factor
Unlike	Hemocytometry, which requires manual counting
Unlike	Vision-based systems, which are 30%-50% more expensive

Demonstrate Scepter Counting

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Customer Approach

- With Scepter counter in hand, say: “Interested in a new cell counter from Millipore? I can show you in 20 seconds.”
- Demonstrate with beads
  - Show the screen to the customer as you insert tip and proceed
  - Explain the histogram-use flip chart
- Demonstrate with cells (as necessary, upon request, etc…)
  - 10-20 minutes to prepare adherent cells
  - <5 minutes for suspended cultures
  - Have customer prepare vial of cells for your visit
  - Cells need to be at specifications (next slide)

If cells are not prepared and adherent, workflow is same as for other counting devices
Trypsinize→ collect→ spin→ resuspend → dilute to specifications (next slide)

Recipe Card for Cell Sampling

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Take a small sample of suspended cells and dilute as recommended

	Recommended	Acceptable	Do NOT Use
Tube	**1.5 mL microcentrifuge tube**	96 well plates and larger	15 mL conical 50 mL conical
Cell Concentration	**50,000-500,000 cells/mL**	System can detect outside range but accuracy decreases	<5,000 cells/mL >1,000,000 cells/mL
Sample volume	**100 µL**	System needs to draw at least 50 µL	<50 µL
Buffers	**PBS**	DMEM, HBSS, Isoton II	Water, non-ionic solutions

Handling Tough Questions

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Questions	Answer	Position
Does Scepter counting measure viability?	•Scepter cell counter does not report ABSOLUTE viability, Scepter screen displays a raw count that can be gated to include only cells of a certain size. •Scepter counter outputs a **histogram** which gives population information about your culture. For instance, an uncharacteristic culture will look very different on the histogram.	**Sell to the value of the histogram**. You are now getting a lot more information about the overall culture that you can not get from hemocytometry or vision-based systems. Beta site data confirms that customers view the histogram as ENOUGH insight into the profile of the culture, absolute viability counts are RARELY necessary.
Are the tips/ instrument sterile?	No, the Scepter counter can be wiped down lightly with EtOH, but the tips are not sterile. **Take a small sample of your cells to another tube and discard the sample after use.**	Most customers are already aliquoting the sample to dilute it to a usable concentration. This is NOT a significant change in their workflow today!
How much is Scepter cell counter?	Scepter cell counter will be the least expensive automated counter on the market. Scepter counter is $2995 and €2995 with your first box of tips FREE.	•VS AUTOMATED- more information, more accurate, LESS $ •VS MANUAL-more accurate, less tedious and worth the extra $ with the additional info gleaned from the histogram!
Positioning Scepter counter vs. guava easyCyte system	Use Scepter counting as a quick check before you move to guava easyCyte flow cytometry. Scepter counting is the count/quality control to continue in your workflow while flow cytometry is your endpoint assay.	•These products exist side by side •Scepter counting is an affordable alternative to guava easyCyte system ONLY if customer just wants a count/some QC information •guava easyCyte systems give you valuable and quantitative endpoint data about your cells.

Handling Tough Questions, continued

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Does Scepter counting measure viability?

Ask if you can show them what Scepter counting can do prior to answering viability questions.

Give the demonstration, then do the following.

- Explain histogram and point out how much more information you aquire from Scepter counting.
- Ask, “How do you interpret this histogram?” “What do you (the customer) think the peaks mean?”
- Point out you can gate in on whatever population of cells you wish to evaluate.
- Inform them that, in most cases, monitoring histogram changes gives you the information you need.
- These are changes you can’t detect by eye or even with viability stains.

Then ask, “Does Scepter counting give you the information you need?”

- Do you still need an absolute count of live/dead?
- Why? For what application?

If customer is still unconvinced, ask, “Can you use Scepter counting for your other counts?”

- Do you ever need a raw count to proceed in your workflow?
- Can Scepter counting be used for passaging, seeding or splitting cells?

Handling Tough Questions, continued

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Can I reuse the Scepter tip?

Tips are NOT reusable

- An error message will be displayed on the instrument- “Open Stop”

WHY?

1. Once wet, the electrodes begin to oxidize, this disrupts the electrical current and will lead to inaccurate counts
2. Instrument does not dispel liquid that is in its microchannels→ drawing up another sample would lead to two contaminated and mixed batches of cells

Customer Profiles By Segment

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How to position

High probability sale

- Culture own cells
- 5-15 counts per week
- <30% “absolute viability”
- Use cell lines
- May use automated system

High

Tedium free
Ease of use
Faster
Lower cost than automated

Medium probability sale

- Culture own cells
- <5, >15 counts per week
- Do not use automated system
- Use primary cells

Medium

Value-added information
Quick insight into the health of cell cultures
More accurate than hemocytometry

Low probability sale

- >30% counts require “absolute viability”

Low

Consistency in the lab
Value-added information

Troubleshooting

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Error/Warning Messages	Cause	Corrective Action
Aperture block	Cell Counter tip is blocked	Sample concentration is too high. Dilute cell sample more. Ensure that cells are in a single-cell suspension. Break clumps by pipetting up and down with a standard pipettor.
	Air bubble in tip	Keep tip fully immersed while screen displays **Submerge the tip**.
	Filter is wet	If **Aperture block** error appears repeatedly, remove filter cover and dry filter. Refer to maintenance section.
	Wrong diluent	Refer to list of acceptable diluents in General Guidelines section.
	O-ring is damaged or misaligned	Change or reposition o-ring. Refer to maintenance section.
Lost start	Sample volume too small, tip not fully immersed in solution while sample is loading, or air bubble in tip.	Make sure sample volume is ≥ 100 µL. Keep tip fully immersed while screen displays **Submerge the tip**.
Lost tip - detect	Tip was removed before counting cycle was completed, or not fully immersed in sample	Keep tip fully immersed in sample during counting cycle.
Start open **Stop open** **Start/stop short** **Electrode short**	Issues detected upon tip insertion	Reinsert tip. If problem persists, return instrument for service.
	Previously used tip detected	Do not reuse tips.