Overview fluidlab R-300

October 2023

Agenda

01 Product overview & USPs

02 Technological background

03 Target groups and customer feedback

04 How to identify the right customer?

05 Tips and tricks for product demos

01 | Product overview & USPs

The central lab technologies combined a handheld device

CELL COUNTING

- Differentiate live and dead cells staining-free between 8 and 80 µm
- Perform cell count with cutting-edge neural network between 3 and 80 µm
- View sample images captured by holographic microscopy
- Gating through histogram views
- Intuitive handling through clearly designed sample carriers

SPECTROMETRY

- Determine the extinction
- View full extinction spectrum from 375 - 700 nm
- Perform time series measurements
- Create calibration curves
- Use calibration curves for rapid sample quantification

USPs of fluidlab R-300

Staining-free cell counting and viability

Get rid of dyes to increase reliability & accuracy

Portable

Measurements can be performed directly under the bench

Easy-to-use

A device that everyone can use without prior extensive training - In three clicks from starting the device to obtaining results

Desktop client for wireless data transfer

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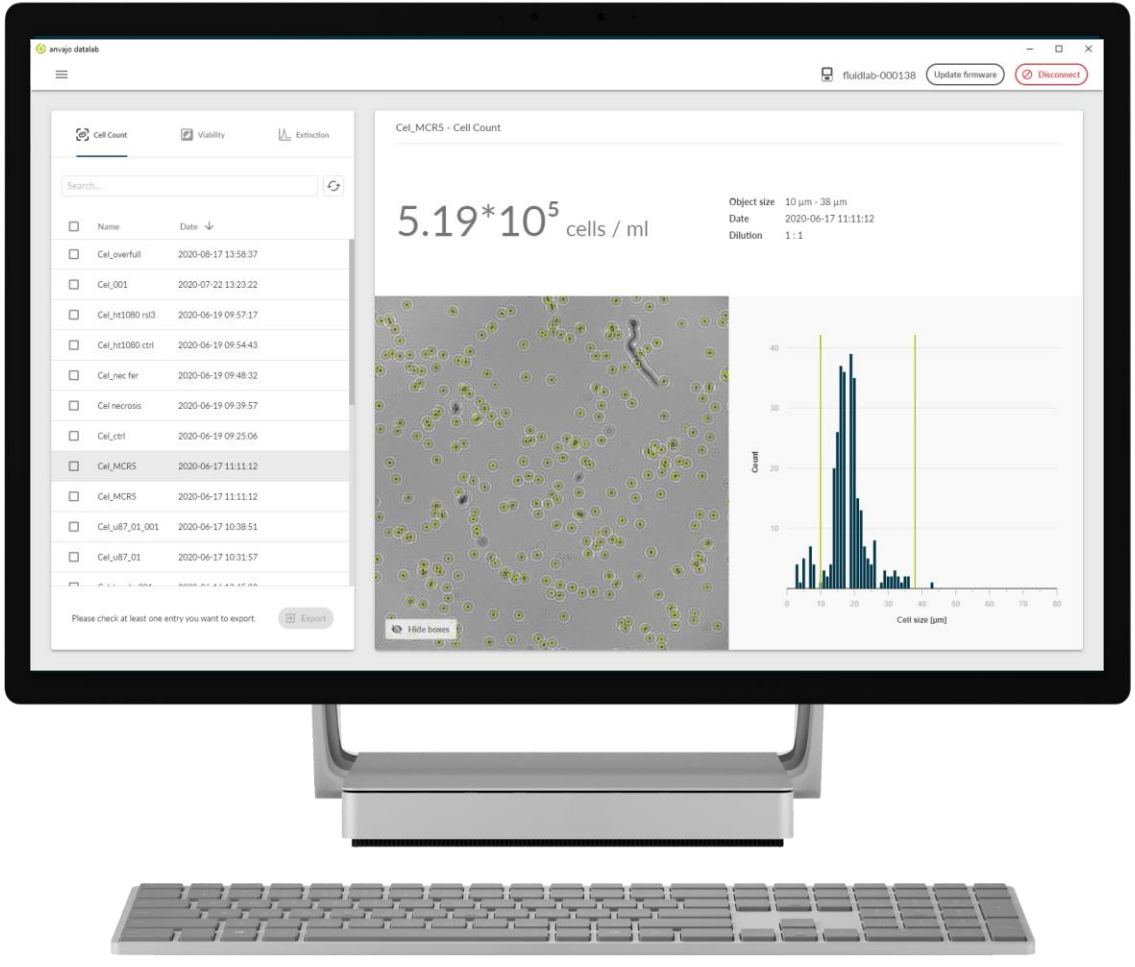
Desktop software client for fluidlab devices

- view measurement data
- export data into various file formats
- upload software updates onto device



02 | Technological background

The core technologies of fluidlab R-300: Combining miniaturized hardware with cutting-edge computing

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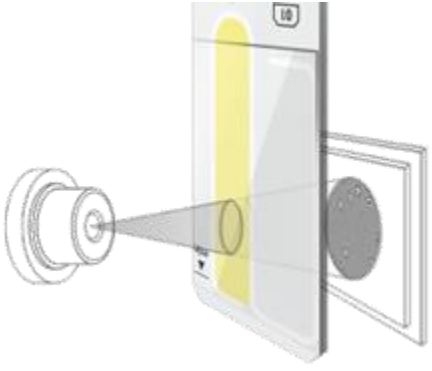
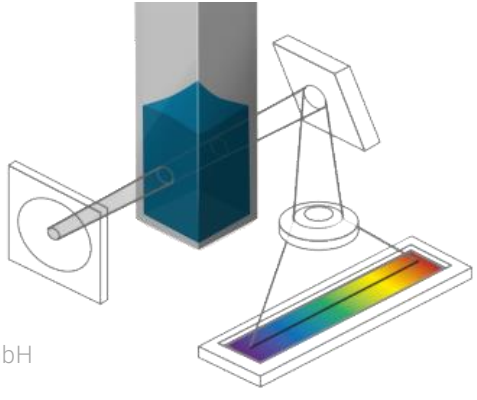
Miniaturized Hardware

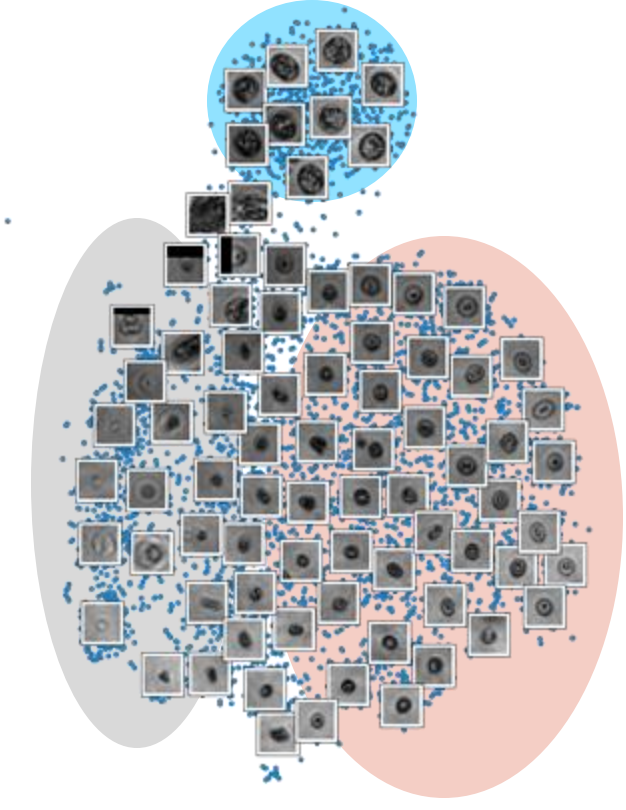
IN-LINE HOLOGRAPHIC MIRCROSCOPY



SPECTROMETRY



Machine-learning based image analysis



The principle of holographic microscopy

Published: 01 May 1948

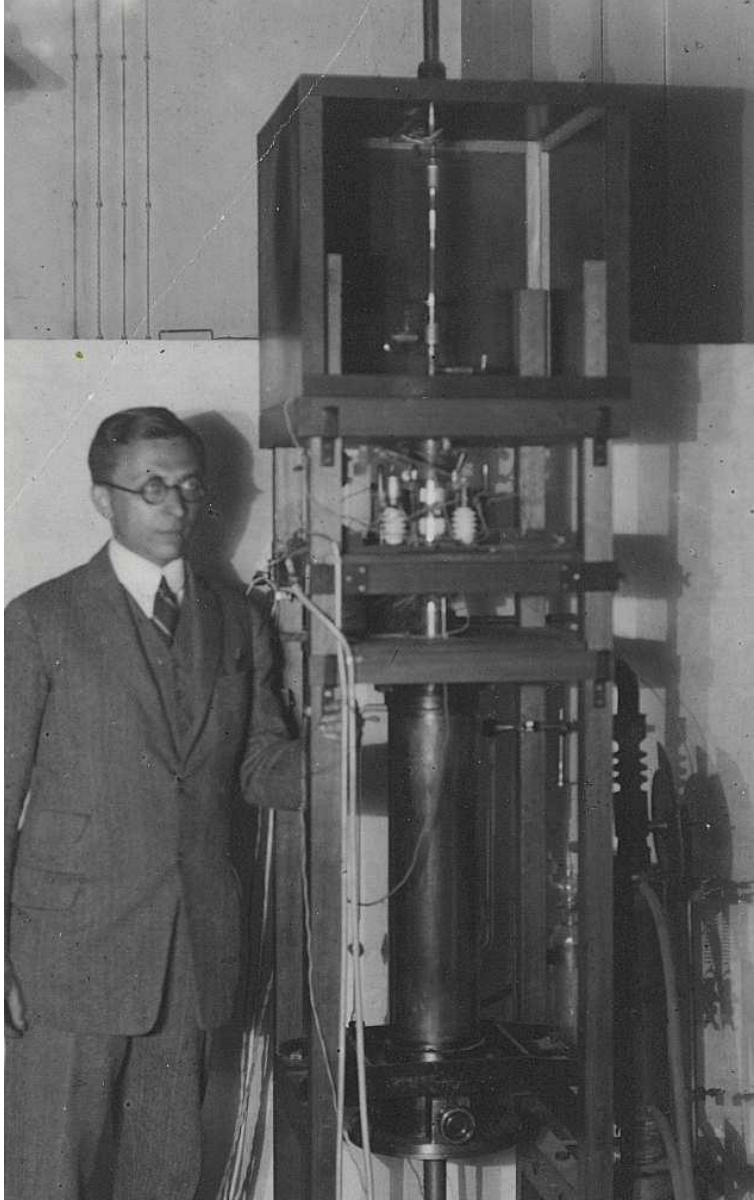
A New Microscopic Principle

D. GABOR

Nature **161**, 777–778(1948) | Cite this article

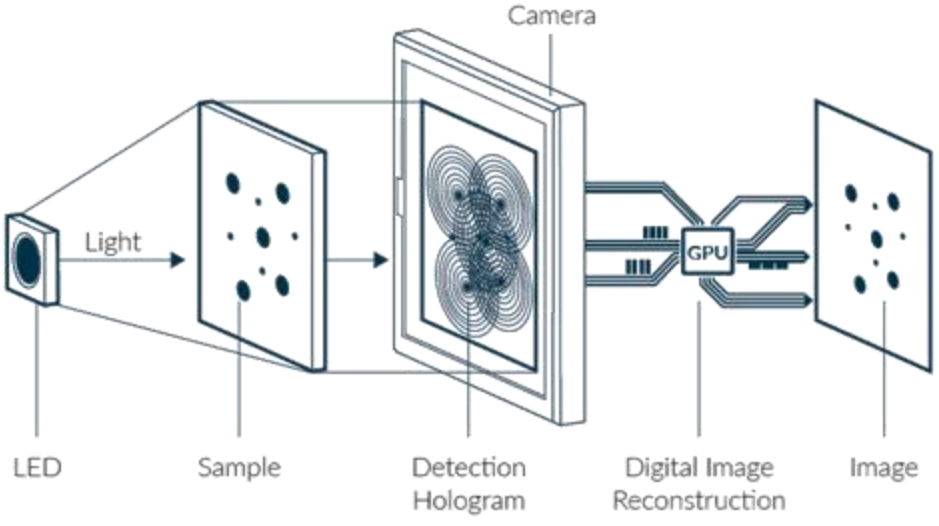
Abstract

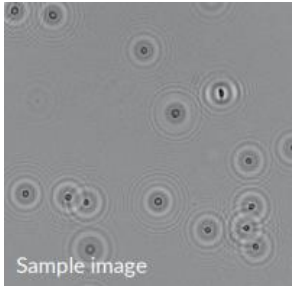
"IT is known that the spherical aberration of electron lenses sets a limit to the resolving power of electron microscopes at about 5 A. Suggestions for the correction of objectives have been made ; but these are difficult in themselves, and the prospects of improvement are further aggravated by the fact that the resolution limit is proportional to the fourth root of the spherical aberration. Tnus an improvement of the resolution by one decimal wotild require a correction of the objective to four decimals, a practically hopeless task."



The technology setup of the fluidlab‘s performance

Innovative holographic microscopy reveals differences in cell states based on the refraction of light by the sample





The secret behind the fluidlab‘s performance

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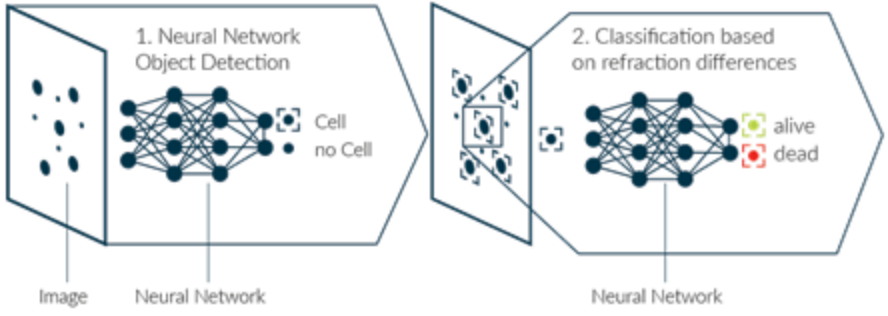
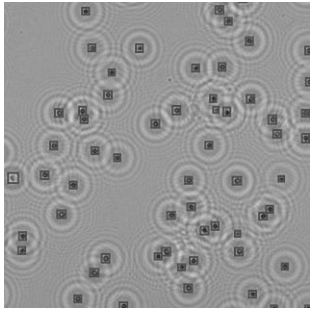
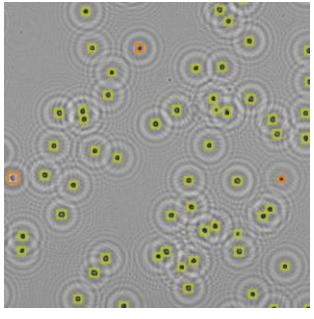
Classification of live and dead cells by convolutional Neural Networks

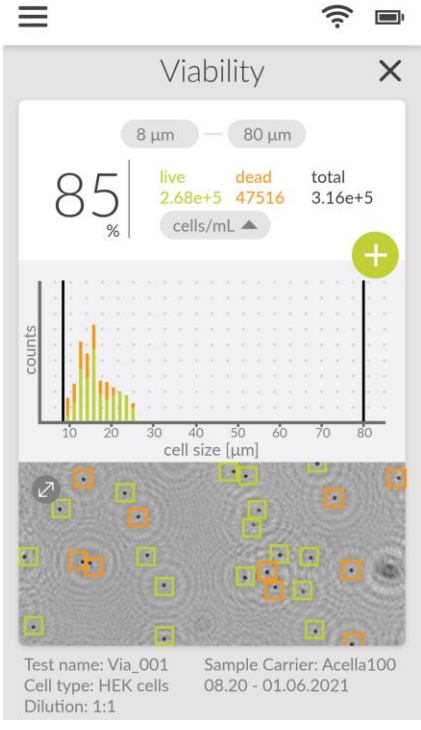




1. Detection

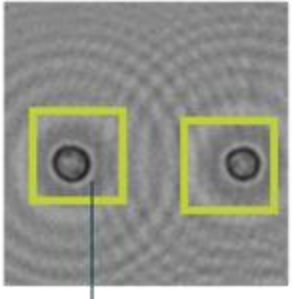


2. Classification



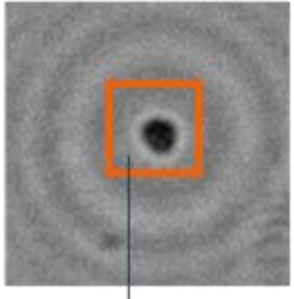
Classification of live and dead cells by convolutional Neural Networks

HeLa cells (size: approx. 40 µm)



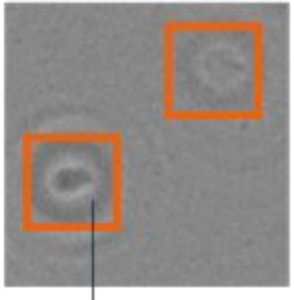
Alive Cell

Intact membrane that clearly separates cytoplasm from surrounding



Early Cell Death

Lost of intracellular features



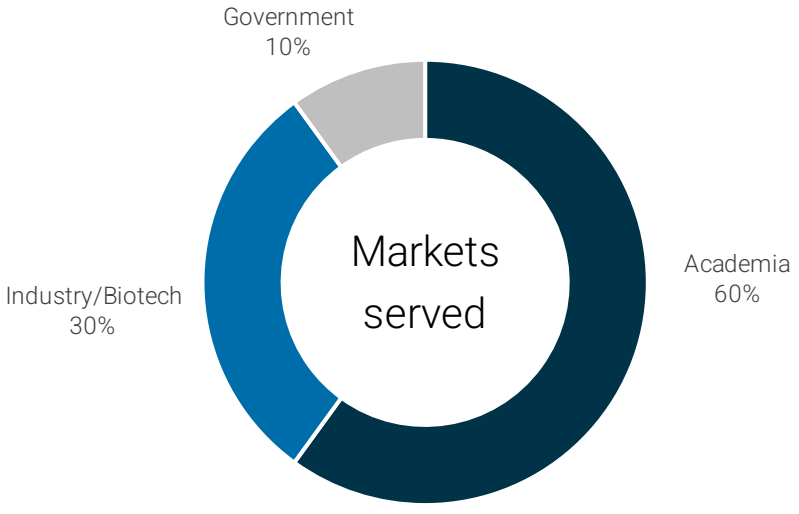
Late Cell Death

Lost of boundaries and intracellular protein content

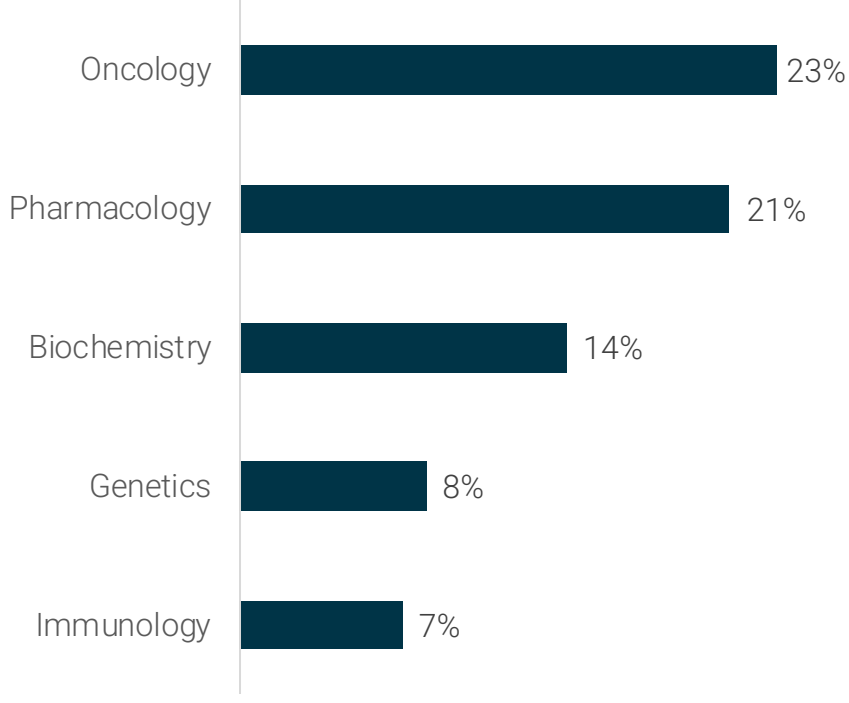
03 Target groups & customer feedback

Target groups in academia, industry & government

Customer distribution



Top 5 research fields



Customer feedback

UNIVERSITY OF CAMBRIDGE

Combining two technologies in one portable device makes our workflow much easier. We do not have to rely on several benchtop devices and carry around or cultures. We now simply bring the instrument in need directly to our samples.

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

[…] the fluidlab's staining-free viability method has enriched our work in this area. Viability measurements are very time-consuming; you have to count all cells individually beforehand and then stain them.

Universitätsklinikum Hamburg-Eppendorf

What we really like is that it can be operated intuitively. It is kept simple so that anyone new to the lab can use it.

Taiwan University

We repeated our tests with the fluidlab several times and the results were entirely accurate. There were little to no differences in the results, the repeatability was very reliable.

Université de Paris

We use the fluidlab because we want to seed cells under defined conditions. To be able to compare, the same number of cells must be initially placed in each well for each condition. At this point, we are very happy that we can use the handy fluidlab in pocket format.

04 | How to identify the right customer?

How to identify the right cell counting customer?

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Q: Which types of samples/cells do you work with and how large are the cells?

Application to use

Mammalian cell lines Mammalian primary cells (except immune cells)	**> 8µm**	**Viability**
Immune cells Yeast cells Plant cells	**< 8µm**	**Cell count**
Bacteria Proteins	**< 3µm**	**Spectrometer**

05 | Tips and tricks for product demos

Hints for fluidlab customer demos – prior to customer visit

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Prior to demo/ testing

Is the sensor clean?

Perform sensor check

- “Maintenance” → “Sensor Status” and perform the sensor status.
- Sensor dirty? (https://www.youtube.com/watch?v=llMK_uliRwI&t=2s)

Hints for fluidlab customer demos – during customer visit

In case a user performs a method comparison (fluidlab R-300 vs. manual counting or other automated counter) and the comparison yields differences in the total count of viability, there are usually two potential sources of error:

1. Improper sample preparation
2. Parameter settings on the device

Hints for fluidlab customer demos – during customer visit

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1. Improper sample preparation

As with any other cell counting method, the fluidlab R-300 can only yield accurate results when the sample was handled and prepared properly. Proper sample preparation include general techniques which are also used for manual or other automated counting:

Thoroughly mix the sample by inverting the tube 5 – 10x.

Aspire and unload the sample in the tube 3x. Then, aspire the sample from the middle of the tube

→ If in doubt, perform a second measurement with both methods (fluidlab R-300 and manual or other automated count) and keep an eye on proper sample handling.

Hints for fluidlab customer demos – during customer visit

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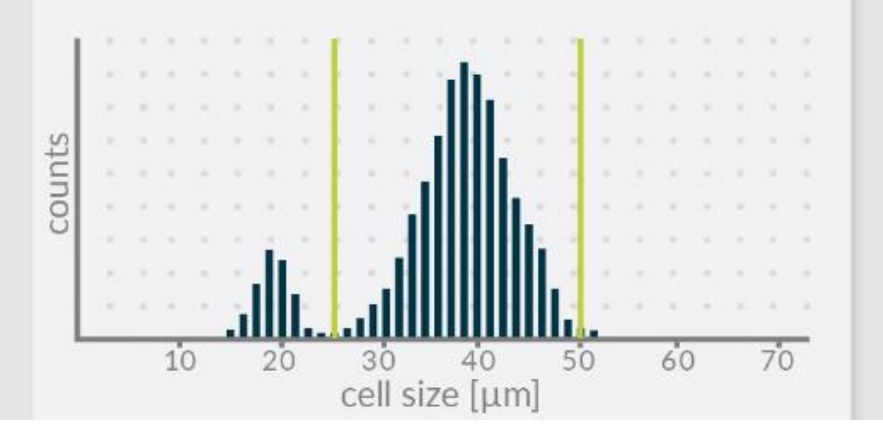
2. **Parameter setting on the device**

- Check the histogram to see if all cells are withing the set gating
- Always make sure that the dilution factor is set correctly, in case the sample had been diluted.



Hints for fluidlab customer demos – during customer visit

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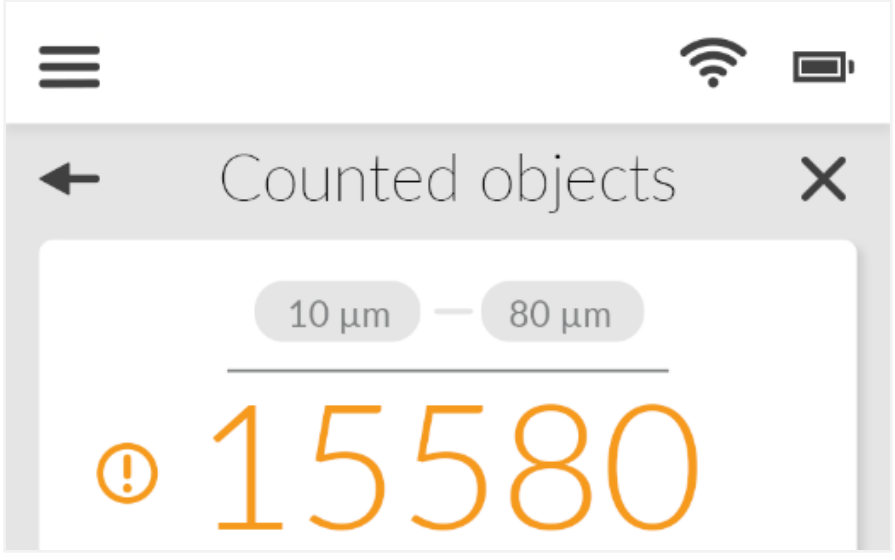
Checking the result display

- Is the sample sufficiently diluted?
- If fluidlab displays “!”, check in reconstructed image if majority of cells is boxed.
- If not – dilute sample



Hints for fluidlab customer demos

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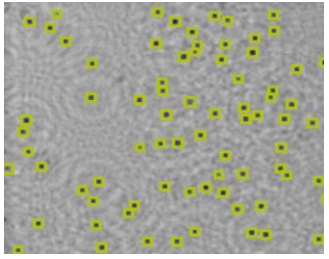
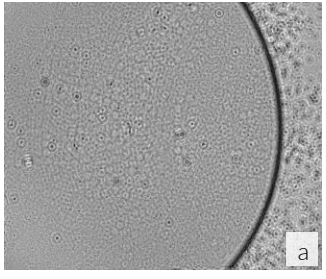
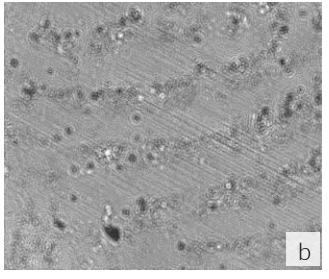
Using the microscopic image:

- Are all cells boxed?

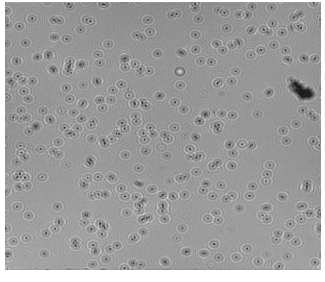


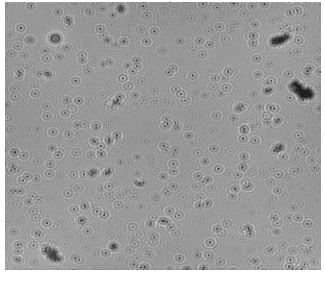
- Are there dirt or air bubbles on/in sample carrier?

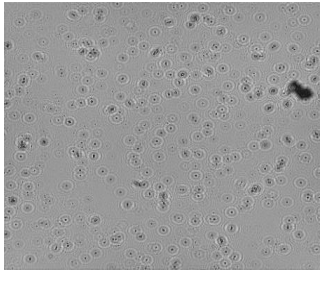




- Is the sensor contaminated?







Product Training – How to demonstrate reproducibility

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When measuring the same slide multiple times, please consider the following

After ~ 3 – 5 minutes sedimentation

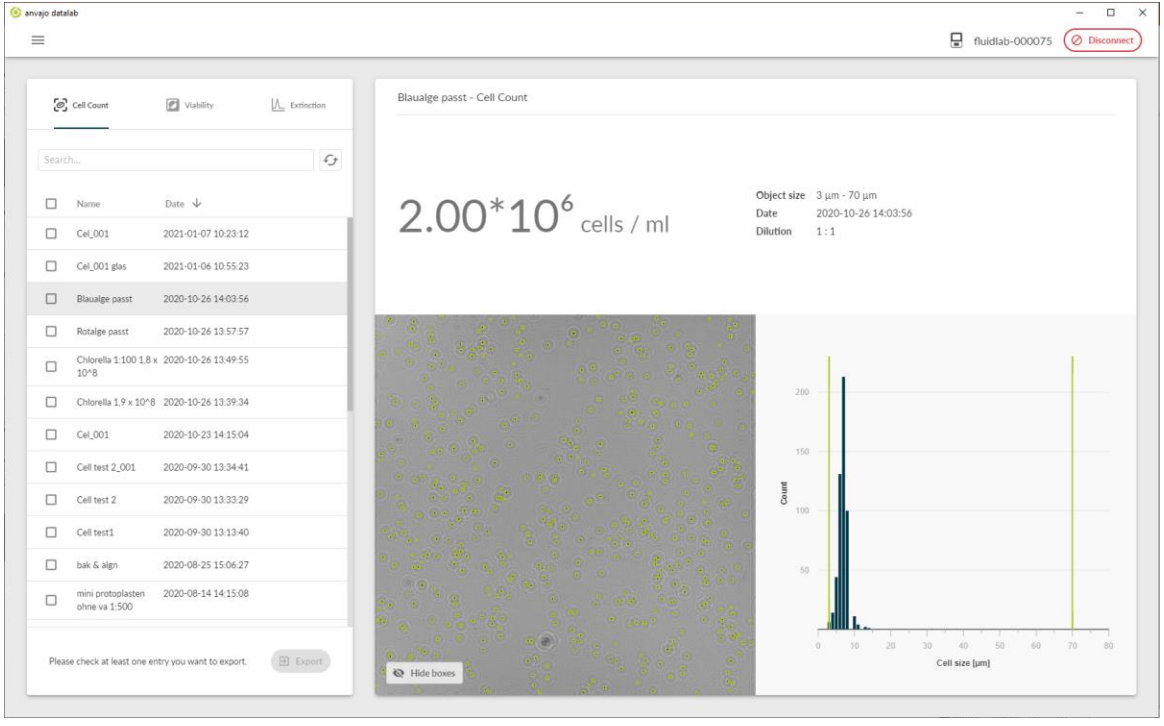
No sedimentation when inserting the slide horizontally

Product Training – Hints for live product demos

Use the anvajo datalab:

- Taking a closer look at the results with our software
- Images can always be shared with anvajo for extensive feedback

- → Download the anvajo datalab free of charge here



THX! FOR YOUR ATTENTION

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