



SINGLE CELL. BIG PICTURE.

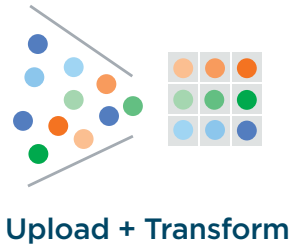


**VISUALIZE**  
*the possibilities.*



# MOVE RAPIDLY FROM DATA TO INSIGHT

Cytobank provides an established cloud-based platform that accelerates research productivity by enabling you to analyze and visualize multiple complex single-cell data sets efficiently and effectively.



Cytometers are able to analyze more than 30 parameters per cell, and millions of cells per sample. Built from the ground up on the concept of single-cell analysis, with all data visualizations based on individual cell events, the software allows you to examine data at the single-cell level of detail without losing information.

## VISUALIZE COMPLEX DATA WITH ILLUMINATING TOOLS

The Cytobank platform provides tools for a complete workflow including data pre-processing steps such as data transformation and fluorescence compensation, classical population identification via biaxial gating and comprehensive population analysis with machine learning-based algorithms.

Unique features for clinical research datasets allow visualization of populations across samples, time points and treatment groups.

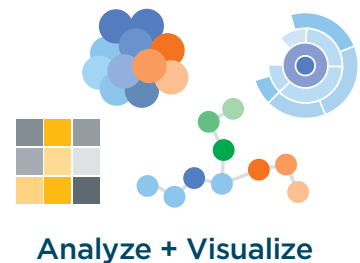
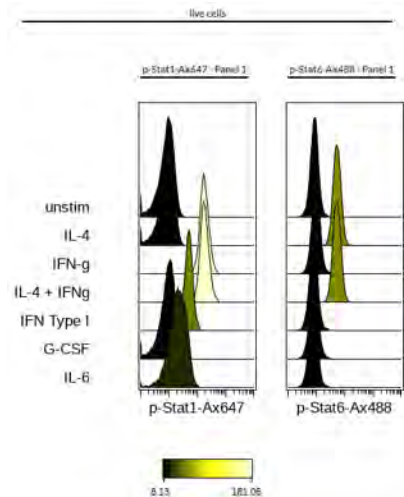
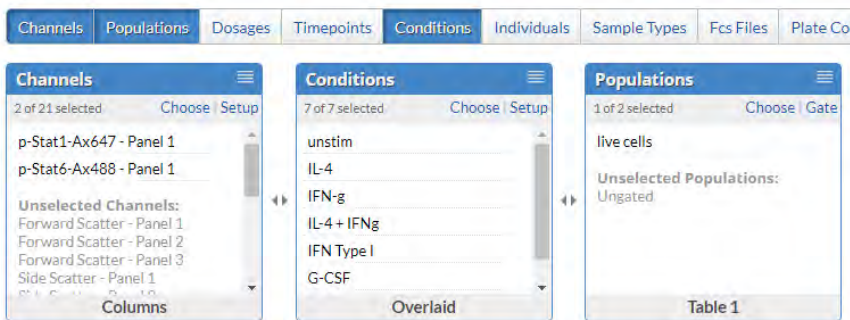


Figure Dimensions ?



The Working Illustration supports automatic figure generation based on scientific variables present in the experiment, such as stimulation conditions, sample type or timepoints.

*Visualize the Possibilities*

# TAKE FULL ADVANTAGE OF HIGH PARAMETER DATA

Quickly summarizing high parameter data in intelligible, comprehensive figures can increase research productivity. The compelling graphics offered by the platform enable unparalleled communication between clinical researchers, scientists and other collaboration partners.

## Sunburst

This novel data representation displays gating hierarchies and statistical data. Dynamically zoom in to focus on populations of interest and reveal relationships between nested data.

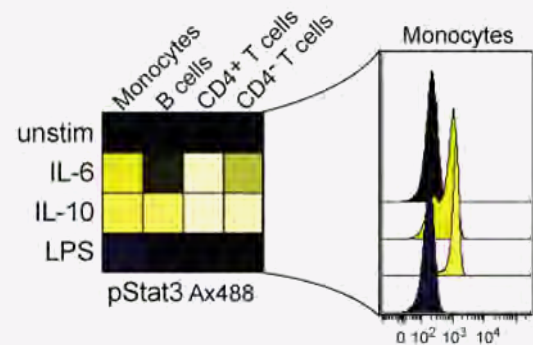
**Sunburst of T cell memory subsets.** Data was generated using the DuraClone IM T cell subsets dry reagent kit and was acquired on a CytoFLEX LX.



## Heatmap

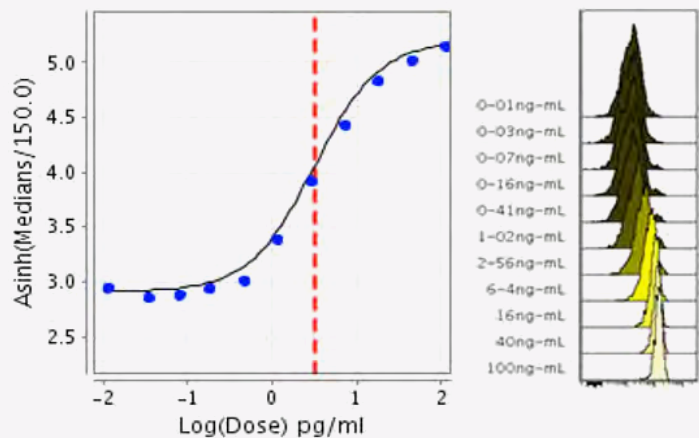
Get the big-picture view of your experiment to observe how all the samples are behaving under different conditions, while at the same time accessing the linked underlying single-cell details.

**Heatmap view** of Stat3 phosphorylation of different cellular subsets after cytokine treatment.



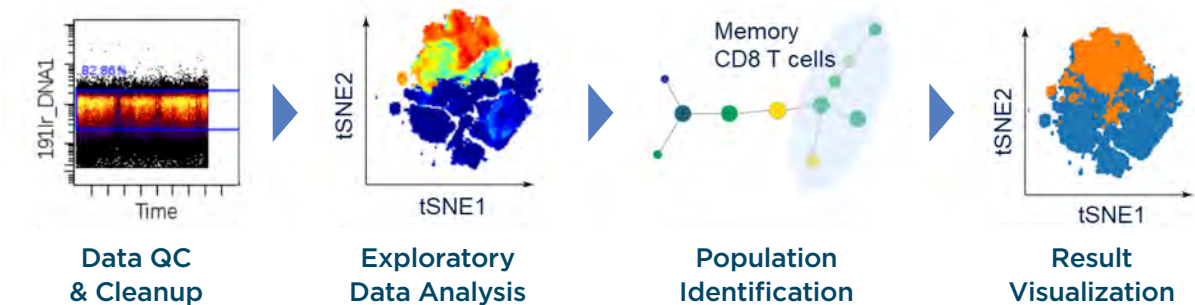
## Dose Response

Dose response analysis can reveal the impact of a treatment or identify the optimal compound dosage. Single cell data can provide important insights into the behavior of specific cell subtypes that cannot be gleaned from bulk population studies.



# DRIVE DISCOVERY WITH MACHINE LEARNING ASSISTED ANALYSIS

Manual analysis of high dimensional data can be assumption-driven and may not allow the detection of unexpected effects. The unsupervised nature of viSNE, SPADE and FlowSOM increase the chance of discovering previously undescribed phenotypes.

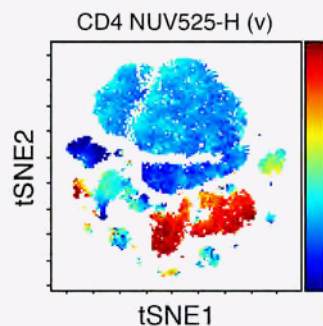


The Cytobank platform's clustering, dimensionality reduction, and visualization tools leverage scalable cloud compute, doing large analyses quickly without taking over your computer. The software automatically and instantly saves all your work in the cloud so data aren't lost and you aren't interrupted. Native algorithm implementation and a fully supported restful API simplifies pipeline construction and integration into your informatics workflows.

## viSNE

A dimensionality reduction algorithm that creates a two-dimensional view of high-parameter data, allowing you to identify interesting and rare biological subsets.

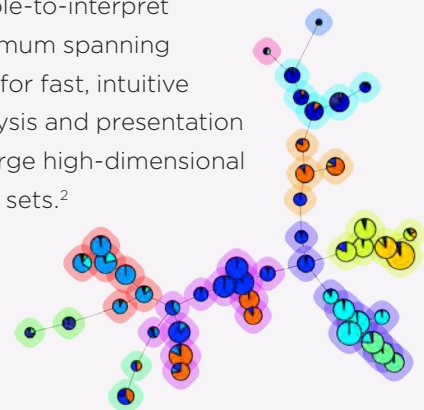
viSNE is often used as a first step for exploratory data analysis and in Cytobank can be easily linked to clustering algorithms such as FlowSOM.<sup>1</sup>



viSNE visualization of 18-marker panel. Data was acquired on a CytoFLEX LX.

## FlowSOM

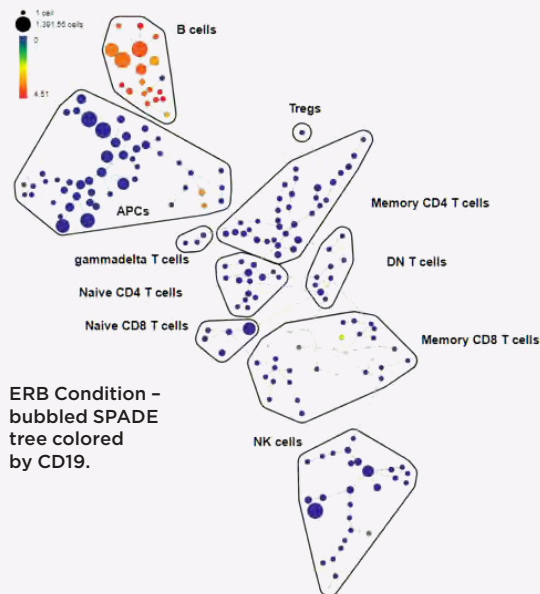
A Self Organizing Map algorithm that clusters phenotypically similar cells in a simple-to-interpret minimum spanning tree for fast, intuitive analysis and presentation of large high-dimensional data sets.<sup>2</sup>



# MACHINE LEARNING ALGORITHMS REPRODUCIBLY IDENTIFY CELL CLUSTERS AND IDENTIFY CHANGES

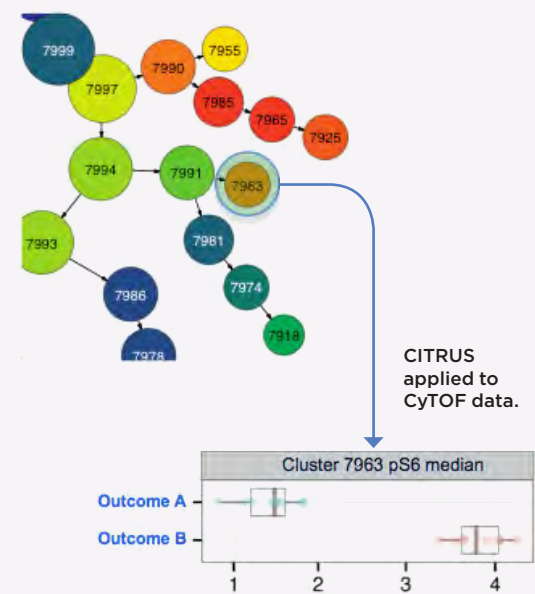
## SPADE

SPADE (Spanning-tree Progression Analysis of Density-normalized Events) automatically clusters similar groups of cells into nodes, creates commonly observed cell groupings in bubbles and allows the visualization of fold-changes between groups of samples.<sup>3</sup>



## CITRUS

A two step algorithm that automatically subsets single cell data then identifies statistically significant differences between groups of samples taking prior knowledge into account. CITRUS is ideally suited to access the statistical prediction power of biomarkers.<sup>4</sup>



### References:

1. Amir ED, Davis KL, Tadmor MD, et al. viSNE enables visualization of high dimensional single-cell data and reveals phenotypic heterogeneity of leukemia. *Nature Biotechnology*. 2013;31(6):545-552. doi:10.1038/nbt.2594
2. Van Gassen S, Callebaut B, Van Helden MJ, et al. FlowSOM: Using self-organizing maps for visualization and interpretation of cytometry data: *FlowSOM*. *Cytometry*. 2015;87(7):636-645. doi:10.1002/cyto.a.22625
3. Qiu P, Simonds EF, Bendall SC, et al. Extracting a cellular hierarchy from high-dimensional cytometry data with SPADE. *Nature Biotechnology*. 2011;29(10):886-891. doi:10.1038/nbt.1991
4. Bruggner RV, Bodenmiller B, Dill DL, Tibshirani RJ, Nolan GP. Automated identification of stratifying signatures in cellular subpopulations. *Proc Natl Acad Sci USA*. 2014;111(26):E2770-E2777. doi:10.1073/pnas.1408792111

# COLLABORATE ACROSS DISCIPLINES AND GEOGRAPHIES

Staying on the cutting edge in our connected world, Cytobank platform's cloud-based capabilities allow scientists from around the globe to collaborate and dive deeper into large and complex data sets. Share and access data anytime, anywhere from any web-enabled device.



## Store + Collaborate

Uploading your data, whether for storage, analysis, or sharing, is a great way to create a reliable backup of your results. In addition to preserving your cytometry experiments, Cytobank's secure servers allow you to back up and associate related experimental data, including protocols, presentations and microscopy images.

The screenshot displays the Cytobank Experiment Manager interface. On the left, a sidebar lists various experiments and projects. The main area shows a detailed view of an experiment titled "MY1 CytoFLEX LX compensated". Below this, a "Linked experiments" section shows a hierarchical tree structure of related experiments. At the bottom, a table lists linked clones.

ID	Name	Size	Created
252480	MY1.CytoFLEX.LX.compensated (Clone)	1.2.GB	Aug 29

Total size: 1.2 GB

The Experiment Manager allows you to search your own experiments as well as experiments that have been shared with you. By organizing experiments in projects you can assign different levels of access. The Tree view clearly shows relationships between experiments and makes it easy to navigate to the advanced analysis you are looking for. Cytobank-curated experiments provide useful exemplary data and analysis strategies and show what is possible.

*Visualize the Possibilities*

# THE CYTOBANK PLATFORM IS AVAILABLE IN TWO VERSIONS TO FIT YOUR NEEDS

## Premium Cytobank

**Ideal for individual academic users.**

- Cutting-edge analytic tools including FlowSOM, SPADE, viSNE and CITRUS.
- The latest visualization tools such as Sunbursts for displaying complex population hierarchies
- Plate-based annotations and dose-response analyses
- API to support custom workflows
- DROP functionality to easily upload high-dimensional data from virtually any source

## Enterprise Cytobank

**Ideal for pharma/biotech and academic institutions.**

- All the functionality of Premium
- Administrator dashboard to manage all your users and data, and a Single Sign On (SSO) option
- Dedicated computing and storage resources for your organization only
- DROP import supports more parameters
- Personalized training and installation support

## Make our team an extension of your team

**Take advantage of a comprehensive collection of support articles and online tutorials that help you get started and advance your data analysis.**

Our Applications Scientists will answer your questions and help you get the most out of your data. For complex projects engage our Scientific Services Team to profit from expert customized solutions.




**Your Team + Our Team**

## No-Risk 30 Day Trial

**Go online and sign up for a risk free 30 day trial at [premium.cytobank.org](http://premium.cytobank.org).**

If you would like to continue using Cytobank after that, contact your sales representative or subscribe online.





## Choose Beckman Coulter for Benchmark Expertise and Innovation

For over 80 years Beckman Coulter has driven innovation. We remain committed to shaping flow cytometry technology to fit seamlessly into your lab's workflow and to provide an optimal user experience. When you choose a Beckman Coulter solution you receive the a high level of expertise, innovation, and quality assurance.

**Contact your local Beckman Coulter sales representative.**

**[beckman.com](http://beckman.com)**



For research use only. Not for use in diagnostic procedures.

© 2019 Beckman Coulter and Beckman Coulter Life Sciences. All rights reserved. Beckman Coulter, the stylized logo, and the Beckman Coulter product and service marks mentioned herein are trademarks or registered trademarks of Beckman Coulter, Inc. in the United States and other countries. All other trademarks are the property of their respective owners.

---

For Beckman Coulter's worldwide office locations and phone numbers, please visit "Contact Us" at [beckman.com](http://beckman.com)

FLOW-5855SB08.19