



EFFICIENT ANALYSIS & SECURE  
SHARING OF HIGH-COMPLEXITY DATA



**VISUALIZE**  
*the possibilities.*



# MOVE RAPIDLY FROM DATA TO INSIGHT



## Upload + Transform

The Cytobank platform is an easy-to-learn cloud-based solution for high-dimensional data analysis, and a reliable tool for visual data management and controlled sharing. And although your flow cytometry datasets might be complex, using Cytobank to analyze them doesn't have to be.

The field of flow cytometry has entered the era of machine learning-assisted data analysis. Cytobank software enables comprehensive visualization and analysis of single-cell data with no need for coding knowledge.

## REDUCE YOUR TIME-TO-RESULTS WITH AN END-TO-END SOLUTION



## Analyze + Visualize

### Reduce Subjectivity

Manual gating is error prone and biased; leverage machine learning-assisted analysis to gain faster insights from complex datasets.

### Improve Traceability

Keep your data organized and backed up daily. Raw data and results are interconnected: no need to question how you got to a result.

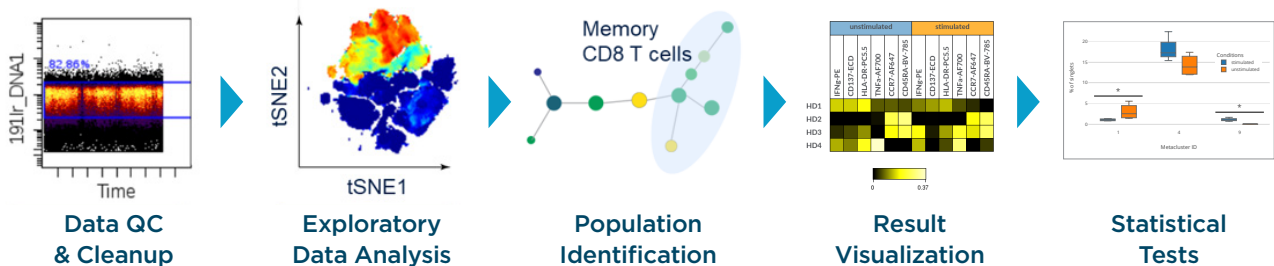
### Ensure Reproducibility

Go from raw data to statistical significance all in one software. Remove copy-paste steps in data analysis to increase productivity and reproducibility.

### Boost Collaboration

Share data with anyone with a web-enabled device in just one click; manage experiments via projects with appropriate collaborator permissions.

The Cytobank platform provides tools for a complete workflow, from raw data to statistical significance, through regular manual gating or advanced machine learning-assisted analysis for dimensionality reduction and unsupervised clustering.



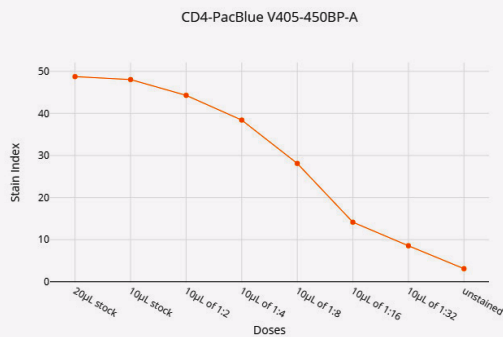
Visualize the Possibilities

# VISUALIZE & INTERACT WITH YOUR CYTOMETRY DATA

Quickly summarizing high-parameter data in intelligible, comprehensive figures can increase your research productivity. Basic functions like the Stain-Index calculation or the Dose-Response curves will allow you to reduce time spent on common data analysis steps; while the Cytobank platform's compelling graphics will enable unparalleled communication among clinical researchers, scientists and other collaboration partners.

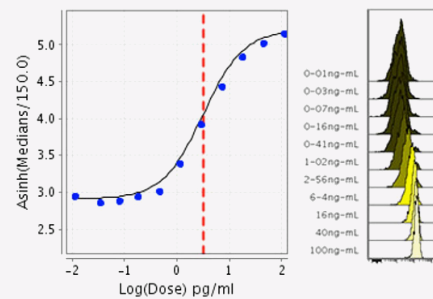
## Stain Index Calculation

Antibody Titration is a critical quality control parameter. With our Summary Charts and Stain Index visualization you can directly see how stain index and fluorescence intensities change without exporting your data.



## Dose Response

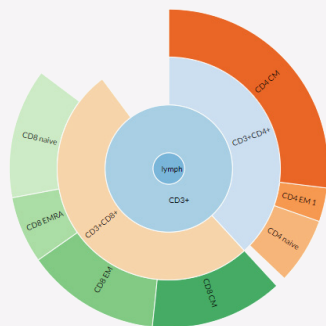
Dose response analysis can reveal the impact of a treatment or identify the optimal compound dosage. Single-cell data can provide important insights into the behavior of specific cell subtypes that cannot be gleaned from bulk population studies.



## Sunburst

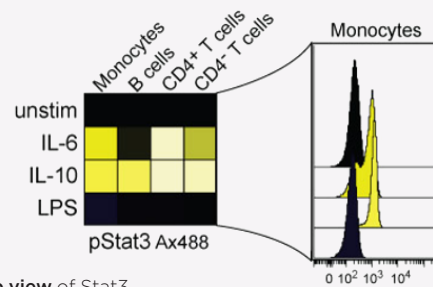
This novel data representation displays gating hierarchies and statistical data. Dynamically zoom in to focus on populations of interest and reveal relationships between nested data.

**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 flow cytometer.



## 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 underlying single-cell details.



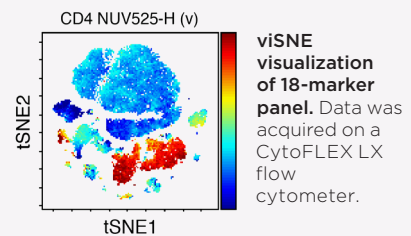
**Heatmap view** of Stat3 phosphorylation of different cellular subsets after cytokine treatment.

# DRIVE DISCOVERY WITH MACHINE LEARNING-ASSISTED ANALYSIS

The Cytobank tools leverage scalable cloud computing, 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 API simplifies pipeline construction and integration into your informatics workflows.

## Dimensionality Reduction

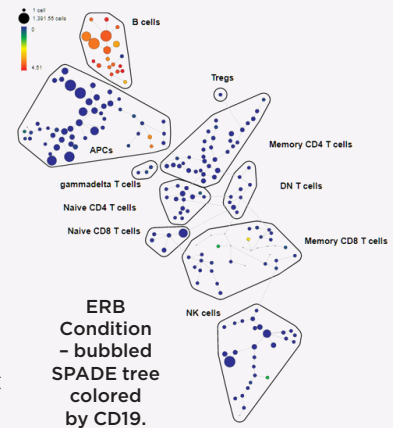
The Dimensionality Reduction Suite in the Cytobank cloud allows you to select among four different algorithms for creating a two-dimensional view of high-parameter data. Perhaps you prefer the distant and dense islands of a UMAP embedding, or you like the larger, less compact tSNE's island? You have the choice among **viSNE**, **UMAP**, **tSNE-CUDA** and **opt-SNE** to help you quickly identify interesting or rare biological subsets in your samples.<sup>1-4</sup>



## Unsupervised Clustering

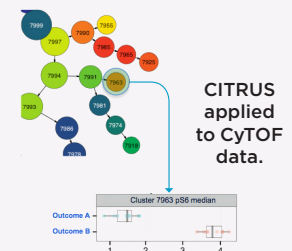
Manual gating of high-dimensional data can be assumption-driven and may not allow the detection of unexpected effects. The unsupervised nature of clustering algorithms increases the chance of discovering previously undescribed phenotypes.

Use **SPADE** or **FlowSOM** to cluster phenotypically similar cells in a simple-to-interpret minimum spanning tree for fast, intuitive analysis and presentation of large high-dimensional datasets.<sup>5</sup> The possibility to re-use the Self Organizing Map (SOM) for further analysis enables comparison between samples acquired at different timepoints, and is the best option for complex longitudinal studies.



## CITRUS

The goal of many researchers is to identify predictive biomarkers. Sign into the Cytobank cloud to discover a two-step algorithm that automatically subsets single-cell data, then identifies statistically significant differences among groups of samples, taking prior knowledge into account. **CITRUS** is ideally suited to access the statistical prediction power of biomarkers.<sup>6</sup>

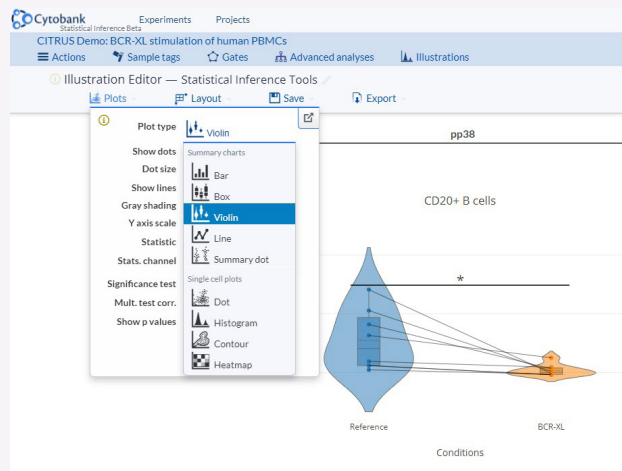
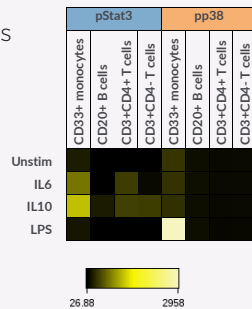


# MOVE QUICKLY FROM RAW DATA TO MODERN SUMMARY VISUALIZATION AND STATISTICAL EVALUATION

The Illustration Editor supports automatic figure generation based on an experiment's scientific variables (Sample Tags) such as stimulation conditions, sample type or timepoints. These variables can be toggled on or off and rearranged dynamically to build and modify a plot layout.

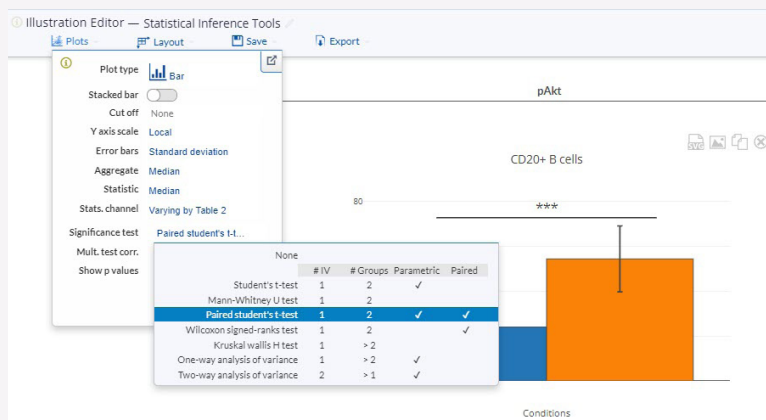
## Summary Visualization

Aggregated Heatmap, Box plot, Violin plot, Bar chart, Line chart and Summary dot enable you to make one-click comparisons of your single-cell data, quickly moving from event-level data to summary visualization.



## Statistical Evaluation

By eliminating the need to manually export population identification analysis results, Cytobank's Statistical Tools allow users to directly run a significant test in the platform using the results created after manual gating analysis or machine learning-based analysis. It is possible to select from among common statistical tests such as regular and paired Student's t-Test, one- or two-way ANOVA,



and many others to calculate statistical significance directly in the Illustration Editor and display results on summary charts—avoiding copy-paste errors that might arise when moving data to another software program. Any changes made to the gating strategy will automatically propagate through the summary charts.

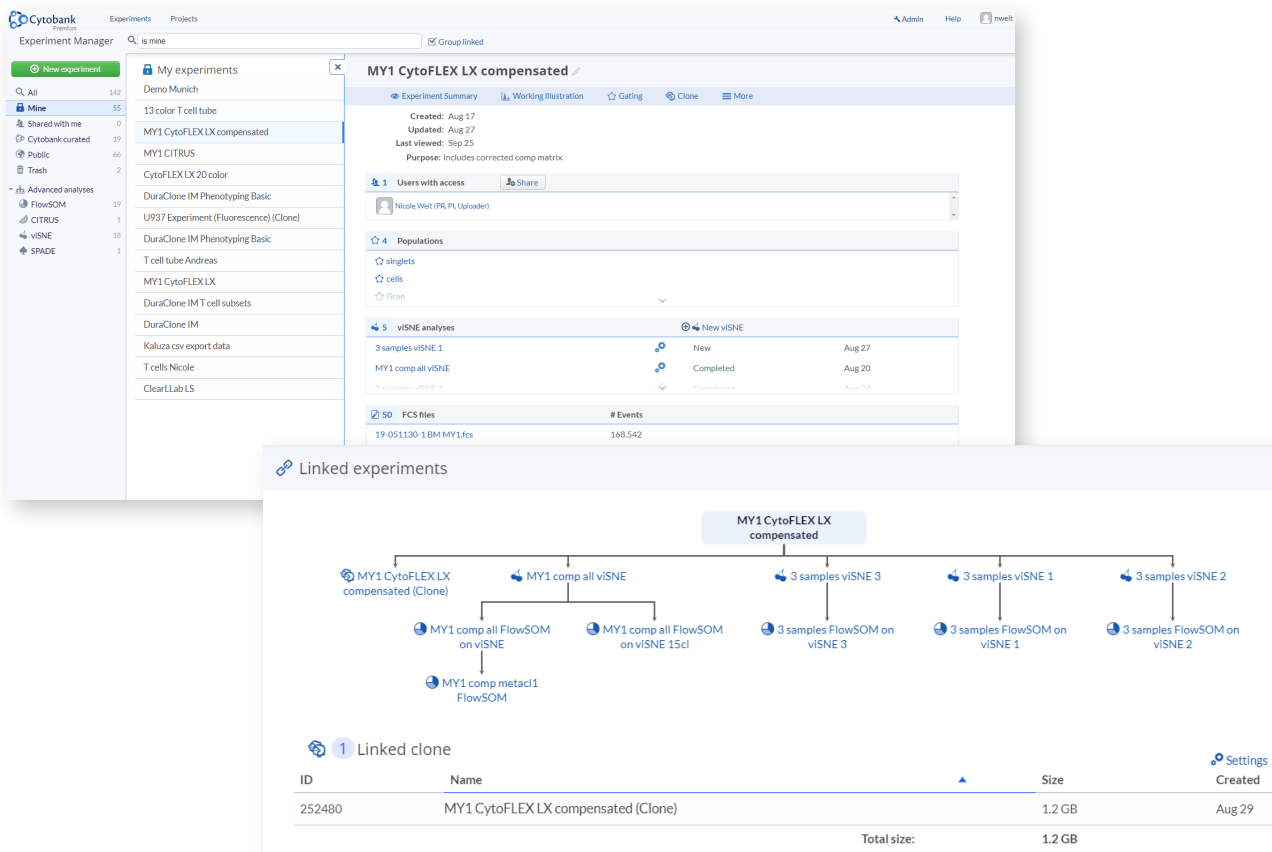
# COLLABORATE ACROSS DISCIPLINES & GEOGRAPHIES

Staying on the cutting edge in our connected world, the Cytobank platform's cloud-based capabilities allow scientists from around the globe to collaborate and dive deeper into large and complex datasets. 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 shows a list of experiments categorized by 'All', 'Mine', 'Shared with me', 'Cytobank curated', 'Public', 'Trash', and 'Advanced analyses'. The main panel shows the details for an experiment titled 'MY1 CytoFLEX LX compensated'. Below this, a 'Linked experiments' tree diagram illustrates the relationships between the main experiment and its clones and analyses. At the bottom, a table lists the 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*

# AVAILABLE IN 2 VERSIONS TO FIT YOUR NEEDS

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## 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

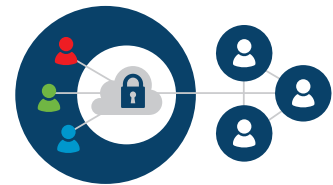
**Ideal for pharma/biotech and academic institutions.**

- All the functionality of Premium
- Administrator dashboard to manage all users/data
- 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

**To sign up for a risk-free 30-day trial, visit [beckman.com](http://beckman.com).**

If you want to continue using Cytobank after your free trial, contact your sales representative or subscribe online.



## Choose Beckman Coulter Life Sciences for Benchmark Expertise and Innovation

Since 1935, the Beckman name has stood for 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 can expect to receive a high level of expertise, innovation and quality assurance.

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

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

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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
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5. 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
6. 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

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