



Artificial Intelligence in Flow Cytometry

Dennis Tielemans

Senior Application Specialist

Waters Biosciences (formerly BD Biosciences)

NVC Antwerp March 2026

Waters™

Biosciences

Formerly BD Biosciences

This business has been acquired by Waters Corporation (“Waters”). Becton, Dickinson and Company or one of its affiliates or subsidiaries (“BD”) remains the legal manufacturer of Biosciences and Diagnostic Solutions products until all required regulatory transfers are completed. During this interim period, BD maintains full responsibility for all regulatory obligations of the legal manufacturer. Product information is supplied under BD’s regulatory authority. To learn more about the relationship between Waters and BD during this transition period, please see our detailed summary: www.waters.com/bdtransaction.

Waters BD FACSARIA III™, BD Influx™, BD FACSMelody™, BD FACSsymphony S6™, BD FACSDiscover S8™, BD AccuriC6 Plus™ BD Fortessa X20™ BD FACSsymphony A1™, BD FACSsymphony A3™, BD FACSsymphony A1™BD FACSDiscover A8™ BD Rhapsody™ BD FACSCalibur™ BD FACSvia™ BD FACSLytic™ BD FACSCanto II™ BD FACS Lyse Wash Assistant™ BD FACS Sample Prep Assistant (SPA) III™ BD FACSDuet™ BD Horizon™ BD Horizon RealYellow™ BD Horizon RealBlue™,BD CellView™ are trademarks of Waters Technologies Corporation. BD is a trademark of Becton, Dickinson and Company.

Evolving Flow Cytometry Landscape

Increasing Demands of Flow Cytometry



Increasing Assay & Analysis Complexity

More parameters, higher number of events, more scientific applications^{1,3,4}



Increasing Laboratory Pressures

Increasing test volumes and workforce strains²



Evolving Compliance Requirements

Global changes for clinical labs and the instruments used for IVD and LDT applications

1. Brestoff, Jonathan R., and John L. Frater. "Contemporary Challenges in Clinical Flow Cytometry: Small Samples, Big Data, Little Time." *The Journal of Applied Laboratory Medicine*, vol. 7, no. 4, July 2022, pp. 931–944. <https://doi.org/10.1093/jalm/jfab176>.
2. Overcoming Lab Staffing Shortages. AACC White Paper, Siemens Healthcare Diagnostics Inc., 2024, <https://www.siemens-healthineers.com/en-us/lab-shortage-impact-survey-2024>.
3. Robinson, J.P., R. Ostafe, S.N. Iyengar, B. Rajwa, and R. Fischer. "Flow Cytometry: The Next Revolution." *Cells*, vol. 12, no. 14, 17 July 2023, p. 1875. doi:10.3390/cells12141875. PMID: 37508539; PMCID: PMC10378642.
4. Cheung, M., J.J. Campbell, L. Whitby, R.J. Thomas, J. Braybrook, and J. Petzing. "Current Trends in Flow Cytometry Automated Data Analysis Software." *Cytometry A*, vol. 99, no. 10, Oct. 2021, pp. 1007–1021. doi:10.1002/cyto.a.24320. PMID: 33606354.

What if.....



... you could use an AI driven gating tool to **increase efficiency and getting answers faster ?**

... you could decrease the user variability in gating to aid daily **routine ?**



BD FACSLyric™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

BD Elastigate™ Autogate Technology

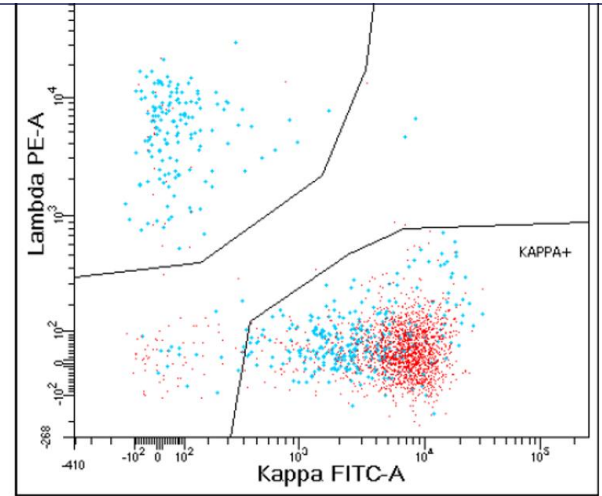
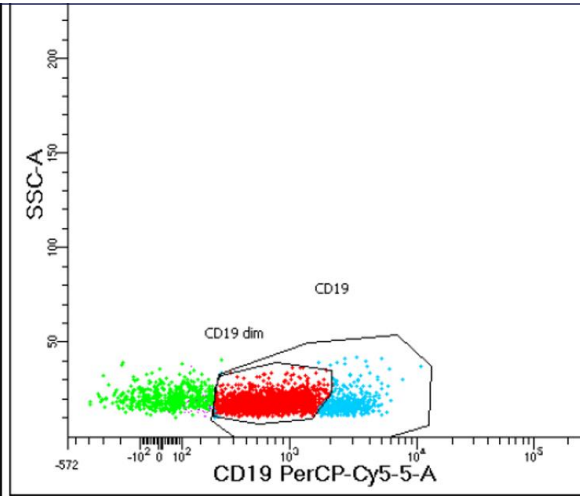
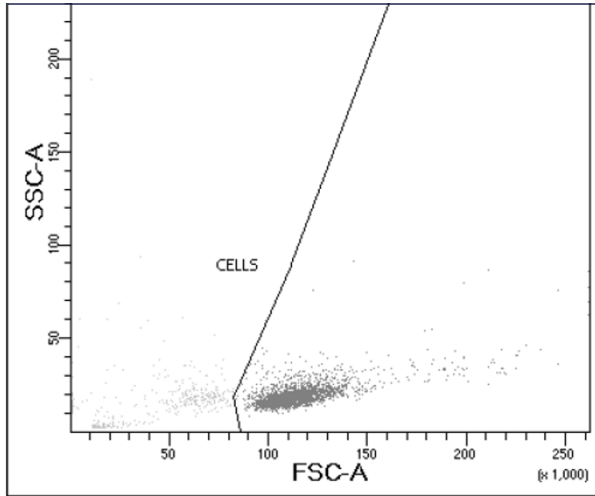


Artificial Intelligence in Flow Cytometry

Traditional Data Interpretation

Data analysis involves a gating hierarchy:

- Involves manual gate adjustments for each sample and is considered complex
- Analysis can be time-consuming
- Risk of subjective operator-to-operator variation and potential for errors



BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark

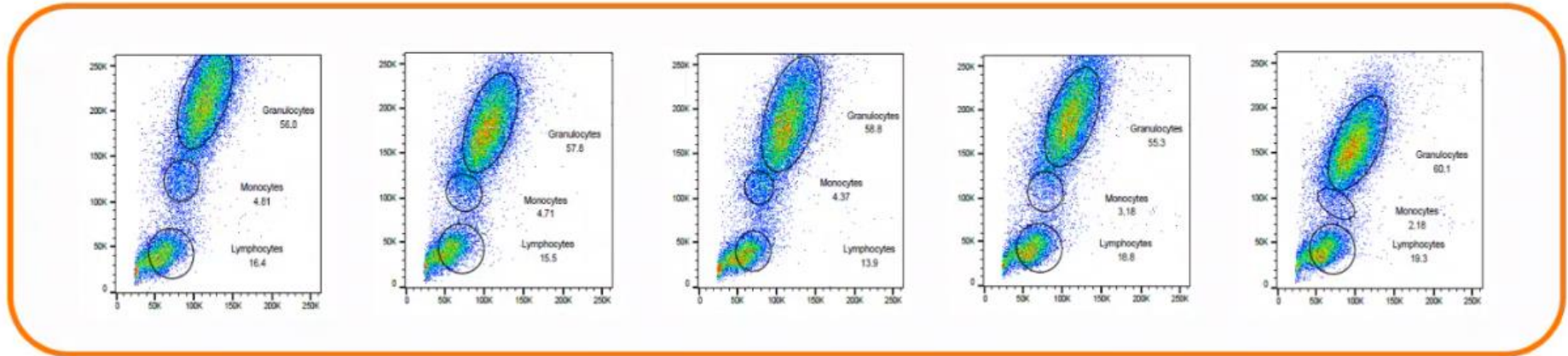


Artificial Intelligence in Flow Cytometry

BD FACSuite™ Application and BD Elastigate™ Technology

A software algorithm reliably places and adjusts gates to each sample, so the user only needs to review the results at the end, with the option to manually correct a gate if necessary

- An alternative to conventional batch analysis
- Adapts to subtle variations in the data without disrupting the user's intended gating strategy.
- Supervised approach, meaning training data is provided by the user



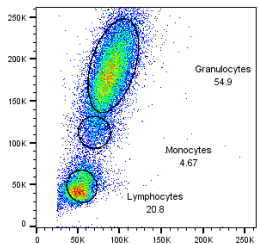
BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



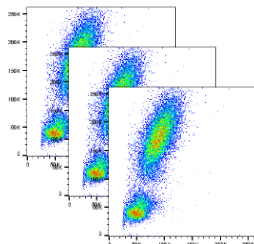
Artificial Intelligence in Flow Cytometry

BD FACSuite™ Application and Elastigate™ Technology

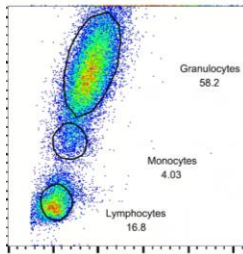
1 Train
Draw gates



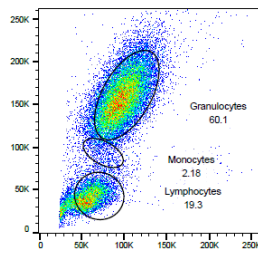
2 Select Target
Select ungated sample(s)



3 Apply
Run the algorithm



4 Review
Manually adjust if needed



Our solution is unique compared to other computational approaches on the market in that:

- It does not need to be customized for specific populations
- The user can view and manually modify the gates after the algorithm is complete
- It can gate negative/empty space

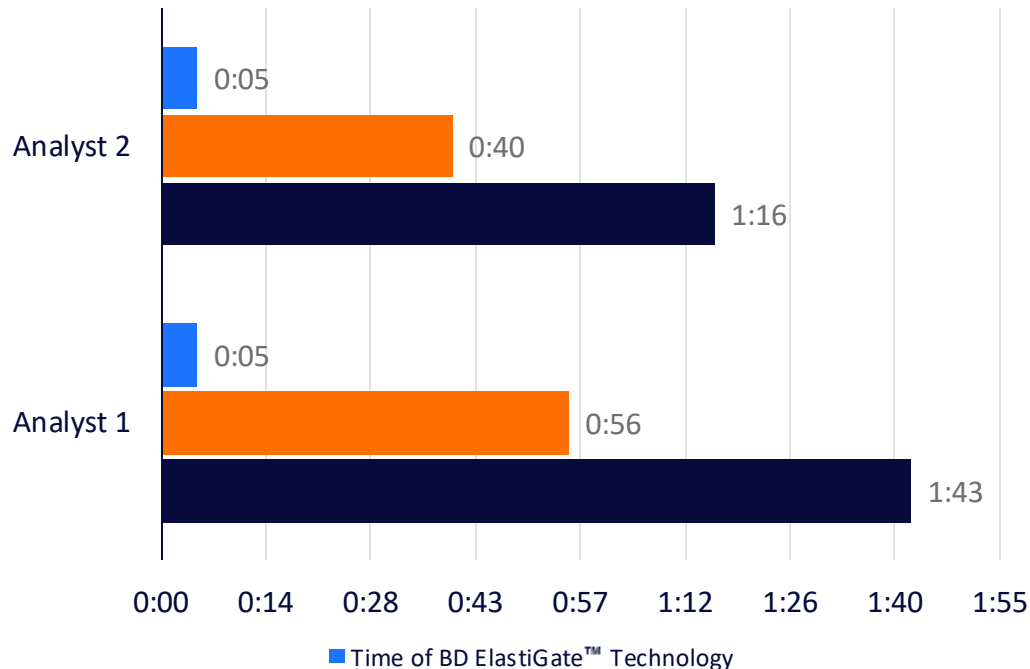
CE BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

BD FACSuite™ Application and Elastigate™ Technology

Time in Motion Study



18x faster
than manual analysis alone

1.8x faster
than manual gating
with additional review time

Manual Gating

103 secs
Avg analyst 1

76 secs
Avg analyst 2

BD Elastigate™ Technology

5 secs
Avg

Avg Additional Review

56 secs
Avg analyst 1

40 secs
Avg analyst 2



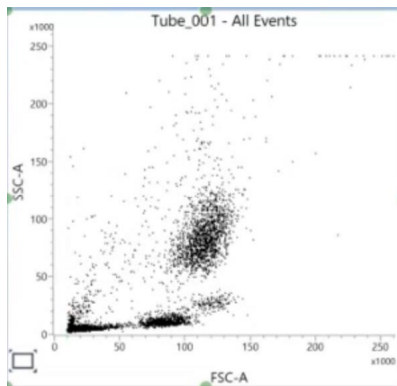
BD FACSuite™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

BD Elastigate™ Workflow Example

Creating an assay:



Create Assay

Rename tubes here as needed

Tube name
Tube_001

Next >> Cancel

Create Assay

Tube 'Tube_001' - manage training data sets

Description for new data (maximum characters 80):

<< Back Next >> Cancel

Create Assay

Enter an assay name with a maximum of 27 characters. The suffix 'UD' (for User Defined) will be appended to the name when assay is saved.

Name: elastigate_001_001

Assay description:

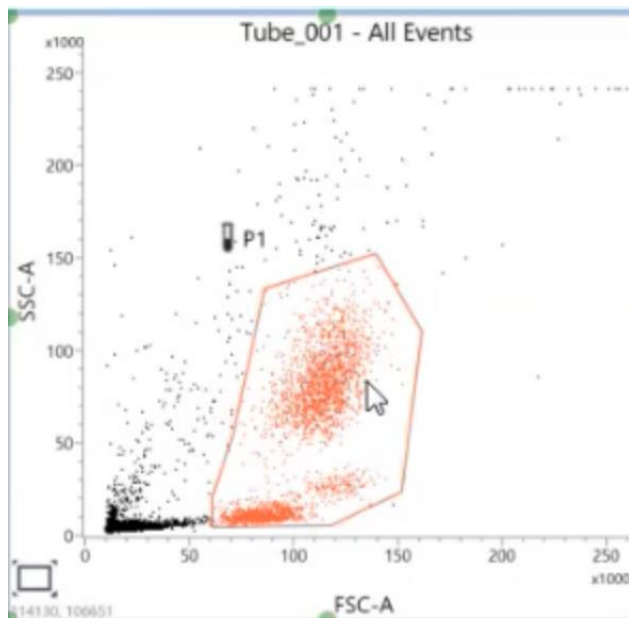
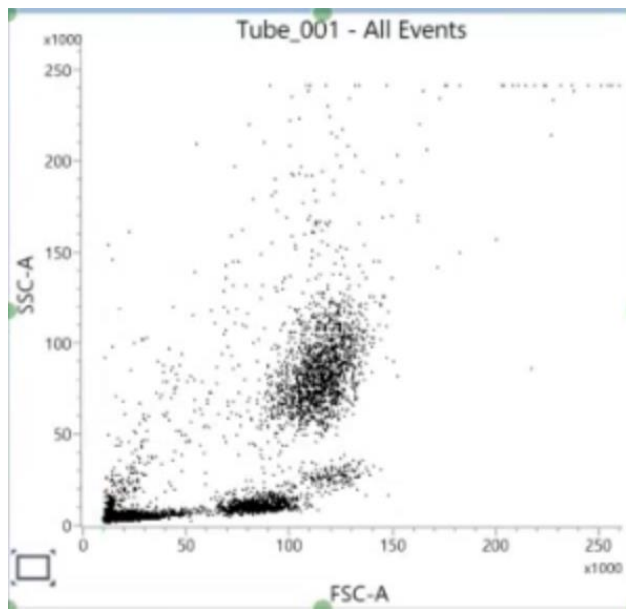
Folder Assignment

Report to display after entry run:

<< Back OK Cancel

BD Elastigate™ Workflow Example

Creating BD ElastiGate with sample data:



BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark

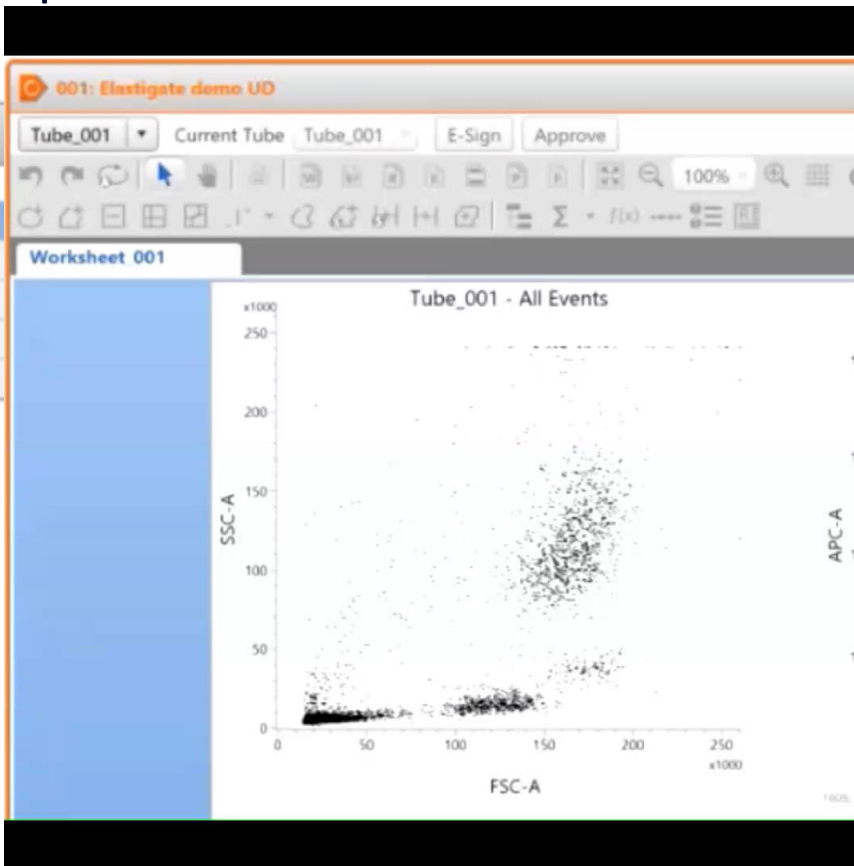


Artificial Intelligence in Flow Cytometry

BD Elastigate™ Workflow Example

Creating a worklist to acquire samples:

Worklist Entries	Audit Trail	E-Sign	Approve	More...
Sample ID	Task	Status		
▶ 1	001 Elastigate demc	Ready		
▶ 2	002 Elastigate demc	Ready		
▶ 3	003 Elastigate demc	Ready		
▶ 4	004 Elastigate demc	Ready		
▶ 5	005 Elastigate demc	Ready		



BD FACS™ Flow Cytometer with the BD FACS™ Clinical and BD FACS™ Applications, BD FACS™ Universal Loader, BD™ CS&T Beads and BD™ FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark

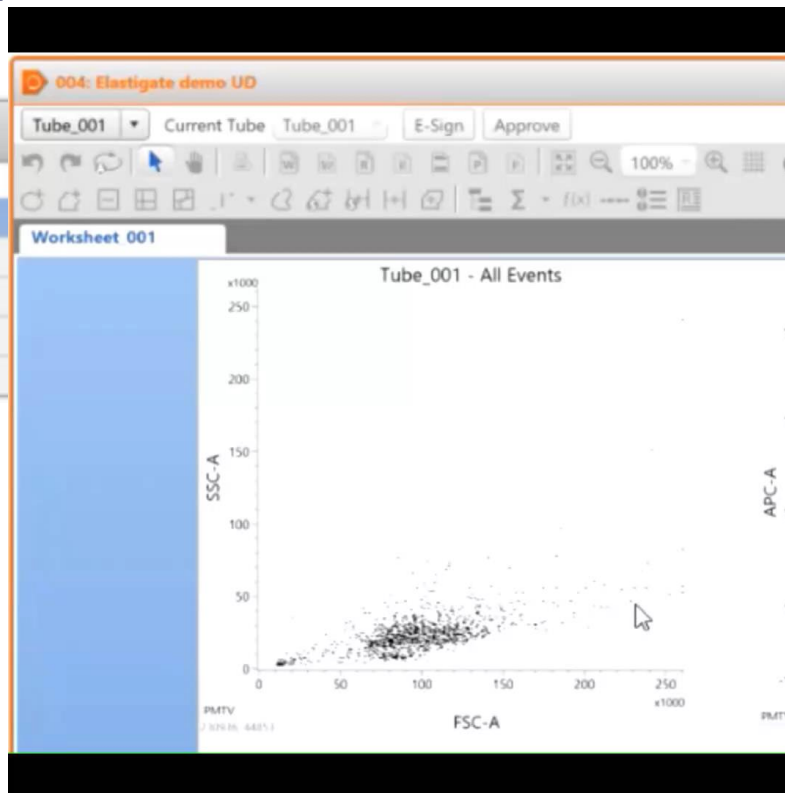


Artificial Intelligence in Flow Cytometry

BD Elastigate™ Workflow Example

Creating a worklist to acquire samples:

Worklist Entries	Audit Trail	E-Sign	Approve	More...
Sample ID	Task	Status		
▶ 1	001	Elastigate demc	Ready	
▶ 2	002	Elastigate demc	Ready	
▶ 3	003	Elastigate demc	Ready	
▶ 4	004	Elastigate demc	Ready	
▶ 5	005	Elastigate demc	Ready	



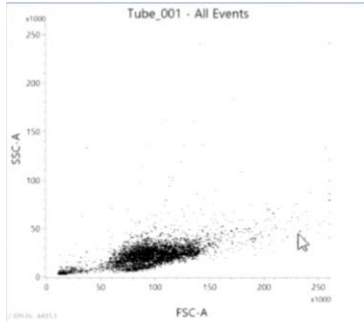
BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD™ CS&T Beads and BD™ FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

BD Elastigate™ Workflow Example

Updating an assay:



Update Assay 'elastigate_001'

Rename tubes here as needed

Tube name
Tube_001

Next >> Cancel

Update Assay 'elastigate_001'

Tube 'Tube_001' - manage training data sets

Add new data

Description for new data (maximum characters 80):

Existing data

Data description	Remove data
added bm	Remove
bm	Remove
pbmc	Remove
bad bm	Remove

<< Back Next >> Cancel

Update Assay 'elastigate_001'

Update assay 'elastigate_001' with these changes.

Note: these changes cannot be undone.

Assay description:

Folder Assignment

Report to display after entry run:

Assay changes:

Describe assay changes here

<< Back OK Cancel



BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark

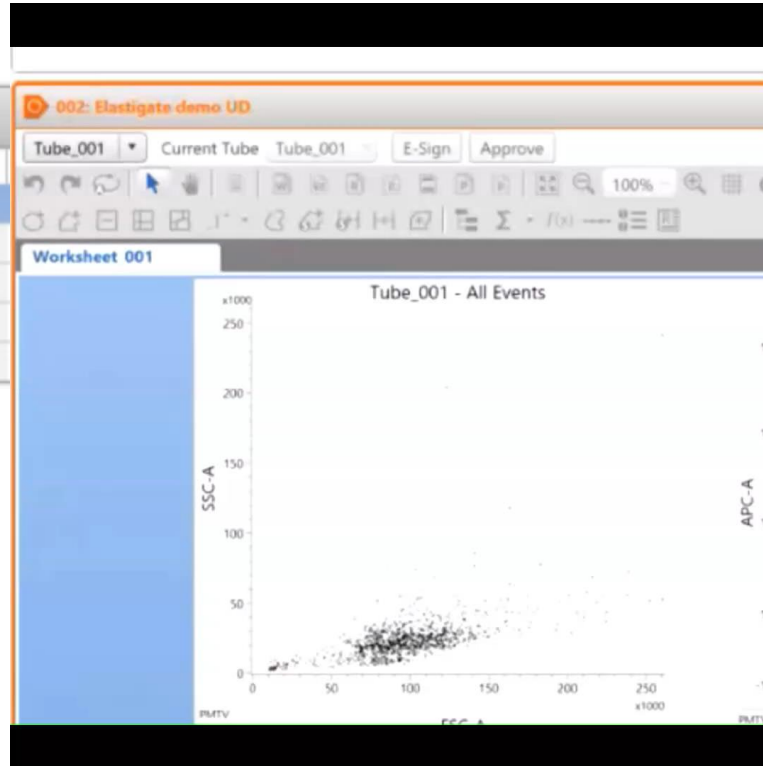


Artificial Intelligence in Flow Cytometry

BD Elastigate™ Workflow Example

Running worklistr with updated assay:

	Sample ID	Task	Status
▶ 1	001	Elastigate demc	Ready
▶ 2	002	Elastigate demc	Ready
▶ 3	003	Elastigate demc	Ready
▶ 4	004	Elastigate demc	Ready
▶ 5	005	Elastigate demc	Ready



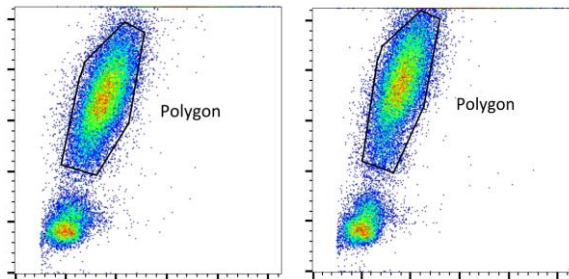
BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



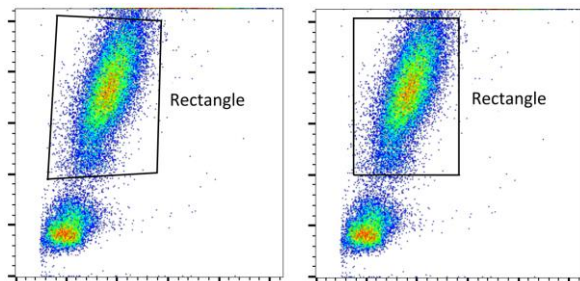
Artificial Intelligence in Flow Cytometry

BD Elastigate™ available gate options

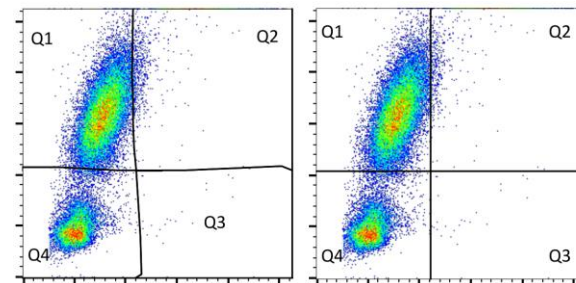
A. Polygon gate



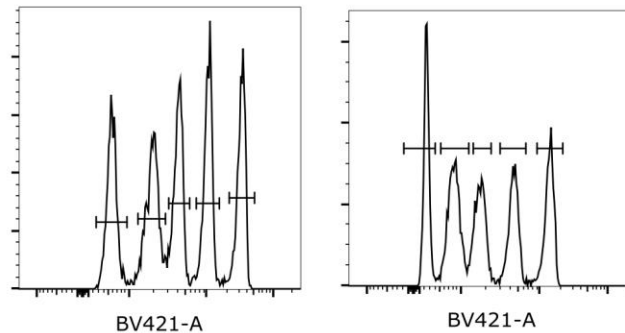
B. Rectangular gate



C. Quad gate



D. Histogram gates



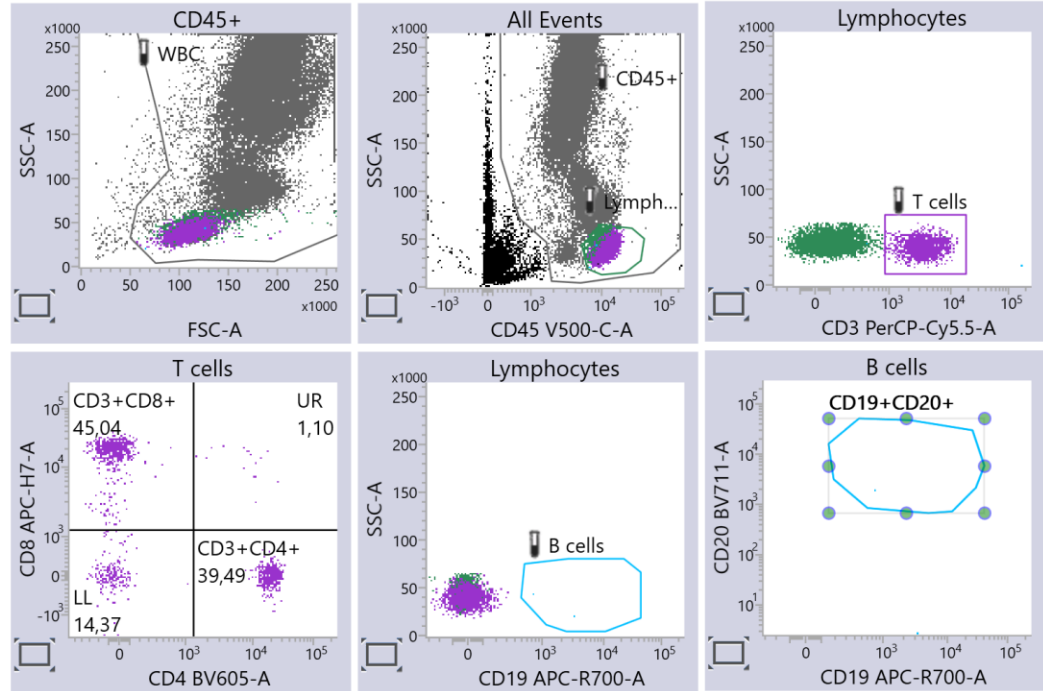
BD FACSLyric™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD™ CS&T Beads and BD™ FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

BD Elastigate™ gating restrictions

The parent population of each BD Elastigate™ gate must contain at least 50 events. Note that the parent population of a gate does not necessarily correspond to the population of the gate itself.



In this case B cells ElastiGate is OK since Lymphs has enough events. It would be impossible to create the CD19+CD20+ ElastiGate, since B cells has less than 50 events.



BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark

BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark

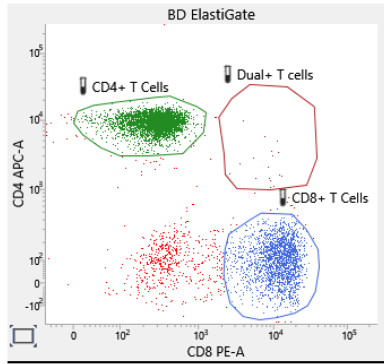


Artificial Intelligence and Traceability in
Flow Cytometry

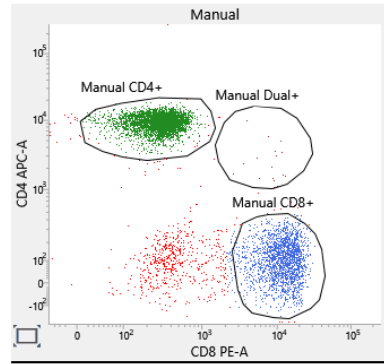
BD Elastigate™ Gating compared to other functionalities

Comparison between gating methods when applied on a similar sample

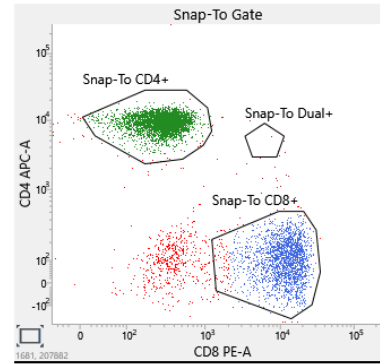
BD Elastigate™



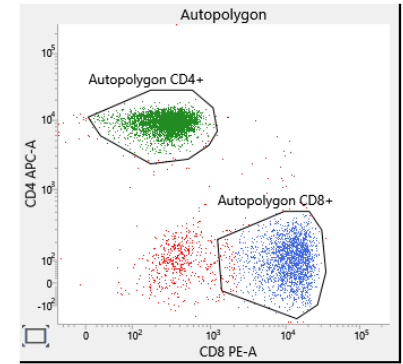
Manual gating



Snap-To gate



Autopolygon gate



BD FACSLytic™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACS™ Universal Loader, BD™ CS&T Beads and BD™ FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

BD FACSuite™ Application and ElastiGate™ Technology

- BD ElastiGate™ is a machine learning-based gating tool.
- An algorithm that mimics the way an expert flow cytometry analyst interprets and adjusts gates in 2-dimensional plots.
- BD ElastiGate™ helps reducing the time of analysis and removes subjectivity from user to user
- Adaptive approach designed to use few training files.

BD ElastiGate™

Your machine learning technology

Now available on BD FACSuite™ Application 1.6



BD FACSLyric™ Flow Cytometer with the BD FACSuite™ Clinical and BD FACSuite™ Applications, BD FACStm Universal Loader, BD® CS&T Beads and BD® FC Beads Kits (7-Color, 5-Color and 2-Color) are in vitro diagnostic medical devices bearing a CE mark



Artificial Intelligence in Flow Cytometry

Thank you!



© 2024 BD. All rights reserved. BD and the BD Logo are trademarks of Becton, Dickinson and Company. All other trademarks are the property of their respective owners.