SMART TUBE

innovation in a tube™

Smart Tube automatically *stimulates* and *stabilizes* blood samples for single-cell proteomics.

1. Draw Blood

Whole blood in a clinical or study environment.

2. Transfer 1ml of Blood to Smart Tube

Whole blood is transferred to the specialized tube for processing.

3. Place Smart Tube in Base Station

Automatically:

1. Incubates with stimulus at 37ºC
2. Introduces Stabilizer
3. Cools and provides temporarily storage for samples

4. Store at -80ºC or Ship on Dry Ice

Smart Tubes are ready to be directly transferred to -80ºC immediately after being stabilized by the system.

Incubating freshly collected patient material with agents that activate specific signal transduction pathways reveals biological states of tremendous clinical potential in leukemia, lymphoma, rheumatoid arthritis, and systemic lupus erythematosus, and is driving advances in drug development and vaccine research. Much of the power of this approach comes from analyzing the samples with single cell proteomic platforms like phospho-specific intracellular flow cytometry.

A key unmet need, and bottleneck in the current workflow, is sample preparation: receiving biological samples in the format they were collected, processing them in such a manner that they can be incubated with experimental agents of interest, and then stabilizing them so they can be banked for subsequent analysis without disrupting the analytes of interest.

The **Smart Tube System** is a compact, fully automated system that replaces hours of highly skilled, labor-intensive sample processing and ensures an unparalleled level of consistency and reproducibility.

Current protocols require large amounts of labor by highly skilled personnel, are extremely difficult to standardize, and separate cells of interest from administered drugs and important biological factors. The space and personnel requirements alone preclude using existing protocols in many clinical studies.

When compared to conventional, labor intensive sample prep approaches, the Smart Tube System has been shown to yield lower autofluorescence and higher signal-to-noise. Additionally, the Smart Tube System has delivered unparalleled performance for analyzing whole blood or bone marrow samples with CyTOF (mass cytometry).
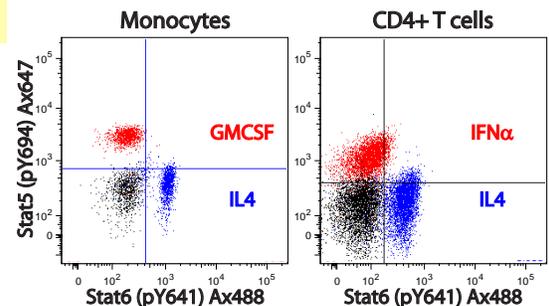
Only Smart Tube allows you to directly freeze whole blood for subsequent analysis by phospho-specific flow cytometry.

Advantages of the Smart Tube System

- Analysis of cells in the most physiologic contex: whole blood.
    - No artifacts from shipping, cryopreservation or culture media.
    - Smart Tube is the only system that allows you to directly freeze samples for single cell proteomics.
- No water bath or centrifuge needed to incubate, stabilize, and freeze samples. Fully automated instrument.
- No calibration. No programming. No special training. One-touch operation.
- Compact 8.5" x 11" footprint.
- Compatible with fluorescent cell barcoding.
- Outstanding performance with CyTOF (mass cytometry).

Antibodies Shown Compatible with the Smart Tube System

Antibodies to Intracellular Epitopes

AKT	(pS473)	(193H12)
ERK	(pT202/Y204)	(20A)
NFkB	(pS529)	(K10-895.12.50)
p38	(pT180/pY182)	(36/p38)
p53	(pS15)	(16G8)
p53	(pS37)	(J159-641.15.4)
S6	(pS235/pS236)	(N7-548)
Stat1	(pY701)	(4a)
Stat3	(pY705)	(4/P-STAT3)
Stat3	(pS727)	(49/p-Stat3)
Stat5	(pY694)	(47)
Stat6	(pY641)	(18/P-STAT6)
IkBα	(total protein)	(L35A5)
Ki67	(total protein)	(B56)
TNFα	(total protein)	(MAb11)

Antibodies to Surface Epitopes

CD3	(UCHT1 and SK7)
CD4	(RPA-T4)
CD7	(M-T701)
CD8	(RPA-T8)
CD14	(M5E2 & MΦP9)
CD15	(W6D3)
CD16	(B73.1)
CD19	(HIB19)
CD33	(P67.6)
CD45	(HI30)
CD45RA	(MEM-56)
CD56	(N901 & HCD56)
CD61	(RUU-PL7F12)
CD62P	(AK-4)
CD66	(B1.1/CD66)
CD66b	(G10F5)
CD161	(HP-3G10)
HLA-DR	(TU36)
IgM	(G20-127)
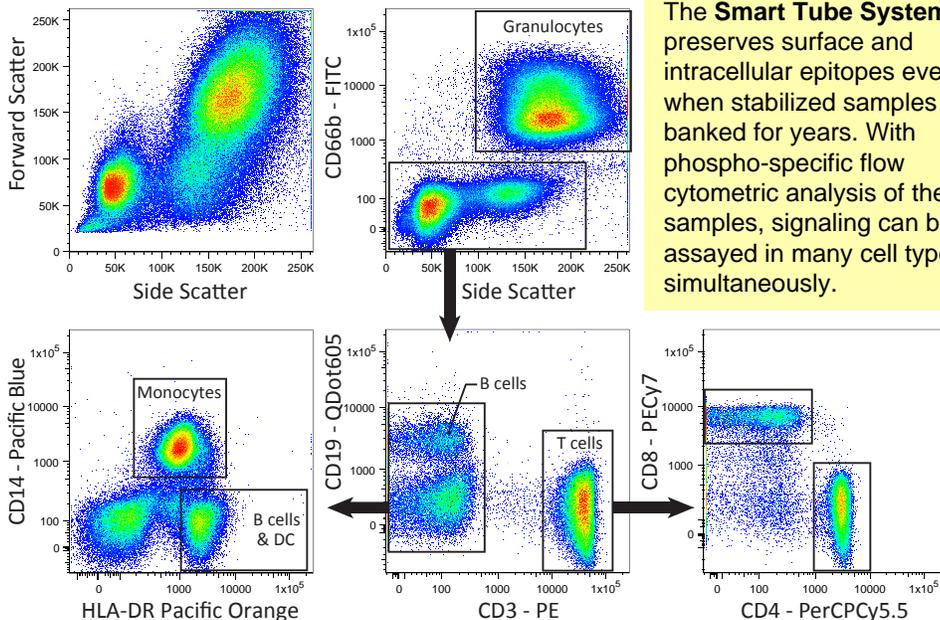
The **Smart Tube System** preserves surface and intracellular epitopes even when stabilized samples are banked for years. With phospho-specific flow cytometric analysis of the samples, signaling can be assayed in many cell types simultaneously.

The Smart Tube System is being used by investigators to measure a broad range of intracellular analytes including phospho-epitopes, cell cycle proteins, markers of apoptosis, and intracellular cytokine production. In addition to the advantages summarized in the list in the panel on the left, the Smart Tube System equals or is superior to existing approaches for measuring these analytes, even some thought to require analyte-specific buffers. Factor in Smart Tube's automation, ease of use, and the ability to bank samples in Smart Tubes for years prior to analysis and the result is a platform that is playing a key role in clinical studies that would not have been possible without it.
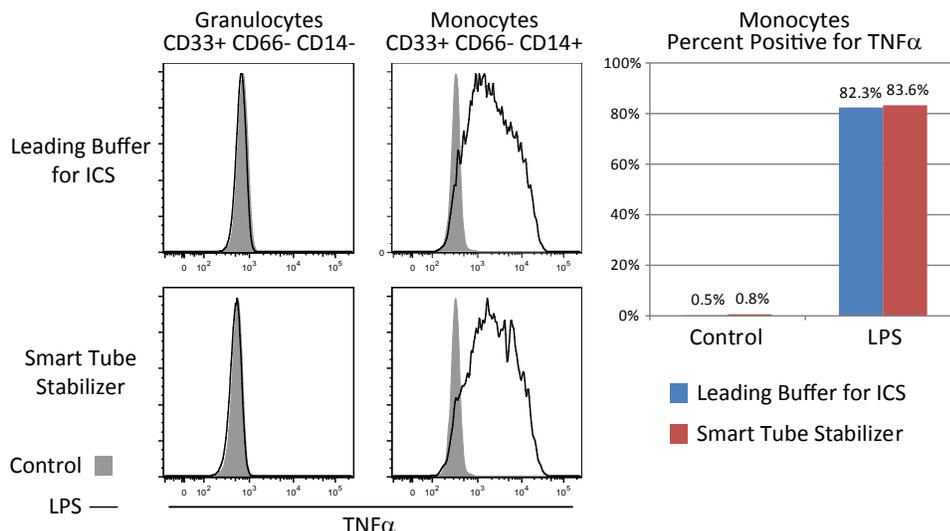
The performance of the Smart Tube System was compared to the industry leading buffer system for intracellular cytokine staining (ICS). Whole blood was incubated for four hours with LPS and Brefeldin A and was prepped in parallel with the Smart Tube System and with the leading buffer for ICS.

While achieving comparable results to the industry leader for intracellular cytokine assays, the Smart Tube System also delivers comparable or superior results to all buffer systems currently used for phospho-epitope analysis of whole blood.