

***Reagent Information***

**Phycoerythrin (PE)-conjugated anti-human ULBP-1:** Supplied as 25 µg of antibody in 1 mL saline containing up to 0.5% BSA and 0.1% sodium azide.

**Clone:** 170818

**Ig class:** mouse IgG<sub>2a</sub>

**Storage:** Reagents are stable for **twelve months** from date of receipt when stored in the dark at 2° - 8° C.

***Additional Reagents Required***

**Paraformaldehyde Fixative** - Dissolve 4.0 g of paraformaldehyde in 100 mL of sterile PBS (10 mM phosphate buffered saline, pH 7.4) by heating the solution at 56° C for about 1 hour. All solids must be fully dissolved prior to use. Store buffer at 2° - 8° C, protected from light, for no longer than 2 weeks.

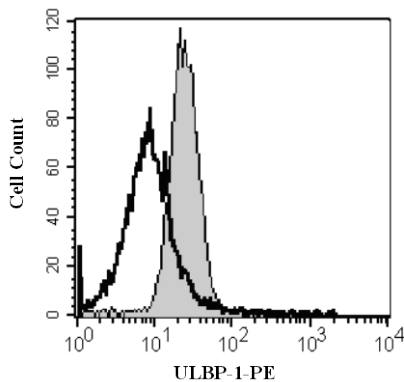
**SAP buffer** - Prepare a sterile solution containing 0.1% (w/v) saponin, 0.05% (w/v) NaN<sub>3</sub> in Hanks' Balanced Salt Solution (HBSS). Store at 18° - 24° C for no longer than 1 month.

***Intended Use***

The reagent is designed for flow cytometric applications intended to identify and quantitate cells possessing cytoplasmic forms of the protein recognized by the monoclonal.

***Principle of the Test***

Fixed cells are permeabilized, allowing conjugated antibodies access to proteins within the cell. Cells are initially fixed in order to minimize leakage of proteins out of the cell. The conjugated antibody is allowed to penetrate and bind to its target within the cell. Following a final wash, the cells are analyzed on a flow cytometer. Flow cytometric analysis of PE conjugates will generate a signal, which can be detected using 488 nm wavelength laser excitation and monitoring emitted fluorescence with a detector, optimized to collect peak emissions at 565 - 605 nm.



Intracellular staining of Daudi cells with PE-conjugated anti-human ULBP-1 (Catalog # IC1380P, filled histogram) or PE-conjugated isotype control (Catalog # IC003P, open histogram).

***Sample Preparation***

Intracellular staining antibodies are designed for multiparameter flow cytometric analysis of cells. If it is desirable to stain for surface proteins, such as CD3, CD4, CD8, etc., in addition to the intracellular staining properties of the cells, we recommend that the investigator determine whether the fixation and permeabilization steps adversely affect the surface protein. Should this be the case, surface staining of cells prior to fixation and permeabilization is recommended.

For intracellular staining, the cells must first be fixed and permeabilized. The use of 4% paraformaldehyde in PBS as a fixative is recommended. Other formulations or tissue fixatives may affect the staining properties of the monoclonal antibody. For permeabilization, 0.1% saponin in a balanced salt solution is effective in facilitating antibody entry into the cells. Due to the reversible nature of cell membrane permeabilization, saponin **must** be included in all buffers used in both the staining as well as washing steps.

***Sample Staining***

1. Harvest the cells and wash twice in cold HBSS or PBS by spinning at 200 x g for 7 minutes.
2. If cells are to be surface stained, follow the staining procedure indicated by the manufacturer.
3. Up to 1 x 10<sup>6</sup> cells were resuspended in 0.5 mL of cold Flow Cytometry Fixation Buffer (Catalog # FC004) and incubated at room temperature for 10 minutes.
4. Vortex the cells should be intermittently in order to maintain a single cell suspension. Following fixation, wash the cells twice in HBSS or PBS by centrifuging at 200 x g for 7 minutes.
5. Harvest the cell pellet from each tube and resuspended in 2 mL of SAP buffer.
6. Centrifuge the cells at 200 x g for 7 minutes.
7. Decant the supernate, ensuring that approximately 200 µL of SAP buffer remains in the tube.
8. Gently resuspend the cells in the remaining SAP buffer and add 10 µL (or a previously titrated amount) of antibody conjugate.
9. Briefly vortex the tube and incubate for 30 - 45 minutes at 18° - 24° C **in the dark**.
10. Wash the cells twice using 2 mL of SAP buffer each time. Centrifuge as in step 6.
11. Resuspend the cells in each tube with 200 - 400 µL of PBS for final flow cytometric analysis.

FOR RESEARCH USE ONLY. NOT FOR USE IN HUMANS.

**R&D Systems Inc.**  
**1-800-343-7475**

## ***Background Information***

ULBP-1 is a member of a family of cell-surface proteins that function as ligands for human NKG2D. ULBP-1 has also been described under the names RaeT1I (retinoic acid early transcript), ALCAN-beta, and NKG2DL1. The name ULBP-1 derives from the original identification of three proteins, ULBP-1, -2, and -3, as ligands for the human cytomegalovirus glycoprotein UL16; they were designated UL16 binding proteins (ULBP). Amino acid sequence identity within this family ranges from 30 - 95%. These proteins are distantly related to MHC class I proteins, but they possess only the  $\alpha 1$  and  $\alpha 2$  Ig-like domains, and they have no capacity to bind peptide or interact with  $\beta 2$ -microglobulin. They are anchored to the membrane via a GPI-linkage. ULBP-1 and several other family members are known to bind to human NKG2D, an activating receptor expressed on NK cells, NKT cells,  $\gamma\delta$  T cells, and CD8<sup>+</sup>  $\alpha\beta$  T cells. Engagement of NKG2D results in the activation of cytolytic activity and/or cytokine production by these effector cells. ULBP-1 is expressed on some tumor cells and has been implicated in tumor surveillance.<sup>1-8</sup>

## ***References***

1. Cosman, D. *et al.*, 2001, *Immunity* **14**:123.
2. Kubin, M. *et al.*, 2001, *Eur. J. Immunol.* **31**:1428.
3. Sutherland, C. *et al.*, 2002, *J. Immunol.* **168**:671.
4. Steinle, A. *et al.*, 2001, *Immunogenetics* **53**:279.
5. Sutherland, C. *et al.*, 2001, *Immunol. Rev.* **181**:185.
6. Pende, D. *et al.*, 2002, *Cancer Res.* **62**:6178.
7. Radosavljevic, M. *et al.*, 2002, *Genomics* **79**:114.
8. NKG2D and its Ligands, 2002, [www.RnDSystems.com](http://www.RnDSystems.com).

## ***Technical Notes***

Appropriate negative controls should be used to verify specificity and rule out background staining. An irrelevant antibody of the same isotype and concentration should be tested to aid in setting quadrant statistics. Antibody binding can also be blocked with a pre-incubation of excess target protein (10X molar excess should give > 90% inhibition of staining). In some cases, however, enhanced staining has been observed. This may be due to detection of the protein binding to cell surface receptors. Unlabeled antibody may also be used as a control. An excess of unlabeled antibody in the presence of labeled antibody should completely inhibit staining.

Production of certain proteins varies between different populations of cells as well as among cells within the same population. Some cells may produce a protein at concentrations below the detection limits of the monoclonal antibody. The investigator is encouraged to determine optimal titers for each antibody conjugate. The use of either monensin or brefeldin A, which act to block intracellular protein transport and result in an accumulation of protein in the Golgi, will enhance detection of the target protein in low level secreting cells.

Some antibodies are sensitive to the conformational structure of their target epitope. Fixation of cells using extremely harsh conditions or for a prolonged period of time may alter the target epitope and render it unrecognizable to the antibody. Strict attention to the recommended fixation conditions must be followed in order to generate consistent results.

**Warning:** Contains sodium azide as a preservative - sodium azide may react with lead and copper plumbing to form explosive metal azides. Flush with large volumes of water during disposal.