

IOTest® CD45-ECD

REF A07784
100 tests; 1 mL
10 µL / test



IOTest
Conjugated Antibody



ENGLISH	Specifications
Specificity	CD45
Clone	J33
Hybridoma	NS1 x Balb/c
Immunogen	Laz 221 cell line
Immunoglobulin	IgG1
Species	Mouse
Source	Ascites
Purification	Protein A affinity chromatography
Fluorochrome	R Phycoerythrin-Texas Red®-X (ECD™)
λ excitation	488 nm
Emission Peak	613 nm
Buffer	PBS pH 7.2 plus 2 mg / mL BSA and 0.1% NaN ₃

USE

This fluorochrome-conjugated antibody permits the identification and numeration of cell populations expressing the CD45 antigen present in human biological samples using flow cytometry.

PRINCIPLE

This test is based on the ability of specific monoclonal antibodies to bind to the antigenic determinants expressed by leucocytes.

Specific staining of the leucocytes is performed by incubating the sample with the IOTest reagent. The red cells are then removed by lysis and the leucocytes, which are unaffected by this process, are analyzed by flow cytometry.

The flow cytometer measures light diffusion and the fluorescence of cells. It makes possible the delimitation of the population of interest within the electronic window defined on a histogram, which correlates the orthogonal diffusion of light (Side Scatter or SS) and the diffusion of narrow-angle light (Forward Scatter or FS). Other histograms combining two of the different parameters available on the cytometer can be used as supports in the gating stage depending on the application chosen by the user.

The fluorescence of the delimited cells is analyzed in order to distinguish the positively-stained events from the unstained ones. The results are expressed as a percentage of positive events in relation to all the events acquired by the gating.

EXAMPLES OF CLINICAL APPLICATIONS

The CD45 molecule and its various isoforms have a variable degree of expression on lymphoid (1-3) or myeloid cells (4). This expression correlates with the stage of differentiation of the cells studied. Thus, characterisation of the density of expression of CD45 is useful for discriminating between normal and malignant leucocytic cells (2, 4-7). The density of expression of CD45 is weak in the case of acute myeloid leukaemias thus enabling malignant cells to be distinguished from normal ones (8). Moreover, the degree of expression of CD45 in cases of acute lymphoblastic leukaemias can be of prognostic value with regards to the progression of the illness (2, 9).

Finally, CD45 monoclonal antibodies (mAb) enable the evaluation of a possible non-leucocytic contamination of the lymphocytic gate during orthogonal light diffusion graphic analysis (Side Scatter) *versus* the fluorescence emitted by CD45 specific conjugated antibodies (10).

STORAGE AND STABILITY

The conjugated liquid forms must be kept at between 2 and 8°C and protected from light, before and after the vial has been opened.

Stability of closed vial: see expiry date on vial.

Stability of opened vial: the reagent is stable for 90 days.

PRECAUTIONS

1. Do not use the reagent beyond the expiry date.
2. Do not freeze.
3. Let it come to room temperature (18 – 25°C) before use.
4. Minimize exposure to light.
5. Avoid microbial contamination of the reagents, or false results may occur.
6. Antibody solutions containing sodium azide (NaN₃) should be handled with care. Do not take internally and avoid all contact with the skin, mucosa and eyes.
Moreover, in an acid medium, sodium azide can form the potentially dangerous hydrazoic acid. If it needs to be disposed of, it is recommended that the reagent be diluted in a large volume of water before pouring it into the drainage system so as to avoid the accumulation of sodium azide in metal pipes and to prevent the risk of explosion.
7. All blood samples must be considered as potentially infectious and must be handled with care (in particular: the wearing of protective gloves, gowns and goggles).
8. Never pipette by mouth and avoid all contact of the samples with the skin, mucosa and eyes.
9. Blood tubes and disposable material used for handling should be disposed of in *ad hoc* containers intended for incineration.

SAMPLES

Venous blood or bone marrow samples must be taken using sterile tubes containing an EDTA salt as the anticoagulant. The use of other anticoagulants is not recommended.

The samples should be kept at room temperature (18 – 25°C) and not shaken. The samples should be homogenized by gentle agitation prior to taking the test sample.

The samples must be analyzed within 24 hours of venipuncture.

METHODOLOGY

NECESSARY MATERIAL NOT SUPPLIED

- Sampling tubes and material necessary for sampling.
- Automatic pipettes with disposable tips for 10, 100 and 500 µL.
- Plastic haemolysis tubes.
- Calibration beads: Flow-Set™ Fluorospheres (Ref. 6607007).
- Red cell lysis reagent with washing stage after lysis. For example: VersaLyse™ (Ref. A09777).
- Leucocyte fixation reagent. For example: IOTest 3 Fixative Solution (Ref. A07800).
- Isotypic control: IOTest reagent.

IgG1-ECD (Ref. A07797).

- Buffer (PBS: 0.01 M sodium phosphate; 0.145 M sodium chloride; pH 7.2).
- Centrifuge.
- Automatic agitator (Vortex type).
- Flow cytometer.

PROCEDURE

NOTE: The procedure below is valid for standard applications. Sample and/or VersaLyse volumes for certain Beckman Coulter applications may be different. If such is the case, follow the instructions on the application's technical leaflet. For each sample analyzed, in addition to the test tube, one control tube is required in which the cells are mixed in the presence of the isotypic control (Ref. A07797).

1. Add 10 µL of specific IOTest conjugated antibody to each test tube, and 10 µL of the isotypic control to each control tube.
2. Add 100 µL of the test sample to both tubes. Vortex the tubes gently.
3. Incubate for 15 to 20 minutes at room temperature (18 – 25°C), protected from light.
4. Then perform lysis of the red cells, if necessary, by following the recommendations of the lysis reagent used.
As an example, if you wish to use VersaLyse (Ref. A09777), refer to the leaflet and follow preferably the procedure called "with concomitant fixation", which consists of adding 1 mL of the "Fix-and-Lyse" mixture prepared extemporaneously. Vortex immediately for one second and incubate for 10 minutes at room temperature, protected from light.

If the sample does not contain red cells, add 2 mL of PBS.

5. Centrifuge for 5 minutes at 150 x g at room temperature.
6. Remove the supernatant by aspiration.
7. Resuspend the cell pellet using 3 mL of PBS.
8. Repeat step 5.
9. Remove the supernatant by aspiration and resuspend the cell pellet using:
 - 0.5 mL or 1 mL of PBS plus 0.1% of formaldehyde if the preparations are to be kept for more than 2 hours and less than 24 hours. (A 0.1% formaldehyde PBS can be obtained by diluting 12.5 µL of the IOTest 3 Fixative Solution (Ref. A07800) at its 10X concentration in 1 mL of PBS).
 - 0.5 mL or 1 mL of PBS without formaldehyde, if the preparations are to be analyzed within 2 hours.

NOTE: In all cases, keep the preparations between 2 and 8°C and protected from light.

PERFORMANCE

SPECIFICITY

MAB J33 stains all the isoforms of the CD45 molecule (180 to 220 kDa); it is therefore referenced as a pan-leucocytic marker. MAB J33 was assigned to CD45 during the 3rd HLDA Workshop on Human Leucocyte Differentiation Antigens, held in Oxford, England, in 1986 (Code WS: 818, Section NL) (11).

LINEARITY

To test the linearity of staining of this reagent, a positive cell line (THP 1) and a negative cell line (FRN 3.4.14) were mixed in different proportions with a constant final number of cells, so that the positive line/negative line ratio of the mixture ranged from 0 to 100%.

Aliquots were stained using the procedure described above and linear regression between the expected values and the observed values was calculated.

Specificity	Linear regression	Linearity (R ²)
CD45	Y = 0.98 X + 0.30	0.999

EXPECTED VALUES

Each laboratory must compile a list of reference values based upon a group of healthy donors from the local population. This must be done by taking age, sex and ethnic group into account, as well as any other potential regional differences.

In our laboratories, the whole blood samples of 50 healthy adults were treated using the reagent described above. The results obtained for the count of the positive events of interest with this reagent are given in the tables below:

Lymphocytes	Number	Mean (%)	SD	CV (%)
CD45 ⁺	50	95.39	3.21	3.00

Monocytes	Number	Mean (%)	SD	CV (%)
CD45 ⁺	50	95.85	4.00	4.00

Granulocytes	Number	Mean (%)	SD	CV (%)
CD45 ⁺	50	98.49	2.18	2.00

INTRA-LABORATORY REPRODUCIBILITY

On the same day and using the same cytometer, 12 measurements of the percentage of staining of a positive target (lymphocytes) were carried out. The results obtained are summarized in the following table:

Positive Target	Number	Mean (%)	SD	CV (%)
CD45 ⁺ Lymphocytes	12	98.98	0.65	0.7

INTER-LABORATORY REPRODUCIBILITY

On the same day and for the same positive target (lymphocytes), 12 measurements of the percentage of stained cells were carried out by two technicians and the preparations analyzed using two different cytometers. The results obtained are summarized in the following tables:

Cytometer n° 1:

Positive Target	Number	Mean (%)	SD	CV (%)
CD45 ⁺ Lymphocytes	12	98.98	0.65	0.7

Cytometer n° 2:

Positive Target	Number	Mean (%)	SD	CV (%)
CD45 ⁺ Lymphocytes	12	99.15	0.29	0.3

LIMITATIONS OF THE TECHNIQUE

1. Flow cytometry may produce false results if the cytometer has not been aligned perfectly, if fluorescence leaks have not been correctly compensated for and if the regions have not been carefully positioned.
2. It is preferable to use a RBC lysis technique with a washing step as this reagent has not been optimized for "no wash" lysis techniques.
3. Accurate and reproducible results will be obtained as long as the procedures used are in accordance with the technical insert leaflet and compatible with good laboratory practices.

4. The conjugated antibody of this reagent is calibrated so as to offer the best specific signal/non-specific signal ratio. Therefore, it is important to adhere to the reagent volume/sample volume ratio in every test.
5. In the case of a hyperleucocytosis, dilute the blood in PBS so as to obtain a value of approximately 5×10^9 leucocytes/L.
6. In certain disease states, such as severe renal failure or haemoglobinopathies, lysis of red cells may be slow, incomplete or even impossible. In this case, it is recommended to isolate mononucleated cells using a density gradient (Ficoll, for example) prior to staining.
7. CD45-negative or very weakly-positive acute lymphoblastic leukaemia have been described. For these, the lymphocytic origin of the blast cells should be confirmed using other markers.

MISCELLANEOUS

See the appendix for examples and references.

TRADEMARKS

The Beckman Coulter logo, COULTER, ECD, EPICS, EXPO, Flow-Set, IOTest, System II, VersaLyse, and XL are registered trademarks of Beckman Coulter Inc.

Texas Red is a registered trademark of Molecular Probes Inc.

MANUFACTURED BY:

IMMUNOTECH SAS
a Beckman Coulter Company
130 avenue de Lattre de Tassigny
B.P. 177 – 13276 Marseille Cedex 9
France
Customer Services: (33) 4 91 17 27 27

www.beckmancoulter.com

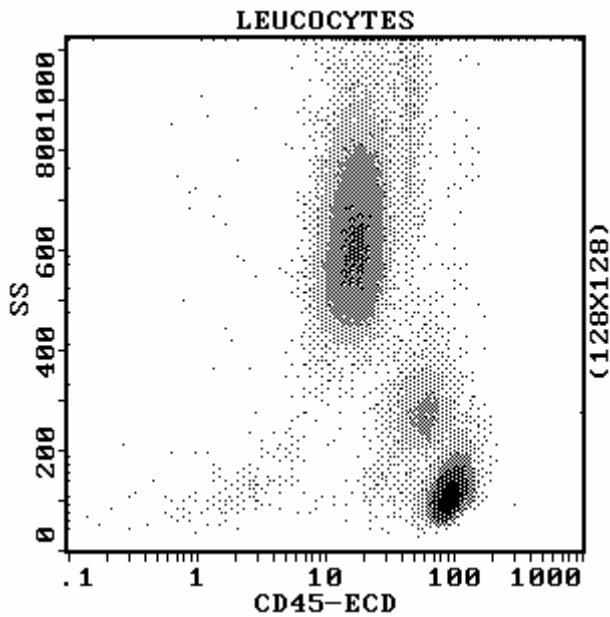


APPENDIX TO REF A07784

EXAMPLES

The graph below is a biparametric representation (SS vs. Fluorescence intensity) of lyzed normal whole blood sample. Staining is with IOTest CD45-ECD Conjugated Antibody (Ref. A07784). Gate is on leucocytes. The isotopic control (Ref A07797) is not shown.

Acquisition and analysis are performed with a COULTER® EPICS® XL™ flow cytometer equipped with System II™ software.



REFERENCES

1. Poppema, S., Lai, R., Visser, L., Yan, X.J., "CD45 (Leucocyte Common Antigen) expression in T and B lymphocyte subsets", 1996, *Leuk. Lymphoma*, 20, 217-222.
2. Caldwell, C.W., Patterson, W.P., "Relationship of T200 antigen expression to stages of B-cell differentiation in resurgent hyperplasia of bone marrow", 1987, *Blood*, 70, 1165-1172.
3. Caldwell, C.W., Patterson, W.P., "Relationship between CD45 antigen expression and putative stages of differentiation in B-cell malignancies", 1991, *Am. J. Hematol.*, 36, 111-115.
4. Caldwell, C.W., Patterson, W.P., Toalson, B.D., Yesus, Y.W., "Surface and cytoplasmic expression of CD45 antigen isoforms in normal and malignant myeloid cell differentiation", 1991, *Am. J. Clin. Pathol.*, 95, 180-187.
5. Höffkes, H.G., Schmidtke, G., Uppenkamp, M., Schmu"cker, U., "Multiparametric immunophenotyping of B cells in peripheral blood of healthy adults by flow cytometry", 1996, *Clin. Diag. Lab. Immunol.*, 3, 30-36.
6. Lacombe, F., Durrieu, F., Briais, A., Dumain, P., Belloc, Bascans, E., Reiffers, J., Boisseau, M.R., Bernard, P., "Flow cytometry CD45 gating for immunophenotyping of acute myeloid leukemia", 1997, *Leukemia*, 11, 1878-1886.
7. Schneider, U., Van Lessen, A., Huhn, D., Serke, S., "Two subsets of peripheral blood plasma cells defined by differential expression of CD45 antigen", 1997, *Br. J. Haematol.*, 97, 56-64.
8. Borowitz, M.J., Guenther, K.L., Shults, K.E., Stelzer, G.T., "Immunophenotyping of acute leukemia by flow cytometric analysis. Use of CD45 and right-angle light scatter to gate on leukemic blasts in three-color analysis", 1993, *Am. J. Clin. Pathol.*, 100, 534-540.
9. Behm, F.G., Raimondi, S.C., Schell, M.J., Look, A.T., Rivera, G.K., Pui, C.H., "Lack of CD45 antigen on blast cells in childhood acute lymphoblastic leukemia is associated with chromosomal hyperdiploidy and other favorable prognostic features", 1992, *Blood*, 79, 1011-1016.
10. Nicholson, J.K.A., Hearn, T.L., Cross, G.D., White, M.D., "1997 Revised guidelines for performing CD4+ T-cell determinations in persons infected with human immunodeficiency virus (HIV)", 1997, *Morbidity and Mortality Weekly Report*, RR-2, 46, 1-29.
11. Cobbold, S., Hale, G., Waldmann, H., "Non-lineage, LFA-1 family, and leukocyte common antigens: New and previously defined clusters", 1987, *Leucocyte Typing III*, White Cell Differentiation Antigens, McMichael A.J., et al., Eds., Oxford University Press, 788-803.