

IOtest® CD38-PC5

REF A07780
100 tests; 1 mL
10 µL / test



IOtest
Conjugated Antibody



ENGLISH	Specifications
Specificity	CD38
Clone	LS198-4-3
Hybridoma	SP2/0 x Balb/c
Immunogen	Human lymphocytic line (Hut 78)
Immunoglobulin	IgG1
Species	Mouse
Source	Ascites
Purification	Protein A affinity chromatography
Fluorochrome	R Phycoerythrin Cyanin 5.1 (PC5)
λ excitation	488 nm
Emission Peak	670 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 CD38 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

Characterisation and numeration of leucocytic populations expressing the CD38 molecule in diseases of the immune system giving rise to an over-expression of the CD38 molecule: immune deficits and viral infections (1).

Follow-up and immunophenotyping of CD38+ leucocytic populations in malignant blood dyscrasias (1 – 4).

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-PC5 (Ref. A07798).
- 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. A07798).

1. Add 10 µL of specific IOtest 3 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

The CD38 antigen, also called the T10 antigen, is a type II transmembranous glycoprotein the terminal N section of which is cytoplasmic. This glycoprotein with a molecular weight close to 45 kDa is expressed on a large number of haematopoietic cells: its distribution depends on the stage of differentiation and the degree of cellular activation. The CD38 antigen is generally defined as a marker for the activation and differentiation of normal and malignant blood cells (1).

More precisely, at the level of B cell lymphocytic differentiation, expression of the CD38 molecule appears during the early stages and disappears during B cell maturation and re-appears during the final stage of differentiation (the plasmocytic stage).

The CD38 molecule is expressed by activated T and B cell lymphocytes, monocytes, the majority of NK cells, by medullary thymocytes (5, 6) and on platelets (6) and red cells (7). CD38 expression on T cell circulating lymphocytes is weak.

The monoclonal antibody LS198-4-3 was assigned to CD38 during the 5th HLDA Workshop on Human Leucocyte Differentiation Antigens, held in Boston, USA, in 1993 (WS Code: T-CD38.06, Section T) (8).

LINEARITY

To test the linearity of staining of this reagent, a positive cell line (MO7E) and a negative cell line (FRN 17.4.14.33) 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)
CD38	$Y = 0.98 X + 0.48$	0.998

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 52 healthy adults were treated using the monoclonal antibody LS198-4-3. The results obtained for the count of the positive events of interest with this antibody are given in the tables below:

Lymphocytes	Number	Mean (%)	SD	CV (%)
CD38 ⁺	52	61.87	10.77	17

Monocytes	Number	Mean (%)	SD	CV (%)
CD38 ⁺	52	99.03	1.13	1

Granulocytes	Number	Mean (%)	SD	CV (%)
CD38 ⁺	52	99.87	0.3	0

INTRA-LABORATORY REPRODUCIBILITY

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

Positive Target	Number	Mean (%)	SD	CV (%)
CD38 ⁺ Lymphocytes	12	60.07	0.6	1
CD38 ⁺ Monocytes	12	96.41	0.46	0.5
CD38 ⁺ Granulocytes	12	99.99	0.03	0

INTER-LABORATORY REPRODUCIBILITY

On the same day and for the same positive target (leucocyte sub-population), 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 (%)
Lymphocytes CD38 ⁺	12	60.07	0.6	1
CD38 ⁺ Monocytes	12	96.41	0.46	0.5
CD38 ⁺ Granulocytes	12	99.99	0.03	0

Cytometer n° 2:

Positive Target	Number	Mean (%)	SD	CV (%)
Lymphocytes CD38 ⁺	12	57.86	0.57	1
CD38 ⁺ Monocytes	12	93.67	0.61	0.6
CD38 ⁺ Granulocytes	12	99.93	0.06	0.1

LIMITATIONS OF THE TECHNIQUE

- 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.
- 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.
- 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.
- 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.
- In the case of a hyperleucocytosis, dilute the blood in PBS so as to obtain a value of approximately 5×10^9 leucocytes/L.
- 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.

MISCELLANEOUS

See the Appendix for examples and references.

TRADEMARKS

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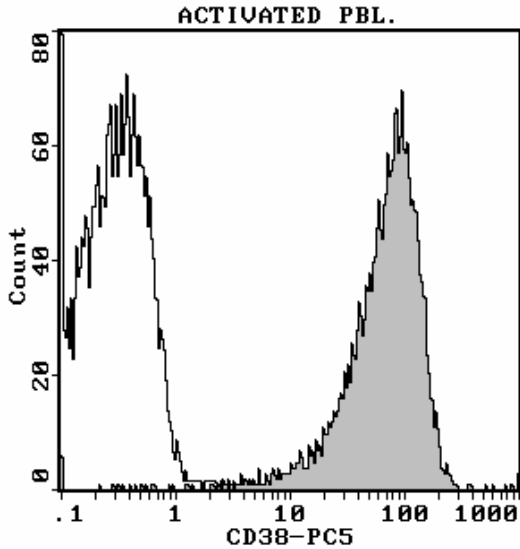


APPENDIX TO REF A07780

EXAMPLES

The graph below is a monoparametric representation (Count vs. Fluorescence Intensity) of activated Peripheral Blood Leucocytes (PBL) from a healthy donor. Staining is with IOTest CD38-PC5 Conjugated Antibody (Ref. A07780). A mouse PC5-conjugated IgG1 isotypic control (Ref. A07798) is shown in light.

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



REFERENCES

1. Mehta, K., Shahid, U., Malavasi, F., "Human CD38, a cell-surface protein with multiple functions", 1996, *The FASEB Journal*, 10, 1408-1417.
2. Davis, B., H., Foucar, K., Szczarkowski, Ball, E., Witzig, T., Foon, K., A., Wells, D., Kotylo, P., Johnson, R., Hanson, C., and Bessman, D."U.S. - Canada Consensus Recommendations on the Immunophenotypic Analysis of Hematologic Neoplasia by Flow Cytometry: Medical Indication", 1997, *Cytometry*, 30, 249-263.
3. Orfao, A., Ruiz-Arguelles, A., Lacombe, F., Ault, K., Basso, G., Danova, M. "Flow Cytometry: its application in hematology", 1995, *Haematologica*, 80, 69-81.
4. Braylan, R.C., Orfao, A., Borowitz, M.J., Davis, B.H., 2001, *Cytometry*, "Optimal number of reagents required to evaluate hematolymphoid neoplasias: Results of an international consensus meeting". 46, 23-27.
5. Funaro, A., Horenstein, A.L., Malavasi, F., "Human CD38: a versatile leukocyte molecule with emerging clinical perspectives", 1995, *Fund. Clin. Immunol.*, 3, 101-113.
6. Ramaschi, G., Torti, M., Festetics, E.T., Sinigaglia, F., Malavasi, F., Balduini, C., "Expression of cyclic ADP-Ribose-synthetizing CD38 molecule on human platelet membrane", 1996, *Blood*, 87, 2308-2313.
7. Zocchi, E., Franco, L., Guida, L., Benatti, U., Bargellesi, A., Malavasi, F., Lee, H.C., DeFlora, A., " A single protein immunologically identified as CD38 display NAD+ Glycohydrolase, ADP-Ribosyl Cyclase and cyclic ADP-Ribose Hydrolase activities at the outer surface erythrocytes", 1993, *Biochem. Biophys. Res. Com.*, 196, 1459-1465.
8. Boumsell, L., "T-cell antigens: section report", 1995, *Leucocyte Typing V, White Cell Differentiation Antigens*, Schlossman, S.F., et al., Eds., Oxford Univ. Press, 241-279.