

**Monoclonal  
Antibodies  
Detecting  
Human  
Antigens**

• **BD Oncomark**  
•  
• **FMC7 FITC/CD23 PE/CD5 PerCP-Cy5.5/  
CD19 PE-Cy7/CD38 APC/CD45 APC-Cy7**

• Catalog No. 338430      50 Tests      20 µL/test

**APPLICATIONS**

This combination of reagents can be useful for the study of B-cell biology.

**DESCRIPTION**

FMC7 recognizes a 105-kilodalton (kd) membrane glycoprotein expressed on a subset of B lymphocytes.<sup>1</sup>

CD23 recognizes a human B-lymphocyte differentiation antigen, Mr 45 kd, that is the low-affinity Fc epsilon receptor.<sup>2-5</sup>

CD5 recognizes a human T-lymphocyte antigen, Mr 67 kd.<sup>6</sup>

CD19 (SJ25C1) recognizes a 90-kd antigen that is present on human B lymphocytes.<sup>7,8</sup>

CD38 recognizes an integral membrane glycoprotein, Mr 45 kd, with a protein core of 35 kd.<sup>9</sup>

CD45 (Anti-HLe-1) recognizes human leucocyte antigens, Mr 180 to 220 kd, that are members of the T200 family.<sup>10</sup>

**Antigen Distribution**

More than 50% of the peripheral B lymphocytes of normal adults carry FMC7 antigen at variable density. FMC7-positive B cells are more mature and they are the subpopulation that responds in vitro to mitogens or antigens.<sup>1,11</sup> The FMC7 antigen is found on B-cell malignancies of most differentiated stages, such as mantle cell lymphoma (MCL), follicular lymphoma, and hairy-cell leukemias, but not in most cases of CLL.<sup>12-16</sup>

The CD23 antigen is present at low density on most normal B lymphocytes<sup>17</sup> and at higher levels on activated B lymphocytes, Epstein-Barr virus (EBV)-transformed lymphoblasts, CLL cells of B-lymphocyte origin, and tonsillar B lymphocytes.<sup>5</sup>

CD23 antigen density increases on the surface of B lymphocytes shortly after activation.<sup>18</sup> The antigen is lost after isotype switching to IgA, IgG, or IgE.<sup>4,17</sup> The CD23 antigen is not present on immature bone marrow B lymphocytes or on T lymphocytes,<sup>4</sup> but it has been reported on monocytes, hypodense eosinophils, and a subpopulation of platelets.<sup>19</sup>

The CD5 antigen is present on approximately 70% of normal peripheral blood lymphocytes and on virtually all T lymphocytes in thymus and peripheral blood.<sup>20-22</sup> The CD5 antibody reacts with most cells in T-lymphocyte areas of spleen and lymph node and with many T-cell leukemias and lymphomas.<sup>23-25</sup> It also reacts with a distinct subset of normal B lymphocytes,<sup>26</sup> occasional cells in B-lymphocyte areas of spleen and lymph node,<sup>23</sup> and most Ig<sup>+</sup> B-chronic lymphoblastic leukemia (CLL) cells.<sup>25-27</sup> Some lymphomas also express the CD5 antigen.<sup>24</sup>

The CD19 antigen is present on approximately 7% to 23% of human peripheral blood lymphocytes<sup>28</sup> and on splenocytes.<sup>29</sup> The CD19 antigen is present on human B lymphocytes at most stages of maturation.<sup>8,30</sup> CD19 does not react with resting or activated T lymphocytes, granulocytes, or monocytes.<sup>8,30</sup>

**For Research Use Only. Not for use in diagnostic or therapeutic procedures.**

The CD38 antigen is expressed on essentially all pre-B lymphocytes, plasma cells, and thymocytes.<sup>9</sup> It is also present on activated T lymphocytes, natural killer (NK) lymphocytes, myeloblasts, and erythroblasts.<sup>9,31-36</sup> The antigen is expressed during the early stages of T- and B-lymphocyte differentiation, is lost during the intermediate stages of maturation, and then reappears during the final stages of maturation.<sup>9,36-38</sup> The CD38 antigen is expressed on 90% of CD34<sup>+</sup> cells; it is not expressed on pluripotent stem cells. Coexpression of CD38 antigen on CD34<sup>+</sup> cells indicates lineage commitment of those cells.<sup>31,39</sup> CD38 is a counter-receptor of CD31.<sup>40</sup> It is also expressed in T- and B-acute lymphoblastic leukemia (ALL), Burkitt's lymphoma, multiple myeloma, and acute myeloid leukemia (AML),<sup>41,42</sup> and chronic lymphocytic leukemia (CLL).<sup>43</sup>

The CD45 antigen is present on all human leucocytes, including lymphocytes, monocytes, granulocytes, eosinophils, and basophils in peripheral blood and has a role in signal transduction, modifying signals from other surface molecules.<sup>10</sup> The CD45 antibody has been reported to react weakly with mature circulating erythrocytes and platelets.<sup>10,44</sup>

## Clones

Clone FMC7<sup>1</sup> is generated from the fusion of mouse P3-NS1-1-AG4-1 myeloma cells with spleen cells from BALB/c mice immunized with human B-lymphoblastoid cell line HRIK.

CD23, clone EBVCS-5,<sup>45</sup> is derived from the hybridization of mouse Sp2/0 myeloma cells with spleen cells from BALB/c mice immunized with in vitro-transformed EBV cell line.

CD5, clone L17F12,<sup>20</sup> is derived from hybridization of mouse NS-1/Ag4 myeloma cells with spleen cells from BALB/c mice immunized with human T-acute lymphoblastic leukemia (ALL) cells.

CD19, clone SJ25C1,<sup>8</sup> is derived from the hybridization of mouse Sp2/0 cells with spleen cells from BALB/c mice immunized with NALM1 + NALM16 cells.

CD38, clone HB7, is derived from hybridization of mouse P3-X63-Ag8.653 myeloma cells with spleen cells from BALB/c mice immunized with the BJAB cell line.<sup>36</sup>

CD45, clone 2D1,<sup>10</sup> is derived from hybridization of mouse NS-1 myeloma cells with spleen cells from BALB/c mice immunized with human peripheral blood mononuclear cells (PBMCs).

## Composition

FMC7 is composed of mouse IgM heavy chains and lambda light chains.

CD23, CD19, CD38, and CD45 are each composed of mouse IgG<sub>1</sub> heavy chains and kappa light chains.

CD5 is composed of mouse IgG<sub>2a</sub> heavy chains and kappa light chains.

This BD Oncomark™ reagent is supplied as a combination of FMC7 FITC/CD23 PE\*/CD5 PerCP-Cy5.5\*/CD19 PE-Cy7\*/CD38 APC\*/CD45 APC-Cy7\* in 1 mL of phosphate-buffered saline (PBS) containing gelatin and 0.1% sodium azide.

\* Patents—PE and APC: US 4,520,110; 4,859,582; 5,055,556; Europe 76,695; Canada 1,179,942  
PerCP: US 4,876,190  
Cy5.5 and Cy7: US 5,268,486; 5,486,616; 5,569,587; 5,569,766; 5,627,027  
PE-Cy7: US 4,542,104  
APC-Cy7: US 5,714,386  
BD FACS lysing solution: US 4,654,312; 4,902,613; 5,098,849

## PROCEDURE

### Staining

Refer to our website ([www.bdbiosciences.com](http://www.bdbiosciences.com)) or contact your local BD representative for the lyse/wash method for direct immunofluorescence.

### Representative Data

**NOTE** Spectral overlap values for PE-Cy7 and APC-Cy7 conjugates can vary from lot to lot. It is important to check these values on a known sample when using a new lot of reagents.

Performed on whole blood stained and lysed using BD FACSTM lysing solution\* (Cat. No. 349202).

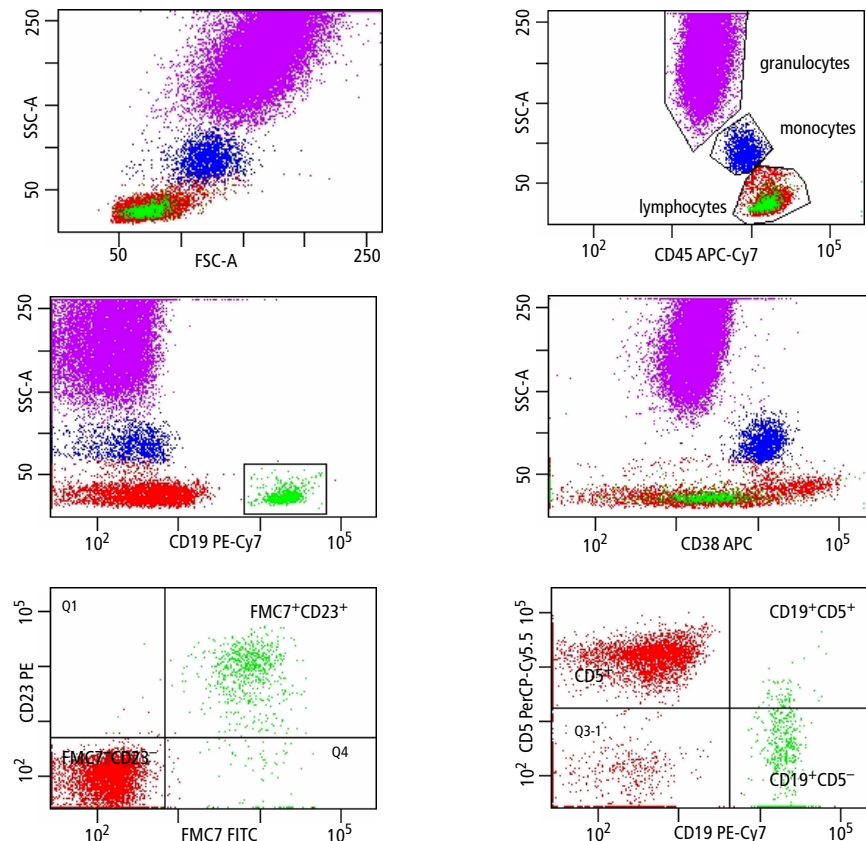


Figure 1 Analyzed with a BD FACSTM brand flow cytometer

## HANDLING AND STORAGE

Store vials at 2° to 8°C. Do not freeze reagents; protect them from prolonged exposure to light. Each reagent is stable for the period shown on the bottle label when stored as directed.

**WARNING** Some APC-Cy7 conjugates show changes in their emission spectrum with prolonged exposure to formaldehyde. We recommend that you analyze fixed samples within four hours.

## WARNING

Reagents contain sodium azide. Sodium azide is harmful if swallowed. Keep out of reach of children. Keep away from food, drink, and animal feedstuff. Wear suitable protective clothing. If swallowed, seek medical advice immediately and show this container or label. Contact with acids liberates very toxic gas. Azide compounds should be flushed with large volumes of water during disposal to avoid deposits in lead or copper plumbing where explosive conditions can develop.

## CHARACTERIZATION

To ensure consistently high-quality reagents, each lot of monoclonal antibody is tested for conformance with characteristics of a standard reagent. Representative flow cytometric data are included in this data sheet.

## WARRANTY

Unless otherwise indicated in any applicable BD general conditions of sale for non-US customers, the following warranty applies to the purchase of these products.

THE PRODUCTS SOLD HEREUNDER ARE WARRANTED ONLY TO CONFORM TO THE QUANTITY AND CONTENTS STATED ON THE LABEL OR IN THE PRODUCT LABELING AT THE TIME OF DELIVERY TO THE CUSTOMER. BD DISCLAIMS HEREBY ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE. BD'S SOLE LIABILITY IS LIMITED TO EITHER REPLACEMENT OF THE PRODUCTS OR REFUND OF THE PURCHASE PRICE. BD IS NOT LIABLE FOR PROPERTY DAMAGE, ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING PERSONAL INJURY, OR ECONOMIC LOSS CAUSED BY THE PRODUCT.

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