

**Description**

The CD19 Positive Cell Isolation Kit is designed to magnetically separate CD19-expressing-cells from a complex immune cell population. This kit is optimized for the isolation of CD19 positive cells from normal human peripheral blood mononuclear cells (PBMCs). Cells are incubated with the antibody:bead complex and placed on a magnet for quick and easy separation. When placed on the magnet, CD19-positive cells will be immobilized along the side of the tube while undesired CD19-negative cells will remain in suspension for easy removal.

**Background**

B cells are lymphocytes that play a critical role in the humoral immune response. These cells produce antibodies, present antigens, and secrete cytokines. CD19 is a canonical marker of B cells and is present at most stages of B cell development. In PBMCs derived from healthy individuals, about 5-10% of the cells are CD19<sup>+</sup> B cells.

**Application(s)**

Isolate CD19-expressing B cells from a mixed population such as PBMCs. Positively selected cells may be used for downstream applications such as genomic analysis, expression assays, protein isolation and flow cytometry.

**Supplied Materials**

Catalog #	Name	Amount	Storage
	Cell Isolation Magnetic Beads	200 $\mu$ l	+4°C
	CD19 Cell Isolation Antibody	40 $\mu$ l	-20°C
78563	10x Cell Isolation Buffer	5 ml	+4°C

**Materials Required but Not Supplied**

Peripheral blood mononuclear cells (PBMCs)  
 Cell Isolation Magnetic Tube Rack (BPS Bioscience #78571)  
 Centrifuge  
 15 or 50 ml tubes  
 Cell counter

**Capacity**

This kit provides enough reagents and materials for isolation from up to 1 x 10<sup>8</sup> PBMCs. It is possible to use this kit for multiple isolations from smaller PBMC samples.

**Estimated Duration**

45 minutes

**Storage Conditions**

This assay kit will perform optimally for up to 6 months from date of receipt when the materials are stored as directed.

**Safety**

This product is for research purposes only and not for human or therapeutic use. This product contains small amounts of sodium azide. This product should be considered hazardous and is harmful by inhalation, in contact with skin, eyes, clothing, and if swallowed. If contact occurs, wash thoroughly.

**Protocol**

Before you begin:

- This protocol is written for a single sample of  $1 \times 10^7$  PBMCs. If using smaller or larger samples, adjust volumes accordingly
- Cell Isolation Buffer: Dilute 10x Cell Isolation Buffer with sterile water. Further sterile filtration is optional. Keep buffer cold whenever possible, on ice.
- General Considerations: To maintain optimal conditions and reduce stress on the cells, it is recommended to work as quickly as possible and keep the cells and reagents cold on ice unless stated otherwise. For separation of sterile cells, practice aseptic techniques, filter buffer after dilution, and work under a laminar flow hood whenever possible.

**Cell Preparation:**

You may prepare your cells ahead of time. To avoid cells from sitting on ice for a prolonged period of time, you may prepare them during the 30 minute incubation (step 6).

1. Upon thawing, ensure that the cells are in single-cell suspension by passing through a 40  $\mu$ m sterile cell strainer.
2. Wash the cells with PBS or Cell Isolation Buffer and count.
3. After counting the cells, adjust them to a density of  $1 \times 10^8$  cells/ml in Cell Isolation Buffer. Keep on ice until step 10.

**Prewash Beads:**

1. Mix beads by doing 5 brief touches on a vortex. Keep the tube upright on ice to avoid beads sticking to sides/cap.
2. For every  $1 \times 10^7$  cells, take 20  $\mu$ l of beads and place in a 15 ml tube.
3. Add up to 1-2 ml of Cell Isolation Buffer and gently pipette up and down to mix.
4. Place the tube on the magnet for 5 minutes. Do not disturb the tube while on the magnet.
5. Carefully remove the supernatant and take the tube off the magnet. Resuspend the beads in 1 ml of Cell Isolation Buffer

**Bind Antibody to Beads:**

6. To each 1 ml of prewashed beads, add 4  $\mu$ l of CD19 Cell Isolation Antibody. Mix gently and incubate at room temperature for 15-30 minutes. Tap or flick the tube periodically to mix.
7. Place the tube on the magnet for 3-5 minutes. You should see the beads collecting on the side of the tube (brownish residue). Gently remove the supernatant.
8. Remove the tube from the magnet and wash by adding 1 ml of cold Cell Isolation Buffer. Resuspend gently.
9. Place on the magnet for 3-5 minutes. Gently remove the supernatant and take the tube off the magnet. Resuspend in 900  $\mu$ l of Cell Isolation Buffer. Keep this antibody:bead complex on ice.

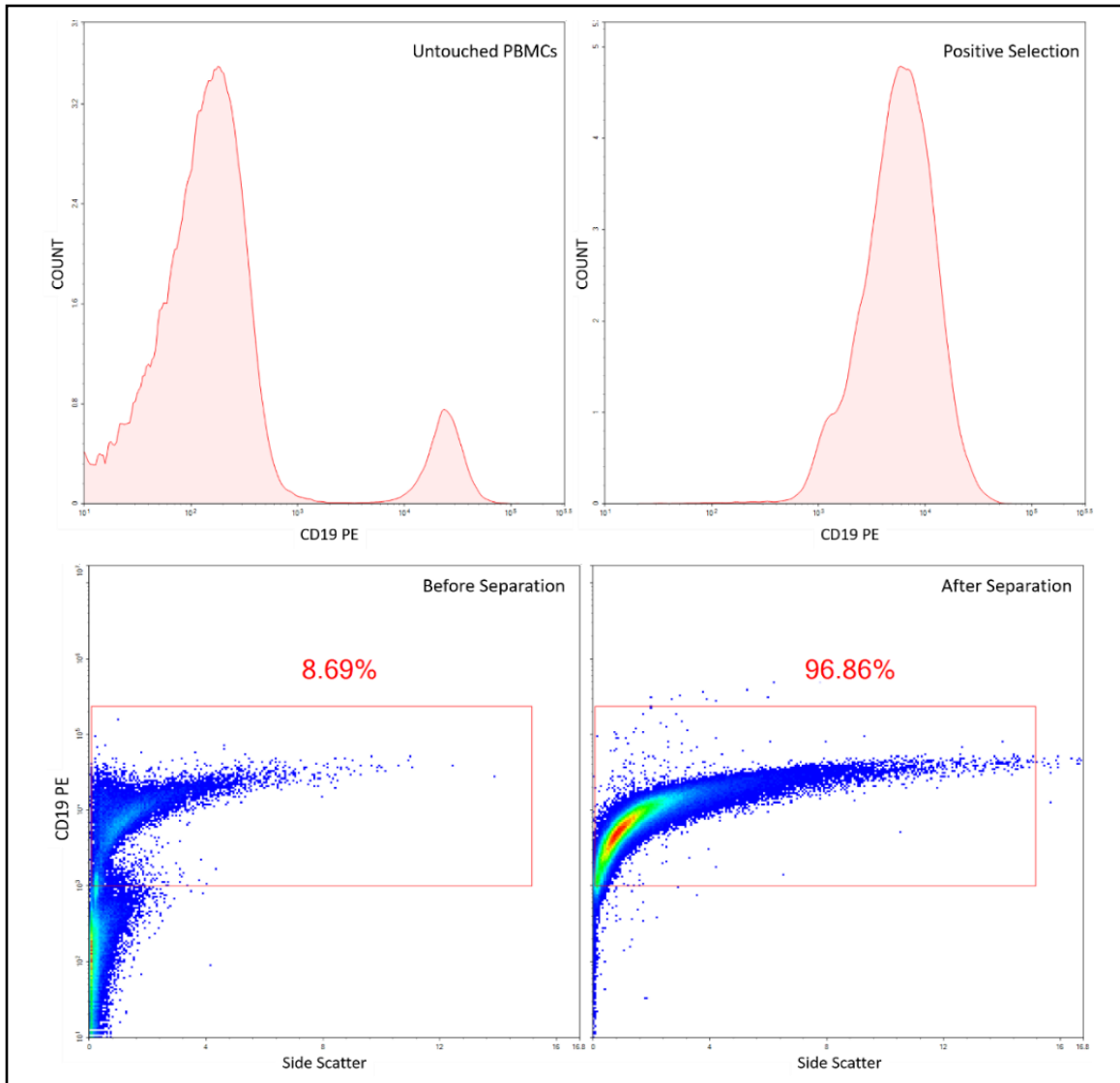
Cell Incubation:

10. Gently mix the cells which have been pre-prepared and adjusted to  $1 \times 10^8$  cells/ml in Cell Isolation Buffer. Aliquot the desired amount of cells into a freshly labeled tube (for less than  $5 \times 10^7$  cells, use a 15 ml tube. For higher cell numbers, use a 50 ml tube).
11. For every  $1 \times 10^7$  cells in 100  $\mu$ l of Cell Isolation Buffer, add 900  $\mu$ l of the antibody:bead mix (from step 9)
  - Ex. If you are isolating from  $1 \times 10^7$  PBMCs, prepare and add 900  $\mu$ l of antibody:bead complex to 100  $\mu$ l of the prepared cells
  - Ex. If you are isolating from  $5 \times 10^7$  PBMCs, prepare and add 4.5 ml of antibody:bead complex to 500  $\mu$ l of the prepared cells
12. Incubate on ice for 15-30 minutes with periodic mixing by gently tapping the tube.
13. After the incubation, wash by adding 1 ml of Cell Isolation Buffer per  $1 \times 10^7$  cells to the tube. Spin down at 300 x g for 5 minutes.
  - It may be useful to save some of the labeled cells before spinning down as a control pre-sort fraction
14. Gently remove the supernatant and resuspend in 3 ml of Cell Isolation Buffer (scale up as needed, according to cell amount).

Magnetic Separation:

15. Place the tube containing the cells on the Cell Isolation Magnetic Tube Rack (BPS Bioscience #78571) for 3-5 minutes without disturbing or twisting the tube to avoid cell shearing/stress
16. Remove the supernatant gently. You should see a brownish residue remaining on the tube. These are CD19<sup>+</sup> cells.
  - It may be useful to save unmagnetized cells from the supernatant as the negative fraction
17. Remove the tube from the magnet and resuspend in 3 ml of Cell Isolation Buffer. Gently resuspend.
18. Repeat steps 15-17 for 2 additional magnetic separations to increase purity.
19. Resuspend the positively isolated cells (brown residue) gently in the desired volume of Cell Isolation Buffer or assay buffer for downstream analysis.

## Example Results



*Figure 1: Comparison of non-isolated and isolated cell populations.*

From a starting sample of 10 million PBMCs, flow cytometric analysis was performed before and after CD19 cell isolation using a PE-labeled anti-CD19 antibody. In the histograms above, “untouched PBMCs” represent the starting cells which have not been incubated with magnetic beads while “positive selection” represents the enriched B cells after isolation. The density plots display flow cytometric analysis of CD19 expression on cells immediately before and after magnetic separation.

### General Considerations

To maintain optimal conditions and reduce stress on the cells, it is recommended to work as quickly as possible and keep the cells and reagents cold on ice unless stated otherwise. For separation of sterile cells, practice aseptic techniques, filter buffer after dilution, and work under a laminar flow hood whenever possible.

**Troubleshooting Guide**

For all further questions, please email [support@bpsbioscience.com](mailto:support@bpsbioscience.com)

**Related Products**

<i>Products</i>	<i>Catalog #</i>	<i>Size</i>
Cell Isolation Magnetic Tube Rack	78571	15 ml/50 ml
Normal Human Peripheral Blood Mononuclear Cells, Frozen	79059	Various
Anti-CD19 CAR-T Cells (primary cells)	78171	Various
CD4+ T cells, Negatively Selected (Human)	79752	10 x 10 <sup>6</sup> cells
CD8+ T cells, Negatively Selected (Human)	79753	10 x 10 <sup>6</sup> cells