Making the Medicines of Tomorrow

Lonza
Specialized Modalities

Quality, purity, functionality

Evaluating performance factors of cryopreserved peripheral blood mononuclear cells

Experiment at ease: Quality PBMCs with minimal RBCs

Human peripheral blood mononuclear cells (PBMCs) are a mixed population of immune cells critical to both innate and adaptive immune functions. They contain a wide variety of cell types (lymphocytes, B, NK, DC and T cells) that can be isolated for specific applications or used as a whole population to model human immune physiology. There are three critical factors to consider when choosing a PBMC product: quality, purity, and functionality. Choosing Lonza's cryopreserved PBMCs guarantees all three.

Quality

Cell count and viability eceeding industry standards

Lonza PBMCs are isolated via apheresis and density gradient separation, and come in a variety of ampule sizes to meet your research needs. Each ampule is guaranteed to provide ≥10, 25, 50 or 100 million viable cells upon thawing. Post-thaw viability is guaranteed to meet an industry standard of ≥70% in every ampoule. To demonstrate this, we randomly sampled three donor lots (Lonza CC-2702; ≥50 million cells) and found post-thaw averages of 54 ± 3 million cells per amp with an average % viability of 89 ± 5 (Fig. 1), clearly showing that Lonza cells greatly exceedindustry benchmarks for quality.

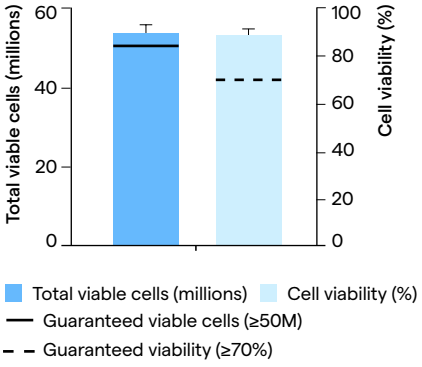

Figure 1.
Average total viable cells (millions) and cell viability (%) of three randomly tested lots of Lonza PBMCs guaranteed to have ≥50 million cells and ≥70% viability. PBMCs were thawed, centrifuged, purged of cryopreservation medium, then resuspended in medium and counted using Trypan blue 0.4% in a 1:2 dilution and a hemocytometer.

Purity

Diverse immune cells, low RBCs

Measuring immunophenotypic marker expression across the same three lots of Lonza CC-2702 PBMCs, we see a consistent and diverse spectrum of immune cell types across donors, as expected, with low levels of red blood cell contamination (Fig. 2). Percent marker expression fell within typical ranges for PBMCs (Table 1). Comparing average CD235a expression (marker expressed by red blood cells) for the same three lots of Lonza's PBMCs to

that of three random lots from three competitors, we see that Lonza PBMCs had the lowest average expression of CD235a and therefore the highest purity, indicating significantly lower contamination by red blood cells (Fig. 3).

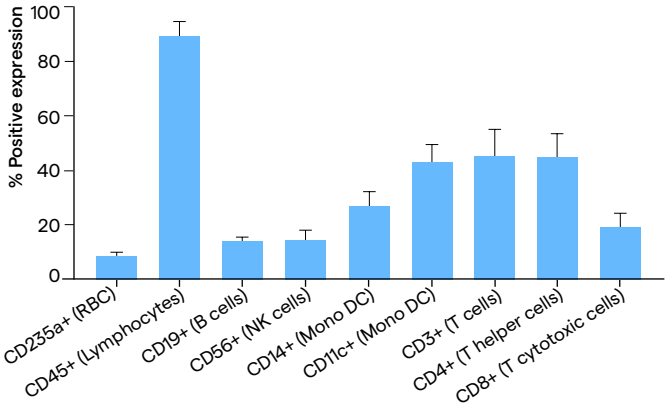

Figure 2.
Population distribution of cells averaged across three randomly tested lots of Lonza human PBMCs. Bars represent average % positive maker expression determined by immunophenotyping. The type of cell indicated by each marker is shown in parentheses. RBC = red blood cells, NK = natural killer cells, DC = dendritic cells, CTL = cytotoxic T cells.

Marker	Cell type	% Positive	Typical range
CD3+	T	45.1% ± 9.9%	45 – 70%
CD4+	Helper T	44.8% ± 8.7%	25 – 60%
CD8+	Cytotoxic T	19.4% ± 4.8%	5 – 30%
CD19+	B	14.2% ± 1.3%	5 – 15%
CD56+	NK	14.5% ± 3.5%	5 – 10%
CD14+	Mono DC	27.1% ± 4.9%	10 – 30%
CD11c+	Mono DC	42.7% ± 6.6%	*Unknown*

Table 1.
Average ± SEM % marker expression for three randomly tested lots of Lonza PBMCs (see Fig. 2) compared with typical ranges for % marker expression found in PBMCs. Our results show that Lonza PBMCs contain a diverse cell population that falls within representative ranges, another indicator of quality.

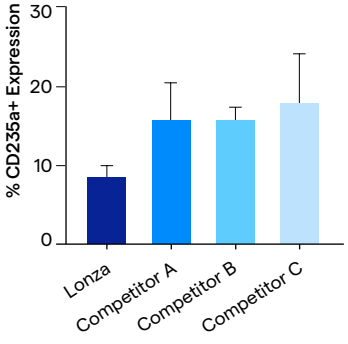

Figure 3.
Purity comparison of human PBMCs between Lonza and three competing brands. Three donor lots were tested and averaged for each competitor. Bars represent % positive expression of red blood cell immunophenotyping marker CD235a+.

Functionality

The convenience of frozen with the confidence of fresh PBMCs

Lonza cryopreserved PBMCs maintain optimal functionality post-thawing. Testing the same three Lonza PBMC lots as above, average % mature dendritic cell (DC) marker expres-sion was significantly higher after LPS stimulation, while CFSE staining showed rapid T cell proliferation when the inflammatory cytokine IL-2 was added along with CD3 and CD28 antigens (data not shown). Furthermore, we recently developed a protocol for co-culturing DC and CD8+ T cells derived from cryopreserved PBMCs that can be found on the Lonza Bioscience website.

PBMCs are used in a large variety of applications, from vaccine and drug development to immunology and disease modeling. Whether you are isolating a specific cell type or modeling complex immune responses to drugs or diseases, Lonza cryopreserved PBMCs offer the quality, purity and functionality you need to achieve your research goals. Lonza maintains inventory from a diverse donor population, allowing you to choose lots based on donor demographic characteristics to develop a representative sample group that works for you. Contact Lonza Scientific Support for more information.

Description	Catalog no.	Size
Human Peripheral Blood Mononuclear Cells (hPBMC), Cryopreserved	CC-2702	≥50 million cells
	CC-2703	≥100 million cells
	CC-2704	≥10 million cells
	CC-2705	≥25 million cells

Use Lonza's X-VIVO® 15 Serum-free Hematopoietic Cell Medium, (Lonza Cat no.: 02-053Q) for culturing PBMCs and other immune cell types. Options are available with and without gentamicin and phenol red, with native or recom-binant transferrin, and for RUO vs FFM (TheraPEAK®). Visit the Lonza website for more information. .

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