



**EasySep™ Human Cord Blood CD34 Positive Selection Kit II**

Positive Selection  
Catalog #17896

For processing 1000 mL of cord blood



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## Description

Isolate highly purified CD34+ cells from fresh whole umbilical cord blood using a simple, two-step procedure.

- Fast and easy-to-use
- Up to 98% purity
- No columns required
- Can be combined with SepMate™ for consistent, high-throughput sample processing

First, hematopoietic progenitor cells are pre-enriched using the RosetteSep™ Human Cord Blood CD34 Pre-Enrichment Cocktail (15896C) with antibodies recognizing T cell, B cell, myeloid cell, and platelet surface markers. CD34+ cells are then selected using the EasySep™ Human CD34 Positive Selection Cocktail (18096C), which contains an antibody recognizing CD34.

RosetteSep™ binds unwanted cells to red blood cells (RBCs), forming immunorosettes, which sediment during density gradient centrifugation. The pre-enriched fraction containing CD34+ cells is harvested from the interface between the plasma and density gradient medium. The pre-enriched CD34+ cells are then labeled with antibodies and magnetic particles, and separated without columns using an EasySep™ magnet. Unwanted cells are simply poured off, while desired cells remain in the tube. Isolated CD34+ cells are immediately available for downstream applications.

- If isolating CD34+ cells from fresh blood or buffy coat the Complete Kit for Human Whole Blood CD34+ Cells (Catalog #15086) is recommended.
- If isolating CD34+ cells from other samples, including fresh or previously frozen mobilized peripheral blood or bone marrow mononuclear cells, or from previously frozen cord blood mononuclear cells, we recommend using the EasySep™ Human CD34 Positive Selection Kit (Catalog #18056).

## Component Descriptions

COMPONENT NAME	COMPONENT #	QUANTITY	STORAGE	SHELF LIFE	FORMAT
RosetteSep™ Cord Blood CD34 Pre-Enrichment Cocktail II	15896C	2 x 2.5 mL	Store at 2 - 8°C. Do not freeze.	Stable until expiry date (EXP) on label.	A combination of monoclonal antibodies in PBS.
EasySep™ Human CD34 Positive Selection Cocktail	18096C	2 x 1 mL	Store at 2 - 8°C. Do not freeze.	Stable until expiry date (EXP) on label.	A combination of monoclonal antibodies in PBS.
EasySep™ Dextran RapidSpheres™ 50100	50100	1 x1 mL	Store at 2 - 8°C. Do not freeze.	Stable until expiry date (EXP) on label.	A suspension of magnetic particles in water.

PBS - phosphate-buffered saline

Components may be shipped at room temperature (15 - 25°C) but should be stored as indicated above.

## Sample Preparation

For available fresh samples, see [www.stemcell.com/primarycells](http://www.stemcell.com/primarycells).

### CORD BLOOD

Collect cord blood in a blood collection container with anticoagulant.

## Recommended Medium

EasySep™ Buffer (Catalog #20144), RoboSep™ Buffer (Catalog #20104), or PBS containing 2% fetal bovine serum (FBS) and 1 mM EDTA. Medium should be free of Ca++ and Mg++.

## Density Gradient Medium

Lymphoprep™ (Catalog #07801).

## Directions for Use – RosetteSep™ Protocol

See page 1 for Sample Preparation and Recommended Medium. Refer to Table 1 for detailed instructions regarding the RosetteSep™ procedure. Ensure that cord blood sample, recommended medium, density gradient medium, and centrifuge are all at room temperature (15 - 25°C).

**Table 1. RosetteSep™ Cord Blood CD34 Pre-Enrichment Protocol**

		ROSETTESEP™	
STEP	INSTRUCTIONS	Standard 50 mL Tube	SepMate™-50
1	Collect cord blood sample within the volume range.	5 - 15 mL	4 - 17 mL
2	Add RosetteSep™ Cocktail to sample.	5 µL/mL of sample	5 µL/mL of sample
	Mix and incubate.	RT for 20 minutes	RT for 10 minutes
3	Dilute sample and mix gently.	Equal volume of recommended medium to sample	Equal volume of recommended medium to sample
4	Add density gradient medium to required tube.	15 mL	15 mL
	Required tube.	50 mL conical tube (e.g. Corning Catalog #352070)	SepMate™-50 tube (Catalog #15450; see Document #29251 for specific instructions)
5	Add diluted sample to the tube containing the density gradient medium.	Layer diluted sample on density gradient medium, being careful to minimize mixing	Pour or pipette diluted sample into tube
6	Centrifuge.	1200 x g for 20 minutes brake off	1200 x g for 10 minutes brake on
7	Collect pre-enriched cells. * For platelet removal see footnote below.	Harvest enriched cell layer with a pipette and transfer to new 50 mL tube**	Pour supernatant into a new standard 50 mL tube
8	Wash pre-enriched cells.	Top up with recommended medium	Top up with recommended medium
9	Centrifuge.	300 x g for 10 minutes brake low	300 x g for 10 minutes brake low
		Carefully aspirate and discard supernatant	Carefully aspirate and discard supernatant
10	Resuspend pre-enriched cells as indicated, in recommended medium.‡ NOTE: If working with a sample which contains a large volume of RBCs, the RosetteSep™ pre-enriched cell pellet may be slightly larger than the recommended resuspension volume. Do not add any additional recommended medium to the sample.	For an original cord blood volume of: <ul style="list-style-type: none"> <li>&lt; 50 mL resuspend in 0.5 mL</li> <li>50 - 100 mL resuspend in 0.75 mL</li> <li>&gt; 100 - 150 mL resuspend in 1.0 mL</li> <li>&gt; 150 mL resuspend in 1.5 mL</li> </ul>	For an original cord blood volume of: <ul style="list-style-type: none"> <li>&lt; 50 mL resuspend in 0.5 mL</li> <li>50 - 100 mL resuspend in 0.75 mL</li> <li>&gt; 100 - 150 mL resuspend in 1.0 mL</li> <li>&gt; 150 mL resuspend in 1.5 mL</li> </ul>
11	The pre-enriched cells are now ready for use.	Continue with the EasySep™ or RoboSep™ Human Cord Blood CD34 Positive Selection protocol	Continue with the EasySep™ or RoboSep™ Human Cord Blood CD34 Positive Selection protocol

RT - room temperature (15 - 25°C)

\* To minimize platelet contamination, remove and discard the top third of the plasma layer before collecting the cells at the density gradient medium : plasma interface.



\*\* Sometimes it is difficult to see the cells at the interface. For maximum recovery, remove some of the density gradient medium along with the pre-enriched cells.

‡ Cell pellets from separate cord bloods, resuspended according to Table 1, step 10, may be combined to obtain a maximum sample volume of 4 mL when using “The Big Easy” or the EasyEights™ EasySep™ magnet.

**Directions for Use – Manual EasySep™ Protocols**

See page 1 for Recommended Medium. Refer to Tables 2 and 3 for detailed instructions regarding the manual EasySep™ procedure for each magnet.

**Table 2. EasySep™ Human Cord Blood CD34 Positive Selection Kit II Protocol**


		EASYSEP™ MAGNETS	
STEP	INSTRUCTIONS	 EasySep™ (Catalog #18000)	 “The Big Easy”™ (Catalog #18001)
1	Prepare RosetteSep™ pre-enriched sample according to Table 1.‡	0.5 mL	0.5 - 4 mL
	Add sample to required tube.	5 mL (12 x 75 mm) polystyrene round-bottom tube (e.g. Corning Catalog #352058)	14 mL (17 x 100 mm) polystyrene round-bottom tube (e.g. Corning Catalog #352057)
2	Add Selection Cocktail to sample.	100 µL/mL of sample	100 µL/mL of sample
	Mix and incubate.	RT for 10 minutes	RT for 10 minutes
3	Vortex RapidSpheres™.	30 seconds	30 seconds
4	Add RapidSpheres™ to sample.	50 µL/mL of sample	50 µL/mL of sample
	Mix and incubate.	RT for 1 minute	RT for 3 minutes
5	Add recommended medium to top up the sample to the indicated volume. Mix by gently pipetting up and down 2 - 3 times.	Top up to 2.5 mL	<ul style="list-style-type: none"> <li>• Top up to 3 mL for samples ≤ 1 mL</li> <li>• Top up to 10 mL for samples &gt; 1 mL</li> </ul>
	Place the tube (without lid) into the magnet and incubate.	RT for 3 minutes	RT for 3 minutes
6	Pick up the magnet, and in one continuous motion invert the magnet and tube, pouring off the supernatant.* Remove the tube from the magnet; this tube contains the isolated cells.	Discard supernatant	Discard supernatant
7	Repeat steps as indicated.	Steps 5 and 6, three more times (total of 4 x 3-minute separations)	Steps 5 and 6, three more times (total of 4 x 3-minute separations)
8	Remove the tube from the magnet and top up the sample with recommended medium. Centrifuge.	300 x g for 10 minutes brake low	300 x g for 10 minutes brake low
		Carefully aspirate and discard supernatant	Carefully aspirate and discard supernatant
9	Resuspend cells in desired medium.	Isolated cells are now ready for use	Isolated cells are now ready for use

RT - room temperature (15 - 25°C)

‡ Cell pellets from separate cord bloods, resuspended according to Table 1, step 10, may be combined to obtain a maximum sample volume of 4 mL when using “The Big Easy” EasySep™ magnet.

\* Leave the magnet and tube inverted for 2 - 3 seconds, then return upright. Do not shake or blot off any drops that may remain hanging from the mouth of the tube.

**Table 3. EasySep™ Human Cord Blood CD34 Positive Selection Kit II Protocol**

		EASYSEP™ MAGNET
		 <b>EasyEights™ (Catalog #18103)</b> <b>14 mL tube</b>
1	Prepare RosetteSep™ pre-enriched sample according to Table 1.‡	0.5 - 4 mL
	Add sample to required tube.	14 mL (17 x 100 mm) polystyrene round-bottom tube (e.g. Corning Catalog #352057)
2	Add Selection Cocktail to sample.	100 µL/mL of sample
	Mix and incubate.	RT for 10 minutes
3	Vortex RapidSpheres™.	30 seconds
4	Add RapidSpheres™ to sample.	50 µL/mL of sample
	Mix and incubate.	RT for 3 minutes
5	Add recommended medium to top up sample to the indicated volume. Mix by gently pipetting up and down 2 - 3 times.	<ul style="list-style-type: none"> <li>• Top up to 3 mL for samples ≤ 1 mL</li> <li>• Top up to 10 mL for samples &gt; 1 mL</li> </ul>
	Place the tube (without lid) into the magnet and incubate.	RT for 10 minutes
6	Carefully pipette** (do not pour) off the supernatant. Remove the tube from the magnet; this tube contains the isolated cells.	Discard supernatant
7	Add recommended medium to top up sample to the indicated volume. Mix by gently pipetting up and down 2 - 3 times.	<ul style="list-style-type: none"> <li>• Top up to 3 mL for samples ≤ 1 mL</li> <li>• Top up to 10 mL for samples &gt; 1 mL</li> </ul>
	Place the tube (without lid) into the magnet and incubate.	RT for 5 minutes
8	Carefully pipette** (do not pour) off the supernatant. Remove the tube from the magnet; this tube contains the isolated cells.	Discard supernatant
9	Repeat steps as indicated.	Steps 7 and 8 (total of 1 x 10-minute and 2 x 5-minute separations)
10	Remove the tube from the magnet and top up the sample with recommended medium. Centrifuge.	300 x g for 10 minutes brake low
		Carefully aspirate and discard supernatant
11	Resuspend cells in desired medium.	Isolated cells are now ready for use

RT - room temperature (15 - 25°C)


‡ Cell pellets from separate cord bloods, resuspended according to Table 1, step 10, may be combined to obtain a maximum sample volume of 4 mL.

\*\* It is recommended to collect the entire supernatant, all at once, into a single pipette (e.g. for the EasyEights™ 14 mL tube use a 10 mL serological pipette).

**Directions for Use – Fully Automated RoboSep™ Protocol**

See page 1 for Recommended Medium. Refer to Table 4 for detailed instructions regarding the RoboSep™ procedure.

**Table 4. RoboSep™ Human Cord Blood CD34 Positive Selection Kit II Protocol**

STEP	INSTRUCTIONS	RoboSep™ (Catalog #20000 and #21000)	
1	Prepare RosetteSep™ pre-enriched sample according to Table 1.‡	0.5 - 4 mL	
	Add sample to required tube.	14 mL (17 x 100 mm) polystyrene round-bottom tube (e.g. Corning Catalog #352057)	
2	Select protocol.	<ul style="list-style-type: none"> <li>Human CD34 Positive Selection II from CB 17896</li> <li>Human CD34 Positive Selection II from CB 17896 - high purity</li> </ul>	
3	Vortex RapidSpheres™.	30 seconds	
4	Load the carousel.	Follow on-screen prompts	
	Start the protocol.	Press the green “Run” button	
5	Unload the carousel when the run is complete and remove the tube from the magnet. Centrifuge.	300 x g for 10 minutes brake low	
		Carefully aspirate and discard supernatant	
6	Resuspend cells in desired medium.	Isolated cells are now ready for use	

‡ Cell pellets from separate cord bloods, resuspended according to Table 1, step 10, may be combined to obtain a maximum sample volume of 4 mL.

## Notes and Tips

### ASSESSING PURITY

The EasySep™ Human Cord Blood CD34 Positive Selection Cocktail uses a class II anti-CD34 antibody clone that may block some class I and II anti-CD34 antibody clones used to assess purity by flow cytometry.

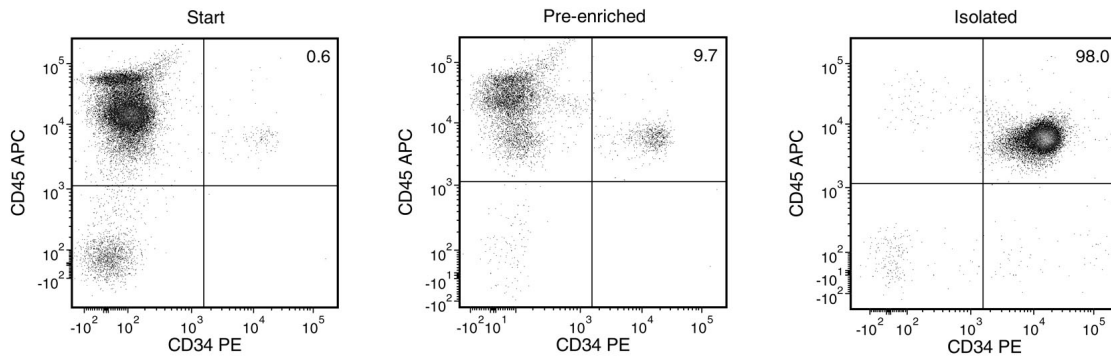
For purity assessment by flow cytometry use one of the following class III fluorochrome-conjugated anti-CD34 antibody clones and a fluorochrome-conjugated anti-CD45 antibody:

- Anti-Human CD34 Antibody, Clone 581 (Catalog #60013) or 8G12, AC136 or BirmaK3, and
- Anti-Human CD45 Antibody, Clone HI30 (Catalog #60018)

Isolated CD34+ cells can be expanded and/or differentiated into mature hematopoietic cells of specific lineages using StemSpan™ Serum-Free Expansion Media and Supplements (for more information, visit [www.stemcell.com](http://www.stemcell.com)).

The frequency of erythroid (BFU-E/CFU-E), myeloid (CFU-GM) and multilineage (CFU-GEMM) progenitor cells can be assessed in colony-forming unit assays in semi-solid culture media using MethoCult™ H4034 Optimum (Catalog #04034) or MethoCult™ H4035 Optimum without EPO (Catalog #04035).

## Data



Starting with fresh cord blood, the CD34+ cell content of the isolated fraction is typically  $91 \pm 9\%$  (mean  $\pm$  SD; using the purple EasySep™ Magnet).

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