



StemSpan™

The Solution to Your Hematopoietic Cell Expansion Needs

The ability to culture hematopoietic stem and progenitor cells in vitro has been instrumental in advancing our understanding of hematopoiesis. As interest in this field has grown, so has the need for more highly-defined, reliable and robust expansion media. STEMCELL Technologies Inc. has developed a family of expansion media products, StemSpan™, which offer a range of formulations including serum-free, xeno-free, and recently, animal component-free media, allowing researchers the flexibility to select a medium formulation specific to their individual application. All StemSpan™ media have been extensively tested in expansion culture using cord blood (CB)- and bone marrow (BM)-derived hematopoietic cells. No cytokines have been added to StemSpan™ media, allowing users the flexibility to prepare a medium that meets their specific requirements.

StemSpan™ Applications:

- Expansion of hematopoietic cells from normal bone marrow, mobilized peripheral blood and cord blood
- Generation of large numbers of mature blood cells and hematopoietic lineage-specific progenitors (i.e. erythroid cells, neutrophils, megakaryocytes and platelets, dendritic cells)
- Short-and long-term culture of human and mouse hematopoietic cells
- Identification of novel regulators of hematopoiesis

PRODUCT	DESCRIPTION	APPLICATIONS
StemSpan™ SFEM II  100 mL (09605) 500 mL (09655)	StemSpan™ Serum-Free Expansion Medium (SFEM) II is an enhanced version of our StemSpan™ SFEM medium. It contains pre-tested bovine serum albumin, insulin, transferrin, and supplements in Iscove's MDM.	This formulation is recommended for the expansion of hematopoietic stem and progenitor cells and the generation of large numbers of mature blood cells by expansion and differentiation of lineage-specific progenitors. This medium supports the highest expansion rate among leading commercially available expansion media tested (Figure 1 and Table 1).*
StemSpan™ SFEM 100 mL (09600) 500 mL (09650)	StemSpan™ Serum-Free Expansion Medium (SFEM) contains pre-tested bovine serum albumin, insulin, transferrin, and supplements in Iscove's MDM.	This formulation is recommended for the serum-free culture of human, mouse, rat, and non-human primate hematopoietic cells.
StemSpan™ H3000 100 mL (09800) 500 mL (09850)	StemSpan™ H3000 is a xeno-free medium which contains only human-derived or recombinant human proteins.	This formulation is recommended for applications in which a culture medium devoid of non-human animal-derived components is required, and the presence of human-plasma derived components is acceptable.
StemSpan™-ACF  100 mL (09805) 500 mL (09855)	StemSpan™ Animal Component-Free (ACF) expansion medium is the world's first commercial expansion medium that contains only recombinant and synthetic components.	This formulation is recommended for applications in which a culture medium devoid of animal- or human-derived components is required, and for pre-clinical expansion that requires maximum lot-to-lot consistency.

*Versus leading commercially available competitors tested.



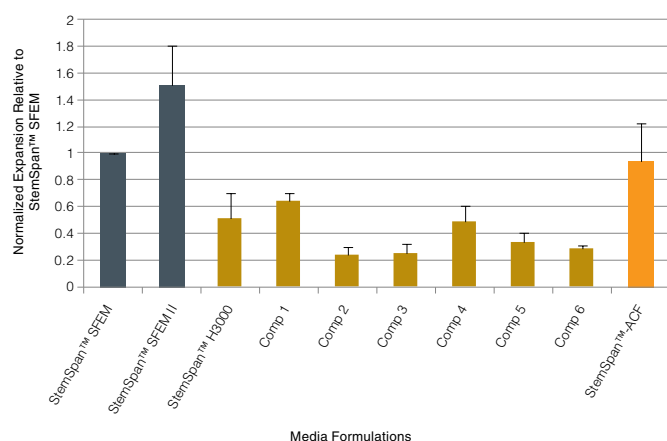
Scientists Helping Scientists™ | WWW.STEMCELL.COM

DOCUMENT #28016 | VERSION 1.0.0 | NOV 2012

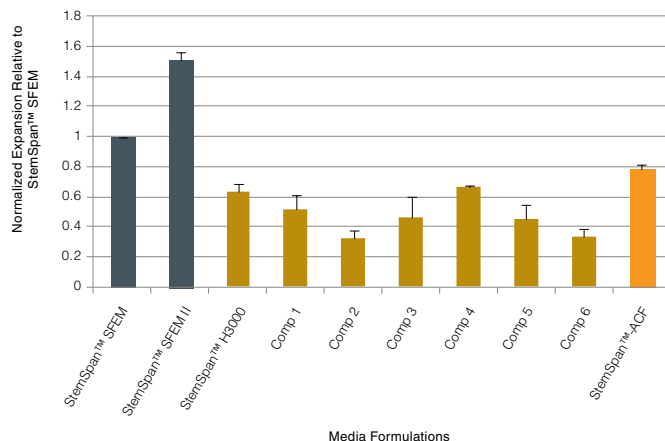
TOLL-FREE T. 1 800 667 0322 • T. +1 604 877 0713 • TECHSUPPORT@STEMCELL.COM • INFO@STEMCELL.COM
 FOR FULL CONTACT DETAILS WORLDWIDE VISIT OUR WEBSITE

FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES.

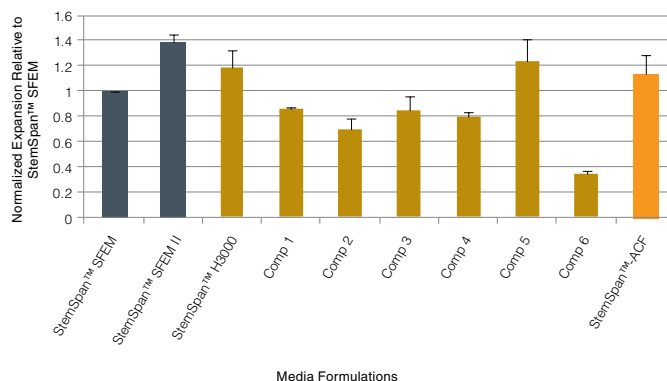
A Cord Blood CD34⁺ Cell Fold Increase



B Bone Marrow CD34⁺ Cell Fold Increase



C Cord Blood TNC Fold Increase



D Bone Marrow TNC Fold Increase

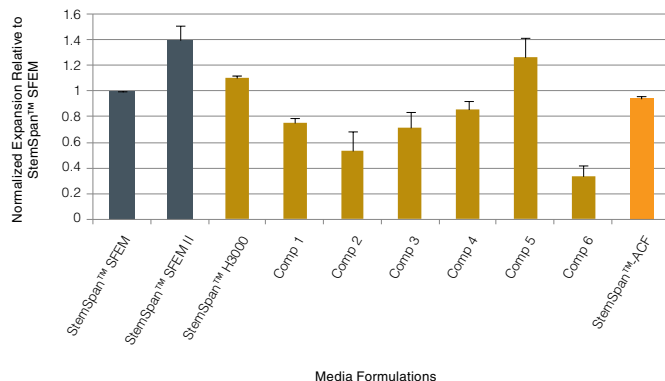


FIGURE 1. Expansion of CD34⁺ cells (A, B) and total nucleated cells (TNC, C, D) in cultures of purified human cord blood (CB, A, C) and bone marrow (BM, B, D) CD34⁺ cells in serum-free, xeno-free and animal component-free media formulations.

Two serum-free media (StemSpan™ SFEM and SFEM II), seven xeno-free media (StemSpan™ H3000 and six media from other suppliers listed as Comp 1-6) and one animal component-free medium (StemSpan™-ACF) were tested. CD34⁺ hematopoietic cells were purified using the EasySep™ CD34⁺ progenitor isolation kits (cat no. 18096 and 19356) and were plated at a concentration of 10⁴ cells/mL in the respective media, supplemented with the StemSpan™ CC100 cytokine cocktail. Total nucleated cells (TNC) and CD34⁺ cells, as well as cell viability, were assessed by flow cytometry after 7 days of culture. Results show the average fold expansion of TNC and CD34⁺ cells for three different CB samples (n=3) and three different BM samples (n=3) expressed relative to the expansion obtained in StemSpan™ SFEM.

■ serum-free media formulation ■ xeno-free media formulation ■ animal component-free media formulation

StemSpan™: The Solution to Your Hematopoietic Cell Expansion Needs

	BONE MARROW						CORD BLOOD					
	% VIABLE CELLS		TNC FOLD INCR		CD34 ⁺ CELL FOLD INCR		% VIABLE CELLS		TNC FOLD INCR		CD34 ⁺ CELL FOLD INCR	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
StemSpan™ SFEM	94.9	2.2	19.0	3.6	2.4	0.7	95.3	1.8	22.4	6.2	3.6	1.9
StemSpan™ SFEM II	96.8	1.5	26.3	4.0	3.5	0.3	97.0	1.5	31.9	9.4	5.5	2.9
StemSpan™ H3000	97.6	1.2	22.2	2.5	1.3	0.9	96.3	1.3	24.7	7.1	2.3	1.3
Comp 1	95.4	2.0	16.2	2.8	1.5	0.5	95.7	1.2	16.7	5.1	1.8	1.0
Comp 2	94.3	1.6	13.3	3.7	0.6	0.4	86.0	7.3	12.8	7.1	1.2	0.8
Comp 3	94.8	2.1	16.4	5.3	0.6	0.4	92.6	3.5	16.7	7.2	1.8	1.3
Comp 4	95.0	1.7	15.1	3.7	1.2	0.6	94.4	1.4	19.5	6.7	2.4	1.3
Comp 5	98.4	1.1	23.2	2.2	0.8	0.1	97.0	1.2	29.4	12.1	1.7	1.1
Comp 6	98.2	0.9	6.4	1.0	0.7	0.2	96.7	1.2	7.8	3.8	1.2	0.7
StemSpan™ ACF	97.6	1.0	21.3	2.0	2.2	0.2	97.1	1.7	21.7	6.5	2.8	1.4

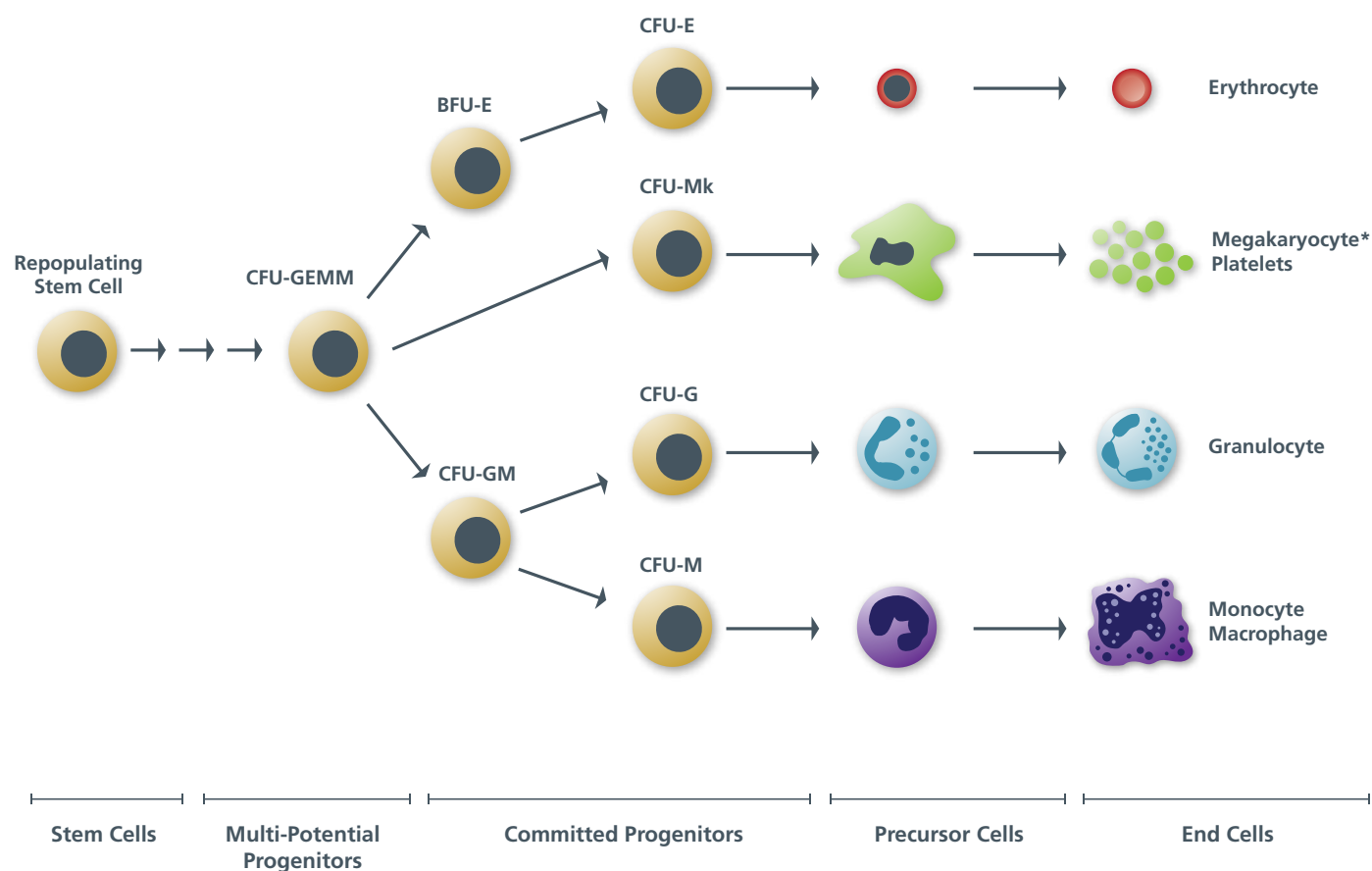
TABLE 1. StemSpan™ media support higher CD34⁺ cell expansion than most commonly used commercially available hematopoietic cell expansion media for human cord blood and bone marrow.

Percent viable cells, fold expansion of total nucleated cells (TNC) and CD34⁺ cells after seven days of culture of human cord blood and bone marrow hematopoietic cells in StemSpan™ SFEM, SFEM II, H3000, ACF and six commercially available media from other suppliers (Comp 1-6) supplemented with the StemSpan™ CC100 cytokine cocktail. Results show the average ± one standard deviation for experiments with three different CB and three different BM samples.

PRODUCT	DESCRIPTION	QUANTITY	CATALOG #
StemSpan™ CC100	Cytokine cocktail for culture and expansion of human hematopoietic cells; contains both early- and late-acting cytokines to generate large numbers of progenitors and mature cells in culture Contains recombinant human (rh) Flt-3 Ligand, rh SCF, rh IL-3, rh IL-6	1 mL (100X concentrate)	02690
StemSpan™ CC110	Cytokine cocktail for culture and expansion of human hematopoietic cells; contains early-acting cytokines for use in short-term cultures to promote proliferation of stem cells and immature progenitors without extensive proliferation and differentiation of later progenitors Contains rh Flt-3 Ligand, rh SCF, rh TPO	1 mL (100X concentrate)	02697
StemSpan™ CC220	Culture, expansion and differentiation of human megakaryocytic progenitors; generates large numbers of megakaryocytes and mature platelets, with minimal expansion and differentiation of cells from other lineages	1 mL (100X concentrate)	02696

The Hematopoietic Hierarchy

Representation of Production of Mature End Cells from Stem and Progenitor Cells



Schematic representation of the production of mature blood cells by the proliferation and differentiation of hematopoietic stem cells. Assays for Long-Term Culture Initiating Cells (LTC-IC) and Cobblestone Area forming Cells (CAFC) identify very primitive progenitor cells that overlap with stem and progenitor cells. Colony-forming Unit (CFU) assays identify multipotential and lineage-committed progenitor cells. CFU-GEMM: Colony-Forming Unit - Granulocyte/Erythrocyte/Macrophage/Megakaryocyte; BFU-E: Burst-Forming Unit - Erythroid; CFU-E: Colony-Forming Unit - Erythroid; CFU-Mk: Colony-Forming Unit - Megakaryocyte; CFU-GM: Colony-Forming Unit - Granulocyte/Macrophage; CFU-G: Colony-Forming Unit - Granulocyte; CFU-M: Colony-Forming Unit - Macrophage. MethoCult™ is the gold standard for CFU assay in which all of the fore mentioned colonies may be accurately detected and enumerated. The colony-forming unit-megakaryocyte (CFU-Mk) is detected using collagen-based MegaCult™-C medium.