StemSpan™ Media and Supplements
for the Expansion and Differentiation of Granulocytes and Monocytes

Background

Investigators studying hematopoiesis require standardized culture media and cytokines to promote the proliferation and/or lineage-specific differentiation of hematopoietic stem and progenitor cells (HSPCs) from bone marrow (BM), cord blood (CB) and other tissues. STEMCELL Technologies has developed a family of expansion media, which includes serum-free and animal component-free formulations (see page 2). StemSpan™ media require the addition of cytokines (e.g. StemSpan™ Expansion Supplements) to promote proliferation and differentiation of HSPCs.

Why Use StemSpan™ Myeloid Expansion Supplements?

STANDARDIZED. Defined and serum-free.

EFFICIENT. Promote the production of thousands of granulocytes or hundreds of monocytes per input human cord blood CD34$^+$ cell in 14-day liquid cultures.

CONVENIENT. Optimized for use with StemSpan™ media.

Product Description

StemSpan™ Myeloid Expansion Supplement (100X) (Catalog #02693) and StemSpan™ Myeloid Expansion Supplement II (100X) (Catalog #02694) contain unique combinations of recombinant human cytokines formulated to selectively promote the differentiation and expansion of CD34$^+$ cells into specific subsets of myeloid progenitor cells.

The original Myeloid Expansion Supplement (Catalog #02693) stimulates the generation of CD15$^+$ granulocytes from BM-, CB- or mobilized peripheral blood (MPB)-derived CD34$^+$ cells and can be added to StemSpan™ SFEM, SFEM II, or -ACF serum-free expansion media.

Myeloid Expansion Supplement II (Catalog #02694) stimulates the generation of CD14$^+$ monocytes from CB-derived CD34$^+$ and is optimized for use with SFEM II. Monocytes generated in culture with Myeloid Expansion Supplement II can be further differentiated to M1 or M2 macrophages, in addition to dendritic cells using either ImmunoCult™-SF Macrophage Medium (Catalog #10961) or the ImmunoCult™ Dendritic Cell Culture Kit (Catalog #10985), respectively. To learn more about these products, see our website for further information.

StemSpan™ Myeloid Expansion Supplement (Catalog #02693)

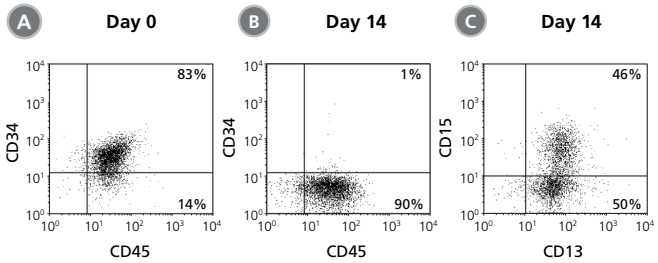

Figure 1. Production of CD15$^+$ Granulocytes by the Expansion and Lineage-Specific Differentiation of Human BM CD34$^+$ Cells Cultured in StemSpan™ SFEM II Containing Myeloid Expansion Supplement (Catalog #02693)

Flow cytometry dot plots for 14-day cultures of human BM CD34$^+$ cells in StemSpan™ SFEM II containing Myeloid Expansion Supplement. The plots show expression of the HSPC marker CD34, and pan-hematopoietic marker CD45 (A) before and (B) after culture, and (C) expression of myeloid markers CD13 and CD15 on the expanded cells. The frequency of CD34$^+$ cells declined from 83% before culture to 1% after 14 days. In parallel, CD15$^+$ granulocytes gradually accumulated from <10% on day 0 to 46% by day 14.

StemSpan™ Myeloid Expansion Supplement II (Catalog #02694)

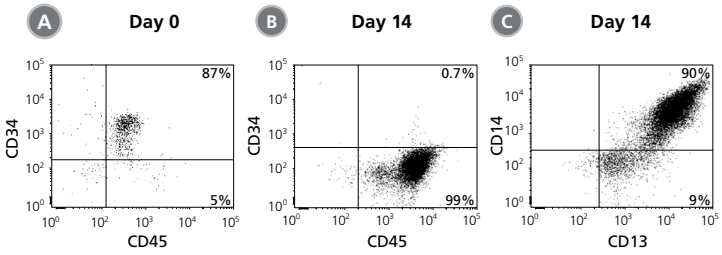

Figure 2. Production of CD14$^+$ Monocytes by the Expansion and Lineage-Specific Differentiation of Human CB CD34$^+$ Cells Cultured in StemSpan™ SFEM II Containing Myeloid Expansion Supplement II (Catalog #02694)

Flow cytometry dot plots for 14-day cultures of human CB CD34$^+$ cells in StemSpan™ SFEM II containing Myeloid Expansion Supplement II. The plots show expression of CD34 and CD45 (A) before and (B) after culture, and (C) expression of CD13 and CD14 on the expanded cells. The frequency of CD34$^+$ cells declined from 87% before culture to less than 1% after 14 days. CD14$^+$ monocytes increased from <5% on day 0 to 90% by day 14.

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StemSpan™ Media and Supplements
for the Differentiation and Expansion of Myeloid Progenitor Cells

Applications:

- Development of standardized procedures to expand granulocytes or monocytes in culture.
- Research into the regulation of granulopoiesis or myelopoiesis.
- Determination of the effects of candidate therapeutics on granulocytes or monocytes during drug development.

Table 1. Production of Myeloid Cells from Human CB CD34$^+$ Cells Cultured in SFEM II Containing Myeloid Expansion Supplement or Myeloid Expansion Supplement II

PRODUCT	TNCs PRODUCED PER INPUT CD34$^+$ CELL*	MYELOID CELLS		
		% CD13$^+$	% CD14$^+$	% CD15$^+$
StemSpan™ Myeloid Expansion Supplement (100X) (Catalog #02693)	5847 (2691 - 9003)	92 (89 - 95)	5 (3 - 8)	47 (39 - 55)
StemSpan™ Myeloid Expansion Supplement II (100X) (Catalog #02694)	2099 (933 - 3264)	94 (90 - 97)	74 (68 - 80)	11 (7 - 15)

Shown are numbers of total nucleated cells (TNCs) produced per input human CB-derived CD34$^+$ cell and percentages of cells positive for myeloid markers CD13, CD14 and CD15 after 14 days of culture in SFEM II containing Myeloid Expansion Supplement (n = 14) or Myeloid Expansion Supplement II (n = 16).
*Mean (95% confidence limits; the range within which 95% of results typically fall).

Media and Supplements for the Differentiation and Expansion of Myeloid Progenitor Cells

PRODUCT	DESCRIPTION	RECOMMENDED FOR
StemSpan™ SFEM 09600 (100 mL) 09650 (500 mL)	Serum-free expansion medium (SFEM) containing pre-tested bovine serum albumin, insulin, transferrin and supplements in Iscove's MDM	Serum-free culture of HSPCs. May be combined with StemSpan™ Myeloid Expansion Supplement (Catalog #02693)
StemSpan™ SFEM II 09605 (100 mL) 09655 (500 mL)	Enhanced version of StemSpan™ SFEM containing pre-tested bovine serum albumin, insulin, transferrin and supplements in Iscove's MDM	Serum-free expansion of human HSPCs. May be combined with StemSpan™ Myeloid Expansion Supplement (Catalog #02693) or StemSpan™ Myeloid Expansion Supplement II (Catalog #02694)
StemSpan™-ACF 09805 (100 mL) 09855 (500 mL)	Animal component-free (ACF) medium containing only recombinant and synthetic components	Culture of human HSPCs in the absence of human- and animal-derived components. May be combined with StemSpan™ Myeloid Expansion Supplement (Catalog #02693)
StemSpan™ Myeloid Expansion Supplement (100X) 02693 (1 mL)	Pre-mixed cocktail of recombinant human cytokines (SCF, TPO, G-CSF and GM-CSF)	Generation of granulocytes by expansion and lineage-specific differentiation of human BM-, CB- or MPB-derived CD34$^+$ cells
StemSpan™ Myeloid Expansion Supplement II (100X) 02694 (1 mL)	Pre-mixed cocktail of recombinant human cytokines (Flt3L, SCF, TPO, M-CSF and GM-CSF and other supplements)	Generation of monocytes by expansion and lineage-specific differentiation of human CB-derived CD34$^+$ cells

For related products for HSPC research, including specialized culture and storage media, supplements, antibodies, cytokines, and small molecules, visit **www.stemcell.com/HSPCworkflow** or contact us at **techsupport@stemcell.com**. For available fresh and cryopreserved peripheral blood, cord blood and bone marrow products in your region, visit **www.stemcell.com/primarycells**.