

## Product Information

### Stemline™ Mesenchymal Stem Cell Expansion Medium without L-glutamine

Catalog Number **S1569**

Storage Temperature 2-8°C

Synonyms: Mesenchymal Stem Cell Growth Medium

#### Product Description

Stemline™ Mesenchymal Stem Cell Expansion Medium has been developed to promote the optimal expansion of mesenchymal stem cells of human origin. This medium supports high viable cell densities.

#### Intended Use

*For R&D use only. Not for drug, household, or other uses.*

#### Introduction

In the 1970's, Friedenstein and his coworkers<sup>1</sup> showed that a fibroblast-like cell was present in bone marrow, which could be expanded *ex vivo* and was able to differentiate into multiple tissue types both in culture and in specific experimental systems *in vivo*.<sup>2</sup> This cell, therefore, displayed the characteristics of a stem cell, but was non-hematopoietic in nature and part of the complex bone marrow stromal microenvironment

Since these pioneering studies, many investigators have confirmed the finding of Friedenstein, and gone on to show that these cells are capable of both extensive *ex vivo* self replication and differentiation into several non-hematopoietic tissue types including: bone,<sup>3-4</sup> cartilage,<sup>5</sup> tendon,<sup>6</sup> muscle,<sup>7</sup> and more recently neurons and other neural cell types.<sup>8</sup> These cells, therefore, offer unique potential for use in the fields of regenerative medicine, gene therapy, and tissue engineering.<sup>9</sup> Pre-clinical studies are already being reported showing their clinical safety and efficacy in the treatment of disease.<sup>10</sup>

These cells are frequently referred to as mesenchymal stem cells or MSCs. Their initial isolation and growth *ex vivo* requires the use of fetal bovine serum (FBS) in the culture system. However, only specific lots of FBS are effective at stimulating optimal mesenchymal stem cell growth. The components in FBS that are required for MSC growth in culture have not been fully identified but it is believed that they are a combination of cytokines and attachment factors.

#### Components

Stemline Mesenchymal Stem Cell Expansion Medium is a proprietary formulation. The medium does not contain L-glutamine, antibiotics, cytokines, or fetal bovine serum.

#### Preparation Instructions

This medium is supplied as a sterile 1X liquid. **Stemline Mesenchymal Stem Cell Expansion Medium must be supplemented with L-glutamine (4 mM final concentration) and fetal bovine serum.**

#### Storage/Stability

This medium is stable, when stored at 2-8 °C and protected from light, until the date indicated on the label.

#### Procedure

##### Plating Cultures

1. Prepare frozen MSCs (mesenchymal stem cells) as directed by the supplier or in accordance with established protocols.
2. Count cells using a hemacytometer.
3. Transfer the proper number of cells to the desired culture vessel containing medium supplemented with L-glutamine and fetal bovine serum (and antibiotics if desired).
4. Place the culture vessel in a humidified incubator at 37°C and 5% CO<sub>2</sub>.

#### Product Profile

Sigma's Stemline Mesenchymal Stem Cell Expansion Medium (Catalog Number S1569) shows robust expansion of mesenchymal stem cells. This product was compared with several other commercially available media for their ability to expand mesenchymal stem cells in a 6-well microplate culture system. For these small-scale experiments, duplicate 2 ml cultures at 5,000 MSCs/cm<sup>2</sup> were incubated for 14 days in Stemline medium or other commercial products containing FBS. Cells expanded in Stemline Mesenchymal Stem Cell Expansion Medium retain their differentiation potential and are able to be passaged routinely.

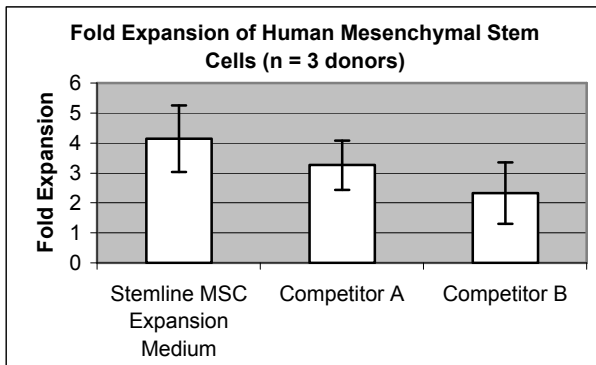


Figure 1. Cells were seeded in triplicate at 5,000 cells per  $\text{cm}^2$  in 6-well tissue culture plates containing either Stemline Mesenchymal Stem Cell Expansion Medium or 2 leading competitors. Each well was treated with trypsin/EDTA, triturated, and harvested after a 14-day expansion. MSCs were counted using a hemacytometer and average viable cell count determined for each condition.

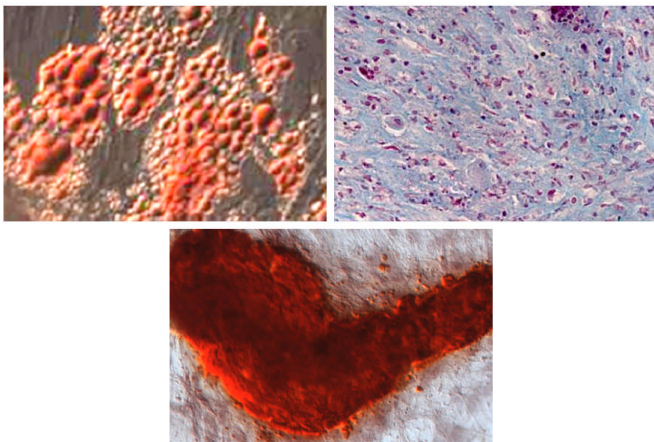


Figure 2. Cells expanded in Stemline Mesenchymal Stem Cell Expansion Medium were capable of appropriate differentiation using standard methods. Expanded cells were capable of forming adipocytes (first panel; oil red O), chondrocytes (second panel; alcian blue) and osteocytes (third panel; alizarin red).

## References

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## Precautions and Disclaimer

MSDS is available upon request or at [www.sigma-aldrich.com](http://www.sigma-aldrich.com).