BI

Achieve More.

More healthy MSCs are generated in less time when cultured in the advanced NutriStem® MSC Medium supplemented with 5% PLTGold® Human Platelet Lysate – a completely xeno-free, clinical-grade medium suitable for MSC scale-up for therapeutics and cell manufacturing.

PLTMax® and PLTGold® Human Platelet Lysates are revolutionary animal serum-free culture supplements with proven growth and cellular kinetic properties, and are routinely used for culture and expansion of both primary cells and stem cells. PLTMax® and PLTGold® enable excellent MSC growth and proliferation in a variety of media, most notably in combination with the defined and highly optimized NutriStem® MSC Medium.

PLTMax® is the original GMP-produced human platelet lysate, which has been used in the clinic since 2008, including more than 30 Phase I, II, and III clinical trials worldwide. PLTGold® is the next generation of human platelet lysates, demonstrating the same exceptional performance in cell culture and expansion as a completely xeno-free supplement. Through pioneering advancements in platelet processing, PLTGold® is a whole, non-fractionated, non-depleted product that does not require the addition of anticoagulants at any stage. PLTGold® contains all of the growth factors and proteins needed for maximized cell growth in a truly xeno-free solution that continues to out-perform other serum supplements.

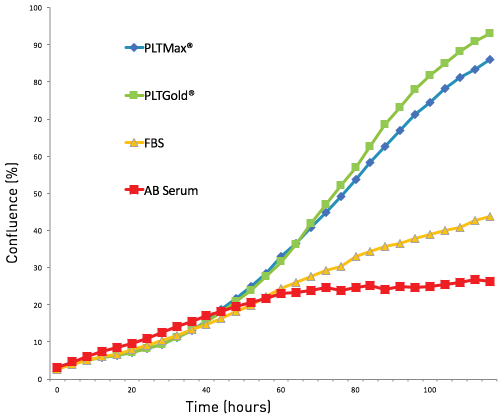

Figure 1. Cell kinetics of AD-MSCs cultured in NutriStem® MSC Basal Medium supplemented with PLTGold® or PLTMax® outperform cultures supplemented with sera. Cell proliferation was assessed based on % confluence of human adipose-derived (AD-) MSCs cultured in NutriStem® MSC Basal Medium supplemented with either 10% human AB serum (red), 10% FBS (yellow), 5% PLTMax® Human Platelet Lysate (blue), or 5% PLTGold® Human Platet Lysate (green). Cells grew significantly faster when cultured in 5% PLTGold® or PLTMax® Human Platelet Lysates as compared to either animal or human sera supplemented at 10%.

NutriStem® MSC Medium with PLTMax® or PLTGold® Human Platelet Lysate demonstrates superior expansion of MSCs.

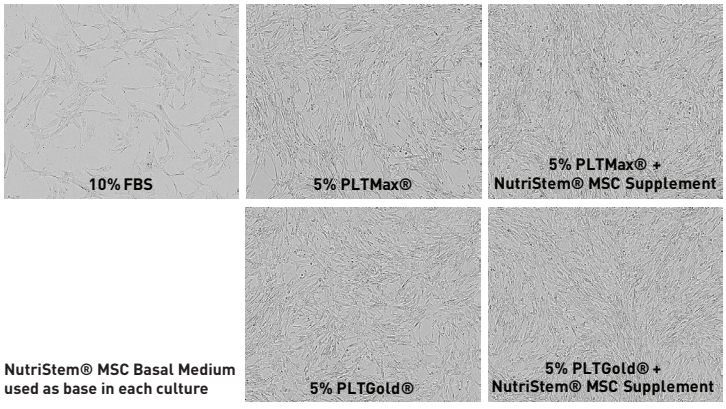

Figure 2. Improved morphology and cell growth is observed when AD-MSCs are cultured in variations of NutriStem® MSC Medium + 5% PLTMax® or 5% PLTGold®. Normal healthy morphology and higher cell numbers are seen when cells are cultured in NutriStem® MSC Basal Medium supplemented with 5% PLTMax® or 5% PLTGold® (middle images) compared to FBS (left image). The addition of 0.6% NutriStem® MSC Supplement to the medium further enhances cell proliferation while maintaining healthy morphology (right images).

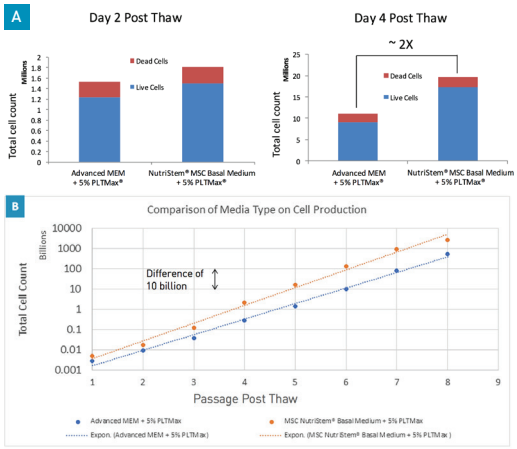

Figure 3. Thawing and expansion are more efficient in NutriStem® MSC Basal Medium + 5% PLTMax®. Cells previously cultured in Advanced MEM + 5% PLTMax® were thawed directly into 2 media conditions. A) Compared to continued culture in Advanced MEM + 5% PLTMax®, more viable cells are obtained when thawed directly into NutriStem® MSC Basal Medium + 5% PLTMax®. More than 10 times more cells were obtained by Day 4 post-thaw when cells were grown in NutriStem® MSC Basal Medium + 5% PLTMax®. B) Upon further culture, cells continue to proliferate at an exponential rate in NutriStem® MSC Basal Medium + 5% PLTMax®. After only 4 passages post-thaw, the expansion rate between culture conditions differs by approximately 10 billion cells. Cell counts taken at end of each passage.

NutriStem® MSC Supplement further enhances performance and maintains healthy MSCs.

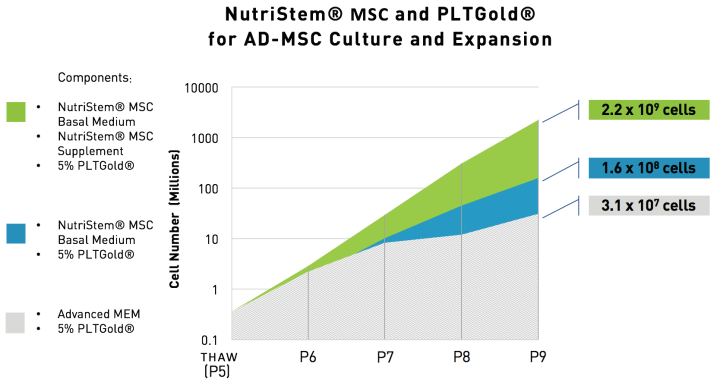

Figure 4. NutriStem® MSC Medium + 5% PLTGold® allows for exceptional growth and expansion of MSCs. Cells previously cultured in Advanced MEM + 5% PLTMax® were thawed and divided into 3 culture conditions for further expansion. Cells cultured in NutriStem® MSC Basal Medium + 5% PLTGold® outperformed cells cultured in Advanced MEM + 5% PLTGold® within 2 passages post-thaw (blue). The addition of 0.6% NutriStem® MSC Supplement further enhanced the cells' proliferation and expansion rate, generating a 70-fold or 7,000% increase in cell number from the Advanced MEM cultures after only 4 passages post-thaw (green).

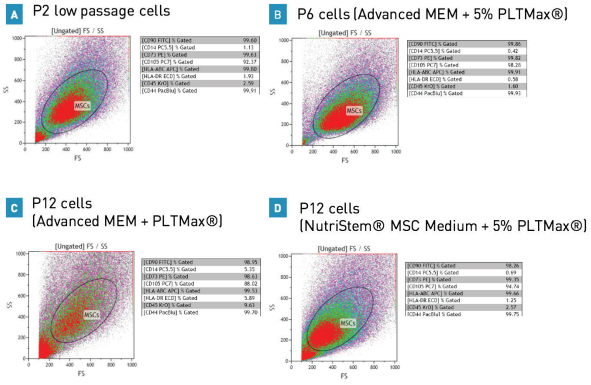

Figure 5. Cells cultured in NutriStem® MSC Basal Medium + NutriStem® MSC Supplement + 5% PLTMax® maintain normal MSC marker expression, similar to low passage MSCs. A) Representative early passage cells. B) Starting cell population for expansion, cultured to this point in Advanced MEM + 5% PLTMax®. C) Cells at P12 after continued expansion in Advanced MEM + 5% PLTMax®. D) Cells at P12 after further expansion in NutriStem® MSC Basal Medium + 0.6% NutriStem® MSC Supplement + 5% PLTMax®. Cells maintained in NutriStem® MSC Medium + Supplement + PLTMax® (D) maintained very high expression of the MSC markers CD90, CD73, CD105, CD44, and HLA-ABC. Notably, these cells also maintained true negative marker expression for CD14, HLA-DR, and CD45, while other cells start to lose this definition when expanded in long-term culture, as seen when the same cells are cultured in Advanced MEM + PLTMax® (C).

NutriStem® MSC Medium supplemented with PLTMax® or PLTGold® is an optimal culture system for expanding MSCs for clinical applications.

PLTMax® Human Platelet Lysate

- Superior alternative to FBS
- Enhanced genetic stability in MSC cultures**
- Faster cell growth kinetics
- Used in over 30 clinical trials worldwide

PLTGold® Human Platelet Lysate

- Promotes rapid and healthy cell expansion
- No animal components; xeno-free
- Non-fractionated, non-depleted
- No heparin or anticoagulants needed

NutriStem® MSC Medium

- Serum-free, xeno-free, defined medium
- Manufactured under cGMP
- In vitro diagnostic medical device (IVD)
- Drug master file (DMF) available

**Refernece: Crespo-Diaz, Ruben et al. (2011) Cell Transplantation. (20)6:797-811.

Ordering Information

Product Name	Grade	Cat. #	Qty.*
PLTMax® Human Platelet Lysate	Research	PLTMAX100R	100 mL
PLTMax® Human Platelet Lysate	GMP, Clinical	PLTMAX100GMP	100 mL
PLTGold® Human Platelet Lysate	Research	PLTGOLD100R	100 mL
PLTGold® Human Platelet Lysate	GMP, Clinical	PLTGOLD100GMP	100 mL
NutriStem® MSC Medium	GMP, Clinical	05-200-1A-KT	500 mL

* Additional sizes and/or customization available upon request.

How to Order

Biological Industries USA | T. 860.316.2702 F. 860.269.0596 | orders@bioindusa.com

BI Biological Industries *Culture of Excellence*

MSC data was generated by Vanesa Alonso-Camino, Scientist at Mill Creek Life Sciences. We thank our colleagues at Mill Creek for their insight, expertise, and support through our ongoing collaboration.