HUMAN PLATELET LYSATE VS. HUMAN SERUM FOR CELL THERAPY

	HUMAN PLATELET LYSATE	HUMAN SERUM
Composition	• Gained out of thrombocyte concentrates • Contains abundant amount of cell expansion promoting GF • Fibrinogens can be removed • Production: Many platelet units from licensed blood centres & donors – less variability because of pooling	• Out of whole blood or plasma • Contains less GF than HPL • GF containing platelets are removed • Does not contain fibrinogens • Less donors than for Human Platelet Lysate – higher variations
Proliferation of stem cells	• HPL outperforms HS for the culture of human macrophages and MSCs • Higher proliferation rates • Maintains phenotype and differentin potential	• In few studies improved cell growth compared to animal sera • In thers supressed cell growth • Limited growth of MSCs with allogeneic serum • Does not maintain the phenotype of cells
Application for cell therapy	• Can be produced in a standardized and GMP way • Process is certified and quality is homogenous as well as batch tests • Is suitable for the production of cell therapies • Reproducible results	• Limited growth of Mesenchymal Stem Cells • Does not maintainan the phenotype of cells
Price for 100ml	• Between 250€ and 590€ depending on the product variation and resulting production steps (fibrinogen depletion, virus inactivation or GMP)	• Between 140€ and 420€ depending on the product production process and the product variation (Male AB serum, filtrated, heat inactivated or GMP)
Product variations	• EU or US origin • GMP-grade manufacturing • Fibrinogen-depleted • Virus inactivated (gamma irratiated) • Mycoplasma and virus tested	• EU or US origin • Virus tested • Mycoplasma tested • Heat inactivated • GMP

GF: Growth-factors

HUMAN PLATELET LYSATE VS. HUMAN SERUM FOR CELL THERAPY

Proliferation of stem cells

HUMAN PLATELET LYSATE

- HPL outperforms HS for the culture of human macrophages and MSCs
- Higher proliferation rates - high amount of cells
- Faster results
- Maintains phenotype and differentin potential

PUBLICATION

“We demonstrate that **human platelet lysate (hPL) can replace hS** in macrophage cultivation and appears to be the **best option for** co-cultivation of **human macrophages with hMSCs**. In contrast to FCS and hS, **hPL maintained the phenotype** of both cell types, comparable to that of their respective standard culture serum, as well as the percentage of each cell population. Moreover, the expression profile and phagocytosis activity of macrophages was similar to hS.“

“Platelet lysate outperforms FCS and human serum for co-culture of primary human macrophages and hMSCs”, Tylek T., Schilling T., Scheleglmilch K., March 2019, Scientific Reports 9, article number: 3533, Internet: https://www.nature.com/articles/s41598-019-40190-9 (28.10.21)

HUMAN PLATELET LYSATE VS. HUMAN SERUM FOR CELL THERAPY

Proliferation of stem cells

HUMAN SERUM	PUBLICATION
✗ In few studies improved cell growth compared to animal sera	"Some authors have **proposed the use of human serum (HS)** of both autologous and allogeneic origin [26–33], **although studies have reported limited growth of MSCs** cultured with allogeneic serum [18, 31]" (1)
✗ Supressed cell growth was observed	"[...] as an alternative to animal serum for cell proliferation, autoserum and allogeneic human serum have been investigated. On the one hand, **few studies have reported that human serum improved cell growth**, and on the other hand, some studies showed that **it suppressed cell growth** [33]."(3)
✗ Limited growth of MSCs with allogeneic serum	
✗ Does not maintain the phenotype of cells	

(1) "Comparison of human platelet lysate alternatives using expired and freshly isolated platelet concentrates for adipose-derived stromal cell expansion", Dessels C., Durandt C., Pepper M.S., March (2018), Platelets Vol.30, Internet: https://www.tandfonline.com/doi/full/10.1080/09537104.2018.1445840 (28.10.21)

(3) "Differences between the Proliferative Effects of Human Platelet Lysate and Fetal Bovine Serum on Human Adipose-Derived Stem Cell" Kakudo N., Morimoto N., Ma Y., 2019, Cells: doi: 10.3390, PMC6829610, Internet: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6829610/ (28.10.21)

HUMAN PLATELET LYSATE VS. HUMAN SERUM FOR CELL THERAPY

Application for cell therapy

HUMAN PLATELET LYSATE	PUBLICATION
✓ Can be produced in a standardized and GMP way ✓ Process is certified and quality is homogenous as well as batch tests ✓ Is suitable for the production of cell therapies ✓ Reproducible results	“[...]hPL has grown as a **viable regulatory-compliant alternative** for the supplementation of **MSC expansion**. Beyond the established effects on cell growth, previous studies have shown **that hPL contains a series of bioactive molecules**, which include **growth factors, chemokines and adhesion molecules** (reviewed by Burnouf et al. [53]), that can “prime” MSCs to acquire an immunomodulatory phenotype [...].“ (13)

"Regulatory-compliant conditions during cell product manufacturing enhance in vitro immunomodulatory properties of infrapatellar fat pad-derived mesenchymal stem/stromal cells." Kouroupis D, Bowles AC, Greif DN, et al. (2020). Cytotherapy.

HUMAN PLATELET LYSATE VS. HUMAN SERUM FOR CELL THERAPY

Application for cell therapy

HUMAN SERUM	PUBLICATION
✗ Limited growth of Mesenchymal Stem Cells ✗ Does not maintainan the phenotype of cells ✗ Difficulty in collection and processing ✗ Difference in quality of autoserum from patient to patient	“While HS of autologous origin may be ideal to avoid potential immune cross-reactions, its use is **limited by difficulties associated with the quality control** of individual sera and the **limited availability** of **large quantities** required for clinical applications [25].”

“Comparison of human platelet lysate alternatives using expired and freshly isolated platelet concentrates for adipose-derived stromal cell expansion”, Dessels C., Durandt C., Pepper M.S., March (2018), Platelets Vol.30, Internet: https://www.tandfonline.com/doi/full/10.1080/09537104.2018.1445840 (28.10.21)