

*“The greatest experiments  
have always been the  
most humane”*

W. Russell e R. Burch The Principles of Humane  
Experimental Technique, 1959

metatissue

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**hPLMA**  
*Methacryloyl Platelet Lysates*

Hi! We are  
Metatissue

### Human-like Microenvironments

Hi! We are Metatissue and we are focused on designing and manufacturing human protein-based products that find application in cell culture, disease modelling, tissue engineering and regeneration.

### hPLMA Methacryloyl Platelet Lysates

hPLMA represents an innovation cell culture platform derived from human platelet lysates, offering a highly relevant microenvironment that promotes robust cellular growth and proliferation.



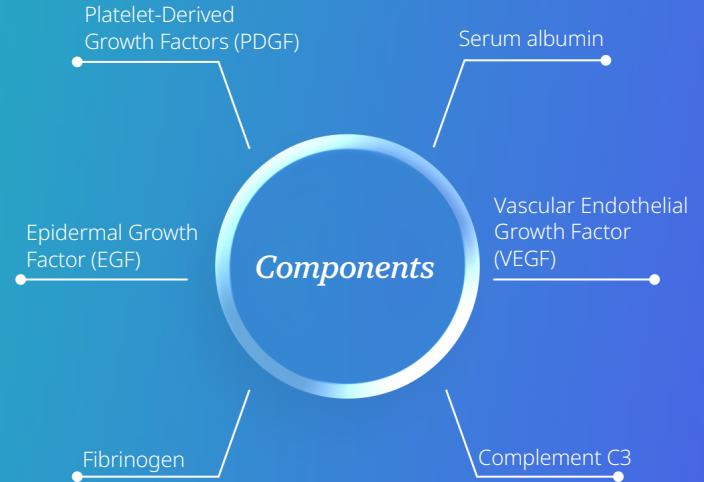
# hPLMA

Componentes

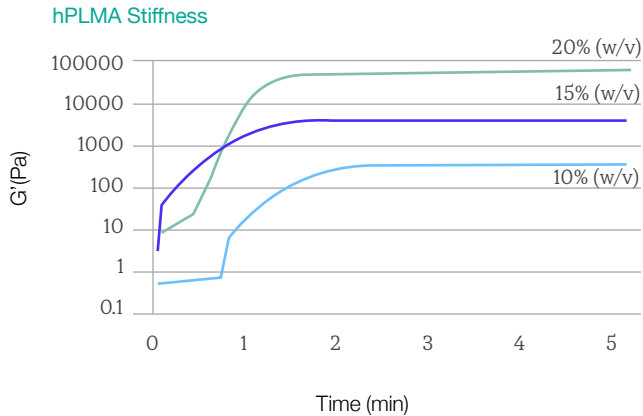


## Specifications Specifications

- > White to light yellow powder
- > Controlled degree of methacrylation
- > Low endotoxin
- > Sterile (bacteria, fungi and mycoplasma)
- > Supports in vitro maintenance of adherent cultured cells



# 3D Cell Culture

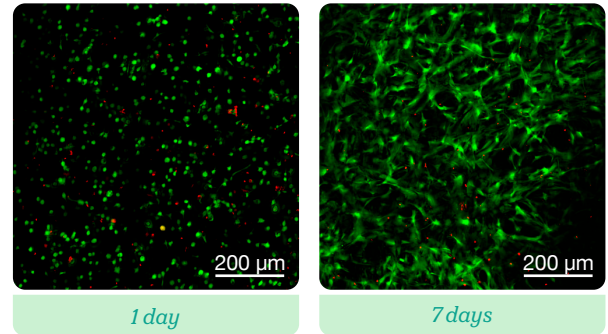


## Mechanically Tunable

hPLMA has tunable mechanical properties that can be modified by altering the polymer concentration in the precursor solution, allowing for the simulation of varying tissue stiffness.

## Cell Encapsulation in Hydrogels

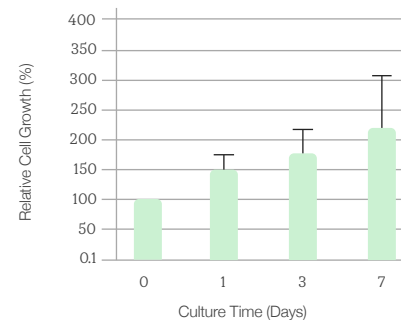
hPLMA 15% (w/v)



Live/Dead staining of Human adipose-derived stem cells

## Cell Viability and Proliferation

hPLMA 15% (w/v)



Encapsulated human adipose stem cells maintain their viability for the least 7 days and are able to proliferate inside the hydrogels.

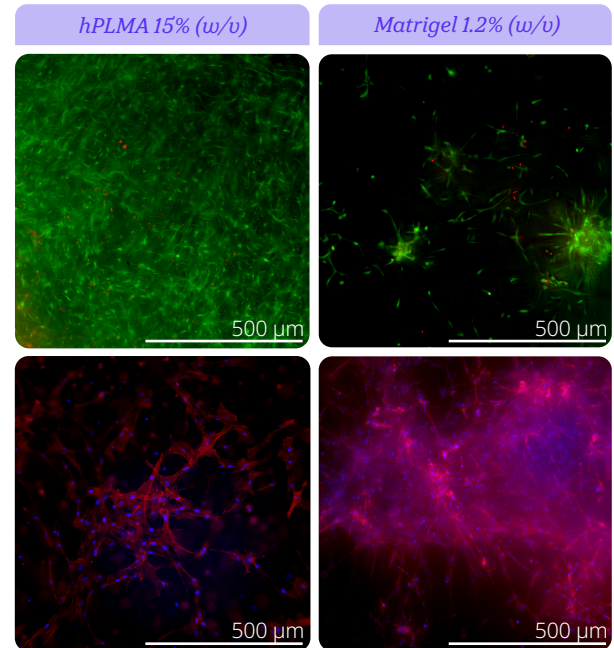
# hPLMA

## Advantages of hPLMA compared to BME Matrices

Properties	hPLMA	BME
human origin	✓	✗
high viability, cell growth and proliferation	✓	✓
low immunogenicity	✓	✗
even cell distribution in hydrogels	✓	✗
stability for 30 days in cell culture conditions	✓	✗
simple to prepare and thermally stable	✓	✗
tunable mechanical properties	✓	✗
potential clinical applications	✓	✗



for 10 ml of **BME** 3 mice are sacrificed, while **hPLMA** has an ethical origin.



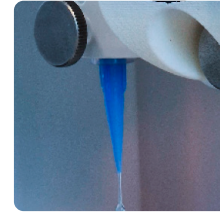
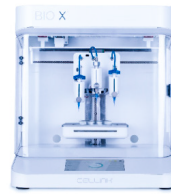
Fluorescence images of hASC in hPLMA, compared to clustered and dying cells in Matrigel at 7 days of culture [(a./b. live cells (green)), dead cells (red); c./d. actin filaments (red), nucleus (blue)].

# Bioinks

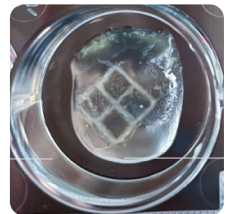
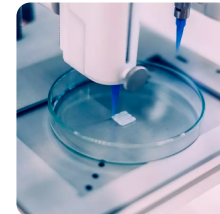
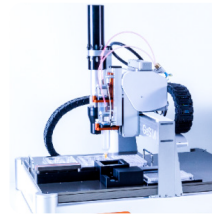
## *hPLMA*

hPLMA can be used as an ink for bioprinting in different printing techniques, such as extrusion or DLP. It can also be added to ink formulations as complement for a human touch.

### *hPLMA ink for extrusion 3D printing*

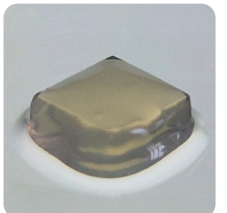
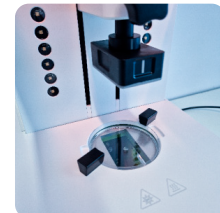


### *hPLMA ink for extrusion 3D printing with a supporting bath (FRESH)\**



\*DOI: 10.1002/smtl.202400857

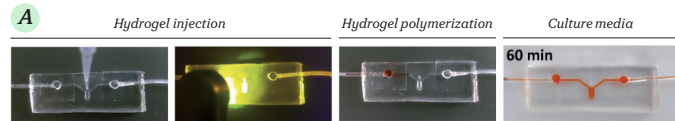
### *hPLMA ink for DLP 3D printing*



# Organ-on-a-Chip

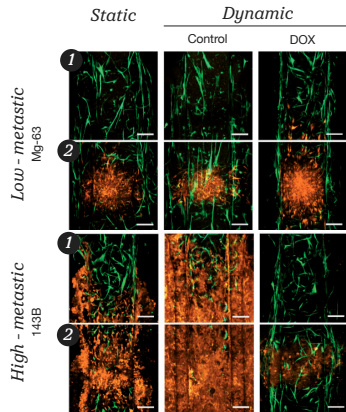
## *hPLMA in organ-on-a-chip*

Designed for interaction into Organ-on-a-Chip platforms, hPLMA hydrogels offer exceptional stability over time, more than 30 days, supporting prolonged cell culture and functional tissue modeling.



Validation of hPLMA hydrogel's ability to support tumour and stromal cell organization and direction in 3D co-culture model.

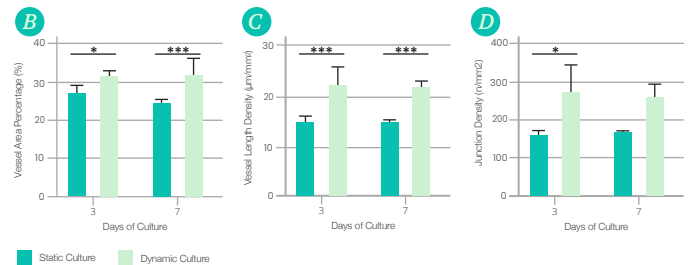
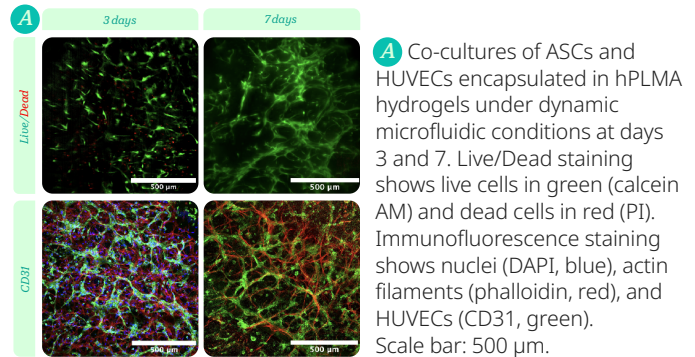
**A** Injection of hPLMA solution into microfluidic devices with photopolymerization.



**B** Comparison of tumor model behavior in static and dynamic conditions, without and with, doxorubicin (DOX) treatment. Scale bar: 200  $\mu$ m.

\*DOI: 10.1002/adfm.2023159470

## *Vascular network formation in ASC/HUVEC co-cultures within hPLMA hydrogels under dynamic microfluidic conditions.*

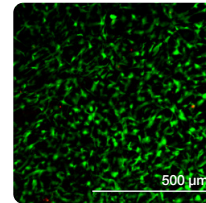


**B C D** Quantification of vessel area, vessel length density, and junction density under static and dynamic conditions. Data are mean  $\pm$  SD (\* $p$  < 0.05, \*\*\* $p$  < 0.001).

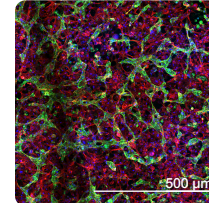
# Validated Human Cells

## *Cell encapsulation*

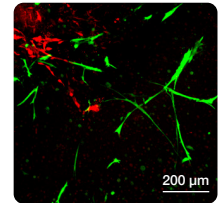
### *Cell encapsulation*



Human Adipose Stem Cells (hASC)

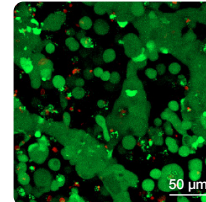


hASC + Human Umbilical Vein Endothelial (HUVECs)

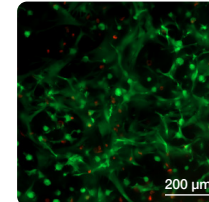


Bone Marrow-Mesenchymal Stem Cells (hBM-MSC)

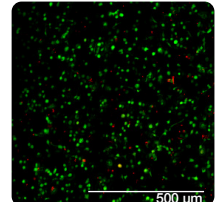
### *Cell encapsulation*



Human induced Pluripotent Stem Cells (hiPSC)-derived Cardiomyocytes (hiPSC-CMs)

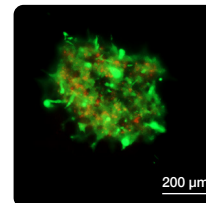


Human Bladder Smooth Muscle Cells (hSMC)

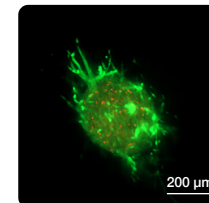


CnT Bladder Epithelium Progenitors (hBlak)

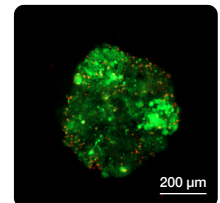
### *Spheroids encapsulation*



Human osteosarcoma cell line (SaOS-2)



Human osteosarcoma cell line (MG-63)



Adenocarcinomic human alveolar basal epithelial cells (A549)