HCS Pharma

Bridging the gap between *in vitro* & *in vivo*: 3D cell culture considering the extracellular matrix

Thursday, June 6th 2023

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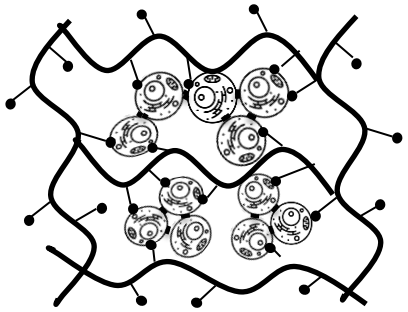
PROBLEM & SOLUTION IN CANCER RESEARCH

HEALTHY TISSUE

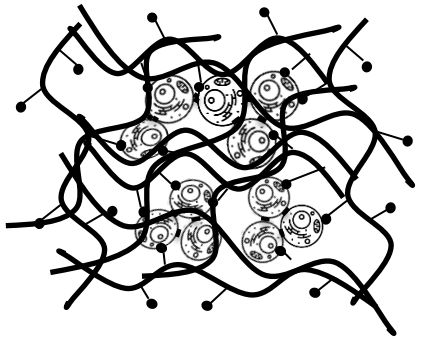


Cells embedded in healthy ECM

Lesion

ECM changes

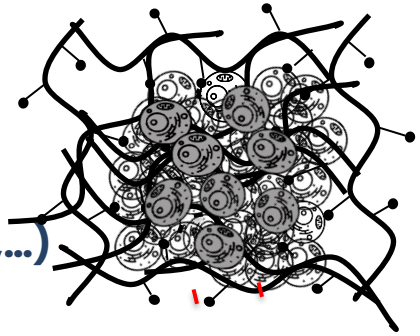
FIBROTIC, DESMOPLASTIC TISSUE



ECM-related stress on cells

Modifications of cell behavior (proliferation,...)

CANCEROUS TISSUE



Cancerous tissue

Problem

CURRENT *IN VITRO* MODELS do not reproduce the *in vivo* tumoral microenvironment, in particular the ECM.

Solution

To properly reproduce cancer pathophysiology, the cancerous ECM should be taken into account (composition, stiffness) in addition to the cells.

BIOMIMESYS® hydroscaffold for 3D cell culture

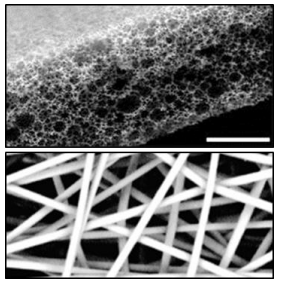
Hydrogels

Biohydric properties,
Cell-matrix interactions

Encapsulated cells
Pathological or non-physiological origin

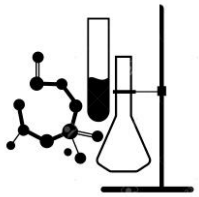
Solid Scaffolds

Porosity,
Structural maintenance



Non-physiological

Hydroscaffold™



Hyaluronic Acid (HA grafted with Adhesic proteins
+
Structural proteins (Collagens …)
+
Peptidic based Cross-linker

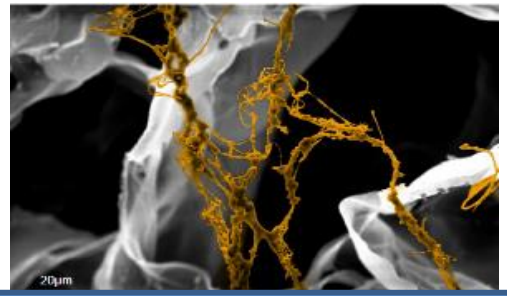
Hydrogel

HCS Pharma's Patented Process

100% animal-free components

BioMIMESYS®

Interpenetrated network HA/collagens



Long-term rigid & stable Hydroscaffold™

From 100 Pa to 16 kPa pre-defined elastic modulus (stiffness)

Porosity 100µm

BIOMIMESYS® 3D cell culture & cancer research

By organ/tissue

BioMIMESYS® Brain

HA + RGDS + collagen IV + cationic polymer
E = 0.1 kPa

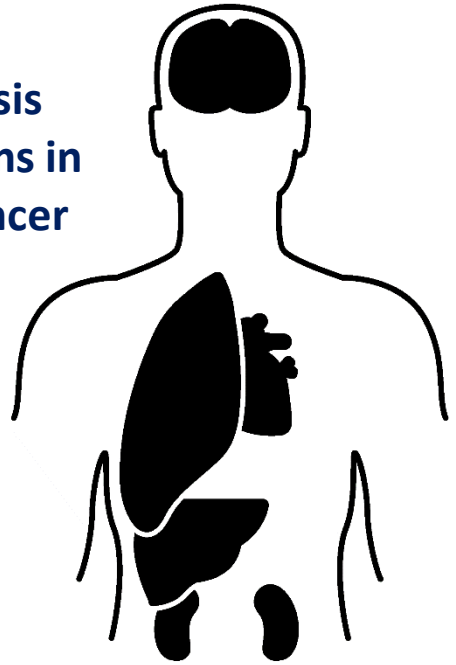
BioMIMESYS® Liver

HA + RGDS + Galactose + Collagen I & IV
E = 0.6 kPa

BioMIMESYS® Adipose Tissue

HA + RGDS + Collagen I & VI
E = 0.5 kPa

Metastasis mechanisms in breast cancer



***+ in vivo/in vitro* correlation**

By pathology

BioMIMESYS® Oncology (generic)

HA + Collagen I
E = 1, 8, 16 kPa

- **Cancer cell behaviour depending on ECM composition & stiffness**
- **Lung cancer responses to targeted therapies**

To know more, come to see poster #7!

Conclusions

- **BIOMIMESYS® 3D system reproduces the ECM, being composed of well-controlled, animal-free components.**

- **Reproducing the stiffness & composition of healthy or diseased tissues in an organ-specific way, it allows a better *in vivo/in vitro* correlation, for a higher predictability of *in vitro* models and efficient drugs.**