

XXVII.
**Balkan Clinical Laboratory
Federation Meeting**
BCLF 2019

XXX.
**National Congress of the
Turkish Biochemical Society**
TBS 2019

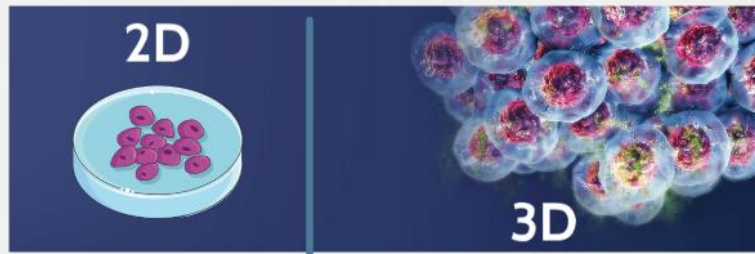


3D Placental Barrier Models: A Novel Cryogel Based Method

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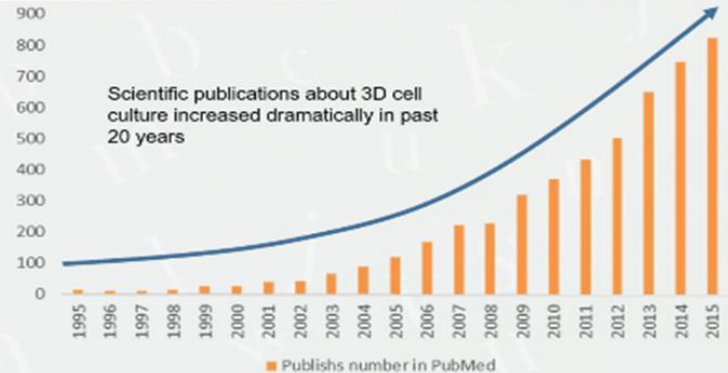
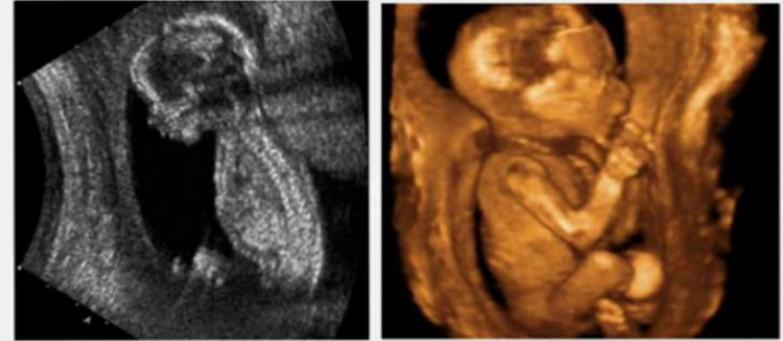


	2D	3D
Interaction	Cell-Cell	Cell-Cell-ECM
Cell shape	Straight, tense-adherent	Spheroid-Matrix
Gradient	Homogeneous	Heterogeneous
Co-culture ability	↓	↑
Drug resistance	↓	↑
ECM	Surface coating, -	Cells secrete themselves

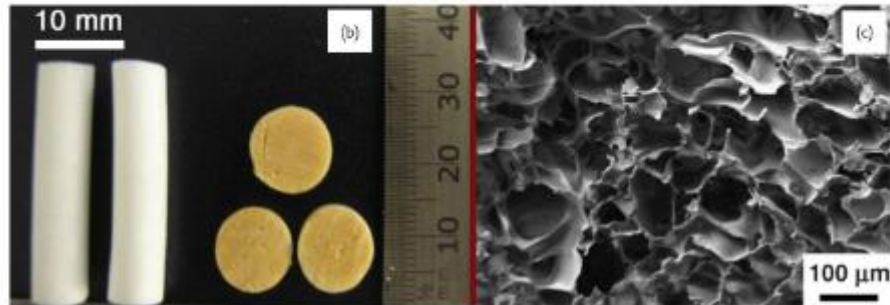
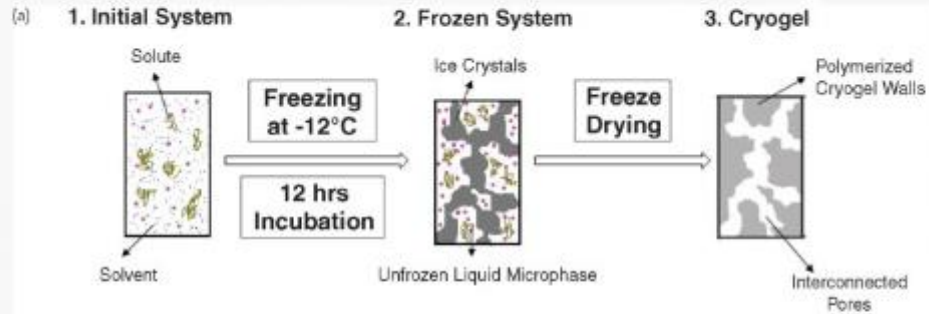
Aim

By using cryogels which have 3D pore structure and biocompatible property, ECM support will be provided and the system will represent *in vivo* better.

2 Dimension *VS* 3 Dimension



Cryogels



- Cryogel scaffolds are manufactured from natural or synthetic polymers using a technology at a temperature below zero, without the use of organic solvents.
- Cryogels are supply biocompatible property, ECM support and will represent in vivo better.

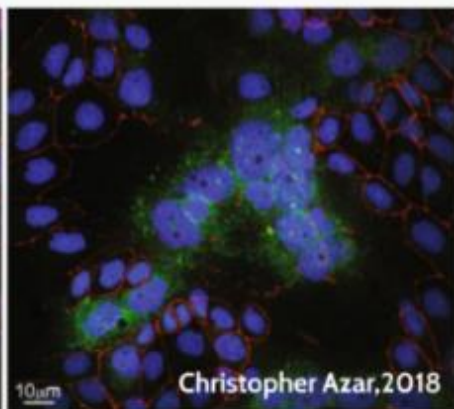
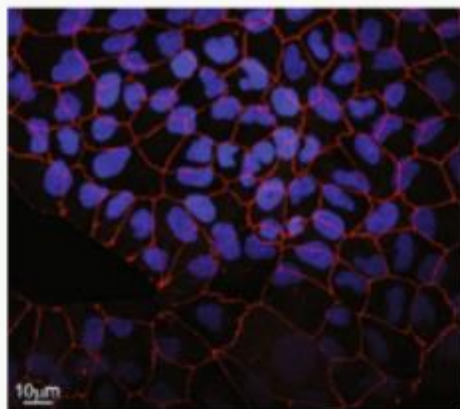
In vitro studies, the BeWo cell line;

Human placental cells have common morphological properties and similar biochemical markers with third trimester cytotrophoblasts.

BeWo

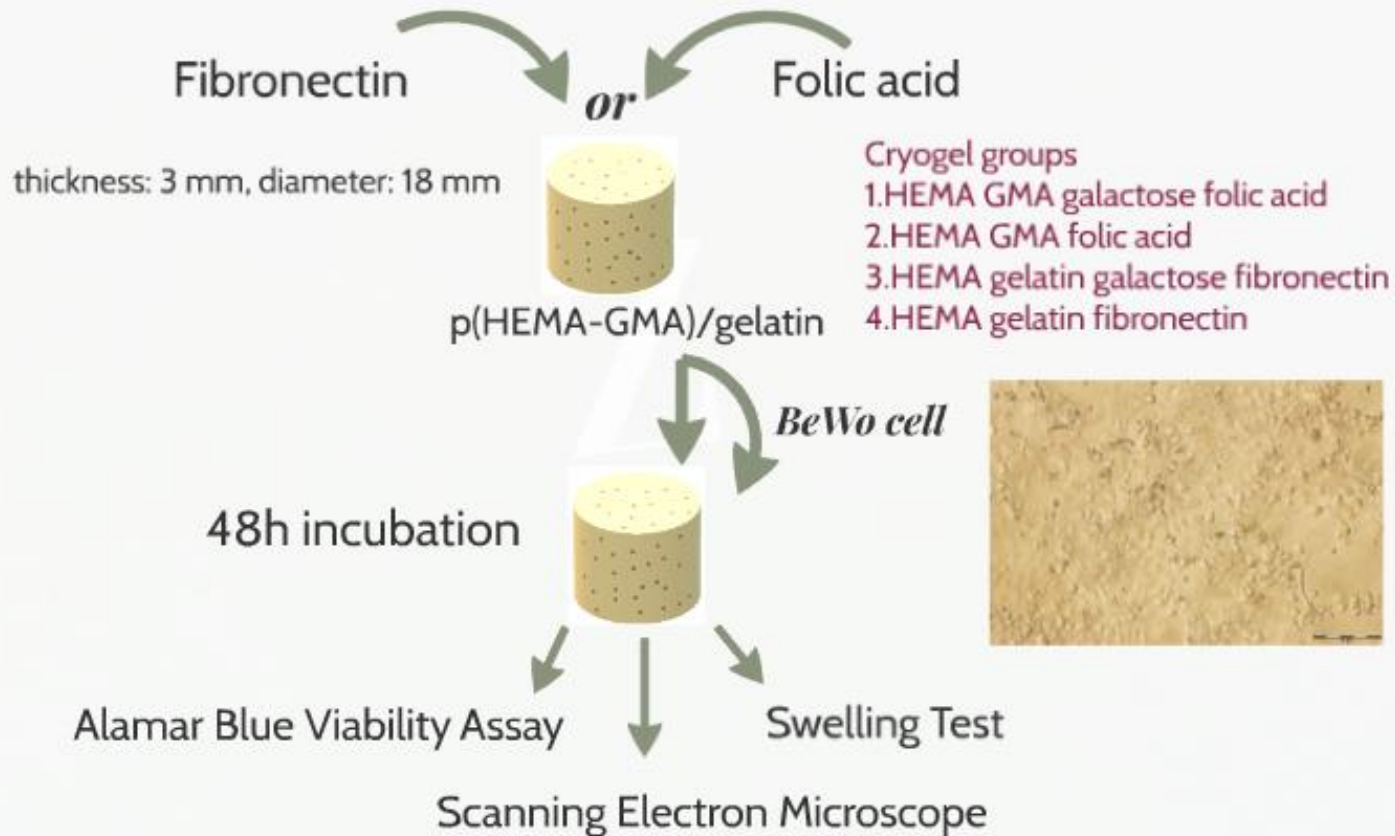


Syncytiotrophoblast

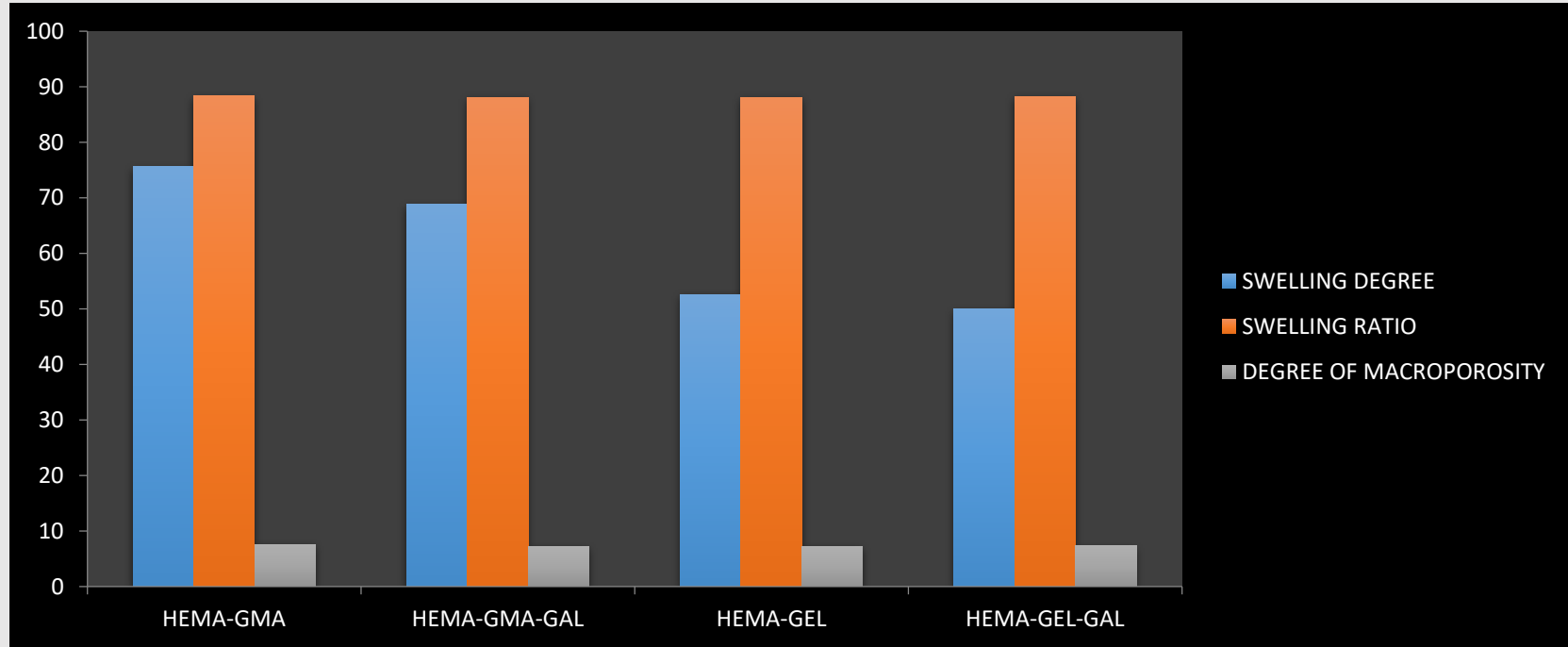


DAPI
ZO-1
hCG

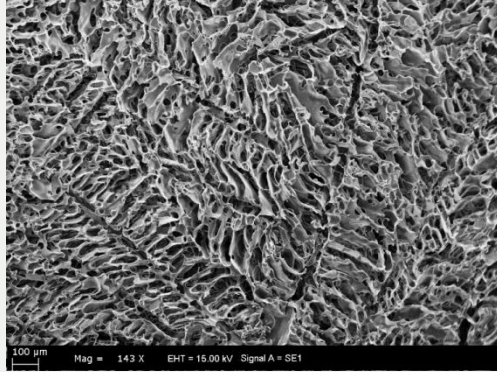
Materials and Methods



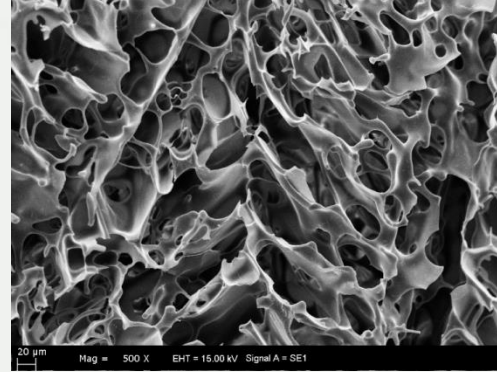
Characterisation of Cryogels (Swelling Test)



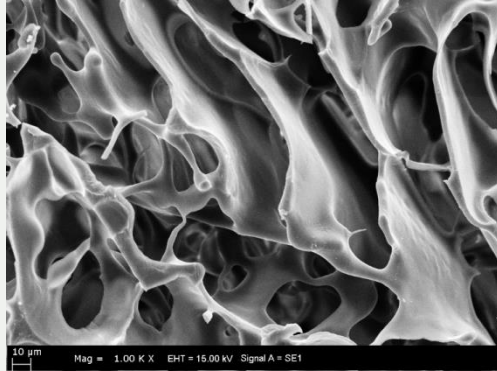
SEM Images



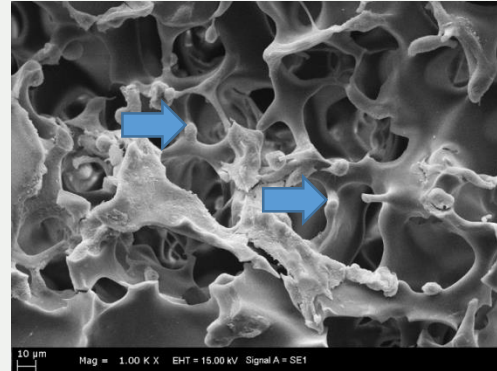
143X, bar 100 μm



500X, bar 10 μm

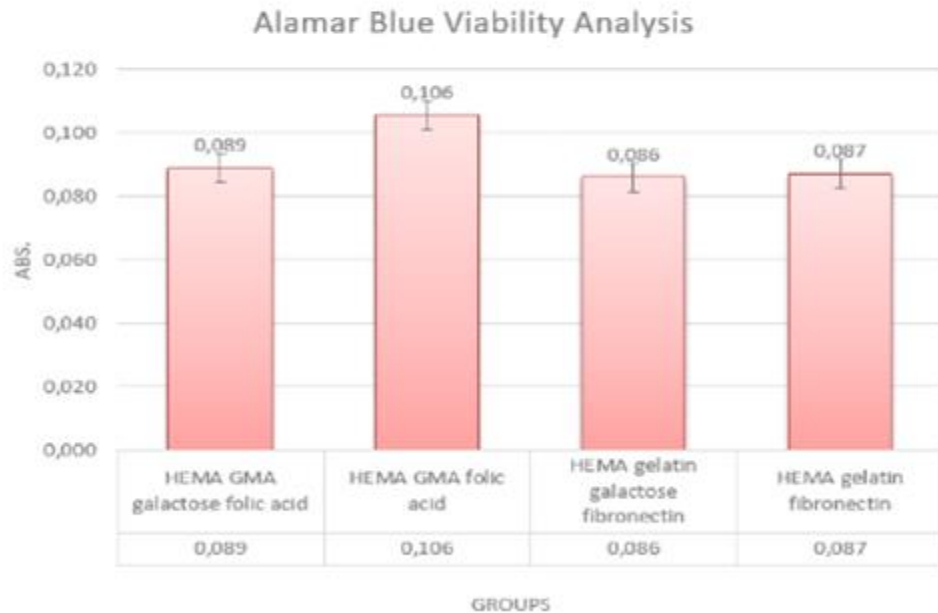


1000X, bar 20 μm



1000X, bar 10 μm
24 h view of cultivation of cells

Results



1. Among the cryogel groups, PHEMA folic acid group had the highest cell viability.

2. Cell viability was lower in galactose-bound cryogel groups than in galactose-free groups.

CONCLUSION

Novel 3D cryogel-cell placental model:

- Ⓢ May be a convenient approach for studying the placental transport mechanisms.
- Ⓢ A useful platform for newly developed and mandatory drug screening used in pregnancy *in vitro*.
- Ⓢ Xenobiotics: cosmetics, cleaning products, food additives and nanoparticles.
- Ⓢ Will reflect the *in vivo* more precisely.

Our project has been approved by TUBITAK, August 2019 (No:119S511)

LITERATURE

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Thank for Listening

