

# ORGANTRANS

## Controlled Organoids Transplantation as Enabler for Regenerative Medicine Translation

[www.organtrans.eu](http://www.organtrans.eu)

# Liver disease

- 2 million deaths per year worldwide
- Liver transplantation is the only effective treatment for various diseases of the liver
- 10% of global transplantation needs are met
- Demand for livers is projected to increase by 23% in the next 20 years

## ORGANTRANS target conditions

- Patients with chronic end-stage liver diseases
- Patients with residual healthy tissues



Live cancer



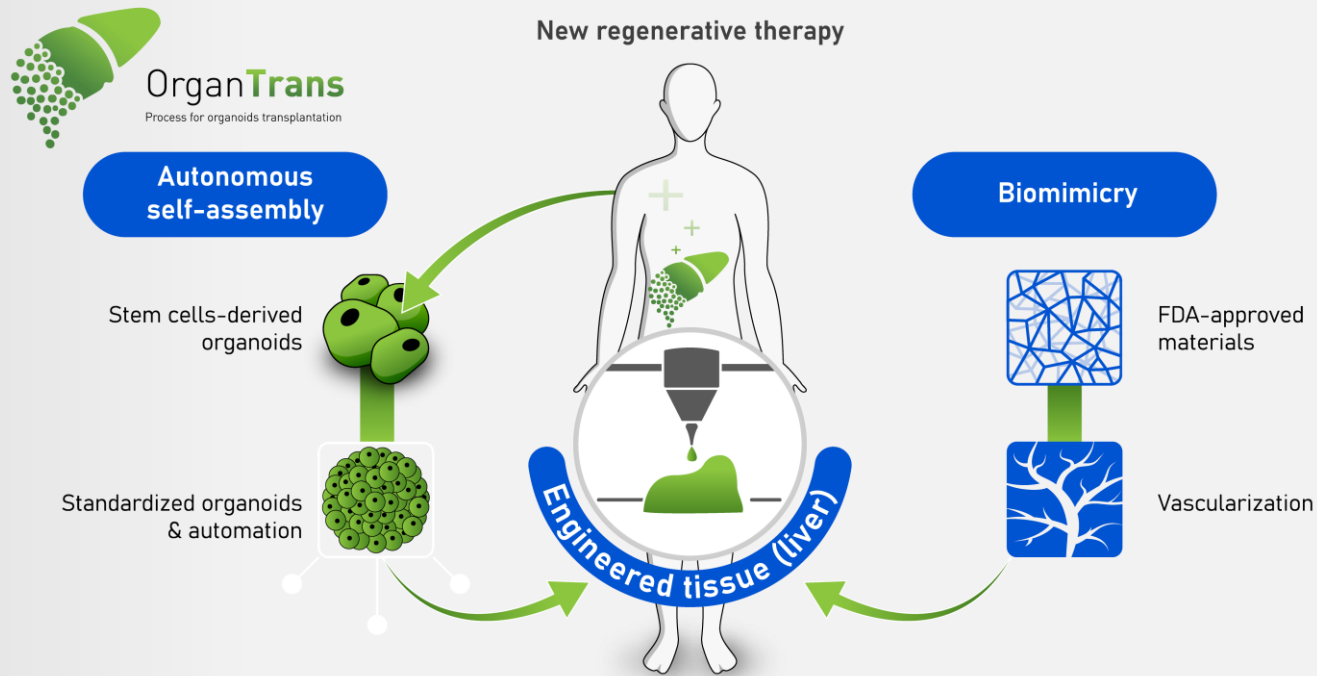
Cirrhosis



Fatty liver

# Overview

## DISRUPTIVE SOLUTION THAT ENABLES THE 3D PRINTING OF TISSUE-ENGINEERED CONSTRUCTS

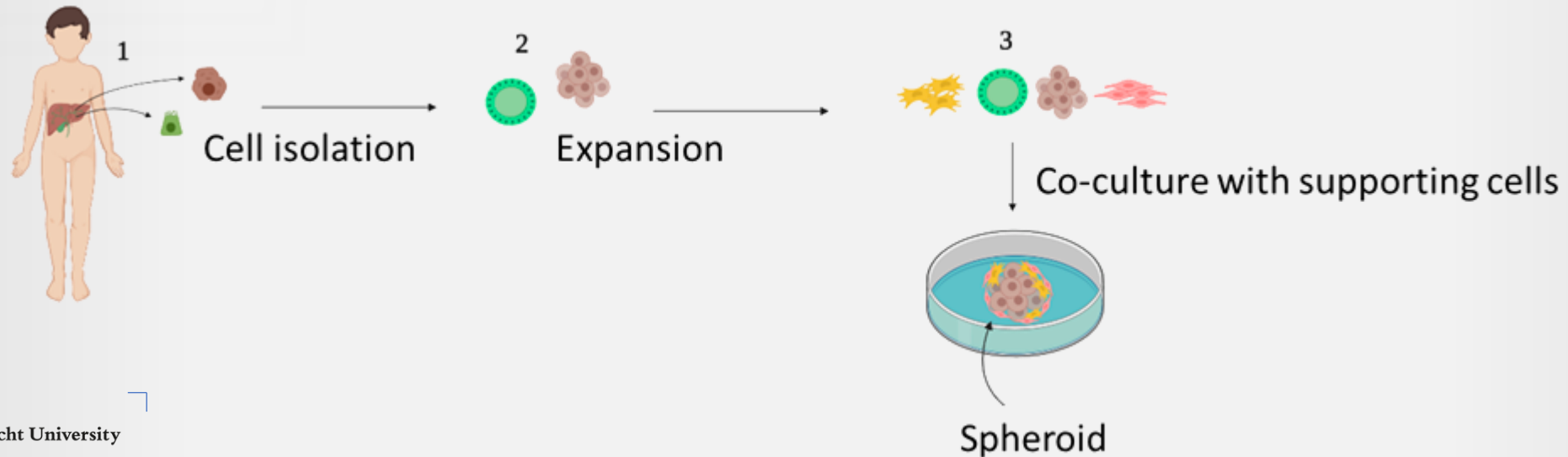


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1. Cell source
2. Spheroid production
3. Spheroid sorting
4. Materials
5. Vascularization
6. Biofabrication
7. Maturation of bioconstruct
8. In vitro & In vivo testing

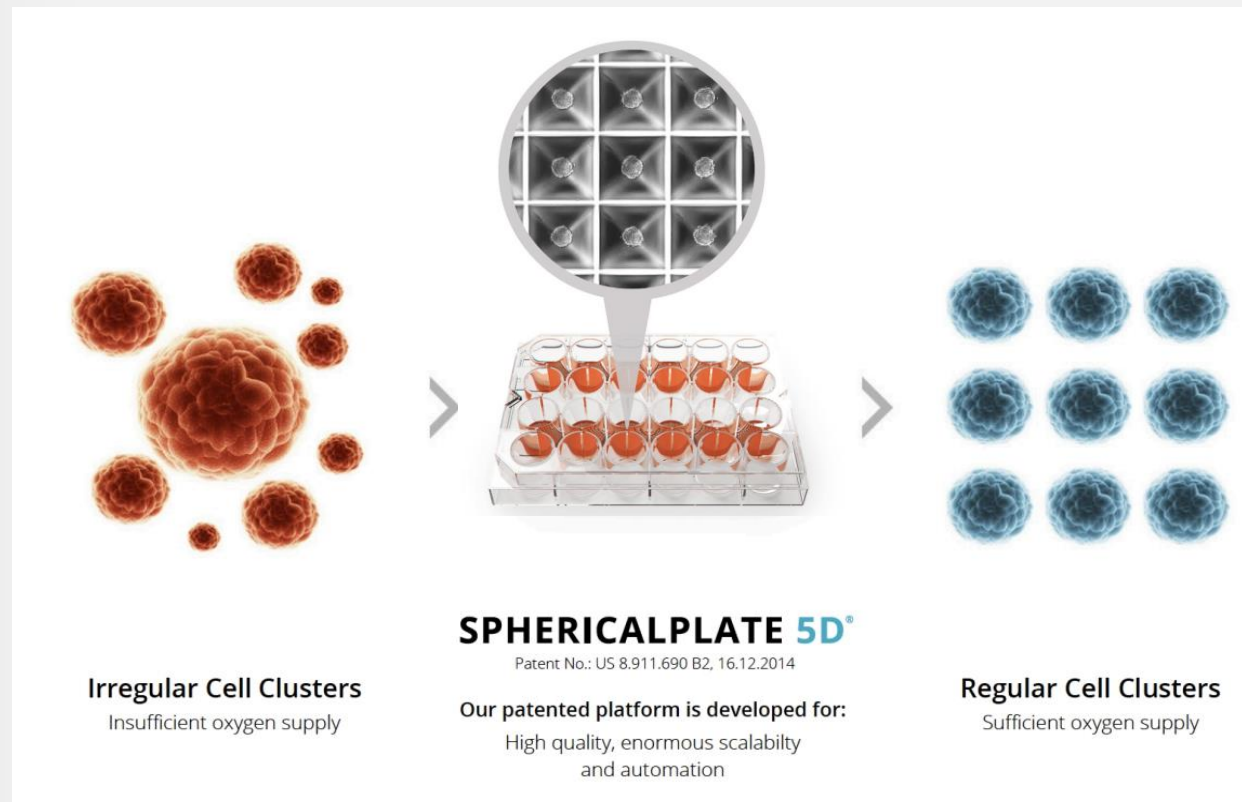
# 1. Cell source: adult stem cells

- Optimal cell ratio's of co-cultures
- Supporting cells composed of bone marrow mesenchymal stem cells and endothelial cells



## 2. Spheroid production using the SPHERICALPLATE 5D technology

- Self-assembling of hepatic (stem) cells into standardized spheroids
- Establishing Roadmap for technical cGMP implementation

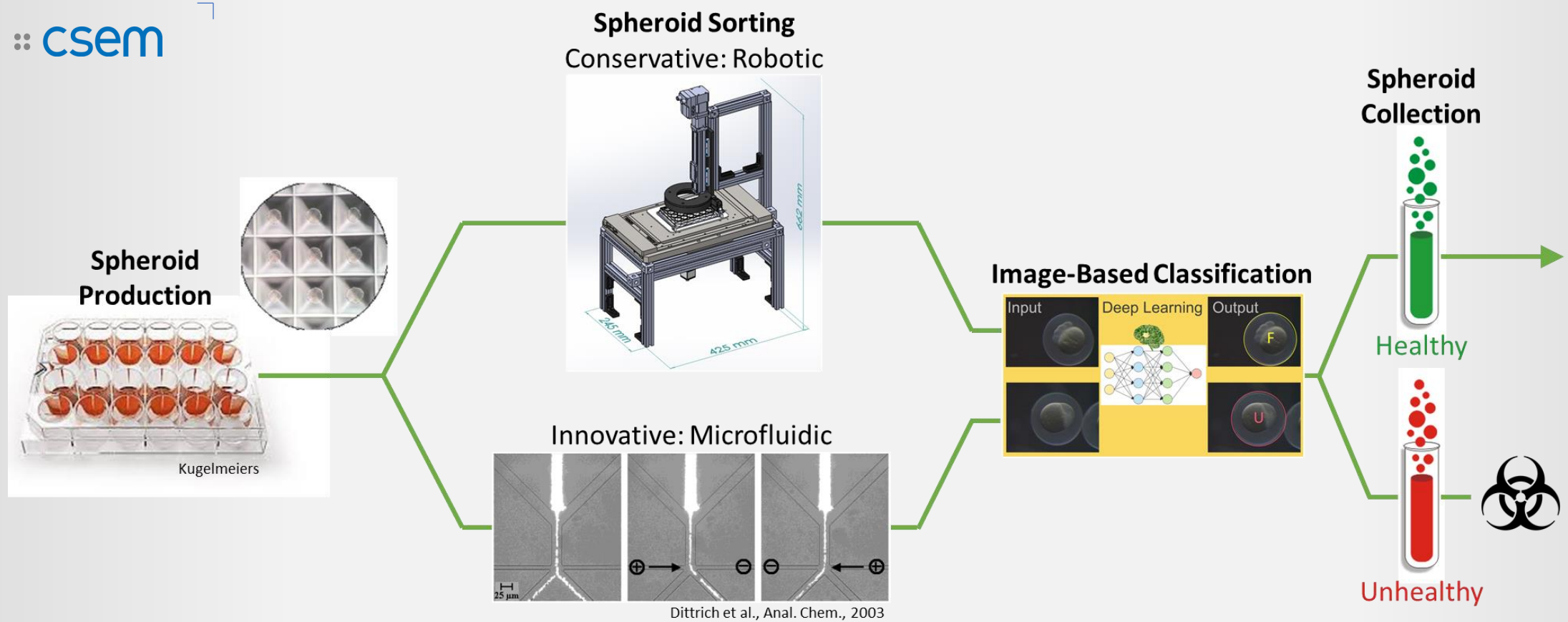


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# 3. Spheroid handling & quality control

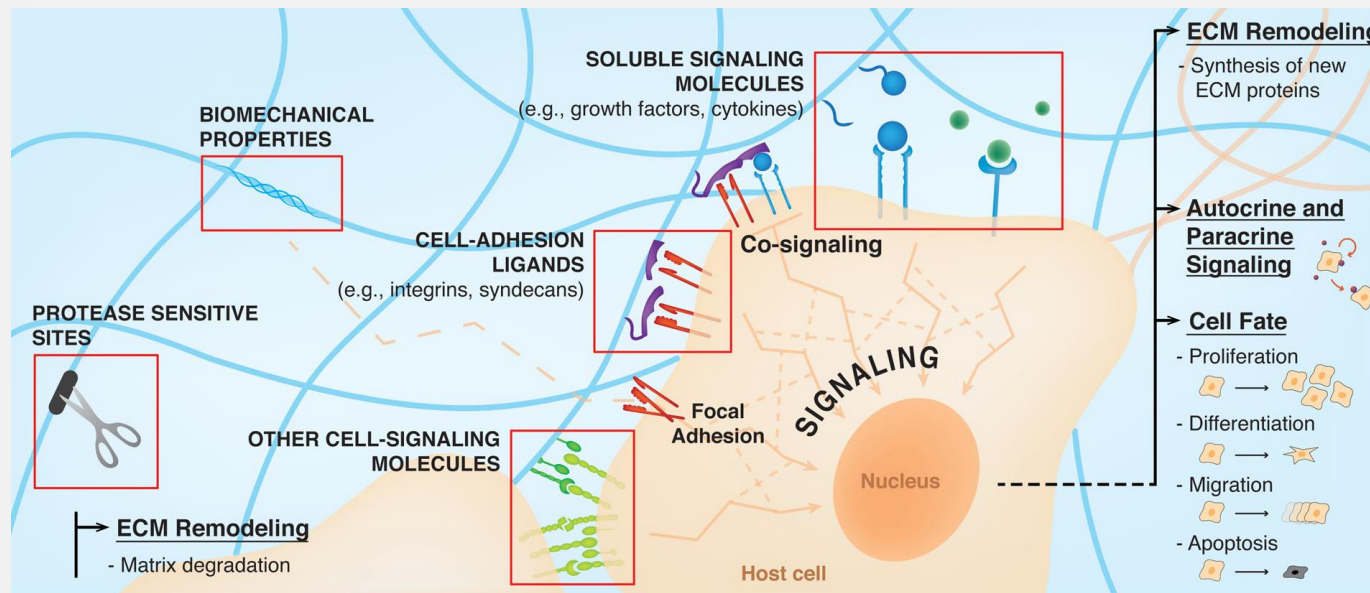
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# 4. Material based on synthetic 3D hydrogel

- ✓ **Biofunctional**
- ✓ **Custom architecture**
- ✓ **Tunable porosity**
- ✓ **Cell spheroid protection**
- ✓ **Printability**
- ✓ **Controlled degradation**
- ✓ **Tunable stiffness**
- ✓ **Vascularization**

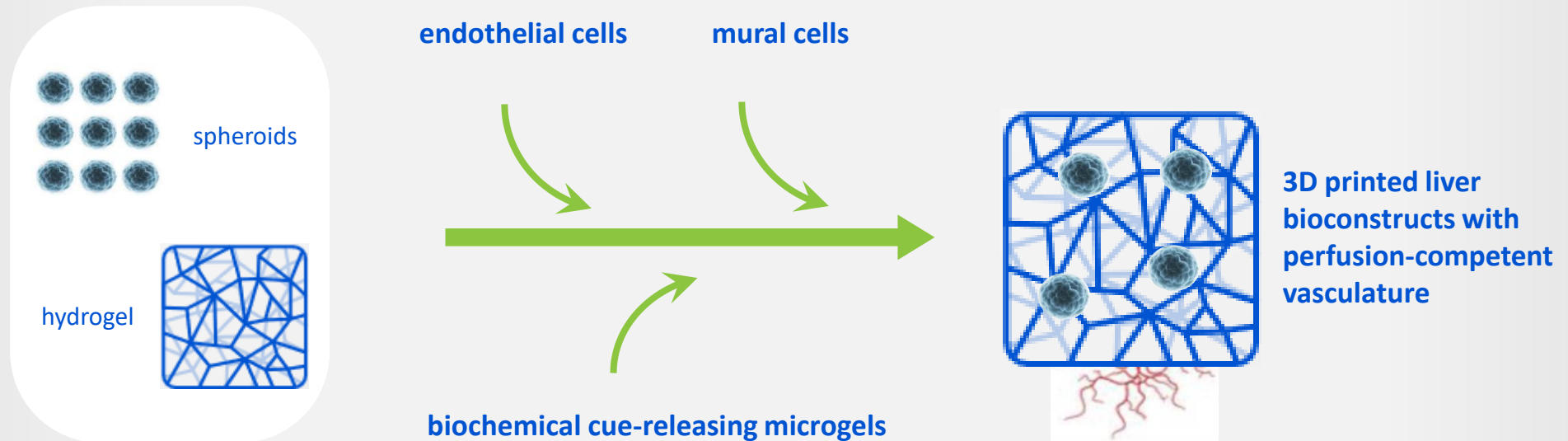


**DWI**  
Leibniz-Institute for  
Interactive Materials

Rice JJ\*, Martino MM\*, De Laporte L\*, Tortelli F\*, Briquez PS, Hubbell JA. Engineering the regenerative microenvironment with biomaterials. Adv Healthc Mater. 2013, 2: 57.

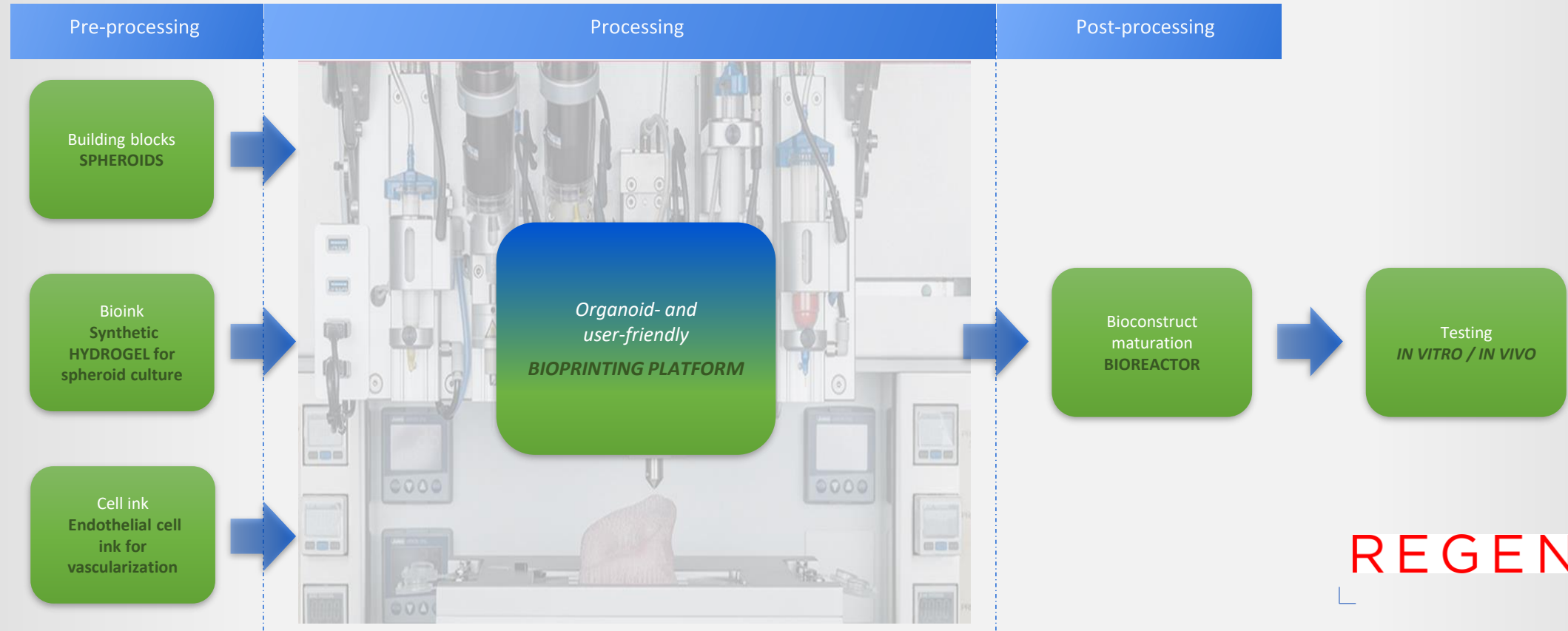
# 5. Vascularization

- Introduction of endothelial cells
- Vascular architecture





# 6. Biofabrication



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# 7. Bioreactor for tissue maturation

Physiological  
microenvironment



Integrated  
microfluidics  
for continuous  
perfusion

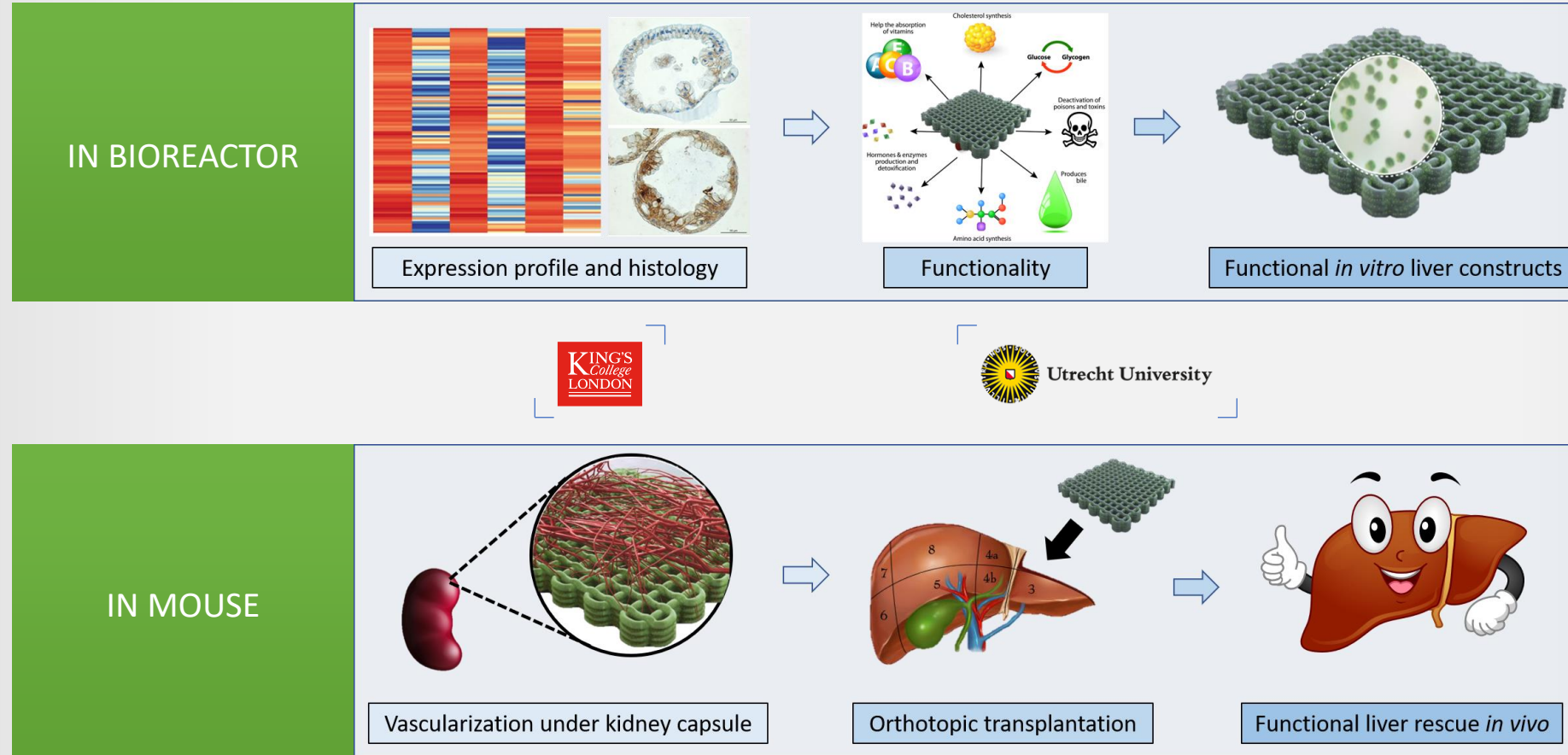


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Biomonitoring (optical oxygen sensing, etc)

# 8. In vitro & in vivo testing



# Contact



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# Thank you for your attention!



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