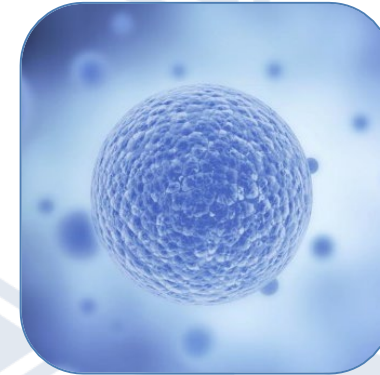


Biomedical Tissue Engineering Lab

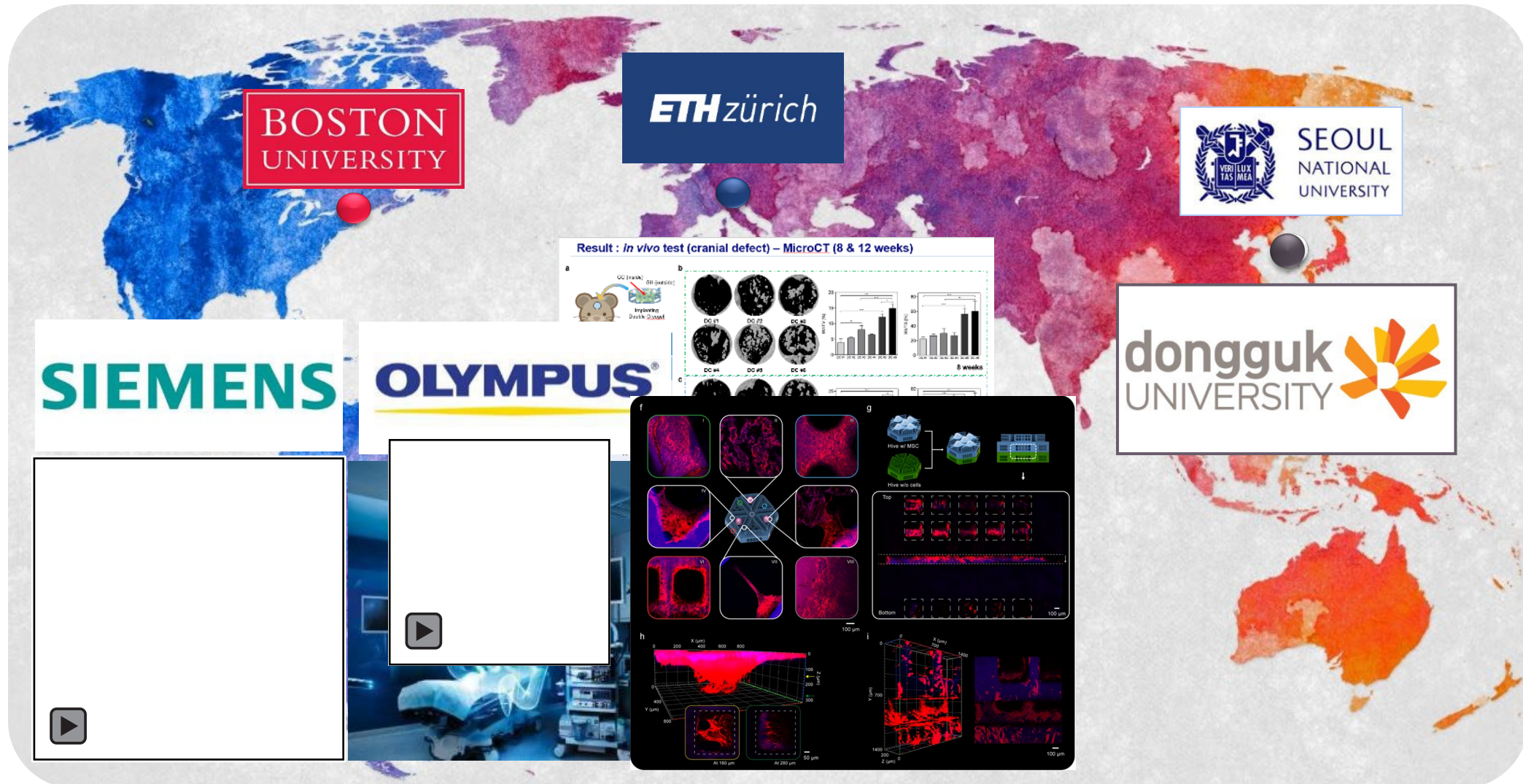
Seung Hun (Sean) Lee

Department of Biomedical Engineering
Dongguk University, Seoul, Korea

Korea-EU Horizon European Researcher Networking Forum - July 3rd, 2025



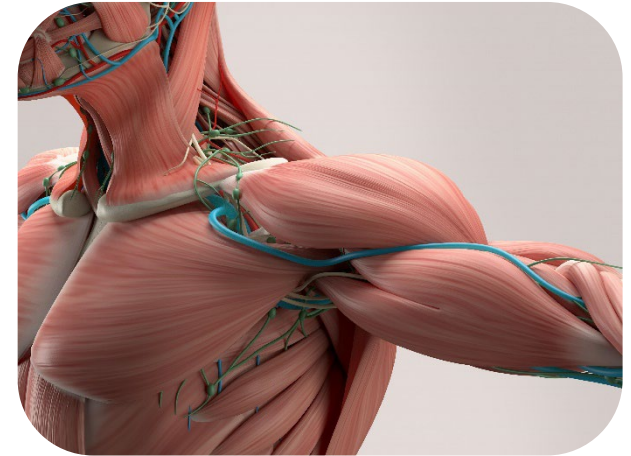
About Sean



Bone



**Tissue
Engineering**

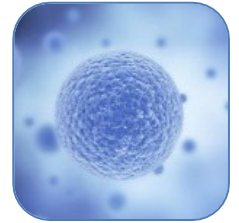


Muscle

Biomedical Tissue Engineering Lab (BTEL)

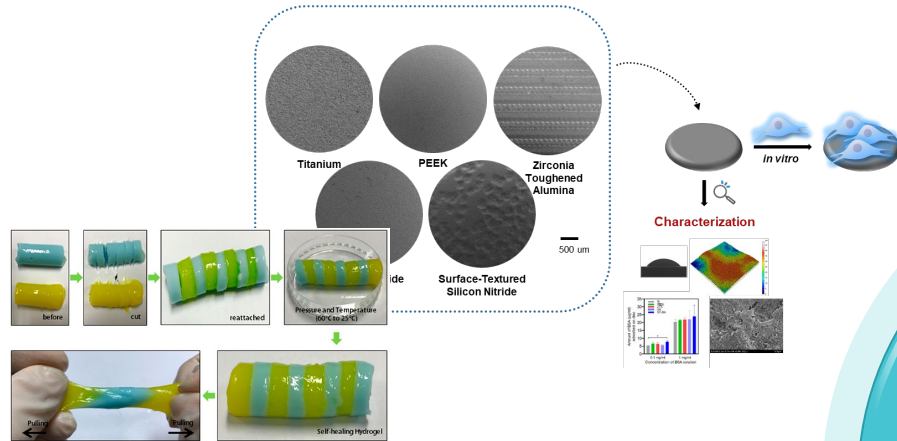
• Research Focus –

- Tissue Engineering, Organoid, Drug Delivery System, Biomaterials, Stem Cells, Cultivated meat

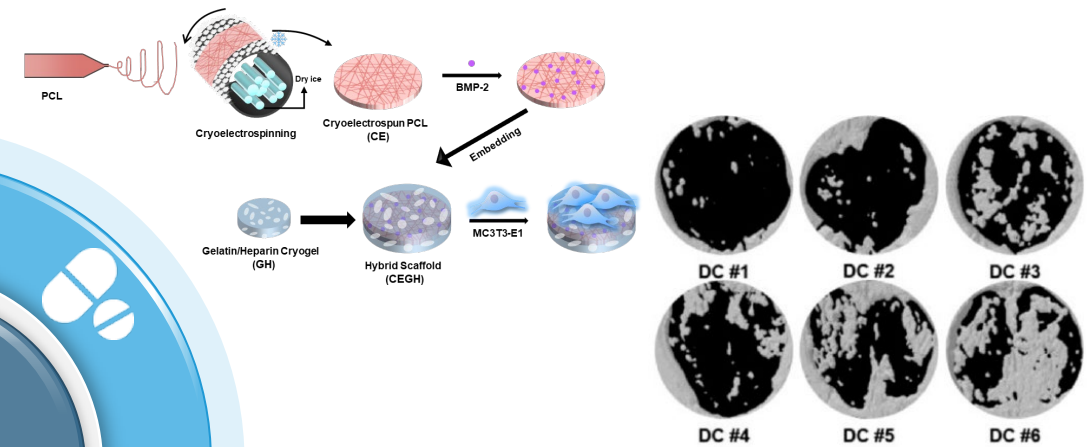




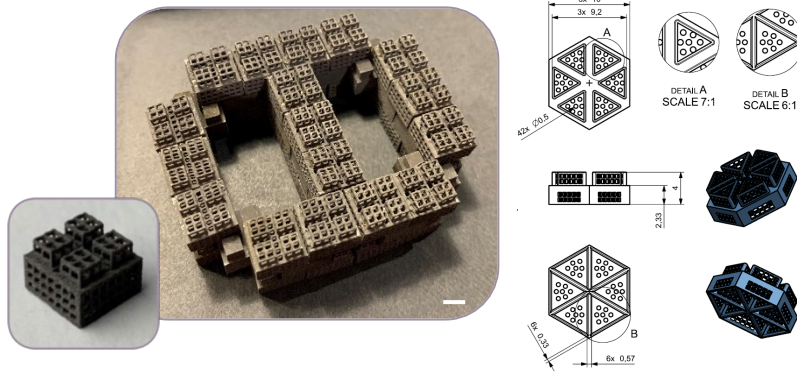
Personalized Biomaterials



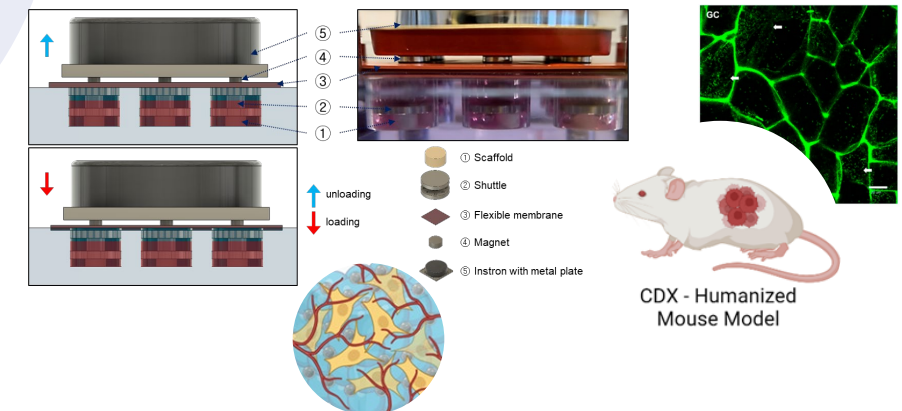
Personalized Drug Delivery



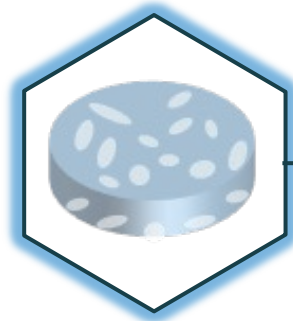
Personalized Scaffolds



Personalized Models

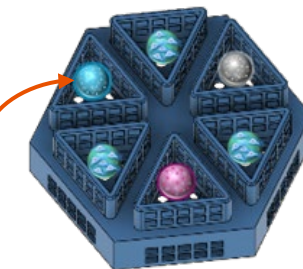
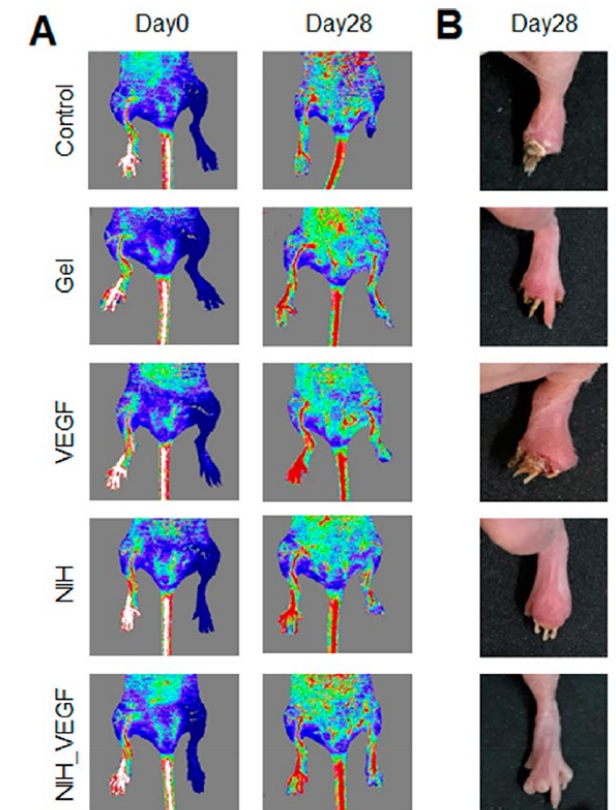
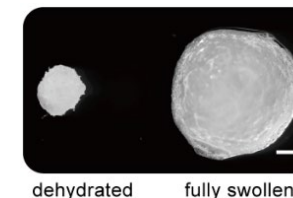
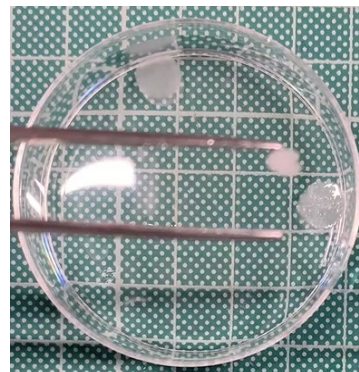
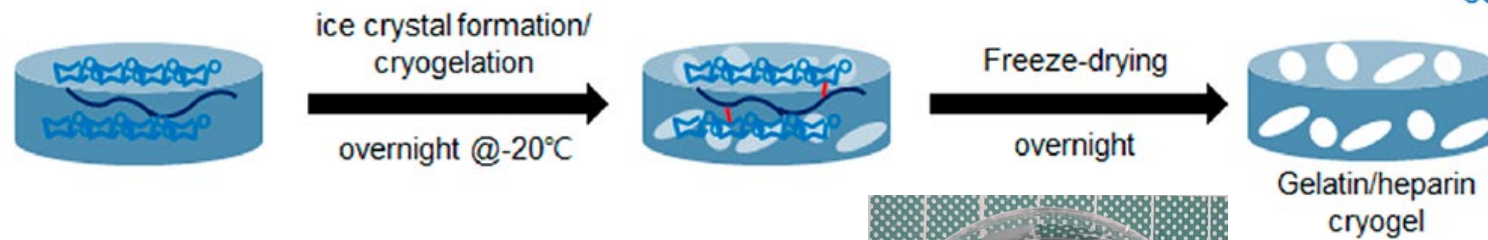
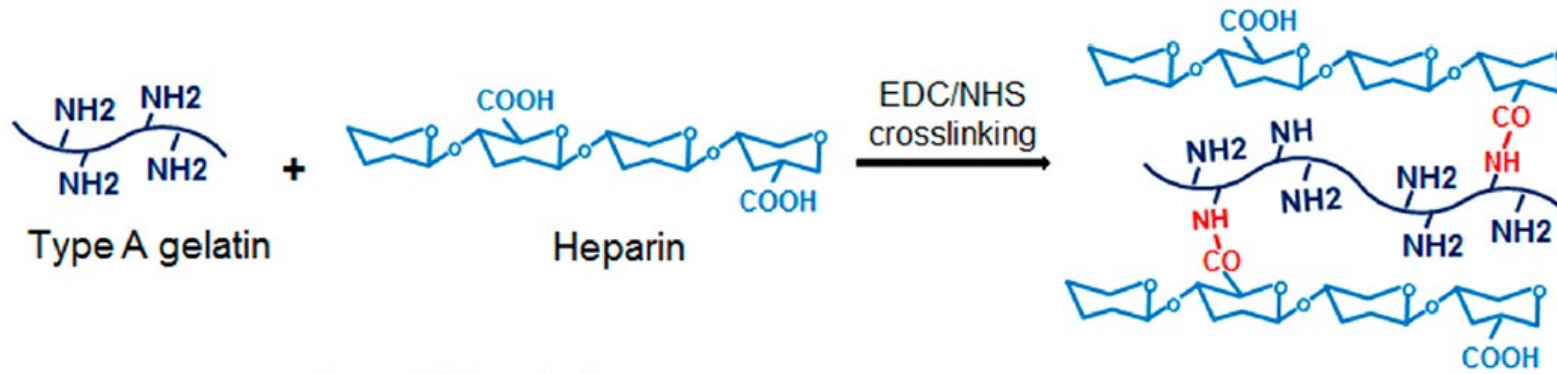
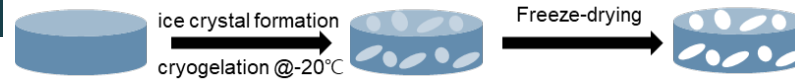


**Tissue
Engineering**

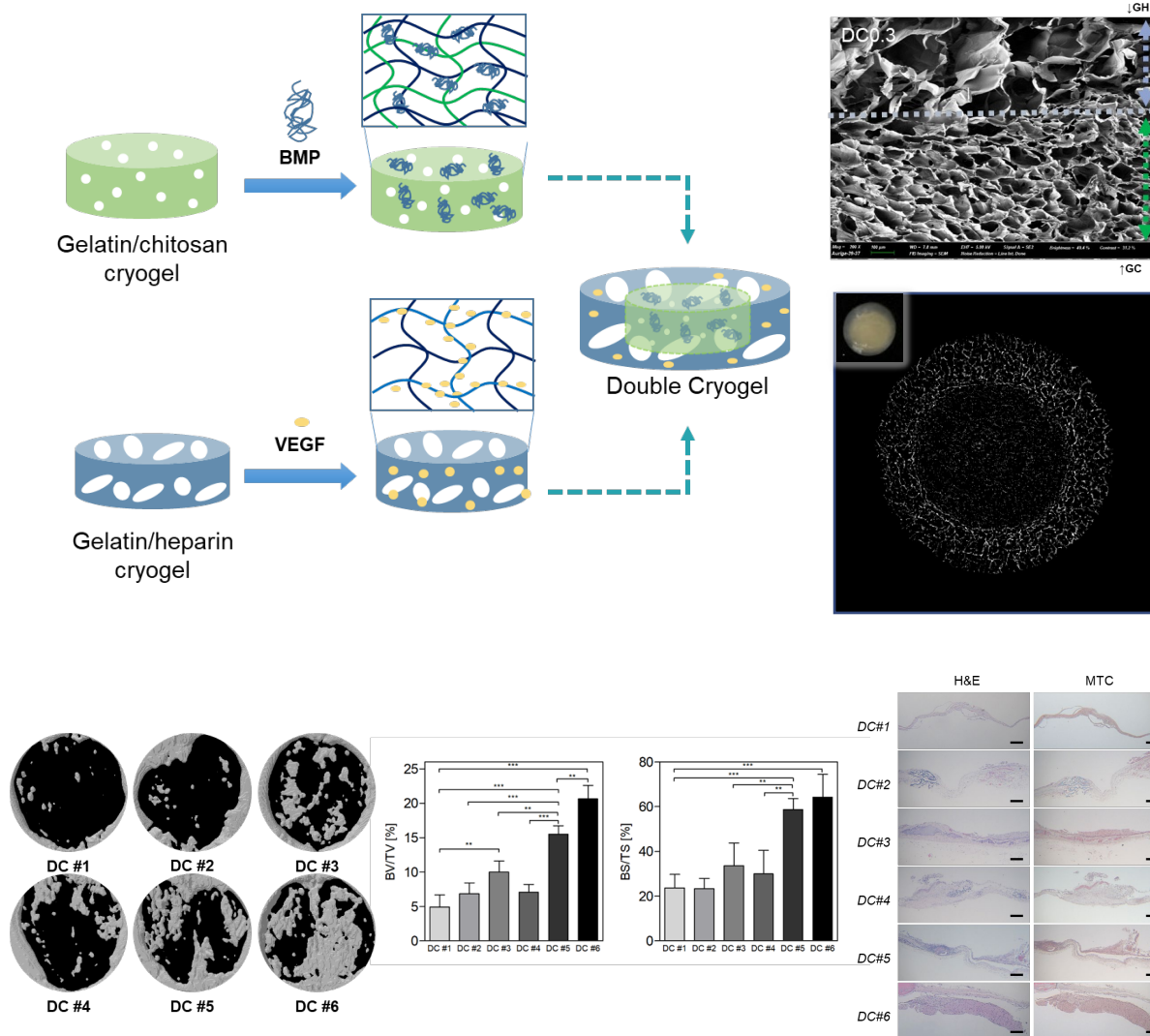


Cryogel

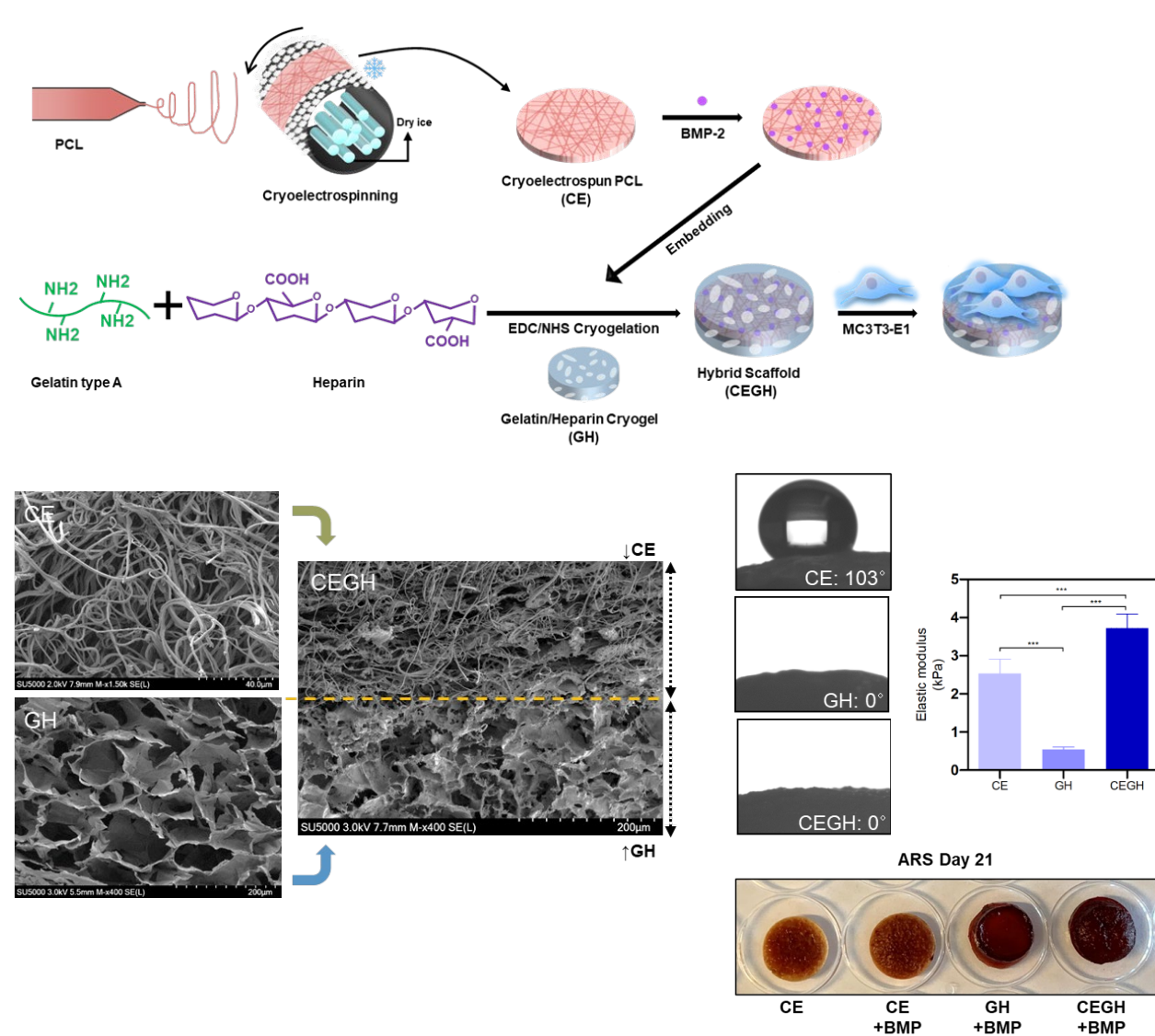
- **Macroporous** microstructure with **highly interconnected pores** (100-200µm)
- Promote **cell infiltration** providing biocompatible-hydrophilic microenvironment



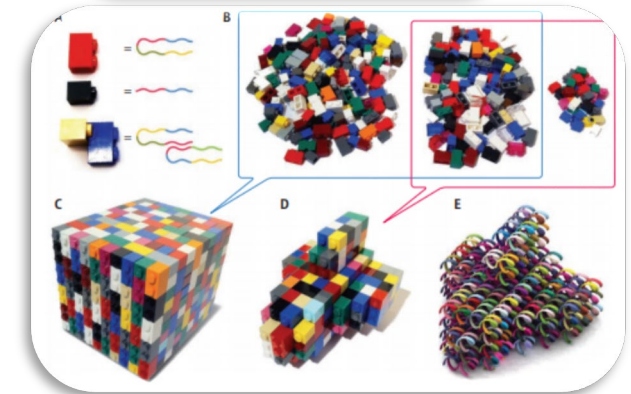
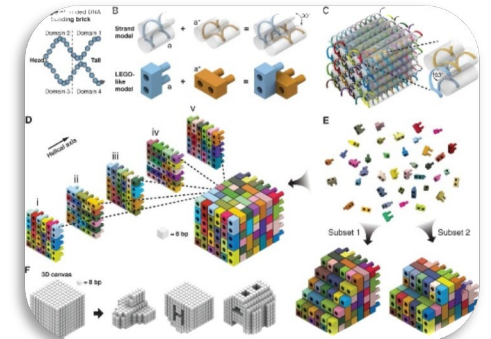
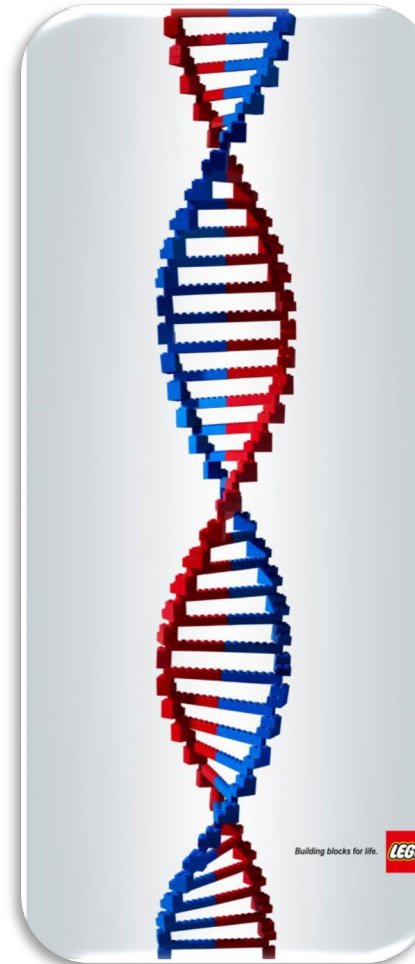
Sequential Growth Factor Releasing Cryogel System



Macroporous Hybrid Scaffold for Sustained Drug Delivery



Personalized Scaffolds - Concept of LEGO®

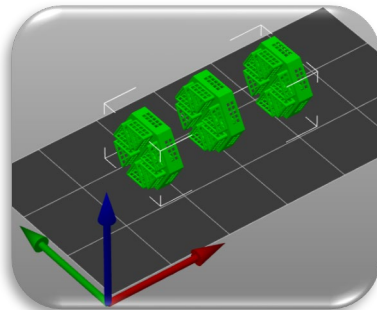


Design flow of modular scaffold

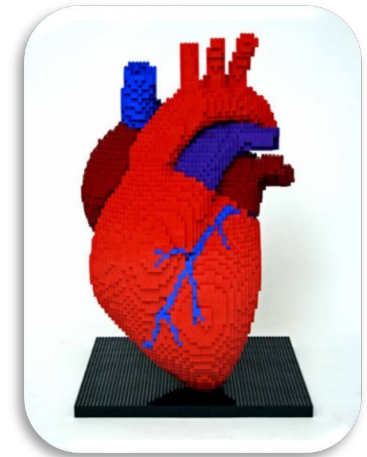
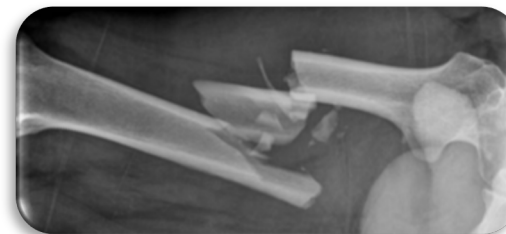
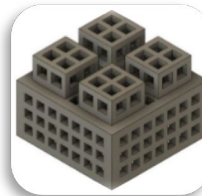
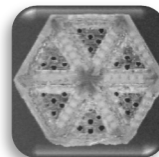
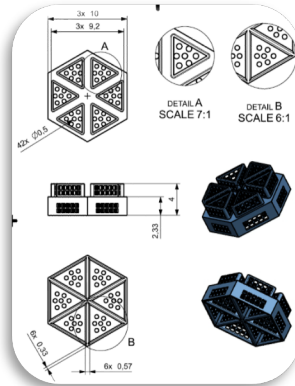
Idea



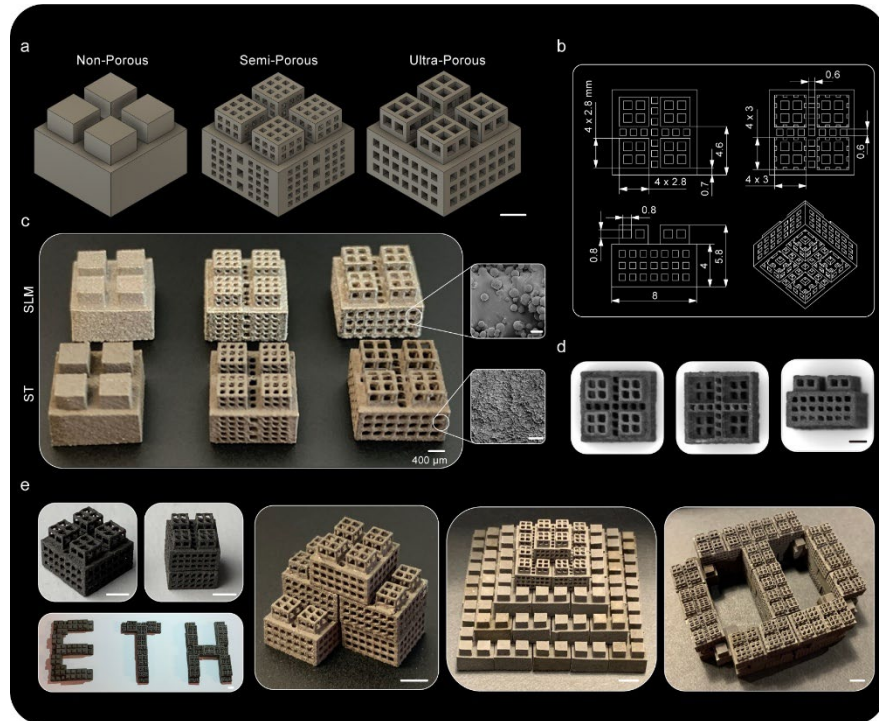
Design



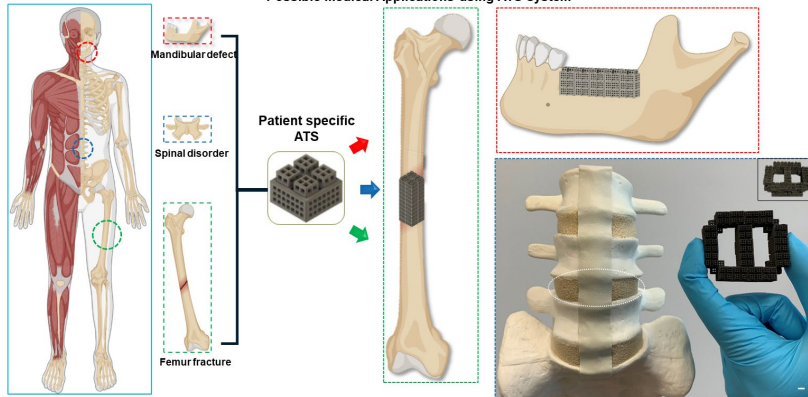
Printing



3D Printed Titanium-based Porous Modular Scaffold

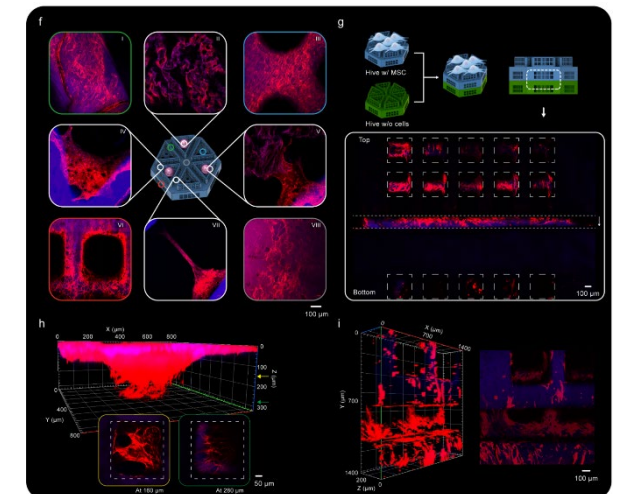
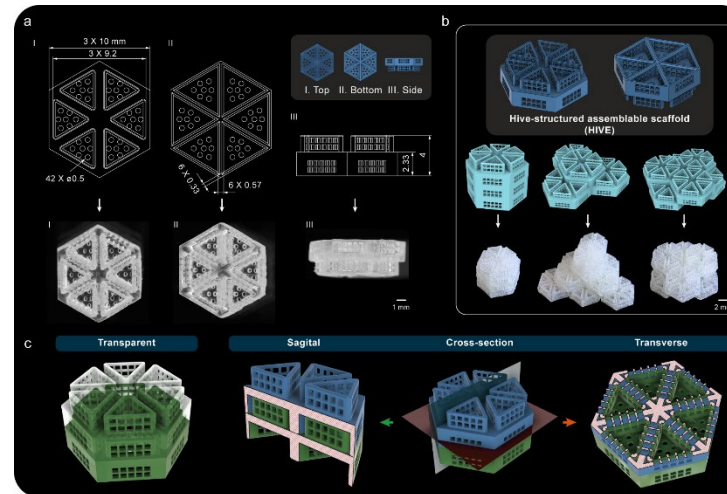
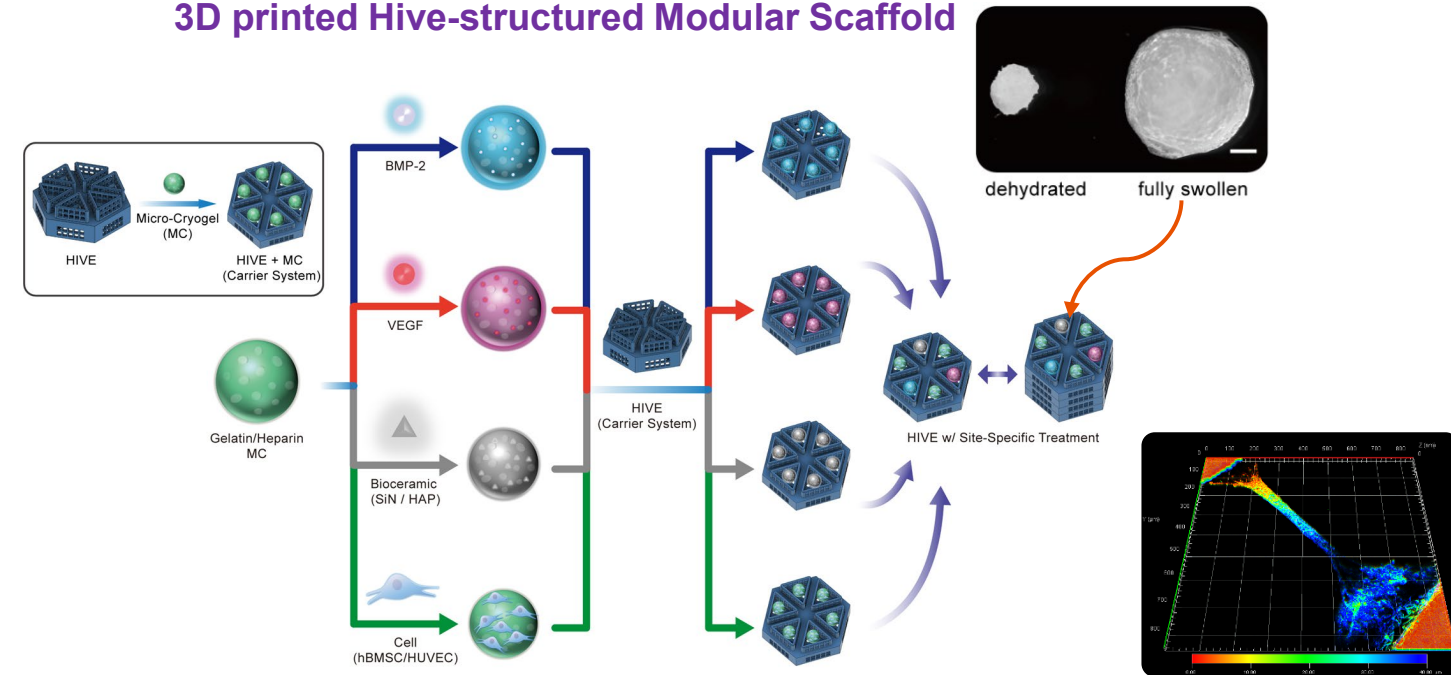


Possible Medical Applications using ATS system



Lee et al.
Biomaterials Advances (2023)

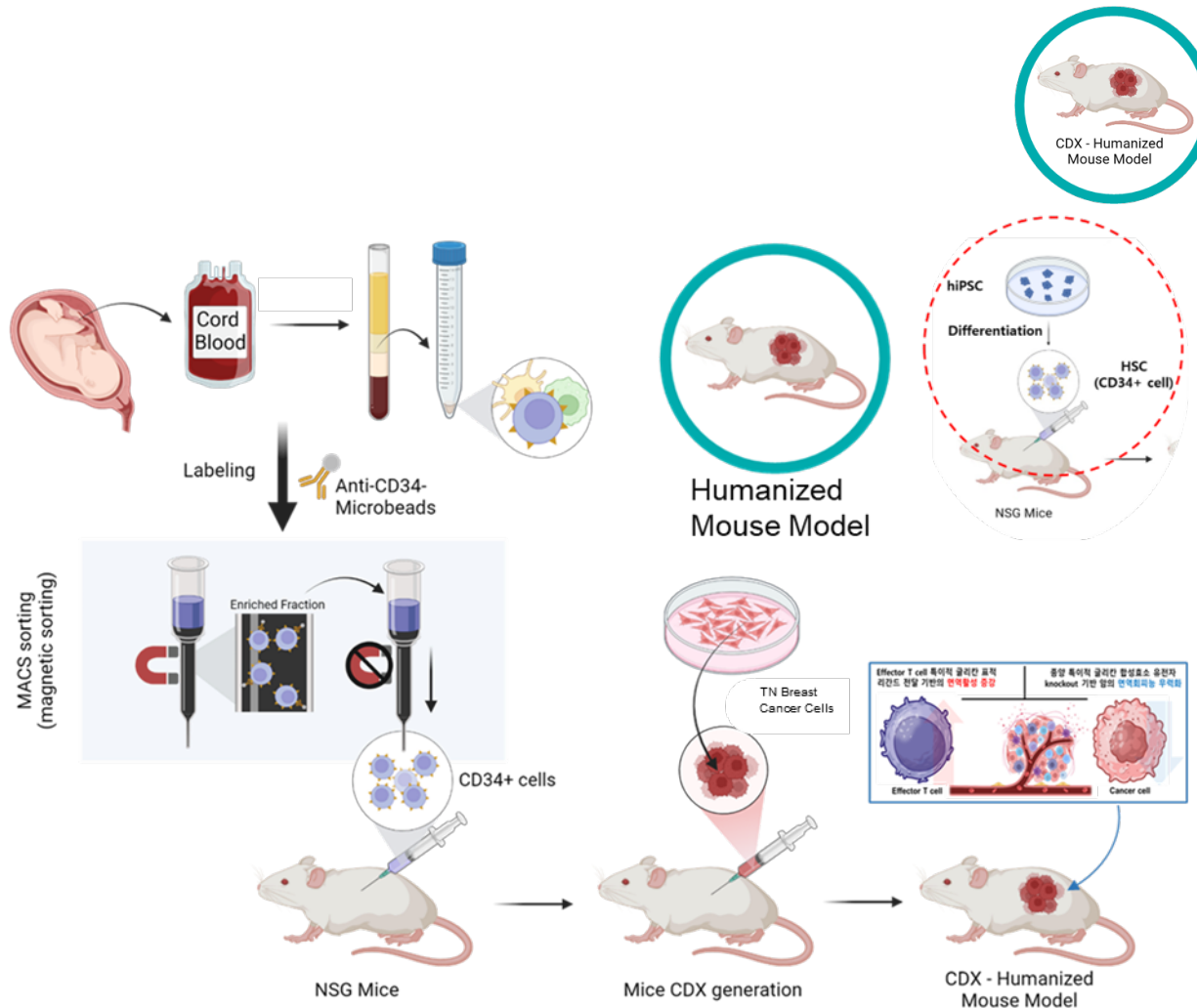
3D printed Hive-structured Modular Scaffold



Lee et al.
Advanced Materials (2023)

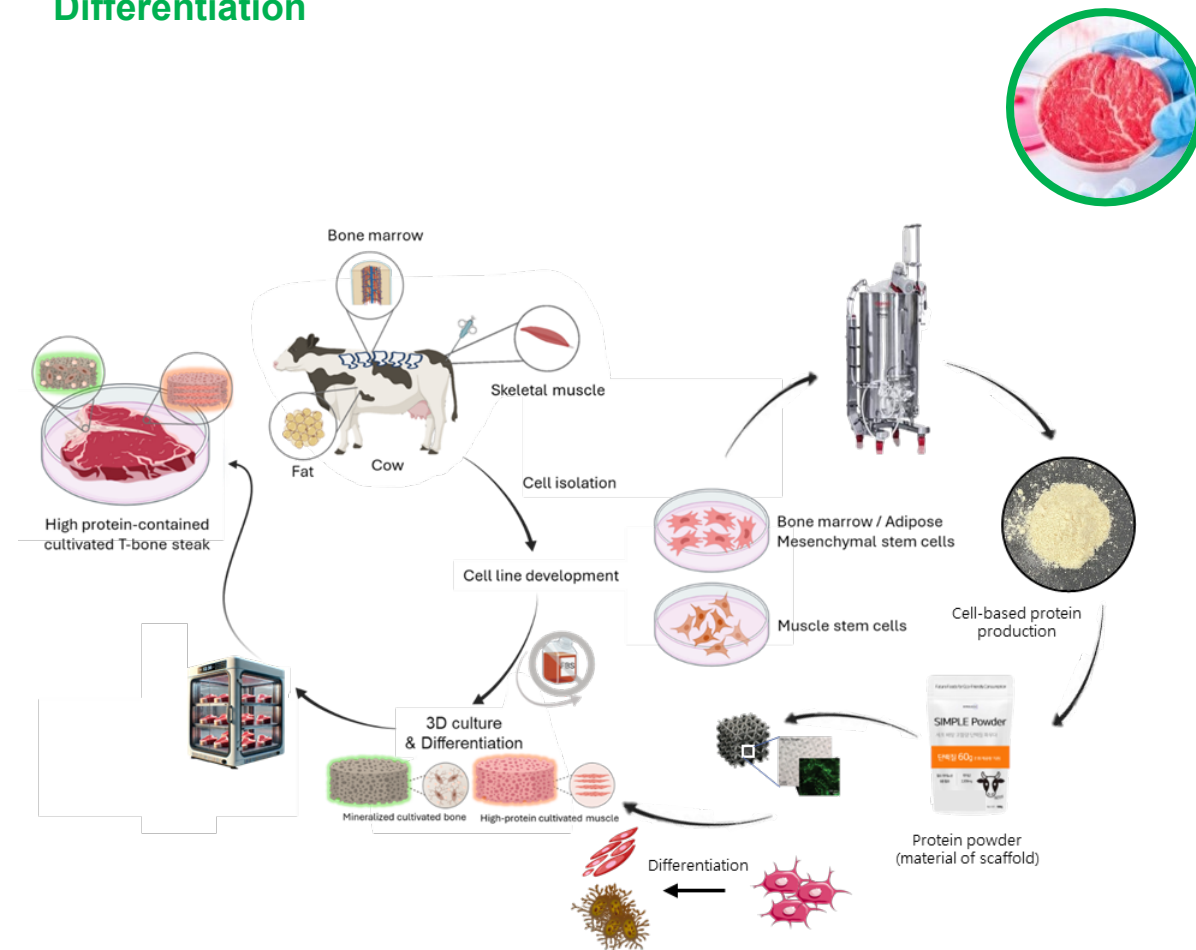
Humanized Mouse Model Development *Using iPSCs*

- Evaluation of Triple-Negative Breast Cancer Therapies



Korea–Switzerland Joint Research Project

- Integration of Stem Cell, Biofabrication, and Bone/Muscle Differentiation



① Biotech-oriented campus

Dongguk University Biomedical Campus



- Specialized in education and research in the field of biotechnology

Dongguk University Hospital



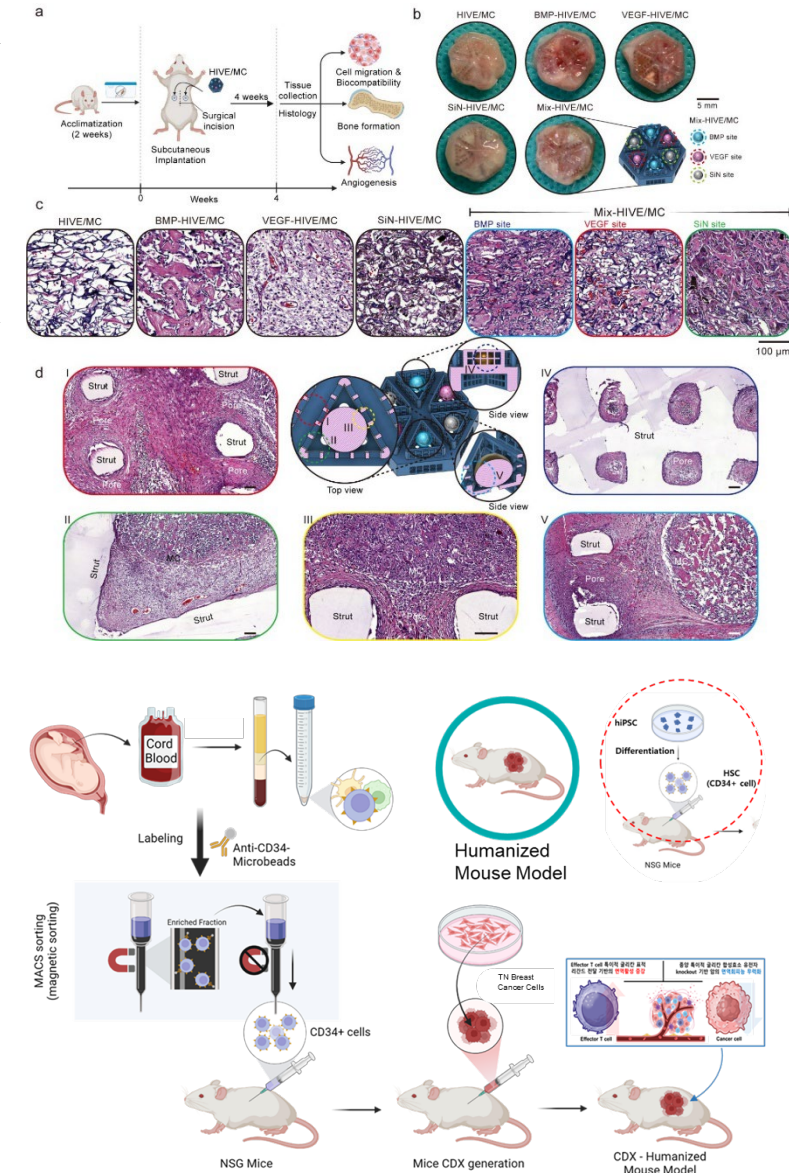
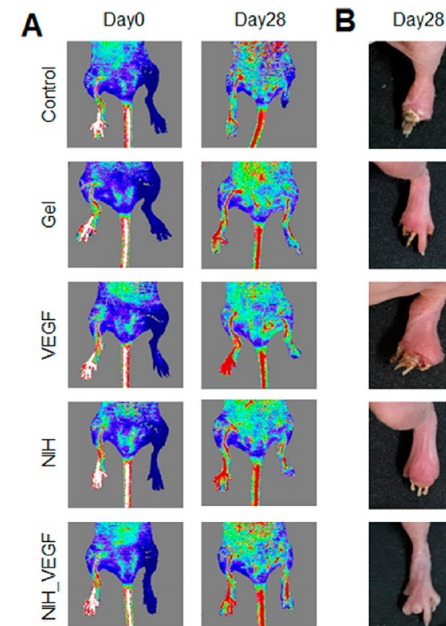
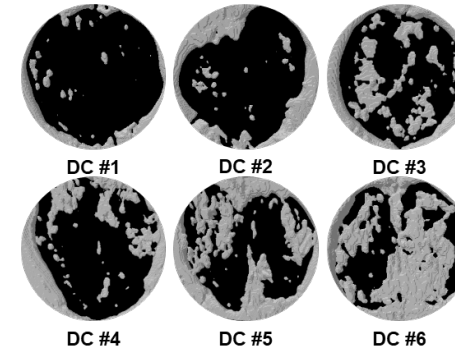
- Seamless collaboration with medical professionals

Preclinical Research Center in Campus

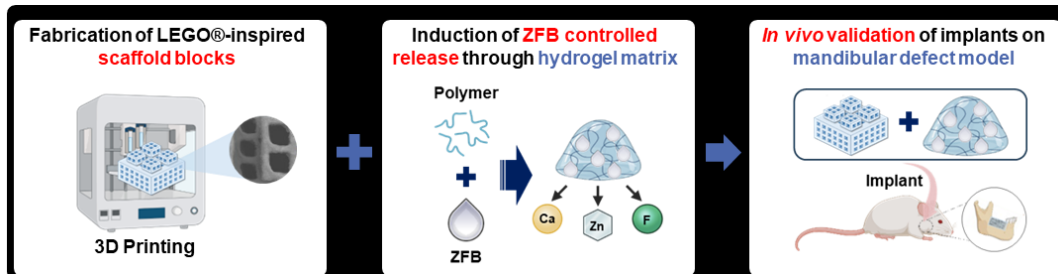
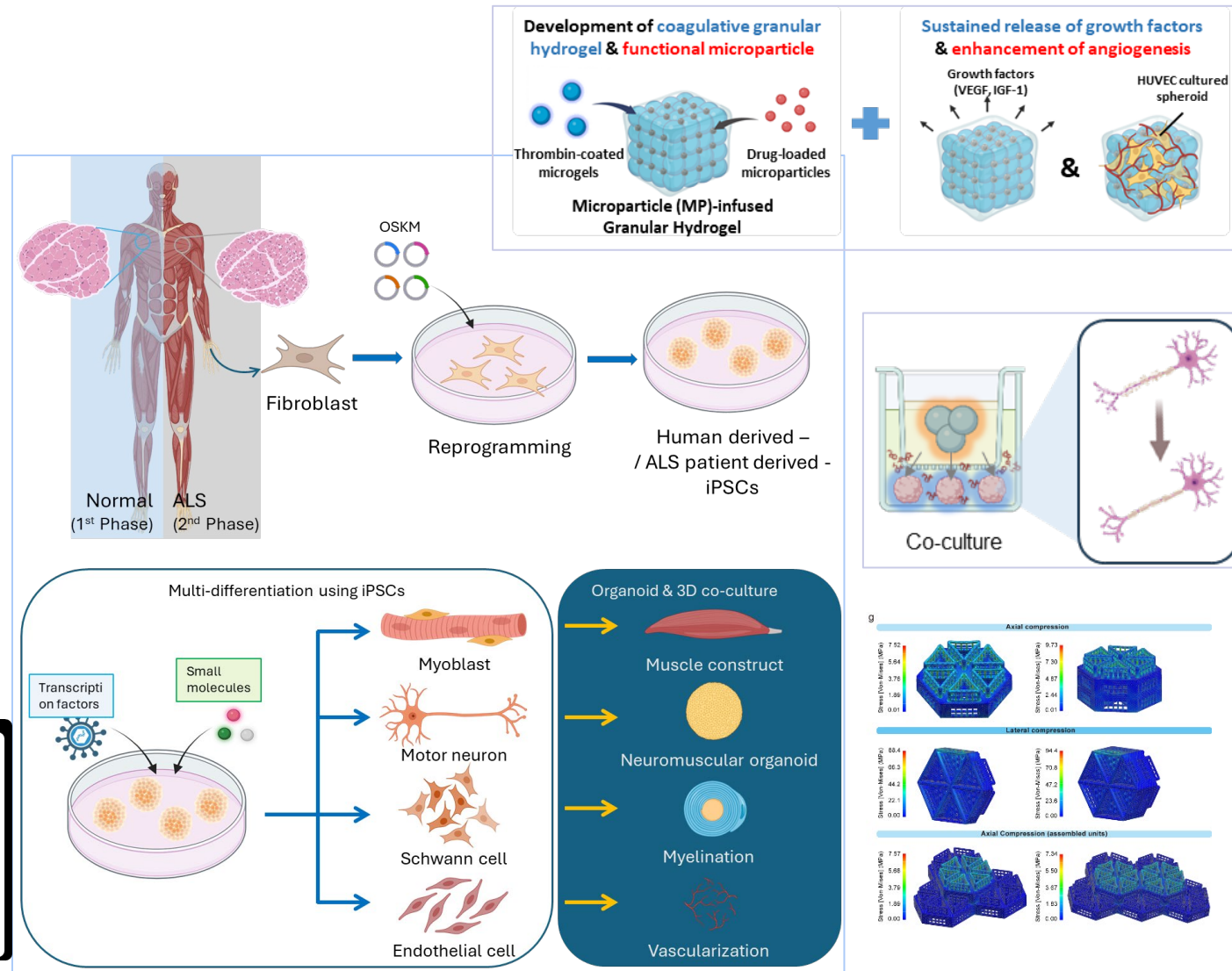
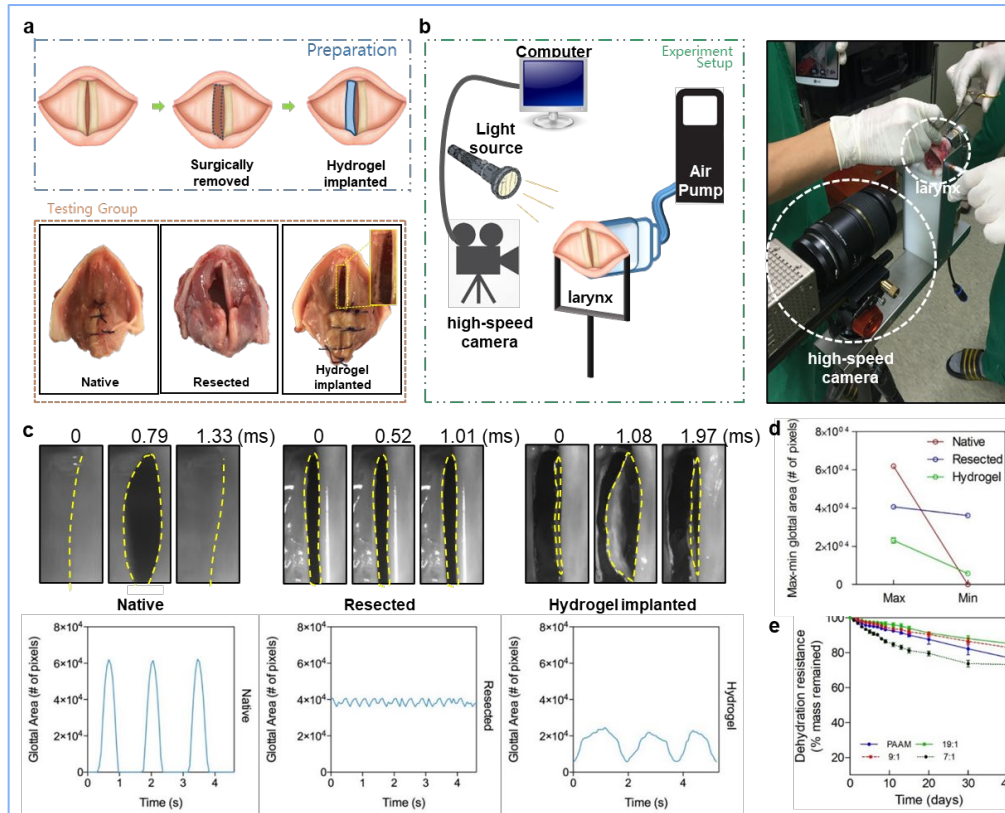


- Dedicated space for animal experiment (592.21 m² in size)

② Preclinical studies + 3R experiences

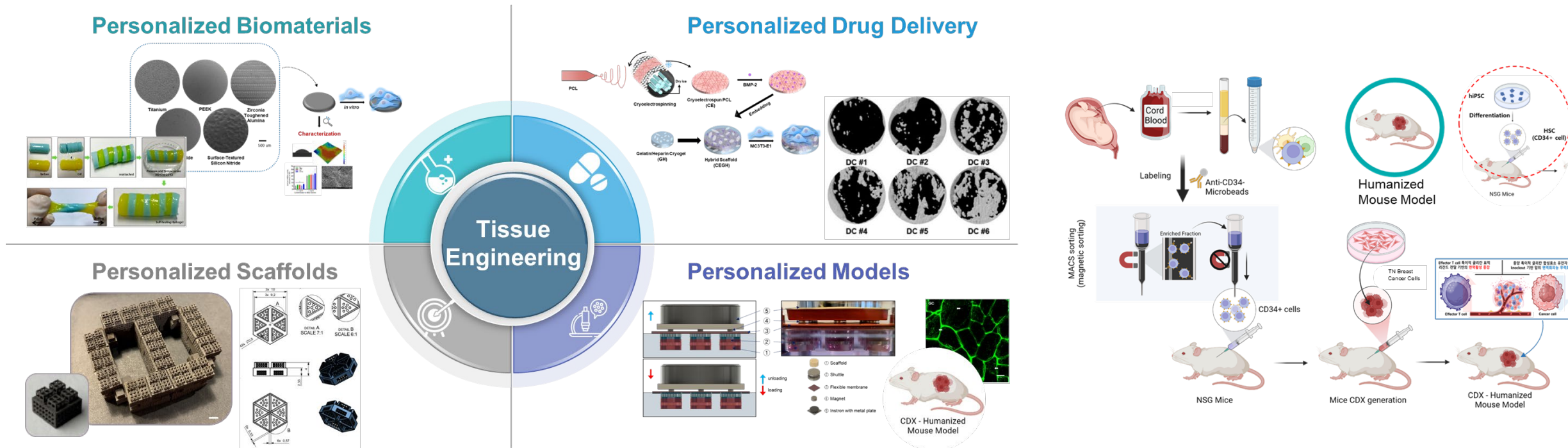


③ Broad Research Spectrum (3D co-culture, Biofabrication, iPSC differentiation, 3D printing, hydrogel, organoid)



Topics that I wish to explore further for Korea-EU collaboration

1. HORIZON-HLTH-2025-01-TOOL-01: Enhancing cell therapies with genomic techniques
2. HORIZON-HLTH-2025-01-TOOL-02: Advancing cell secretome-based therapies
3. HORIZON-HLTH-2025-01-TOOL-05: Boosting the translation of biotech research into innovative health therapies
4. HORIZON-HLTH-2025-01-DISEASE-07: Tackling high-burden for patients and under-researched medical conditions



Thank you

Contact

lsean@dgu.ac.kr



BTEL Homepage

Acknowledgements

Biomedical Tissue Engineering Lab, Dongguk University

Korea-EU Research Centre

National Research Foundation of Korea (RS-2024-00415982)

Korea Institute for Advancement of Technology (P241200036)

