POLITECNICO
MILANO 1863

DIPARTIMENTO DI CHIMICA,
MATERIALI E INGEGNERIA CHIMICA
GIULIO NATTA

SEZIONE DI INGEGNERIA BIOLOGICA

Coordinatore

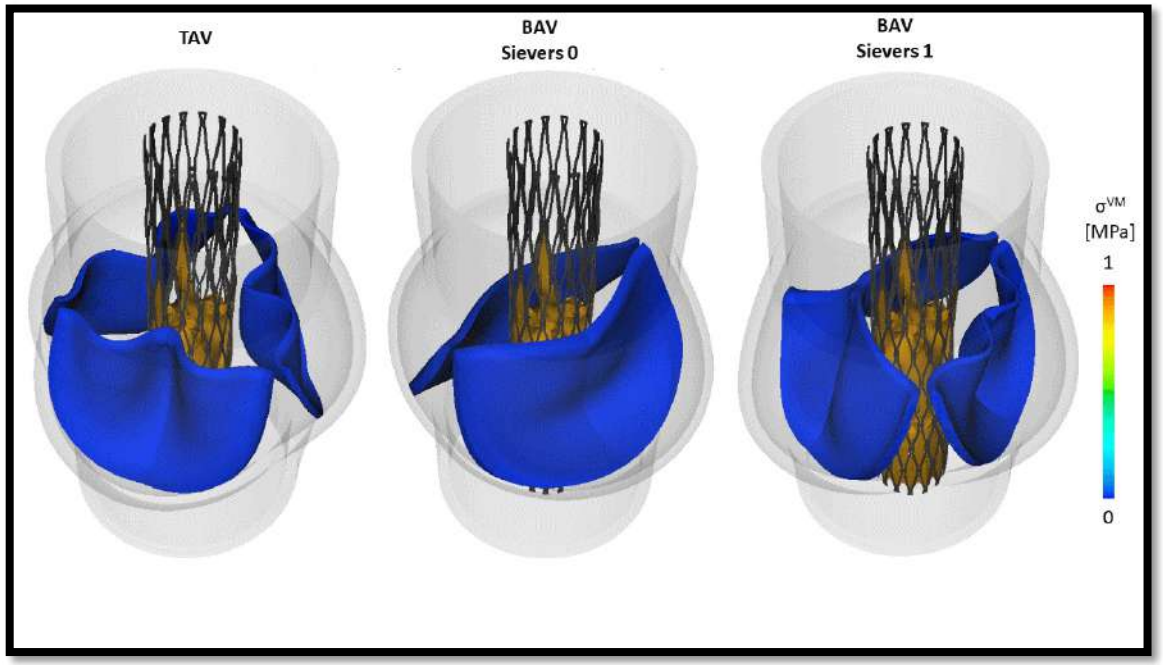
Francesco Migliavacca

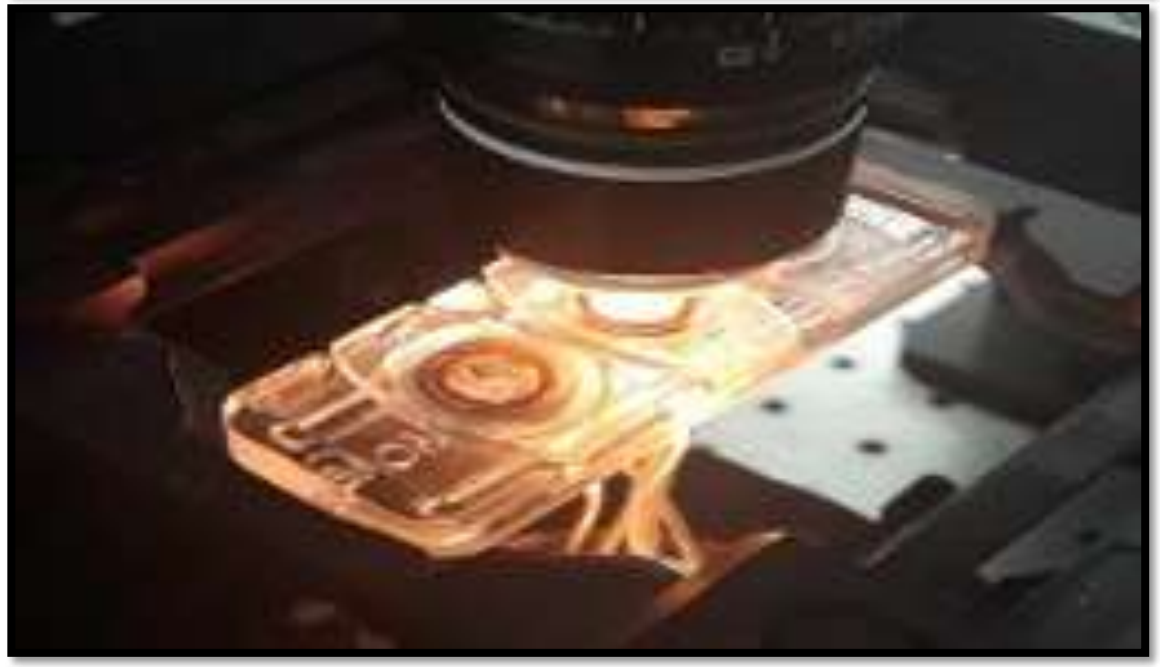
INTRODUZIONE

La Sezione si propone di raccogliere e coordinare un ampio spettro di competenze scientifiche che trovino applicazione nel campo delle **scienze della vita** e delle relative **tecnologie**, con particolare attenzione alla **diagnosi** e alla **cura** delle malattie. A puro titolo di esempio, si citano quelle competenze provenienti dai settori dell'**ingegneria biomedica**, dell'**ingegneria dei materiali**, dell'**ingegneria dei processi** e della **biologia**.

Topics

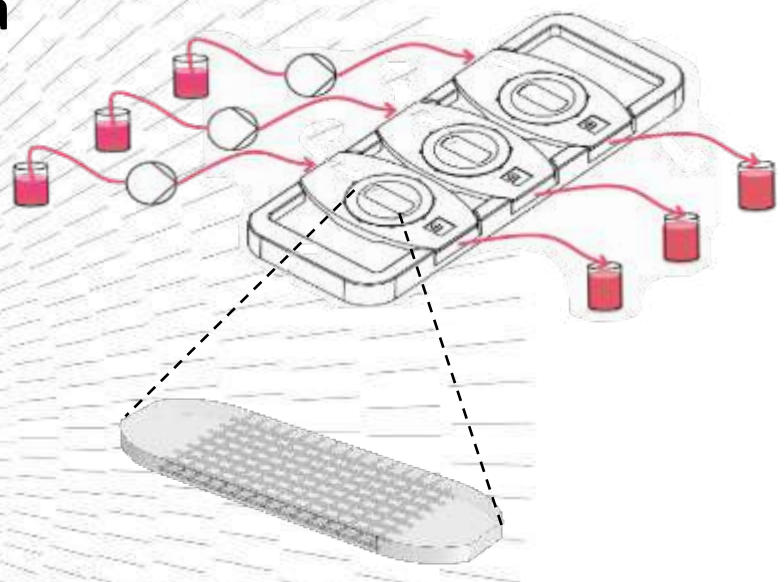
- MECHANOBIOLOGY
- DRUG AND GENE DELIVERY
- 3D BIOPRINTING
- MICROFLUID DEVICES
- ARTIFICIAL ORGANS
- DEVICE CERTIFICATION
- IN SILICO MEDICINE
- INNOVATIVE BIOMATERIALS





MECHANOBIOLOGY

a MOAB bioreactor



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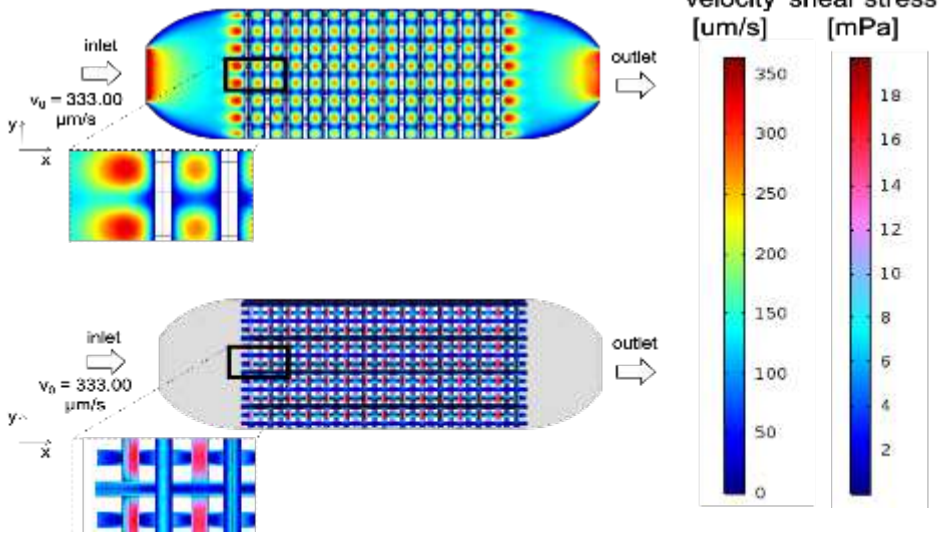
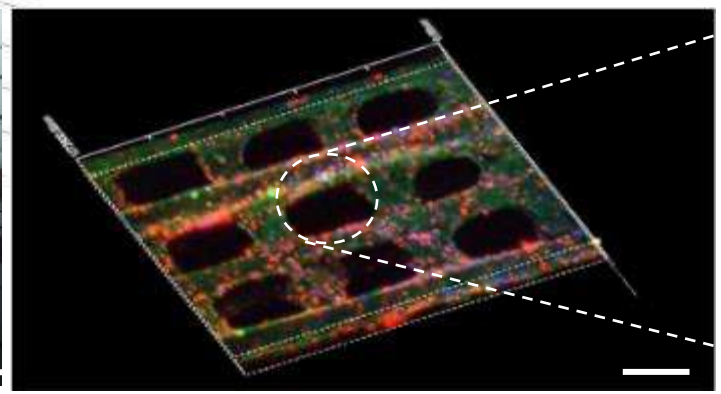


c

d Lymphnode-on-a-chip



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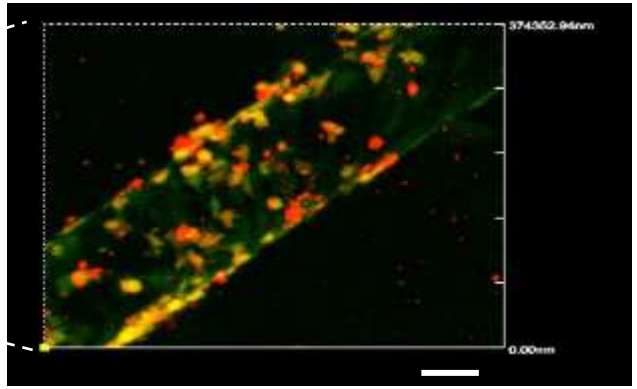
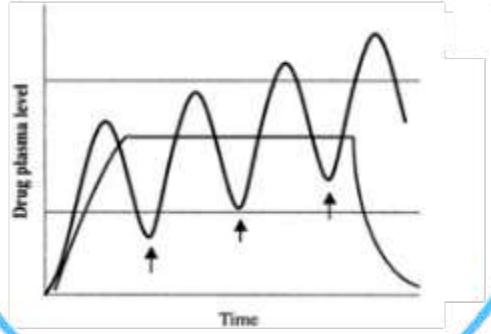
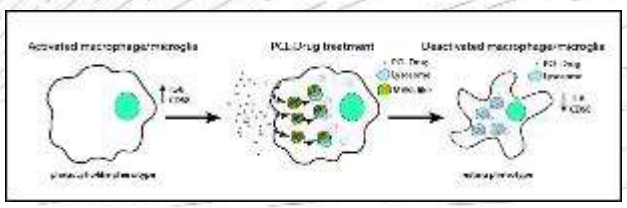


DRUG DELIVERY

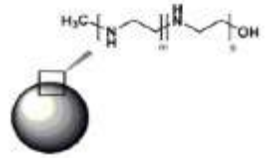
Controlled drug delivery systems

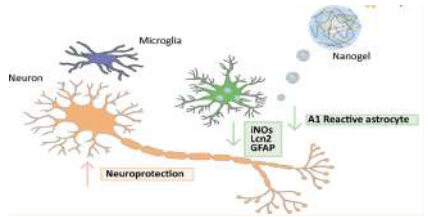


O/W Nanoparticles

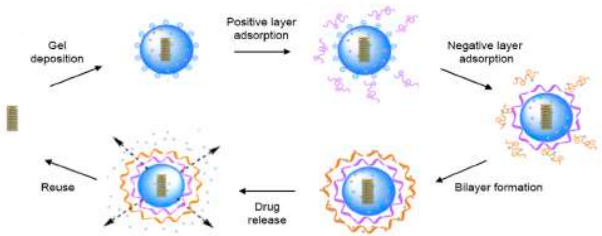


Nanogels

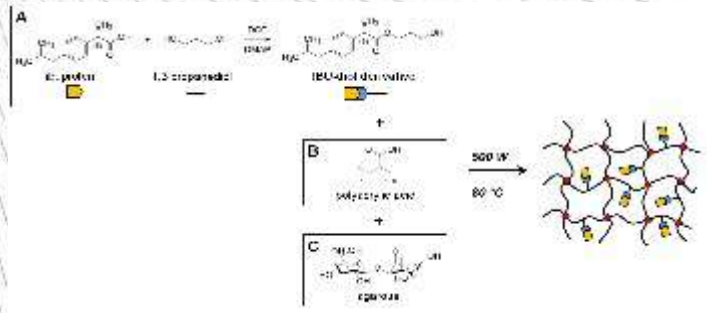




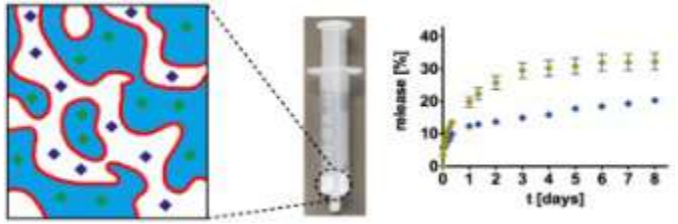
Robots



Hydrogels

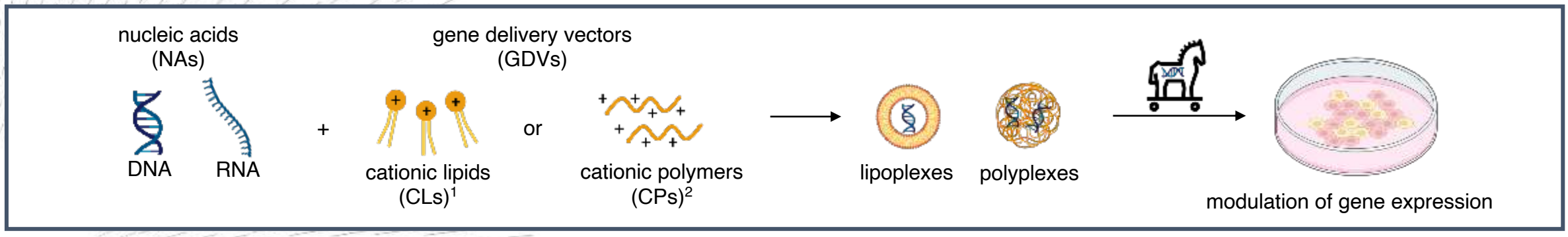


Bicontinuous structures



GENE DELIVERY

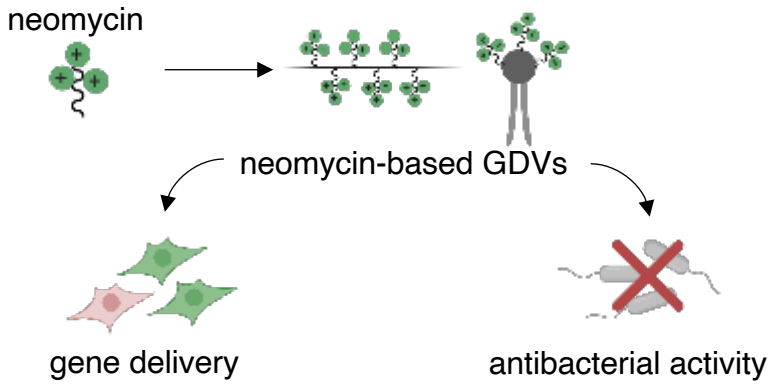
Proffs G. Candiani e N. Bono



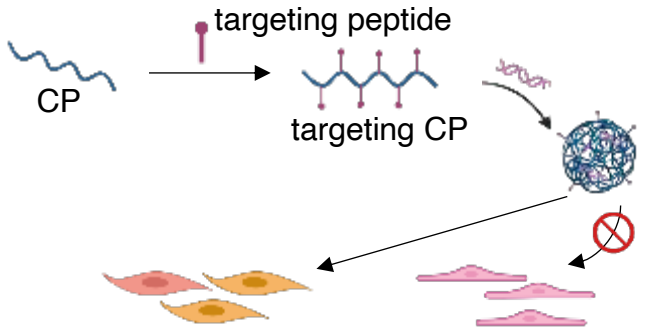
Synthesis of multifunctional gene delivery vectors

in collaboration with **O^{SCM} Lab** (Prof. A. Volonterio, Prof. C. Punta)

synthesis of antibacterial GDVs[3,4]

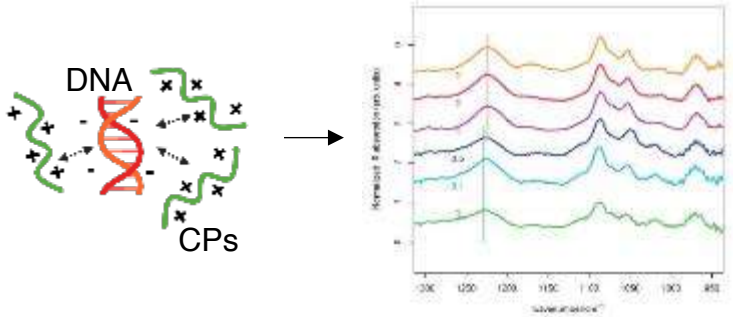


synthesis of cell-selective GDVs



Molecular studies of NA/GDV interaction[5]

in collaboration with **FunMat Lab** (Prof. M. Tommasini, A. Lucotti)



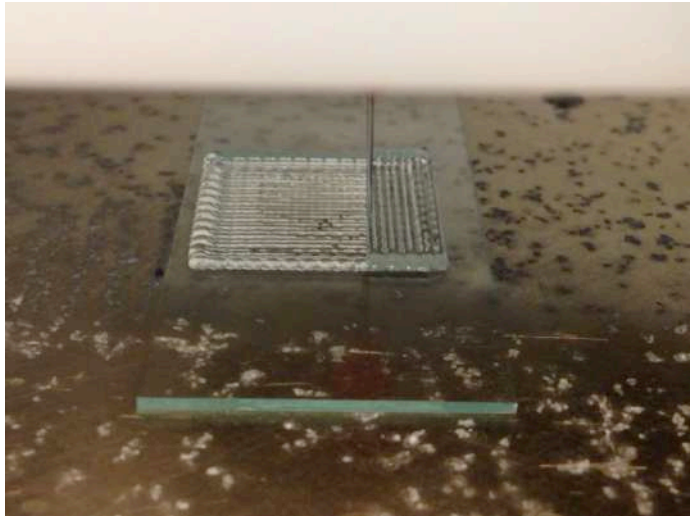
Spectroscopic analysis of the interaction between NAs and GDVs

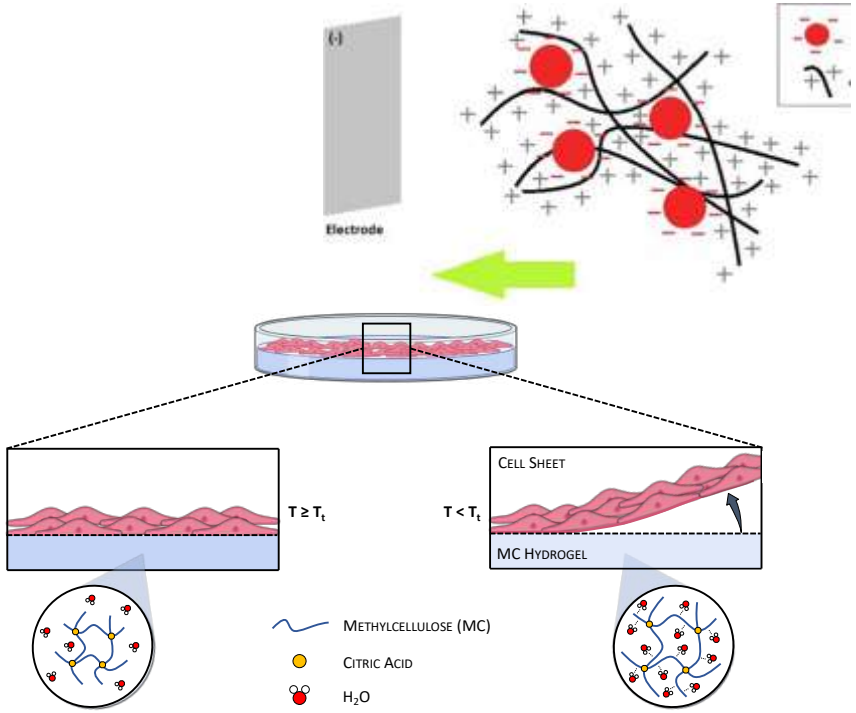
[1] Ponti F. et al, Chem. Phys. Lipids (2021), 235, 105032; [2] Bono N. et al, Pharmaceutics (2020) 12(2), 183; [3] Bono N. et al, ACS Omega (2019) 4(4), 6796-6807; [4] Bono N. et al, Int. J. Pharm. (2018), 549(1-2), 436-445; [5] Lucotti A. et al, RCS Advances (2014), 4(91), 49620-49627

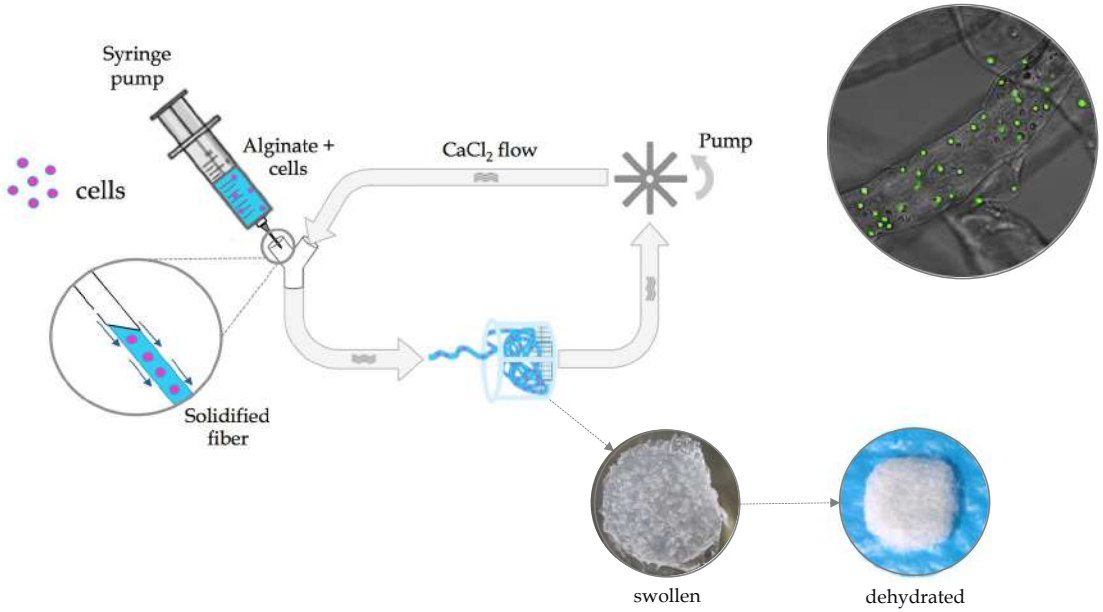
PROCESSING FOR 2D AND 3D STRUCTURES

- printing and **bioprinting** of new biomaterials
- **innovative methods** for cellularized patches
- **electrodeposition** of natural polymers
- **electrospinning** of biological-derived polymers
- **cell sheet** engineering

b²efore
biomaterials & biofabrication for regenerative engineering

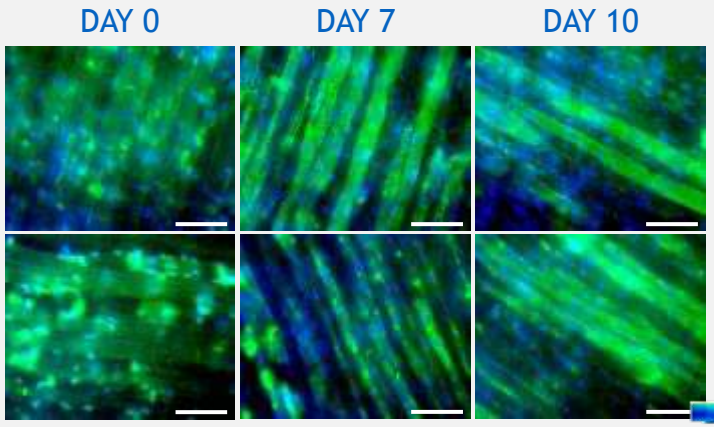


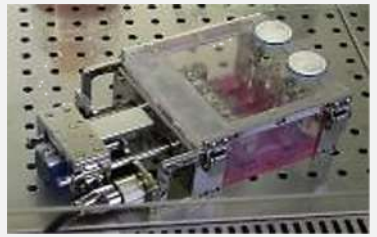


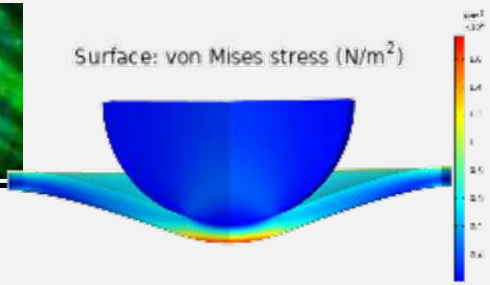


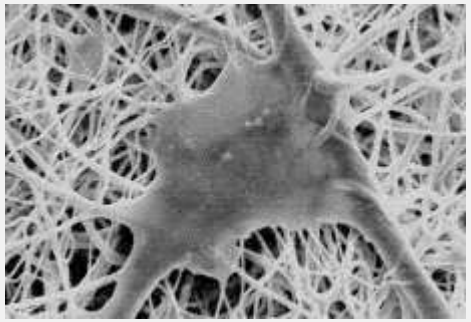
3D BIOPRINTING AND SOFT TISSUE MECHANICS

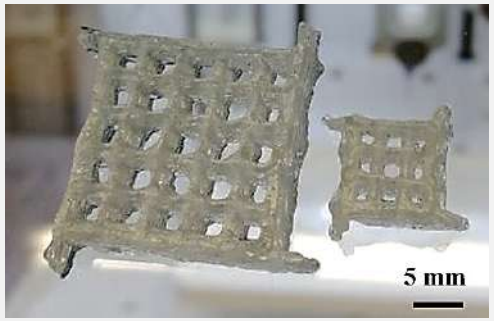
MgShell





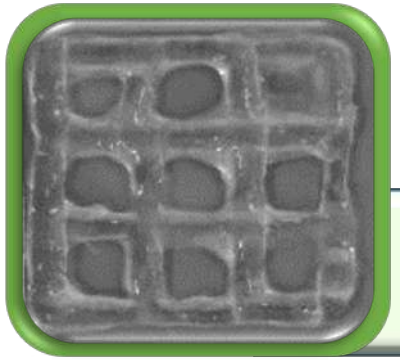




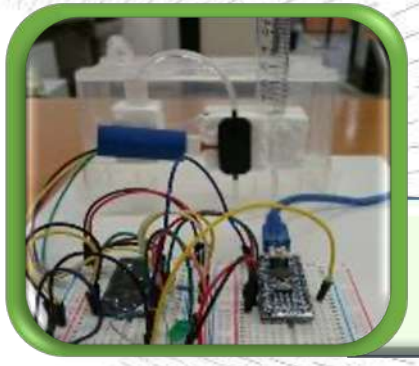


@LaBS_Polimi

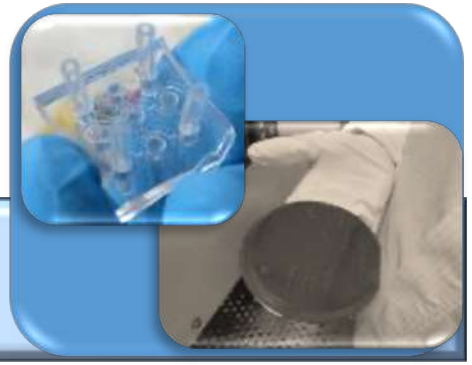
MICROFLUIDIC DEVICES



Bioprinting



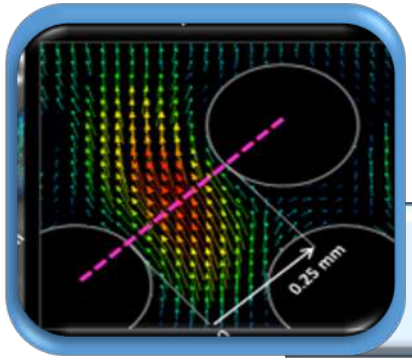
Microfluidic automation



Chip microfabrication

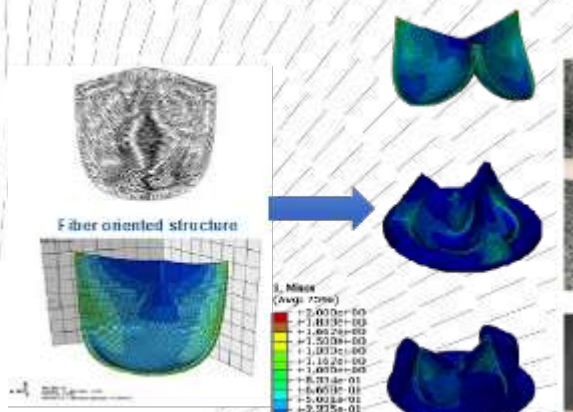
polifab
POLITECNICO DI MILANO

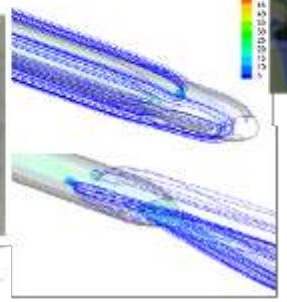
Computational fluid dynamics for microcirculation

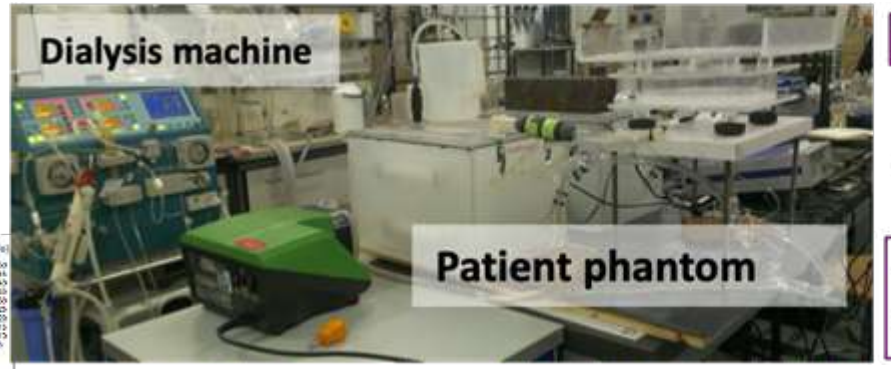


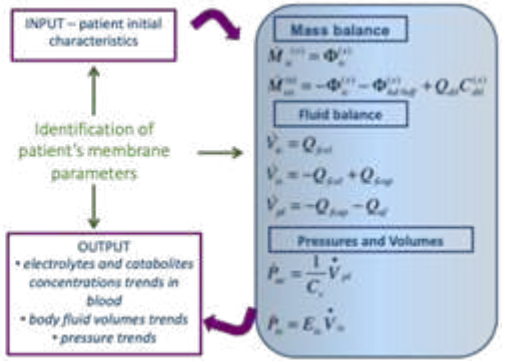
Micro particle image velocimetry

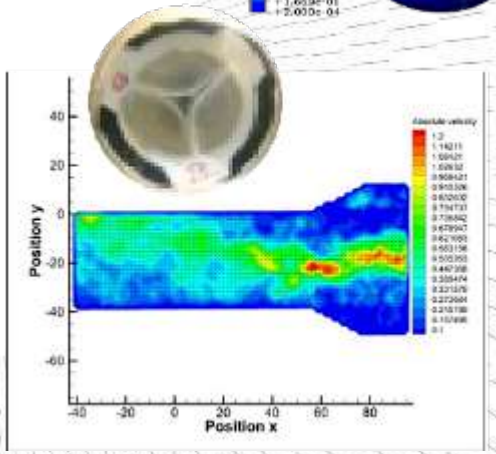
ARTIFICIAL ORGANS

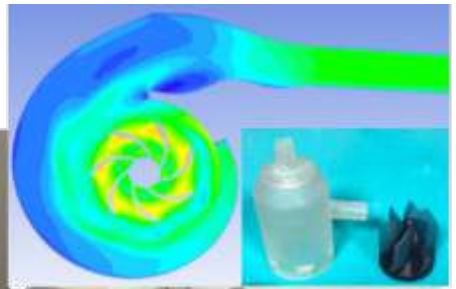


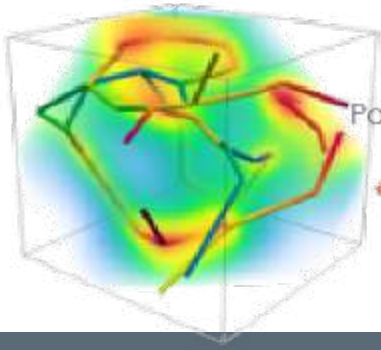


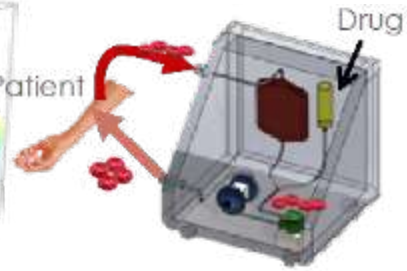




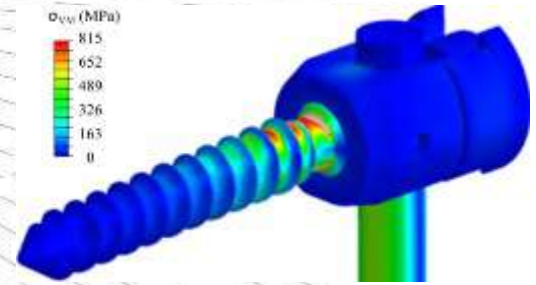


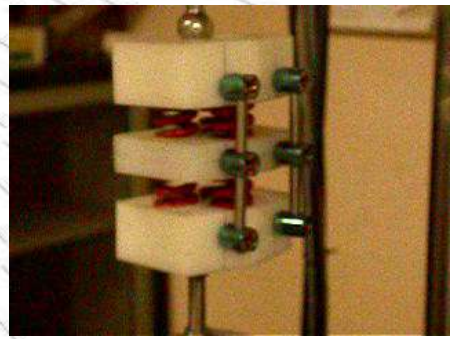


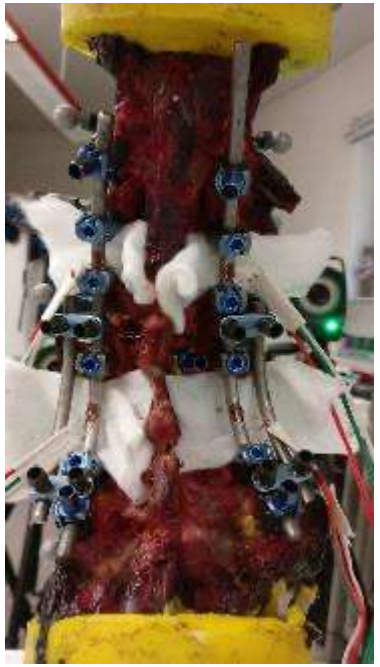


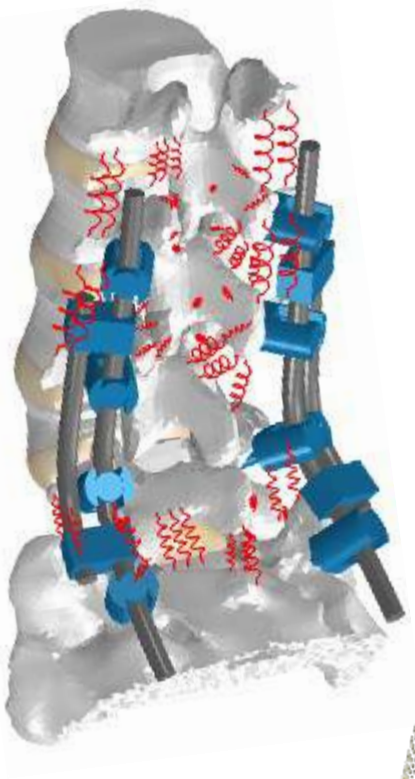


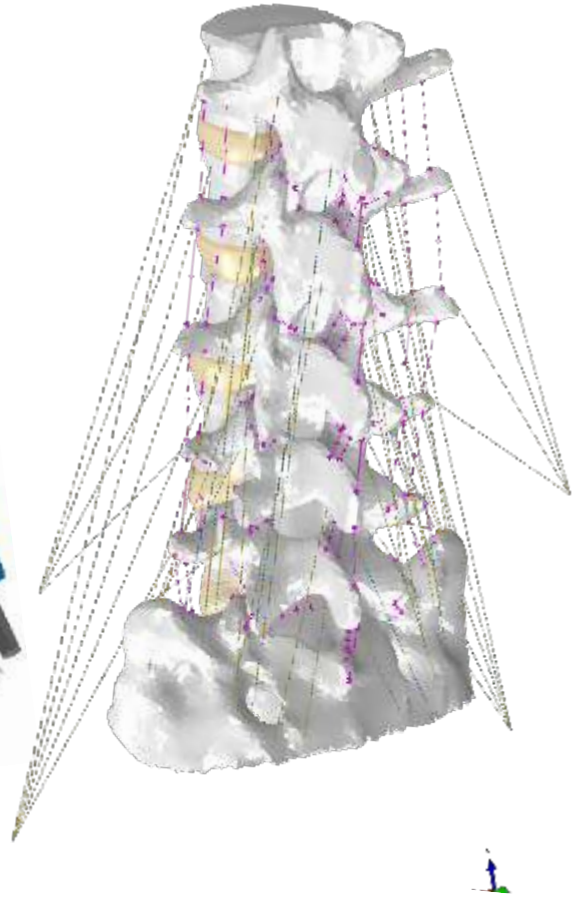
DEVICE CERTIFICATION



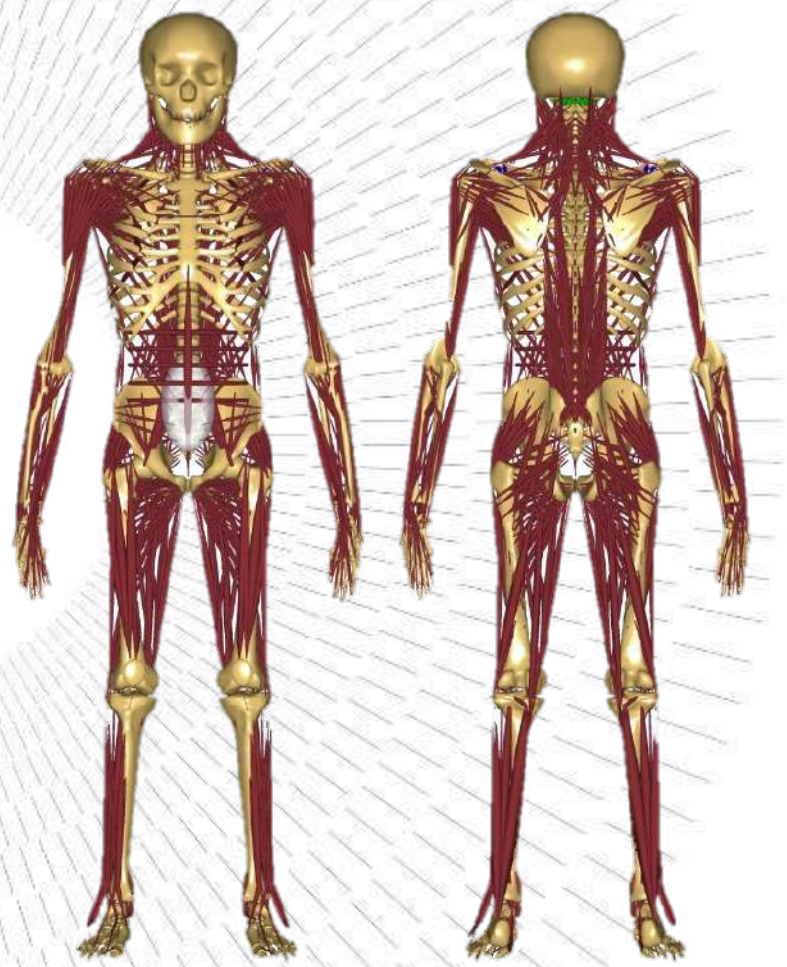


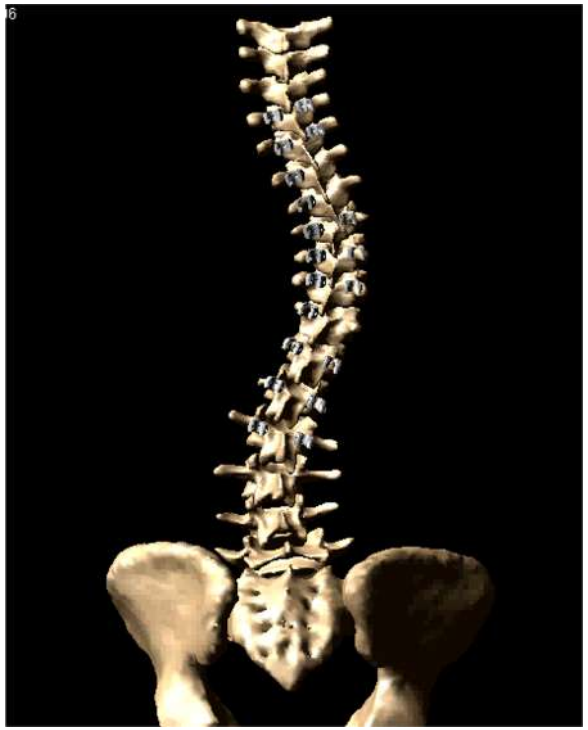




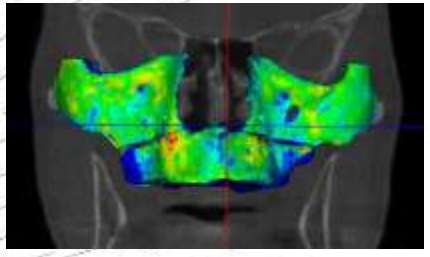


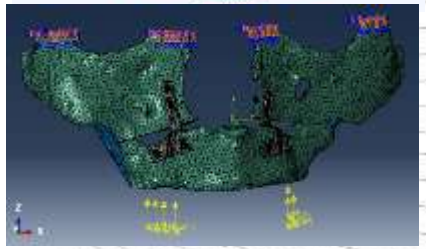
IN SILICO MEDICINE - spinal



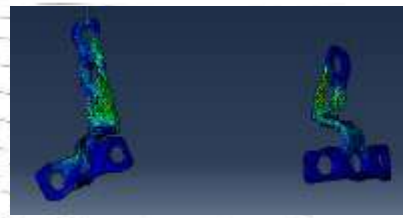


IN SILICO MEDICINE – maxillofacial



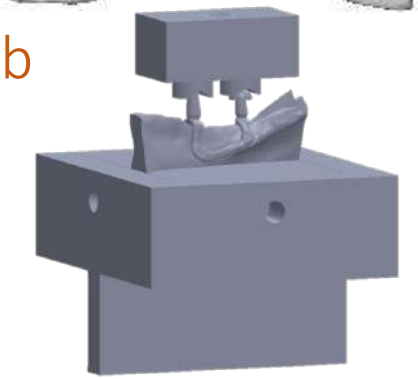


Surgery case Modelling

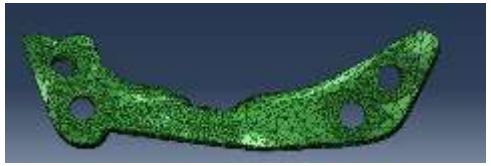


Patient specific

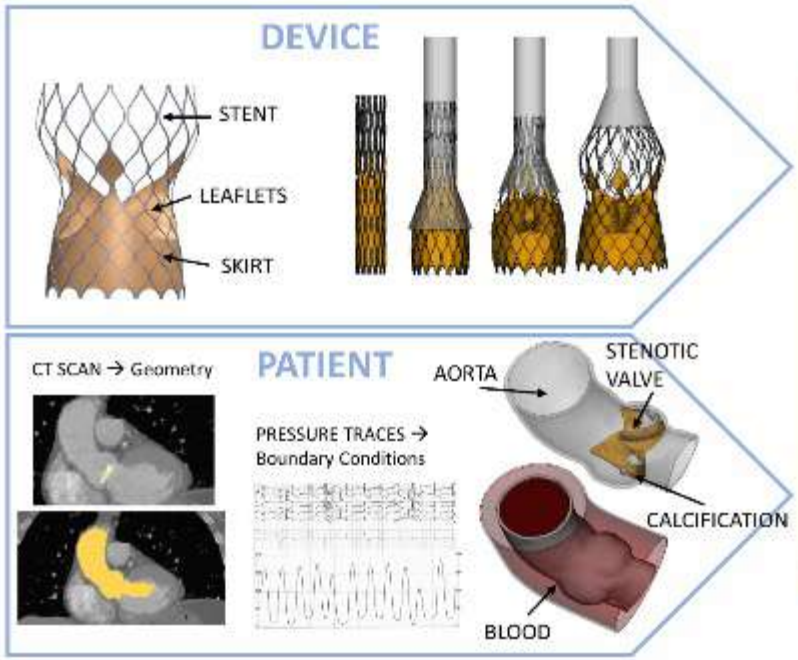
Mechanical Lab Testing

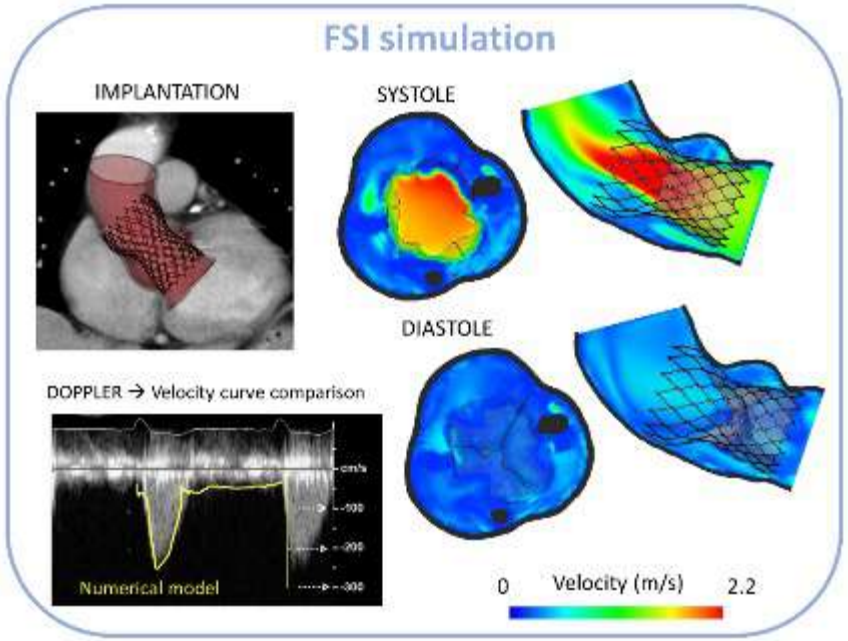


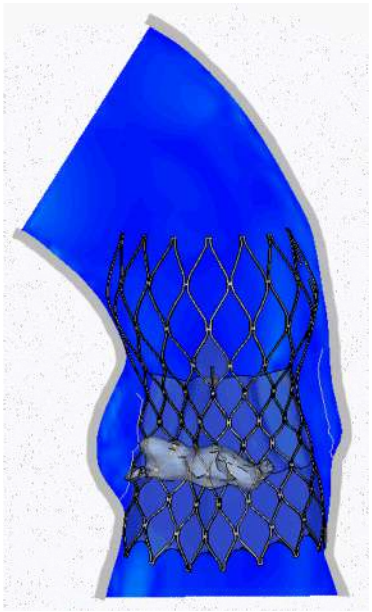
Additive manufacturing of devices



IN SILICO MEDICINE - cardiovascular



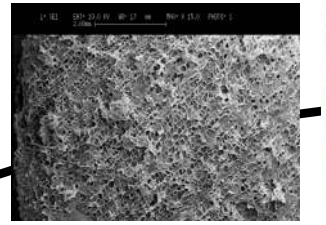


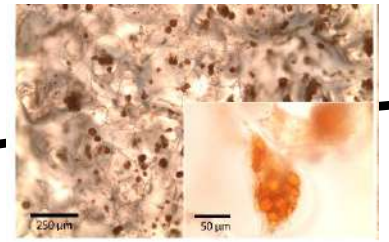


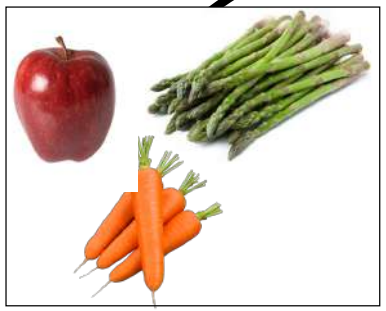
INNOVATIVE BIOMATERIALS

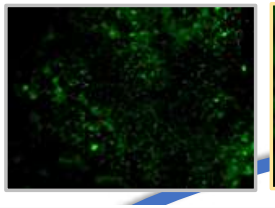
- biomaterials for regenerative medicine:
  - **scaffold** from **vegetables** and **fruits**
  - structure for scaffold **vascularization**
  - new formulations for **biomaterial inks**/bioinks
- new solution for improvement of implantable devices

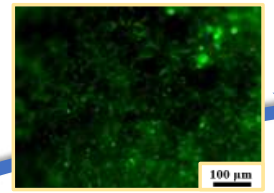
b²efore
biomaterials & biofabrication for regenerative engineering

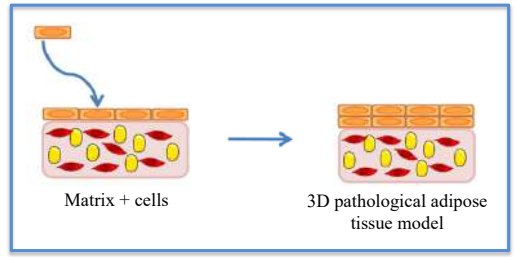












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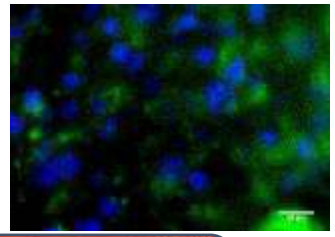

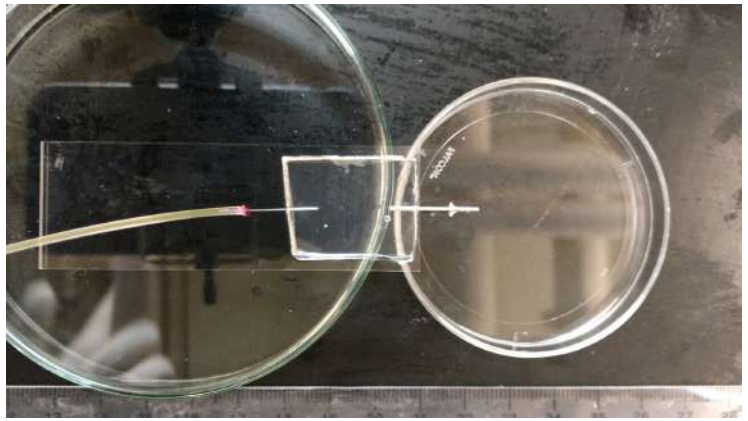

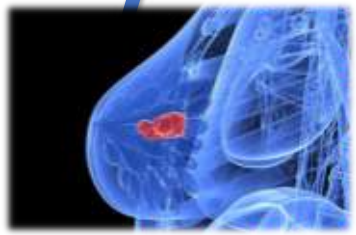

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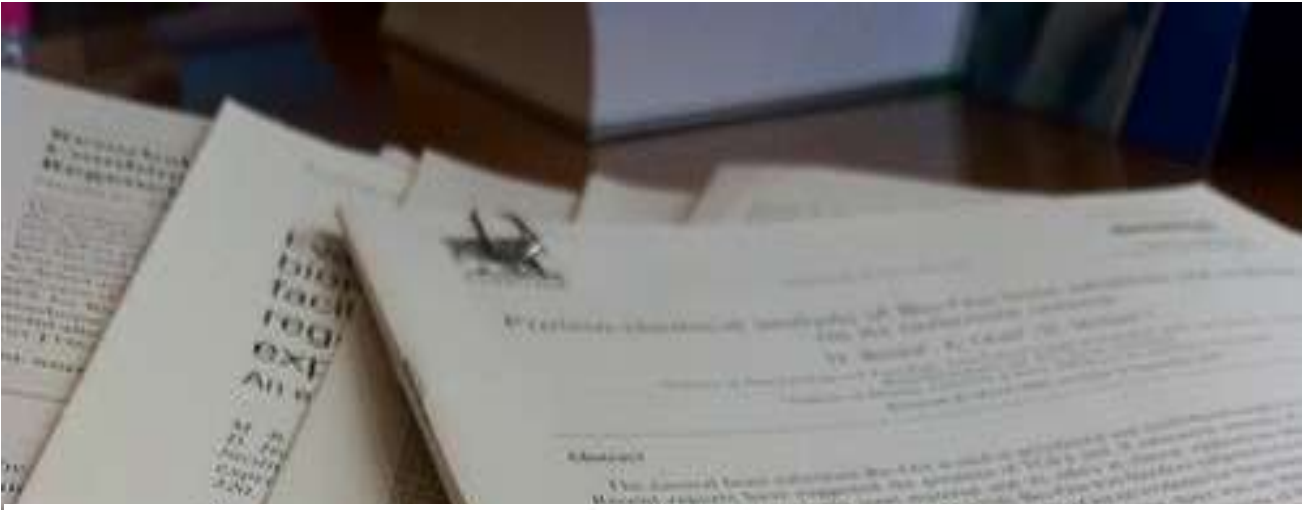

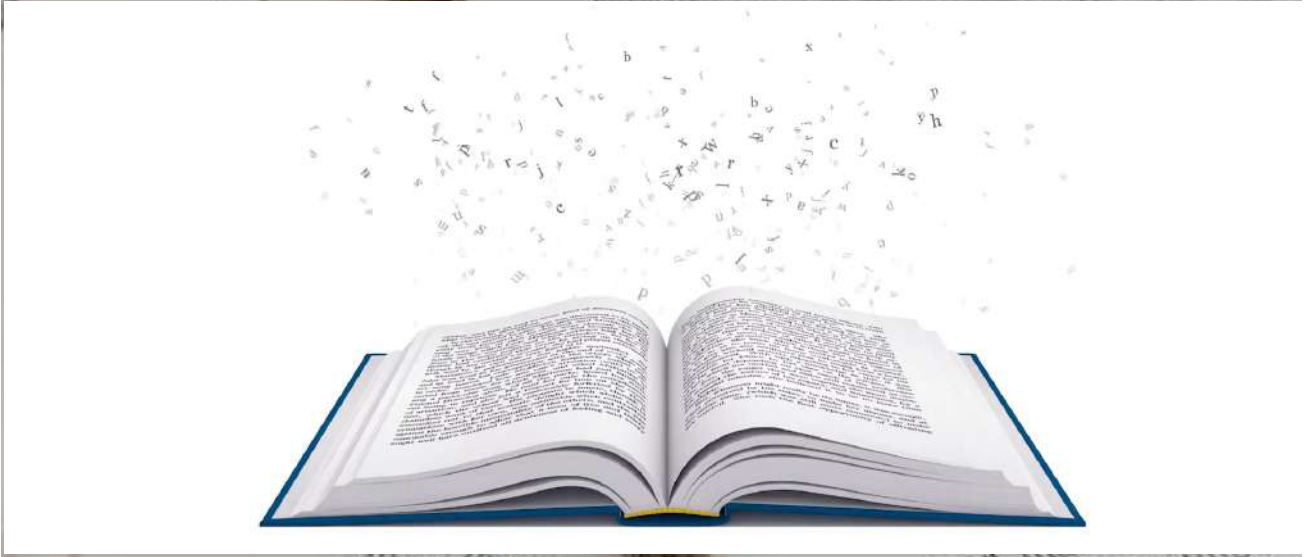

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