

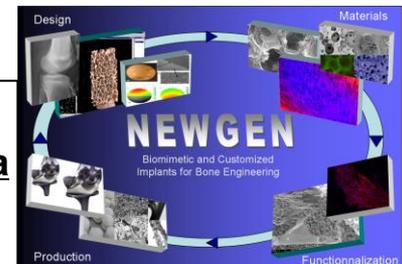
- **Complete denomination:** INEB Instituto de Engenharia Biomédica (Univ. Porto)
- **Location (city, country):** Porto, Portugal
- **Director:** Dr. Pedro Granja
- **Contact person in NEWGEN:** Prof. Fernando J. Monteiro (Biocomposites research group Leader)(14 researchers; 5 PhD's)
- **Working Group involvement:** Coordinator of WG4, participant WG3
- **Staff:** Maria Pia Ferraz, Susana Sousa, Christiane Salgado, Marta Laranjeira(PhD's)
+ PhD students, Master students, project researchers
+ Prof. Maria Helena Fernandes (external collaborator)

Research topics: Biomaterials; Tissue Engineering; Composites for Drug releasing and scaffolding for tissue regeneration; Bioactive surfaces on ceramic substrates for guided tissue growth

➤ Researchers expertises:

Biocomposite scaffolds development including physical, chemical and surface characterization *in vitro* studies and microbiology

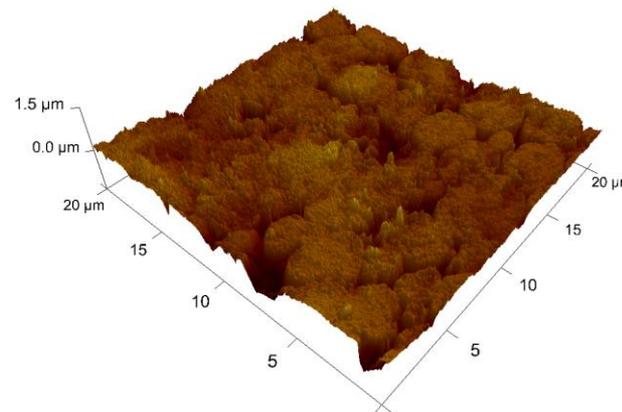
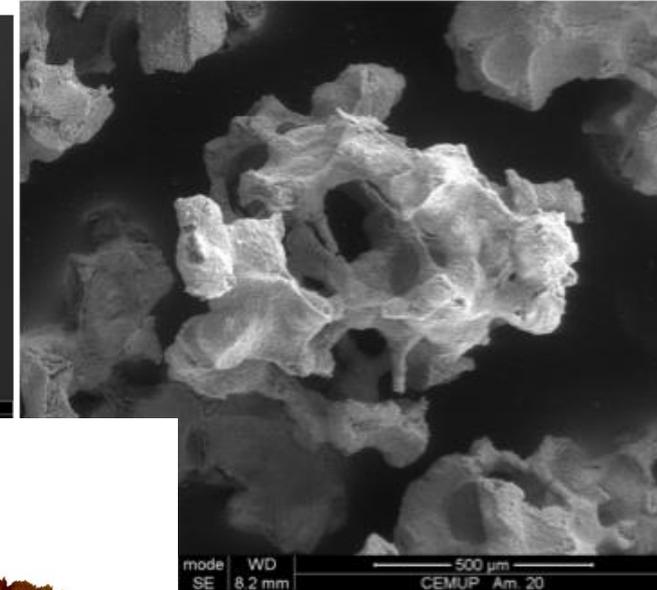
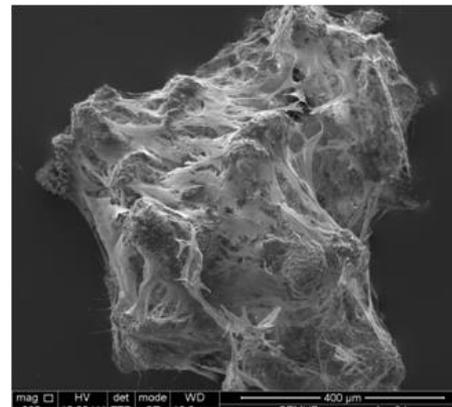
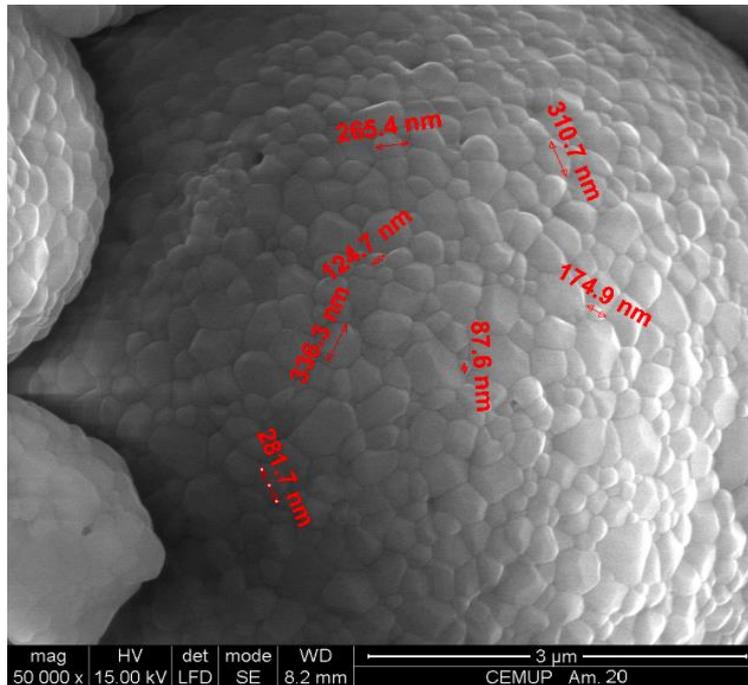
INEB
Instituto de Engenharia Biomédica
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Example

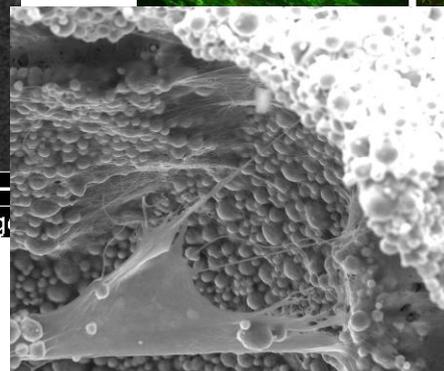
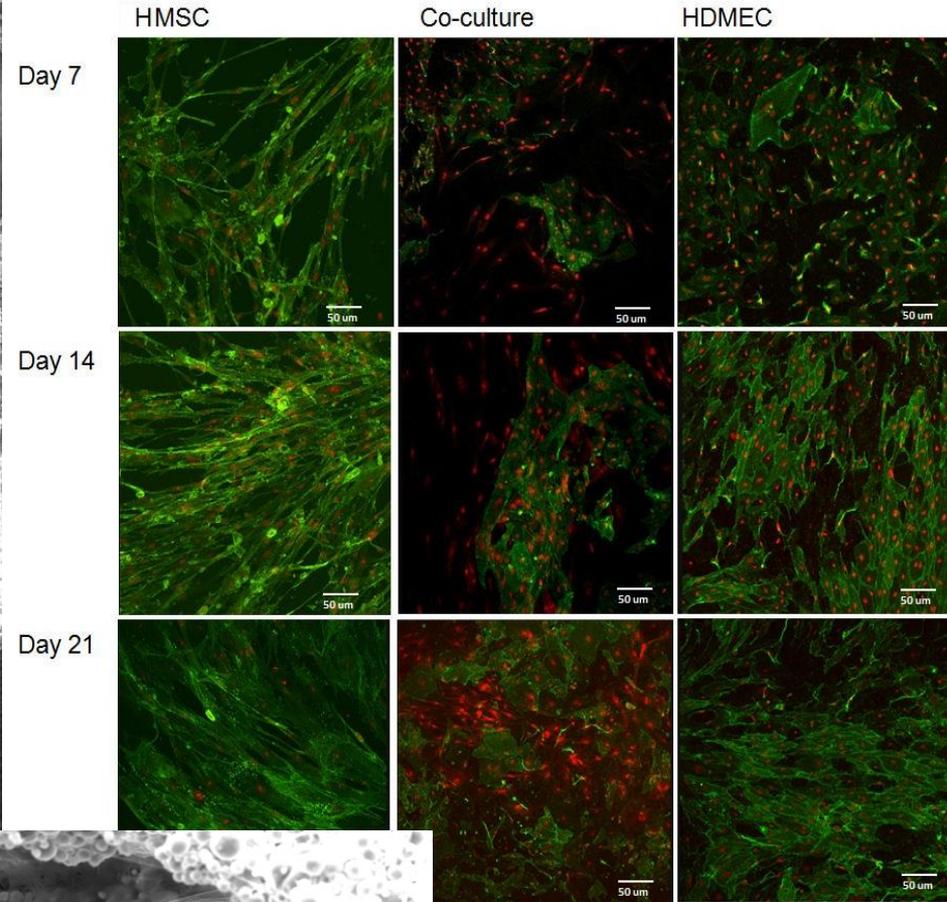
(nanoHA + Type I collagen) composite scaffolds for bone regeneration and for controlled drug release



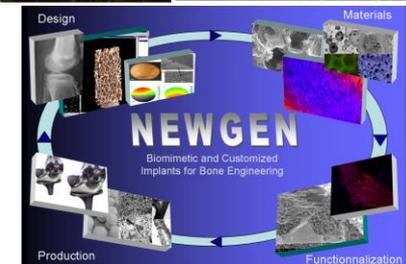
NanoHydroxyapatite/ Collagen Scaffold



mag HV det mode WD
350 x 15.00 kV ETD SE 10.9 mm
CEMUP HA colagen 300 µm



mag HV det mode WD
2.500 x 15.00 kV ETD SE 12.3 mm
CEMUP HA colagenio 50 µm

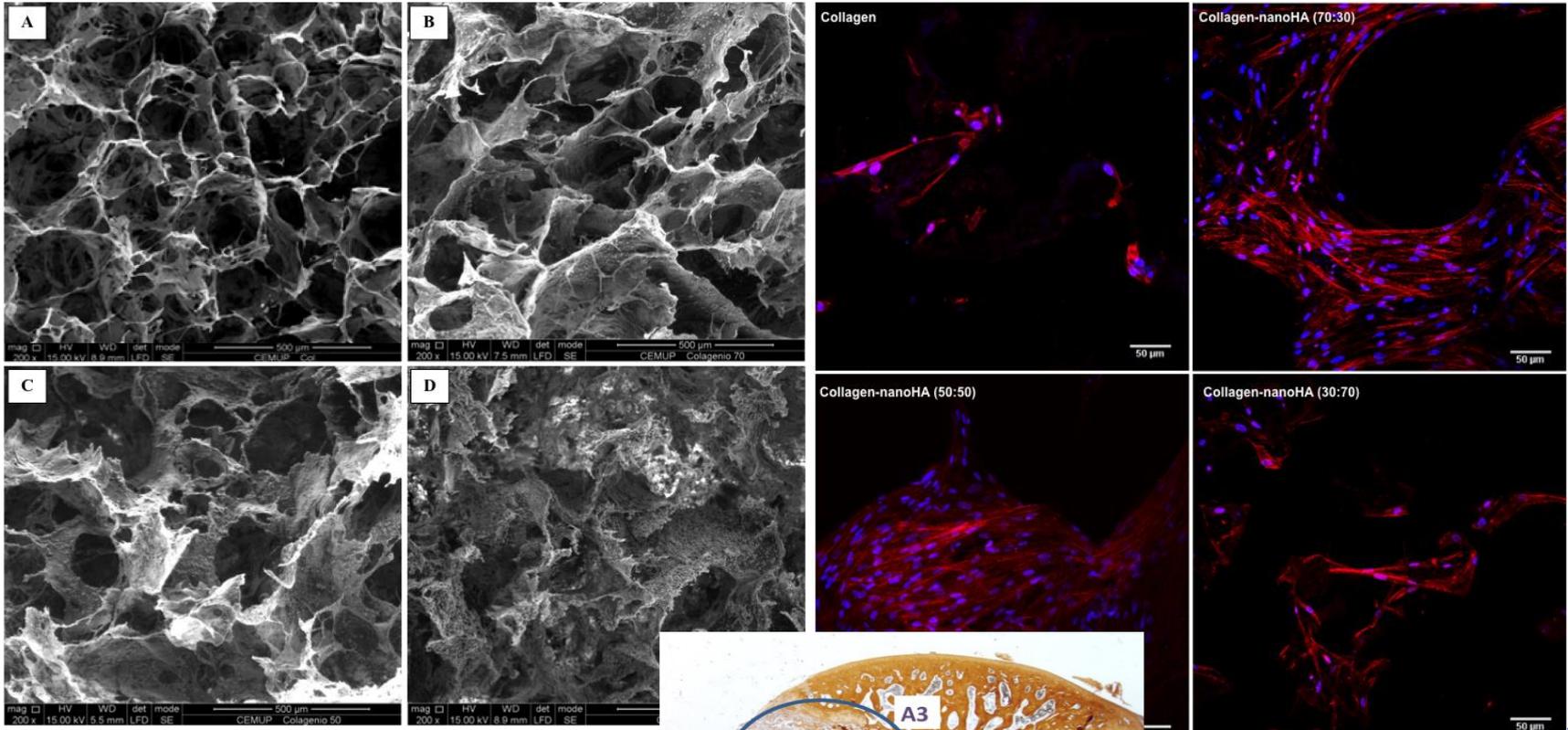


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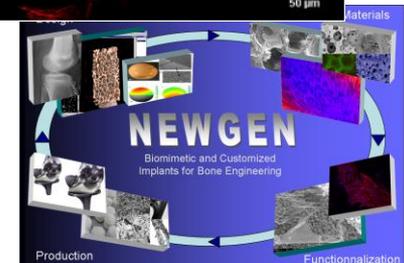
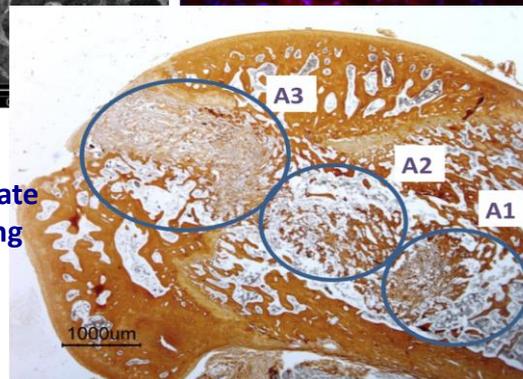
Type I collagen/nanoHA sponges for bone tissue engineering

3D hBMSC cultures



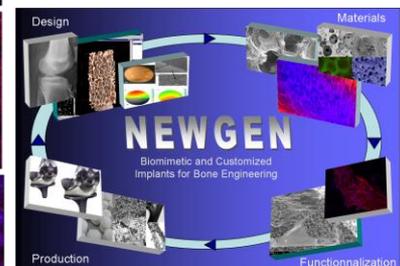
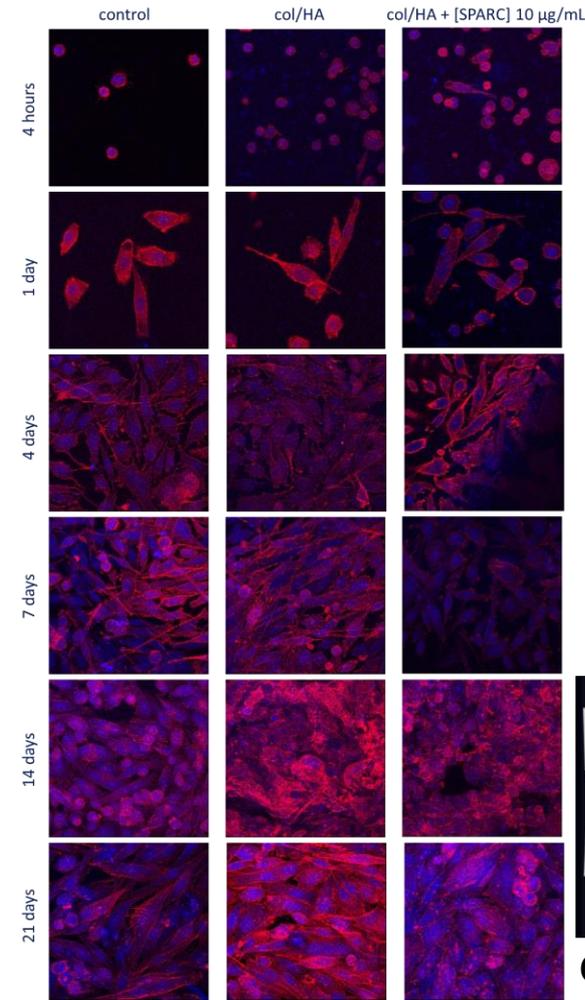
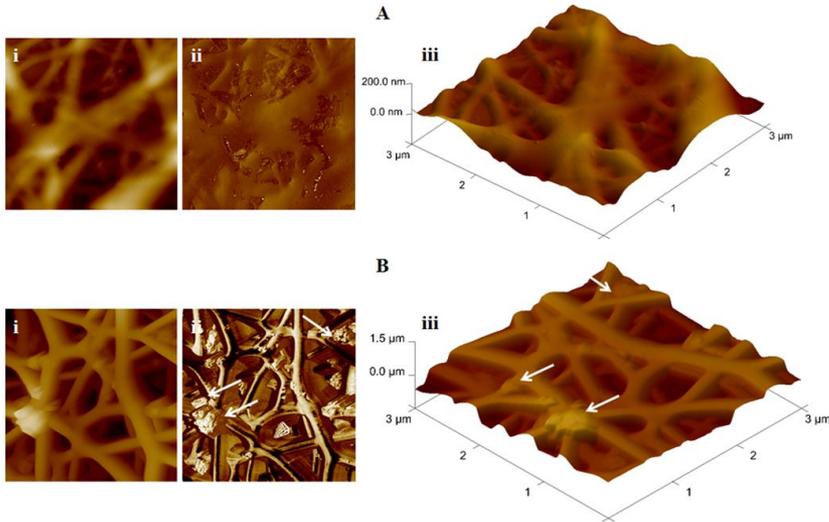
Teixeira et al,
J Biomed Mater Res A (2010)

In vivo experiments in rats.
De novo bone being formed with adequate vasculature and inflammation zone being progressively reduced



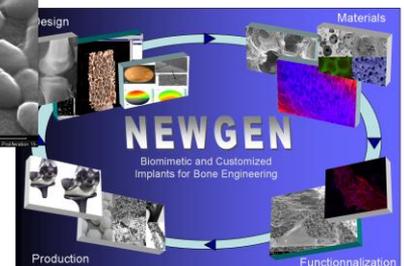
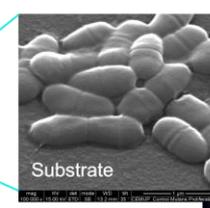
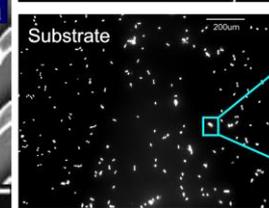
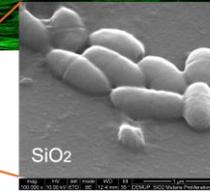
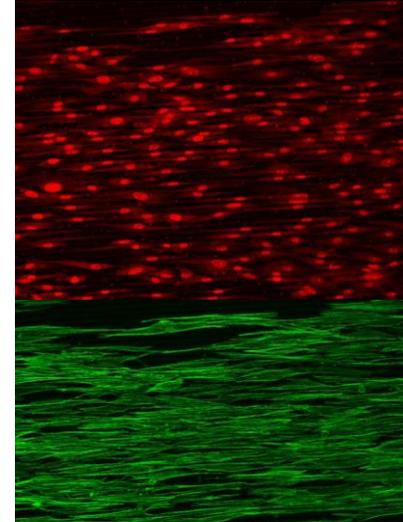
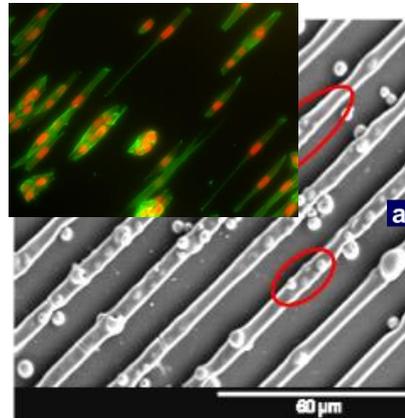
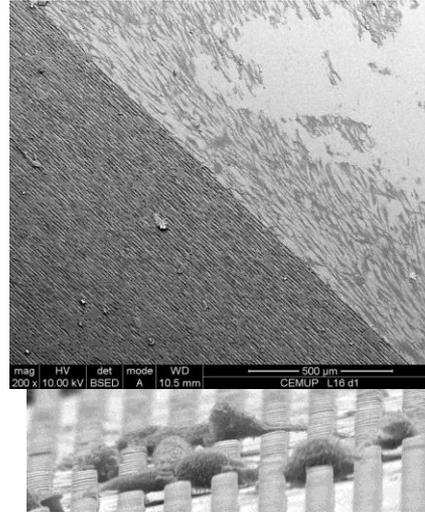
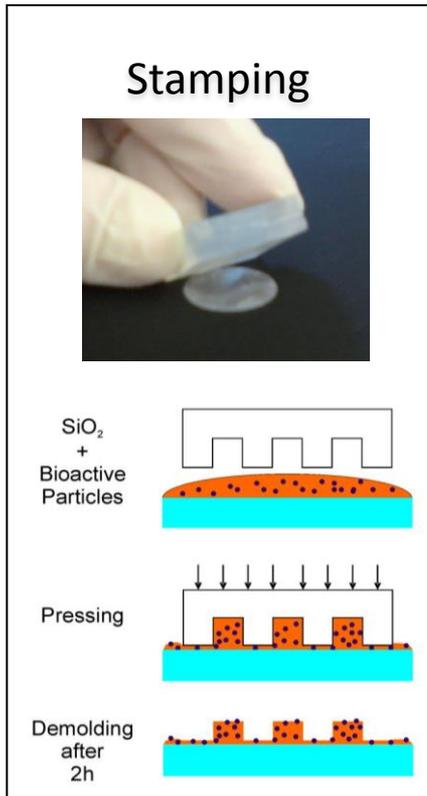
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Example
Influence of SPARC adsorption on the Behavior of PCa cells and osteoblasts in a 3D Nanohydroxyapatite/collagen scaffold



Example Microstructured anisotropic surfaces for guided tissue growth on ZrO₂ based implants

SiO₂ + nanoHA
coatings on zirconia



Technological platforms

Services Unit for Interfaces and Macromolecules (SUIM):

Atomic force microscopy (AFM) coupled to inverted fluorescence microscopy (IFM)

Confocal RAMAN microscopy

Imaging ellipsometry

Fourier transformed infrared/RAMAN spectroscopy

Quartz crystal microbalance with dissipation (QCM-D)

Surface energetics and electrokinetics (nanoparticles and membranes(Zeta potential))

Gel permeation chromatography/size exclusion chromatography (GPC/SEC)

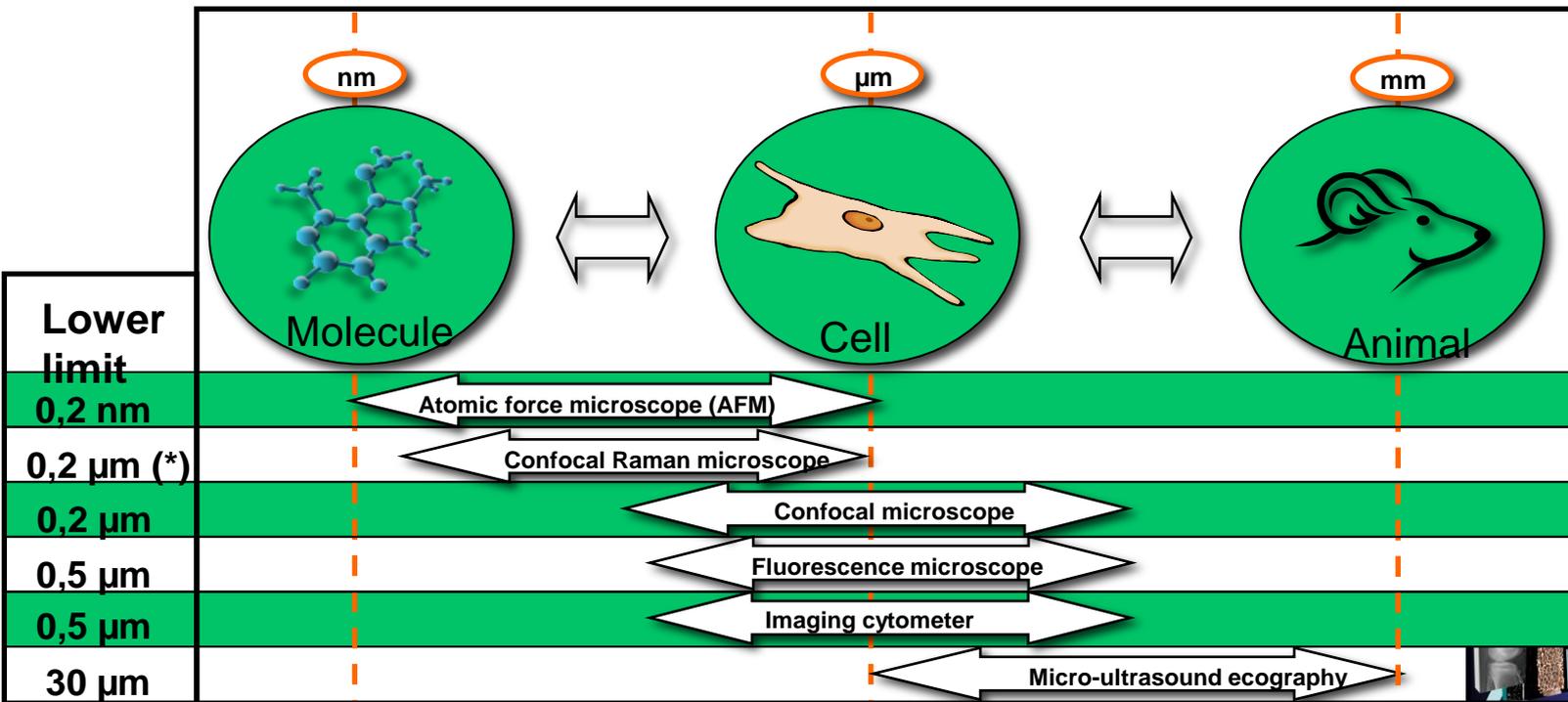
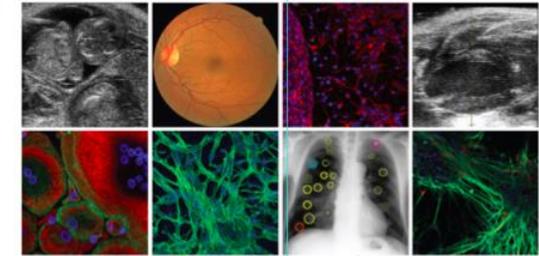
Contact Angle and Surface Tension (hydrofobicity)

Dynamic mechanical testing (DMA)

In Vitro Cell cultures testing facilities and
Microbiology Lab

Technological platforms

Competence Center in Bioimaging for Biomaterials and Regenerative Therapies (under development)



(*) refers to Raman confocal microscopy, which gives molecular information

