BIOLOGICAL CHARACTERIZATION PLATFORM

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ALIVE STRATEGIC AXIS

Major extension
New room, biological zone

MultiFab
Multi material 3D printing
Part of MultiFab integrated

Fourth zone
Biology and chemistry for micro & nano systems

2008

2012

2017
Workflow

Technologies
- Silicon/glass
- Polymers
- Biomaterials

Biological or Environmental Samples
- Organoids
- Cells
- Intracellular biomolecules
- Extracellular analytes

Instrumentation
- Optical microscopy
- Electrical spectroscopy
- Force spectroscopy
- Electrochemistry

Biology
- Microbiology
- Eukaryote cell culture
- Human blood samples

Chemistry
- Nanomaterials
- Light-induced polymerization
- Surface modification
Operational organization

7 rooms for a total surface of 450 m² with ~ 60 users

1- Cell culture rooms (class 1 and 2) 45 m²
2- Shared space for sample preparation 167 m²
3- Optical Microscopy 45 m² & Atomic force microscopy 36 m²
4- Electrochemistrity facility 30 m²
5- Fablab Multifab 37 m²
6- « Laboratoires communs » Biosoft & Impyact 20 m²
1- Cell culture facility

Facilities:
- *In vitro* culture of (human and animal) cells lines and primary cells (L2 laboratory)
- Human blood samples from “Etablissement Français du Sang”
- Bacteria, yeasts, micro-algae ... (L1 laboratory)

Applications:
- Cell culture in miniaturized microelectronic platforms
- Control of cell growth in miniaturized platforms
- Conditioning and monitoring of microphysiological systems
2- Molecular Biology facility

UV-Visible Spectrophotometer
• Absorbance measurements
• Biomolecule titration

Fluorimetry
• UV/Vis/NIR wavelength range
• Microplate format

Applications:
• Sample characterization,
• Blood conditioning,
• Immunocytochemistry
3- Chemistry & Nanomaterials

Nanoparticles conditioning

Suspension dispersion

Nanoparticles size and charge characterization

Dynamic Light Scattering - Zetasizer Nano ZS (Malvern):
- Size range 0.6 nm - 6 μm
- Zeta potential measurement

Coulter Counter qNano (IZON Science):
- Size range 40 nm – 15 μm
- Concentration measurement
- Zeta potential measurement
4- Optical/Force microscopy

Facilities:
- Inverted and upright, white light and fluorescence microscopy,
- Chamber with temperature and CO2 controlled environment for live cell imaging
- AFM Nano Wizard3 (JPK) on Zeiss microscope

Applications:
- Microfluidic devices,
- Biomarker analysis,
- Molecule, cell observations,
- Droplets, air microbubble generation in liquid phase.
5- Electrochemistry

Facilities to control and measuring the potential or current in liquid

- Metrohm Autolab potentiostat,
- Biologic VMP3 polypotentiostat,
- Ametek Parstat polypotentiostat

- Electrochemical treatment and/or functionalisation
- I-V cyclic voltammetry
- impedance spectroscopy

Applications:
- Detection of anti-oxidant (ascorbic acid, uric acid, glutathion) for skin analysis,
- Detection of algae activity,
- Detection of cell activity.
6- FAbLAB MultiFab

Open platform founded by FEDER and Region Occitanie:

• Development and dissemination of additive manufacturing technologies to academic and industrial partners
• 3D printing and bioprinting technologies, focused on high resolution (<10 µm) and multimaterials
• Stereolithography, inkjet printing, laser melting/sintering, proprietary technologies based on high-resolution photopolymerization and microfluidics for bioprinting

• Fabrication of microdevices from the millimetric down to the nanometric scale
• Large variety of materials including polymers, composite materials, metals, liquid inks, biomolecules,…
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Outcomes – Molecular analysis

Molecular nanomanipulation

Electrochemical sensing

Mechanical sensing

Optical sensing

Extracellular analytes
Outcomes – Cellular analysis

Optical & Force Microscopy

Cells

Electrical activity monitoring

Impedance spectroscopy
Outcomes – Microphysiological systems

Implanted electrodes

Cell culture in complex 3D scaffolds

Organoids