



ERRMECE

RESEARCH TEAM ON EXTRACELLULAR MATRIX-CELL RELATIONSHIPS

Équipe de Recherche sur les Relations Matrice Extracellulaire-Cellules

EA 1391

17 teacher-researchers

16 doctoral and postdoctoral researchers

ERRMECE, a life and health sciences research unit, conducts both fundamental and applied research into the interrelationships between cells and their various environments, whether natural (extracellular matrix, biofilms, microenvironment, etc.) or synthetic (surfaces, synthetic materials, biomaterials, etc.). The unit develops multiscale and multidisciplinary approaches based on molecular, supramolecular, and cellular perspectives. Its research revolves around:

- Dynamic matrix architecture and cellular response mechanisms
- Biomaterials and tissue engineering
- Microbial behaviour at interfaces

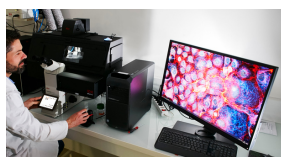


KEYWORDS SCIENCE

- Extracellular matrix and cellular environment
- Cellular and tissue pathophysiology: aging, carcinogenesis, wounds and healing
- Infectiology, colonisation, and cellular and bacterial contamination
- - Biomaterials (inert, bioactive, living, hybrid, etc.) and tissue bioengineering

KEYWORDS APPLICATIONS

- Biotechnologies
- Pharmacy
- Diagnosis
- Cosmetics
- Environment
- Security
- Heritage



APPLICATIONS AND INDUSTRIAL SECTORS

- Biomaterials engineering and molecular interactions: biomaterials based on thin films, hybrid organic/inorganic and/or connected medical devices, fluid hydrogel-type biomaterials optimised for molecular delivery, etc.
- Extracellular matrix engineering: adhesive biomimetic matrices, forensic matrices, dynamic and electro-stimulable matrices
- Control of bacterial contamination and biofilms
- Ecotechnologies
- Biodeterioration and preservation of materials: heritage materials (wood, etc.), building materials, innovative materials (phase change materials, etc.)

INDUSTRIAL PARTNERSHIPS · SPIN-OFFS

- 5 to 10 industrial collaborations per year
- BIOEC, BIOBANK, Laboratoires BROTHIER, SEBBIN, CLARINS, GENODICS, CLOTHO

KNOW-HOW · SKILLS · EXPERTISE · SPECIFIC FEATURES

- Purification and characterisation of matrix molecules (using healthy or pathological human samples, plant or marine samples, etc.) and development of biomimetic matrices
- Design of advanced 2D, 3D, and dynamic cell culture models; biological characterisation (cytotoxicity, molecular expression, cell behaviour) and quantitative imaging applied to tissue cell engineering, the development of therapeutic strategies (aging, cancers, wound healing, etc.), technological strategies (forensics), and sustainable development strategies (biomimetics, marine ecosystems, etc.)
- Microbial behaviour during surface colonisation processes, biofilm control in a physiopathological context, biofilm control in an environmental context (industrial, historical, or environmental sites)
- Design, development, and characterisation of biomaterials of various origins (ceramic, polymeric, lipidic, etc.), structural sizes (from macro- to nanometric scale), and states (gelled, thin films, emulsions, etc.) for health applications (bone engineering, skin engineering, delivery of biological (bacteriophage), natural, or synthetic active ingredients, etc.)
- Functionalisation of biomaterials and assessment of their bioactive properties, using biological approaches (cellular, molecular, microbial)

EQUIPMENT

- Photonic microscopy for eukaryotic and prokaryotic cell imaging and on materials for sample studies, videomicroscopy, and quantitative imaging
- Spectroscopy for molecular characterisation and the study of proteins' structural dynamics: fluorescence spectroscopy, infrared, UV-Visible absorption, polarimetry
- Protein purification systems: FPLC chains equipped with different columns (affinity, exclusion, ion exchange, His-Tag)
- Three level II containment laboratories dedicated to eukaryotic cell culture and pathogenic microorganisms, flow cytometry, etc.
- Molecular Biology Laboratory dedicated to the extraction, amplification, and characterisation of nucleic acids, the level of gene expression, microbial diversity, the design and production of recombinant proteins, bacterial or phagic genetic modifications, etc.
- Systems for characterising gel-type materials (proteins, biofilms) using rheology and texturometry, and for characterising biomolecular interactions
- Access to a microscopy platform: LASER Confocal Scanning Microscopy, Scanning Electron Microscopy, Atomic Force

PATENTS · SOFTWARE

- 4 active patents
- Controlled delivery, combination of molecules, tissue treatment method, etc.