



**LIÈGE université**  
**Center for Interdisciplinary  
Research on Medicines**

# **CIRM**

# **Center for Interdisciplinary Research on Medicines**

GROWTH ACROSS BORDERS  
OCTOBER 8, 2025

**P.-Y. Sacré**  
**M. Frédérich**

# University of Liège

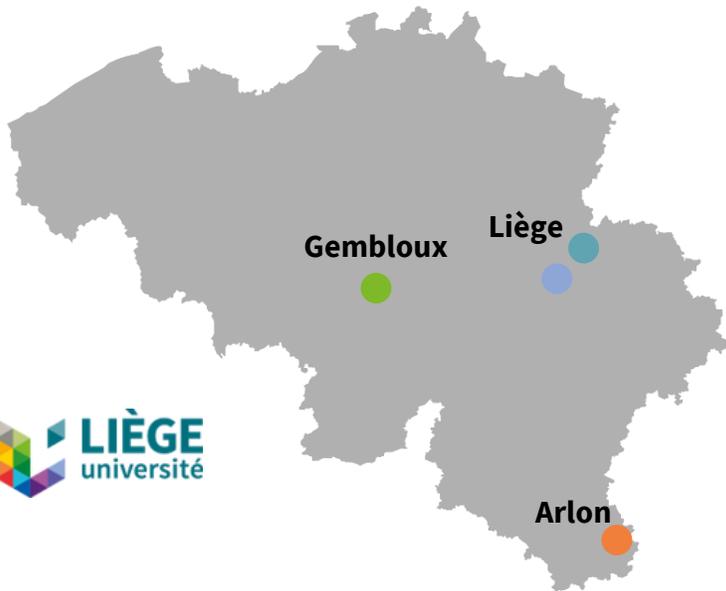
**3** Cities

**4** Campuses

**11** Faculties

**1** Hospital

**2** Clinics



● Liège City center

● Liège Sart Tilman

Human sciences

- Philosophy & Letters
- Law, Political Science and Criminology
- Social Sciences
- HEC Liège – School of Management
- Psychology, Logopaedics, and Educational Sciences
- Architecture

Science and technology

- Gembloux Agro-Bio Tech
- Faculty of Applied Sciences
- Sciences

Health sciences

- Medicine
- Veterinary medicine

University Hospital of Liège (CHU)

University Veterinary Clinic

University Psychology and Speech Therapy Clinic

# ULiège Key Figures



More than  
**90,000** alumni



**26,641** students  
**2,439** PhD students



**5,513** total staff  
**2,937** research staff



**193** masters



**42** research units



**314M** research budget



**114** active spin-offs  
with **3** created in 2024

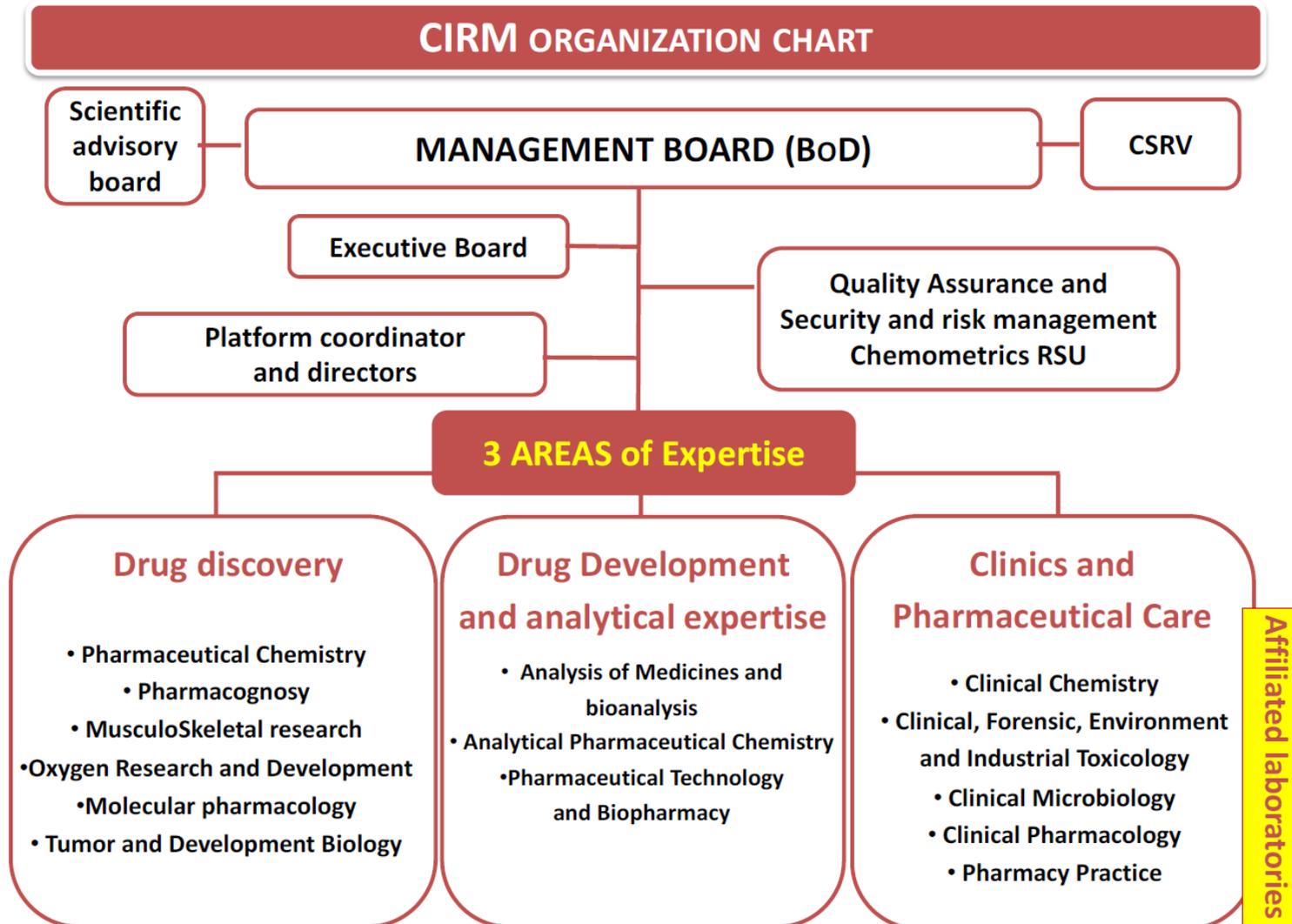


**654**  
technology transfers



**20** patents  
delivered in 2024

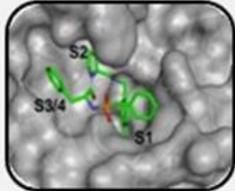
# Organization



14 laboratories

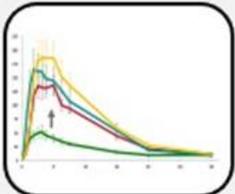
7 technological hubs

Research and services  
**from drug discovery to patient**



## TARGET AND LEAD DISCOVERY

- Synthesis or extraction of **novel pharmacologically active small molecules**.
- Develop original **pharmacological assay to assess activity of a putative target**
- Screen libraries for the **identification of active and selective ligands**
- Investigate the pharmacological properties of the target and ligands and **validate it at a preclinical level**



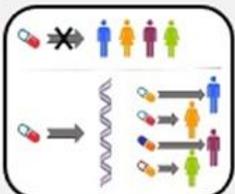
## ANALYTICAL STRATEGY AND DATA TREATMENT

- Improve the **data treatment** for analytical strategies
- Development of **innovative analytical methods** and strategies
- Fight against **falsified drugs**.
- Towards a better quality control of biopharmaceuticals.



## ADVANCED DRUG DELIVERY AND THERAPY

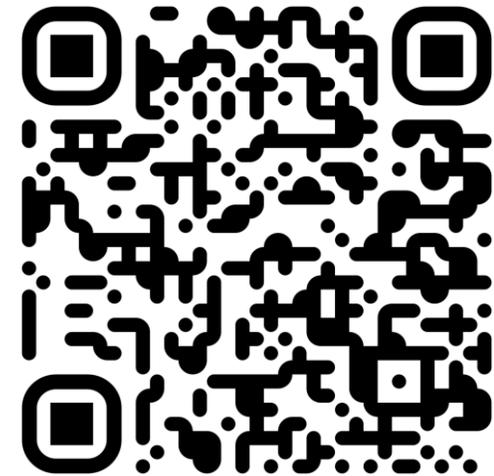
- **Drug targeting**
- **Nano vectorization:** design of a vector of nanometric size capable of transporting an active molecule to a given therapeutic target
- Improve the bioavailability of **BCS II and IV drugs**, and **biopharmaceuticals**.



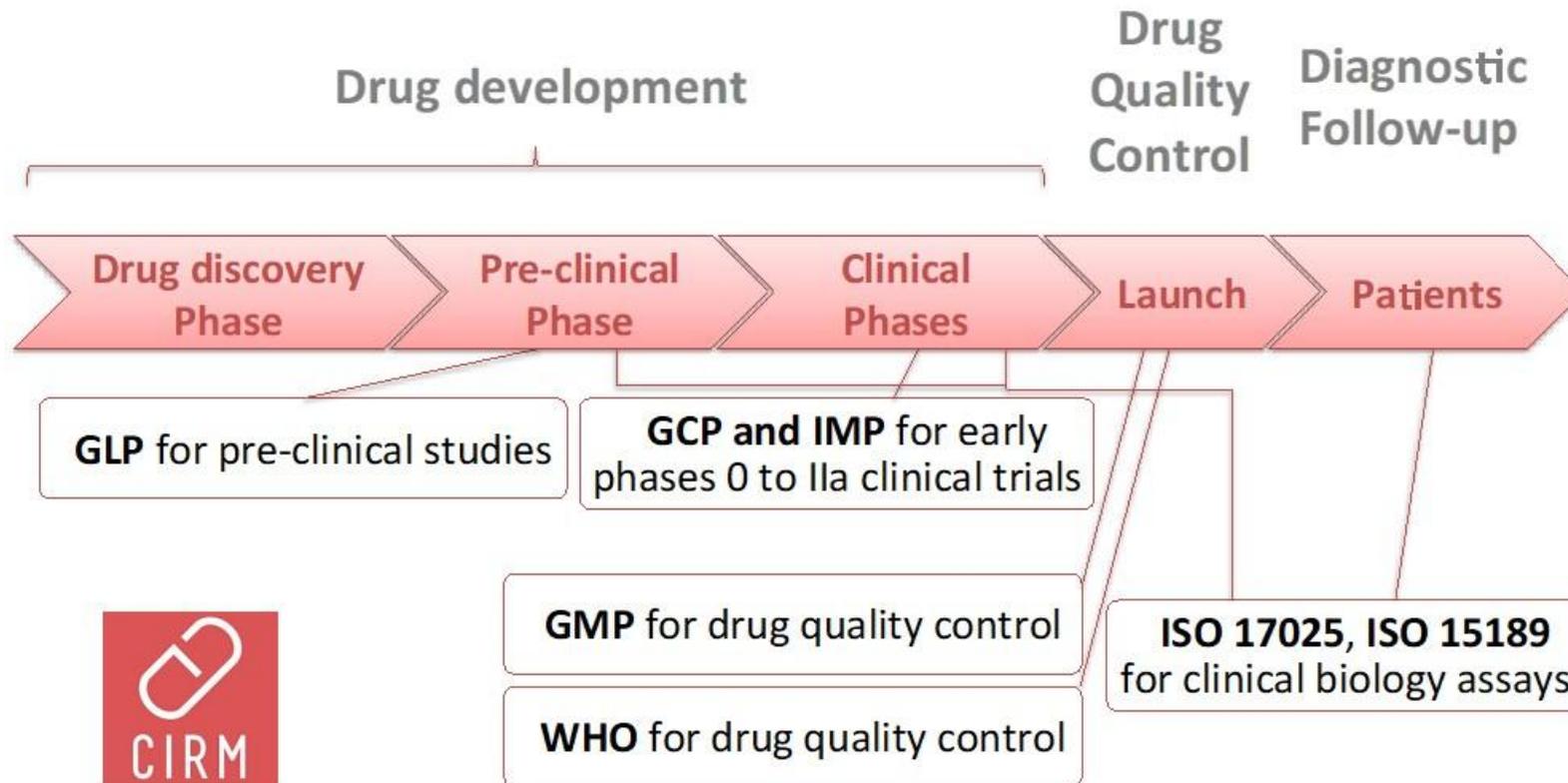
## BIOMARKER RESEARCH AND PERSONALIZED MEDICINE

- **Biomarker discovery** (diagnostic, pronostic, follow up, exposition)
- Better **characterize and stratify the patients**
- Evaluate and **improve the efficacy and safety** of treatment (TDM)

## CHECK OUR PUBLICATIONS



## Quality Systems implemented in CIRM entities



**WHO**

## **Intersection of two worlds:**

***ACADEMIA*** → cutting-edge research in all pharmaceutical sectors

***INDUSTRY*** → close collaboration with small and big industries

**→ *RESULT ORIENTED RESEARCH IN A QUALITY ENVIRONMENT***

## MaS – Santé Hub

- Proteomics and metabolomics biomarker discovery and validation
- Surfacome (cell surface proteome) of cancer cells
- Therapeutic pharmacological monitoring
- Screening of therapeutic and illicit drugs
  
- **Equipment:** TQ-MS, HRMS, IMS, ...
- **Expertise:** coupling MS to LC, CE, microfluidics

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## NMR – Santé Hub

- Structural analysis of small synthetic and natural compounds
  - Metabolomics in clinics, pre-clinics and natural applications
  - Quantitative analysis of compounds and complex mixtures
  - Verification of identity and purity of medicines
- 
- **Equipment:** Bruker 500 and 700 MHz with cryoprobe, Bruker SamplePro Tube
  - **Expertise:** structural analysis, Q-NMR, metabolomics

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## ViBra – Santé Hub

- Drug characterization and quality control
  - Development of PAT methods
  - Formulation analysis with Raman and IR chemical imaging
  - SERS detection of impurities at low concentration
- 
- **Equipment:** Transmission Raman, Raman confocal microscope, IR microscope, IR, NIR, and Raman spectrometers, handheld NIR and Raman spectrometers
  - **Expertise:** Multivariate data analysis, SERS, chemical imaging



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## ScF – Santé Hub

- Particle engineering
- Drug formulation
- Drug extraction
- Liposome sterilization
- Drug quality control
  
- **Equipment:** UPC<sup>2</sup>, PGSS, Supercritical CO<sub>2</sub> extractor
- **Expertise:** nanoparticle production, development of laboratory-scale processes & transfer to pilot scale

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# Services - Technological Hubs

## In Vitro – Santé Hub

- Characterization of nanoparticles with individual particle tracking
- Metabolic activity assessment
- Multimodal analysis of microplates
- *in vitro*  $CI_{50}$  of drugs or extracts on several strains of *Plasmodium falciparum*
- High resolution label-free quantitative live imaging of *in vitro* cultured cells.
  
- **Equipment:** Two cell culture rooms; FlexStation® 3 Benchtop Multi-Mode Microplate Reader; Nanosight NS300; CxA (Nanolive)

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## Prod– Santé Hub

- 100m<sup>2</sup> GMP facility room for pharmaceutical dosage form production
  - 2 class D rooms (10 and 21m<sup>2</sup>)
  - 1 class C room (13m<sup>2</sup>)
  - weighing room equipped with weighing stations included in a type II safety hood
- Full GMP qualified environment
- GMP facility room containing all equipment for small-scale production
- **Applications:** Hot Melt Extrusion, 3D printing, Supercritical Fluid technology, containment enclosure for reconditioning
- **Expertise:** benefit from expertise in pharmaceutical technology and GMP quality control production and analysis facilities



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## Purification – Hub

- Natural compounds discovery and purification
- Synthetic compounds purification
- Structural elucidation/characterization
- Chemodiversification
  
- **Equipment:** preparative chromatographic systems (MPLC, HPLC, DCVC, CPC, ...), extraction equipment (Buchi Reveleris, Multivapor, ...), synthesis equipment (Ika® Electrosynthesis, Photochemistry stations, ...),
- **Expertise:** extraction/purification of synthetic and natural compounds followed by purity and structural characterization

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## PHASE - PHarmaceutical and Analytical Services and Expertises

- Robust optimization of analytical methods
- Validation of analytical methods
- QC testing using Compendial monographs (EP, USP,...)
- Stability Studies (storage and testing) under ICH normal, intermediate and accelerated conditions
- Vibrational spectroscopy and Hyperspectral imaging
- Quality Assurance (QA) system under GMP certification
  
- **Equipment:**
  - physico-chemical testing instrument
  - Separative techniques
  - Mass spectrometers
  - Vibrational spectroscopy and hyperspectral imaging
  - Elemental analysis



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## GLP Preclinical and Toxicological Analysis and Evaluation Unit (GLP-AEPT)

- Drugs and metabolites assays in complex biological media (plasma, serum, urine, blood, milk, eggs, tissues, organs, etc.)
- Pharmacokinetic or toxicokinetic studies in humans or animals
- Studies of drug residues in veterinary medicines



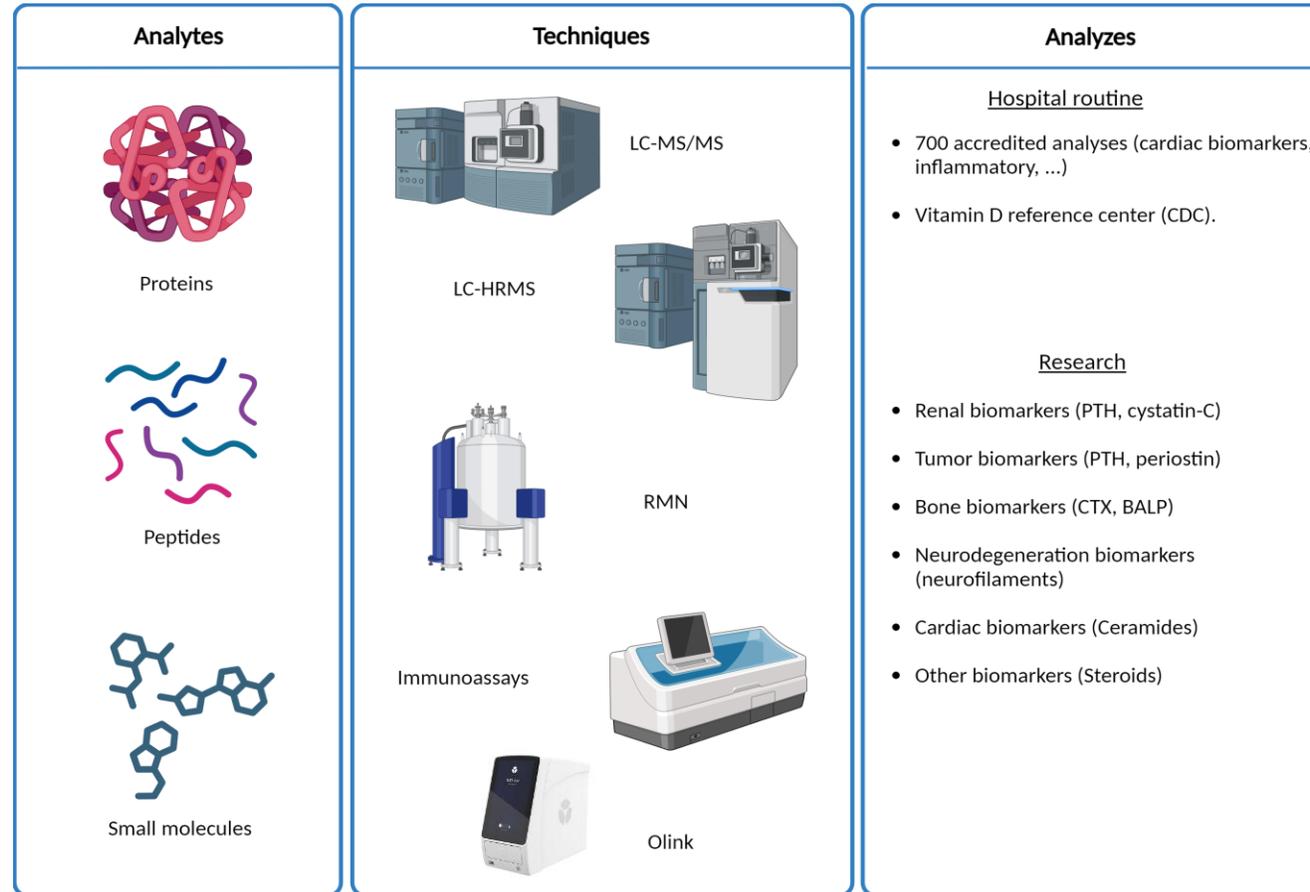
## Environmental Toxicology Unit

- Analysis of biological samples for pesticides, PCBs, metals, flame retardants, plasticisers, PFAS, etc.

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# Services – (pre-)clinical

## Clinical Chemistry



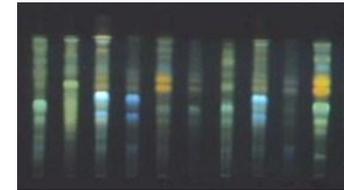
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# Specific activities

## Laboratory of Pharmacognosy

- Extraction and quality control of medicinal plants
- Bioguided extraction of bioactive substances

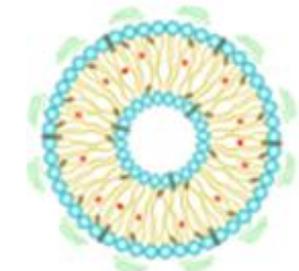
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## Laboratory of Pharmaceutical Technology and Biopharmacy

- Development of **oral formulations** (compression, HME, 3D printing, CO<sub>2</sub> supercritical)
- Amorphous solid dispersion
  - Personalized treatment
- Particle engineering for **powder** development (spray-drying, freeze-drying)
  - Inhalation powder
- Development of **lipid-based nanoparticles** (hydration of lipid film, rapid mixing, CO<sub>2</sub> supercritical)
  - LNP for gene therapy
  - Liposomes for classical API

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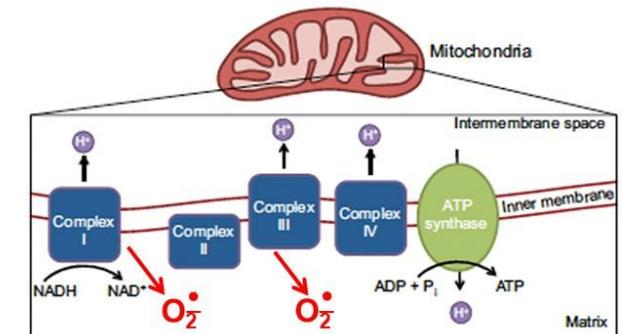
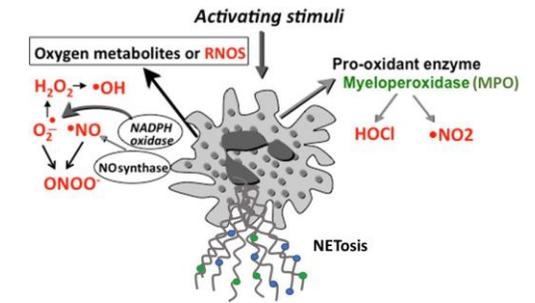


# Specific activities

## Center for Oxygen Research and Development (CORD)

- Measurement of the production of **reactive oxygen species (ROS)** and modulation of their release by synthetic compounds or natural extracts
- Platform for investigating **mitochondrial function** using various technologies including **high-resolution oxygraphy**
- **Preclinical cell therapy platform** based on patented minimally invasive technology for producing **stem cells** from muscle micro-biopsies (mdMSCs)

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# Specific activities

## musculoSkeletal Innovative research Lab (mSKIL)

- pre-clinical and clinical investigation of drugs, food supplements and medical devices used in the treatment of MusculoSkeletal (MSK) disorders and rheumatic diseases (osteoarthritis, sarcopenia and intervertebral disk degeneration)
- In vitro models
  - cytokines network, oxidative stress, senescence, cartilage repair and degradation, bone remodeling, synovial inflammation and skeletal muscle cells metabolism.
- In vivo models
  - pain, inflammation, osteoarthritis, and intervertebral disk degeneration.
- genomic, proteomic and metabolomics studies of conditioned culture medium, serum, plasma, synovial fluids or tissues
- diagnosis and follow-up of osteoarthritic patients



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## University certificates

- Radiopharmacy
- Quality assurance
- Regulatory Affairs
- Clinical test
- Phytotherapy
- Quality control
- Pharmaceutical management



TRAINING

**CIRM makes the link between**  
**ACADEMIA & INDUSTRY**  
**“from research to patient”**

**Quality environment**

GCP

GMP

GLP

ISO17025

ISO 15189



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