RÉPUBLIQUE FRANÇAISE

Liberté
Égalité
Fraternité

INRAE Lyon 1 Inserm

UMR1397

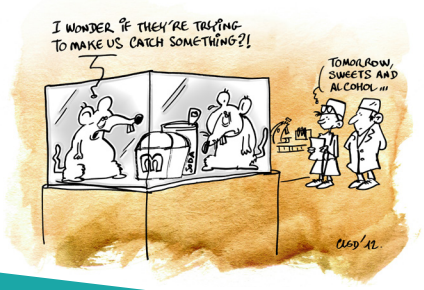
Cardiovascular diseases, Metabolism, Diabetology and Nutrition Laboratory (CarMeN)

Management
Hubert Vidal, Director

Research topics
- Food and human health
- Mitochondrial – endoplasmic reticulum structural and functional interactions
- Pathophysiology of ischemia-reperfusion syndromes in the heart, kidney and brain

Key figures
- 71 researchers and equivalent
- 15 hospital practitioners
- 36 engineers, technicians and administrative staff
- 32 students and post-docs
- 3 research teams

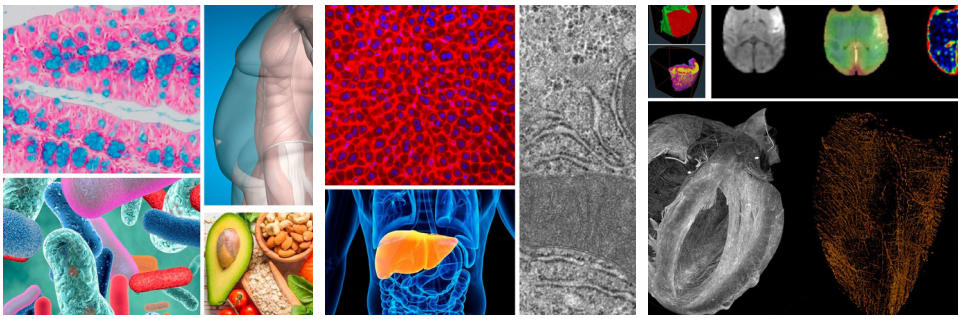
Keywords
- Nutrition & Food
- Cardiometabolic diseases
- Ischemia-reperfusion
- Microbiota, pre/probiotics
- Functional organelles (mitochondria, endoplasmic reticulum)
- Inflammation



Mission and objectives

The Cardiovascular diseases, Metabolism, Diabetology and Nutrition laboratory (CarMeN) is a joint research unit (UMR) jointly supervised by INRAE, INSERM and Claude Bernard Lyon 1 University.

The CarMeN UMR carries out research into cardiovascular diseases, metabolism, diabetology and nutrition. These major diseases have common pathophysiological bases linked to the environment, lifestyle and aging of the population.



Photos ©INRAE

In order to propose innovative strategies to prevent and treat metabolic diseases, the main objectives are to:

- study the impact of foodstuffs on metabolism and health by targeting intestinal homeostasis, particularly by understanding the role of the complex structure of foodstuffs (both natural and processed) and of additives, ingredients and pollutants, in health and disease;
- identify common mechanisms of failure in the action and secretion of insulin by targeting the functional roles of MAMs (mitochondria-associated membranes) in controlling the homeostasis of glucose and lipids and to identify new factors and regulators affecting MAMs;
- study the pathophysiology of ischemia-reperfusion syndromes in the heart, kidney and brain by targeting the inflammatory process and the role of mitochondria.

Centre
Lyon-Grenoble Auvergne-Rhône-Alpes

Faculté de Médecine Lyon Sud
Centre Hospitalier Lyon Sud
Sect. 2 Bât. CENS ELI-2D
165, chemin du Grand Revoyet
69310 Pierre Bénite
Tel.: +33(0)4 26 53 59 17

https://carmen.univ-lyon1.fr/en/

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

INRAE Lyon 1 Inserm

UMR1397

CarMeN unit teams

- DO-IT team: "Diet and food matrix in obesity and metabolic diseases: role of intestinal tract and innovative therapeutics"
- MERISM team: "Mitochondria-ER interactions and signalling in metabolic health and diseases"
- IRIS team: "Ischemia-Reperfuslon Syndromes (IRIS)"

Glossary

- CERMEP: In Vivo Imaging Centre
- CIC: Clinical Investigation Centre
- CRNH-RA: Rhône-Alpes Human Nutrition Research Centre
- ENS: Ecole Normale Supérieure de Lyon
- HCL: Hospices Civils de Lyon
- INSA: Institut National des Sciences Appliquées
- PBES: Plateau de Biologie Expérimentale de la Souris
- SFR: Structure Federative de Recherche (Research Cluster)

Research

To achieve these objectives, various research projects have been developed covering:

- the study of animal- and plant-based dietary polar lipids as well as "fast" and "slow" lipids (more or less emulsified and/or rigid vs liquid)
- prebiotics, slowly digestible starch, polyphenols, bioactive lipids & probiotics
- the postprandial and metabolic impacts of the food matrix and metabolic flexibility
- FGF19, agent preventing sarcopenia, bile acid, metabolic endotoxemia
- personalized bariatric medicine, surgical innovation and safety, diet-related behaviour and strategies for nutritional management
- impacts on adipose tissue and adipocyte stem cells
- mathematical modelling of lipid absorption and postprandial response
- characterization of MAMs' physiological role in controlling glucose and lipid metabolism and study of the underlying molecular mechanisms
- identification of new nutritional or pharmacological regulators of MAMs and their functional impacts
- imagery and molecular mechanisms of ischemia-reperfusion: Ca2+, cell death, metabolism and inflammation
- mechanisms of packaging and preserving organs & engineering
- research into early post-infarction prognostic biomarkers and treatments
- characterization of post-ischemic inflammatory response mechanisms during a stroke and neuroprotection strategies
- study of the pathophysiology of ischemia-reperfusion kidney damage
- evaluation of organ protection and/or conservation strategies such as therapeutic hypothermia

Collaboration and expertise

At the local level, the CarMeN UMR relies on several clinical research partners (CRNH-RA, CIC, HCL), and on technological facilities (CERMEP, SFR Santé Lyon Est, SFR Biosciences, PBES, INSA Lyon, ENS de Lyon).

At the national level, the UMR collaborates with 73 research teams (CIRAD Montpellier, INRAE units STLO, MICALIS and MEDIS, Institut Cochin, Institut Pasteur Lille, etc.) and 27 industries. The laboratory is involved in the INRAE metaprogramme BESTDAIRY that includes nine INRAE units, as well as in the INRAE consortium SYALSA OM3D.

At the international level, the UMR collaborates with 35 partners (University of Oslo - Norway, University of Mississippi - USA, Medical Center, Lebanese University, etc.). The CarMeN laboratory and the Federal University of Paraiba (UFPB-Brazil) have been selected for the 2023 CAPES-COFECUB programme.

Scientific facilities

The UMR has two laboratory facilities: one covering 650 m2 at Lyon Est hospital and one covering 1200 m2 at Lyon Sud hospital.

Technical support facilities (cytometry, confocal microscopy, genomics, histology, cell culture) and an in vivo exploration facility, iXPLORA (IBISA accredited) are available to researchers. The whole UMR is certified ISO 9001:2015 (AFNOR).

Teaching

The UMR is heavily involved in scientific teaching at the Lyon Faculty of Medicine, the Biosciences Faculty, the Institute of Technology in biological engineering and INSA, thanks to the work of 51 lecturers, some of whom are practitioners. The UMR coordinates the Master RCMN (nutritional and cardiometabolic regulations) and is a member of EDISS, interdisciplinary Doctoral School in Health Sciences.

Communication - August 2024