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## LYOS - Physiopathologie, diagnostic et traitements des maladies osseuses

Rapport Hcéres

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# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

HCERES report on research unit:

Pathophysiology, Diagnosis and Treatments of Bone  
Diseases

LYOS

Under the supervision of the following  
institutions and research bodies:

Université Claude Bernard Lyon 1 – UCB

Institut National de la Santé Et de la Recherche  
Médicale - INSERM

# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

*In the name of HCERES,<sup>1</sup>*

Didier HOUSSIN, president

*In the name of the experts committee,<sup>2</sup>*

René RIZZOLI, chairman of the committee

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Under the decree No.2014-1365 dated 14 november 2014,

<sup>1</sup> The president of HCERES "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5)

<sup>2</sup> The evaluation reports "are signed by the chairman of the expert committee". (Article 11, paragraph 2)

## Evaluation report

This report is the result of the evaluation by the experts committee, the composition of which is specified below.  
The assessments contained herein are the expression of an independent and collegial deliberation of the committee.

Unit name:	Pathophysiology, Diagnosis and Treatments of Bone Diseases
Unit acronym:	LYOS
Label requested:	UMR_S
Present no.:	UMR_S 1033 Inserm
Name of Director (2014-2015):	Mr Philippe CLÉZARDIN
Name of Project Leader (2016-2020):	Mr Philippe CLÉZARDIN

## Expert committee members

Chair:	Mr René RIZZOLI, Université de Genève, Suisse
Experts:	Ms Claudine BLIN, Université de Nice (representative of the CSS)
	Mr Nick HARVEY, University of Southampton, United-Kingdom
	Mr Luis MARQUES DA COSTA, Instituto de Medicina Molecular, Lisbon, Portugal
	Mr Philippe ORCEL, University Paris Diderot

### Scientific delegate representing the HCERES:

Mr Jean GIRARD

### Representatives of the unit's supervising institutions and bodies:

Ms Benedicte DURAND (representative of the Doctoral School ED n°340  
"Biologie Moléculaire et Intégrative de la Cellule")

Mr Germain GILLET, University of Lyon 1

Ms Anne ROCHAT, Inserm

## 1 • Introduction

### History and geographical location of the unit

The INSERM unit UMR S1033 is the result of the merging in 2011 of 2 Inserm units in the Lyon area. Unit Inserm UMR\_S 664 (dir.: Mr Philippe CLÉZARDIN) set up on January 1<sup>st</sup> 2005 and unit Inserm UMR\_S 831 (dir.: Mr Roland CHAPURLAT) set up on January 1<sup>st</sup> 2007. The research theme of unit U 664 focused on the study of “Mechanisms and Treatments of Bone Metastasis and Solid Tumours”. That of unit UMR\_S 831 was aimed at studying “Osteoporosis and Bone Quality”. In the framework of the evaluation campaign 2011-2014, it appeared logical to Mr Roland CHAPURLAT and Mr Philippe CLÉZARDIN to group their forces to form a single research unit dedicated to Bone Diseases.

Presently, this unit is the largest research unit in France dedicated to the improvement of care of benign and malignant bone disease. Its main objective is to investigate and understand the mechanisms leading to bone fragility in osteoporosis and to identify the molecular mechanisms preceding the occurrence of bone lesions in metastatic cancer. The unit is composed of 3 teams on 2 sites, which are close geographically, with full complementary medical, scientific and technical competences, enabling a fully translational research approach of the objectives. One site is at the UFR de Médecine Lyon-Est (Laennec complex) and the second at the Hôpital Edouard Herriot (pavillon F - service de Rhumatologie) where the clinical research is run. Thanks to sites very close to each other (a few minutes by foot), interaction is very easy between the collaborators working at each of the sites.

Translational research and its international recognition are undoubtedly the major assets of the unit.

### Management team

The staff is composed of 60 employees, including 15 on temporary contracts, 9 Inserm/CNRS researchers, including 6 qualified research supervisors (HDR), 7 teacher-researchers, including 6 HDR. The unit has experienced a 22% increase in size since 2011 and beneficiates of 900 m<sup>2</sup> of laboratory on the Laennec site and of 400 m<sup>2</sup> on the Edouard Herriot hospital site, for clinical investigation.

The management is ensured by the unit director assisted by the 2 teams' leaders.

### HCERES nomenclature

SVE1\_L4

### Unit workforce

Unit workforce	Number as at 30/06/2014	Number as at 01/01/2016
<b>N1:</b> Permanent professors and similar positions	4	3
<b>N2:</b> Permanent researchers from Institutions and similar positions	11	14
<b>N3:</b> Other permanent staff (without research duties)	17	19
<b>N4:</b> Other professors (Emeritus Professor, on-contract Professor, etc.)		
<b>N5:</b> Other researchers (Emeritus Research Director, Postdoctoral students, visitors, etc.)	6	7
<b>N6:</b> Other contractual staff (without research duties)	10	5
<b>TOTAL N1 to N6</b>	<b>48</b>	<b>48</b>

Unit workforce	Number as at 30/06/2014	Number as at 01/01/2016
Doctoral students	17	
Theses defended	8	
Postdoctoral students having spent at least 12 months in the unit	3	
Number of Research Supervisor Qualifications (HDR) taken	4	
Qualified research supervisors (with an HDR) or similar positions	11	12

## 2 • Overall assessment of the unit

### Global assessment of the unit

The Inserm unit UMR S1033 is considered as the first one in France in the field of translational research related to bone fragility and metastatic cancer. It is among the first 10 in Europe and probably 20 in the world. The recognition is based on the scientific visibility from publications, the participation to multicenter trials, the presence as speakers in congresses, the number and quality of publications, the participation to various networks, the attraction of industry funding, and the active participation of unit members in numerous committees of scientific societies.

### Strengths and opportunities in relation to the context

#### Strengths:

- translational research projects, encompassing molecular mechanisms to clinical applications, ie a full bench to bed approach;
- availability of several well documented and investigated patients cohorts, some followed since many years;
- transdisciplinary research projects;
- numerous high quality publications;
- high capacity of resilience, as demonstrated by a fully smooth transition after the 2011 merging.

#### Opportunities:

- "Horizon 2017" project of the Hospices Civils de Lyon (HCL): Expert Center in Oncology on Bone Metastasis (CEMOS);
- Laboratory of Excellence "DEVweCAN" (10 years, 12 M€) Laboratory of Excellence: includes 11 research teams that have been ranked A+ at the previous HCERES evaluation campaign 2011-2014.

Arrival of 3 scientists: one PHU from HCL, one CR1 CNRS and one MCU-PH from HCL. This arrival coincides with the retirement of the current head of team #3.

#### National partnerships:

- ARROW (INCa November 2014 - November 2017): Role of axon guidance receptors in the colonisation of the osteoblastic niche by cancer cells. Includes 2 academic labs (Lyon, Paris);
- INCa (November 2014 - November 2018): Identification of ion channel functional signature for the metastatic prostate cancer prognostic and targeting. Includes 5 academic labs (Lille, Lyon, Nantes, Tours, Brest);

- MOUSE-KOSTO (ANR Blanc; 2014 - 2017): Redundancy and complementarity of osteopontin and bone sialoprotein in skeletal biology - generation and experimental analysis of double knockout mice. Includes 2 academic labs (Lyon, Saint Etienne);

- MULTIPS (ANR Blanc; 2014 - 2017): Multiphysic and multiscale assessment of bone quality. Includes 2 academic labs (Lyon).

European partnerships:

TURBO project: TumoUR and BOne. Horizon 2020: Marie Curie Action Initial Training Network (ITN). 8 academic partners, 4 SMEs (budget: 3 M€). Primary objective: to improve career perspectives of early-stage researchers in both public and private sectors. Secondary objective: to foster collaboration between participating laboratories, in which fellows will take part through individual training-through-research projects.

### Weaknesses and threats related to the context

Teams missing a statistician-data manager, an animal care engineer.

Various key positions are covered by temporary contracts. The loss of these important and useful elements would be a major threat for the unit efficacy.

The 7 cohorts of osteoporotic patients are mostly dependent on the leader of team 1.

In addition to publications in specialized journals, some key papers in prestigious general journals are missing.

External fundings are too industry-dependent.

Mostly internal recruitment of collaborators.

Lack of a future identified deputy leader in each team.

### Recommendations

A data-manager-statistician should complete the team. A part time collaborator with an affiliation to an university biostatistician group would be a good option.

A deputy team leader should be identified for each team.

An unit director should be identified for the next mandate.

A diversification of non-institutional funding to become less dependent on industry should be a priority.