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## LAI - Adhésion et inflammation

Rapport Hcéres

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# HCERES

High Council for the Evaluation of Research  
and Higher Education

Department of Research Evaluation

HCERES report on the interdisciplinary  
research unit:

Adhesion & Inflammation Lab

LAI

Under the supervision of  
the following institutions  
and research bodies:

Aix-Marseille Université

Centre National de la Recherche Scientifique - CNRS

Institut National de la Santé Et de la Recherche

Médicale - INSERM

Evaluation Campaign 2016-2017 (Group C)

# HCERES

High Council for the Evaluation of Research  
and Higher Education

Department of Research Evaluation

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

Michel Cosnard, president

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

Ana-Sunčana Smith, chairwoman 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 sole result of evaluation by the expert committee, the composition of which is specified below.

The assessments contained herein are the expression of an independent and collegial reviewing by the committee.

Unit name:	Adhesion & Inflammation Lab
Unit acronym:	LAI
Unit number:	AMU UM61 / CNRS UMR 7333 / INSERM U1067
Name of Director (2016-2017):	Mr Olivier THEODOLY
Name of Project Leader (2018-2022):	Mr Olivier THEODOLY

## Expert committee members

Chair:	Ms Ana-Sunčana SMITH, Friedrich Alexander University Erlangen-Nürnberg, Germany
Experts:	Mr Didier CHATENAY, Pierre and Marie Curie University, Paris (representative of the CNU) Mr Loïc DUPRÉ, Paul Sabatier University, Toulouse Ms Maria Carla PARRINI, Curie Institute, Paris (representative of supporting personnel) Mr Martin PASCAL, Curie Institute, Paris (representative of the CoNRS) Ms Claire THIBAULT, Pierre and Marie Curie University, Paris (representative of the CSS INSERM)

### Scientific delegate representing the HCERES:

Mr Kamel BENLAGHA

### Representatives of supervising institutions and bodies:

Mr Pierre CHIAPETTA, AMU

Mr Niels KELLER, CNRS

Mr Dominique NOBILE, INSERM

### Representative of Doctoral School:

Mr Conrad BECKER, ED n° 352, « Physique et Sciences de la Matière »

## 1 • Introduction

### History and geographical location of the unit

The Adhesion & Inflammation Lab (Laboratoire Adhésion & Inflammation) LAI, was established in 1994 within the Sainte-Marguerite Hospital at Marseille. One year after its accreditation with CNRS in 2004, the main part of the unit moved the Luminy Campus which enabled immersion of the laboratory into the most stimulating research environment in Marseille. Nonetheless, the laboratory maintained a smaller research endeavour at the hospital “La Conception”, to support activities related to translational medicine.

### Management team

Mr Olivier THEODOLY was entrusted with the leadership of the unit at the time of Mr Pierre BONGRAND’s retirement and is still for the next 5 years. He is assisted by Mr Philippe ROBERT as vice-director.

### Scientific domains

The unit develops and applies quantitative approaches to tackle problems related to cell adhesion and the immune response. The main focus of LAI research is quantitative measurement of the adaptive immune response on a wide range of scales associated with this process, from molecular interactions at surfaces, over the behaviour of single lymphocytes during activation, migration and recruitment, to remodelling of pulmonary epithelium and endothelium in mice models and human patient samples during infection.

## Unit workforce

Unit workforce	Number on 30/06/2016	Number on 01/01/2018
N1: Permanent professors and similar positions	5	2
N2: Permanent researchers from Institutions and similar positions	4	4
N3: Other permanent staff (technicians and administrative personnel)	4	3
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	2	
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	0	
N6: Other contractual staff (technicians and administrative personnel)	0	
N7: PhD students	6	
<b>TOTAL N1 to N7</b>	<b>21</b>	
Qualified research supervisors (HDR) or similar positions	6	

Unit record	From 01/01/2010 to 30/06/2016
PhD theses defended	6
Postdoctoral scientists having spent at least 12 months in the unit	7
Number of Research Supervisor Qualifications (HDR) obtained during the period	0

## 2 • Overall assessment of the interdisciplinary unit

LAI is presented as a “pluridisciplinary” laboratory involving physicists, biologists, and medical doctors. LAI is located at the Luminy Campus and the Hospital La Conception corresponding to the scientific and the medical activities. LAI maintains a relatively small size, single team, which facilitates management and favours interactions between its components.

As such the main strength of this unit is to develop new approaches that allow quantitative analysis over a wide range of scales associated with key events in the adaptive immune response. Its interdisciplinary nature allows LAI to gather a spectrum of approaches around this theme both from the conceptual (in vivo/in vitro, animal models/human patients, tissue/single cell, etc.) and technical (surface patterning, microfluidics, flow chamber, AFM, optical tweezers, etc.) points of view.

Over the last period, however, LAI has undergone significant structural modifications, including the change in leadership. The transition, during which the unit managed to maintain the scientific output and reputation acquired over the last 20 years, seems to be successfully completed. Nonetheless, due to recent personal turn-over of members associated with the hospital, new recruitments of permanent staff will be necessary. It will be therefore crucial to identify medical and scientific staff that can join LAI and support its ambitious research plan. Despite these changes, today, LAI presents itself as a coherent group of academics performing excellent research in an environment cherishing fundamental principles of scientific diligence.

The competitiveness of LAI on the national and international level is demonstrated by a strong track record, particularly in the last period. Notably, this includes 64 papers, out of which 23 are interdisciplinary, and some were published in the most prestigious journals including *Nature*, *Nature Communications*, *Physical Review Letters*, *Nanoletters*, and *Proceedings of the National Academy of Sciences of U.S.A.* Furthermore, LAI produced 82 clinical reports and submitted 3 patents.

LAI has a long standing reputation in method development. This activity was successfully continued in the last quintal with the advancement of methodological approaches associated with flow chambers, microfluidics, optics, and micropatterning. Members of the unit contributed to conceptual understanding of fundamental biophysics processes (ligand-receptor recognition and response to force), and applied this understanding in the biological (lymphocyte adhesion, recruitment and activation) and translational setting (immunology, and response to selected diseases).

LAI’s connection with the hospital also provides unique opportunities to develop interactions with clinics. It is therefore not surprising that the last period saw strengthening of the technological transfer with several procedures now becoming part of regular diagnostic procedures in the clinic, particularly in the context of autoimmune diseases, and immune defects. Development of therapeutic assays for the respiratory distress syndrome, multiple sclerosis, as well as the construction of rapid antibiogramms is ongoing.

Its interdisciplinary nature makes LAI particularly suitable for networking. Hence, LAI is an integral part of then “Laboratoire d’Excellence” (LabEx) INFORM -and contributes to the CENTURI institutes convergence, which aims to structure multidisciplinary approaches to life sciences. The unit was making a conscious effort to increase its visibility, for example by organising several meetings. These efforts should bring fruit in the next period, when one should expect the participation of LAI in the European networks, and stronger presence on the international conferences.

Another strong point of LAI is its training program. The positive attitudes of the new leadership are well translated to the young investigators who clearly prosper by working in this unit. Currently, 12 are members of the group are master’s or PhD students or postdoctoral researchers. During the last period, 6 students completed a 3-year PhD program with a remarkable output, and secure career options upon leaving the unit. LAI is obviously committed to transferring the know-how and its interdisciplinary scientific attitude as evidenced by a number of courses delivered by its PIs.

In the new funding period LAI must focus on consolidating its research capacities, focusing its scientific directions, and strengthening involvement in the medical applications. LAI will need to make strong effort to convey the emerging new spirit to the community, both locally and internationally. Based on a progressive recruitment policy, a strategy to maintain this unique multidisciplinary unit and its critical mass of deserving researchers will need to be implemented. These key challenges in will need to be surpassed in order to maintain the specificity of this small but progressive unit. Still the scientific quality and the enthusiasm of the members of LAI place them in an excellent position to face these challenges and find the right solutions and secure the long term sustainability of LAI.