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# MiHAR - Microbiotes, hôtes, antibiotiques et résistances bactériennes

Rapport Hcéres

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# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

HCERES report on research unit:

Microbiotas, Hosts, Antibiotics and Bacterial  
Resistances

MiHAR

Under the supervision of  
the following institutions  
and research bodies:

Université de Nantes

# HCERES

High Council for the Evaluation of Research  
and Higher Education

Research units

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

Michel Cosnard, president

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

Benoit Guery, chairman of the committee

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Under the decree N°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:** Microbiotas, Hosts, Antibiotics and Bacterial Resistances

**Unit acronym:** MIHAR

**Label requested:** EA

**Current number:**

**Name of Director  
(2015-2016):**

**Name of Project Leaders  
(2017-2021):** Mr Eric BATARD & Mr Didier PELLETIER

## Expert committee members

**Chair:** Mr Benoit GUERY, Université de Lille

**Experts:** Mr Antoine ANDREMONT, Hôpital Bichat Claude Bernard, Paris  
Mr Ferhat MEZIANI, Université de Strasbourg, Strasbourg

**Scientific delegate representing the HCERES:**  
Ms Catherine SCHUSTER

**Representatives of supervising institutions and bodies:**  
Mr Frédéric BEN HAMOU, Université de Nantes  
Ms Brigitte DRENO, Université de Nantes

**Head of Doctoral School:**  
Ms Corinne MIRAL, Doctoral School ED n°502, "Biologie-Santé".

## 1 • Introduction

### History and geographical location of the unit

The MiHAR team is part of the unit “Thérapeutiques cliniques et expérimentales des infections” (EA3826) headed by Mr Gilles PÔTEL which plans to split into two separate units: MiHAR as a new unit and EA 3826. MiHAR is located at the same place than the EA3826 on the 4<sup>th</sup> floor of the Faculty of Medicine. The group will move in 2016 in the new “Institut de Recherche en Santé” (IRS-2) on the Nantes Island.

### Management team

The MiHAR team intends to work in a new separate unit that will be headed by Mr Eric BATARD and Mr Didier PELLETIER.

### HCERES nomenclature

SVE1-LS6

### Scientific domains

The scientific domain of MiHAR is the relationship between microbiota, the hosts (human and animals), the antibiotics and the consequences on antimicrobial resistance. The unit will focus on the relationship between digestive tract microbiota and enterobacteria resistance to cephalosporins, penems and quinolones.

## Unit workforce

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	4 (2 FTE)	7 (3.5 FTE)
N2: Permanent researchers from Institutions and similar positions		
N3: Other permanent staff (technicians and administrative personnel)		5 (1.1 FTE)
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)		
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)		
N6: Other contractual staff (technicians and administrative personnel)		
N7: PhD students	1 (0.5 FTE)	
TOTAL N1 to N7	5 (2.5 FTE)	
Qualified research supervisors (HDR) or similar positions	4	

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	1
Postdoctoral scientists having spent at least 12 months in the unit	
Number of Research Supervisor Qualifications (HDR) obtained during the period	2

## 2 • Overall assessment of the unit

## Introduction

The MiHAR group results from the split of the EA3826 in two teams. MiHAR recently became independent and choosed to focus on antibiotic resistance and microbiota. Between 2010 and 2015, the research activities have been divided in two, epidemiological analysis of microbial resistance and training and acquisition of techniques designed to perform microbiota analysis. For the next contract, the initial team members will be joined by researchers from Nantes and Angers in order to build a motivated group working on microbiota, host, antibiotics and microbial resistance. The report is globally heterogenous reflecting the "in progress" phase of the unit.

### Global assessment of the unit

MiHAR itself does not exist *per se* and cannot be evaluated as an entity. The data presented to the committee reflect the individual activity of each team partner, providing the committee a good perspective of their potential complementarities that may become a strength in the future. The former research network, represented by the unit members, focused on 5 main themes. The first one is the epidemiological surveillance of enterobacteria resistance to beta-lactams and fluoroquinolones: this is mainly a hospital-based study. The second one is the analysis of antibiotics prescription and consumption. In a third theme, the group explored the relationship between antibiotic, host and bacterial resistance, and the group successfully generated a pharmaco-epidemiological approach from the raw data, with potential consequences in the clinical management of antibiotic therapy. The 4<sup>th</sup> topic is based on the analysis of the gut microbiota: a member of the team was trained in Minneapolis to learn the techniques that could be implemented in Nantes. Finally, the group studied the modulation of the interactions between microbiota/host and antibiotics: this last topic aims at exploring the relationship between antibiotic duration and resistance generation.

The individual assessment of each of these themes shows potential to build a new team. The MiHAR unit proposes to study the interactions between host and microbiota and the consequences on resistance after antibiotic treatment. Their goal is to modulate these interactions, to control the resistance and propose therapeutic strategies. As an ultimate goal of their project, the group proposes to optimise the antibiotic treatment based on personalized microbiota analysis.

The committee feels that it is too early to create an individualized entity; the MiHAR group is not yet completely mature.

### Strengths and opportunities in the context

The MiHAR group associates a large number of people with many complementary expertises, who take part in potent local and national networks (involvement in nine national multicentric studies). Antibiotic resistance is currently a major problem at the national and international levels. Therefore, national societies and the French high authority for health (HAS) provided clear recommendations to fight antibiotic resistance and promote antibiotic good use and stewardship. The goals of MiHAR therefore perfectly match with the national objectives.

### Weaknesses and threats in the context

The MiHAR unit is very young and has not yet the experience to work and publish as an entity. By analysing the project, the committee noted several major limitations. The first goal seems feasible, but the link between the epidemiological data obtained and the goal of the group was not clearly described.

Concerning the analysis of the microbiota and the optimisation proposed, the amount of data to be generated along with several different potential conditions (various types of colonization, relative quantity of resistant pathogens...) seems rather ambitious and needs to be restricted. Another limitation is the microbiota analysis itself, with such a very limited specific staff (lack of biostatisticians) in the context of a serious international competition.

The need of animal models and the basic research project were not detailed. Moreover, the relevance of the use of animal models was not convincing.

Looking at the structure, the MiHAR group just emerged from the EA3826. The group has neither technical staff, nor full time researcher. This hampers the feasibility of the project in regard of the schedule. Finally, the project has not yet got any funding.

### Recommendations

The committee recommends having a more specific, detailed and focused project in the context of a hot topic (relationship between microbiota, antibiotic treatment and infection occurrence) and proposing a detailed program for the recruitment of the manpower and expertise requested to achieve the project (Biostatistician, Microbiologist, Lab technicians).

Since some unit members are located at a 100 km distant laboratory, a weekly meeting (at least by videoconference) and a single database gathering all documents from the unit should be implemented.